Start Elevator Srl

COMPONENTI OLEODINAMICI PER ASCENSORI

Operating instructions

90/M PUMP UNIT

GB

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ANNEX

This book is integrant part of the unit therefore must be kept for the lasting in operation of the unit, in a place accessible and known by the installation, use and maintenance personnel.

The herewith instructions aim to permit the positive and safe execution of the installation operations, starting-up, working, control, maintenance and possible repair of the pump unit.

If any situation or event, not specified in the following pages, should occur, please refer to our Technical Department. For any request of general technical information or spare parts, please quote the right series number of the pump unit (see Annex 1).

SYMBOLS LEGEND

This symbol warns that not observing the related instruction involves a risk of damage to the unit or to the system

This symbol warns that not observing the related instruction involves an electric shock risk

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1. Preliminary operations

1.1 Delivery inspection

At the delivery, check that the pump unit has not suffered from any damage during transport, check that the packing is integral and that there are all the necessary accessories and/or required, in particular the filter, which, if not assembled, to facilitate transport operations, must be placed inside the pump unit tank. Moreover, check the correspondence of the specifications on the forwarding and identification plates to the order. (Annex 1)

In case of damages, anomalies or lacks, please opportunely inform our Technical Department.

1.2 Warehousing

Awaiting installation, the pump unit must be kept out of the bad weather (it can particularly get damaged by water, damp and sun) and in a steady position, to avoid overturn risk. It's not advisable to place one unit over the other. The temperature in the warehouse must be between -25 and +50 °C

1.3 Displacement

The pump unit must be displaced with care, using its special handles, with transpallet or with trolleys, trying to avoid crashes, falls and overturns which may cause damages even without apparent breakdowns.

Note: Overall dimensions for warehousing and displacement operations are in Annex 2.

2. Operating limits

2.1 General instructions

- The installation of a pump unit in a system, that is not in conformity with the rules in force, is forbidden.

- The pump unit has been designed and manufactured to be combined with Start Elevator Hydraulik cylinder-piston groups. For uses in different combinations, please opportunely contact our Technical Department.

- The pump unit must be installed in an airy premises, off dust and damp.

2.2 Specific limits

- Maximum operating static pressure	45 bar
- Maximum pressure of the overpressure valve setting	60 bar
- Maximum oil temperature	60° C
- Engine room temperature	5-40° C

3. Installation

To avoid vibrations it's suggested using rubber supports under the pump unit

3.1 Oil type

The oil to use must have particular specifications which permit to avoid wear and tear in the unit materials and which permit a proper working of the system.
Use top quality oils, with high viscosity index, specific for this kind of installation.

In order to choose the right oil type, please refer to the following oil characteristics

Scale ISO 46 or 68 class HV

Additives: antifoam, antiwear, antioxidative, antirust, improvement viscosity index, improvement sliding point

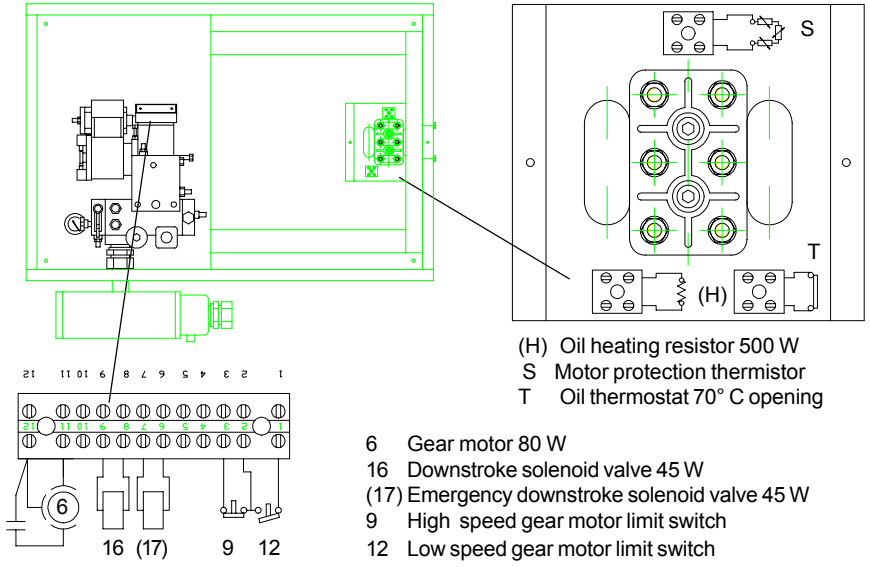
Characteristics Physical - Chemical:

- specific weight	0.86 Kg/dm3
- viscosity at 40° C	46 cSt - working temperatures 15-50° C
- viscosity at 40° C	68 cSt - working temperatures 25-55° C
- viscosity index	> 140

Before using any oil with different specifications please consult our Technical Department

Before introducing any oil in the tank, please verify that this is perfectly clean and dry

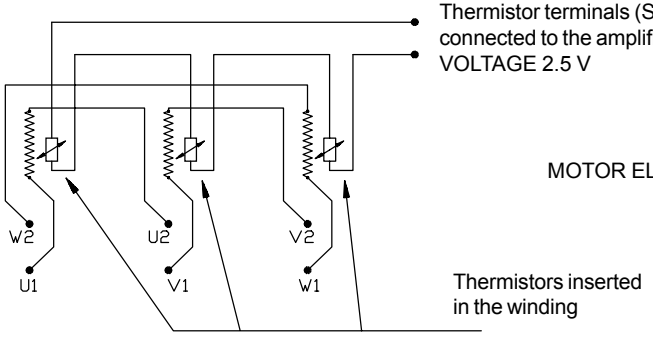
3.2 Electrical connections



(H) Oil heating resistor 500 W
S Motor protection thermistor
T Oil thermostat 70° C opening

6 Gear motor 80 W
16 Downstroke solenoid valve 45 W
(17) Emergency downstroke solenoid valve 45 W
9 High speed gear motor limit switch
12 Low speed gear motor limit switch

For motor absorption see Annex 3 .



Thermistor terminals (S) to be connected to the amplifier MAX VOLTAGE 2.5 V

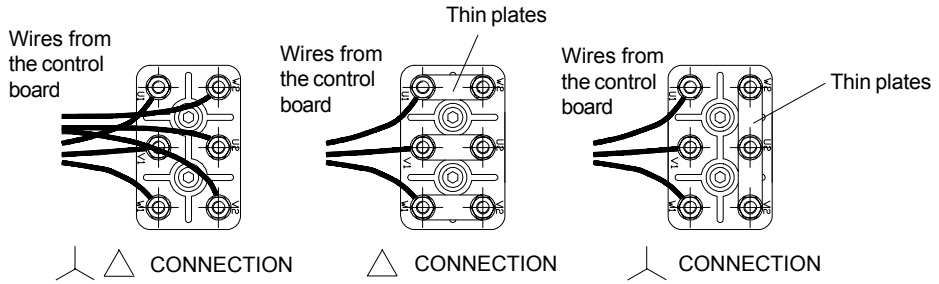
MOTOR ELECTRIC DIAGRAM

Thermistors inserted in the winding

Execute the earth connection before any other connection !

On delivery, the motor terminal board disposition corresponds to the 380V (400V) three phase supply. Therefore, modify the motor terminal board to adapt to the correct supply voltage.

Ex.: if on the motor plate is written: delta 230 - star 400, the pump unit will be delivered with star connection; if the pump unit works at 230V (220V), the connection must be modified (delta).
In case of star-delta starting remove all the thin plates.



Maximum voltage to motor protection thermistors not higher than 2.5 V.
With an higher voltage the thermistors burn and often the winding gets damaged.

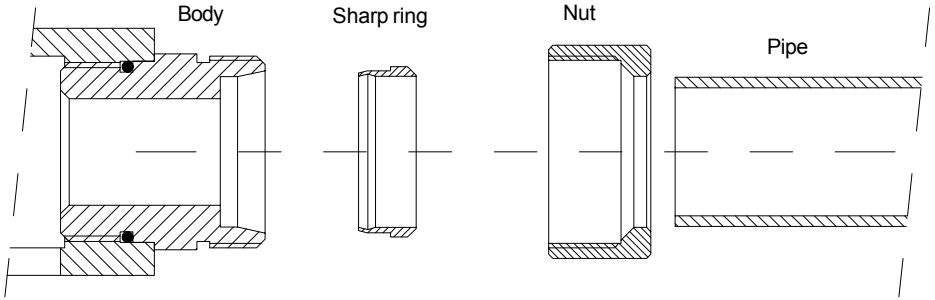
3.3 Hydraulic connection

When the pump is supplied without the flexible pipe for the hydraulic connection, it is necessary to determine the suitable pipe and connection to use on the basis of the following table

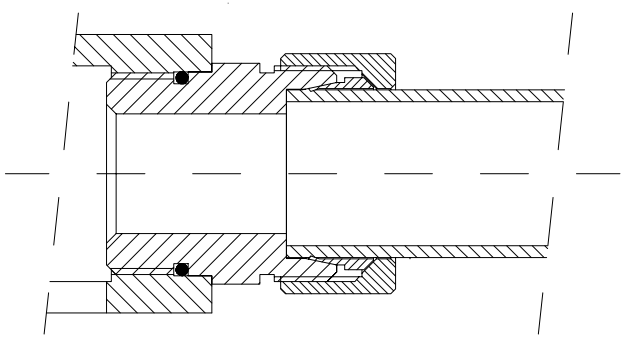
Pump Type [l/min]	Pump unit connection type	Connecting pipe type
55-150	ERMETO PIPE 35	- RIGID PIPE 35 (see 3.3.1)
		- FLEXIBLE PIPE 1"1/4R2 with connections HERMETIC FEMALE O'RING OG.24° LIGHT SERIES FIL.M 45x2 (see 3.3.2)
	GAS 1"1/4 MALE	- FLEXIBLE PIPE 1"1/4R2 with connections GAS FEMALE 1"1/4 (see 3.3.2)
180-300	ERMETO PIPE 42	- RIGID PIPE 42 (see 3.3.1)
		- FLEXIBLE PIPE 1"1/2 R2 with connections HERMETIC FEMALE O'RING OG.24° LIGHT SERIES FIL.M 52x2 (see 3.3.2)
	GAS 1"1/2 MALE	- FLEXIBLE PIPE 1"1/2 R2 with connections GAS FEMALE 1"1/2 (see 3.3.2)
380-450	GAS 2" MALE	- FLEXIBLE PIPE 2" R2 with connections GAS FEMALE 2" (see 3.3.2)

3.3.1 Connection with rigid pipes

For a correct use and relative technical yield of the connection it's necessary to use high quality pipes.
Use: COLD FINISHED PRECISION PIPES WITHOUT WELDING NORMALIZED BONDERIZED FOR OLEODYNAMIC CIRCUITS, DIN 2391/C ST 35.4.
Maximum permitted hardness, measured on the external pipe diameter: 75 HRB.



1. Cut right angle the pipe (do not use roll pipe cutters). Clean from external and internal deburrings, protecting the faying surface.
2. Grease with oil the cone and the thread of the body, the sharp ring and the nut thread.
3. Drive the nut first and then the ring on the pipe; THE SHARP RING EDGE MUST FACE THE PIPE FITTING BODY.
4. Drive the pipe into the cone of the body to lean it to its beat.
   Hand screw the nut to the complete tightening.
5. Keep the pipe on its beat and make sure it can't turn. Screw the tightening nut three fourth turn using a wrench with an extension arm.
   In this way the sharp edge of the ring engraves the external part of the pipe and creates a rim in front of its sharp edge.
6. Screw anticlockwise the nut and check the evenness of the engravement rim made by the sharp ring all around the pipe.
7. Screw clockwise the nut to encounter a certain resistance and then one more 1/4 turn.



3.3.2 Connection with flexible pipe

Before screwing the flexible pipe on the pump unit connection, check that:

1. on the pipe there is a plate that specifies the pipe type, the working pressure and the date of testing.
2. both the pump unit connection and the pipe fitting are clean.

For pipes with HERMETIC FEMALE fitting, before screwing the pipe it's necessary to take the nut and the ring off the pump unit connection.

4. Starting up

4.1 Starting

After having followed the instructions about connections, explained in chapter 3 (Installation) it is possible to start the motor:

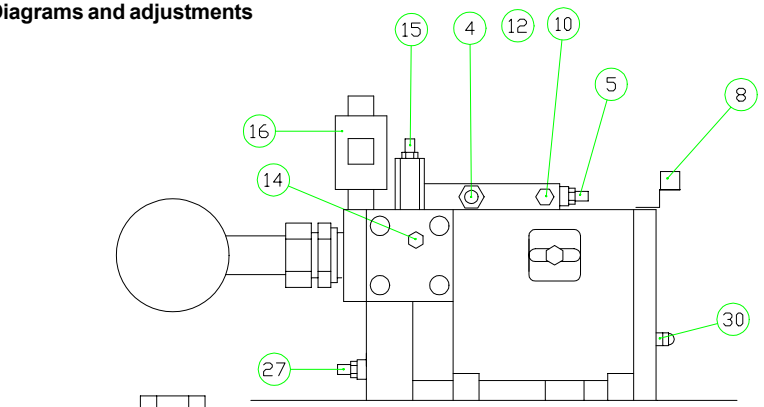
start the motor only after the connection of its protection thermistors.

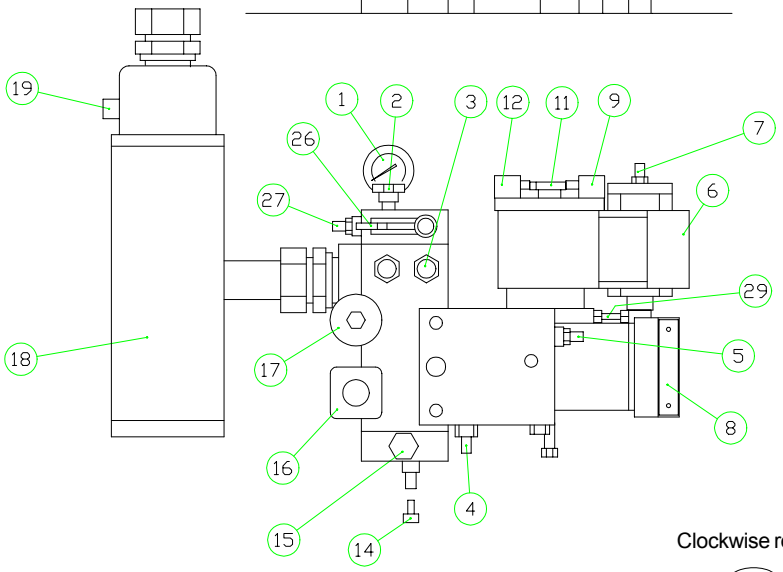
If the motor is noisy on the first start it probably turns in the wrong direction, it is thus necessary to reverse two of the feeding phases.

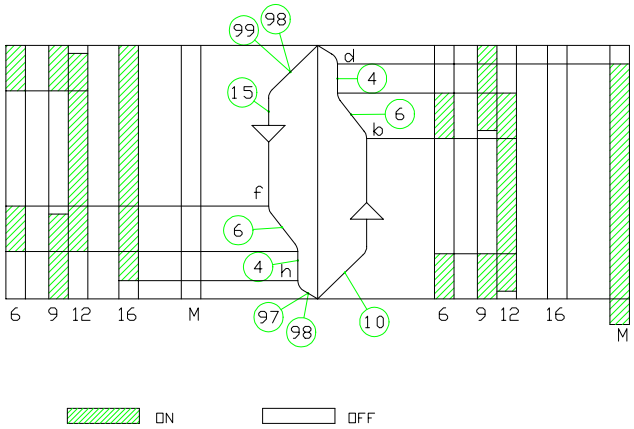
Once ascertained that the motor turns regularly it is necessary to fill the piston and the hydraulik circuit:

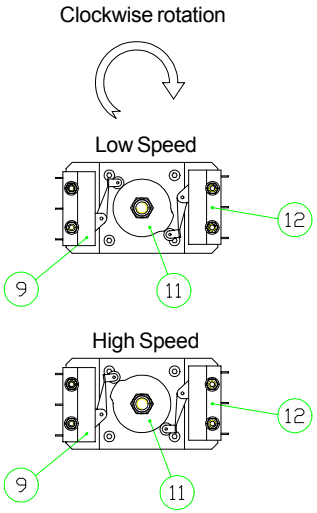
- Screw anticlockwise for two turns the bleeder screw on the piston.
- Start jogging the motor, for ten seconds, with short breaks, checking the oil level in the pump unit, till when the oil comes out of the piston bleeder screw.
- Close the piston bleeder screw and complete the filling of the pump unit.
- Take the piston in the upstroke position, the oil level in the pump unit must be above the minimum hack of the control dipstick and it must be at least 5 cm above the upper part of the motor.
- During an upstroke screw anticlockwise a bit the bleeder screw, which is located on the plenum chamber on the motor pump group, and tight the screw before the stop.
- Make the piston and pump unit bleeding operations several times in order to eliminate all the air in the hydraulic circuit.

4.2 Diagrams and adjustments









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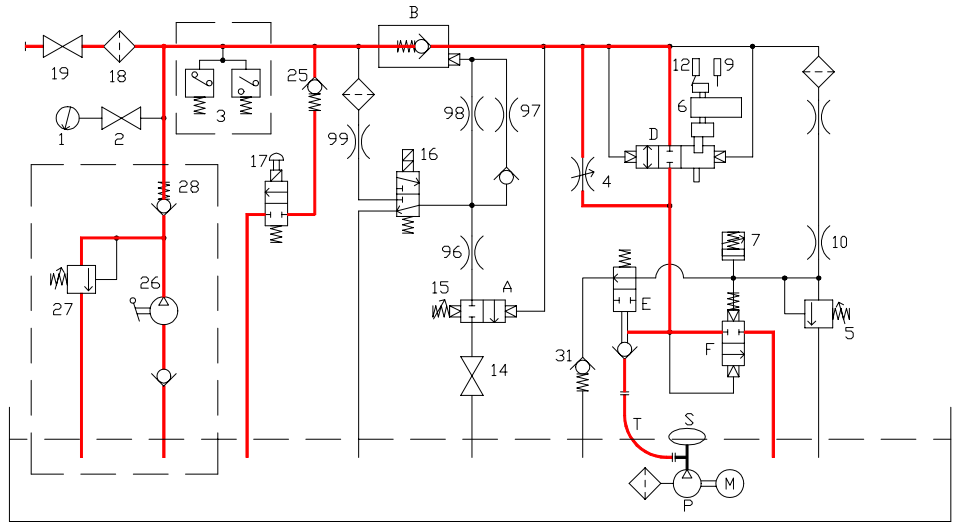


LEGENDA

1 Gauge
2 Gauge cut-out cock
3 (Pressure switches)
4 Low speed adjusting screw
- clockwise decrease (-)
- anticlockwise increase (+)
5 Maximum pressure valve adjusting screw
- clockwise increase (+)
- anticlockwise decrease (-)
6 Gear motor
7 Upward starting time adjusting screw
- clockwise decrease (-)
- anticlockwise increase (+)
8 Valve terminal board connection
9 High speed limit switch
10 Upward start throttle
11 Speed shift valve retainer
12 Low speed limit switch
14 Fastening screw test
15 Downward speed adjusting screw
- clockwise increase (+)
- anticlockwise decrease (-)
16 Downstroke solenoid valve
17 Emergency downstroke pushbutton (solenoid valve)
18 Filter
19 Valve cut-out cock
25 Emergency downstroke minimum pressure valve
26 (Hand pump)
27 (Hand pump safety valve adjusting screw)
- clockwise increase (+)
- anticlockwise decrease (-)
28 (Hand pump non-return valve)
29 Gear motor position adjusting screw (*)
30 Safety valve arrest screw (*)
31 Pilot circuit check valve
96-97-98-99 Throttles
A) Pressure regulator assembly
B) Pilot-operated non-return valve
D) Speed shift valve
E) Pump non-return distributor valve
F) Upward starting and safety valve
M) Asynchronous motor
P) Three screw pump
S) Pump silencer
T) Flexible pipe

(*) *This valve is factory set. Adjustments should only be carried out via the manufacturer's technical specifications*

h - downward stop contact
f - downward starting reducing speed contact
d - upward stop contact
b - upward starting reducing speed contact

4.3 Working

UPSTROKE 1/8 - STANDING

In this phase all the components are at rest and the system is kept steady from the shutdown of the non-return valve <B>.

UPSTROKE 2/8 - STARTING

Starting of the motor <M> and feeding of the gear motor <6>. (**)
The control of the limit switch <11> will move from the limit <12> to the limit <9>, which will interrupt the feeding to the gear motor. In this position the speed shift valve <D< is open.

UPSTROKE 3/8 - OUTLET IN THE TANK

The whole delivery of the pump is discharged in the tank through the valve <F> while the valve <7> accumulates the oil of the pilot circuit.
If the valve <7> is adjusted with short stroke, the system will jerk in departure.

UPSTROKE 4/8 ACCELERATION

When the valve <7> has finished its stroke, the pilot oil comes to close the valve <F> with consequent increase of pressure in the valve group. When the pressure reaches the one of the system the valve <B> will open and the system will start moving. The movement of valve <F> depends on the throttle <10> that controls the passage of the oil in the pilot circuit.
If the throttle <10> is obstructed the valve group cannot achieve the upstroke pressure.

UPSTROKE 5/8 HIGH SPEED

In high speed all the oil of the pump flows towards the valve <B> and then towards the piston.

UPSTROKE 6/8 DECELERATION

In proximity of the floor turn on the gear motor <6> (**) it will close the valve <D> so that the pressure will increase and the valve <F> will open.
A part of the oil will flow in the tank with the consequent deceleration of the system.
The limit switches control <11> will move from the switch <9> to the switch <12> and the gear motor feeding will interrupt.

UPSTROKE 7/8 LOW SPEED

When valve <D> it is completely closed, the oil can flow to the piston only through the passage controlled by screw <4>, this thus determines the value of the upstroke low speed.

UPSTROKE 8/8 STOP

In connection with the floor break feeding to the motor <M>.

DOWNSTROKE 1/7 STANDING (see corresponding upstroke phase)

DOWNSTROKE 2/7 STARTING

Activation of the downstroke solenoid valve <16> and contemporary feeding of the gear motor <6>. (**)
The limit switches control <11> will move from the switch <12> to the switch <9> and the gear motor feeding will interrupt. In this position the speed shift valve <D> is open.
The solenoid valve <16> pilots through the throttles <99-98> the piston that releases the non-return valve <B>.
The opening of the non-return valve <B> determines the gradual downstroke of the system.

DOWNSTROKE 3/7 REGULATOR INTERVENTION

The increase in the oil speed determines a correspondent increase of pressure in the valve group. When the pressure value correspondent to the setting <15> is reached, the valve of regulator <A> intercepts the pilot oil of the non-return valve and sends it in draining through the passage <14>. (*)

DOWNSTROKE 4/7 HIGH SPEED

The high speed is reached when the non-return valve is in such a position that the pressure in the valve group it's the same of the pressure regulator setting.

DOWNSTROKE 5/7 DECELERATION

In proximity of the floor, turn on the gear motor <6> (**). It will close the valve <D> so that the pressure in the valve group will increase and the regulator will intervene <A> and the non-return valve will partially close <B>. (*)

The limit switch control <11> will move from the switch <9> to the switch <12> that will interrupt the feeding to the gear motor.

DOWNSTROKE 6/7 LOW SPEED

when the valve <D> it's completely closed the oil can flow in the group only through the passage adjusted by the screw <4> which thus determines the value of the downstroke low speed too.

DOWNSTROKE 7/7 STOP

In connection with the floor break feeding to the solenoid valve <16>, it will send in draining the pilot oil of the non-return valve <B> through throttles <97-98> (◆) with gradual stop of the system.

SAFETY VALVE INTERVENTION (*)

During upstroke, an unusual increase of pressure, higher than the setting of the valve <5>, causes its opening and the draining of the pilot oil of the non-return valve <F>.
The lack of its pilot opens completely the valve <F> and sends in draining the oil that flows from the pump, and the system stops immediately.
The system is automatically reset as soon as the overpressure stops.

MANUAL EMERGENCY DOWNWARD

Press the emergency downstroke button on the top of the pump to start the cock <17> (◆) that directly discharges the oil of the circuit, permitting the manual downstroke of the cabin.
In indirect systems the manual operation is automatically interrupted when the setting of the valve <25> is reached. It closes the passage of the oil to the cock.
The cock can be predisposed to be electrically started through coil.

MANUAL EMERGENCY UPWARD

When on the valve group is fitted the hand pump <26> (always fitted in indirect systems) use the issued lever to pump the oil to the hydraulik circuit in pressure, through the non-return valve <28> in order to lift the cabin.
In case of over pressure during the pumping, the safety valve intervenes <27> and it sends in draining the delivery oil of the pump, thus interrupting the upward of the cabin.

(*) The oil discharge at the external of these devices in this phase is normal.
(**) The gear motor must always turn in the same direction.

NOTE:

- The control board must be predisposed, in order to place the gear motor in the low speed position before any starting.

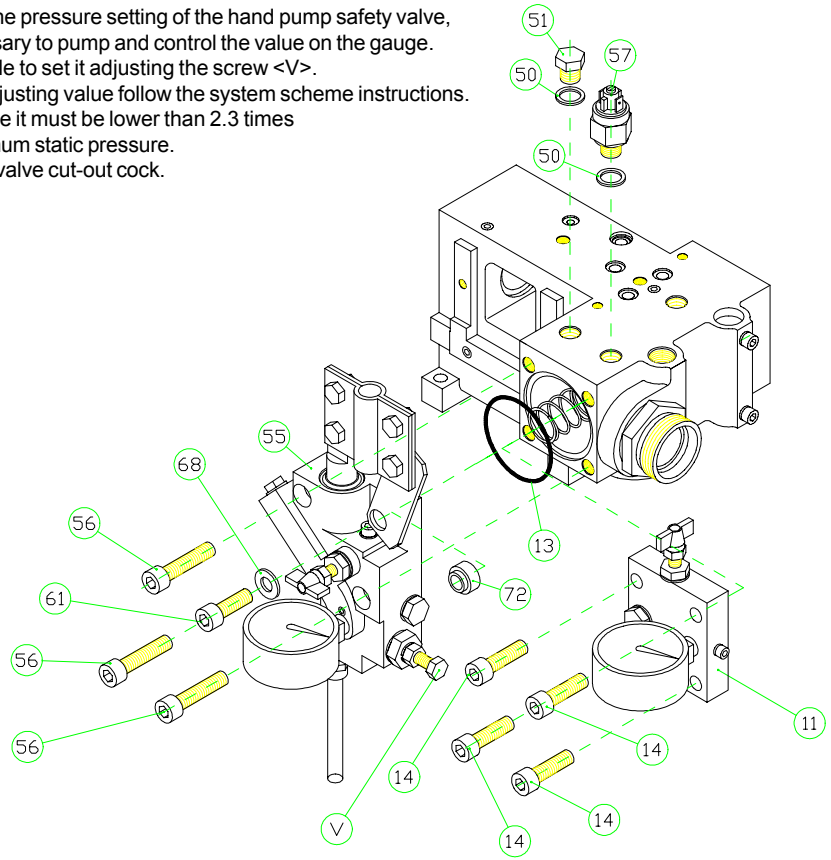
- The switches in the starting deceleration stroke space < b, f > must be positioned in order to leave, when the oil is cold, a low speed space <4> of 10-15 cm.

4.4 Installation and accessories adjustment

4.4.1 Emergency upstroke device (hand pump)

- Close the valve cut-out cock that is on the external part of the pump.
- Discharge the pressure of the valve group operating on the emergency downstroke button and on the downstroke solenoid valve.
- Remove the screw <51> in the drawing.
- Remove the plate <11> on which the gauge is fixed turning anticlockwise the four fastening screws <14>.
- Assemble the hand pump <55> in the place of the plate, using the screws supplied with the hand pump.
- Pump with the hand pump till the transfer of the oil from the hole of the screw <51>.
- Reassemble the screw <51>.

- To verify the pressure setting of the hand pump safety valve, it's necessary to pump and control the value on the gauge. It's possible to set it adjusting the screw <V>. For the adjusting value follow the system scheme instructions. In any case it must be lower than 2.3 times the maximum static pressure.
- Open the valve cut-out cock.



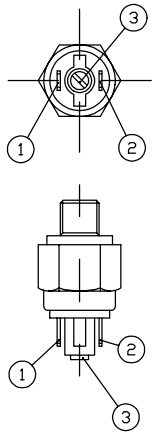
4.4.2 Pressure switch

- Close the valve cut-out cock that is on the external part of the pump.
- Discharge the pressure of the valve group, operating on the emergency downstroke button and on the downstroke solenoid valve.
- On the valve group there are two connections for the pressure switch, in correspondence of screws <51>. The position of this connections is interchangeable. Unscrew one of them and screw the pressure switch <57>.
- Open the valve cut-out cock.

The pressure switch permits to commute an electrical circuit when in the hydraulik system the pressure switch setting is reached or is over.

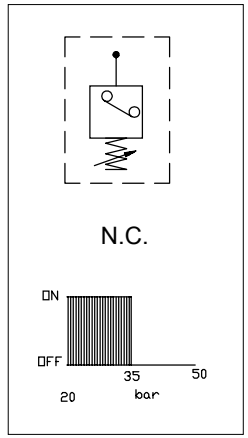
The electrical connection is possible through "faston" type tap as shown in the draw with number <1> and <2>.

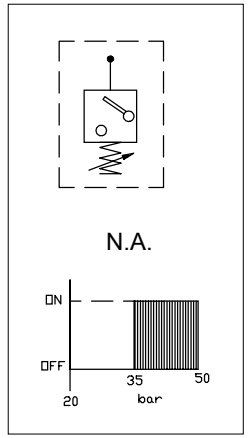
The pressure switch can be Normally Closed (N.C.) or Normally Open (N. O.) during the working.
Here are the operating diagrams of two pressure switches set at 35 bar.



TECHNICAL CHARACTERISTICS

- Field of adjusting 5-50 bar
- Intervention tolerance ± 4 % of set pressure
- Maximum static pressure 200 bar
- Maximum contact load
  Alternating current up to 42 Volts - 2 Amp
  Direct current up to 42 Volts - 1 Amp
- Codes PRSM005050C (N.C.) and PRSM005050A (N.O.)





Pressure setting to be executed before connecting the pressure switch to the control board:

It's necessary to have an instrument that relieves the electrical continuity between the taps <1> and <2> of the pressure switch N.C. (N.O.)
Moreover it's necessary to take the pressure of the system to the operating value.

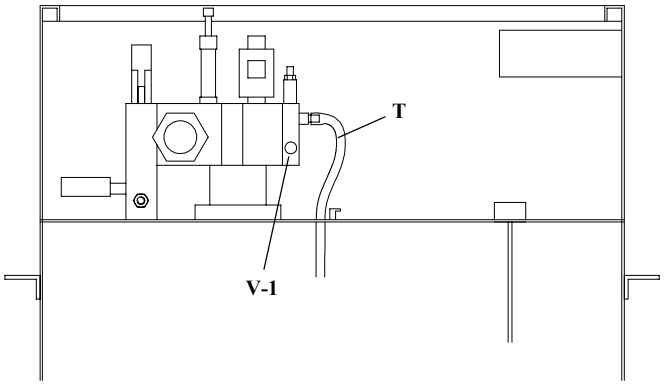
If the switch is closed (open) gradually turn anticlockwise the screw <3> to open (close) the switch.

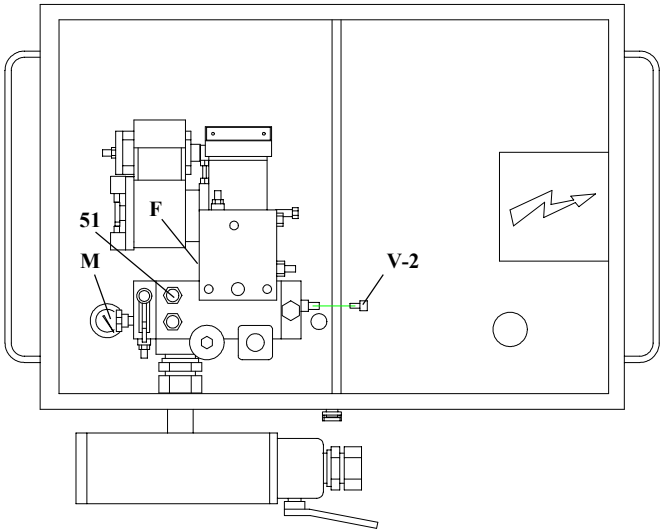
If the switch is open (closed) gradually turn clockwise the screw <3> to close (open) the switch then screw anticlockwise to open (close) the switch again.

4.5 Test and trying

4.5.1 Drop test

- Replace the plastic pipe <T> on the valve group with the screw <V> (screw type M5 x 14), moving it from V-1 to V-2.
- Send the cabin full load to the top floor and start the downstroke.
- The safety valve must operate.
- Replace the screw <V> with the plastic pipe <T>.
- Make sure that the pressure in the pump, during the upstroke, hasn't changed.





4.5.2 Double pressure test

When there is no hand pump installed on a unit (i.e.: direct system) the pressure test must be carried out with an external hand pump fitted with a flexible pipe to be connected to the unit and with a gauge for the control of pressure.
Connect the hand pump it is possible to use one of the pressure switches <51> 1/4 Gas Female type.
When it is used the hand pump equipped with the unit, see chapter 4.4.1 for installation and adjustment.

Note: Do the test only when the oil temperature is stabilized.

4.5.3 Operating pressure survey

It is possible to measure the different pressures with the issued gauge fitted on the unit (0-100 bar).
When the unit is equipped with the hand pump, the gauge is fitted on its body, however there is a gauge cut-out cock to be closed after the survey.
It is possible to use a gauge with a 1/2 Gas connection through the issued connection supplied with the unit to fit in <M>. This supplementary connection is closed with the above mentioned cock too.
The pressure records to verify are: 1) static loadless, 2) static full load, 3) dynamic upward, 4) dynamic downward.
The static pressure survey must be carried out after the discharging of the dynamic overpressures by shortly pressing the manual downstroke button.

4.5.4 Safety valve pressure setting

To verify the setting value of the overpressure valve close the valve cut-out cock and open the gauge cut-out cock.
Start the upward motor, and press shortly the emergency downstroke button to stabilize the reading value, it must not be higher than 140% of the full load static pressure.
The motor must not operate for more than 5-6 sec.
At the end of the test discharge the pressure with the emergency downstroke button and then close the gauge cut-out cock and open the one of the valve group.
During normal operation make sure that no oil comes out of the discharge hole <F> of the safety valve, otherwise operate as shown in chapter 5.1.1.

4.5.5 Emergency downstroke minimum pressure valve test (not loosening ropes in indirect systems).

When the cabin is blocked on its drives by the parachuting devices, press the emergency downstroke button: the piston must not go down.
The emergency downstroke minimum pressure valve test is composed by a ball and a spring accessible by removing the emergency downstroke button. Its setting is fixed.

4.5.6 Slow downstroke test

Carry out the test only when the oil temperature is stabilized.
Before beginning the test shortly press the emergency downstroke button to discharge possible overpressures in the system circuit and to avoid frictions on guides.
The cabin has to go down 10 mm in 10 min maximum.

5. Maintenance

Before working on the unit make sure that the power switch is off and remember to completely discharge pressure in the system.

5.1 Failures search (Ref. Diagrams and adjustments chapter 4.2)

UPWARD PROBLEMS	POSSIBLE CAUSES	Chapter
The motor hardly turns or gives vibrations	- Wrong motor connection	(3.2)
The system does not go up and the motor works regularly	- Upward start throttle <10> obstructed - Safety valve <5> lacking	(5.1.1) (5.1.1)
The system starts with a jerk	- Mechanical starting <7>: verify the adjustment and sliding of the valve	
Slow speed at full load	- Adjustment of the safety valve <5>	(4.5.4)
The system jerks in deceleration	- See above	(4.5.4)
The system does not decelerate and it does not stop on the floor	- Gear motor <6> - Low speed limit switch <12>	
The hand pump doesn't work	- To prime and adjust the pump	(4.4.1)

DOWNWARD PROBLEMS	POSSIBLE CAUSES	Chapter
The system does not start	- Downstroke solenoid valve <16> - Throttle <98> obstructed - Pressure switch <A> blocked	(5.1.2)
Slow speed	- Downstroke solenoid valve <16> - Pressure regulator <A>	(5.1.2)
The system stops after a while and the pressure in the unit falls to zero	- Pressure regulator <A> blocked (the valve on the piston operates)	
There is no deceleration and the system does not stop to the floor.	- Gear motor <6> - Low speed limit switch <12>	
The system lowers without leaking in the circuit.	- Non-return valve gasket <B> - Downstroke solenoid valve lacking <16> - Emergency downstroke cock <17> - Non-return hand pump valve <28>	(5.1.3) (5.1.2) (5.1.2) (5.1.2)
The test of not loosening ropes in emergency downstroke, gives a negative result	- Emergency downstroke minimum pressure valve <25> lacking or its low setting	(5.1.2)

5.1.1 Intervention on the safety valve circuit

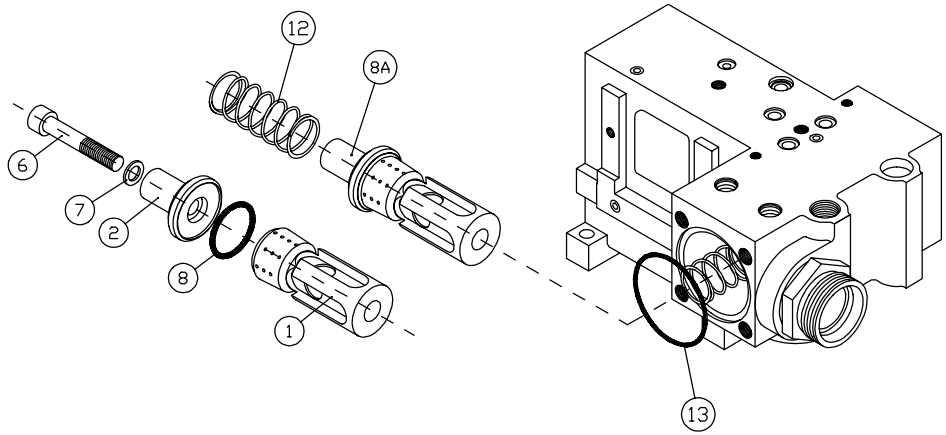
To avoid upward problems related with the safety valve circuit it is important to operate as follows:
- Remove the throttle that controls the upstroke starting <10> and then replace its screw without the throttle.
- Anticlockwise loosen the adjusting screw of the safety valve <5>, note down the position first, till when the spring does not operate anylonger.
- Start the main motor and leave it working for 5-7 sec., so that the system does not start, but the oil flows in the safety valve circuit and cleans it.
- Stop the motor and check that the throttle is completely free, then replace it on the screw <10>.
- Adjust the screw <5> in the original position and then verify the setting of the safety valve as shown in chapter 4.5.4

5.1.2 Intervention on solenoid valves and on ball valves

Verify the electrical excitation and the deenergization of the coil of the solenoid valve
Make sure no impurities are under the ball.
If necessary, change the ball using an "A" type and give a firm stroke on the ball when it is in its seat.

5.1.3 Change of the non return valve gasket

After having relieved pressure from the valve group remove the hand pump or the gauge plate.
Then operate to the spring and to the non-return valve.
Anticlockwise turn the screw <6> to open the valve, keep attention not to damage the sliding parts of side <1>.
The measures of the "OR" gasket are: wire diameter 3.53 mm., internal diameter 31,34 mm.
Place the new gasket in the valve seat and press it controlling if any irregularity on the circumference may occur.
Replace the valve in the group controlling that the sliding is free.



5.2 Periodical checks

The following checks must be carried out immediately after installation, afterwards it is recommended to carry them out with the stressed periodicity

CHECK TYPE		PERIODICITY	Chapter
Valve group seal		every 1-2 months	(4.5.6)
Oil level		every 1-2 months	
Oil Conditions	after 1-2 months then	every year	
Motor protection efficiency		every year	
Filter	after 1-2 months then	every year (substitution every three years)	
Working pressure		every year	(4.5.3)
Safety valve pressure setting		every year	(4.5.4)
Double static pressure test		every year	(4.5.2)
Dropping test		every year	(4.5.1)
Emergency downstroke minimum pressure valve test (not loosening ropes in indirect systems)		every year	(4.5.5)
Plates and diagrams		every year	Annex 1

5.3 Emptying reservoir

To empty the reservoir is necessary to remove the superior cover and to pour the oil with a pump.
To remember before working on the unit make sure that the power switch is off.
For the operations of emptying it is advised to use an electric pump from the followings characteristics:
45 L/min, 17 Hm, 440 W. and it is recommended to read the instructions of the pump before using it.
If the emptying is performed for the change of oil to have care to clean the reservoir from the possible dregs deposited inside.

6. Declaration of conformity

We Start Elevator Hydraulik
29010 Incrociata di Calendasco (Piacenza)

Declare under our sole responsability that the product:

Type 90/M
Serial No. from 98 00000

to which this declaration relates, is in compliance with:

- the *EN 81.2 1998* standard
- the *89/336/EC* directive, according to *EN 12015 1998* and *EN 12016 1998* standards

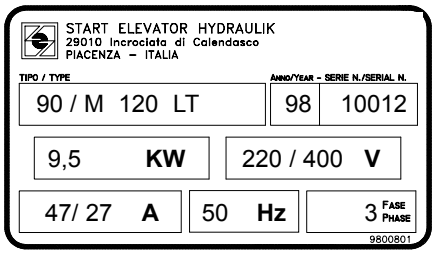
Calendasco, li 30/06/99

Start Elevator Hydraulik
Lucchini Pier Guido Direttore Generale

Annex 1

PUMP UNIT PLATES

A1.1 Identification plate



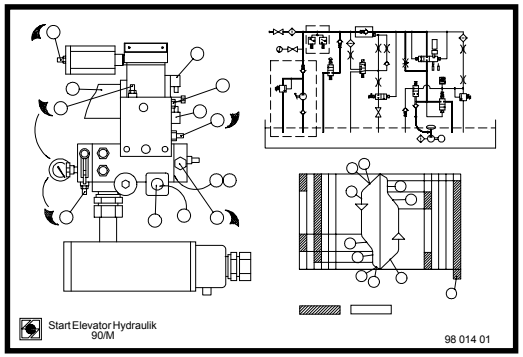
Color: GREY
Dimensions: 100 x 60 mm
Location: under cover top right

A1.2 Forwarding plate

ORDER CONFIRMATION NUMBER
NAME OF CUSTOMER
CUSTOMER REFERENCE

Color: WHITE
Dimensions: 200 x 70 mm
Location: upon cover top right

A1.3 Adjustment plate



Color: GREY
Dimensions: 280 x 200 mm
Location: under cover left

A1.4 Emergency upward plate

Salita di emergenza
Manoeuvre de secours montée
Emergency upward

Color: YELLOW
Dimensions: 75 x 25 mm
Location: on the hand pump valve group

A1.5 Emergency downward plate

Discesa di emergenza
Manoeuvre de secours descente
Emergency downward

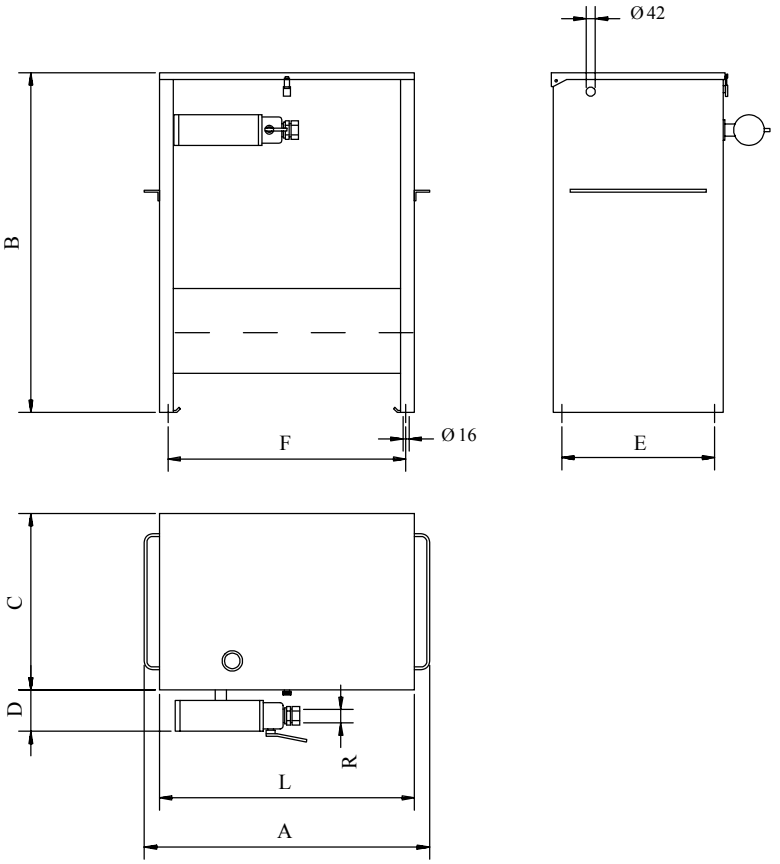
Color: RED
Dimensions: 75 x 25 mm
Location: on the pump unit top near the red switch

A1.6 Electrical motor plate

Location: on the connecting box in the pump unit

Annex 2

DIMENSIONS OF THE PUMP UNIT



Tank type	Pump type [l/min]	DIMENSIONS [mm]								CAPACITY [litres]		WEIGHT [Kg]
		A	B	C	D	E	F	L	R	Min. Level	Available	
90 / 01	da 55 a 150	830	1000	500	120	450	700	750	35 - G 1"1/4	65	135	150
90 / 02 / A	150 KW = 16	930	1000	500	120	450	800	850	35 - G 1"1/4	75	150	165
	da 180 a 205	930	1000	500	130	450	800	850	42 - G 1"1/2	75	150	
90 / 02	da 180 a 205 KW>=20	1080	1000	600	130	550	950	1000	42 - G 1"1/2	100	210	206
	da 250 a 300	1080	1000	600	130	550	950	1000	42 - G 1"1/2	100	210	
90 / 03	da 250 a 380 KW>=24	1180	1100	600	130	550	950	1100	42 - G 1"1/2	110	300	230

Annex 3

MOTOR ABSORPTION

THREE PHASE MOTORS 50 HZ		KW	3	4.4	6	7.7	9.5	12	16	20	24	33
		HP	4.08	5.98	8.16	10.5	12.9	16.3	21.7	27.2	32.6	44.8
220 V	NOMINAL CURRENT		14.2	19.4	26.5	32	39	47	62	74	92	121
	CURRENT (TORQUE 30% HIGHER THAN NOMINAL		18.7	25.5	36	41	51	64	81	99	121	159
	DIRECT STARTING CURRENT		40	55	76	90	118	145	199	248	312	475
380 V	NOMINAL CURRENT		8.2	11.2	15.3	18.4	22.5	27	36	43	53	70
	CURRENT (TORQUE 30% HIGHER THAN NOMINAL		10.8	14.7	20.7	23.8	29.5	37	47	57	70	92
	DIRECT STARTING CURRENT		23	32	44	52	68	84	115	143	180	274
400 V	NOMINAL CURRENT		8	11	15.1	18	21.8	26.5	35	42	50	66
	CURRENT (TORQUE 30% HIGHER THAN NOMINAL		10.3	13.9	19.7	22.6	28	35	45	54	66	87
	DIRECT STARTING CURRENT		24	34	46	54	72	88	121	150	189	288
415 V	NOMINAL CURRENT		7.7	10.6	14.6	17.3	21	25.5	34	40	48	64
	CURRENT (TORQUE 30% HIGHER THAN NOMINAL		10	13.4	19	21.8	27	33.7	43	52	64	84
	DIRECT STARTING CURRENT		23.1	33	44	52	69	85	117	145	182	278
		Weight kg	18	20	21	23	26	29	34	41	55	70

CURRENT WITH λ–Δ STARTING = 1.2 NOMINAL CURRENT

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SYSTEM DETAILS

System Reference:

Year: Serial number:

Pump Liters Power

Static pressure loadless: full load:

Full load upward dinamic pressure : downward:

Safety valve pressure setting:

BY TECHNICAL OFFICE
90/M 2-2003

Start Elevator Srl

COMPONENTI OLEODINAMICI PER ASCENSORI

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Cap. Soc. Euro 40.000 i.v.

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