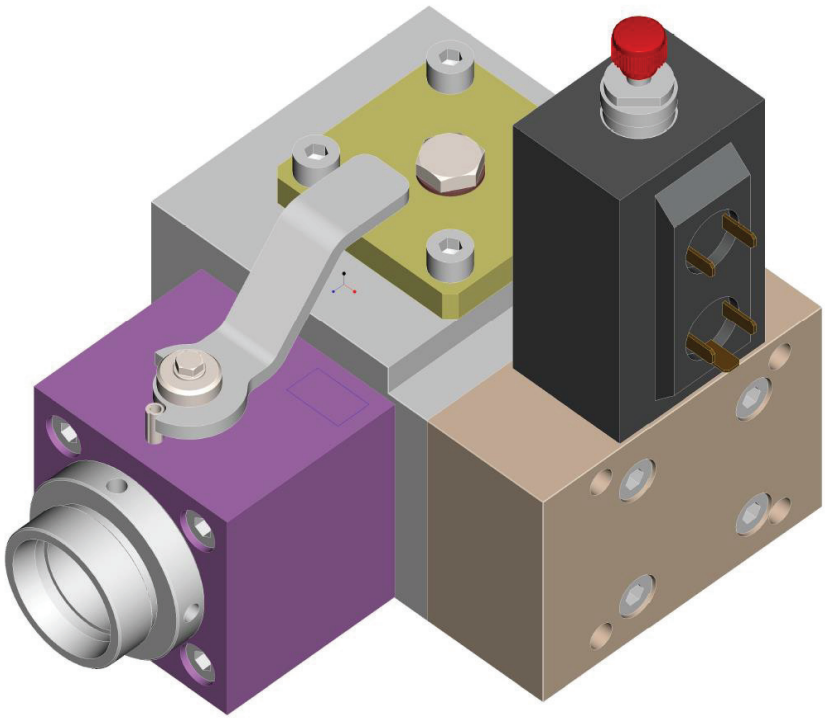
Compilato da/Compiled by: Galparoli

Approvato da/Approved by_____

# Safety Valve HM-SV

## Installation, maintenance and startup guide



# Summary

# 1 General purpose and important notes

The Safety Valve HSV installation, maintenance and start up guide is an integral part of the product HM-SV. It describes the product's safe use and maintenance in all operative phases and is valid for all models that are referred to.
This guide is intended for operators, installers and repair technician.

## *1.1 Conformity*

The product is designed and was developed in conformity with the following directives and standards:

- Lift Directive 2014/33/UE
- EN81-2:1998 + A3:2009
- EN 81-20:2014
- EN 81-50:2014

## *1.2 Intended use*

The safety valve HM-SV is a component of the unintended car movement protection in down direction according to EN81-2:1998 + A3:2009, EN 81-20:2014 e EN 81-50:2014.

Combination of the safety valve HM-SV with an unintended car movement-detecting component and an actuating component, which are subject to individual approvals will constitute the complete protection system that entirely fulfils the requirements of a safety component.

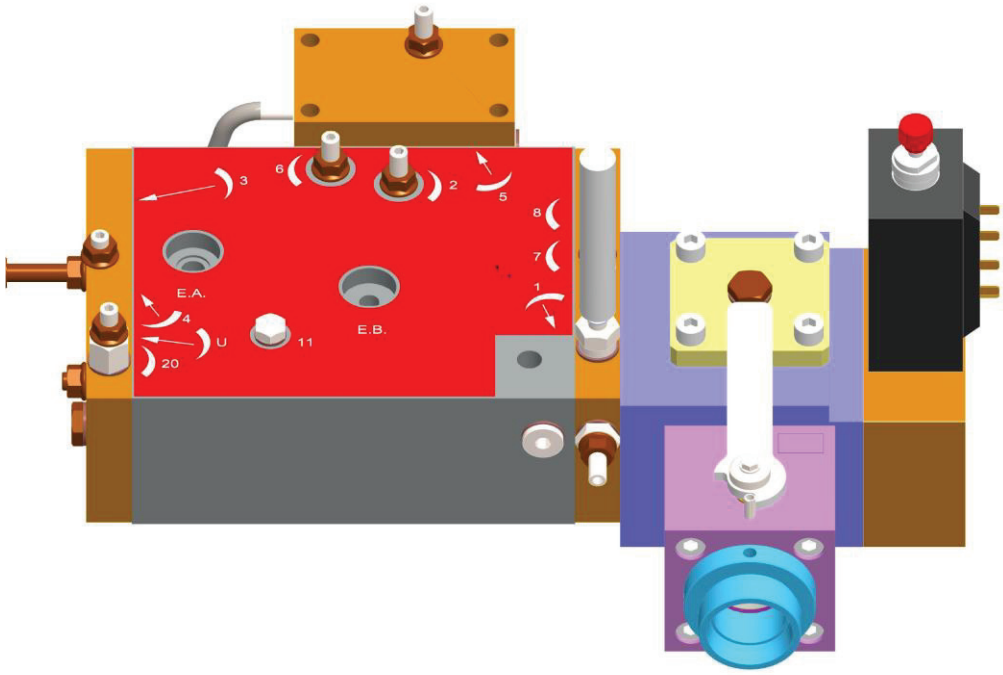
If the power supply of HM-SV solenoid 12:A is correctly interrupted (see chapter 2.5.1.1 ) and all the operational limits are being observed (see chapter 2.6.1), the valve respects the requirements par.,5.6.7.5 e 5.6.7.6 EN 81-20:2014 independently from oil flow, load pressure and oil viscosity.

Hence proof of the function of the complete protection means can be provided by a travel at reduced speed (e.g. inspection speed).

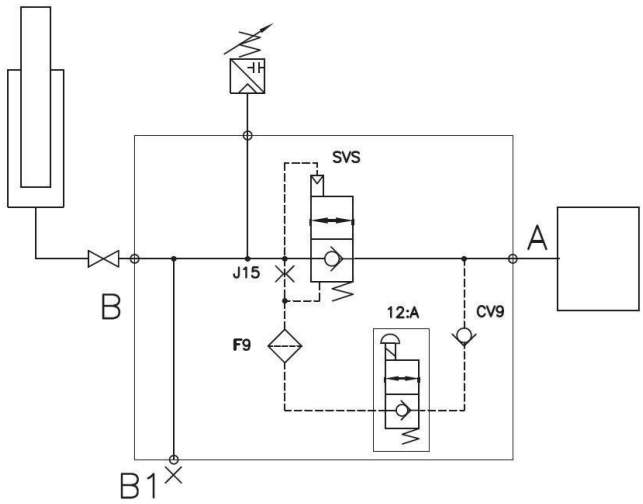
The product must not be handled in any way by unauthorised persons.

# 2 Description of Safety Valve HM-SV

## 2.1 Configuration

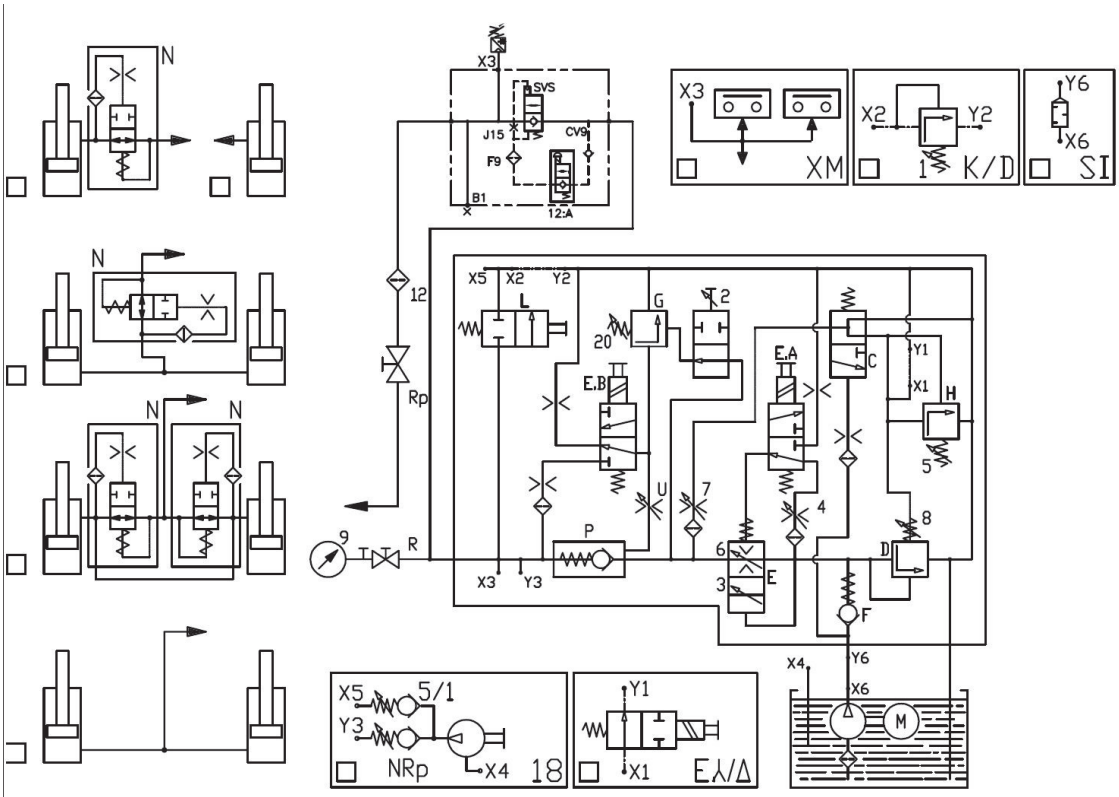



## 2.2 HM-SV valve hydraulic and electrical diagram




| Name | Description |
|---|---|
| A | From the power unit |
| B | To the cylinder |
| B1 | To the cylinder (alternate exit) |
| SVS | Main spool |
| J15 | Nozzle |
| F9 | Pilot filter |
| CV9 | Check valve |
| 12:A | Pilot valve |

## 2.3 Hydraulic scheme: MORIS main valve with HM-SV safety valve




### FUNCTIONAL SIMBOLOGY:

| | |
|---|---|
| C | VALVE FOR SAFETY PRESSURE INSERTING |
| CV9 | HM-SV CHECK VALVE |
| D | STEP/SEQUENCE VALVE |
| E | FLOW RATE REGULATION VALVE |
| E.A | VALVE FOR HIGH SPEED IN UP/DOWNWARD DIRECTION |
| E.B | DOWNWARD VALVE |
| E.Δ/Δ | STAR DELTA, STAR VALVE (ON REQUEST) |
| F | ONE WAY FLOW VALVE |
| F9 | HM-SV PILOT FILTER |
| G | MODULATING VALVE |
| H | MAX. PRESSURE VALVE |
| J15 | HM-SV NOZZLE |
| L | ROD MANUAL DOWNWARD VALVE |
| N | SAFETY VALVE TO PREVENT ROD FAILURE |
| $NR_P$ | NONRETURN VALVE OF THE HAND PUMP |
| P | NONRETURN VALVE |
| R | GAUGE STOPCOCK WITH TEST JOINT |
| $R_P$ | MAIN STOPCOCK |
| SI | ATTENUATION BOX |
| SVS | HM-SV MAIN SPOOL |
| XM | PRESSURE SWITCH FOR MIN/MAX PRESSURE |
| K/D | CONTROL VALVE FOR ROD COUNTERPRESSURE |
| 12:A | HM-SV PILOT VALVE |

### ADJUSTMENT SCREW FOR:

| | |
|---|---|
| 1 | ROD COUNTERPRESSURE |
| 2 | REGULATION OF TEST VALVE FOR ROD FAILURE |
| 3 | REGULATION OF HIGH SPEED BALANCE IN UP/DOWNWARD DIRECTION |
| 4 | 1st DECELERATION PHASE |
| 5 | MAX. PRESSURE |
| 5/1 | OVERPRESSURE VALVE OF THE HAND PUMP |
| 6 | 2nd DECELERATION PHASE |
| 7 | UPWARD ACCELERATION |
| 8 | VALVE 'D' COUNTERPRESSURE |
| 9 | PRESSURE GAUGE |
| 12 | FILTER |
| 18 | HAND PUMP |
| 20 | DOWNWARD SPEED |
| U | DOWNWARD DEPARTURE DEVICE |

### FUNCTIONAL COMPONENTS

| | |
|---|---|
| ☒ | AVAILABLES |
| ☐ | NOT AVAILABLES |

## 2.4 Working description

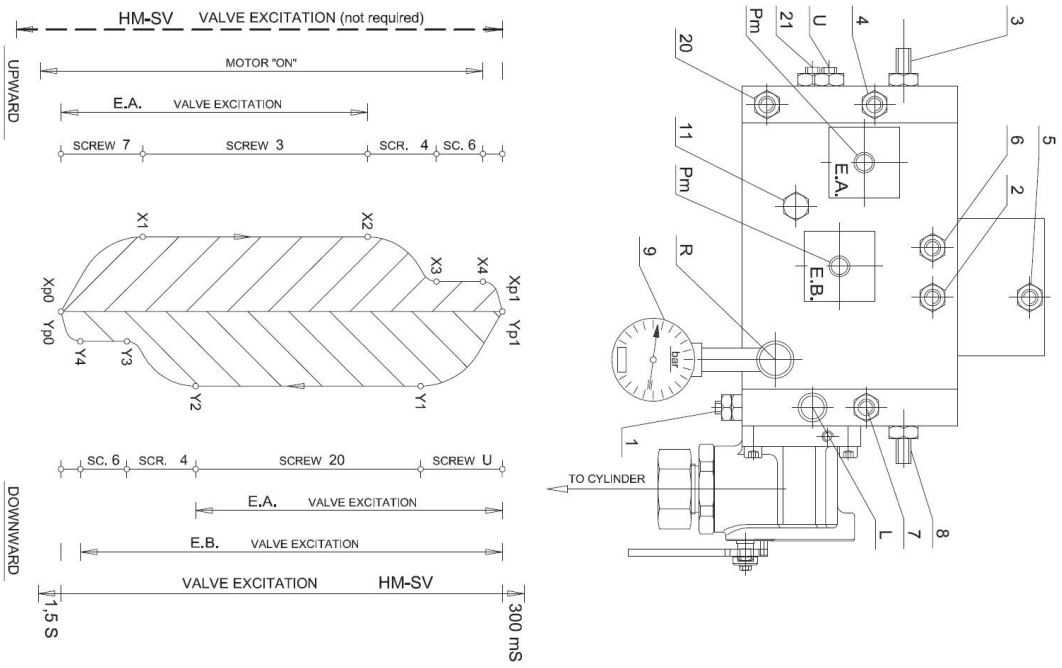
The Safety Valve HM-SV is an electrically pilot operated check valve for hydraulic lifts. It must be installed between the cylinder and the main valve, as close as possible to the latter. It enables the oil flow from the lift valve A to the cylinder B during travel UP, and does not allow the flow in opposite direction (from B to A) unless the pilot valve 12:A is energised.

### 2.4.1 Integration of the safety valve HM-SV into the lift control

#### *2.4.1.1 State of the Safety Valve solenoid vs. State of the lift*

| State of the lift | State of the HM-SV coil | | | Remarks |
|---|---|---|---|---|
| | Must be energised | Must be de-energised | Arbitrary | |
| Travel UP with door closed | | | **X** | No influence of the Safety Valve during travel UP |
| Travel DOWN with door closed | **X** | | | |
| Standstill with door open | **X** | | | For re-levelling |
| Standstill with door closed, travel DOWN to start immediately | **X** | | | The Safety Valve must be energised at least 300 ms before travel starts, else the travel control of the lift valve can be negatively affected |
| Longer standstill period with door closed | | **X** | | For increased Energy Saving |
| Unintended travel UP with door open | | | **X** | No influence of the Safety Valve during travel UP, lift must be stopped by disconnection of the motors contactors |
| Unintended travel DOWN with door open | | **X** | | Interruption to the power supply of the Safety Valve solenoid when the unlocking zone is vacated (emergency stop); see notes on the positioning of the shaft switches $d_{max}$ in chapter 2.3.1.3 |
| Hand pump operation | | | **X** | No influence of the Safety Valve during the travel UP |
| Emergency lowering, electrical | **X** | | | By means of the optional emergency power winding of the Safety Valve |
| Emergency lowering, manual | | | **X** | By means of manual release of the Safety Valve |

### 2.4.1.2 *Signal sequence during the normal operations of MORIS valve 15-250, direct starting*




ADJUSTMENT

SCREW- 1 ADJUSTMENT FOR ROD COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE

SCREW- 2 ADJUSTMENT AND TEST OF SAFETY VALVE FOR ROD FAILURE (SEE DWG N°9345)

SCREW- 3 ADJUSTMENT FOR HIGH SPEED BALANCING IN UP/DOWN DIRECTION - TIGHTEN SCREW TO REDUCE SPEED

SCREW- 4 ADJUSTMENT FOR 1ST DECELERATION PHASE - SCREW DOWN FOR A SOFT DECELERATION

SCREW- 5 ADJUSTMENT FOR MAX. PRESSURE - TIGHTEN SCREW TO INCREASE PRESSURE

SCREW- 6 ADJUSTMENT FOR LOW SPEED IN UPWARD AND DOWNWARD DIRECTION - TIGHTEN SCREW TO REDUCE SPEED

SCREW- 7 ADJUSTMENT FOR DEPARTURE IN UPWARD DIRECTION - TIGHTEN SCREW FOR SOFT DEPARTURE (1)

SCREW- 8 ADJUSTMENT FOR VALVE "D" COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE

9 PRESSURE GAUGE

SCREW- 11 CONTROL OF PRESSURE SEAL BY NONRETURN VALVE WITH STANDSTILL SYSTEM

SCREW- 20 ADJUSTMENT FOR DOWNWARD DIRECTION SPEED - TIGHTEN SCREW TO INCREASE SPEED

E.A. VALVE FOR HIGH SPEED IN UP/DOWNWARD DIRECTION

E.B. DOWNWARD DIRECTION VALVE

L PUSH BUTTON FOR MANUAL EMERGENCY IN DOWNWARD DIRECTION

Pm MANUAL PUSH BUTTON FOR STARTING EMERGENCY VALVE

R TAP TO CUT OFF PRESSURE GAUGE

SCREW- U DOWNWARD DEPARTURE DEVICE - TIGHTEN SCREW TO REDUCE SPEED (1)

NOTE (1): DO NOT TIGHTEN COMPLETELY, SINCE DEPARTURE MOVEMENT MAY BE INTERRUPTED

OPERATION

| DOWNWARD | | UPWARD | |
|---|---|---|---|
| Yp1 → Y1 | | Xp0 → X1 | MOTOR SUPPLY AND E.A. VALVE EXCITATION |
| Y1 → Y2 | | X1 → X2 | ACCELERATION IN UPWARD DIRECTION - ADJUST USING SCREW 7 |
| Y2 → Y3 | | X2 → X3 | CONSTANT HIGH SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 3 |
| Y3 → Y4 | | X3 → X4 | 1ST DECELERATION PHASE FROM HIGH TO LOW SPEED - E.A. DE-ENERGIZED ADJUST USING SCREW 4 |
| Y4 → Yp0 | | X4 → Xp1 | CONSTANT LOW SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 6 2ND DECELERATION PHASE TO FLOOR LEVEL (MOTOR OFF) |

E.A./E.B. VALVES EXCITATION - ACCELERATION IN DOWNWARD DIRECTION ADJUST USING SCREW U

CONSTANT HIGH SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 20

1ST DECELERATION PHASE - E.A. VALVE DE-ENERGIZED ADJUST USING SCREW 4

CONSTANT LOW SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 6

2ND DECELERATION PHASE TO FLOOR LEVEL - E.B. VALVE DE-ENERGIZED

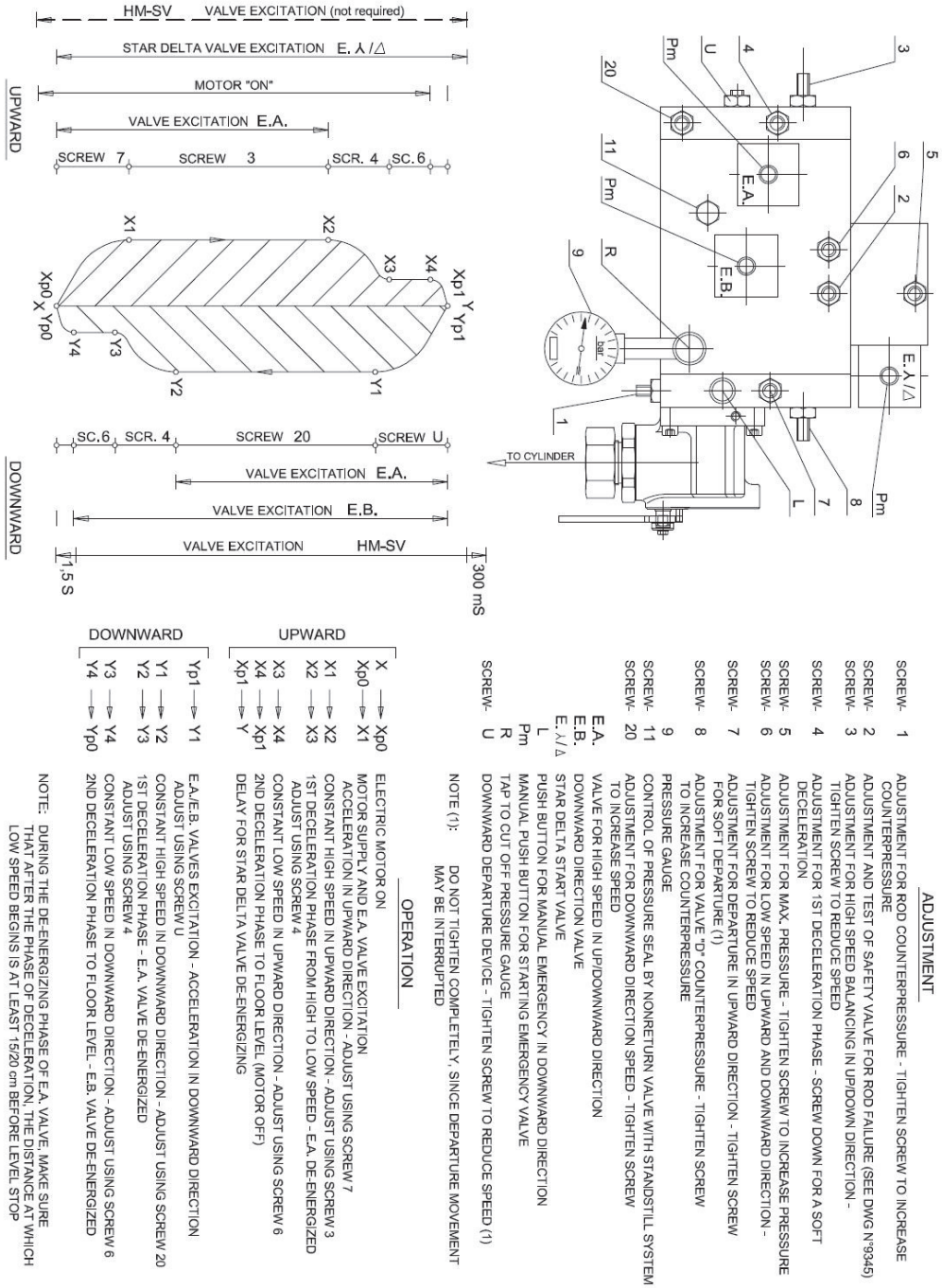
NOTE: DURING THE DE-ENERGIZING PHASE OF E.A. VALVE, MAKE SURE THAT AFTER THE PHASE OF DECELERATION, THE DISTANCE AT WHICH LOW SPEED BEGINS IS AT LEAST 15/20 cm BEFORE LEVEL STOP

**NOTE:** *with this configuration the Safety Valve HM-SV does not work as a redundant safety device, therefore does NOT require monitoring.*

**NOTE2:** *during UP-travel, the energization of the HM-SV coil is arbitrary (see 2.4.1.1)*

**NOTE3:** *see HM-SV application range at paragraph 2.5.1*

### 2.4.1.3 *Signal sequence during the normal operations of MORIS valve 15-250, star-delta starting*




| ADJUSTMENT | | |
|---|---|---|
| SCREW- 1 | ADJUSTMENT FOR ROD COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE | |
| SCREW- 2 | ADJUSTMENT AND TEST OF SAFETY VALVE FOR ROD FAILURE (SEE DWG N°9345) | |
| SCREW- 3 | ADJUSTMENT FOR HIGH SPEED BALANCING IN UP/DOWN DIRECTION - TIGHTEN SCREW TO REDUCE SPEED | |
| SCREW- 4 | ADJUSTMENT FOR 1ST DECELERATION PHASE - SCREW DOWN FOR A SOFT DECELERATION | |
| SCREW- 5 | ADJUSTMENT FOR MAX. PRESSURE - TIGHTEN SCREW TO INCREASE PRESSURE | |
| SCREW- 6 | ADJUSTMENT FOR LOW SPEED IN UPWARD AND DOWNWARD DIRECTION - TIGHTEN SCREW TO REDUCE SPEED | |
| SCREW- 7 | ADJUSTMENT FOR DEPARTURE IN UPWARD DIRECTION - TIGHTEN SCREW FOR SOFT DEPARTURE (1) | |
| SCREW- 8 | ADJUSTMENT FOR VALVE "D" COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE | |
| SCREW- 9 | PRESSURE GAUGE | |
| SCREW- 11 | CONTROL OF PRESSURE SEAL BY NONRETURN VALVE WITH STANDSTILL SYSTEM | |
| SCREW- 20 | ADJUSTMENT FOR DOWNWARD DIRECTION SPEED - TIGHTEN SCREW TO INCREASE SPEED | |
| E.A. | VALVE FOR HIGH SPEED IN UP/DOWNWARD DIRECTION | |
| E.B. | DOWNWARD DIRECTION VALVE | |
| E.Y /Δ | STAR DELTA START VALVE | |
| L | PUSH BUTTON FOR MANUAL EMERGENCY IN DOWNWARD DIRECTION | |
| Pm | MANUAL PUSH BUTTON FOR STARTING EMERGENCY VALVE | |
| R | TAP TO CUT OFF PRESSURE GAUGE | |
| SCREW- U | DOWNWARD DEPARTURE DEVICE - TIGHTEN SCREW TO REDUCE SPEED (1) | |

NOTE (1): DO NOT TIGHTEN COMPLETELY, SINCE DEPARTURE MOVEMENT MAY BE INTERRUPTED

| UPWARD | | DOWNWARD | |
|---|---|---|---|
| X → Xp0 | OPERATION | Yp1 → Y1 | |
| Xp0 → X1 | ELECTRIC MOTOR ON | Y1 → Y2 | E.A./E.B. VALVES EXCITATION - ACCELERATION IN DOWNWARD DIRECTION ADJUST USING SCREW U |
| X1 → X2 | MOTOR SUPPLY AND E.A. VALVE EXCITATION | Y2 → Y3 | CONSTANT HIGH SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 20 |
| X2 → X3 | ACCELERATION IN UPWARD DIRECTION - ADJUST USING SCREW 7 | Y3 → Y4 | 1ST DECELERATION PHASE - E.A. VALVE DE-ENERGIZED ADJUST USING SCREW 4 |
| X3 → X4 | CONSTANT HIGH SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 3 | Y4 → Yp0 | CONSTANT LOW SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 6 |
| X4 → Xp1 | 1ST DECELERATION PHASE FROM HIGH TO LOW SPEED - E.A. DE-ENERGIZED ADJUST USING SCREW 4 | | 2ND DECELERATION PHASE TO FLOOR LEVEL - E.B. VALVE DE-ENERGIZED |
| Xp1 → Y | CONSTANT LOW SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 6 | | |
| | 2ND DECELERATION PHASE TO FLOOR LEVEL (MOTOR OFF) | | |
| | DELAY FOR STAR DELTA VALVE DE-ENERGIZING | | |

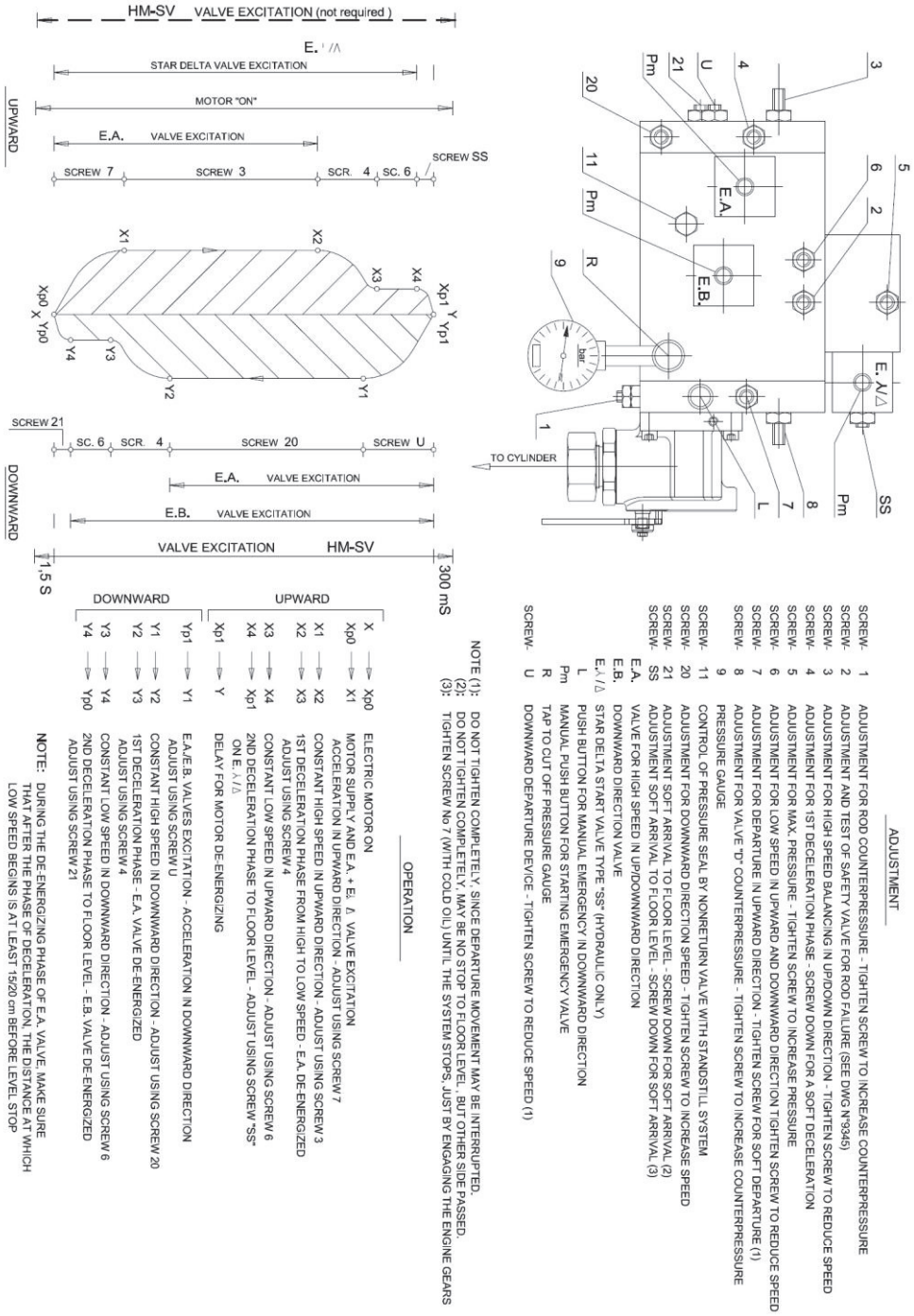
NOTE: DURING THE DE-ENERGIZING PHASE OF E.A. VALVE, MAKE SURE THAT AFTER THE PHASE OF DECELERATION, THE DISTANCE AT WHICH LOW SPEED BEGINS IS AT LEAST 15/20 cm BEFORE LEVEL STOP

**NOTE:** ***with this configuration the Safety Valve HM-SV does not work as a redundant safety device, therefore does NOT require monitoring.***

**NOTE2:** ***during UP-travel, the energization of the HM-SV coil is arbitrary (see 2.4.1.1)***

**NOTE3:** ***see HM-SV application range at paragraph 2.5.1***

### 2.4.1.4 *Signal sequence during the normal operations of MORIS valve 15-250, star-delta with soft-stop*




ADJUSTMENT

SCREW- 1 ADJUSTMENT FOR ROD COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE
SCREW- 2 ADJUSTMENT AND TEST OF SAFETY VALVE FOR ROD FAILURE (SEE DWG N°9345)
SCREW- 3 ADJUSTMENT FOR HIGH SPEED BALANCING IN UP/DOWN DIRECTION - TIGHTEN SCREW TO REDUCE SPEED
SCREW- 4 ADJUSTMENT FOR 1ST DECELERATION PHASE - SCREW DOWN FOR A SOFT DECELERATION
SCREW- 5 ADJUSTMENT FOR MAX. PRESSURE - TIGHTEN SCREW TO INCREASE PRESSURE
SCREW- 6 ADJUSTMENT FOR LOW SPEED IN UPWARD AND DOWNWARD DIRECTION TIGHTEN SCREW TO REDUCE SPEED
SCREW- 7 ADJUSTMENT FOR DEPARTURE IN UPWARD DIRECTION - TIGHTEN SCREW FOR SOFT DEPARTURE (1)
SCREW- 8 ADJUSTMENT FOR VALVE "D" COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE
SCREW- 9 PRESSURE GAUGE
SCREW- 11 CONTROL OF PRESSURE SEAL BY NONRETURN VALVE WITH STANDSTILL SYSTEM
SCREW- 20 ADJUSTMENT FOR DOWNWARD DIRECTION SPEED - TIGHTEN SCREW TO INCREASE SPEED
SCREW- 21 ADJUSTMENT SOFT ARRIVAL TO FLOOR LEVEL - SCREW DOWN FOR SOFT ARRIVAL (2)
SCREW- SS ADJUSTMENT SOFT ARRIVAL TO FLOOR LEVEL - SCREW DOWN FOR SOFT ARRIVAL (3)
E.A. VALVE FOR HIGH SPEED IN UP/DOWNWARD DIRECTION
E.B. DOWNWARD DIRECTION VALVE
E.A./Δ STAR DELTA START VALVE TYPE "SS" (HYDRAULIC ONLY)
L PUSH BUTTON FOR MANUAL EMERGENCY IN DOWNWARD DIRECTION
Pm MANUAL PUSH BUTTON FOR STARTING EMERGENCY VALVE
R TAP TO CUT OFF PRESSURE GAUGE
SCREW- U DOWNWARD DEPARTURE DEVICE - TIGHTEN SCREW TO REDUCE SPEED (1)

NOTE (1): DO NOT TIGHTEN COMPLETELY; SINCE DEPARTURE MOVEMENT MAY BE INTERRUPTED.
(2): DO NOT TIGHTEN COMPLETELY; MAY BE NO STOP TO FLOOR LEVEL - BUT OTHER SIDE PASSED.
(3): TIGHTEN SCREW No 7 (WITH COLD OIL) UNTIL THE SYSTEM STOPS, JUST BY ENGAGING THE ENGINE GEARS

OPERATION

ELECTRIC MOTOR ON
MOTOR SUPPLY AND E.A. + E. Y/Δ VALVE EXCITATION
ACCELERATION IN UPWARD DIRECTION - ADJUST USING SCREW 7
CONSTANT HIGH SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 3
1ST DECELERATION PHASE FROM HIGH TO LOW SPEED - E.A. DE-ENERGIZED
ADJUST USING SCREW 4
CONSTANT LOW SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 6
2ND DECELERATION PHASE TO FLOOR LEVEL - ADJUST USING SCREW "SS" ON E. Y/Δ
DELAY FOR MOTOR DE-ENERGIZING
E.A./E.B. VALVES EXCITATION - ACCELERATION IN DOWNWARD DIRECTION
ADJUST USING SCREW U
CONSTANT HIGH SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 20
1ST DECELERATION PHASE - E.A. VALVE DE-ENERGIZED
ADJUST USING SCREW 4
CONSTANT LOW SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 6
2ND DECELERATION PHASE TO FLOOR LEVEL - E.B. VALVE DE-ENERGIZED
ADJUST USING SCREW 21

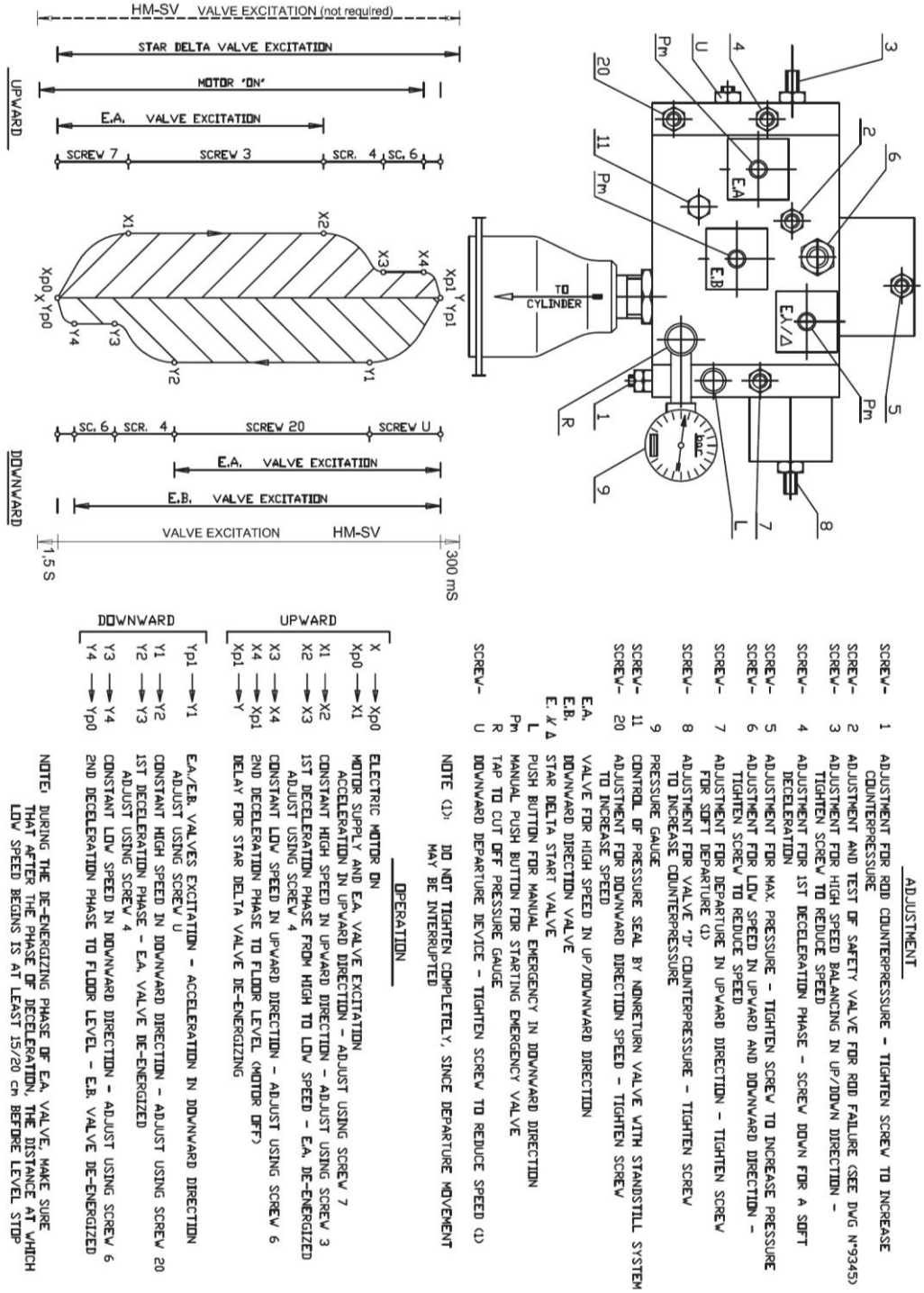
NOTE: DURING THE DE-ENERGIZING PHASE OF E.A. VALVE, MAKE SURE THAT AFTER THE PHASE OF DECELERATION, THE DISTANCE AT WHICH LOW SPEED BEGINS IS AT LEAST 15/20 cm BEFORE LEVEL STOP

**NOTE**: *with this configuration the Safety Valve HM-SV does not work as a redundant safety device, therefore does NOT require monitoring.*

**NOTE2**: *during UP-travel, the energization of the HM-SV coil is arbitrary (see 2.4.1.1)*

**NOTE3**: *see HM-SV application range at paragraph 2.5.1*

### 2.4.1.5 *Signal sequence during the normal operations of MORIS valve 300-650, star-delta*

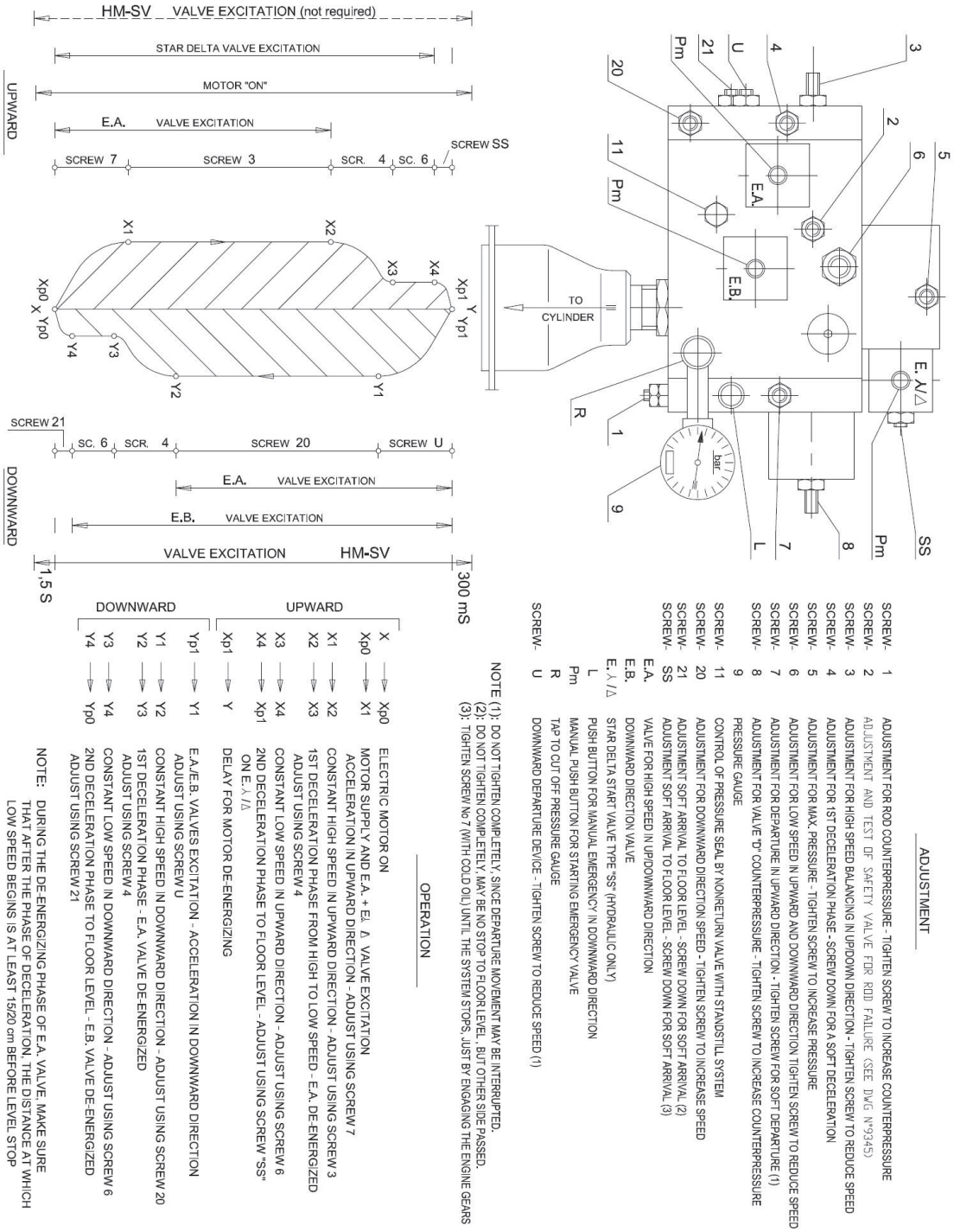



**NOTE**: *with this configuration the Safety Valve HM-SV does not work as a redundant safety device, therefore does NOT require monitoring.*

**NOTE2**: *during UP-travel, the energization of the HM-SV coil is arbitrary (see 2.4.1.1)*

**NOTE3**: *see HM-SV application range at paragraph 2.5.1*

### 2.4.1.6 *Signal sequence during the normal operations of MORIS valve 300-650, star-delta with soft-stop*




| | | ADJUSTMENT |
|---|---|---|
| SCREW- | 1 | ADJUSTMENT FOR ROD COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE |
| SCREW- | 2 | ADJUSTMENT AND TEST OF SAFETY VALVE FOR ROD FAILURE (SEE DWG N°9345) |
| SCREW- | 3 | ADJUSTMENT FOR HIGH SPEED BALANCING IN UP/DOWN DIRECTION - TIGHTEN SCREW TO REDUCE SPEED |
| SCREW- | 4 | ADJUSTMENT FOR 1ST DECELERATION PHASE - SCREW DOWN FOR A SOFT DECELERATION |
| SCREW- | 5 | ADJUSTMENT FOR MAX. PRESSURE - TIGHTEN SCREW TO INCREASE PRESSURE |
| SCREW- | 6 | ADJUSTMENT FOR LOW SPEED IN UPWARD AND DOWNWARD DIRECTION TIGHTEN SCREW TO REDUCE SPEED |
| SCREW- | 7 | ADJUSTMENT FOR DEPARTURE IN UPWARD DIRECTION - TIGHTEN SCREW FOR SOFT DEPARTURE (1) |
| SCREW- | 8 | ADJUSTMENT FOR VALVE "D" COUNTERPRESSURE - TIGHTEN SCREW TO INCREASE COUNTERPRESSURE |
| | 9 | PRESSURE GAUGE |
| SCREW- | 11 | CONTROL OF PRESSURE SEAL BY NONRETURN VALVE WITH STANDSTILL SYSTEM |
| SCREW- | 20 | ADJUSTMENT FOR DOWNWARD DIRECTION SPEED - TIGHTEN SCREW TO INCREASE SPEED |
| SCREW- | 21 | ADJUSTMENT SOFT ARRIVAL TO FLOOR LEVEL - SCREW DOWN FOR SOFT ARRIVAL (2) |
| SCREW- | SS | ADJUSTMENT SOFT ARRIVAL TO FLOOR LEVEL - SCREW DOWN FOR SOFT ARRIVAL (3) |
| E.A. | | VALVE FOR HIGH SPEED IN UP/DOWNWARD DIRECTION |
| E.B. | | DOWNWARD DIRECTION VALVE |
| E.$\lambda$/$\Delta$ | | STAR DELTA START VALVE TYPE "SS" (HYDRAULIC ONLY) |
| L | | PUSH BUTTON FOR MANUAL EMERGENCY IN DOWNWARD DIRECTION |
| Pm | | MANUAL PUSH BUTTON FOR STARTING EMERGENCY VALVE |
| R | | TAP TO CUT OFF PRESSURE GAUGE |
| SCREW- | U | DOWNWARD DEPARTURE DEVICE - TIGHTEN SCREW TO REDUCE SPEED (1) |

NOTE (1): DO NOT TIGHTEN COMPLETELY, SINCE DEPARTURE MOVEMENT MAY BE INTERRUPTED.
(2): DO NOT TIGHTEN COMPLETELY, MAY BE NO STOP TO FLOOR LEVEL - BUT OTHER SIDE PASSED.
(3): TIGHTEN SCREW N° 7 (WITH COLD OIL) UNTIL THE SYSTEM STOPS, JUST BY ENGAGING THE ENGINE GEARS

| DOWNWARD | | UPWARD | | | OPERATION |
|---|---|---|---|---|---|
| | | | | X → Xp0 | ELECTRIC MOTOR ON |
| | | | | Xp0 → X1 | MOTOR SUPPLY AND E.A. + E.$\lambda$/$\Delta$ VALVE EXCITATION |
| | | | | X1 → X2 | ACCELERATION IN UPWARD DIRECTION - ADJUST USING SCREW 7 |
| | | | | X2 → X3 | CONSTANT HIGH SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 3 |
| | | | | X3 → X4 | 1ST DECELERATION PHASE FROM HIGH TO LOW SPEED - E.A. DE-ENERGIZED ADJUST USING SCREW 4 |
| | | | | X4 → Xp1 | CONSTANT LOW SPEED IN UPWARD DIRECTION - ADJUST USING SCREW 6 |
| | | | | Xp1 → Y | 2ND DECELERATION PHASE TO FLOOR LEVEL - ADJUST USING SCREW "SS" ON E.$\lambda$/$\Delta$ |
| | | | | Y → Yp1 | DELAY FOR MOTOR DE-ENERGIZING |
| | | | | Yp1 → Y1 | E.A./E.B. VALVES EXCITATION - ACCELERATION IN DOWNWARD DIRECTION ADJUST USING SCREW U |
| | | | | Y1 → Y2 | CONSTANT HIGH SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 20 |
| | | | | Y2 → Y3 | 1ST DECELERATION PHASE - E.A. VALVE DE-ENERGIZED ADJUST USING SCREW 4 |
| | | | | Y3 → Y4 | CONSTANT LOW SPEED IN DOWNWARD DIRECTION - ADJUST USING SCREW 6 |
| | | | | Y4 → Yp0 | 2ND DECELERATION PHASE TO FLOOR LEVEL - E.B. VALVE DE-ENERGIZED ADJUST USING SCREW 21 |

NOTE: DURING THE DE-ENERGIZING PHASE OF E.A. VALVE, MAKE SURE THAT AFTER THE PHASE OF DECELERATION, THE DISTANCE AT WHICH LOW SPEED BEGINS IS AT LEAST 15/20 cm BEFORE LEVEL STOP

**NOTE:** *with this configuration the Safety Valve HM-SV does not work as a redundant safety device, therefore does NOT require monitoring.*

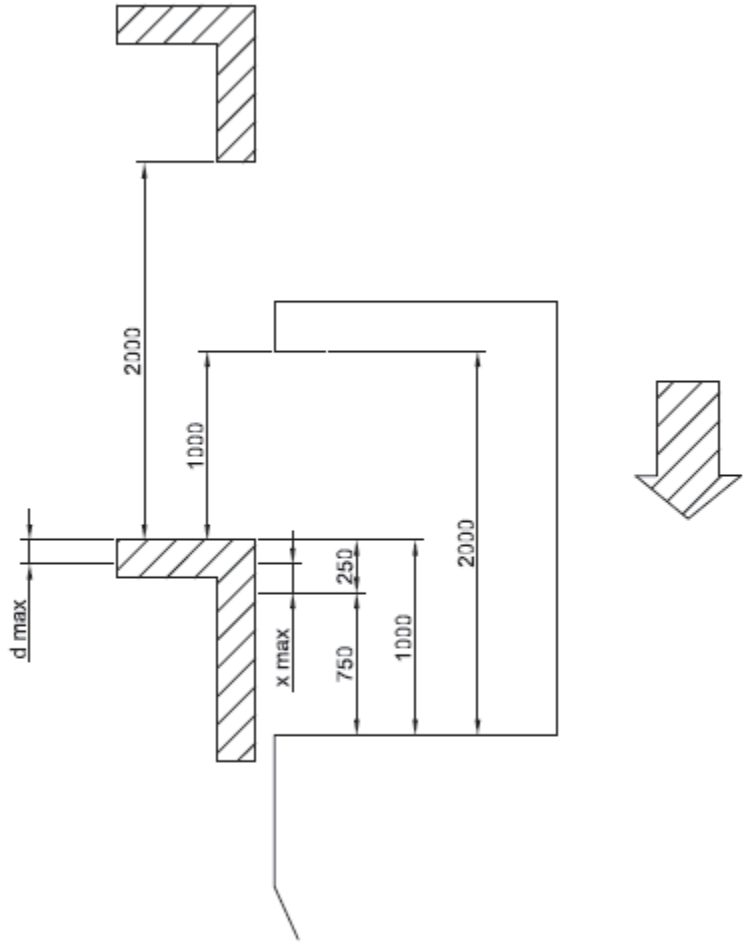
**NOTE2:** *during UP-travel, the energization of the HM-SV coil is arbitrary (see 2.4.1.1)*

**NOTE3:** *see HM-SV application range at paragraph 2.5.1*

### 2.4.1.7 *Positioning of the shaft switches $d_{max}$*

$X_{max} = v_{max} * t$

$d_{max} = 250\ mm - v_{max} * t$




EN81-20:2014 paragraph 5.6.7.5 commands that the lift moving DOWN unintentionally with open door shall be stopped in such a way that:

- the distance between the floor of the car and the floor of the landing will not exceed 1200 mm.
- the free distance from the car door lintel to the floor of the landing shall not be less than 1000 mm.

Both requirements must be fulfilled simultaneously. In order to obtain both criteria simultaneously, the clearance height of the open door would have to be 2200 mm at minimum. The clearance height of many car doors is 2000 mm only. This reduces the maximum permissible distance between the floor of the car and the floor of the landing to 1000 mm.

The highest possible speed at which an hydraulic lift must be stopped by the safety valve HM-SV is the speed slightly below the tripping speed of the over-speed governor or the pipe rupture valve. In the worst case this speed is 1.3 m/s.

The Safety Valve HM-SV is designed in such a way that, considering a speed $v_{max}$ of 1,3 m/s, maximum load and the most unfavourable oil condition (low oil temperature), the lift car will be stopped in 750 mm after de-energising the solenoid of the safety valve HSV. Hence the solenoid of the safety valve HSV must be de-energised when the lift has travelled no more than:

$$1000\ mm - 750\ mm = 250\ mm$$

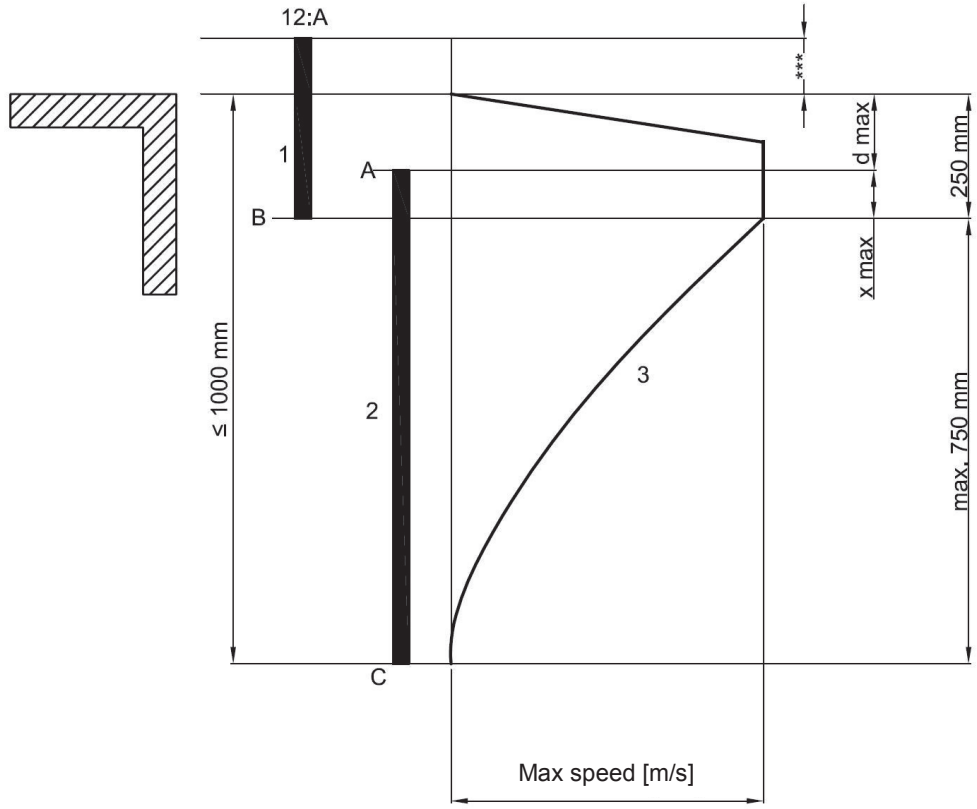
The signal processing time $t$ that the lift controller needs from the discovery of a down-movement with open doors, to the de-energization of the solenoid of the safety valve HSV, gives the distance travelled during signal processing $x_{max}$ according to the formula:

$$x_{max} = v_{max} * t$$

where $v_{max}$ is the lift speed corresponding to the intervention flow of the specific lift rupture valve. Hence the maximum permissible distance $d_{max}$ between the shaft switch (for detecting an unintended movement) and the floor level is:

$$d_{max} = 250\ mm - v_{max} * t$$

### 2.4.1.8 *Functioning of the Safety Valve HSV is case of an unintended travel DOWN.*




Legend:

| Number | Description |
|---|---|
| 1 | HM-SV solenoid 12:A is energized |
| 2 | Open-door unintended movement |
| 3 | Travel curve at unintended travel DOWN with maximum acceleration |
| A | Unintended movement is detected |
| B | Braking system activation, i.e. HM-SV solenoid 12:A is de-energized |
| C | Car stops: the open-door unintended movement has ended |
| *** | 300 ms before the travel DOWN command is present |

## *2.5 Technical data*

### 2.5.1 Working limits

| **Specifications** | **HM-SV 150** | **HM-SV 440** |
|---|---|---|
| Nominal flow range [l/min] | 50 ÷150 | 150 ÷ 440 |
| Operating pressures [bar] | 10 ÷ 50 | 10 ÷ 50 |
| Pressure drop UP, A→B [bar] | < 1 | < 3,7 |
| Pressure drop DOWN, B→A [bar] | < 1,5 | < 5 |
| Viscosity Range [cSt] | 25-200 | 25-200 |
| Oil temperature olio [°C] * | + 5°C ÷ + 60°C | + 5°C ÷ + 60°C |
| Permissible fluid | Hydraulic oil | Hydraulic oil |

* in order to respect the safety valve operating limits, the correct oil type must be chosen, in accordance to the working oil temperatures

### 2.5.2 Port specifications and Dimensions HM-SV 150 and HM-SV 440

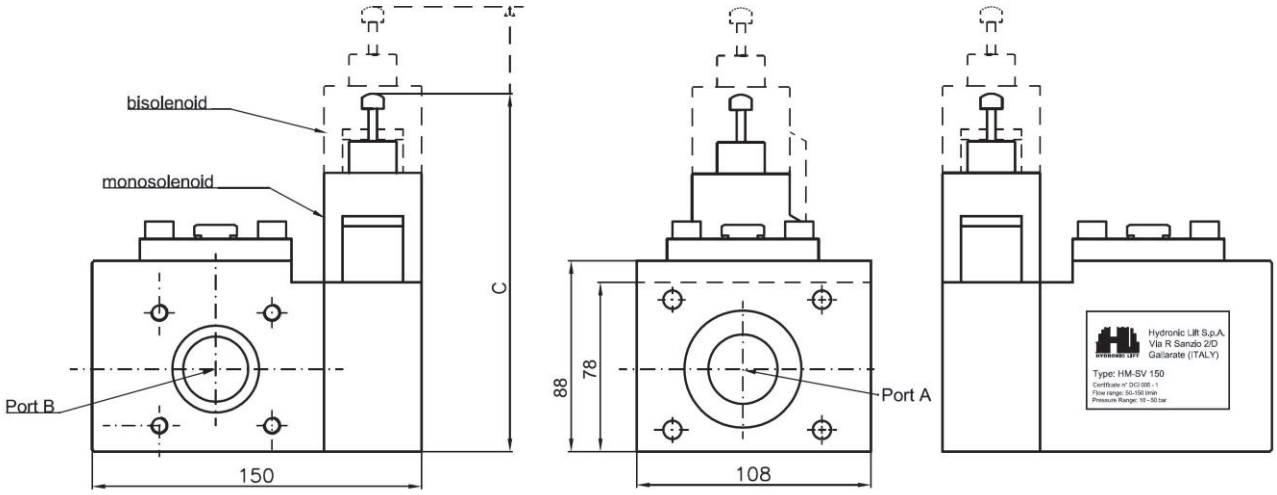



Figure 1

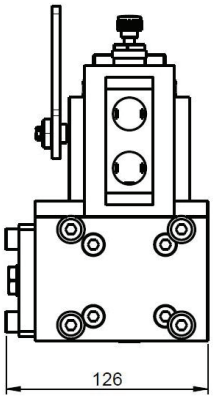



Figure 2 (vertical oil port)

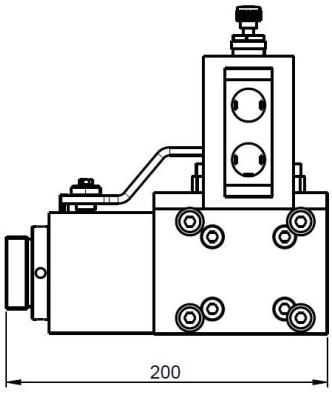



Figure 3 (horizontal oil port)

| Type | Port A | Port B |
|---|---|---|
| HM-SV-150 | Flanged, with 4 screws | • Flanged, with 4 screws; ball valve thread: Male M36x2, M45x2, M52x2 (Fig 2 and Fig 3) |
| HM-SV-440 | Flanged, with 4 screws | • Flanged, with 4 screws; ball valve thread: Male M36x2, M45x2, M52x2 (Fig 2 and Fig 3) |

| Type | Model | | C [mm] | L [mm] | P[mm] |
|---|---|---|---|---|---|
| | Code | Description | | | |
| HM-SV 150 | Z000008AA-A0 | Mono-solenoid | 163 | 150 | 108 |
| | Z000009AA-A0 | Bi-solenoid | 203 | 150 | 108 |
| HM-SV-440 | Z000010AA-A0 | Mono-solenoid | 163 | 150 | 108 |
| | Z000011AA-A0 | Bi-solenoid | 203 | 150 | 108 |

### 2.5.3 Identification label

The two different types of HM-SV valve can be identified by the label (depicted below) fixed directly on the valve

| HM-SV 150 | HM-SV 440 |
|---|---|
|  |  |

### 2.5.4 HM-SV wiring, available voltages

| Model | Main coil voltage | Emergency voltage | Max consumption |
|---|---|---|---|
| 12VdC | 12VdC ± 5% | - | 45W |
| 24 VdC | 24 VdC ± 5% | - | 36W |
| 48 VdC | 48 VdC ± 5% | - | 36W |
| 60 VdC | 60 VdC ± 5% | - | 36W |
| 80 VdC | 80 VdC ± 5% | - | 36W |
| 90 VdC | 90 VdC ± 5% | - | 36W |
| 99 VdC<br>110VaC * | 99 VdC ± 5% | - | 38W |
| 110 VdC | 110 VdC ± 5% | - | 36W |
| 180 VdC | 180 VdC ± 5% | - | 36W |
| 198 VdC<br>220 VaC-230VaC * | 198 VdC ± 5% | - | 42W |
| 220 VdC<br>240 VaC * | 216 VdC ± 5% | - | 37W |
| 24/12 VdC | 24 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 48/12 VdC | 48 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 60/12 VdC | 60 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 80/12 VdC | 80 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 90/12 VdC | 90 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 99/12 VdC<br>110/12VaC * | 99 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 110/12 VdC | 110 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 180/12 VdC | 180 VdC ± 5% | 12VdC ± 5% | 36W/45W |
| 198/12 VdC<br>220/12VaC-230/12VaC * | 198 VdC ± 5% | 12VdC ± 5% | 42W/45W |
| 220/12 VdC<br>240/12 VaC * | 216 VdC ± 5% | 12VdC ± 5% | 37W/45W |

* In order to use A.C. voltage on the coil, make sure that the connector with rectifying bridge is used

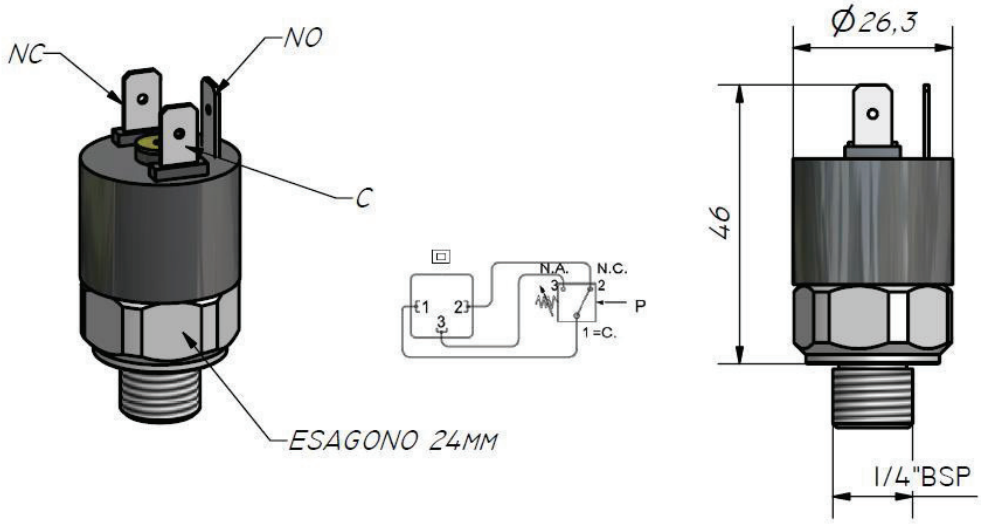
**NOTE 1:** ***energising simultaneously both the main coil winding and the emergency power winding will overheat the solenoid. Do not energise both the main coil winding and the emergency power winding simultaneously***

**NOTE 2:** ***For different coil voltages, please contact MORIS Italia***

## 2.5.5 Pressure switches

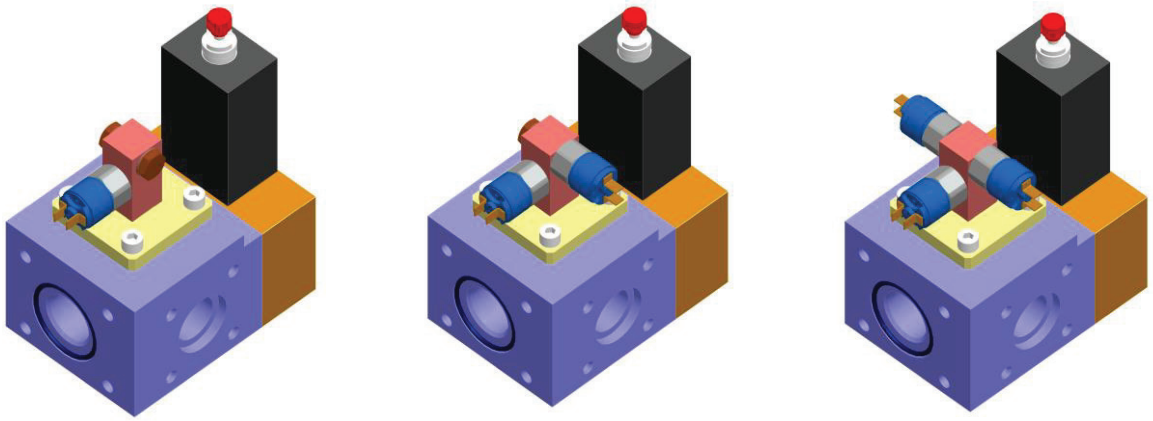
If a main distributor valve is used in conjunction with the HM-SV Safety Valve, in order to correctly sense the hydraulic circuit pressure, all pressure switches must be installed on the HM-SV valve, as described in paragraph 2.5.5.2

### *2.5.5.1 Description of pressure switches*




| Description | Value | Unit of measure |
|---|---|---|
| Setting range | 5 ÷70 | bar |
| Maximum pressure | 150 | bar |
| Hysteresis fixed value | ~2 | %FS |
| Switch precision | ~3 | Set value % |
| Hydraulic connection | ¼” | BSP |
| Working temperature | -25÷85 | °C |
| Max current at 250VaC | 0.5 | A |
| Protection degree | IP54 | |

### *2.5.5.2 Pressure switch configuration with HM-SV valve*



# 3 Installation and commissioning

## *3.1 Electrical wiring*

1. Connect the solenoid of the Safety Valve to the lift control.

**NOTE**: ***incorrect wiring will damage the solenoid. Connect voltages only according to the type of the solenoid coil and the prescribed wire assignment.***

## *3.2 Start up*

1. During the lift installation, it is required to perform at least 2-3 runs both in up and in down directions, pressing at the same time the two down manual lowering valves (see paragraph 4.2) to purge the air inside the valve HM-SV.
2. When installation works are done, prior to commissioning the lift, execute the first maintenance of the Safety Valve (see chapter 5).

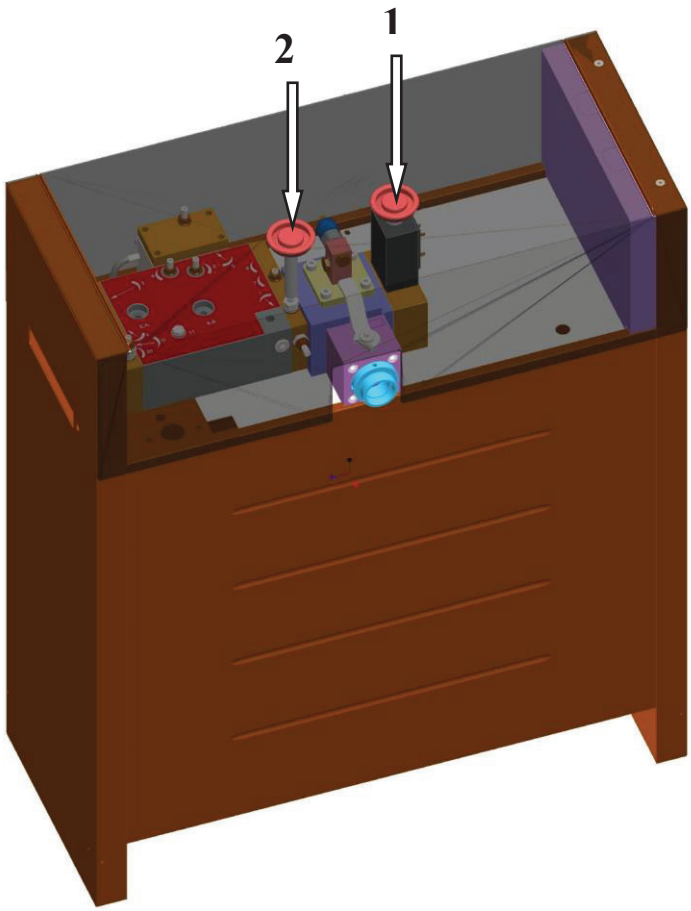
# 4 Operation

## *4.1 Normal operation*

1. To enable a DOWN travel, either the main coil winding 12:A or the emergency power winding 12:AA of the HM-SV valve must be energised by the lift control at the right time (see paragraph 0).
   Except those two items, no other parts have to be operated during normal operation of the lift.

## *4.2 Manual operation*

1. Observe the instruction in the lift documentation or in the lift valve documentation for a proper execution of the manual emergency lowering.
2. Push the red button (see picture below) on 12:A electrovalve of HM-SV (item no.1); at the same time, operate the manual descent command (button, lever or knob) on the main control valve (item no.2)



3. Keeping both buttons operated, control the lowering of the car, using the main control valve manual descent command intermittently (item no.2), until the intended floor level is reached
4. When the desired level has been reached, simultaneously release both manual descent commands.

**NOTE**: ***the manual operation command can get hot if the solenoid of the HM-SV safety valve is energised over a longer period of time. If there is a suspect that the knob is hot, pull the knob only with the aid of either a sufficiently insulating glove or a proper tool***

# 5 HM-SV valve correct functioning check

The compulsory maintenance intervals are:

- First time at the start up
- After 3 months from start-up
- Every 6 months

The principal maintenance tasks are:

- Leakage test of the valve (see paragraph 5.1)
- Simplified functional test (see paragraph 5.2)

## *5.1 Leakage test of the valve*

1. Observe the instruction in the lift documentation or in the lift valve documentation for a proper execution of the manual emergency lowering.
2. Make sure that the car is positioned in such a zone that i twill be easy to precisely assess any car movement.
3. Check for 5 seconds that the car is remaining stand still at floor level
4. Make sure that both coils 12:A and 12:AA (if present) are not energized.
5. Energize the down solenoid valve of the main control valve (e.g. EB electrovalve on a MORIS control valve), ensuring that the solenoid valve 12:A and 12:AA (if present) of the HM-SV valve are **NOT** energized.
6. Check the following points:
    a. the indication on the manometer of the main control valve drops to zero
    b. Following the operation performed at point 5, the car should experience any appreciable movements
7. When no visible movement of the car has been observed, it is necessary to restore the normal lift operations:
    a. De-energize the down solenoid valve of the main control valve (e.g. EB electrovalve on a MORIS control valve)
    b. Make sure that both the main coil 12:A and the emergency coil 12:AA (if present) of the HM-SV valve are properly connected to the lift control again

If the procedure is done correctly the leakage test has been passed successfully.

If, during this procedure, any car movement has been observed, first of all make sure that the HM-SV manual descent button has not been activated by mistake.
If the car keeps moving downwards:

- Keep the elevator in out-of-service state
- Replace the supposedly faulty HM-SV valve
- Execute the test again

**NOTE:** ***if the HM-SV safety valve is malfunctioning, please contact MORIS Italia Technical Support Service.***

### *5.2 Simplified functional test*

1. Execute a travel DOWN at the inspection speed and, while the car is moving, disconnect the power supply to the main coil winding of the solenoid of the HM-SV Safety Valve. Once this procedure has been completed, if the HM-SV Safety Valve operates properly, the car will stop under all circumstances after 750 mm maximum.

2. Make sure that the main coil windings and the emergency power winding (optional) of the solenoid of the Safety Valve are properly connected to the lift control again.

**NOTE:** ***if the HM-SV safety valve is malfunctioning, please contact MORIS Italia Technical Support Service.***

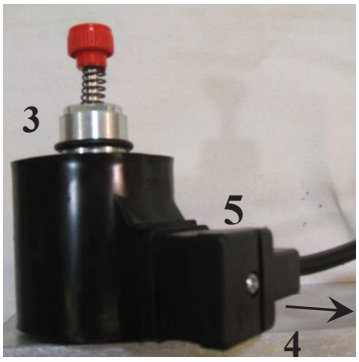
## 6 Repair

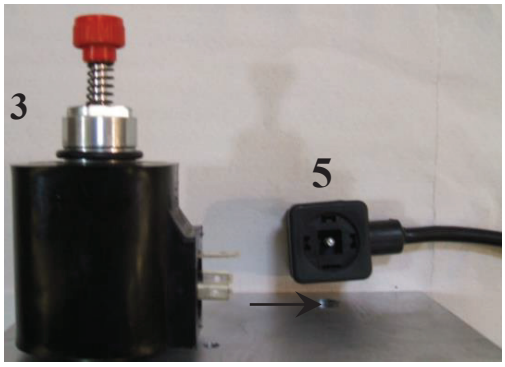
Except for the 12:A (or 12:AA if present) solenoid coil, the Safety Valve has no parts that could be replaced or repaired by a lift technician. Any disassembly or repair operation (apart from 12:A or 12:AA solenoid coil replacement, see paragraph 6.1) must be performed by MORIS Italia customer service exclusively.

### *6.1 Replacement of the solenoid coil*

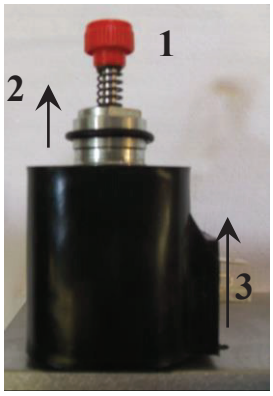
**NOTE**: ***the manual operation command can get hot if the solenoid of the HM-SV safety valve is energised over a longer period of time. If there is a suspect that the knob is hot, pull the knob only with the aid of either a sufficiently insulating glove or a proper tool***

1. Make sure that the main coil windings is disconnected from the lift control.
2. Unscrew the bolt (4) that links the plug (5) to the coil (3).

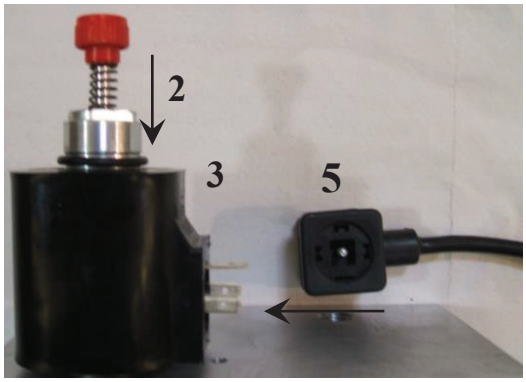



3. Remove the plug (5) from the coil (3).
4. Remove the coil (3) from the electrovalve shaft (1), by first removing the o-ring (2) and then pulling the coil up.




5. Slide the new solenoid coil (3) onto the electrovalve shaft (1) and place the o-ring (2) back.
6. Connect the cable to the coil (3) with the plug (5) and fix it with the screw (4).





7. Connect the solenoid coil cable to the lift control panel

HYDRONIC LIFT

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**Per ulteriori informazioni e chiarimenti contattare:**

**For further information and advice contact:**

**MORIS Italia S.r.l.**
**Via per Cadrezzate 21/C**
**21020 Brebbia VA - Italy**
**Tel: +39 0332 984211**
**Fax. +39 0332 984280**
**e-mail: moris@moris.it**
**www.moris.it**
**www.moris.it/en/contatti-2/contatti-in-moris**