7th Km N.R. Arta-Agrinio • 47040 Arta
Tel.: +30 26810 70988, 66120 & 66018 • Fax: +30 26810 65935
www.uplift.gr • e-mail: info@uplift.gr

USER'S MANUAL
HYDRAULIC INVERTER ELEVATOR

EDITION: 01
DATE:15/05/2012
APPROVAL: TECHNICAL SERVICE

TABLE OF CONTENTS

1. GENERAL INFORMATION BEFORE INSTALLATION

1.1 INTRODUCTION

The assembly, installation starts and the maintenance of the hydraulic elevator should be performed only by qualified staff. Before starting any operation in hydraulic components, the trained staff should read these instructions carefully and especially chapters 1.3 “Safety measures” and 1.4 “Warnings about operation mode”. These “operation instructions” are an integral part of the installation, and they should be kept in a place that is both safe and easily accessible.

1.2 RESPONSIBILITIES AND WARRANTIES

These instructions are intended for staff specialized in installation, adjustment and maintenance of hydraulic elevators.

Uplift assumes no responsibility for any damage resulted from different use than that it was explained or from lack of experience, from carelessness of people in charge of the assembly and from repair tasks of the hydraulic components.

If components or parts different from those indicated have been installed and if any modification or repair task has been performed by unauthorized workshop or unskilled workers, the warranty from UPlift is no longer valid.

1.3 SAFETY MEASURES

The facilities and the maintenance staff are fully responsible for their safety at work. All safety measures should be followed carefully in order to avoid any damage or accident of the skilled or unskilled staff or subjects during installation or maintenance tasks. These instructions concern signs corresponding to important safety measures.

DANGER: This sign draws attention to an increased risk of injury. It should always be respected.


WARNING: This sign draws attention to the information which, if disregarded, may harm people or cause extensive material damage. It should always be respected.


ATTENTION: This sign draws attention to the information containing important use instructions. Failure to comply with these instructions may lead to damage or danger.

1.4 WARNING OF OPERATION MODE

With this manual, follow the most important principles which should always be respected during hydraulic installations tasks. These principles will not arise again in the following chapters, because they are already known.

1.4.1 WORKPLACE SAFETY


The lack of observation or attention to simple safety rules may result even in serious incidents. In case of hydraulic installation tasks, it is necessary that/to:

- The elevator should be at the base directly to buffer.
- Block the main switch to make sure that the elevator will not be in operation by mistake.
- Turn the oil pressure to zero before opening any part of the hydraulic circuit, of the covers or before unscrewing any part.
- Prevent oil, rod and gasket as well as any rubber part of installation from being in contact with the ash during welding tasks.

- Make sure that there is no spilled oil or oil leakage and that the installation is always maintained in a clean condition so that any leakage can be easily identified.

1.4.2 CLEANING

The ash and the dust inside the hydraulic installation can cause malfunction and premature wear. Before integration, it is necessary to clean carefully the various parts:

- All possible protection covers, plastic bags and tapes used in the package should be removed.
- If the connecting pipes are flexible or made from steel, they must be cleaned inside. The steel pipes especially must be cleaned inside and remove any ash from their edges. A pipe bender and not a flame must be used in order to bend the steel pipe.
- Before oil infusion into the tank (cauldron) of the pump, make sure that it is clean and there is no water inside.
- Always use a good filter in order to drop oil or to add it in the tank (cauldron).
- In order to clean the pipes and the pump, do not use fretted clothes or steel wool.
- The head of the cylinder (piston) and all the components made from plastic or caoutchouc should be protected if they are around any colour, concrete or welding machine.
- All the installation components which have been dismantled in order to be tested or repaired, as well as the sealing surfaces, the pipes and the components should be cleaned very carefully before putting back together.

1.4.3 INSTALLATION

For the installation or the replacement of hydraulic components, the following points should be respected:

- Use only materials indicated by Uplift (especially hydraulic oil) and the original parts of Uplift.
- Avoid the use of sealing compounds, such as silicone, gypsum or hemp that can leach into the hydraulic circuit.
- In the case that the pipes have been bought directly from the market, choose only those corresponding to the safety measures and according to installation pressure. Note that the steel pipe is used only to connect the pump with the piston and may increase or transmit the noise.
- Install the flexible pipes with the correct bend radius as indicated by the manufacturers and avoid the pipes that are longer than necessary.

1.4.4 MAINTENANCE

During maintenance tasks except from normal tests, you should bear in mind that:

- The damaged pipes should be replaced immediately.
- Find the oil leakage and its causes.
- The oil that might have been spilled should be cleaned so that the leakage can be easily located.
- Make sure that there is not unusual and excessive noise inside pump, motor or suspensions.

1.4.5 ANTI-POLLUTION MEASURES

In case of oil spill from the circuit during repair tasks, this oil should not be spread around but be collected immediately using a cloth or sponge and put carefully in suitable containers. In case of oil replacement, the used oil must be put too in suitable containers. For the used oil and the clothes containing oil, please contact the specializing companies, according to the regulations of the country of the elevator's operation.
As for the regulations against water pollution (see underground facilities acting directly with large quantity of oil). Act in accordance with national rules.

1.5 CONTROL OF SUPPLIES

If a material withdrew before signing the delivery document of the consignor, make sure that the goods correspond to the inventory referred to the delivery document and to the order.

1.6 RATING PLATES

The main components have their own plates including all the data necessary for their identification.

- Piston: sticker on piston crown.
- Rupture valve: plate fix on the side of valve.
- Pump: plate fix on the lid of the tank.
- Flexible pipe: date of test, test pressure and name of the manufacturer engraved.

1.7 CHARACTERISTICS OF MECHANICAL AREA

Before installation:

- Make sure that the chamber, the depth of chamber, the height of last stop and the mechanical area correspond to the needs of the project and comply with the regulations.
- Make sure that the various components to install should be accessible.
- Make sure that the bottom of the chamber is clean, dry and impermeable.
- Make sure that the chamber is efficiently ventilated and illuminated.
- Make sure that the mechanical area has a door opening outwards, if possible silent and well-ventilated, at a recommended temperature between 5^0 and 30^0 C.

2. TRANSFER AND STORAGE

2.1 GENERAL INFORMATION

As for the transfer and the storage of the hydraulic components, the following safety rules should be respected:

 For the lifting of loads, use only suitable winches and their maximum capacity.

Never walk or stop under a suspended load.

 You should avoid the vibrations of hydraulic components.

- If the hydraulic components should be stored, check first if the package is in perfect condition. If necessary, repair or replace them with other more suitable.

- Store the hydraulic components in a dry place, without dust and at a temperature between 5^0 and 30^0 C.
- If pistons or pump should be stored for a long time, it would be better for their preservation if you fill them with oil.

2.2 PUMPS

Pumps are protected by a thermal contraction plastic cover and a plastic tape. The pump can be packaged in a hard carton or wooden box, at customer's request.

TRANSFER OF PUMPS

- Load and unload a pump using clarks. If a pump should be lifted with ropes, pass them under the handles.
- Pumps should not be placed one above the other, unless they are packaged in a specially designed wooden box.

STORAGE OF PUMPS

- Store the pumps in a dry place at a temperature between 5^0 and 30^0 C.
- Check the protective wrapping and replace it, if necessary.
- When pumps should be stored for a long time, it is better to fill the tank at least with oil.

2.3 INVERTER

INVERTER is delivered in a cardboard carton.

STORAGE OF INVERTER

- Store INVERTER in a dry place at a temperature between 5^0 and 30^0 C.
- Check the protective wrapping and replace it, if necessary.

2.4 FLEXIBLE PIPES AND RIGID PIPES

TRANSFER OF PIPES

- Avoid the bending of flexible pipes.
- Protect the flexible pipes from contact with caustic substances, solvents or other chemicals.
- Transfer the flexible pipes in the original package.
- Avoid any bend of rigid pipes.
- Transfer rigid pipes with their lids.

STORAGE OF PIPES

- Store the pipes in a dry place at a temperature between 5^0 and 30^0 C.
- Protect the flexible pipes from direct sunlight or from heat source.
- Do not store flexible pipes for more than 2 years from the date of testing indicated in fitting.

3. ELECTRICAL CONNECTIONS

3.1 GENERAL REGULATIONS

Every electrical connection should be performed by trained and qualified staff, according to specific regulations.

 Before starting any task, always turn off the power.

 The power supply cables should have the requested power. The isolation of cables should be in accordance with electrical grid voltage. The connecting cables should not be in contact with hot surfaces.

 The ground wire shoud be always connected to bolt having the relevant sign.

3.2 JUNCTION BOX

The junction box is in the cover of the pump, near to valve block.

- The box of the pump consists of (see Illustration No 1):

  a) – Terminal block of electric motor.

  b) – Ground bolt.

  c)– Thermostat for oil temperature at 70^0 C.

  d) – Thermistor motor at 110^0 C.

  e) – Thermistor that recognizes oil temperature.

- The box of the pump with pre-wiring (optional) consists of:

  a) – Terminal block of electric motor

  b) – Ground bolt

  c) – Terminals of thermostat for oil cooling (optional)

  d) – Terminals of maximum pressure switch (optional)

  e) – Terminals of minimum pressure switch (optional)

  f) – Terminals of RGK coil

  g) – Terminals of RGE coil

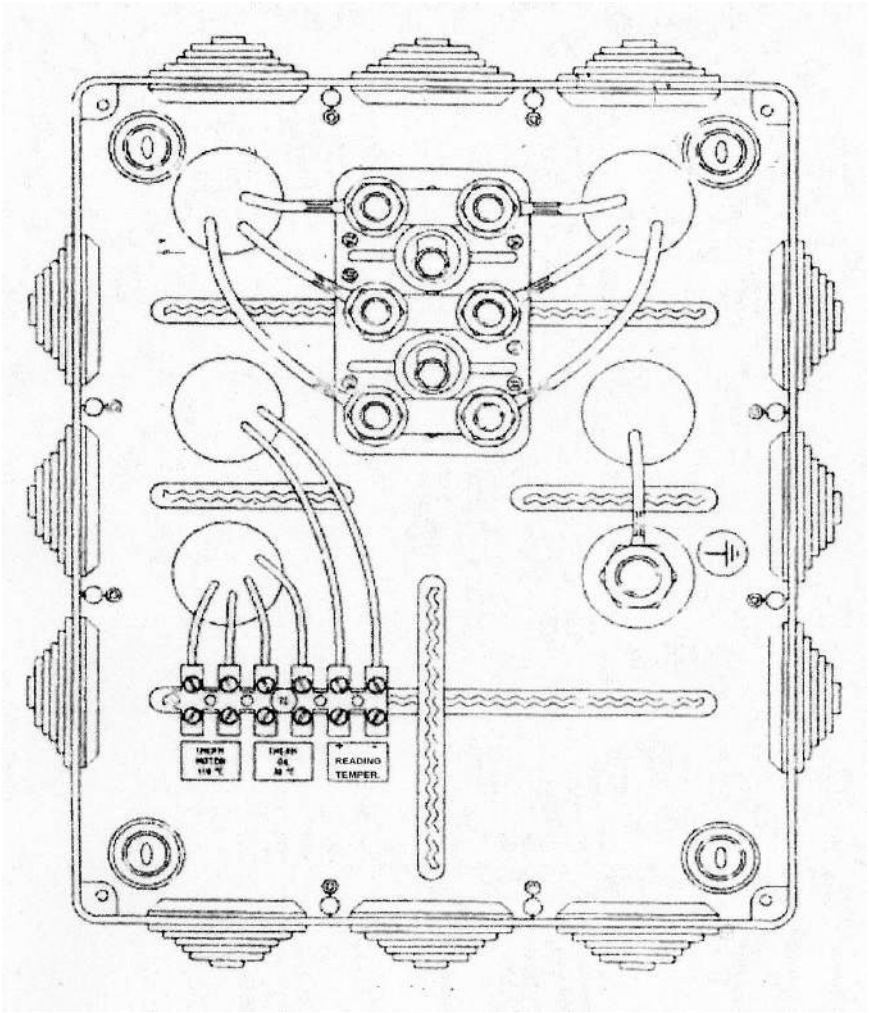
  h) – Terminals of thermistor motor at 110^0 C.

  I) – Terminals of oil thermostat at 70^0 C.

  j) – Terminals of overload pressure switch (optional)

  k) – Terminals of thermistor that recognizes oil temperature.

Illustration No 1: JUNCTION BOX FOR PATTERN PUMP UNIT



3.3 ELECTRICAL CONNECTION OF THE 3-PHASE MOTOR

Motor terminals have already been placed at the terminal block inside the junction box.

- In case the motor starts immediately, the frequency and one of the motor voltages should correspond to the network's frequency and voltage.

Connection zones at the terminal block should follow the diagram found on the motor rating plate or follow the instructions of the table (see Illustration No 2).

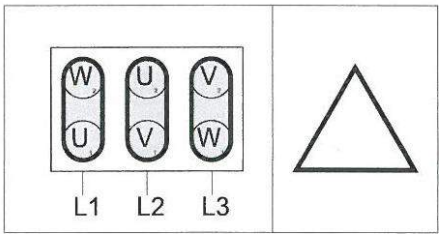
ARRANGEMENT OF CONNECTION ZONES FOR 3-PHASE MOTORS

IMMEDIATE START-UP

Power 230V – Motor 230/400

Power 400V – Motor 400/690

Power 415V – Motor 415/720



Power 400V – Motor 230/400

Power 690V – Motor 400/690

Power 720V – Motor 415/720

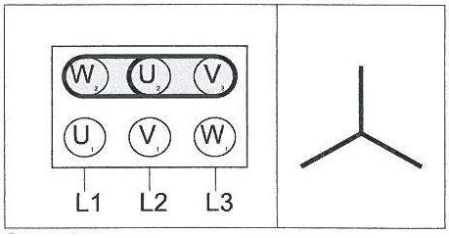


Illustration No 2 ELECTRICAL CONNECTION OF 3-PHASE MOTOR

3.4 THERMISTOR PROTECTION

The motors come with their thermistor at 110^0 C. Thermistors are wire wound when inserted, one for each phase and are serially connected.
They have very low resistance below 110^0 C, but their resistance rises rapidly when one or all of their windings reach 110^0 C.

To protect the motor, thermistors should be connected to an appropriate relay, sensitive to resistance variations.

Warning: Thermistors should not be subjected to a voltage higher than 2,5 V.

When properly connected, thermistors protect motor from the overheating of windings.

Overheating could be caused by:

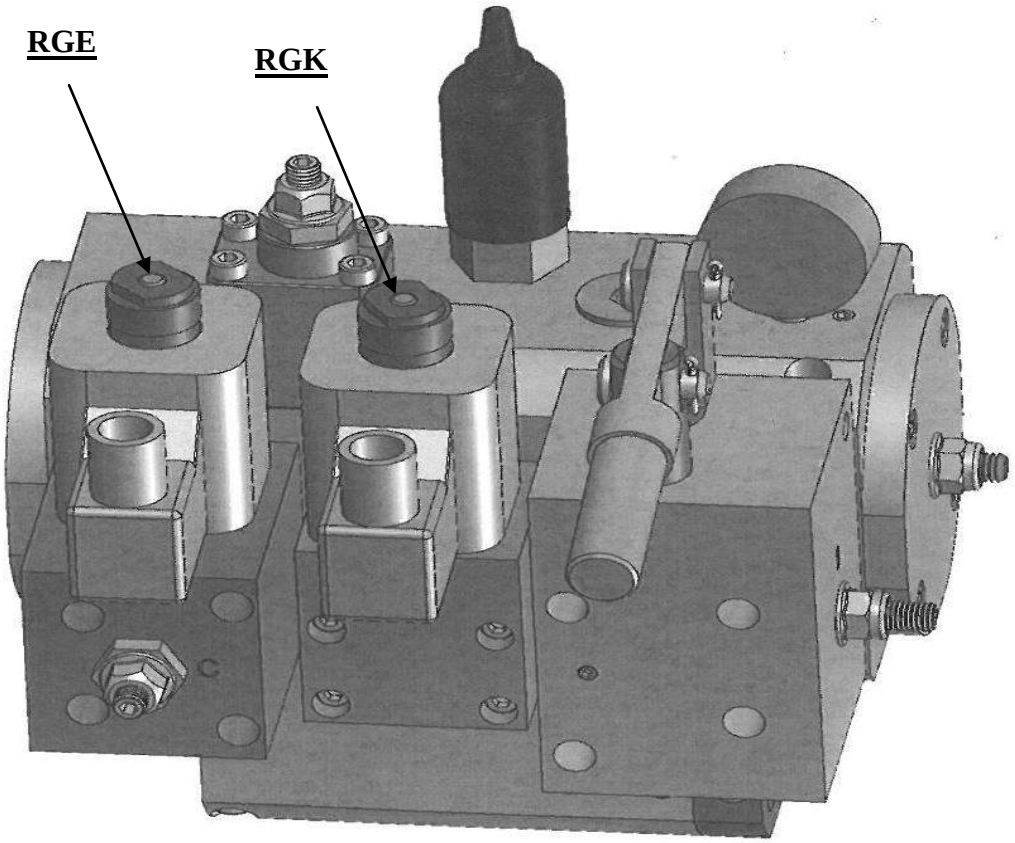
- One of power supply phases is missing
- Overuse
- Voltage variations
- Extremely high oil temperature

3.5 ELECTRICAL CONNECTION OF VALVE UNIT

RG.10 valve (see Illustration No 3) includes the following electro-valves:

- RGK = electro-valve of down direction
- RGE = emergency electro-valve of down direction
- THE RGK ELECTRO-VALVE regulates down direction. This valve should move only during down direction throughout the whole rail.
- THE RGE ELECTRO-VALVE E is used for emergency down direction. When the coil is energized, the hydraulic valve allows the elevator car to move slowly downwards.

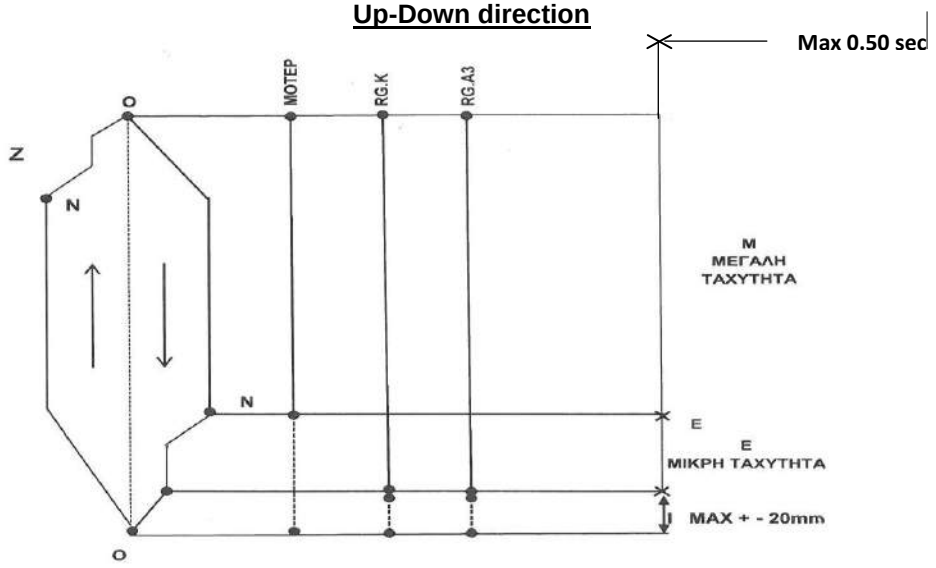
Illustration No 3 RG.10 Valve



3.6 INSTALLATION OF SHAFT SWITCHES FOR DECELERATION OF DISTANCE

Illustration No 4 Operation Diagram RG.A Up – Down direction

Operation Diagram of RG.A
Up-Down direction



I : Final leveling movement (soft stop).

E: Low speed of down direction.

M: High speed.

RG.K: Central down direction valve.

RG.A3: A3/2009 safety valve.

O: Floor level.

N: Transition point from high speed to low speed.

Z : Low speed of up direction.

N – Change in speed before stopping (20-30 mm) (soft stop is controlled by the inverter)

Z – Up direction deceleration distance (shaft switch)

E – Down direction deceleration distance (shaft switch)

In order to achieve smooth deceleration, the connection at MI 1 input of the inverter (high speed) should be opened at a distance from the arrival floor. This distance depends on speed: the greater the distance, the higher the speed of the unit.

 The distance from the MI 1 input from the landing should be calculated according to the following table:

Car speed	RGK Power cut off	
	Up direction distance	Down direction distance
0,40 m/s	0,55 m	0,65 m
0,60 m/s	0,75 m	0,85 m
0,80 m/s	0,95 m	1,05 m

3.7 ELECTRICAL COMPONENTS OF INVERTER UNIT

3.7.1 INTRODUCTION

Uplift uses an inverter with a rotary switch with special software for hydraulic elevators. It controls both the up and down direction.

You can obtain the following advantages:

- Non-existence of maximum peak current values during start-up. The maximum starting current never exceeds the nominal value of the required current.
- Increase of power coefficient cos. f. up to 0.99
- Energy savings
- Optimisation of convenient operation
- Adjustable speed of inspection
- You can set a maximum limit for the power absorbed by the network in order to reduce installed power.

3.7.2 WARNINGS AND PRECAUTIONS

 Read this manual in its entirety before enabling the equipment following procedures step by step. Carefully read the following chapters paying attention to detail: ADJUSTMENT AND ACTIVE ERROR PROCEDURES.

3.7.2.1 WARNING

 Please read the following procedures carefully to avoid any risk of serious accidents.

1 – The leakage current from the Inverter to the earth is higher than 30m A, and thus the current circuit must include a residual-current device with an ID which is not less than 300m A, type B or type A. According to regulations, connection to the earth should be made by a cable which is not shorter than 10mm^2. If the residual-current device must turn off the power switch, do not execute this operation repeatedly, because this could cause a permanent failure in the inverter device.

2 – If the parameters used for the programming of the unit are wrong, the motor can rotate at a higher speed than the synchronized speed. Do not run the motor beyond its pre-set electrical and mechanical limits. The installer is responsible for making sure that the movements created in safety conditions do not surpass the operating limits set.

3 – Electrocution hazard. Enable the inverter only with its installation manual. Never remove the cover during operation. Before any intervention on the equipment, disconnect it from the power supply and wait for a few minutes for the internal capacitors to adjust.

4 – The external braking resistor, if any, gets hotter during operation. Do not install it close to or in contact with inflammable materials. To improve heat release it is a good practice to put the resistor on a metal plate. Ensure proper protection for it and make sure it is not accessible.

5 – The inverter should be supplied with direct current. In case of power failure, wait for at least one minute before re-connecting. EXTREMELY RAPID RE-CONNECTION WITH POWER SUPPLY MAY DAMAGE THE INVERTER.

4. VALVE UNIT AND INVERTER CALIBRATION AND ADJUSTMENT PARAMETERS

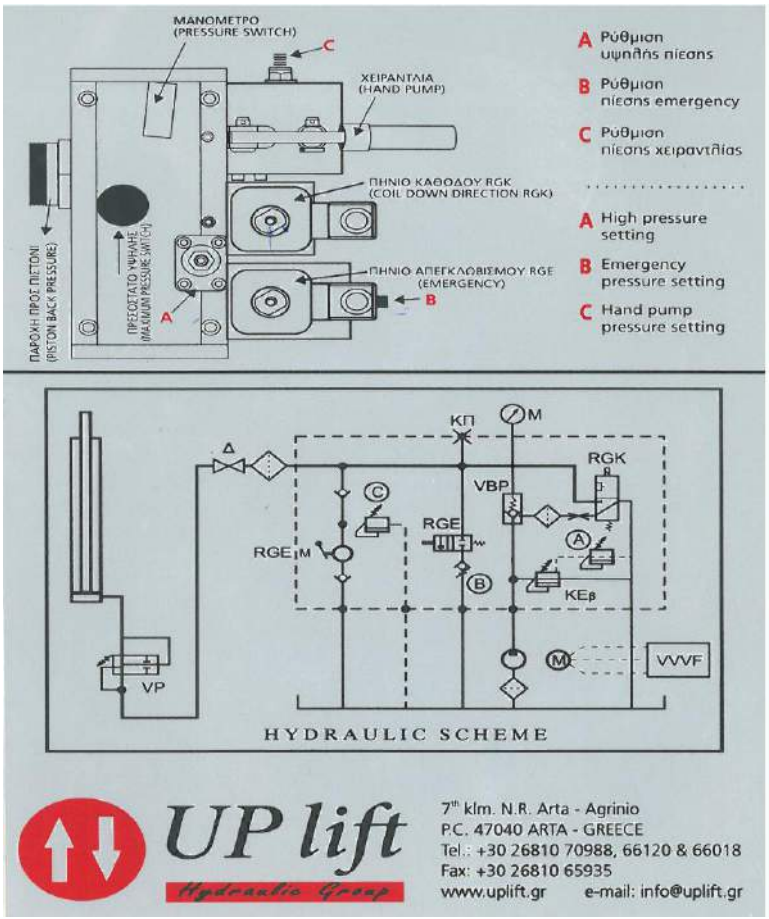
4.1 GENERAL INFORMATION

The valve unit is adjusted and controlled by the factory together with the shut-off valve and the units of motor, pipe and inverter. When the adjustment has been completed, a diagram is prepared; it illustrates the behaviour of the speed during the up and down direction. This diagram is provided with the pipe. The rating plate (see illustration No. 5) is attached to the pipe cover and shows-illustrates the drawing of the valve, all regulation points, the description of electro-valves and the identification data of the installation. In case it is necessary to readjust the valve or the inverter for any reason please check first that:

– All electrical connections have been carried out correctly.

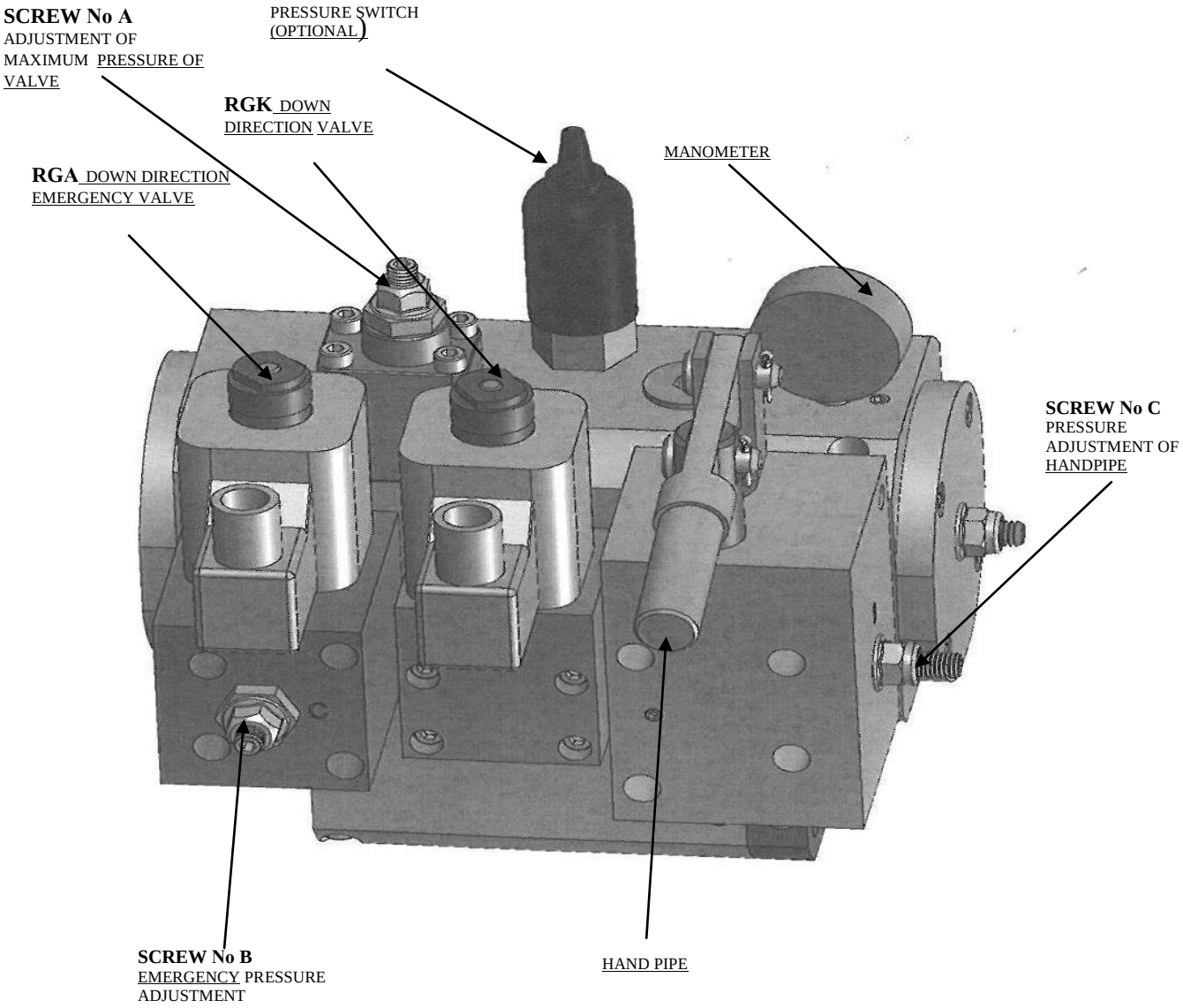
– The type of oil contained in the tank is approved and temperature ranges between 2^0 and 50^0 C.

Illustration No 5 Rating Plate



4.2 ADJUSTMENT AND REGULATION OF VALVE UNIT "**RG10**"

Illustration No 6



SCREW	DESCRIPTION	INSTRUCTIONS
N^{O} A	Valve maximum pressure adjustment	Screw in to increase maximum pressure Unscrew to reduce maximum pressure
N^{O} B	Pressure meter rod and rope anti-loosening calibration device	Screw in to prevent the bar from falling in case of an emergency Unscrew for the rod to fall in case of emergency
N^{O} C	Hand pipe pressure adjustment	Screw in to adjust pressure increase of the hand pipe Unscrew to adjust pressure decrease of the hand pipe

Table 1

4.2.1 VALVE OVERPRESSURE CALIBRATION: SCREW No A

Valve overpressure should be adjusted at a pressure which is 1.4 times that of the maximum static pressure with full load. (Higher values corresponding to maximum 1.7 times are also accepted only if this is taken into account during the project phase). Maximum pressure is achieved only when the piston is at the top-last position or when the main valve line is closed..

- Turn off the shut-off valve from the main line and turn on the pressure switch valve.
- Screw in Screw No A and drain any pressure by means of the manual red emergency button.
- Start-up the motor upwards.
- Screw in Screw No A to reach the highest pressure value you want and stop the motor.
- Drain pressure once again by means of the manual button; enable the motor checking that the manometer shows the adjusted pressure, lock the nut and stop the motor.

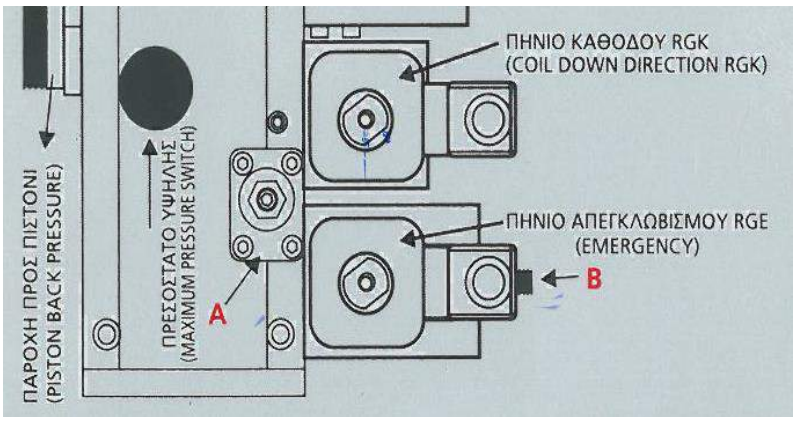
In case given pressure must be reduced, press the button with your hand, unscrew Screw No A and repeat adjustments.

4.2.2 PRESSURE METER ROD AND ANTI-LOOSENING CALIBRATION ROPE : SCREW No.B

In indirect installations enabling the emergency button does not cause ropes to slacken when the car is blocked. Therefore, in the circuit there must be residual pressure over the pressure created by the weight of the rod, the pulley and ropes. This pressure is produced by Screw No B: by screwing in, pressure increases; by unscrewing, it decreases. The value of the pressure meter opposite the down direction of the rod amounts to app. 6/8 bar.

- Adjust the pressure meter as follows (see Illustration No 7):
  - Shut off the main shut-off valve and drain pressure by pressing the manual button. Residual pressure in the manometer corresponds to the pressure meter of the anti-loosening rope.
  - If the pressure value must increase or decrease, screw in or unscrew Screw No B accordingly.
- If the input pressure should be verified:
  - Increase pressure in the circuit by means of the hand pipe.
  - Drain pressure by means of the manual button and read the remaining pressure.
  - If necessary, repeat the forenamed actions until you reach the pressure measurement you want (back-pressure).

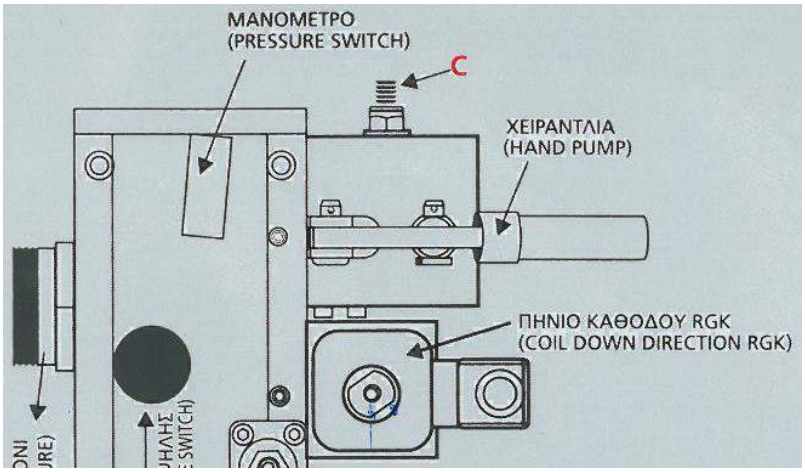
Illustration No 7. Adjustment of back-pressure rod



4.2.3 PRESSURE CALIBRATION OF HAND PIPE: SCREW No. C

The hand pipe has its own safety valve, which must be adapted 2.3 times to maximum static pressure. Adaptation is achieved by means of Screw No C: by screwing in, maximum pressure increases - by unscrewing, it decreases. (See Illustration No. 8). In case there are difficulties in enabling the hand pipe, shut off the main disabling valve, unscrew Screw No B, drain pressure by means of the manual button and enable the hand pipe lever quickly. If necessary, try to fill in the plastic pipe, which gets into the tank, with oil.

Illustration No 8 Pressure adjustment of the hand pipe



- Act on screw No C to adjust the correct pressure and enable the hand pipe lever. Pressure adjustment of the hand pump is the maximum pressure possible and is visible in the manometer.
- Drain pressure by means of the manual emergency button.

4.2.4 CALIBRATION OF PRESSURE SWITCHES (MINIMUM – MAXIMUM PRESSURE - OVERLOAD)

In case a pre-set pressure value has been obtained by means of a pressure switch, an electrical contact, which may change by being turned on and off, is energized. There may be pressure switches with different categories of insulating materials, different levels of accuracy and different hysteresis. The following illustrations show three types of pressure switches and two types of contacts. Intervening pressure is adjusted by means of a housing screw located at the centre of the pressure switch. (See Illustration No 9). If you turn it clockwise, pressure intervention rises; if you turn it anticlockwise it decreases. The pressure switch is connected to a block of valves and immediately sets the pressure line directed towards the piston before the pilot application. Rupture valve RG. 10 is thus not always under pressure.

Adjust the pressure switch as follows:

- Turn off the main shut-off valve
- Drain pressure by means of the manual push-button.
- Move pressure to the value you want by means of the hand pipe
- Connect the tester to the contacts of the pressure switch
- Act on the adjustment screws of the pressure switch until contact exchange has been achieved.

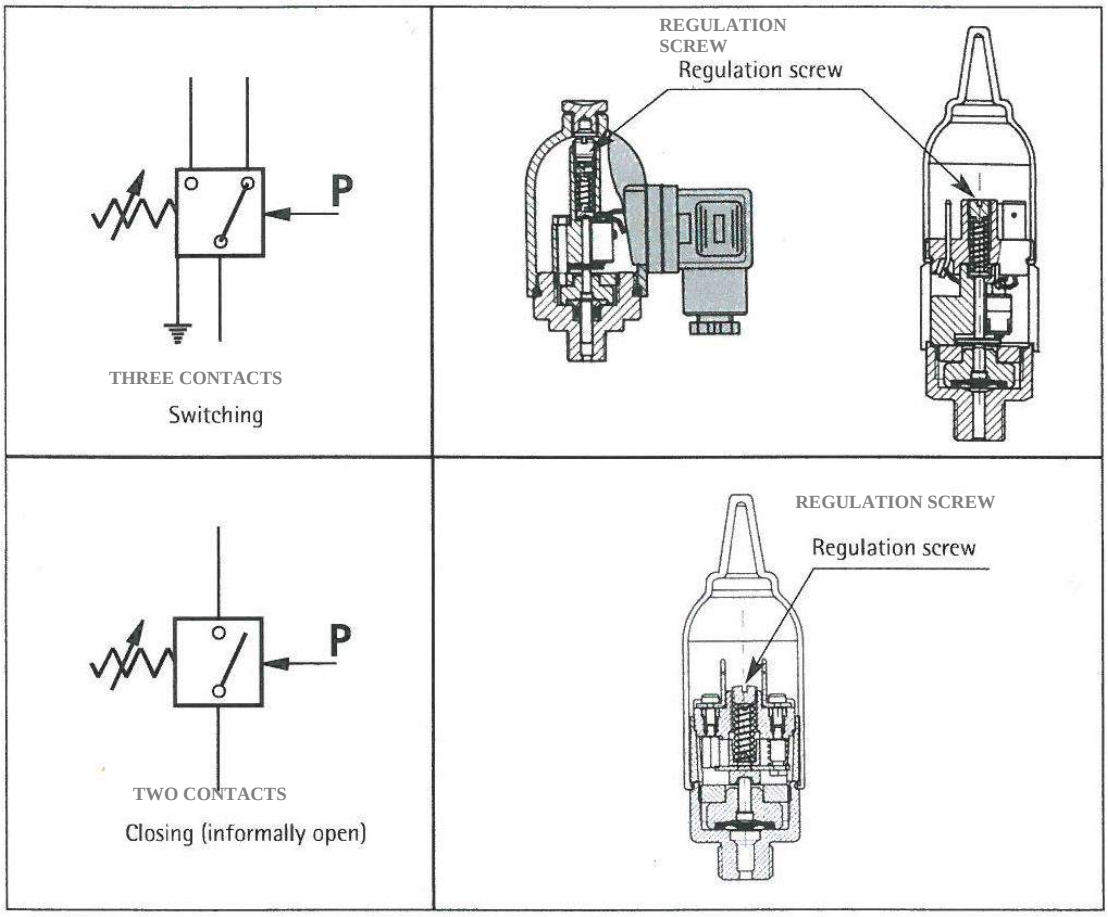


Illustration No 9 High-low pressure switches

5. INVERTER DELTA CONNECTION

5.1 INTRODUCTION

5.1.1 GENERAL INFORMATION

It is a revolutionary hydraulic system for elevators which does not use any throttle valve. It is made up of an inverter that controls oil's flow, which is pumped directly from the VVVF motor both upwards and downwards.

- A performing system thanks to the reduced pressure leaks in the VVVF motor.
- A smart system thanks to full speed control.
- A lighter pump thanks to the new design of mechanical switches.

The INVERTER is a converter operating in an open loop state with special software for hydraulic elevators. The INVERTER runs equally well when it is connected to both new and old hydraulic power units. It is able to control both the up and the down direction, since the hydraulic power unit is intended for this purpose.

INVERTER allows the attainment of the following advantages:

- Non-existence of maximum peak current values during start-up. The maximum starting current never exceeds the nominal value of the required current.

- Increase of power coefficient by introducing parallel capacity: Cos f = 0.98.
- Energy savings.
- Optimisation of convenient operation.
- Emergency rescue operation, possible also in the up direction.
- Adjustable speed of inspection.
- It is not affected by ambient temperature changes.
- It does not increase the temperature of hydraulic fluid.
- Car speed up to 1 m/s.
- Accurate floor approach.
- Flexible operation by means of a hand terminal.
- Overall motion thanks to VVVF motor, which lowers power consumption (kWh) from 20% to 50% and reduces oil heating from 50% to 70%.
- Suitable for high – traffic installations, refrigerants can be avoided.
- Extended range of models, supply of all types upon specific request (> 22 kW).

5.2 WARNINGS & SAFETY PRECAUTIONS

Before connecting the equipment to the power supply, please read this manual thoroughly. Pay particular attention to the ADJUSTMENT PROCEDURE chapter and follow procedures step by step.

5.2.1 SAFETY WARNINGS

To avoid any hazard of a serious accident, follow the procedures below:

- Since the leakage current from the inverter to the grounding is over 30 m A, then the electric power circuit will have to incorporate a leakage current protection device with I_d not below 30 m A, type B or type A. Regulations require that grounding be performed with cables the section of which must not be under 10 mm^2. If the leakage current protection device must be energized by shutting off the main power switch, do not execute this function repeatedly because it may cause permanent damage to the inverter driving mechanism.
- If the parameters used for the programming of the driving mechanism are wrong, then the electrical motor can rotate in a higher speed than the synchronised speed. Do not run the electrical motor beyond its pre-configured electrical and mechanical limitations. The installer is responsible for guaranteeing all movements in safety conditions without exceeding the pre-set operating limits.
- Electrocution hazard. Connect the inverter to the power supply only when the front cover is mounted. NEVER remove the cover during operation. Before executing any operation in the equipment, disconnect it from power supply and wait a few minutes for the internally connected capacitors to discharge.
- If there is an external resistor limiting current flow, it gets hot during operation. Do not install it close to or in contact with inflammable materials. A good practice to improve the loss of heat is to fasten the resistor onto a metal plate. Make sure it is correctly protected and cannot be touched.
- The inverter must be continuously fed by the grid. In case of power failure from the grid, wait for at least one minute before re-connecting. The immediate and quick re-connection of the inverter to the power supply may damage the inverter.
- Do not use the oscilloscope or any other kind of instruments to test the internal circuits of the inverter. This operation must only be performed by a qualified technician.

5.2.2 PRECAUTIONS

To avoid any hazard or failure or damage of the mechanism, carefully follow the advice of this manual.

1. Do not connect the equipment to a voltage higher than the permitted input voltage. Excessive voltage may cause irreparable damage to internal parts.

2. In case of prolonged power failures without power supply, to avoid any damage, follow the instructions below before re-starting the driving mechanism:

– If the inverter remains idle for several months, connect it to the power supply for at least one hour in order to recharge the channel capacitor. 3

– If the inverter remains idle for longer than a year, supply it with power for one hour at a voltage rate 50% below the nominal input voltage and then supply it with the nominal input voltage for one hour.

3. Do not connect capacitors to the inverter outputs.

4. If a protection function of the driving mechanism is enabled for any reason, before correcting the fault, check with absolute certainty what exactly energized the protection circuit.

5. Use an inverter with nominal current equal to or higher than the nominal current of the electrical motor.

6. If it is necessary, the resistor limiting the current flow will have to be connected between B1 and B2. If the resistor is connected between + 2 and + 1, the inverter may be damaged.

5.3 CONNECTION OF THE POWER CIRCUIT

L1 ; L2 ; L3 ;	Alternate current input power	Connect the three phases of the power supply with these 3 terminals in any way
U ; V ; W ;	Inverter output	Connect the 3 output phases to the power relays and afterwards to the electrical motor
B1 , B2	External current flow limiting resistor	Connect the external current flow limiting resistor (if necessary)
⏚	Grounding	Connect to the grounding of the building

5.3.1 SAFETY WARNINGS

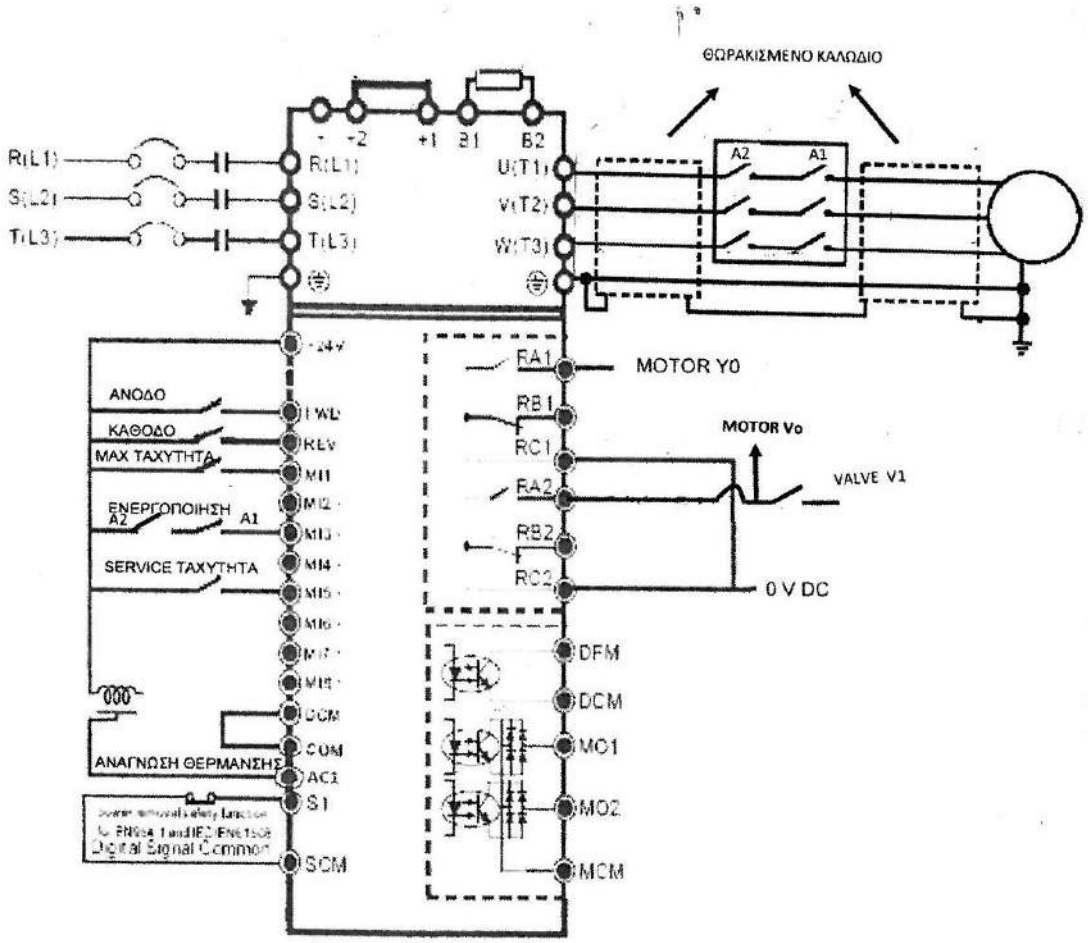
1. Do not connect the inverter to the current without connecting the grounding first.
2. To increase the protection of the inverter (especially against over-voltage of thunderstorms) you can install 3 electrical fast-acting fuses (1 for each phase), in series with the alternate current phase terminals. Fuses must have values in line with the different sizes. You can buy the set of fuses fully equipped with the protection box upon request (fuses are not necessary).
3. To avoid irreparable damage of the inverter, do not connect current flow limiting resistors with resistance or power values below those required by the manufacturer.
4. The driving mechanism of the inverter is connected “up line” compared to the power relays.
5. The external current flow limiting resistor becomes hot during operation. Do not install the current flow limiting resistor close to or in contact with inflammable materials and protect it to minimize direct contact hazard.
6. Wire and connect earth systems according to professional standards to avoid problems of electromagnetic interference.
7. Particular attention is required during electrical connections. If the input and output connected are inverted, the inverter will inevitably be damaged.
8. Make connections following the INPUT-OUTPUT signs according to the original manufacturer's illustrations (see Page 26 & 27).

9. Do not use the signs of the inverter as a power relay because inevitable damage will be caused (use external auxiliary relays).

10. In power supplies use protection wires (screening).

11. Always use an electromagnetic interference current absorption filter. .

5.3.1.1 INVERTER CONNECTION

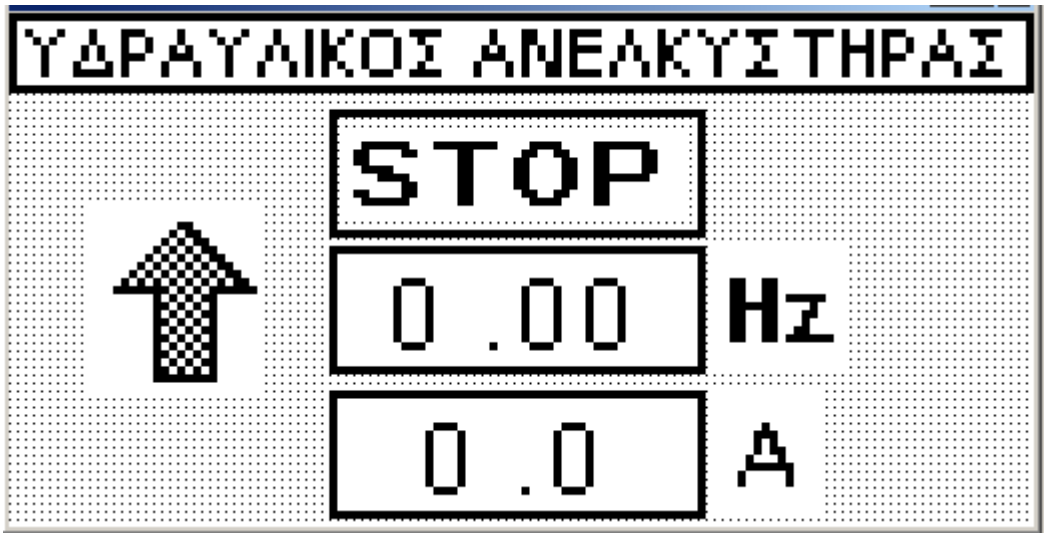


CLEMENS	CABLE	DESCRIPTION
FWD	RED	UP DIRECTION
REV	GREEN	DOWN DIRECTION
MI 1	YELLOW – GREEN	HIGH SPEED
MI 3	YELLOW	ACTIVATION
MI 5	BLUE	SPEED SERVICE
RA 1	GREY	MOTOR
RC 1	PINK - 0VDC	PINK – 0 V DC
RA 2	BROWN	VALVE
RC 2	PINK – 0 V DC	PINK – 0 V DC

5.3.1.2 CONFIGURATIONS OF HYDRAULIC INVERTER ELEVATOR

MANUAL SCREEN

HOME PAGE



ELEVATOR CONFIGURATIONS

Press Shift and F9 to go to Settings.

Go back to Home Page / Previous Page.

Up direction Settings.

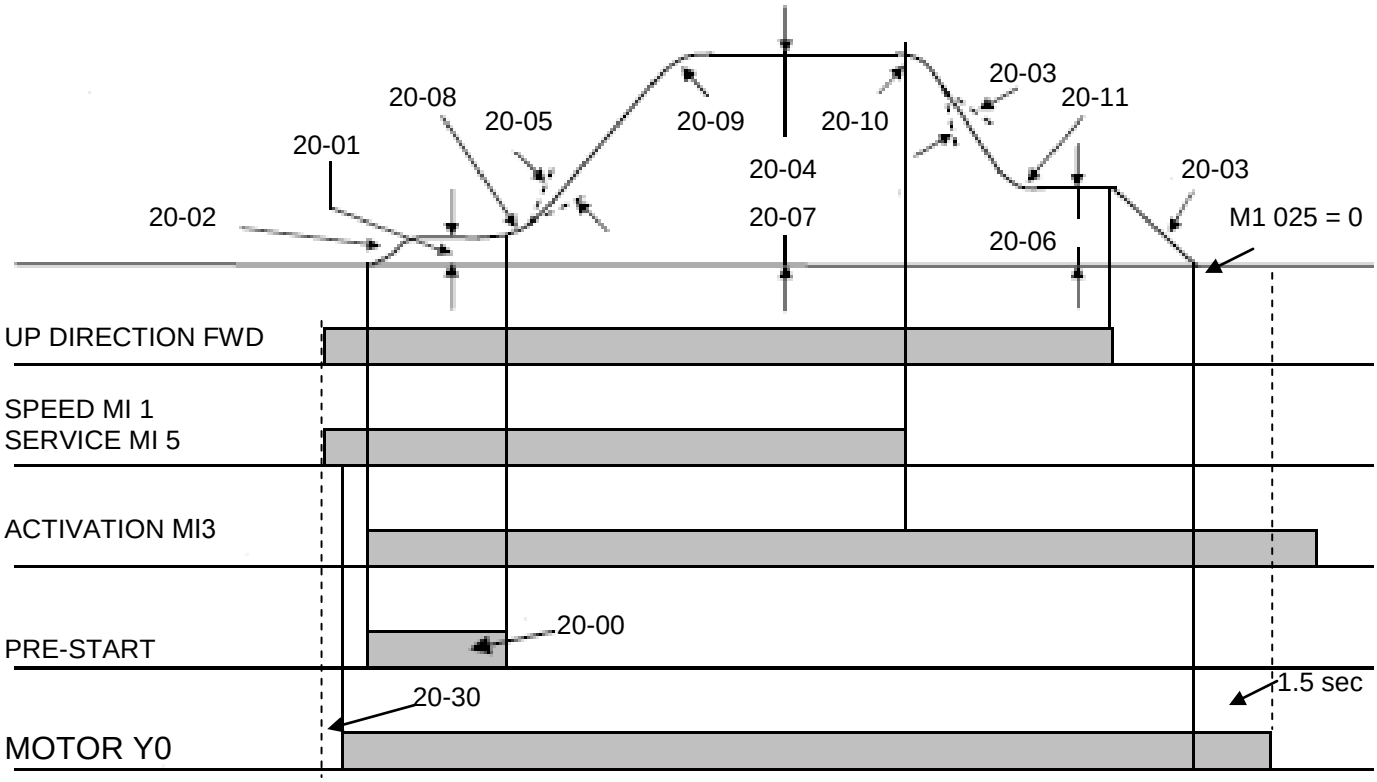
Other configurations.


ΥΔΡΑΥΛΙΚΟΣ ΑΝΕΛΚΥΣΤΗΡΑΣ
ΠΑΡΑΜΕΤΡΟΙ
ΗΛ/ΚΙΝΗΤΗΡΑ / ΒΑΛΒΙΔΑ


ΥΔΡΑΥΛΙΚΟΣ ΑΝΕΛΚΥΣΤΗΡΑΣ
ΠΑΡΑΜΕΤΡΟΙ
ΕΛΕΓΧΟΥ ΥΔΡΑΥΛΙΚΩΝ

In order to change a configuration, press F0 and change the value using the arrow keys or entering the number.

CONFIGURATIONS OF UP DIRECTION



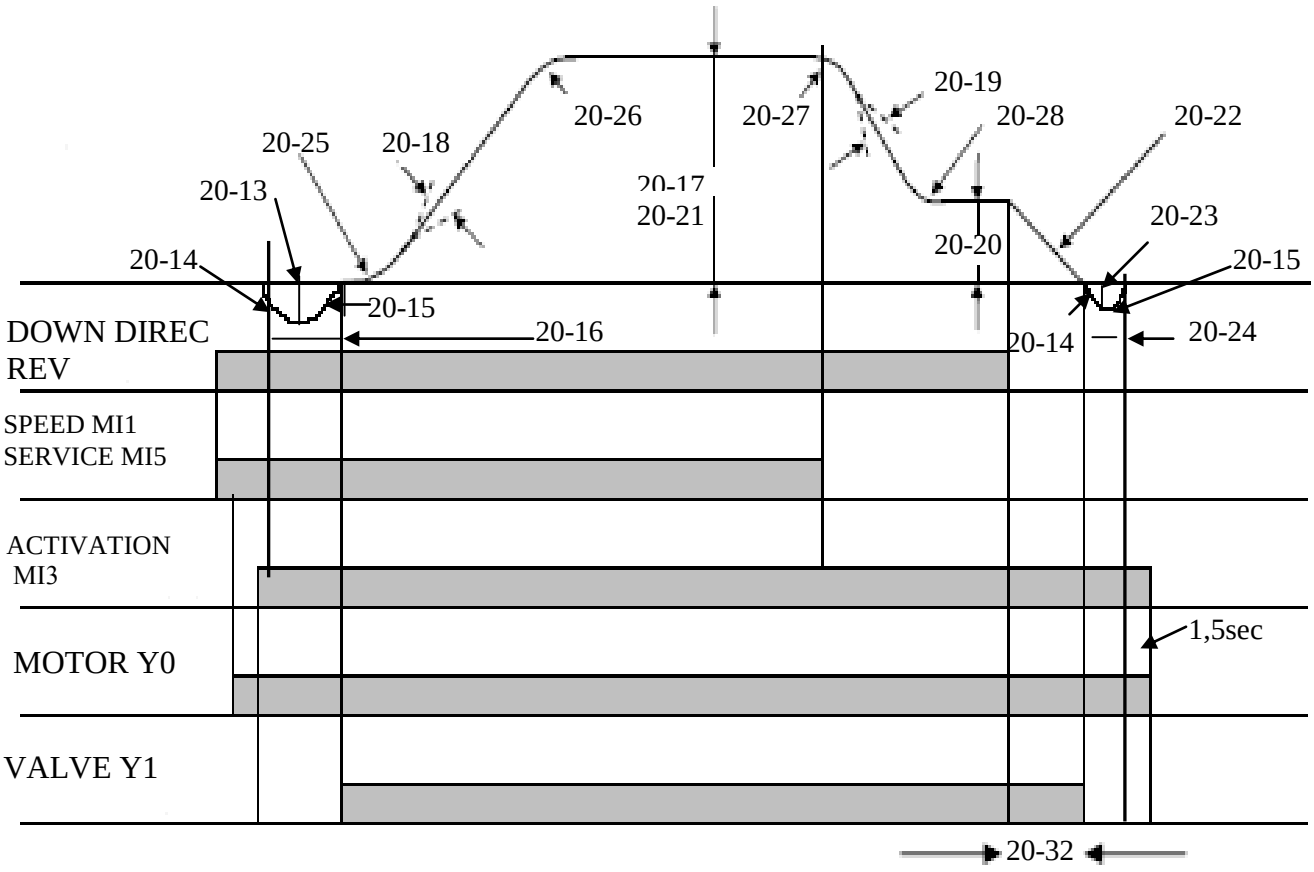
- EXAMPLES OF SETTINGS FOR SMOOTH START OF UP DIRECTION

Configurations	Start with jerks	Delay in starting	Fast start
20-01	+	+	=
20-00	+	+	=
20-05	=	=	+
20-08	+	=	+

- EXAMPLES OF SETTINGS FOR SMOOTH STOP OF UP DIRECTION

Configurations	Long duration with low speed	Stop without low speed	Beyond the terminal limit	Does not reach terminal limit
20-03	+	-	-	+
20-06	=	=	-	+

CONFIGURATIONS OF DOWN DIRECTION



- EXAMPLES OF SETTINGS FOR SMOOTH START OF DOWN DIRECTION

Configurations	Up direction is perceptible before starting down direction	Delay in starting	Fast start
20-13	-	+	=
20-16	-	+	=
20-18	=	=	+

- EXAMPLES OF SETTINGS FOR SMOOTH STOP OF DOWN DIRECTION

configurations	Stop without low speed	Long duration with low speed	Beyond the terminal limit	Does not reach terminal limit	Abrupt stop	Stop with jerks
20-19	-	+	=	=	=	=
20-20	=	=	-	+	=	=
20-28	=	=	-	+	=	=
20-24	=	=	=	=	+	-
20-23	=	=	=	=	+	-
20-32	=	=	=	=	+	-

SOS

When changing the time of acceleration or deceleration, it should not be greater than the duration of the operation. E.g.:
20-14 : the time of acceleration, smoothing, down direction should not be greater than the configuration 20-16 : Duration of smoothing of down direction.

CONFIGURATIONS FOR UP DIRECTION					DEFAULT
20-00	D 0	XX.X	sec	DURATION OF PRE-START OF UP DIRECTION	sec
20-01	D 1	XX.XX	Hz	SPEED OF PRE-START OF UP DIRECTION	Hz
20-02	D 2	XX.XX	sec	ACCELERATION TIME OF PRE-START OF UP DIRECTION	sec
20-03	D 3	XX.XX	sec	DECELERATION TIME OF UP DIRECTION	sec
20-04	D 4	XX.XX	Hz	HIGH SPEED OF UP DIRECTION	Hz
20-05	D 5	XX.XX	sec	ACCELERATION TIME OF UP DIRECTION	sec
20-06	D 6	XX.XX	Hz	LOW SPEED OF UP DIRECTION	Hz
20-07	D 7	XX.XX	Hz	MAINTENANCE SPEED OF UP DIRECTION	Hz
20-08	D 8	XX.XX	sec	DEPARTURE S – CURVE RAMP OF UP DIRECTION TIME 1	sec
20-09	D 9	XX.XX	sec	ARRIVAL S – CURVE RAMP OF UP DIRECTION TIME 2	sec
20-10	D 10	XX.XX	sec	DEPARTURE S – CURVE RAMP OF DOWN DIRECTION TIME 1	sec
20-11	D 11	XX.XX	sec	ARRIVAL S – CURVE RAMP OF DOWN DIRECTION TIME 2	sec
20-12	D 12	XX.X	sec	DELAY ACTIVATION UP DIRECTION	sec
CONFIGURATIONS FOR DOWN DIRECTION					
20-13	D 13	XX.XX	Hz	SMOOTHING SPEED OF DOWN DIRECTION	Hz
20-14	D 14	XX.XX	sec	SMOOTHING ACCELERATION TIME OF DOWN DIRECTION	sec
20-15	D 15	XX.XX	sec	SMOOTHING DECELERATION TIME OF DOWN DIRECTION	sec
20-16	D 16	XX.X	sec	SMOOTHING DURATION OF DOWN DIRECTION	sec
20-17	D 17	XX.XX	Hz	HIGH SPEED OF DOWN DIRECTION	Hz
20-18	D 18	XX.XX	sec	ACCELERATION TIME OF DOWN DIRECTION	sec
20-19	D 19	XX.XX	sec	DECELERATION TIME OF DOWN DIRECTION	sec
20-20	D 20	XX.XX	Hz	LOW SPEED OF DOWN DIRECTION	Hz
20-21	D 21	XX.XX	Hz	MAINTENANCE SPEED OF DOWN DIRECTION	Hz
20-22	D 22	XX.XX	sec	DECELERATION TIME OF FINAL MOTION	sec
20-23	D 23	XX.XX	Hz	SPEED OF FINAL MOTION	Hz
20-24	D 24	XX.X	sec	DURATION OF FINAL MOTION	sec
20-25	D 25	XX.XX	sec	DEPARTURE S – CURVE RAMP OF UP DIRECTION TIME 1	sec
20-26	D 26	XX.XX	sec	ARRIVAL S – CURVE RAMP OF UP DIRECTION TIME 2	sec
20-27	D 27	XX.XX	sec	DEPARTURE S – CURVE RAMP OF DOWN DIRECTION TIME 1	sec
20-28	D 28	XX.XX	sec	ARRIVAL S – CURVE RAMP OF DOWN DIRECTION TIME 2	sec
20-29	D 29	XX.X	sec	DELAY ACTIVATION DOWN DIRECTION	sec
CONFIGURATIONS FOR ELECTRIC MOTOR – VALVE					
20-30	D 30	XX.X	sec	DELAY TIME TO THE ACTIVATION OF ELECTRIC MOTOR	sec
20-31	D 31	XX.X	sec	DELAY TIME TO THE ACTIVATION OF VALVE	sec
20-32	D 32	XX.X	sec	DELAY TIME TO INACTIVATION OF VALVE	sec
CONTROL OF HYDRAULIC SYSTEM					
20-33	D 33	X		ACTIVATION / INACTIVATION OF CONTROL OPERATION	
20-34	D 34	XX.XX	Hz	SPEED OF CONTROL OPERATION	Hz
20-35	D 35	XX.XX	sec	RAMP OF UP DIRECTION	sec
20-36	D 36	XX.XX	sec	RAMP OF DOWN DIRECTION	sec
20-37	D 37	XXX.X	sec	CONTROL DURATION	sec
20-38	D 38	XXX.X	sec	WAITING TIME OF DOWN DIRECTION COMMAND – POST INACTIVATION	sec
CONFIGURATIONS FOR OIL TEMPERATURE					

30-00	S3		CONTROL TEMPERATURE S3	40.0	^{0}C
30-01	S2		CONTROL TEMPERATURE S2	30.0	^{0}C
30-02	S1		CONTROL TEMPERATURE S1	5.0	^{0}C
30-03			DEAD ZONE	2.0	^{0}C
30-04	S3		CORRECTIONS FOR MORE THAN 40.0 ^{0}C	2.15	Hz
30-05	S2		CORRECTIONS FOR MORE THAN 30.0 ^{0}C	1.10	Hz
30-06	S1		CORRECTIONS FOR LESS THAN 5.0 ^{0}C	-0.50	Hz
CONFIGURATIONS FOR POWER SUPPLY					
40-00*			LIMIT AMPERE	28.0	A
40-01			DEAD ZONE	7.0	A
40-02			CORRECTION FOR MORE THAN 28.0 A	1.5	Hz

SETTING A

* 40-00 : From the INVERTER panel, measure the AMPERE.

ATTENTION!!: Put the elevator car into operation without persons.

Add 5% to the indicated price and write the result in the zone: 40-00

6 MAINTENANCE

6.1 GENERAL INFORMATION

In general, hydraulic components are not subject to continuous wear, they require little maintenance and are considered safe. However, to achieve such results it is imperative to use carefully selected components that fit the dimensions of the installation. Furthermore, the hydraulic oil should match the room's temperature and the installation's traffic demands and conditions.


However, it is necessary to perform the standard maintenance and control works mentioned in the recommended periodic maintenance manual and fix any eventual problems.


If any irregularities or faults, that could jeopardise the safety of the people or of the installations, are identified in the components, then the operation of the installation should be stopped until all defective components have been fixed or replaced.

6.2 OIL LEAKAGE AND LOSS OF ELEVATOR CAR'S LEVELLING

Oil leakage from the hydraulic circuit causes loss of the elevator car's levelling, even when it is controlled, as far as floor level is concerned, which renders the re-levelling system useless.


Please bear in mind that a drop in the oil's temperature could cause loss of elevator car's levelling. This becomes apparent when the installation stops, then the oil is very hot and the machine room's temperature is much lower than the oil's.

 In such a case the re-levelling system should not be deactivated because it could result to significant loss of elevator car's levelling.

- Oil leakage from the hydraulic circuit could be caused by:

6.2.1 OIL LEAKAGE FROM THE PIPES

Oil leakage usually appears in the joints of rigid pipes or along flexible pipes and is visibly identifiable. It can be addressed by tightening the fittings of the pipes or by replacing flexible pipes.

6.2.2 OIL LEAKAGE FROM THE CYLINDER

Large-scale leakage from the piston is caused mainly by wear or by ruined gaskets located at the piston crown. Leaked oil is collected in a suitable area and through a PVC pipe is drained to a transparent recipient. It is imperative that dust does not block the piston crown or the opening that leads to the PVC pipe. Oil leakage from the piston depends on traffic intensity and the wear of the gaskets.

When oil leakage exceeds 1 or 2 litres per month, it is advisable to replace the piston's gaskets.

- Oil leakage from underground indirect injection pistons could be triggered by chemical or electrical corrosion of the piston. This causes the oil level in the tank to steadily fall.

 Underground pistons should be wrapped with protective wrapping material to avoid polluting the ground or the groundwater.

 If oil leaks to the ground, the underground pistons should be disassembled and replaced.

6.2.3 LEAKAGE AND DAMAGE INSIDE THE VALVE

In order to verify that the valve/gasket has been properly sealed the following procedure must be followed:

- When the valve's temperature has levelled the temperature of the room, close the main supply line of the shut-off valve and, using the hand pump, increase pressure until it reaches twice the level of the static pressure.
- If there is no leakage from the valve, pressure continues to fall slowly and steadily, less than 5/6 bars during the first 3-4 minutes and tends to restore itself.
- If the valve has a leak, pressure falls rapidly, more than 5-6 bars during the first 3-4 minutes and static pressure falls as well.
- The valve's components that could cause leakage to occur are:

a) Hand pump.
A small ball secures the hand pump's gasket. Turn on the hand pump, leave the lever towards the valve and wait for some minutes to check gasket/seal. If there is a leakage, the lever should automatically return to its initial position.
Repeat the same procedure to be sure that leakage is not caused by dirt particles that have set between the ball and the valve seat. Replace hand pump if necessary.

b) Manual emergency RGE valve.
The hand pump can also be sealed by a small ball whose proper function could be jeopardised by a layer of dirt between the ball and the valve seat. First, perform a check by removing half of the tank's cover and by looking underneath the valve. A small oil outflow will appear each time the emergency switch is activated.
The outflow should stop when the switch is turned left. If not, leakage may occur, from the emergency shut-off valves or from the RGK electro-valve, which has the same discharge point.

The following checks should be performed with pressure inside the valve. Thus, they should be performed very carefully. In order to check water tightness/gasket of the safety valve you should remove the coil, remove the kingpin, thoroughly remove the remaining oil and make sure there is no further oil outflow.

If you notice any oil leakage then the down direction block should be replaced or it should be repaired as described below:

Close the main shut off line, unscrew the screw No B (back pressure gauge rod) and press the emergency manual override button in order to reduce pressure to zero.

- Unscrew the block's mounting screws and check the ball's seats.
- Remove central shaft that obstructs the spring and the ball.
- Review valve seats and if they are defective or show corrugations, try to repair them by restoring the correct position of the balls and by securing them to the proper hole/hit.

Warning: Do not hit hard with a hammer because the seat is made of aluminium and could break. If possible, replace the balls that secure the seats.

- Properly reassemble all components, reassemble the block and check whether it is watertight or not.

c) Down direction of RGK electro-valve.
The ball of the gasket of the down direction valve could remain slightly open and cause oil leakage.

The following checks should be performed without any pressure inside the valve. Thus, it is necessary to close the main shut off line, unscrew the screw No 3 (pressure gauge rod) and press the emergency manual override button to reduce pressure to zero.

The down direction of the valve could malfunction for the following reasons:

- Small metal particles or dirt have entered the coil between the pipe and the position indicator and delay or obstruct the return movement of the position indicator.

  If necessary, remove the coil, unscrew the mechanical part of RGK and shake it back and forth to check whether the piston is free or not. If not, replace it.
- The button of the coil of the RGK works only when it is manually activated with a screwdriver and the position indicator of the coil cannot return to stand-by position. It is necessary to remove the coil, unscrew the mechanical part of the RGK and push the piston to the back.
- Some metal particles are located between the ball and the gasket to prevent blocking or destruction of RGK valve's gasket. To check the RGK electro-valve's gasket it is necessary to remove the coil, unscrew the mechanical part of the spiral, remove the kingpin and the aluminum RGK valve.

At this stage, it is necessary to check the RGK valve and then proceed in the following way:

- Remove central shaft/seeger that obstructs the spring and the ball at the lower part of the RGK valve.
- Check the ball's seat and if you notice any corrugations or defect, try to repair it by repositioning the ball and hitting it properly in order to secure it.

Warning: Do not hit very hard because the seat is made of aluminum and it could break. If possible, replace the balls that hold the seats.

- Properly reassemble all parts, reassemble the RGK valve to its correct position, the kingpin and the coil.

 Restore pressure in the valve by opening the shut-off valve and make sure there is no oil outflow from underneath the valve.

 If any oil outflow appears then the RGK valve or the down direction block should be replaced.

d) RG10 non pilot type check valves.
The RG10 valve (check valve) should keep the main line closed when the elevator car is still. A gasket layer between the two parts of the piston guarantees perfect impermeability.

With time, metal particles could destroy the gasket. They scratch the gasket and obstruct its proper sealing because they set between the seat and the gasket.

Closure could be also delayed if the RG10 piston does not work properly because of the presence of dirt and could also be obstructed by the imperfect closure of RGK electro-valves.

In order to avoid leakage from the RG10:

- Check that the piston of the RG10 runs smoothly and if necessary, remove dirt and clean with a thin fabric.
- Make sure that the RGK electro-valve closes completely, when the coil is disconnected (see previous point c).
- Replace RG10 gasket

- Close the main shut-off valve line.
- Unscrew the screw No B of the pressure/back pressure gauge rod and reduce pressure to zero using the manually operated maneuver button.
- Remove cover to reach the piston of the RG10.
- Unscrew the screw that holds the two parts of the piston together and replace the gasket. Take extra caution to replace it correctly.
- Reassemble all parts, and be careful with the O-ring between the valve and the cover.

6.3 PRESENCE OF AIR IN THE OIL

The presence of air in the oil is identified when the tank has foam in it (mainly during down direction) and when oil is whitish.

An increase in the oil's coefficient of compressibility has a negative effect to the installation. The most common problems are:

- When the installation stands still at a floor, the elevator car sinks when loaded and rises when unloaded.
- Powerful lateral oscillations, noise in the pump and defective motion appear when the installation is in motion.
- The presence of air in the oil could relate to insufficient air bleeding during the first filling of the circuit, very low oil level in the tank, the drainage pipe is no longer connected to the valve etc.

 In order to bleed the air out of the circuit:

- When the oil is hot, lower the shock absorbers of the elevator car, press the manual operated button to release pressure and unscrew the screw No B of the pressure gauge
- Remove the air bleeding screw of the piston and leave to rest for 8/10 hours. The air will rise from the oil and the air from the tank will automatically be released. Now bleed the air out of the piston.

6.4 FILTER IN THE VALVE

- In order to clean or replace the filter container of the shut-off valve, before closing the shut-off valve, unscrew the screw No B and release pressure. Then unscrew the lower part of the filter to reach the container.

6.5 OIL DETERIORATION

It is difficult to calculate the deterioration rate of oil. It depends on the operating conditions like temperature and pressure and on the actual operating hours.

- The quality of the oil is affected by dust and moisture and by the condensation of the air that enters the tank during upward movement. Oil deterioration may occur very quickly.
- In hydraulic installations, pressure and temperature are relatively low and do not shorten the oil's life expectancy, unless the oil is continuously overheated or the motor burns oil.
- The actual operating hours of good quality oil, when all aforementioned factors are not taken into consideration, range between 3,000 to 5,000 at most. The two aforementioned factors have an impact on those figures.
- At least every year or after 2,000 operating hours, you should check the condition of the oil: smell, colour, foam, dirt particles etc. If necessary, refer to a specialized laboratory for a detailed analysis.

 If oil should be replaced, please comply with the anti-pollution regulations.

6.6 ELECTRIC ANTI-SKID SYSTEM

Check anti-skid system by using the emergency manual override at every floor.

6.7 BATTERY DISCHARGE

Perform regular checks of the battery's performance, by unplugging the installation from the electrical supply.

6.8 SIGNS-CHARTS-USER MANUAL

Ensure that all signs, charts and the user manual are available.

6.9 MAINTENANCE OF INVERTER

In order to make sure that the unit will live longer and operate smoothly you should perform routine checks. Before carrying out the routine check, always unplug the unit and make sure the keyboard has been deactivated.

1 – Remove dust from the fans and from the circuit of the control board. Preferably, use compressed air or a vacuum cleaner.

2 – Make sure there are no loose screws at the control terminals or the power supply unit.

3 – Make sure the unit of the inverter runs normally and there are no indications of overheating.

6.9.1 MEGGER TESTS

 When you perform insulation tests using a Megger tester to the wiring or the motor, you should disconnect all unit terminals and perform the tests only to the electrical circuit according to the adjacent diagram. Do not perform Megger tests to the control circuits.

 The elevator CONTROL PANEL should comply with the safety regulations according to the EN 81.1 and EN 81.2 standards and with any other regulation that might be added by European or International institutions and concern the safe operation of elevators.

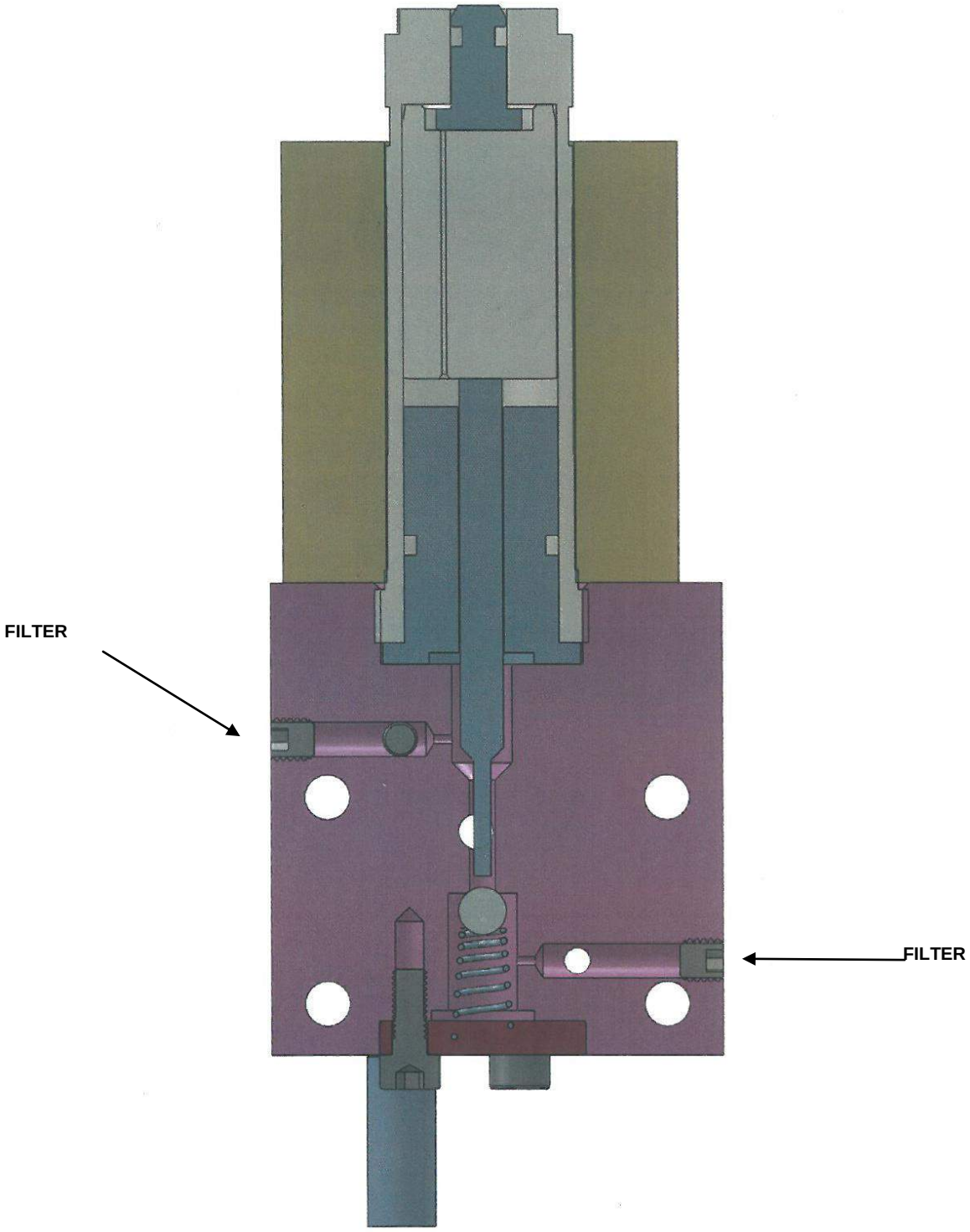
 Protect the VALVE V1 against misfunctioning downwards, among others, if the command of power relay is not activated then Motor Vo cannot be activated as well.

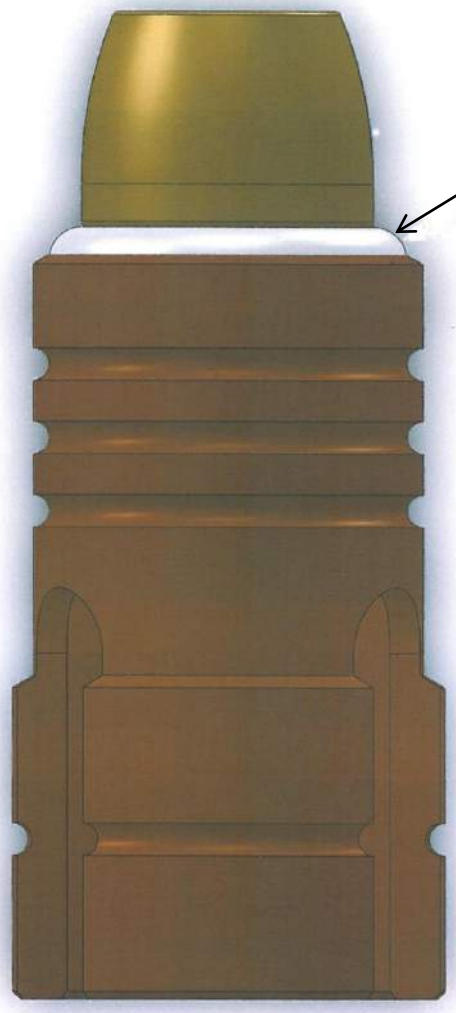
6.10 RECOMMENDED PERIODIC MAINTENANCE MANUAL

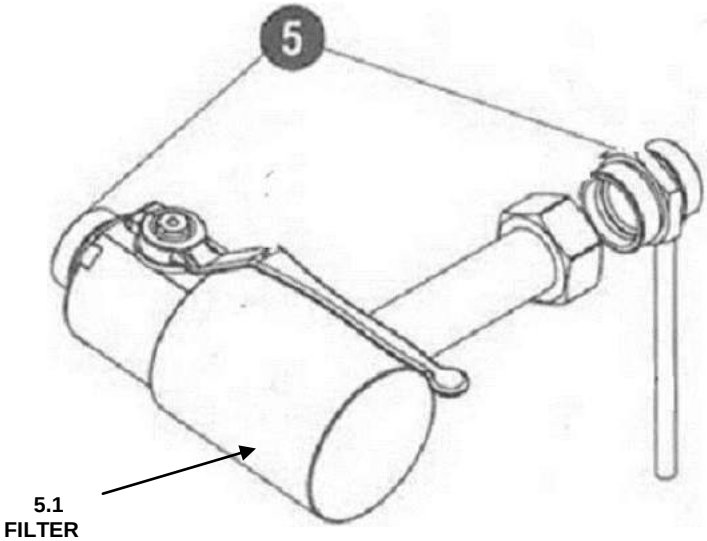
RECOMMENDED PERIODIC MAINTENANCE TASK	FOCUS ON OPERATION INSTRUCTIONS FOR THE PERIODIC MAINTENANCE			
	INSTALLATION COMPLETED	EVERY 2-3 MONTHS	EVERY YEAR	EVERY 5-10 YEARS
TIGHTNESS CONTROL OF CYLINDER GASKETS	X	X		
TIGHTNESS CONTROL OF SEALED VALVES	X	X		
CONTROL OF SEALING / TIGHTNESS OF THE PIPES	X		X	
CONTROL OF OIL LEVEL AND MAINTENANCE	X	X	X	X
CLEANING OF VALVE FILTERS AND SHUT-OFF VALVE	X		X	
CONTROL OF PRESSURE AND ADJUSTMENT OF THE MAX. STATIC PRESSURE TO TWICE	X		X	
CONTROL OF RUPTURE VALVE IN OPERATION	X	X		
CONTROL OF ROPES ANTI-LOOSENING AND PRESSURE METER	X		X	
CONTROL OF ANTI-SKID SYSTEM	X	X		
CONTROL OF EMERGENCY AND BATTERY	X		X	
SIGNS – CHARTS – USER MANUAL	X		X	
GENERAL REPAIR				X
CLEANING OF INVERTER'S FAN	X	X		
CONTROL OF INVERTER'S ELECTRICAL CONNECTION			X	

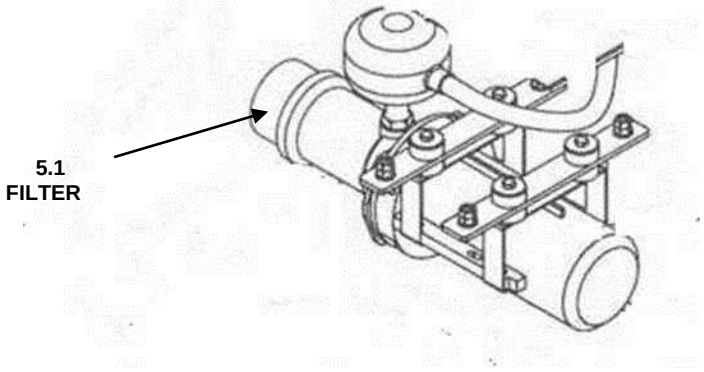
6.11 FILTERS

RGK COMPONENT OF DOWN DIRECTION




CENTRAL O-RING SEAL


5
5.1
FILTER


5.1
FILTER