HERCULES
CARPARKING SYSTEMS

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July 2021

Single Stage Scissor Hoist (CAPACITY 3,000kg)

14-16B Thrupp Street, Neutral Bay NSW

1. FOREWORD

This handbook contains the necessary information for using the electric-hydraulic car lift model SINGLE STAGE SCISSOR HOIST according to its technical characteristics and to the uses expected and allowed by HERCULES CARPARKING SYSEMS.

For any other information regarding the use of the machine, please contact the manufacturer.

Duty of storage

It is mandatory to store this handbook and all the publications enclosed in an easily accessible place known by all of the users, possibly near the machine.

This handbook is part and parcel of the product and must be retained for future reference until the machine is dismantled. It must be kept in good conditions at all times and stored in an easily accessible place known by all of the users, if possible, near to the lift. The handbook must report any information regarding possible modifications to the machine, allowed and made by HERCULES CARPARKING SYSEMS.

If the manual or part of it is lost or destroyed, new copies must be available. They are eventually to be requested to the address reported in the previous chapter.

2. LABEL

HERCULES CARPARKING SYSTEMS Hercules Carparking Systems Unit 1 / 87 Reserve Road, Artarmon NSW 2064 info@hercules.com.au	YEAR OF CONSTR. 2021
	SERIAL N° 4340
	CAPACITY 3.000 Kg.
	MASS 4.400 Kg.
CE MODEL: Single Stage Scissor	POWER 16,5 Kw

3. SPECIFICATIONS

World-class single stage scissor lift designed for transporting vehicles or other loads floor to floor up to a height of 4 meters. A sturdy structure with self-lubricating bushings and sliding blocks grants no load deformation and ensures a very long lifetime. Lifting capacities range from 3.000 Kg to 6.000 Kg.

The lift requires an extremely shallow pit making it ideal for those places where there are digging problems. Little building works are needed as there is no need of wall anchors.

Features:

- Single stage cars scissor lift;
- Anti-skid checker plate platform;
- Electric-hydraulic unit 400V triphase – 16 kW;
- Person on Board kit: on-platform low voltage Man on board controls with 'Dead Man' push buttons, operating key, emergency stop button, intercom and telephone, return-to-floor button and auxiliary battery (in case of power failure), vehicle positioning optic control size 800mm height (onto the car platform); EC Type Certificate issued by a primary Notified Body;
- N. 2 Light barrier height 800mm;
- Inputs/outputs to accept signals from the doors/gates;
- N. 2 Low voltage controls at the floors with 'Dead Man' push;
- Buttons, operating key and emergency stop button;
- Slow down switches (soft landing) and over travel switches;
- Lift props;
- N. 2 Magnetic sensor;
- N. 2 stops;
- IP55 electric wiring protection compliant with CEI 64-2 directive;
- Painted RAL 9006 and RAL 7016.

Installation

The installation should be performed by trained technicians and is expected to need of building work only with regard to the premises in which the facility will be housed and the ducts undercurrent. (details have been provided by Ecospace Srl through drawings). It's absolutely forbidden to unauthorized persons to perform operations involving the assembly and / or disassembly of any kind. Upon installation they are placed devices relevant to safety and functionality of the system, such as limit switches, safety locks, etc It's then explained the need to delegate to professionally trained technicians that delicate function.

It is buyer's duty to prevent people or animals from accessing the lift during the operations (rise/descent). It is strictly forbidden to open the landing doors when the platform is in motion; should the lift be placed outdoors; the landing doors must be equipped with in-operation flashing lights and/or audible buzzers. The buyer must also read, understand and operate the lift according to the instruction manual. For any other matter not mentioned above please refer to the EU Machinery Directive, particularly to the 'Dead Man' normative.

Technical data

Car platform lifting capacity:	3.000 Kg (only uniformly distributed load)
Weight (mass)	4.400 Kg
Lifting time:	10 cm/s
Shaft length	6080 mm
Shaft width	3080 mm
Platform length:	6000 mm
Platform width:	3000 mm
Useful length	5800 mm
Useful width	2850 mm

Travel	3000 mm
Extra travel max.	50 mm
Pit	550 mm
Motor (power 380V):	16 Kw
Motor maximum pressure:	150 bar
Speed max. car on platform:	3 Km/h

Aggressive braking and / or acceleration are prohibited on the platform

4. SAFETIES

This machine has been designed considering the applicable articles of Machine Directive 2006/42/CE. According to the place and the kind of installation, other safety devices may be required (fixed barriers and inter-locked gates) in compliance with the standards.

DANGER

The fixed protections must be only removed by the authorized maintenance personnel and must be always reassembled before starting the lift again.

All the barriers and the protections are fixed so that an intentional action to remove them is requested. At the end of any maintenance work, it is necessary to place them again into the proper position.

All parts of the machine must be ground connected through a ground wire. Moreover, all the machine control devices and their circuits, which are interconnected with the operator, are low-voltage powered.

SAFETY DEVICES

Machine devices (provided with the lift)

- Anti-drop valves and pressure switches control the load.
- Couple of photocells self-centering on the platform (light barrier height 800 mm);
- Photocells presence of cars on the platform.
- Protection on the long sides of the loading platform.
- Emergency stop buttons and with mechanical detent (one for each pushbutton panel);
- Emergency stop buttons in the pit.
- Emergency button in the bottom of the pit for maintenance.
- Lighting in the pit for maintenance.
- Handling lift with command "man present and responsible."

Installation devices (to be installed by the buyer)

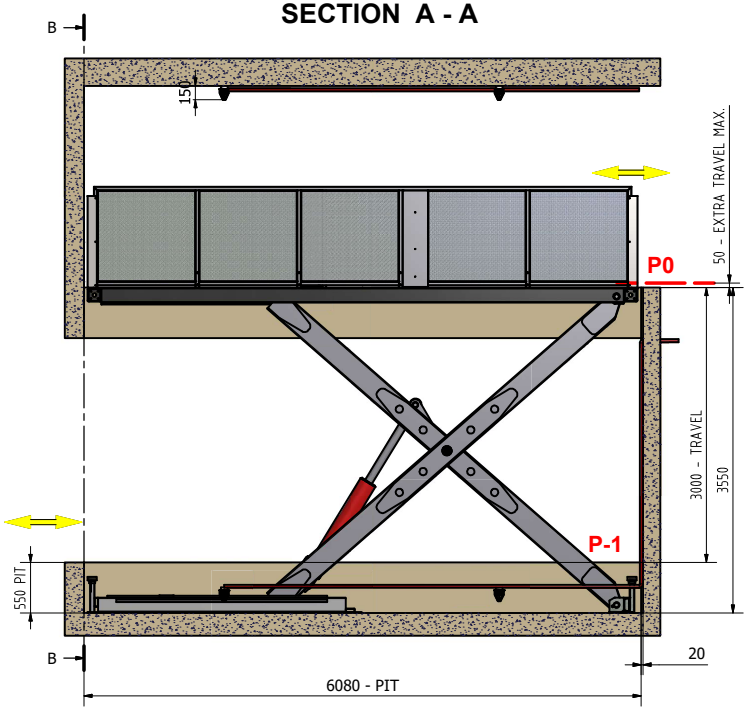
- Perimeter protections at the access/exit floors.
- Electric locks and / or sensors for locking the platform to access gates.

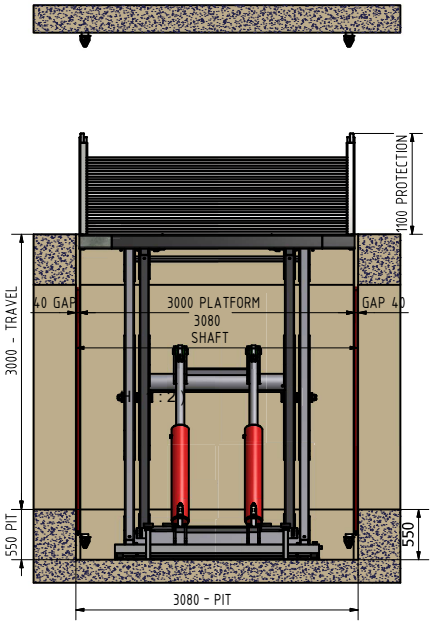
Landing door/gate electric locks are aimed to prevent any door/gate opening should the platform not be at the requested level. They also prevent the platform from rising/lowering when the gates are not firmly closed.

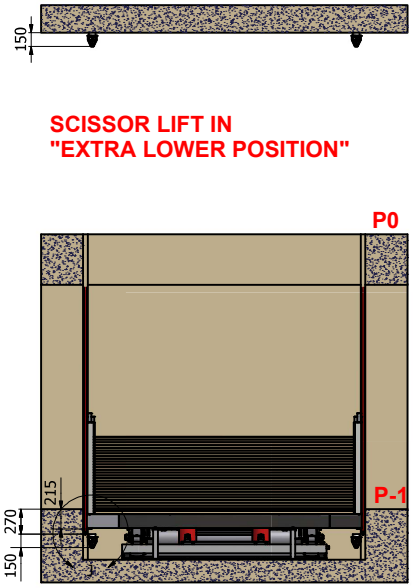
DANGER

It's forbidden to remove or render the barriers not sufficient to guarantee a reasonable degree of safety for the people. It is also forbidden to tamper with or modify (even partially) the safety devices on the machine. In case of anomalies or malfunctions please contact HERCULES

SECTION A - A







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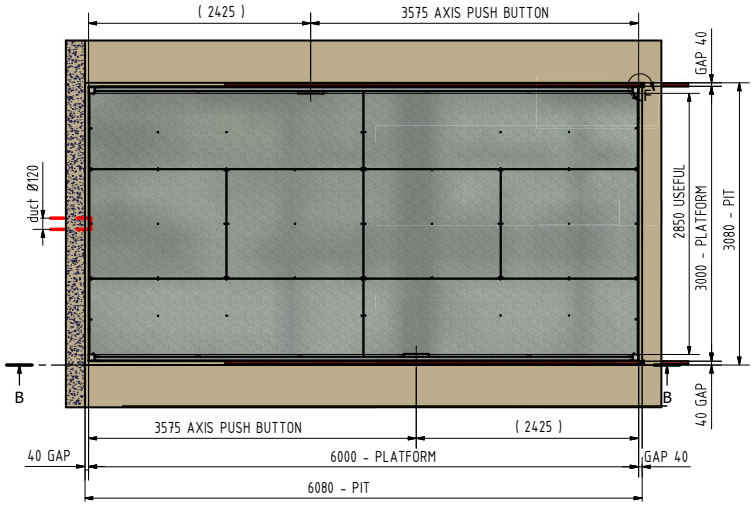

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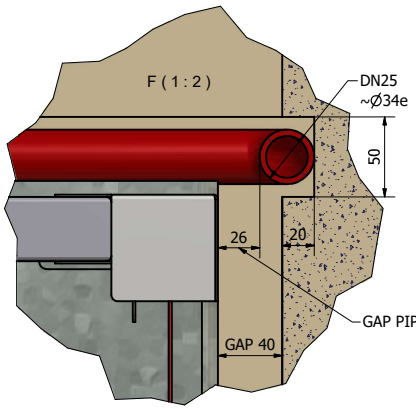

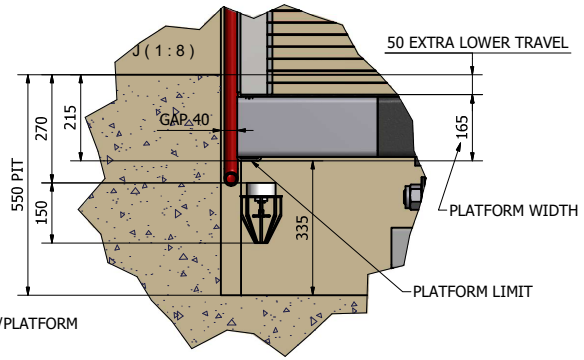

NO.	DATE	REVISIONS & DESCRIPTION	ENG'R	APPR'D
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HERCULES CARPARKING SYSTEMS

MODEL NAME	HCP-CL01-02	JOB			TITLE	3,000kg Capacity CAR LIFT
DATE	8 April 2021		SCALE	S/N	SUBJECT	LAYOUT
DRAWN	DESIGNED	CHECKED	REVIEWED	APPROVED	FILE NAME	
	James Han				DRAWING NO.	HCP-CL2-001

REV. 5

5. GETTING STARTED

Scheduled terms of use
The lift has been designed and built for parking up to one vehicle, 3.000 kg capacity (car dimensions must fit the platform).

Not allowed terms of use
Any other use of the lift represents a not allowed term of use and voids the guarantee.
The builder is not responsible for any damages or malfunctions due to the inobservance of rules stated on this handbook.

It is forbidden the use of the lift:

- by not trained personnel.
- against the regulations in force.
- in case of faulty power supply.
- in case of inobservance of the instructions for use and maintenance.
- in case of lack of maintenance.

Any lift modification (in order to improve/reduce performances) is considered “IMPROPER USE”. HERCULES declines every responsibility in case of inobservance of the terms of use.

It is also forbidden:

- to exceed the platform capacity (stated onto the metal label);
- to remove the safety devices.
- to tamper with the rise and lowering speed (which is pre-set by HERCULES in compliance with the regulations in force);
- the use of the lift by people under 18-year-old.
- to place goods or other materials onto the platform.
- to start the lift if the vehicle protrudes from the platform out of shape.
- to use the lift if there are any troubles or in case of danger.

Unsuitable working area
The entrance and exit areas must be kept free from obstacles to prevent dangers when the vehicle enters or exits the platform. Entrance and exit levels must be properly illuminated.

Technical assistance
In case of need (anomalies or breakages), please contact HERCULES at your earliest convenience. Please always quote the following data when contacting HERCULES:

- LIFT MODEL
- SERIAL NUMBER
- YEAR OF CONSTRUCTION

6. USING THE CAR LIFT

Control devices
The machine is equipped with push-button boards, each one placed near to the entry of its own level.

The following picture shows the push-button board.

- Busy – Yellow Flashing light.
  The yellow "busy" light will be flashing to indicate the lift is currently in use or that the lift has been called.
- Enable key slot.
- Call.
  The "call" button will be illuminated white if the lift is positioned at that level
- Emergency button.

External Operation:
1. Insert key, into the "enable" port and turn
2. Press the up or down floor button once
3. Wait for the car lift door to fully open
4. Remove your key

(or as an alternative to step 1-4, if provided, press your remote control)

5. Drive into the car lift

All the models supplied by Hercules Carparking Systems have undergone severe tests with overload capacities.

WORKING PRINCIPLE
The platform can be moved by pressing the button of one of the boards, that are placed near their own entries.
It's necessary to insert the unlock key into its switch and turn the key to ON position in order to activate a pushbutton board.

The rise and descent buttons are made of luminous LED lights which indicate the platform position.

The machine can be turned on only when:
- the lift doors are closed (the related electric locks prevent the platform from working);
- the push-button panels voltage indicator light is turned on.

FROM THE UPPER LEVEL:
The engine starts and the platform starts descending.

If the button is released before the platform has completed the stroke, the machine stops. It's possible to turn it on again (up or down) by acting on the push-button panels.

It's possible to open the platform entry gates only when the platform has arrived at one of the two levels.

USING THE MACHINE

- If the machine is not powered, go to the general switch (that is located on the electric box) and place it on *position 1-ON*;
- insert key, turn, and press the desired floor button once
- Wait for the car lift door to fully close
- Press & hold the desired floor button continuously until the button lights up white
- Release the button to open the door
- Remove your key - wait for the car lift door to fully open - drive out of the car lift

CONTROL PANEL HOIST

The person must always remain inside the car. A pair of photocells placed diagonally in the middle of the loading platform, allows the movement of the scissor lift only in the presence of the vehicle on the platform. Vertical movement of platform takes place by holding down the button on the panel control.

VOLTAGE INDICATOR
Light will turn off in the event of a power loss in the building, in this case the lift can only be operated down, until power is restored.

UP
Press and hold button for the up direction. Illuminates when the platform reaches (Ground Floor)

DOWN
Press and hold button for the down direction. Illuminates when the platform reaches (Basement level)

HELP CALL
Press and hold the button for at least 5 seconds to be connected to an operator, use only in the event of any emergency.

PHOTOCELLS OBSTRUCTED
Illuminates red if there is any object protruding over the front or rear of the lift platform, clear any obstructions before operating the lift.

TURN ON
Must be lit up blue for the lift to run, press the button once to turn on the light if it is off. Check all Emergency stop buttons are released if the blue light does not turn on when pressed.

EMERGENCY STOP

ONLY PRESS THE EMERGENCY BUTTON IN THE EVENT OF A HAZARD ONBOARD. To reset just twist the button (before twisting the red mushroom-button, verify that the danger is no longer present).

1. identify and eliminate the cause of the emergency.
2. put in function the emergency push-button again by turning it in the direction indicated by the arrow.

FREQUENTLY ASKED QUESTIONS

How do I know the lift is busy?
The yellow "busy" light on the outside will be flashing to indicate the lift is currently in use or that the lift has been called.

I am in the lift, but lift is not working, why not?
If the lift is not working for you, please check the following:

1. You are in the lift with a car? Both sensors in the middle of the platform need to detect a car for the lift to work, if you are in there without a car, the lift will not work.

2. Check that the voltage light is illuminated, if it is NOT there is no power – please contact your building manager.

3. Check that the lift door is fully closed. If it is NOT fully closed, please turn the key and press the desired floor once and wait for the door to close.

4. Check that the photocell obstruction light is NOT illuminated. If it is illuminated that means something is interfering with the sensors on the front of the rear of the platform. Please check your car is not parked too far forward, or too far back. Please check there is no persons or rubbish in front of the sensors.

5. Check that the turn on blue light is illuminated. If it is NOT illuminated, please press the button.
   If it still does not illuminate, it might mean that an emergency stop button is pressed in. Please check all emergency stop buttons. There are two inside the lift (on each side) and there is one on each level (outside the lift doors). Twist the emergency buttons and press the turn on light again – it should light up blue, meaning the machine is now ready for use.

6. If none of these things work, please press the "help call" button for at least 5 seconds to be connected to an operator, use only in the event of any emergency.

I lost my key. Or my remote no longer works.
You can order new remotes and keys from Hercules Carparking Systems. Just send an email to info@hercules.com.au

Why do I need to hold the button all the way down?
Unfortunately, that is due to an Australian Standard in place. Please contact us if you'd like to learn more about this.

MAINTENANCE

It is deemed necessary to check the following on regular bases (at least bi-annually) and only when the lift is off (tension disconnected):

- fluid level into the tank by using the gauge: a decreased level indicates leakages. An increased level may indicate a contamination because of leakages from the water-cooling system, or that the lift higher parts are emptying during stops.
- external seals: check at sight both joints and pipes. Check all components. Keep clean the plant outer side to easily spot eventual leakages.
- fluid temperature: an increasing temperature brings seals and mechanical parts to a quick deterioration. Fluid temperature must not exceed 60°C. Many things may determine a temperature increase, such as:
    1. The heat exchanger is not efficient.
    2. Increased internal leakages.
    3. Damaged rotating gears.
    4. Bad pressure limit valves adjustment.
    5. Partially open compression relief taps.
- Check the pressure values: check the valves pressure limit operating value
- Make sure the filters are clean. If the filters indicator shows they are dirty (red area) it is necessary to replace them within 8 working-hours.
- Check the fluid contamination: any fluid colour and/or aspect change. Should the fluid look like a cloudy emulsion or brownish, the lift cannot work properly. Checks must be done by looking at the indicator on the tank.
- Check the noise: an increasing noise means the plant doesn't work well.
- Check the electric absorption: if the electric engine increases its absorption (when tonnage/pressure is equal), the machine doesn't work well.
- Check the flexible pipes: make sure there are no signs of deterioration such as cover cracks, scratches or tearing's, deformations, blisters or swellings, leakages, or sticking areas on pipes surface. The presence of at least one of such anomalies requires a pipe replacement.
- During the first hours of operation it's necessary to check fluid level in the tank to spot eventual leakages.
- Temperature must not go above 60°C. After the first 50 hours of operation check both the pressure and the temperature; check the filters' cleanliness.

Refilling or Replacing the Fluid

Refill the fluid through the cap every time the tank level reaches the minimum. Should the level go below the minimum it may overflow when emptying pipes. Too frequent refills may indicate leakages. Find the leakages and fix them. Every 2000 / 3000 hours it's better to change the fluid with a same type one. If you want to use a different fluid type or fluid brand, please seek for the supplier's advice (considering that some fluid residues remain into the pipes).

Replacing Filters

Filters must be replaced whenever the fluid is replaced and when the indicator shows a dirty filter.
Replacing filters is more effective than cleaning them as new filters are more efficient and reduce wear.

Cleaning the Lift

It's important to maintain the lift clean to prevent fluids from getting polluted. Don't use solvents, degreasers or detergents to clean the outer surface as they may pollute the fluid. Only use not filamentous rags and compressed air.

Oil Dynamic Components Maintenance

After localizing the problem, consider if it can be fixed by the operator or by the manufacturer. The manufacturer should be called for:

- Replacing valve seals.
- Replacing entire components, making sure these bear the same name and electric characteristics. As far as the valves are concerned, the assembling sequence dimensions reported on the hydraulic diagram have to be respected. The specialized personnel must keep all of the lift diagrams during the maintenance.

CAUTION:

- Installing a diverse component from the original one may cause troubles. In case of doubt, please ask the manufacturer.
- Duly clean the lift before servicing it.
- Once the service is finished please check the fluids. Contaminated fluids need to be replaced. Maintenance rules set forth on the manual do not discharge the user from servicing the lift according to the laws in force in the country where the lift is installed.

SHORT STOP

If the lift stops for less than two months just make sure it is preserved in well conditions. After a short stop it is sufficient to purify the air from the lift.

LONG STOP

If the lift stops for more than two months, please turn it on for a few minutes on regular bases to allow the internal components lubricate. It is advisable to reduce the eventual accumulator pressure. After a long stop it is necessary to check if the fluid is contaminated. If contaminated, please replace it. Check all the external valve seals and eventually replace them. Restart the lift.

Equipment Maintenance

For a good maintenance of oil dynamic lift, it is necessary to have a set of spare parts, such as:

- THERMOMETER: if possible, an electronic one, contact sensible for a quick detection of hot parts.
- MULTIMETRE: we strongly recommend a digital millimetre in order to check:
    1. Solenoid resistance.
    2. Solenoid tension power on/off.
    3. Current solenoids values.
- CHRONOGRAPH: To check actuators speed and capacity.
- PRELOAD INSTRUMENT: To check the eventual accumulator pressure.

Procedure Emergency Descent

Lift evacuation procedure in case of power loss and UPS ON

In case of power failure is only possible to manoeuvre down the platform manually, only by specialized staff and / or instructed, using the following procedure:

If the person is on the loading platform, the operator presses the button down on the COP installed on board, the lift will go down to the lowest level. The person can open the door manually by moving the appropriate lever to exit from the lift.

Once the emergency operation performed, notify the company responsible for maintenance, specifically pointing the problems encountered and the action taken. We accept no liability for injury or damage due to failure to observe the rules of use and instructions, as well as to work on the system performed by unauthorized persons.

Lift evacuation procedure in case of power loss and UPS OFF
In case of power failure and UPS not working, the person on board must call external assistance by using the intercom installed on the control board. The assistance will come on site and by manually manoeuvring the hydraulic unit, the platform will down at the lowest level and after the assistance will unlock the electro lock door.

In case of power failure is only possible manoeuvre down the platform manually, only a qualified and / or authorized, by following these steps:

- Disconnect the power supply by disconnecting the power Motive power (OFF).
- Mechanical blocks must be inside.
- Make sure the doors and the safety plan are closed and locked.
- Pump oil with the lever (up to 90 bar).
- Turn the red button located on the hydraulic unit (see photo).

- The platform begins to descend. If you release the red control knob platform stops.
- Unlock the door relative to the plane lower bound for the opening, through a device.
- Double-check that the protections of the upper floors are closed and locked.

Once you finished notifying the company responsible for maintenance, specifically pointing to the problems encountered and the action taken. We accept no liability for injury or damage caused by non-compliance with the rules of use and instructions for use, as well as to work on the run from unauthorized persons.

Maintenance in the pit
Before doing bottom job, be careful with the following:

- turn off the main switch and make sure it cannot turn on again.
- place appropriate billboards for "out-of-use facility for maintenance"
- remove the key from the pushbutton.
- Install blocks to prevent accidental fall of the platform.

Once the operation has been performed, restore the regular functionality, power, remove the billboards and carefully fill in the attached maintenance card.

MAINTENANCE SHEET

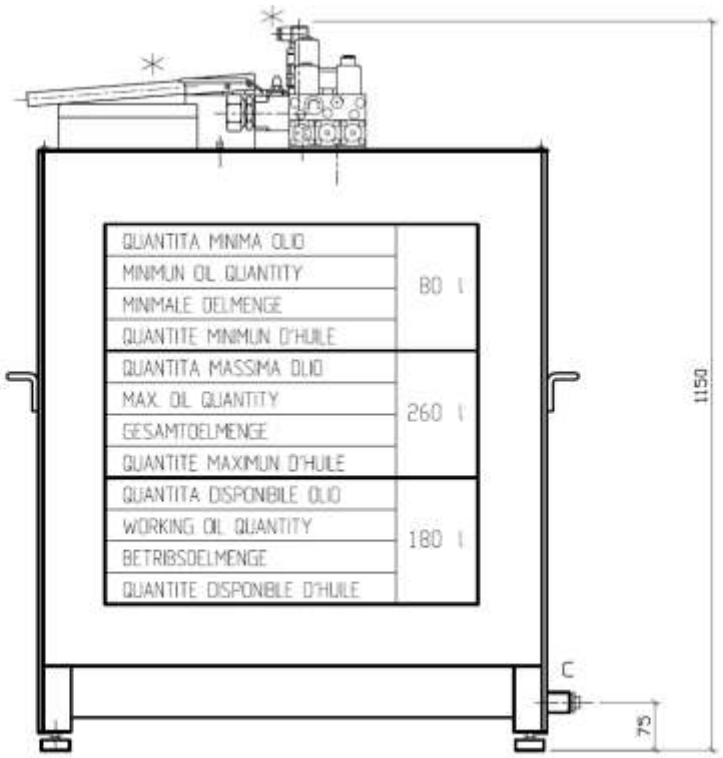
This lift is being serviced by: _____

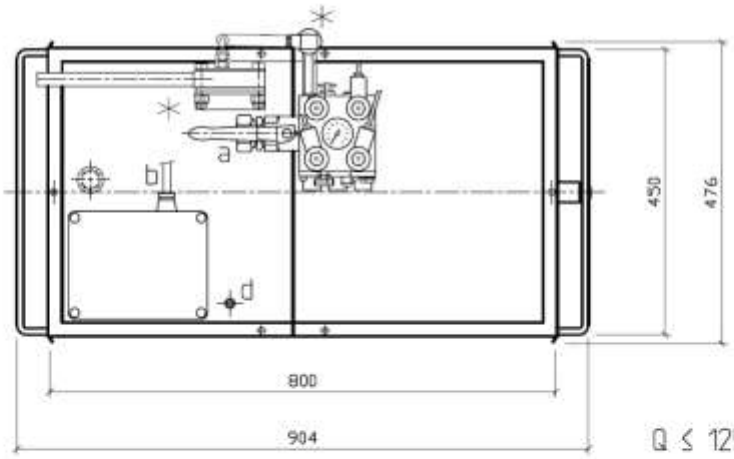
Located in: _____

In case of emergency please ring this number: _____

DATE	REPLACED PARTS	DESCRIPTION OF FAULT	OPERATOR'S SIGNATURE	CLIENT'S SIGNATURE

HYDRAULIC UNIT, DIAGRAM AND PARTS LIST



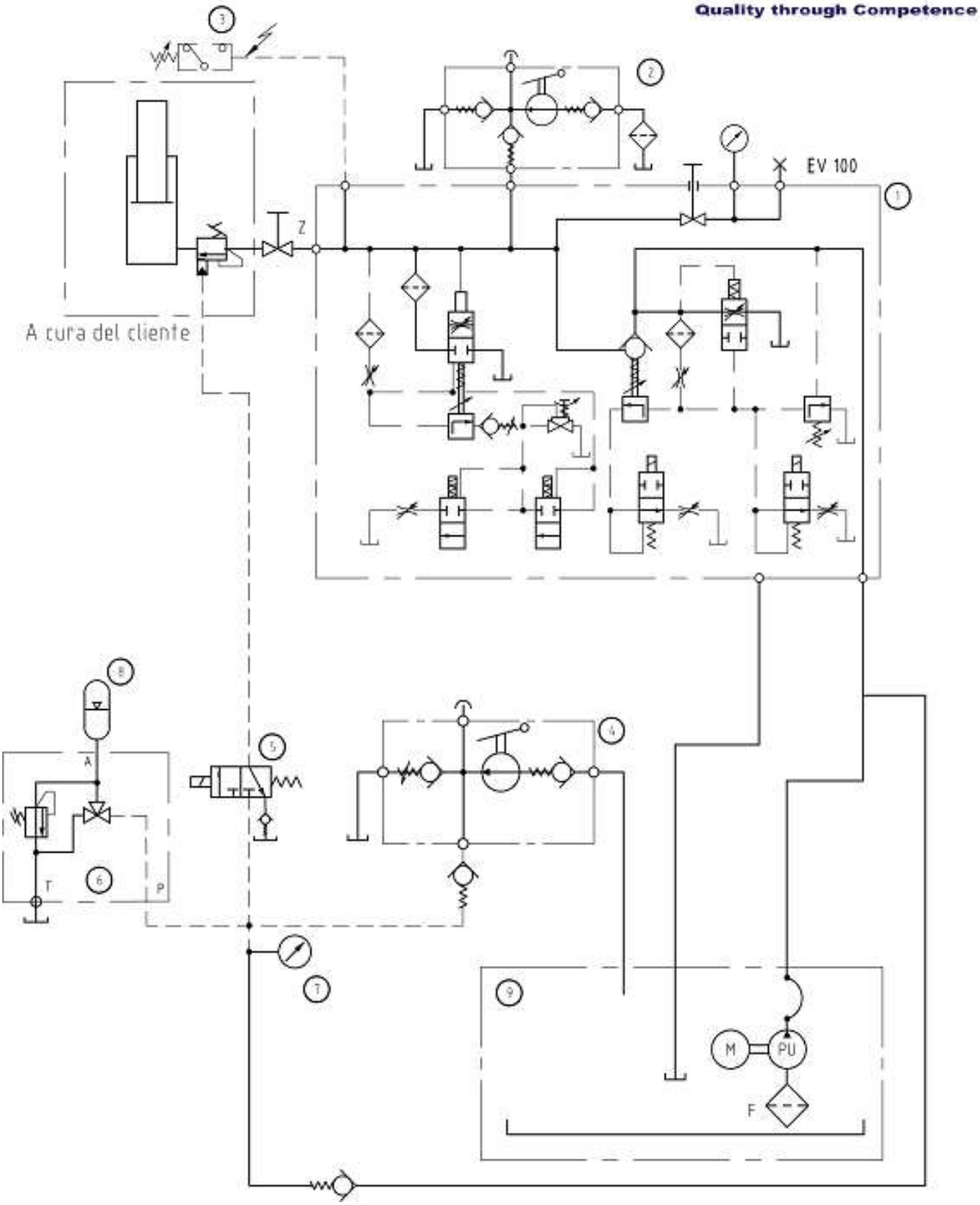


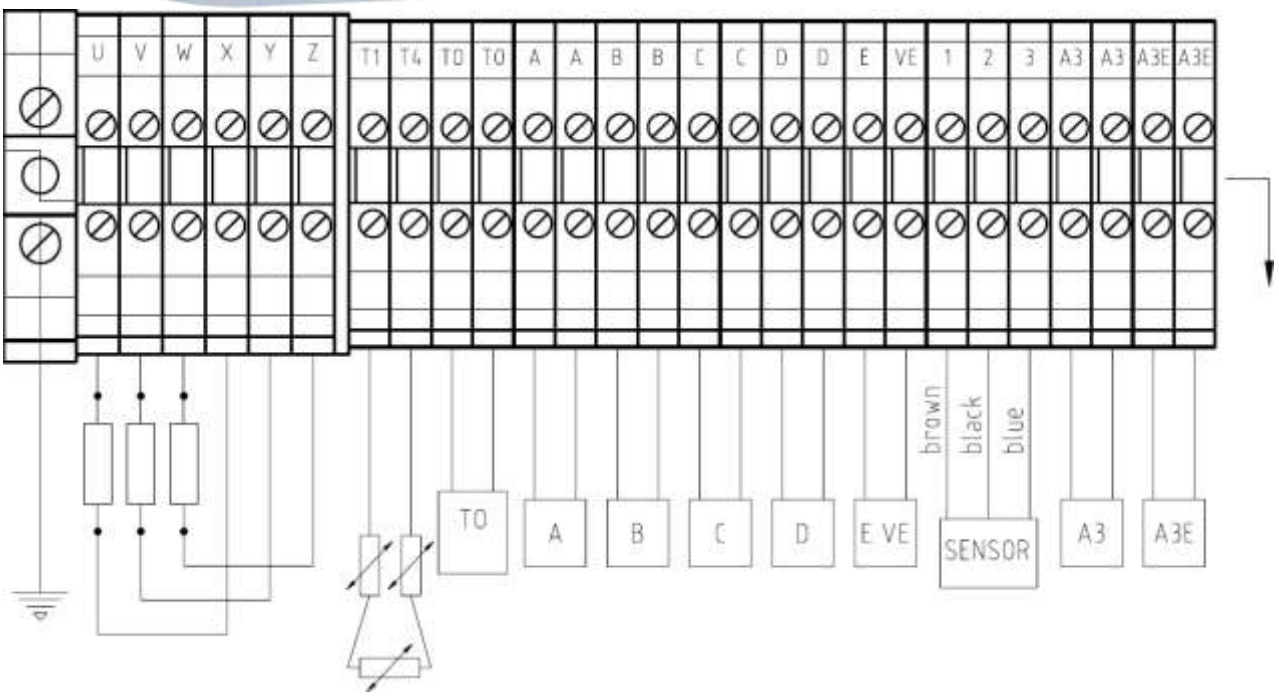
✳ POMPA A MANO E PRESSOSTATO SOLO SE RICHIESTI O NECESSARI / MANUAL PUMP AND PRESSURE SWITCH AS OPTIONAL OR IF REQUIRED
HANDPUMPE UND DRUCKSCHALTER WENN VERLANGT ODER NOETIG / POMPE MANUELLE ET PRESSOSTAT SI DEMANDES OU SI NECESSAIRES

a	ATTACCO PER LA TUBAZIONE
	CONNECTION FOR PIPE
	ANSCHLUSS FUER DELLEITUNG
	RACCORD POUR LE CIRCUIT EXTERIEUR
b	FORO PER PASS. CAVI D'ALIMENTAZIONE
	HOLE FOR PASSING ELECTRIC CABLE
	EINFUEHRUNGSOEFFNUNG FUER DIE ELEKTRSCHEN KAEBEL
	TROU POUR LE PASSAGE DES CABLES D'ALIMENTATION

c	SCARICO OLIO
	OIL DRAIN
	OELAUSFLUSS
	DECHARGE HUL
d	ATTACCO RECUPERO OLIO DI PERDITA
	CONNECTION TO RECOVER LEAKING OIL
	VERBINDUNG FUER DIEWIEDERGEWINNUNG DES LECKOELS
	ATTAQUE PUOR LA RECUPERATION DE L'HUILE PERTES

Quality through Competence

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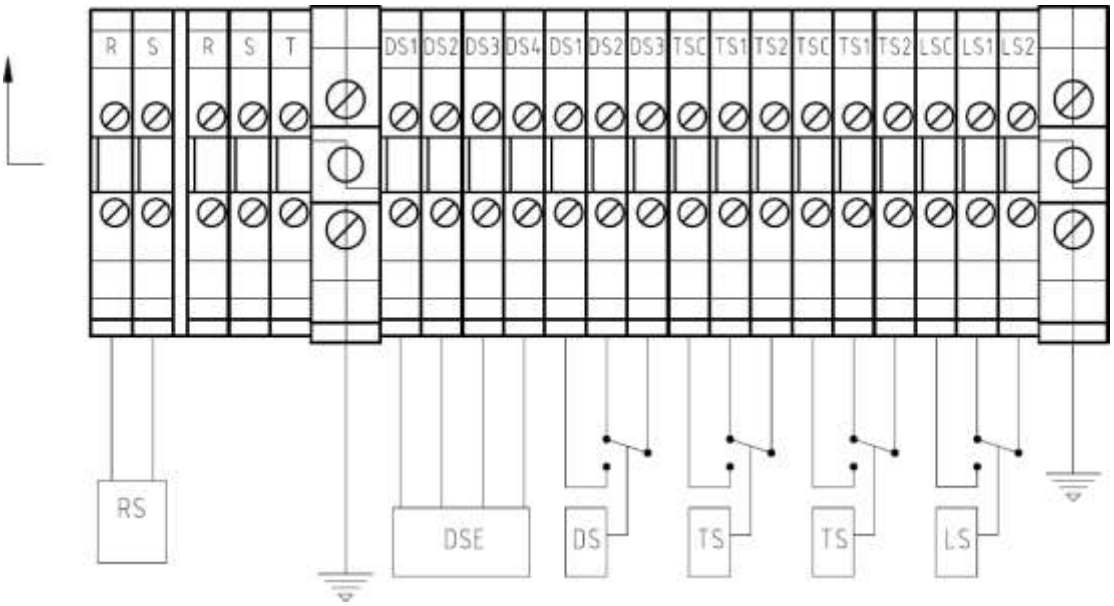
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DS1 DS2 DS3 DS4 DS1 DS2 DS3 TSC TS1 TS2 TSC TS1 TS2 LSC LS1 LS2
RS
DSE
DS
TS
TS
LS

U V W X Y Z	Motore principale	Main electric motor
T1 T4	Termistori	Thermistors
TO	Termostato	Thermostat
A	Solenoide A	Solenoid A
B	Solenoide B	Solenoid B
C	Solenoide C	Solenoid C
D	Solenoide D	Solenoid D
E VE	Bobina di emergenza	Emergency coil
SENSOR	Sensore del blocco elettronico	Flow sensor of electronic valve
RS	Resistenza	Tank heater
R S T	Linea per raffreddamento	Line for cooling system
DSE	Pressostato elettronico	Electronic pressure switch
DS	Pressostato	Pressure switch
TS	Termostato	Thermostat
LS	Livellostato	Oil level switch
A3	Valvola antiritorno pilotata EN 81-A3	Safety valve EN 81-A3
A3E	Bobina di emergenza per valvola A3	Emergency coil for valve A3
U V W X Y Z	Elektromotor	Moteur électrique
T1 T4	Kaltleiter	Thermiques
TO	Thermostat	Thermostat
A	Magnetventil A	Electrovalve A
B	Magnetventil B	Electrovalve B
C	Magnetventil C	Electrovalve C
D	Magnetventil D	Electrovalve D
E VE	Notström Ablass Spule	Bobine d'emergence
SENSOR	Flussmengensensor des elektronischen Ventil	Détecteur de débit de la soupape électronique
RS	Tankheizung	Chauffage pour cuve à huile
R S T	Elektrische Leitung für Kühlaggregat	Ligne pour refroidissement
DSE	Elektronische Druckschalter	Pressostate électronique
DS	Druckschalter	Pressostate
TS	Thermostat	Thermostat
LS	Öl Niveau Schalter	Interrupteur du niveau d'huile
A3	Drucksperrventil nach EN 81-A3	Clapet de blocage en descente EN 81-A3
A3E	Notström Ablass Spule für A3 Ventil	Bobine d'emergence pour valve A3
A-B-C-D-E-VE	Blocco EV 100 Steuerventil EV 100	Control valve EV 100 Soupape de contrôle EV 100
A-C-D-SENSOR	Blocco elettronico SEV Elektronische Steuerventil SEV	Electronic control valve SEV Soupape de contrôle électronique SEV

EV 100

Elevator Control Valves

The BLAIN EV 100 program includes the widest range of options offered to the elevator industry for high performance passenger service. Easy to install, EV 100's are smooth, reliable and precise in operation throughout extreme load and temperature variations.

¾" EV

EV 100

1 ½" EV

EV 100

2 ½" EV

EV 100

Description

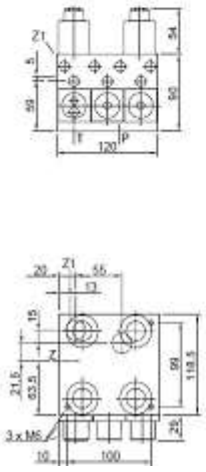
Available port sizes are ¾", 1 ½", 2" and 2 ½" pipe threads, depending on flow. EV 100's start on less than minimum load and can be used for across the line or wye-delta starting. According to customers' information, valves are factory adjusted ready for operation and very simple to readjust if so desired. The patented up levelling system combined with compensated pilot control ensure stability of elevator operation and accuracy of stopping independent of wide temperature variations.
EV 100 valves include the following features essential to efficient installation and trouble free service:

- Simple Responsive Adjustment
- Temperature and Pressure Compensation
- Solenoid Connecting Cables
- Pressure Gauge and Shut Off Cock
- Self Closing Manual Lowering
- Self Cleaning Pilot Line Filters
- Self Cleaning Main Line Filter (Z-T)
- Built-in Turbulence Suppressors
- 70 HRc Rockwell Hardened Bore Surfaces
- 100% Continuous Duty Solenoids

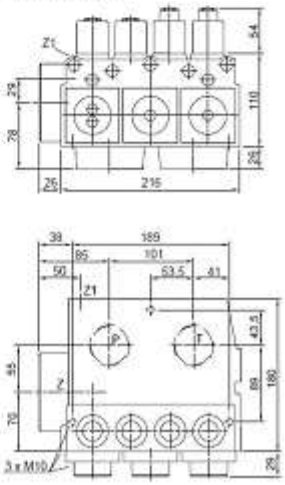
Technical Data:		**¾" EV**	**1 ½" & 2" EV**	**2 ½" EV**
Flow Range:	l/min	10-125 (2-33 USgpm)	30-800 (8-208 USgpm)	500-1530 (130-400 USgpm)
Pressure Range:	bar	5-100 (74-1500 psi)	3-100 (44-1500 psi)	3-68 (44-1000 psi)
Press. Range CSA:	bar	5-100 (74-1500 psi)	3-70 (44-1030 psi)	3-47 (44-690 psi)
Burst Pressure Z:	bar	575 (8450 psi)	505 (7420 psi)	340 (5000 psi)
Pressure Drop P–Z:	bar	6 (88 psi) at 125 lpm	4 (58 psi) at 800 lpm	4 (58 psi) at 1530 lpm
Weight:	kg	5 (11 lbs)	10 (22 lbs)	14 (31 lbs)

Oil Viscosity: 25-60 mm²/sec. at 40°C (15-35 cSt. at 120°F). **Max. Oil Temperature:** 70°C (158°F)
Solenoids AC: 24 V/1.8 A, 42 V/1.0 A, 110 V/0.43 A, 230 V/0.18 A, 50/60 Hz. **Insulation Class, AC and DC:** IP 68
Solenoids DC: 12 V/2.0 A, 24 V/1.1 A, 42 V/0.5 A, 48 V/0.6 A, 80 V/0.3 A, 110 V/0.25 A, 196 V/0.14 A.

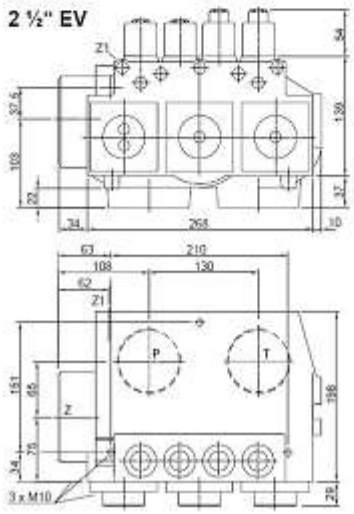
¾" EV



1 ½" & 2" EV



2 ½" EV



Hercules Carparking Systems 2004
ABN: 67 077 434 452
Unit 1, 87 Reserve Road
ARTARMON NSW 2064

Hercules Carparking Systems (Melbourne)
ABN: 72 622 520 281
Unit 6 / 1 Bell Street
PRESTON VIC 3072

Hercules Carparking Systems (Qld)
ABN: 30 625 912 469
Unit 1, 87 Reserve Road
ARTARMON NSW 2064

Hercules Carparking Systems (WA)
ABN: 29 617 098 487
41 Esplanade
NEDLANDS WA 6009

EV Control Valve Types

Optional Equipment

EN	Emergency Power Solenoid
CSA	CSA Solenoids
KS	Slack Rope Valve
BV	Main Shut-Off Valve
HP	Hand Pump
RS	Pipe Rupture Valve
ES	Pipe Rupture Valve End Switch
DH	High Pressure Switch
DL	Low Pressure Switch
CX	Pressure Compensated Down
MX	Auxiliary Down

EV 100

Up Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
All 'up' functions are smooth and adjustable.
Up Levelling speed is adjustable.
Up Stop is smooth and exact through valve operation whereby the pump must run approx. ½ sec. longer through a time relay.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
All down functions are smooth and adjustable.

USA Patent No. 4,637,495
Pats & Pats Pend: France, Germany, Italy, Japan, Switzerland & U.K.

Warning: Only qualified personell should adjust or service valves. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical power is switched off and residual pressure in the valve is reduced to zero.

Adjustments UP

Valves are already adjusted and tested. Check electrical operation before changing valve settings.
Test that the correct solenoid is energised, by removing nut and raising solenoid slighty to feel pull.

Nominal Settings: Adjustments **1 & 4** approx. level with flange faces. Up to two turns in either direction may then be necessary. Adjustments **2, 3 & 5** all the way 'in' (clockwise) then **2 & 5** two turns 'out' (c-clockwise), **3** three turns out. A small final adjustment may be necessary.

EV 100

1. **By Pass:** When the pump is started, and solenoids **A** and **B** energised, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
2. **Up Acceleration:** With the pump running and solenoids **A** and **B** energised as in **1**, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
3. **Up Deceleration:** When solenoid **B** is de-energised, whilst solenoid **A** remains energised, the car will decelerate according to the setting of adjustment **3**. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration.
4. **Up Levelling:** With solenoid **A** energised and solenoid **B** de-energised as in **3.**, the car will proceed at its levelling speed according to the setting of adjustment **4**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster up levelling.
5. **Up Stop:** At floor level, solenoid **A** is de-energised with solenoid **B** remaining de-energised. Through a time relay the pump should run approx. ½ second longer to allow the car to stop smoothly by valve operation according to the setting of adjustment **5.** 'In' (clockwise) provides a softer stop, 'out' (c-clockwise) a quicker stop.

S Relief Valve: 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

EV Elevator Valves

Control Elements

A Solenoid (Up Stop)	**U** By Pass Valve
B Solenoid (Up Deceleration)	**V** Check Valve
C Solenoid (Down Deceleration)	**W** Levelling Valve (Up)
D Solenoid (Down Stop)	**X** Full Speed Valve (Down)
H Manual Lowering	**Y** Levelling Valve (Down)
S Relief Valve	**F** Filter

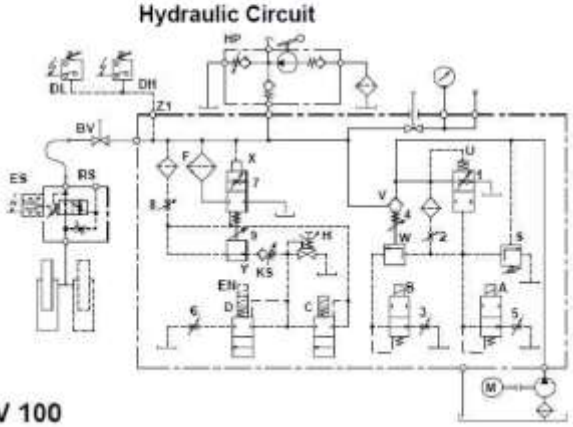
Adjustments UP

1 By Pass	
2 Up Acceleration	
3 Up Deceleration	
4 Up Levelling Speed	
5 Up Stop	

Adjustments DOWN

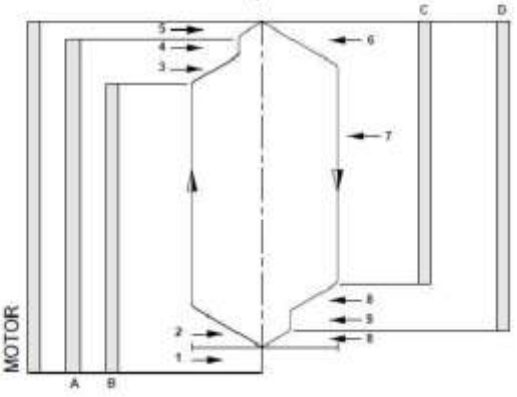
6 Down Acceleration	
7 Down Full Speed	
8 Down Deceleration	
9 Down Levelling Speed	

Hydraulic Circuit



EV 100

Electrical Sequence



Warning: Only qualified personnel should adjust or service valves. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical controller is switched off and residual pressure in the valve is reduced to zero.

Adjustments DOWN

Valves are already adjusted and tested. Check electrical operation before changing valve settings. Test that the correct solenoid is energised, by removing nut and raising solenoid slightly to feel pull.

Nominal Settings: Adjustments **7 & 9** approx. level with flange face. Two turns in either direction may then be necessary. Adjustments **6 & 8** turn all the way 'in' (clockwise), then three turns 'out' (c-clockwise). One final turn in either direction may be necessary.

6. Down Acceleration: When solenoids **C** and **D** are energised, the car will accelerate downwards according to the setting of adjustment **6**. 'In' (clockwise) provides a softer down acceleration, 'out' (c-clockwise) a quicker acceleration.

7. Down Speed: With solenoids **C** and **D** energised as in **6** above, the full down speed of the car is according to the setting of adjustment **7**. 'In' (clockwise) provides a slower down speed, 'out' (c-clockwise) a faster down speed.

8. Down Deceleration: When solenoid **C** is de-energised whilst solenoid **D** remains energised, the car will decelerate according to the setting of adjustment **8**. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration. **Attention: Do not close all the way in! Closing adjustment 8 completely (clockwise) may cause the car to fall on the buffers.**

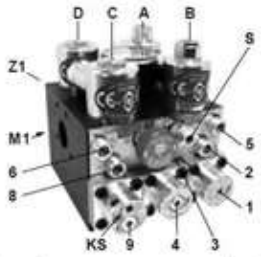
9. Down Levelling: With solenoid **C** de-energised and solenoid **D** energised as in **8** above, the car will proceed at its down levelling speed according to the setting of adjustment **9**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster down levelling speed.

Down Stop: When solenoid **D** is de-energised with solenoid **C** remaining de-energised, the car will stop according to the setting of adjustment **8** and no further adjustment will be required.

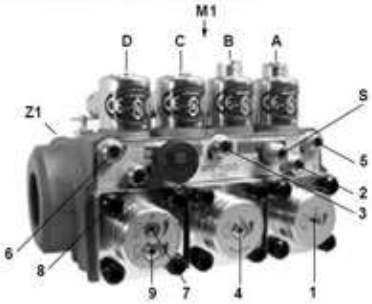
KS Slack Rope Valve: Solenoids **C** and **D** must be de-energised! The KS is adjusted with a 3 mm Allan Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when Manual Lowering **H** is opened. Should the car not descend, **K** must be backed off until the car just begins

Positions of Adjustments

Important: Length of ¾" thread on pump connections should not be longer than 17 mm!



M1 Second pressure gauge connection, ½"
Z1 Pressure switch connection, ¼"



Adjustments UP

1 By Pass
2 Up Acceleration
3 Up Deceleration
4 Up Levelling Speed
5 Up Stop

Adjustments DOWN

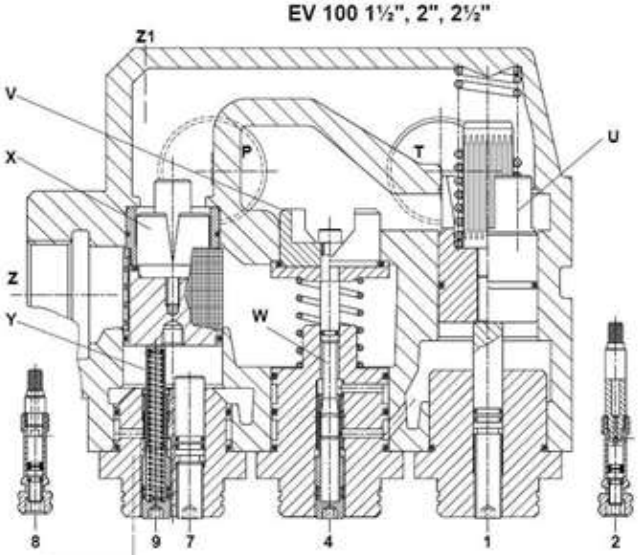
6 Down Acceleration
7 Down Full Speed
8 Down Deceleration
9 Down Levelling Speed

Control Elements

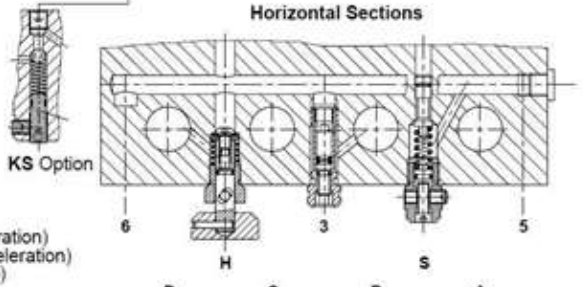
A Solenoid (Up Stop)
B Solenoid (Up Deceleration)
C Solenoid (Down Deceleration)
D Solenoid (Down Stop)
H Manual Lowering
S Relief Valve
U By Pass Valve
V Check Valve
W Levelling Valve (Up)
X Full Speed Valve (Down)
Y Levelling Valve (Down)

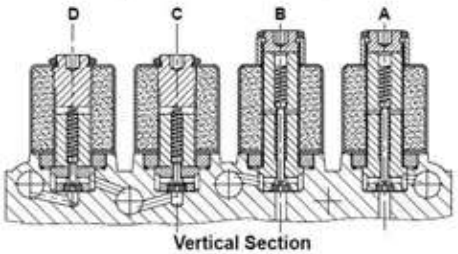
Valve Types	Elements Omitted
EV 0	A, B, W, 3, 4 & 5
EV 1	B, W, 3 & 4
EV 10	A & 5
EV 100	as shown

EV 100 1½", 2", 2½"



Horizontal Sections





Vertical Section

EV Spare Parts List

EV

Pos.	No.	Item
1	FS	Lock Screw - Flange
	FO	O-Ring - Flange
	1F	Flange - By Pass
	EO	O-Ring - Adjustment
	1E	Adjustment - By Pass
	UO	O-Ring - By Pass Valve
	U	By Pass Valve
	UD	Noise Suppressor
	UF	Spring - By Pass
2	2	Adjustment - Up Acceleration
3	3	Adjustment - Up Deceleration
4	EO	O-Ring - Adjustment
	4E	Adjustment - Up Levelling
	4F	Flange - Check Valve
	FO	O-Ring - Flange
	VF	Spring - Check Valve
	W	Up-Levelling Valve
	WO	O-Ring - Up Levelling Valve
	VO	Seal - Check Valve
	V	Check Valve
	W6	Screw - Check Valve
5	3	Adjustment - Up Stop
6	3	Adjustment - Down Acceleration
7	7F	Flange - Down Valve
	FO	O-Ring - Flange
	7O	O-Ring - Adjustment
	7E	Adjustment - Down Valve
	UO	O-Ring - Down Valve
	XO	Seal - Down Valve
	X	Down Valve
	XD	Noise Suppressor
	F	Main Filter
8	8	Adjustment - Down Deceleration
9	EO	O-Ring - Adjustment
	9E	Adjustment - Down Levelling
	9F	Spring - Down Valve
	Y	Down Levelling Valve
H	H	Manual Lowering - Self Closing
	HO	Seal - Manual Lowering
S	SE	Adjustment - Screw
	SM	Hexagonal
	MS	Grub Screw
	SO	O-Ring - Nipple
	SZ	Nipple
	SF	Spring
	SK	Piston
A+B	MM	Nut - Solenoid
	AD	Collar - Solenoid
	M	Coil - Solenoid (indicate voltage)
	AR	Tube - Solenoid 'Up'
	MO	O-Ring - Solenoid
	AN	Needle - 'Up'
	AF	Spring - Solenoid 'Up'
	AH	Seat Housing - 'Up'
	AS	Seat - Solenoid 'Up'
C+D	MM	Nut - Solenoid
	M	Coil - Solenoid (indicate voltage)
	DR	Tube - Solenoid 'Down'
	MO	O-Ring - Solenoid
	DF	Spring - Solenoid 'Down'
	DN	Needle - 'Down'
	DK	Core - Solenoid
	DG	Seat Housing with Screen-'Down'
	FD	Filter Solenoid
	DS	Seat - Solenoid 'Down'

Some parts occur more than once in different positions of the valve.

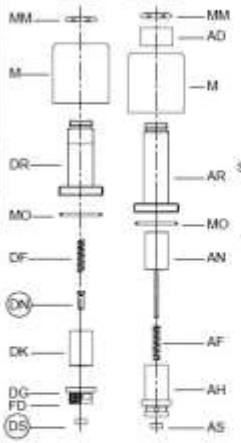
O-Ring-Size

No.	¾"	1 ½"	2 ½"
FO	26x2P	47x2.5P	58x3P *
EO	9x2P	9x2P	9x2P
UO	26x2V	39.34x2.62V	58x3V
WO	5.28x1.78V	5.28x1.78V	5.28x1.78V
VO	23x2.5V	42x3V	60x3V **
7O	5.28x1.78P	9x2P	9x2P
XO	13x2V	30x3V	47x3V
HO	5.28x1.78V	5.28x1.78V	5.28x1.78V
SO	5.28x1.78P	5.28x1.78P	5.28x1.78P
MO	26x2P	26x2P	26x2P

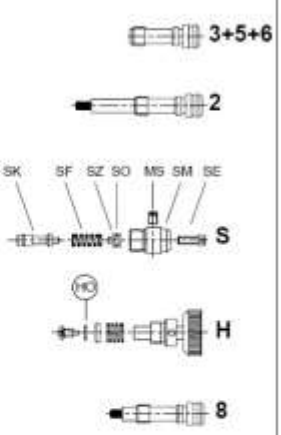
* FO by 4F 2½" is 67x2.5P
** 90 Shore

O-Ring: V - Viton
P - Perbunan

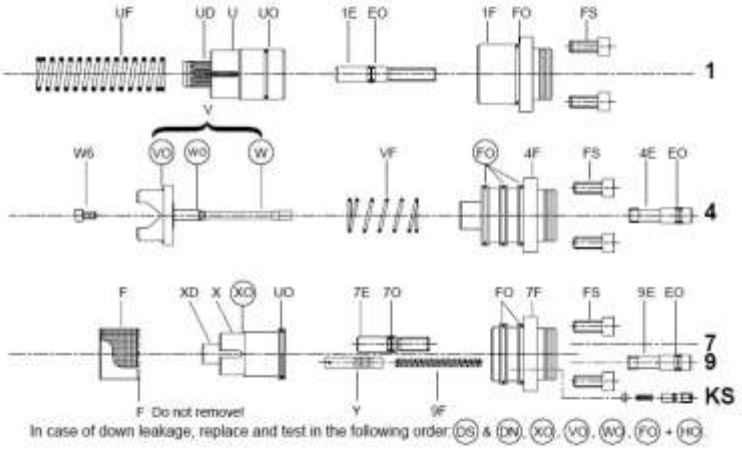
Solenoid Valves



Adjustments

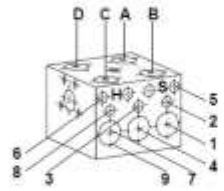


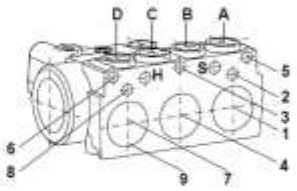
Flow Valves

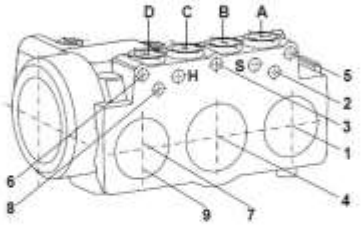


In case of down leakage, replace and test in the following order: (DS) & (DN), (XO), (VO), (WO), (FO) + (HO).

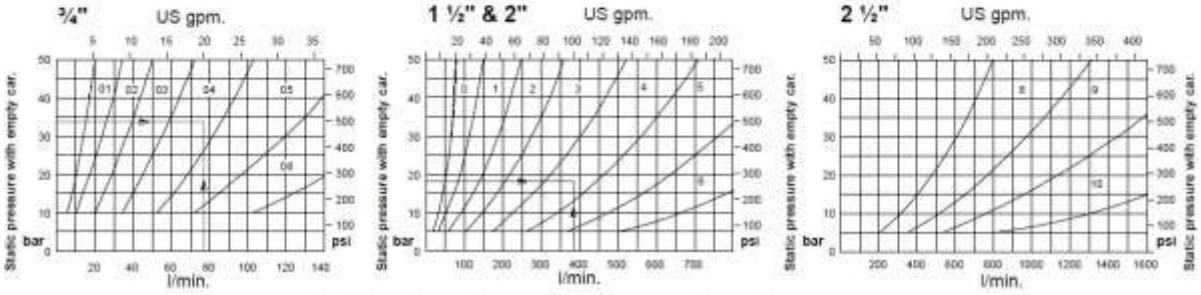
Taper threads: Do not exceed 8 turns of piping into the valve connections.







Flow Guide Selection Charts

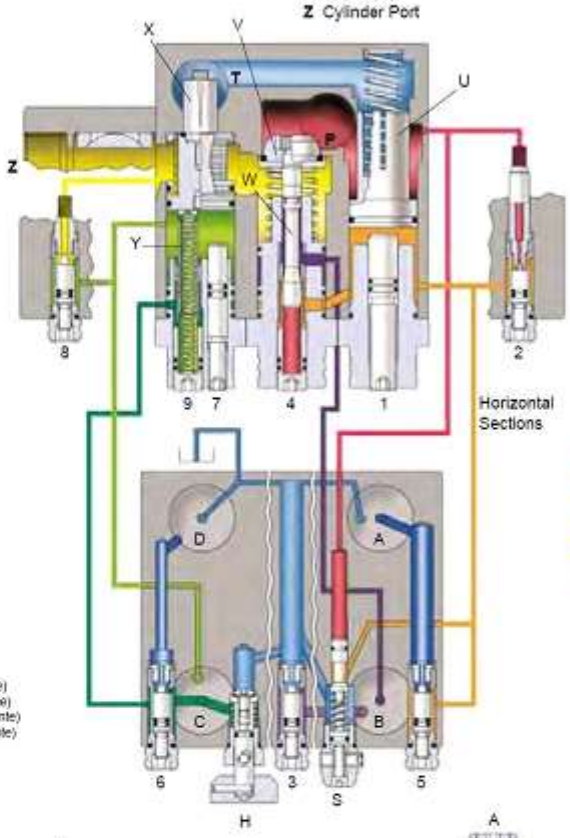


To order EV 100, state pump flow, empty car pressure (or flow guide size) and solenoid voltage.
Example order: EV 100, 380lpm, 18 bar (empty), 110 AC = EV 100/4/110AC

EV 100 Service Manual

Elevator Valve - EV 100 3/4"
for Home Lifts

P Pump Port
T Tank Port
Z Cylinder Port



Control Elements
A Solenoid (UP Stop)
B Solenoid (UP Deceleration)
C Solenoid (Down Deceleration)
D Solenoid (Down Stop)
H Manual Lowering
S Relief Valve
U By Pass Valve
V Check Valve
W Leveling Valve (Up)
X Full Speed Valve (Down)
Y Leveling Valve (Down)

Adjustments UP
1 By Pass
2 Up Acceleration
3 Up Deceleration
4 Up Leveling Speed
5 Up Stop

Adjustments DOWN
6 Down Acceleration
7 Down Full Speed
8 Down Deceleration
9 Down Leveling Speed

Pressure
Pumpe
Bypass Valve
Up Leveling
Tank
Cylinder
Down Valve
Down Leveling

Steuerelemente
A Magnetventil (Halt oben)
B Magnetventil (Abbremsen auf)
C Magnetventil (Abbremsen unten)
D Magnetventil (Halt unten)
H Notablassventil
S Überdruckventil
U Umlaufkolben
V Rückschlagventil
W Schleichfahrtventil (auf)
X Senkkolben
Y Schleichfahrtventil (ab)

Einstellungen AUF
1 Umlaufeinstellung
2 Anfahrdrossel
3 Abbremsdrossel
4 Schleichfahrteinstellung
5 Haltedrossel

Einstellungen AB
6 Anfahrdrossel
7 Senkfahrteinstellung
8 Abbremsdrossel
9 Schleichfahrteinstellung

Druck
Pumpe
Umlaufkolben
Schleichfahrt (Auf)
Tank
Zylinder
Senkkolben
Schleichfahrt (Ab)

Eléments de commande
A Electro-vanne 'arrêt' (en fin de montée)
B Electro-vanne 'ralentissement' (montée)
C Electro-vanne 'ralentissement' (descente)
D Electro-vanne 'arrêt' (en fin de descente)
H Descente de secour (homme mort)
S Valve de sécurité
U By-pass
V Clapet anti-retour
W Soupape montée petite vitesse
X Soupape descente
Y Soupape descente petite vitesse

Réglages MONTEE
1 By-pass
2 Etrangleur de démarrage
3 Etrangleur de ralentissement
4 Réglage de petite vitesse
5 Etrangleur d'arrêt

Réglages DESCENTE
6 Etrangleur de démarrage
7 Réglage de grande vitesse
8 Etrangleur de ralentissement
9 Réglage de petite vitesse

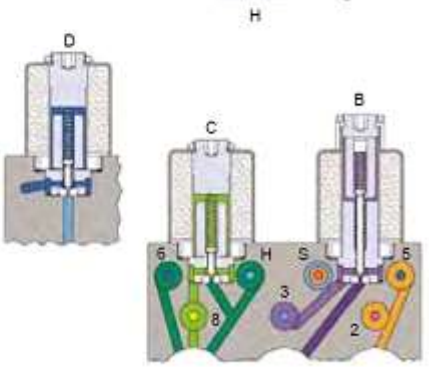
Pression
Pompe
By-pass
Montée petit vitesse
Cuve
Vérin
Soupape descente
Descente petite vitesse

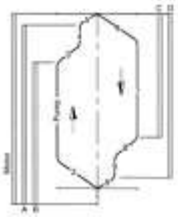
Elementos de mando
A Válv. magnética 'parada' (arriba)
B Válv. magnética 'frenado' (subida)
C Válv. magnética 'frenado' (bajada)
D Válv. magnética 'parada' (abajo)
H Válv. parada de urgencia (manual)
S Válv. de seguridad
U Válv. de desviación
V Válv. de retención
W Válv. de subida lentísima
X Válv. de bajada
Y Válv. de bajada lentísima

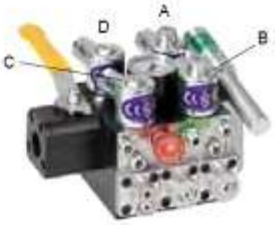
Ajustes SUBIDA
1 Desviación
2 Arranque
3 Frenado
4 Recorrido lentísimo
5 Parada

Ajustes BAJADA
6 Arranque
7 Recorrido en bajada
8 Frenado
9 Recorrido lentísimo

Presión
Bomba
Válvula de desviación
Subida lentísima
Tanque
Cilindro
Válvula de bajada
Bajada lentísima







Elevator Valve
EV 100 1½", 2", ½"

EV 100 Service Manual

P Pump Port
T Tank Port
Z Cylinder Port

Control Elements
A Solenoid (UP Stop)
B Solenoid (UP Deceleration)
C Solenoid (Down Deceleration)
D Solenoid (Down Stop)
H Manual Lowering
S Relief Valve
U By Pass Valve
V Check Valve
W Leveling Valve (Up)
X Full Speed Valve (Down)
Y Leveling Valve (Down)

Adjustments UP
1 By Pass
2 Up Acceleration
3 Up Deceleration
4 Up Leveling Speed
5 Up Stop

Adjustments DOWN
6 Down Acceleration
7 Down Full Speed
8 Down Deceleration
9 Down Leveling Speed

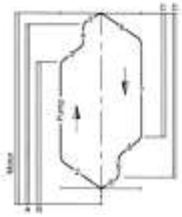
Pressure
Pumpe
Bypass Valve
Up Leveling
Tank
Cylinder
Down Valve
Down Leveling

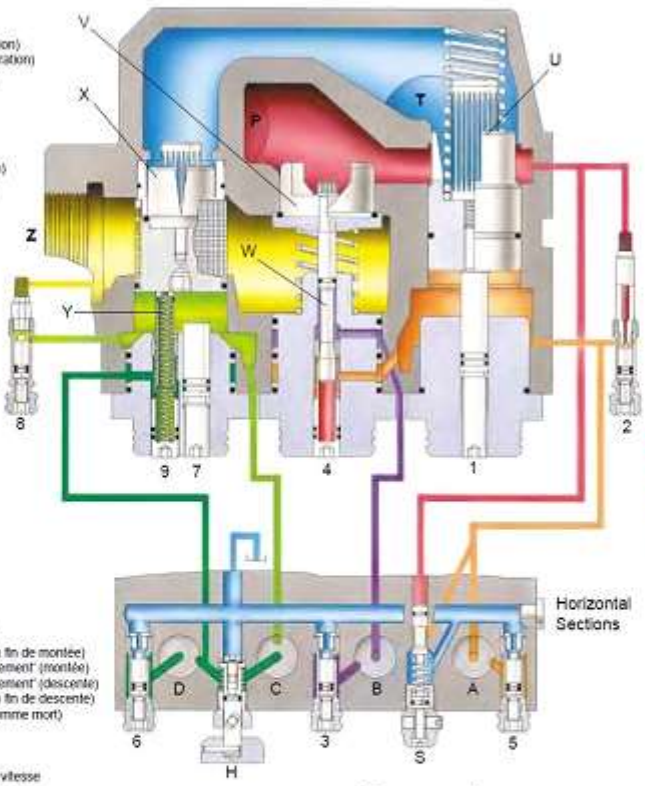
Eléments de commande
A Electro-vanne 'arrêt' (en fin de montée)
B Electro-vanne 'ralentissement' (montée)
C Electro-vanne 'ralentissement' (descente)
D Electro-vanne 'arrêt' (en fin de descente)
H Descente de secour (homme mort)
S Valve de sécurité
U By-pass
V Clapet anti-retour
W Soupape montée petite vitesse
X Soupape descente
Y Soupape descente petite vitesse

Réglages MONTÉE
1 By-pass
2 Etrangleur de démarrage
3 Etrangleur de ralentissement
4 Réglage de petite vitesse
5 Etrangleur d'arrêt

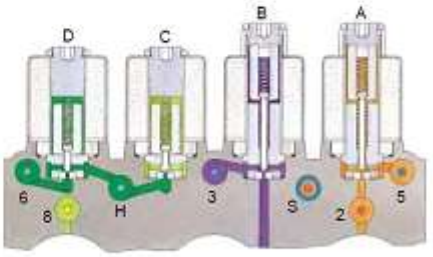
Réglages DESCENTE
6 Etrangleur de démarrage
7 Réglage de grande vitesse
8 Etrangleur de ralentissement
9 Réglage de petite vitesse

Pression
Pompe
By-pass
Montée petit vitesse
Cuve
Vérin
Soupape descente
Descente petite vitesse





Horizontal Sections



Vertical Section

Steuerelemente
A Magnetventil (Halt oben)
B Magnetventil (Abbremsen auf)
C Magnetventil (Abbremsen unten)
D Magnetventil (Halt unten)
H Notablassventil
S Überdruckventil
U Umlaufkolben
V Rückschlagventil
W Schleichfahrtventil (auf)
X Senkkolben
Y Schleichfahrtventil (ab)

Einstellungen AUF
1 Umlaufeinstellung
2 Anfahrdrossel
3 Abbremsdrossel
4 Schleichfahrteinstellung
5 Halledrossel

Einstellungen AB
6 Anfahrdrossel
7 Senkfahrteinstellung
8 Abbremsdrossel
9 Schleichfahrteinstellung

Druck
Pumpe
Umlaufkolben
Schleichfahrt (Auf)
Tank
Zylinder
Senkkolben
Schleichfahrt (Ab)

Elementos de mando
A Válv. magnética 'parada' (arriba)
B Válv. magnética 'frenado' (subida)
C Válv. magnética 'frenado' (bajada)
D Válv. magnética 'parada' (abajo)
H Válv. parada de urgencia (manual)
S Válv. de seguridad
U Válv. de desviación
V Válv. de retención
W Válv. de subida lentísima
X Válv. de bajada
Y Válv. de bajada lentísima

Ajustes SUBIDA
1 Desviación
2 Arranque
3 Frenado
4 Recorrido lentísimo
5 Parada

Ajustes BAJADA
6 Arranque
7 Recorrido en bajada
8 Frenado
9 Recorrido lentísimo

Presión
Bomba
Válvula de desviación
Subida lentísima
Tanque
Cilindro
Válvula de bajada
Bajada lentísima

EV 100 Service Manual

Quick adjustment procedure

Solenoid Coils

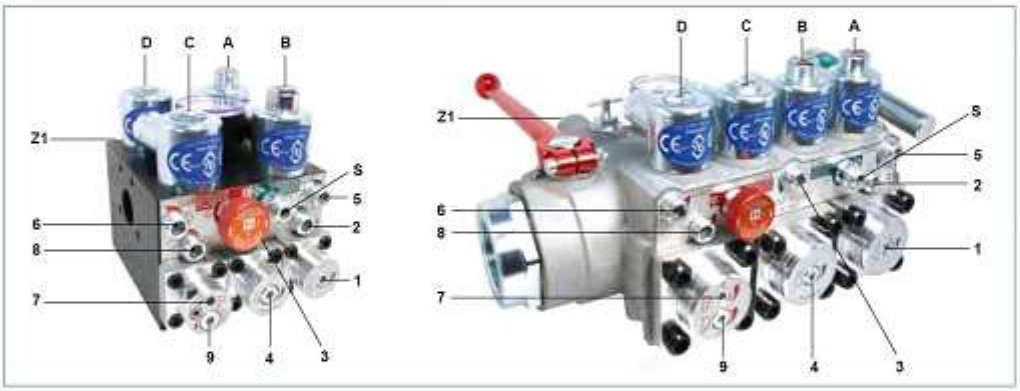
During adjustment of the EV 100 valve, instead of making a full floor to floor travel to check operation, much time can be saved by removing the securing nuts of the coil and switching to deceleration or to acceleration by lifting or replacing the appropriate coil by hand, allowing several adjustment corrections during one car travel between floors.

Caution: Once removed from the solenoid tube, the energised coil will begin to overheat after about 20 secs.
If necessary, to slow the rate of heating, place an 8 or 10 mm socket key or similar steel rod as core thru the coil.
Do not lay an energised coil to one side, otherwise it may overheat unnoticed.

If the coil becomes too hot to hold, it must be replaced, back over the solenoid tube and any further adjustment carried out with the elevator making normal floor to floor runs.

Car not visible from Machineroom

If the car cannot be seen during adjustment of the valve, the acceleration and deceleration times can be heard from the change of the turbulent noise within the valve as the speed of the car changes. With no load in the car, the duration of the speed changes should be about 2,5 seconds. This applies to adjustments 2, 3, 6 and 8.



Up Travel (empty car)

PRE-SETTINGS		EV 100 ¾"	EV 100 1½" - EV 100 2½"	
Adjustment No. **1**	level with flange face			5 mm Socket key
Adjustment No. **2**	all the way 'in'	then 1,5 turns 'out'	then 2 turns 'out'	3 mm Socket key
Adjustment No. **4**	level with flange face			5 mm Socket key
Adjustment No. **3**	all the way 'in'	then 1,5 turns 'out'	then 2,5 turns 'out'	3 mm Socket key
Adjustment No. **5**	all the way 'in'	then 1,5 turns 'out'	then 2,5 turns 'out'	3 mm Socket key
Adjustment No. **S**	all the way 'in'	then 1,5 turns 'out'	then 1,5 turns 'out'	3 mm Socket key

1. Pilot Pressure Setting
Disconnect coil **A**. Energise Motor (pump).
If the car does not move, turn No. **1** 'in' until the car begins to move, turn No. **1** 'out' until the car stops, then back out again 1/2 turn. The car remains standing still.
DO NOT UP-LEVEL WITH THIS ADJUSTMENT! Between full and empty car, levelling speed differences would be extreme.

2. Up Acceleration
Reconnect coil **A**. Start Motor and energise coil **A** and **B** (normal 'up' call).
Observe the up acceleration. If it is too quick, turn No. **2** 'in' ½ turn. If it is too long, turn No. **2** 'out' ½ turn.
Repeat until acceleration is satisfactory. Acceleration time should be about 2,5 secs.

4. Up Levelling
Disconnect coil **B**. Energise Motor and coil **A** (normal 'up-level' call).
With adjustment No. **4** level with the face of the flange the car will up level. If the levell1ing speed is too fast, turn No. **4** 'in' until the speed is as required. If the speed is too slow, turn No. **4** 'out'. Recommended speed 6 cm/sec.

Quick adjustment procedure

3. Up Deceleration
With coil **B** still disconnected. Energise motor and coil **A** (normal 'up-level' call).
The car will travel upwards at levelling speed. Turn No. **3** 'in' until the car starts to up level faster, then turn No. **3** 'out' until the original levelling speed is observed. Reconnect coil **B** and place a normal up call.
Observe the deceleration of the car. If it is too long, turn No. **3** 'out' ¼ turn; if it is too short, turn No. **3** 'in' ¼ turn.
Repeat until deceleration is satisfactory. Deceleration time should be about 2,5 secs.

5. Up Soft Stop
Disconnect coil **A**. Energise Motor.
The car should not move. Turn No. **5** 'in' until the car starts upwards then turn No. **5** 'out' until the car stops.
Reconnect coil **A**. Energise Pump-Motor and **A**. The car will travel upwards at levelling speed.
Lift **A** coil by hand briefly and observe the stopping of the car. If the stop is too hard turn No. **5** 'in' ¼ turn.
If the stop is too soft, turn No. **5** 'out', ¼ turn. Repeat until the stop is satisfactory.

S Pressure Relief Valve
Turn **S** screw 'out' until about 2 mm of the screw head is showing. Close the ball valve in the cylinder line and open the manual lowering **H** to lower valve pressure down to zero. Place an up call, energising motor and coils **A** and **B**. The relief pressure will show on the pressure gauge.
To increase the relief valve setting, turn **S** 'in'.
To decrease the relief valve setting, turn **S** 'out', then open the manual lowering for ½ second with the pump still running to release locked-in pressure, before observing the pressure gauge reading.

PRE-SETTINGS				
Adjustment No. **8**	all the way 'in'	then 1 turns 'out'	then 1,5 turns 'out'	3 mm Socket key
Adjustment No. **6**	all the way 'in'	then 1,5 turns 'out'	then 1,5 turns 'out'	3 mm Socket key
Adjustment No. **7**	3 mm under the flange face			5 mm Socket key
Adjustment No. **9**	level with flange face			5 mm Socket key

8. Down Deceleration
Place down call (coils **C** and **D** energised).
As the car approaches full speed, remove coil **D** by hand briefly from the solenoid and observe the deceleration of the car.
If the deceleration is too long, turn No. **8** 'out' ¼ turn; if it is too short, turn No. **8** 'in' ¼ turn.
Repeat until deceleration is satisfactory. Deceleration time should be about 2,5 secs.

6. Down Acceleration
Turn No. **6** all the way 'in'. Place down call (coils **C** and **D** energised).
The car will not move. Turn No. **6** 'out' slowly until the car accelerates downwards.
If the acceleration is too long, turn No. **6** 'out' ¼ turn. If it is too short, turn No. **6** 'in' ¼ turn.
Acceleration time should be about 2,5 secs.

7. Down Full Speed
Place down call (coils **C** and **D** energised).
Observe full down speed. Turn No. **7** 'in' for slower, 'out' for faster speed.

9. Down Levelling Speed
Disconnect coil **C**. Place down call (**D** energised).
Observe down levelling speed. Turn No. **9** 'in' for slower, 'out' for a fast down levelling speed.
Recommended speed 6 cm/sec.

H Emergency Lowering
The manually operated emergency down speed and the **D** coil operated down levelling speed are the same.

Down Stop
When solenoid **D** is de-energised with solenoid **C** remaining de-energised, the car will stop according to the setting of adjustment 8 and no further adjustment will be required.

KS Slack Rope Valve
The KS is adjusted with a 3 mm Socket Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when the **D** solenoid alone is energised. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.

EV 100 Service Manual

EV Spare Parts List

Pos.	No.	Item
1		FS Lock Screw - Flange
		FO O-Ring - Flange
		1F Flange - By Pass
		EO O-Ring - Adjustment
		1E Adjustment - By Pass
		UO O-Ring - By Pass Valve
		U By Pass Valve
		UD Noise Suppressor
		UF Spring - By Pass
2	2	Adjustment - Up Acceleration
3	3	Adjustment - Up Deceleration
4		EO O-Ring - Adjustment
		4E Adjustment - Up Levelling
		4F Flange - Check Valve
		FO O-Ring - Flange
		VF Spring - Check Valve
		W Up-Levelling Valve
		WO O-Ring - Up Levelling Valve
		VO Seal - Check Valve
		V Check Valve
		W6 Screw - Check Valve
5	3	Adjustment - Up Stop
6	3	Adjustment - Down Acceleration
7		7F Flange - Down Valve
		FO O-Ring - Flange
		7O O-Ring - Adjustment
		7E Adjustment - Down Valve
		UO O-Ring - Down Valve
		XO Seal - Down Valve
		X Down Valve
		XD Noise Suppressor
		F Main Filter
8	8	Adjustment - Down Deceleration
9		EO O-Ring - Adjustment
		9E Adjustment - Down Levelling
		9F Spring - Down Valve
		Y Down Levelling Valve
H		H Manual Lowering - Self Closing
		HO Seal - Manual Lowering
S		SE Adjustment - Screw
		SM Hexagonal
		MS Grub Screw
		SO O-Ring - Nipple
		SZ Nipple
		SF Spring
		SK Piston
A+B		MM Nut - Solenoid
		AD Collar - Solenoid
		M Coil - Solenoid (indicate voltage)
		AR Tube - Solenoid 'Up'
		MO O-Ring - Solenoid
		AN Needle - 'Up'
		AF Spring - Solenoid 'Up'
		AH Seat Housing - 'Up'
		AS Seat - Solenoid Up'
C+D		MM Nut - Solenoid
		M Coil - Solenoid (indicate voltage)
		DR Tube - Solenoid 'Down'
		MO O-Ring - Solenoid
		DF Spring - Solenoid 'Down'
		DN Needle - 'Down'
		DK Core - Solenoid
		DG Seat Housing with Screen-'Down'
		FD Filter Solenoid
		DS Seat - Solenoid 'Down'

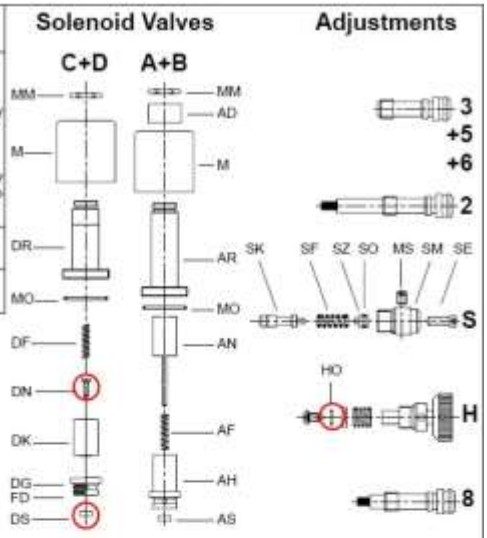
Some parts occur more than once in different positions of the valve.

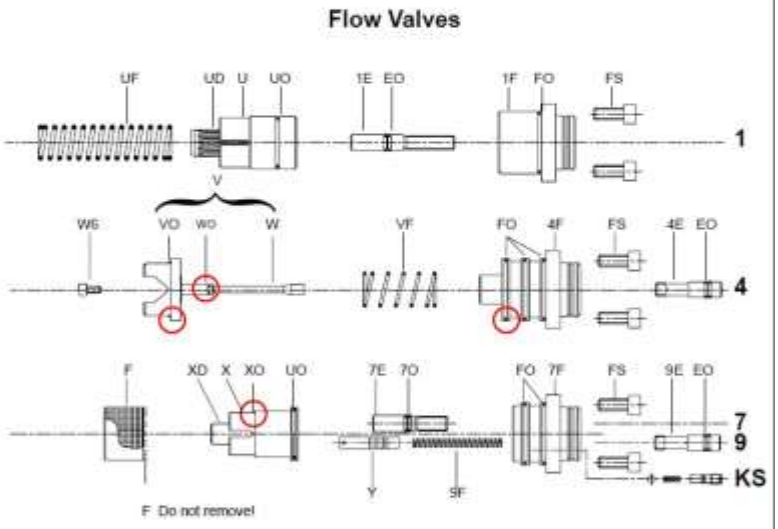
O-Ring-Size

No.	¾"	1 ½"	2½"
FO	26x2P	47x2.5P	58x3P *
EO	9x2P	9x2P	9x2P
UO	26x2V	39.34x2.62V	58x3V
WO	5.28x1.78V	5.28x1.78V	5.28x1.78V
VO	23x2,5V	42x3V	60x3V **
7O	5.28x1.78P	9x2P	9x2P
XO	13x2V	30x3V	47x3V
HO	5.28x1.78V	5.28x1.78V	5.28x1.78V
SO	5.28x1.78P	5.28x1.78P	5.28x1.78P
MO	26x2P	26x2P	26x2P

* FO by 4F 2½" is 67x2.5P
** 90 Shore

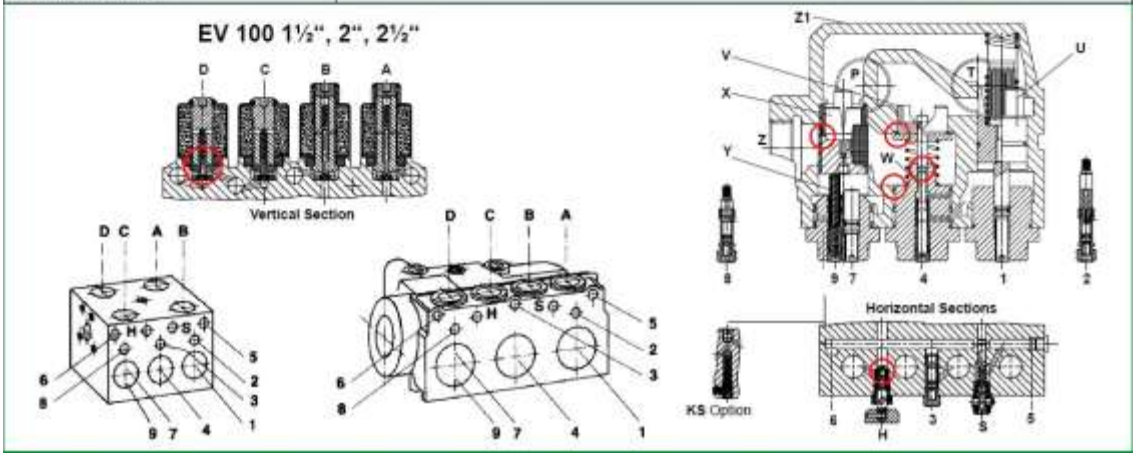
O-Ring: V - Viton
P - Perbunan





Down Leakage (Relevelling)

In case of down leakage, replace and test in the following order: (DS) & (DN), (XO), (VO), (WO), (FO) + (HO).



EV 100 Trouble Shooting (2007)

UP Travel

Valves are fully adjusted and tested in the factory. Check electrical operation before changing valve setting.

Problem	Possible cause	Recommended
No Up-Start (Elevator remains at floor)	Test: Turn adjustment **5** all the way in. If the elevator now starts upwards the problem is at solenoid **A**.	
	Solenoid **A** not energised or voltage too low.	See Ⓐ below.
	Solenoid **A** tube not screwed down tight.	Tighten Solenoid **A** tube.
	Solenoid valve **A**: Dirt or damage between needle **AN** and seat **AS**.	Clean or change needle and seat.
	Adjustment **2** not far enough open.	Turn out adjustment **2**.
	Adjustment **1** too far back (open). Not enough pilot pressure.	Turn in adjustment **1** with the pump running.
	Pressure relief **S** valve is set too low.	Set relief valve higher.
	Adjustment **8** turned in too far (car sits on the buffer).	Turn out adjustment **8**.
	Bypass flow guide **U** is too large.	Insert smaller bypass flow guide (see flow guide charts at EV catalogue).
	Pump running in the wrong direction.	Install the pump correctly.
	The pump connection flange is leaking excessively.	Seal the pump connection.
	The pump is undersize or worn.	Select bigger pump or replace pump.
	Test: If by turning adjustment **1** with the pump running the pressure does not rise above 5 bar, even with a smaller bypass valve inserted, the problem should be sought at the pump.	
Up-Start, but no Full Speed	Test: Turn adjustment **3** all the way in. If the elevator now travels upwards at full speed the problem is at solenoid **B**.	
	Solenoid **B** not energised or voltage too low.	See Ⓐ below.
	Solenoid **B** tube not screwed down tight.	Tighten Solenoid **B** tube.
	Solenoid valve **B**: Dirt or damage between needle **AN** and seat **AS**.	Clean or change needle and seat.
	The pump connection flange is leaking excessively.	Seal the pump connection.
	The pump is undersize or worn.	Select bigger pump or replace pump.
	Test: If by turning adjustment **1** with the pump running the pressure does not rise above 5 bar, even with a smaller bypass valve inserted, the problem should be sought at the pump.	
Up-Start too hard	Adjustment **1** turned in too far.	Turn out adjustment **1**.
	Adjustment **2** turned out too far.	Turn in adjustment **2**.
	Bypass flow guide U too small (slots too narrow).	Change to flow guide with wider slots.
	O-Ring **UO** on Bypass Valve **U** is leaking.	Change O-Ring → see EV Spare Parts List.
	Star to Delta motor switch period is too long.	0.2-0.3 sec. is sufficient.
	Excessive friction on the guide rails or in the cylinder head.	Can not be eliminated thru valve adjustment.
No deceleration into leveling speed	Solenoid **B** does not de-energise.	Lift coil to check magnetic pull. See Ⓐ below. Slow down switch possibly set to high (late).
	Adjustment **3** turned in too far.	Turn out adjustment **3**. Turn in adjustment **2**.
	O-Ring **UO** on Bypass Valve **U** is leaking.	Change O-Ring → see EV Spare Parts List.
Levelling too fast	Adjustment 4 too far screwed out.	Turn in adjustment **4** to about 0.05 m/s leveling speed.
Deceleration into leveling speed but overtravel of floor level	Solenoid **A** is de-energised too late.	Lift coil to check pull. See Ⓐ below.
	Adjustment **5** turned in too far.	Turn out adjustment **5**.
	Adjustment **1** turned in too far.	Turn out adjustment **1**.
	Up leveling speed too high.	Turn in adjustment **4** to about 0.05 m/s leveling speed.
Bypass-pressure not adjustable	Restriction on the return line.	Remove restriction; enlarge return line.
	Bypass flow guide **U** too small (slots too narrow).	Change to flow guide with wider slots.
Elevator stops before reaching the floor (no leveling)	Solenoid **A** and **B** reversed.	Swap solenoid A and B. See Ⓐ below.
	Up leveling speed too slow.	Turn out adjustment **4**.
	Middle O-Ring **FO** of flange **4F** is leaking.	Change O-Ring → see EV Spare Parts List.
	Relief valve is set too low.	Set relief valve higher.

Ⓐ For checking the operation of the solenoids, remove the top nuts. By lifting the coils a few millimeters, the magnetic pull of the coil can be felt. For testing, the operation of the elevator car can also be controlled by lifting and replacing the coil. If the coil gets too hot, the coil has to be mounted onto the solenoid and the following adjustments have to be carried out on normal travels from floor to floor.

Standard settings: Adjustments **1 & 4** approx. level with flange faces. Up to two turns in either direction may then be necessary. Adjustments **2, 3 & 5** all the way in (clockwise) then for **EV ¾": all adjustments** 1.5 turns out (c-clockwise), for **EV 1 1/2 " – 2 ½": adjustments 3 & 5** two and half turns out (c-clockwise), **adjustment 2** two turns out. Small final adjustments may be necessary.

EV 100 Service Manual

EV 100 Trouble Shooting (2007)

DOWN Travel

Valves are fully adjusted and tested in the factory. Check electrical operation before changing valve setting.

Problem	Possible cause	Recommended
No Down Start	Solenoid **D** not energised or voltage too low.	Lift coil to check magnetic pull. See Ⓐ below.
	Adjustment **6** turned in too far.	Turn out adjustment **6**.
	Adjustment **8** turned out too far.	Turn in adjustment **8** cautiously. **Attention:** Danger of traveling through
	O-Ring **UO** on Down Valve **X** is leaking.	Change O-Ring → see EV Spare Parts List.
No full speed	Solenoid **C** not energised or voltage too low.	Lift coil to check magnetic pull. See Ⓐ below.
	Adjustment **7** turned in too far.	Turn out adjustment **7**.
	Down Valve flow guide **X** too small.	Check insert size (see flow guide charts page 6)
No down leveling. Elevator stops before floor level	Solenoid **C** and **D** reversed.	Lift coil to check magnetic pull. See Ⓐ below.
	Adjustment **9** turned in too far.	Turn out adjustment **9** to about 0.05 m/s leveling speed.
	Spring **9F** in adjustment **9** is broken.	Replace adjustment **9** complete.
No down leveling. Elevator travels though floor level	Adjustment **8** turned in too far. Filter of adjustment 8 blocked or adjustment 8 is damaged.	Turn out adjustment **8** about ½ turn.
	Adjustment **9** turned out too far.	Turn in adjustment **9** to about 0.05 m/s leveling speed.
	Solenoid valve **C**: Dirt or damage between needle **DN** and seat **DS**.	Clean or change needle and seat.
	Inner O-Ring **FO** on flange **7F** is leaking.	Change O-Ring → see EV Spare Parts List.
Elevator sinks quickly	Solenoid **D** tube not screwed down tight.	Tighten Solenoid **D** tube.
	Adjustment **8** turned in too far.	Turn out adjustment **8** about ½ turn.
Elevator sinks slowly due to inner leakage (Relevelling)	For possible down leakage points, see „Technical Dokumentation System Lenkage".	Replace one seal at a time and test before proceeding to the next point of possible leakage, if still necessary.
	Solenoid valve **D**: Dirt or damage between needle **DN** and seat **DS**.	Clean or change needle and seat.
	O-Ring **XO** of Down Valve **X** is leaking.	Change O-Ring → see EV Spare Parts List. When Down Valve is compensated, replace Down Valve.
	O-Ring **VO** of Check Valve **V** is leaking.	Change Check Valve → see EV Spare Parts List.
	O-Ring **WO** of Leveling Valve **W** is leaking.	Change O-Ring → see EV Spare Parts List.
	Inner O-Ring **FO** on flange **4F** is leaking.	Change O-Ring → see EV Spare Parts List.
	O-Ring **HO** of Manual Lowering **H** is leaking.	Replace Manual Lowering.
Elevator sinks due to inner leakage of auxiliary equipment	HP: Handpump is leaking.	Remove suction tube and observe if handpump leaks. Replace complete hand pump.
	HX/MX : Adjustment **8M** turned in too far.	Turn out adjustment **8M**.
	HX/MX: Down valve **9M** is leaking. Dirt or damage between the needle **DN** and seat **DS**.	Clean or change needle and seat.
	HX/MX: O-Ring **XO** of Down Valve **YM** is leaking.	Change O-Ring → see EV Spare Parts List.
	HX/MX: Manual Lowering is leaking (HX/MX).	Replace Manual Lowering.
	Contraction of oil during cooling especially from 35°C or above.	Consider oil cooler if hot oil is a problem.

Ⓐ For checking the operation of the solenoids, remove the top nuts. By lifting the coils a few millimeters, the magnetic pull of the coil can be felt. For testing, the operation of the elevator car can also be controlled by lifting and replacing the coil. If the coil gets too hot, the coil has to be mounted onto the solenoid and the following adjustments have to be carried out on normal travels from floor to floor.

Standard settings: Adjustments **7 & 9** approx. level with flange faces. Up to two turns in either direction may then be necessary. Adjustments **6 & 8** all the way in (clockwise) then for **EV ¾"**, **adjustment 6**,1 ½ turn and **adjustment 8**, 1 turn out (c-clockwise), for **EV 1 1/2 " – 2 ½"**, **adjustments 6 & 8**, 1 ½ turns out (c-clockwise). Small final adjustments may be necessary.

Slack Rope Valve `K´

Purpose

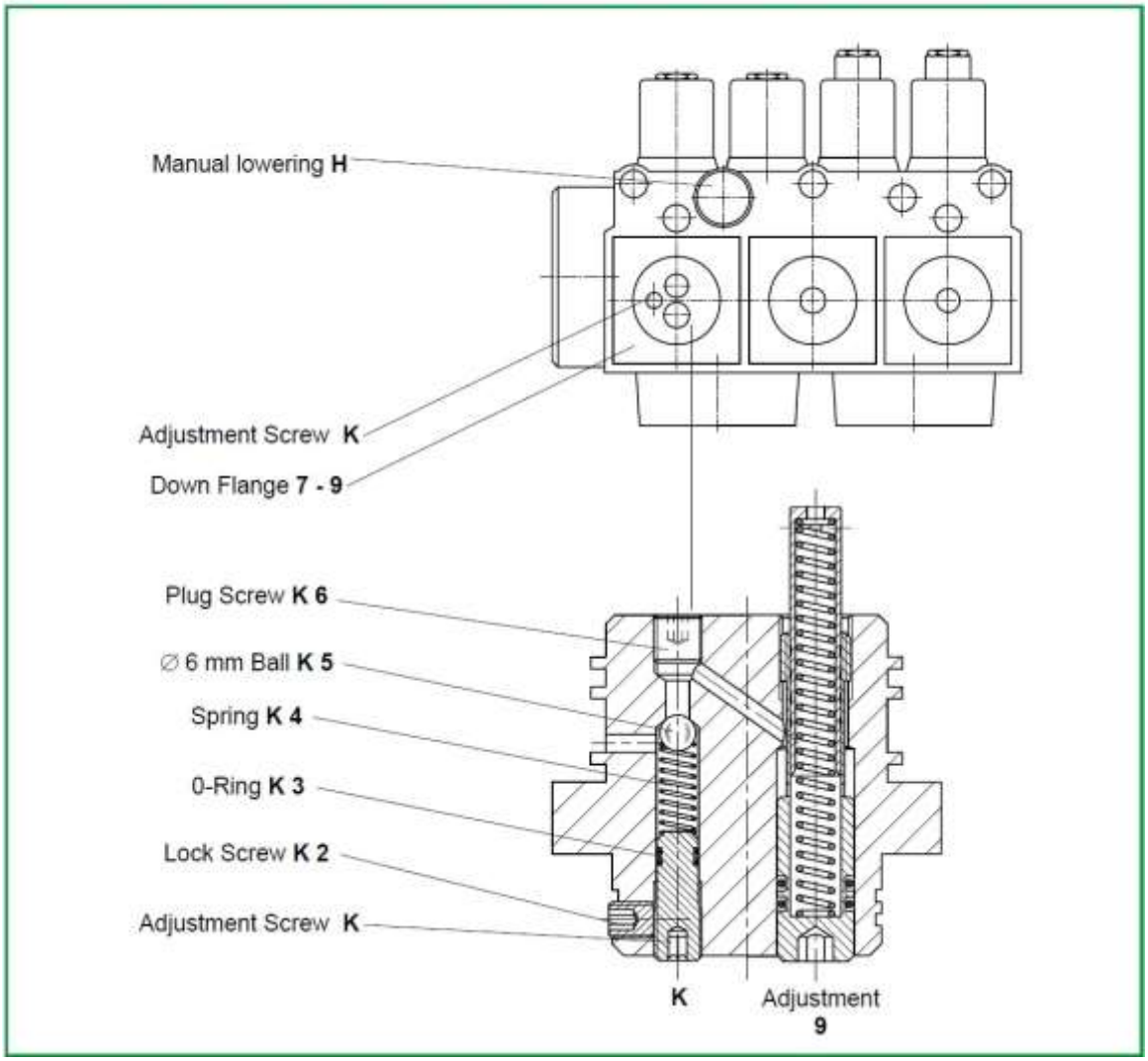
In the case of the operation of the safeties in a 1:2 hydraulic lift system when the weight of the car is no longer carried by the ropes, the electrical supply to the elevator must automatically be switched off. The **K** Slack Rope Valve avoids the ram being lowered by the opening of the manual lowering valve which could otherwise cause a tangled rope condition. The **K** Slack Rope Valve prevents the pressure holding up the ram from being evacuated through the manual lowering valve.

Function

The K valve is adjusted to a pressure just above the pressure produced by the weight of the ram. When under normal operating conditions, the weight of the car acts upon the ram through the 1:2 roping, the resulting pressure is sufficient to open the poppet of the **K** valve when the manual lowering **H** is opened, allowing the car to descend as required. When however the `safeties´ have operated and only the weight of the ram and sheave block are acting upon the hydraulic system, the resulting pressure is too low to open the **K** valve. The ram and sheave block can not be lowered.

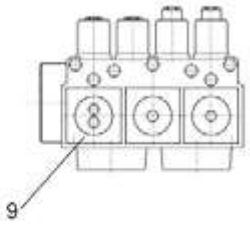
Adjustment

The **K** is adjusted with a 3 mm Socket Key by turning the screw **K** `in` for higher pressure and `out` for lower pressure. With **K** turned all the way `in`, then half a turn back out, the unloaded car should descend when the **D** solenoid alone is energised. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.



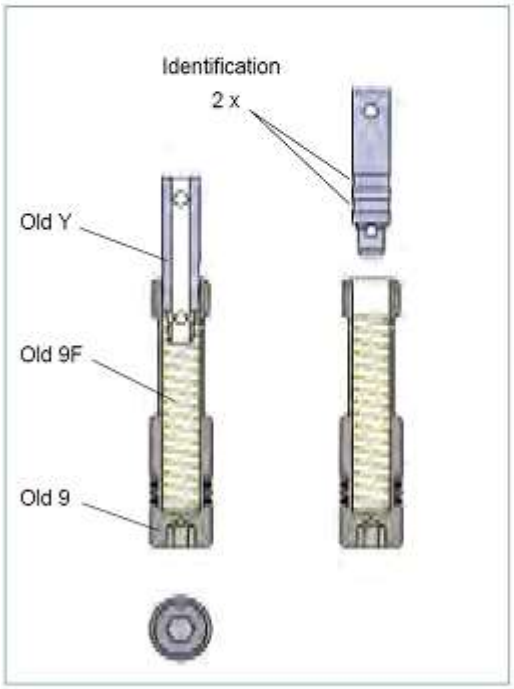
EV 100 Service Manual

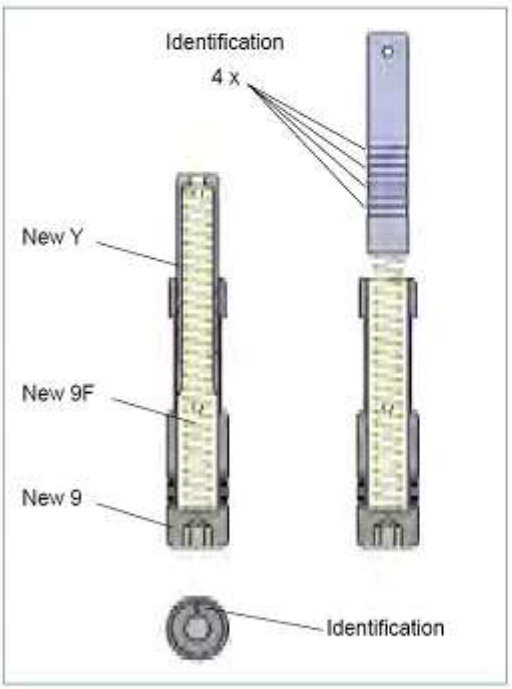
Down Levelling Adjustment 9 Replacement



Old Type
1971 - 1999
Replacement not necessary
if operation is normal

New Type
from Jan. 2000





Advantages of new type

- Smoother deceleration
- Higher mechanical closing force
- Longer spring life
- Easier assembly

In the past, a small number of the original springs No. 9F have broken. Beginning January 2000, the design of the down levelling adjustment was modified to take a stronger spring.
The complete new adjustment is interchangeable with the original adjustment 9.
A broken spring 9 would cause the down levelling speed to be slower. No danger to passengers would arise as a consequence.

Overheating of Power Units - System Leakage

Oil temperatures above 55 °C (130° F) should be avoided, otherwise the efficiency of the pump drops considerably and its life is reduced. Aging of the oil is also accelerated.

Possible causes of overheating:

1. Up levelling too long due to the levelling speed being too slow or the slow down switch being set too low.
2. Machine room ventilation inadequate.
3. The frequency of operation is too high for the normal rate of heat dissipation.

Temporary solution:

As a temporary measure to avoid overheating of the oil resulting in the shut down of the elevator, the down speed can be slowed to reduce frequency of operation until a permanent solution is installed.

Cooling systems

a. If the degree of overheating is not excessive and it takes for example two to three hours for the oil temperature to rise from 20° to 55°C (70° to 130° F), it may be sufficient to improve air circulation around the power unit, for example through the installation of a 0.05 to 0.10 kW ventilator extracting air out of the machine room or through a fan of similar power, blowing air over the power unit.

b. Should the above be inadequate, depending on the size of the elevator, it will be necessary to install a 10-50 l/min. (3 - 13 gpm) pump to circulate the hot oil through an air cooled radiator of about 0.1 to 0.2 fan kW. It is also essential that there is sufficient extraction of warm air out of the machine room or that the cooler is out side of the machine room, for example in the elevator shaft. The effective cooling power of an air cooled radiator should not to be confused with the power of the fan drive which normally need only be 0.1 or 0.2 kW. Normally, the effective cooling power of a cooler need only be approximately ¼ of the main hydraulic elevator motor, in the case of submersible drives.

Cooling systems for the above purpose should be switched into operation when the oil reaches 30° - 35°C (85° - 95° F).

System leakage (re-levelling)

The aim of manufacturers of hydraulic elevator control valves is to produce valves with zero leakage. Due to fine contamination in the oil perfect sealing between valve parts may not always be achieved, leading to a slow down leak of the elevator car.

It would become unnecessarily expensive to strive for perfect sealing in every valve in operation. Therefore, because code requirements assure a safe relevelling system whether descent of the car is caused by valve leakage or through the cooling of the oil in the cylinder pressure system, a minor leakage of the control valve can be tolerated.

1. The European Code EN 81-2 require: that the loaded elevator does not leak downwards by more than 10 mm (3/8") in 10 minutes. This is the standard used to determine if a valve should be serviced for leakage.
2. For practical reasons, a quicker method for judging valve leakage is to close the ball valve in the cylinder line and observe the gauge showing pressure in the cylinder chamber of the valve. If this pressure falls to zero in less than 20 secs, it may be necessary to service the valve, depending on the diameter of the main ram and sensitivity of the customer.
3. Down sinking giving the impression of leakage can be due to cooling of the oil.

When the elevator is at rest and the temperature of the oil falls, contraction of the oil in the cylinder and piping causes the car to sink. This sinking is very slow but overnight without relevelling could amount to as much as half a meter, depending on the temperature drop of the oil and the volume of oil in the cylinder system. The elevator relevelling system, operating normally however, keeps the car at floor level.

4. In the case of Blain EV valves, see page 6 indicating where valve down leakage can occur.

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Switch Distances

Recommended distances between leveling and stop switches

Elevator Speed mtrs/sec.	Switch Distance approx. cm	Elevator Speed ft/min.	Switch Distance approx. inches
0,10	5	20	2
0,15	10	30	4
0,20	15	40	6
0,25	18	50	7
0,30	25	60	9
0,35	30	70	12
0,40	40	80	16
0,45	46	90	18
0,50	50	100	20
0,55	58	110	23
0,60	70	120	28
0,70	80	140	31
0,80	95	160	36
0,90	105	180	41
1,00	120	200	48

With no load in the car, the deceleration time should be 2 to 2,5 secs. from full speed to levelling speed. The levelling time should be 1 to 2 secs.

Accurate landing can be affected by different factors as follows:

a. If the levelling speed is fast i.e. 0,1 m/sec (20 ft/min), landing will not be as accurate as when the levelling speed is slower i.e. 0,05 m/sec (10 ft/min).

b. If the soft stop adjustment '5' is set too soft, stopping will be less accurate as when '5' is set for a quicker stop.

c. Particularly when the mechanic can not see the operation of the elevator car, it is possible that the elevator has not finished decelerating from fast speed before reaching the floor. In other words, the elevator has not slowed down to its correct levelling speed before the stop switch is actuated.
Usually, the levelling operation can be observed through the crack in the car doors. Alternatively, in the machine room, the turbulent noise within the valve during levelling can be heard and should last 1 to 2 secs. following 2 to 2,5 secs. deceleration time with no load in the car.

d. A difference in landing accuracy between the elevator being loaded and unloaded, can be due to the car under load, leaning to one side by several millimeters causing an alteration in the operating position of the stop switch by some centimetres.

Flow - Pressure Tables (metric)

EV 100 Service Manual

Ram Ø • Area • Speed • Flow
Piston Ø • Aire • Vitesse • Débit
Kolben Ø • Fläche • Geschwindigkeit • Durchfluss
Pistón Ø • Area • Velocidad • Caudal

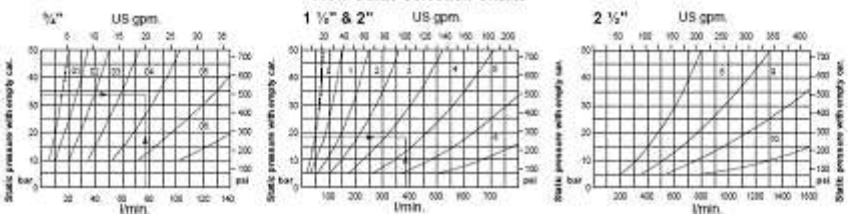
m/sec.		0,05	0,10	0,15	0,20	0,25	0,30	0,35	0,40	0,45	0,50	0,55	0,60	0,70	0,80	0,90	1,00
Ø mm	cm²	l/min.															
35	9,6	2,9	5,8	8,7	11,5	14	17	20	23	26	29	32	35	40	46	52	58
40	12,6	3,8	7,5	11,3	15,1	19	23	26	30	34	38	41	45	53	60	68	75
45	15,9	4,8	9,5	14,3	19,1	24	29	33	38	43	48	52	57	67	76	86	95
50	19,6	5,9	11,8	17,7	23,6	29	35	41	47	53	59	65	71	82	94	106	118
55	23,8	7,1	14,3	21,4	28,5	35	43	50	57	64	71	78	86	100	114	128	143
60	28,3	8,5	17,0	25,4	33,9	42	51	59	68	76	85	93	102	119	136	153	170
65	33,2	10,0	19,9	29,9	39,8	50	60	70	80	90	100	110	119	139	159	179	199
70	38,5	11,5	23,1	34,6	46,2	58	69	81	92	104	115	127	139	162	185	208	231
75	44,2	13,3	26,5	39,8	53,0	66	80	93	106	119	133	146	159	186	212	239	265
80	50,3	15,1	30,2	45,2	60,3	75	90	106	121	136	151	166	181	211	241	271	302
85	56,7	17,0	34,0	51,1	68,1	85	102	119	136	153	170	187	204	238	272	306	340
90	63,6	19,1	38,2	57,3	76,3	95	115	134	153	172	191	210	229	267	305	344	382
95	70,9	21,3	42,5	63,8	85,1	106	128	149	170	191	213	234	255	298	340	383	425
100	78,5	23,6	47,1	70,7	94,2	118	141	165	188	212	236	259	283	330	377	424	471
105	86,6	26,0	52,0	77,9	103,9	130	156	182	208	234	260	286	312	364	416	468	520
110	95,0	28,5	57,0	85,5	114,0	143	171	200	228	257	285	314	342	399	456	513	570
115	103,9	31,2	62,3	93,5	124,6	156	187	218	249	280	312	343	374	436	499	561	623
120	113,1	33,9	67,9	101,8	135,7	170	204	238	271	305	339	373	407	475	543	611	679
125	122,7	36,8	73,6	110,4	147,3	184	221	258	295	331	368	405	442	515	589	663	736
130	132,7	39,8	79,6	119,5	159,3	199	239	279	319	358	398	438	478	557	637	717	796
140	153,9	46,2	92,4	138,5	184,7	231	277	323	369	416	462	508	554	647	739	831	924
150	176,7	53,0	106,0	159,0	212,1	265	318	371	424	477	530	583	636	742	848	954	1060
160	201,1	60,3	120,6	181,0	241,3	302	362	422	483	543	603	664	724	844	965	1086	1206
170	227,0	68,1	136,2	204,3	272,4	340	409	477	545	613	681	749	817	953	1090	1226	1362
180	254,5	76,3	152,7	229,0	305,4	382	458	534	611	687	763	840	916	1069	1221	1374	1527
190	283,5	85,1	170,1	255,2	340,2	425	510	595	680	766	851	936	1021	1191	1361	1531	1701
200	314,2	94,2	188,5	282,7	377,0	471	565	660	754	848	942	1037	1131	1319	1508	1696	1885
210	346,4	103,9	207,8	311,7	415,6	520	623	727	831	935	1039	1143	1247	1455	1663	1870	2078
220	380,1	114,0	228,1	342,1	456,2	570	684	798	912	1026	1140	1254	1368	1597	1825	2053	2281
240	452,4	135,7	271,4	407,2	542,9	679	814	950	1086	1221	1357	1493	1629	1900	2171	2443	2714
260	530,9	159,3	318,6	477,8	637,1	796	956	1115	1274	1434	1593	1752	1911	2230	2548	2867	3186
280	615,8	184,7	369,5	554,2	738,9	924	1108	1293	1478	1663	1847	2032	2217	2586	2956	3325	3695
300	706,9	212,1	424,1	636,2	848,2	1060	1272	1484	1696	1909	2121	2333	2545	2969	3393	3817	4241

Ram Ø • Area • Load • Pressure
Piston Ø • Aire • Cargaision • Pression
Kolben Ø • Fläche • Gewicht • Druck
Pistón Ø • Area • Carga • Presión

kg		500	750	1000	1500	2000	2500	3000	3500	4000	4500	5000	6000	7000	8000	9000	10000
Ø mm	cm²	bar															
35	9,6	51	76	102	153	204	255	306	357	408	459	510	612	714	816	918	1020
40	12,6	39	59	78	117	156	195	234	273	312	351	390	468	546	625	703	781
45	15,9	31	46	62	93	123	154	185	216	247	278	308	370	432	493	555	617
50	19,6	25	38	50	75	100	125	150	175	200	225	250	300	350	400	450	500
55	23,8	21	31	41	62	83	103	124	145	165	186	206	248	289	330	372	413
60	28,3	17	26	35	52	69	87	104	121	139	156	173	209	243	278	312	347
65	33,2	15	22	30	44	59	74	89	103	118	133	148	177	207	237	266	296
70	38,5	13	19	26	38	51	64	78	89	102	115	127	153	178	204	229	255
75	44,2	11	17	22	33	44	56	67	78	89	100	111	133	155	178	200	222
80	50,3	9,8	15	20	29	39	49	59	68	78	88	98	117	137	156	176	195
85	56,7	8,8	13	17	26	35	43	52	61	69	78	86	104	121	138	156	173
90	63,6	7,7	12	15	23	31	39	46	54	62	69	77	93	108	123	139	154
95	70,9	6,9	10	14	21	28	35	42	48	55	62	69	83	97	111	125	138
100	78,5	6,2	9,4	13	19	25	31	38	44	50	56	62	75	87	100	112	125
105	86,6	5,7	8,5	11	17	23	28	34	40	45	51	57	68	79	91	102	113
110	95,0	5,2	7,7	10	16	21	26	31	36	41	47	52	62	72	83	93	103
115	103,9	4,7	7,1	9,4	14	19	24	28	33	38	43	47	57	66	76	85	94
120	113,1	4,3	6,5	8,7	13	17	22	26	30	35	39	43	52	61	69	78	87
125	122,7	4,0	6,0	8,0	12	16	20	24	28	32	36	40	48	56	64	72	80
130	132,7	3,7	5,5	7,4	11	15	19	22	26	30	33	37	44	52	59	67	74
140	153,9	3,2	4,8	6,4	9,6	13	16	19	22	26	29	32	38	45	51	57	64
150	176,7	2,8	4,2	5,6	8,3	11	14	17	19	22	25	28	33	39	44	50	56
160	201,1	2,4	3,7	4,9	7,3	9,8	12	15	17	20	22	24	29	34	39	44	49
170	227,0	2,2	3,2	4,3	6,5	8,6	11	13	15	17	19	22	26	30	35	39	43
180	254,5	1,9	2,9	3,9	5,8	7,7	9,6	12	14	15	17	19	23	27	31	35	39
190	283,5	1,7	2,6	3,5	5,2	6,9	8,6	10	12	14	16	17	21	24	28	31	35
200	314,2	1,6	2,3	3,1	4,7	6,2	7,8	9,4	11	13	14	16	19	22	25	28	31
210	346,4	1,4	2,1	2,8	4,2	5,7	7,1	8,5	9,9	11	13	14	17	20	23	26	28
220	380,1	1,3	1,9	2,6	3,9	5,2	6,5	7,7	9,0	10,3	12	13	16	18	21	23	26
240	452,4	1,1	1,6	2,2	3,3	4,3	5,4	6,5	7,5	8,7	9,8	11	13	15	17	20	22
260	530,9	0,9	1,4	1,8	2,8	3,7	4,6	5,5	6,5	7,4	8,3	9,2	11	13	15	17	19
280	615,8	0,8	1,2	1,6	2,4	3,2	4,0	4,8	5,6	6,4	7,2	8,0	9,6	11	13	14	16
300	706,9	0,7	1,0	1,4	2,1	2,8	3,5	4,2	4,9	5,6	6,2	6,9	8,3	9,7	11	13	14

mm²/0,40 = in² | l/min. x 1,97 = ft³/min. | l/min. x 0,22 = Imp. gals | mm/25,4 = inches | l/min. x 0,26 = US. gals | kg x 2,2 = lbs | bar x 14,7 = psi

Flow Guide Selection Charts



H 11
H 12

Hand pump
Pompe à main
Handpumpe
Bomba a mano

¾" EV

1½"-2" EV

2½" EV

Description (GB)

H 11 and H 12 pumps are for application with hydraulic lifting or pressing equipment, for emergency operation of hydraulic elevators and for the pressure testing of hydraulic systems in general. The H 11 is constructed for side mounting. The H 12 is fitted with a base plate for separate application.

The built-in relief valve should be adjusted to prevent unintentional high pressure being applied to the system. A built-in manual valve for releasing pressure from the system is available as an option.

Beschreibung (D)

H 11 und H 12 Handpumpen sind geeignet für den Einsatz mit hydraulischen Hebe- und Pressanlagen, für die Notbetätigung von hydraulischen Aufzügen, sowie zur Druckprüfung von hydraulischen Systemen im allgemeinen. Die H 11 Handpumpe ist für die seitliche Montage konstruiert. Die H 12 Handpumpe ist mit einer Montageplatte ausgerüstet und für den separaten Einsatz vorgesehen.

Um zu verhindern, daß unbeabsichtigt ein zu hoher Druck in das System gesetzt wird, ist ein Überdruckventil eingebaut. Auf Wunsch ist ein eingebautes Zylinderdruck-Entlastungsventil lieferbar.

Description (F)

Les pompes à main H 11 et H 12 sont prévues pour utilisation avec des installations hydrauliques de levage et de pression, pour la commande d'urgence des ascenseurs hydrauliques, ainsi que pour le contrôle de pression des systèmes hydrauliques en général.
La pompe à main H11 est construite pour le montage latéral. La H 12, pourvue d'une plaque de montage est prévue pour l'application separée.

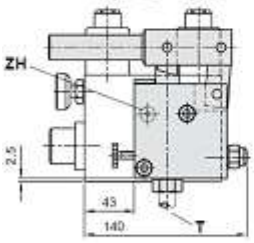
Pour éviter une surpression inopinée dans le système, une soupape de surpression est incorporée.
Une soupape manuelle permettant la dépressurisation du système est livrable sur demande.

Descripción (E)

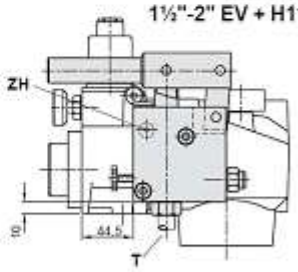
Las bombas a mano H 11 y H 12 son aptas para ser empleadas en instalaciones hidráulicas de elevación y prensado, para el accionamiento de emergencia de elevadores hidráulicos, así como para comprobar la presión de sistemas hidráulicos en general. La bomba a mano H 11 está concebida para ser montada lateralmente a la electroválvula EV, mientras que la H 12 se instala sobre una placa de montaje de forma independiente.

Para evitar, una presión demasiado elevada en el sistema, hay que regular convenientemente la válvula de sobrecarga incorporada.
Con el fin de aligerar la presión del sistema, se puede suministrar una válvula de evacuado, sobre pedido.

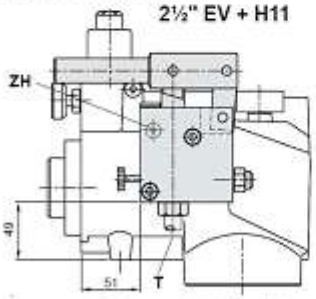
¾" EV + H11



1½"-2" EV + H11



2½" EV + H11

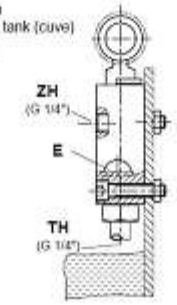


See also EV prospect. | Siehe auch EV Prospekt. | Autres dates voir prospectus EV. | Véase también prospecto EV.

H 11T

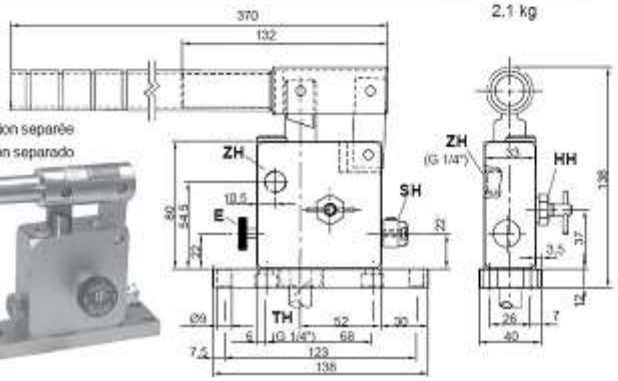
For mounting inside tank
Für Montage am Tankinneren
Pour montage à l'intérieur du tank (cuve)
Por montaje dentro del tank

1.7 kg



H 12

For separate installation
Für separate Montage
Pour installation separée
Por instalación separado



2.1 kg

Hand pump
Pompe à main
Handpumpe
Bomba a mano

H 11
H 12

(GB)

Warning: Only qualified personell should adjust or service hydraulic equipment. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical power is switched off and residual pressure in the system is reduced to zero.

Installation
The inside diameter of the suction line should not be less than 8 mm diameter (5/16"). The connection of the suction line to the hand pump must be a perfect seal. A filter fitted to the bottom end of the suction line is recommended.

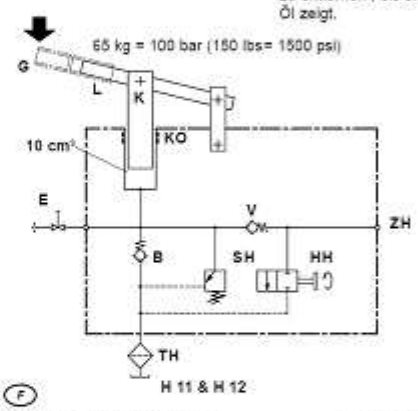
Air Bleed
If the operation of the pump arm does not produce a build up of system pressure, it may be necessary to release trapped air out of the hand pump by opening the air bleed screw **E** half a turn and pumping several strokes until oil appears at the bleed screw thread.

(D)

Warnung: Neueinstellungen und Wartung dürfen nur durch qualifiziertes Aufzugspersonal durchgeführt werden. Nicht autorisierte Bedienung kann Verletzungen, tödliche Unfälle oder materielle Schäden zur Folge haben. Vor der Wartung innerer Teile ist sicherzustellen, daß der elektrische Strom abgeschaltet ist und daß der Druck im System auf Null reduziert worden ist.

Installation
Der Durchmesser der Ansaugleitung sollte mindestens 8 mm haben. Der Anschluß der Saugleitung an der Handpumpe muß einwandfrei dicht sein. Ein Sieb, angebracht am unteren Ende der Saugleitung, ist empfohlen.

Entlüftung
Falls die Betätigung des Pumpenhebels zu keinem Aufbau des Systemdruckes führt, wird es notwendig sein, durch Öffnen der Entlüftungsschraube **E** um 1/2 Umdrehung und mehrmaliger Betätigung des Hebels, die in der Handpumpe evtl. befindliche Luft zu entfernen , bis sich über dem Gewinde der Entlüftungsschraube Öl zeigt.



H 11 & H 12

Elements

V	Check-Valve (Pressure line)
VO	Check-Valve (O-Ring)
B	Check-Valve (Suction line)
K	Piston
KO	0-Ring - Piston
SH	Relief-Valve
HH	Pressure bleed (optional)
E	Air bleed
L	Lever
G	Lever extension
ZH	Pressure Port
ZO	O-Ring - Port
TH	Suction Port

Elemente

V	Rückschlagventil (Druckleitung)
VO	Rückschlagventil (O-Ring)
B	Rückschlagventil (Saugleitung)
K	Druckkolben
KO	O-Ring - Druckkolben
SH	Überdruckventil
HH	Druckentlastung (auf Wunsch)
E	Entlüftungsschraube
L	Hebel
G	Hebelverlängerung
ZH	Druckanschluß
ZO	O-Ring - Anschluß
TH	Sauganschluß

(F)

Attention: Les parametres standards ne doivent être changés que par le personnel qualifié de l'ascenseur. Toute manipulation non autorisée peut résulter en blessures de personnes, accidents mortels ou dommages de l'equipment. Avant de remplacer des pièces à l'interieur, veuillez vous assurer que la ligne de cylindre est fermée, que l'approvisionement électrique est coupé et que la pression dans la soupape est lâchée au moyen de la descente de secours.

Installation
Le diamètre intérieur de la conduite d'aspiration doit être de 8 mm au minimum. Le raccordement de la conduite d'aspiration à la pompe a main doit être d'une étanchéité parfaite. Il est recommandé de munir d'un filtre l'extrémité inférieure de conduite d'aspiration.

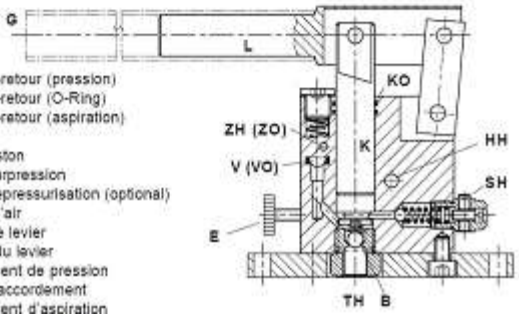
Purge de l'air
Au cas où l' utilisation du rallonge de levier ne cause pas la montee en pression du syséme il sera nécessaire de purger; pour cela ouvrir d'un demi tour la vis de purge **E** et pomper jusqu'à l'apparition d'huile à la vis de purge.

(F)

Advertencia: Sólo personal cualificado deberia ajustar o revisar las válvulas. La manipulación por inexpertos podria causar daños serios y desminuir la duración de vida del equipo. Para la revisión de la parte interior, hay que asegurarse de que esté desconectado del suministro eléctrico y que el resto de presión en la válvula se haya reducido a cero.

Instalación
La tubería de aspiración deberá tener, como mínimo 8 mm. de diámetro interior. La conexión, entre tubería de aspiración y bomba, debe ser de una hermeticidad perfecta. Es recomendable colocar un filtro en el extremo inferior de la tubería de aspiración.

Purga de aire
Si al accionar la palanca de la bomba no se consigue aumentar la presión del sistema, será necesario evacuar el posible aire que pueda encontrarse en la bomba. Para ello, se dara media vuelta al tornillo de descarga **E** y se accionará varias veces la palanca, hasta que se aprecie aceite en la rosca del tornillo de descarga.



Eléments

V	Clapet anti-retour (pression)
VO	Clapet anti-retour (O-Ring)
B	Clapet anti-retour (aspiration)
K	Piston
KO	0-Ring - Piston
SH	Valve de surpression
HH	Valve de depressurisation (optional)
E	Vis purge d'air
L	Rallonge de levier
G	Extension du levier
ZH	Raccordement de pression
ZO	O-Ring - Raccordement
TH	Raccordement d'aspiration

Elementos

V	Válvula de antiretorno (presión)
VO	Válvula de antiretorno (O-Ring)
B	Válvula de antiretorno (aspiración)
K	Pistón
KO	Anillo 0 - Piston
SH	Válvula de seguridad (aspiración)
HH	Descarga de presión (opcional)
E	Purga de aire
L	Palanca
G	Alagardera de palanca
ZH	Conexión de presión
ZO	Anillo O - Conexión
TH	Conexión de aspiración

CX Option

Pressure Compensated Down Valve for EV 100 Valves

Druckkompensiertes Senkventil für EV 100 Ventile

Standard Down Valve **X**
Standard Senkventil **X**

Compensated Down Valve **CX**
Kompensiertes Senkventil **CX**

Down valves X and CX are interchangeable

Senkventile X und CX sind austauschbar

'X' Advantages
Smoother operation
Shorter travel time with load
Only the o-rings need to be serviced
Lower cost

'X' Vorteile
Weichere Fahreigenschaften
Kürzere Fahrtzeit mit Zuladung
Nur die O-Ringe müssen bei Wartungen getauscht werden.
Geringere Kosten

'CX' Advantages
No overspeeding with excessive load

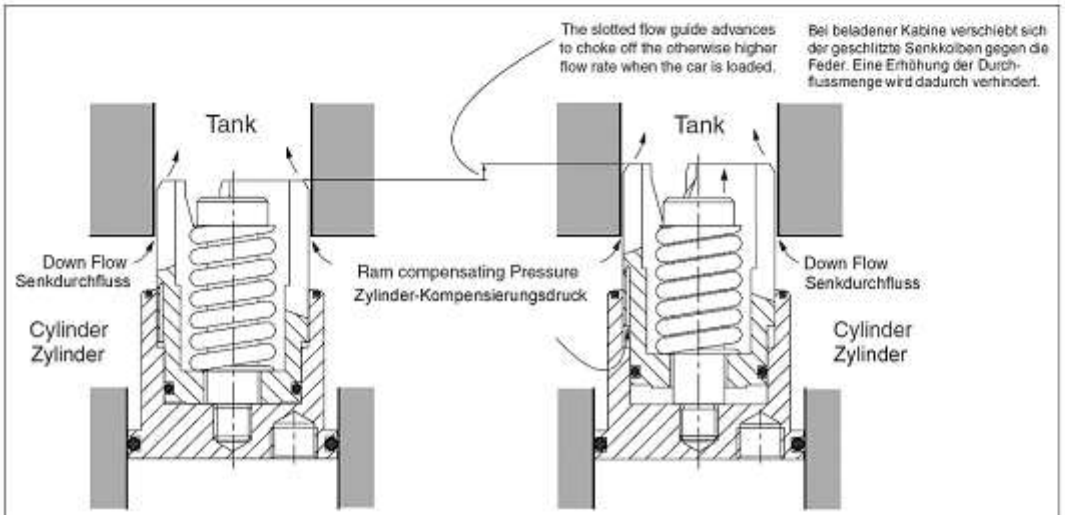
'CX' Vorteile
Keine überhöhte Geschwingigkeit bei übermäßiger Zuladung

Application
We recommend using the standard 'X' down valve as long as the total full load is less than 2,5 times the empty car load.
Compensated down valves are available for all EV 100 sizes.

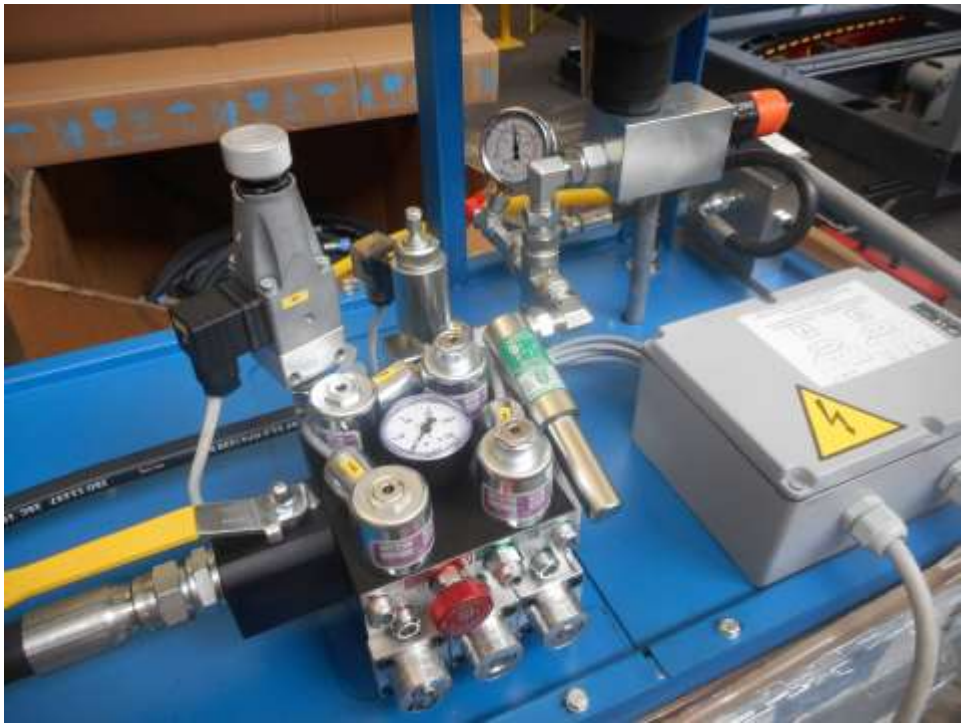
Anwendung
Wir empfehlen den Einsatz des kompensierten Senkventils 'CX', sobald das Gesamtgewicht der beladenen Kabine das 2,5 fache der leeren Kabine überschreitet.
Kompensierte Senkkolben sind für alle Größen des EV 100 erhältlich.

Performance comparison
Standard Down Valve X:
An increase in load of 100% will cause an increase in down speed of approximately 60%.
Compensated Down Valve:
An increase in load of 100% will cause a change of down speed within ± 10%.

Leistungsvergleich
Standard Senkventil X:
Eine Erhöhung der Zuladung von 100% verursacht eine Erhöhung der Senkgeschwindigkeit um etwa 60%.
Kompensiertes Senkventil:
Eine Erhöhung der Zuladung von 100% verursacht eine Veränderung der Senkgeschwindigkeit von ± 10%.



Hydraulic Unit



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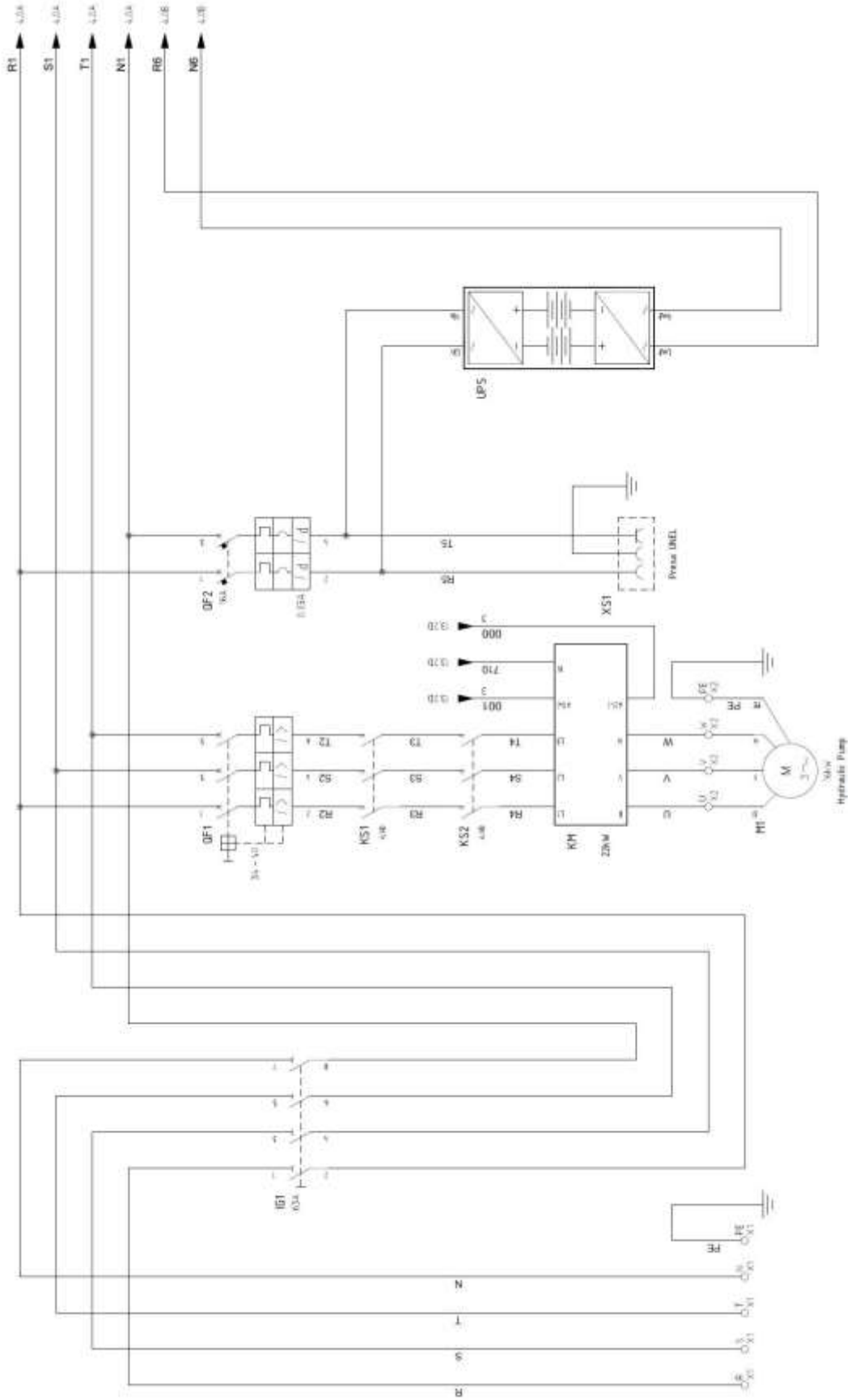
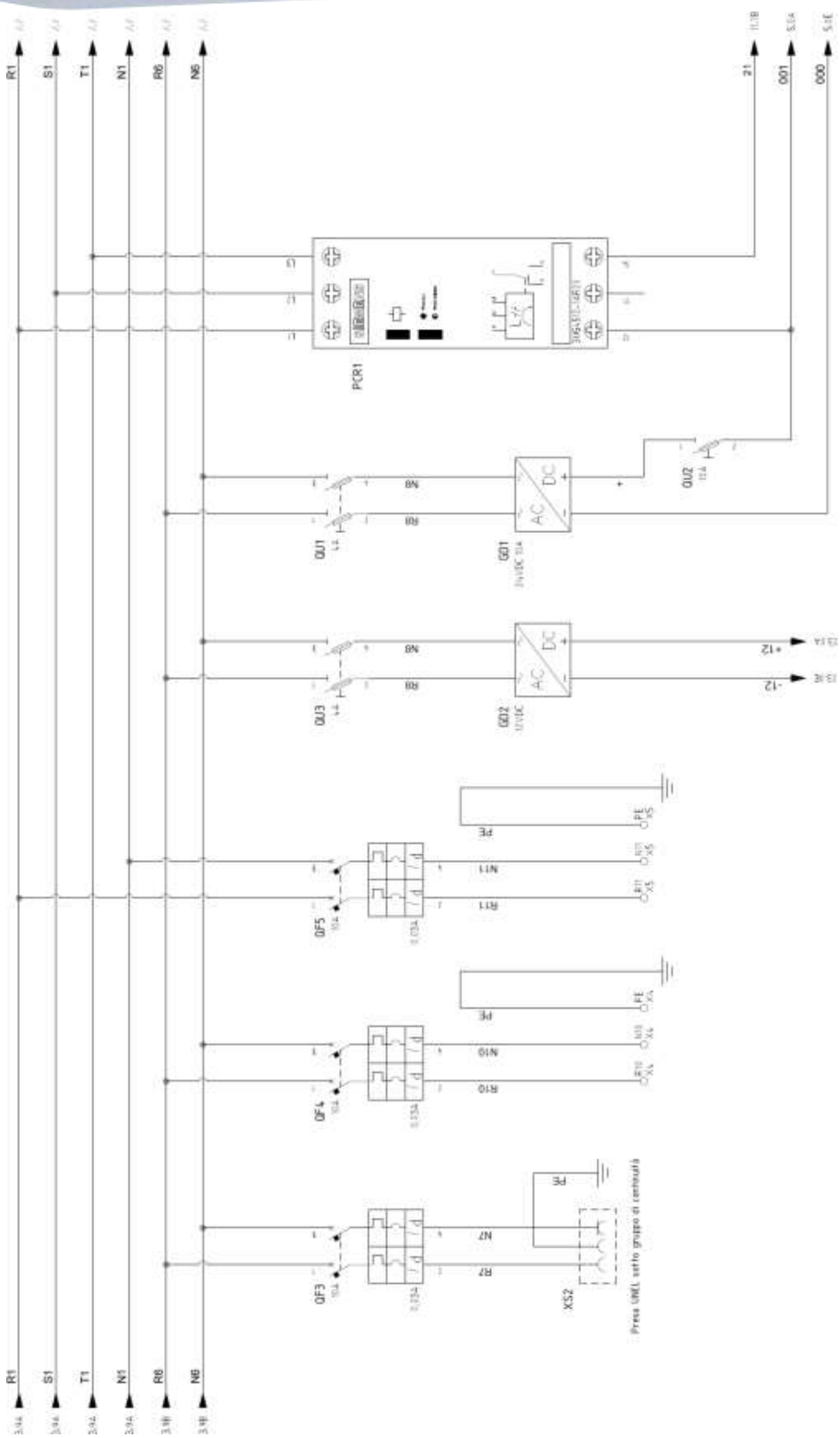
Diagrams and Electric Cabinet





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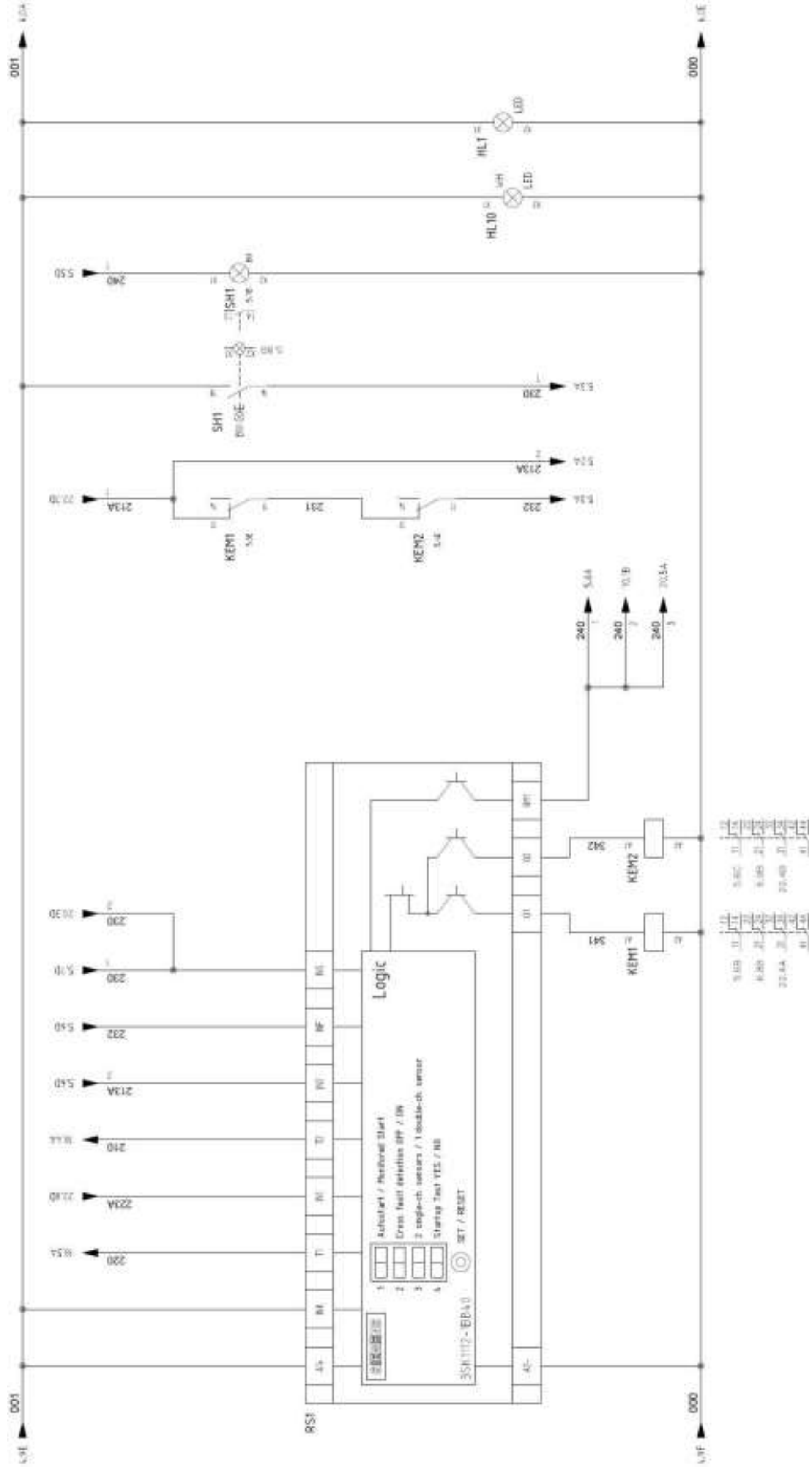

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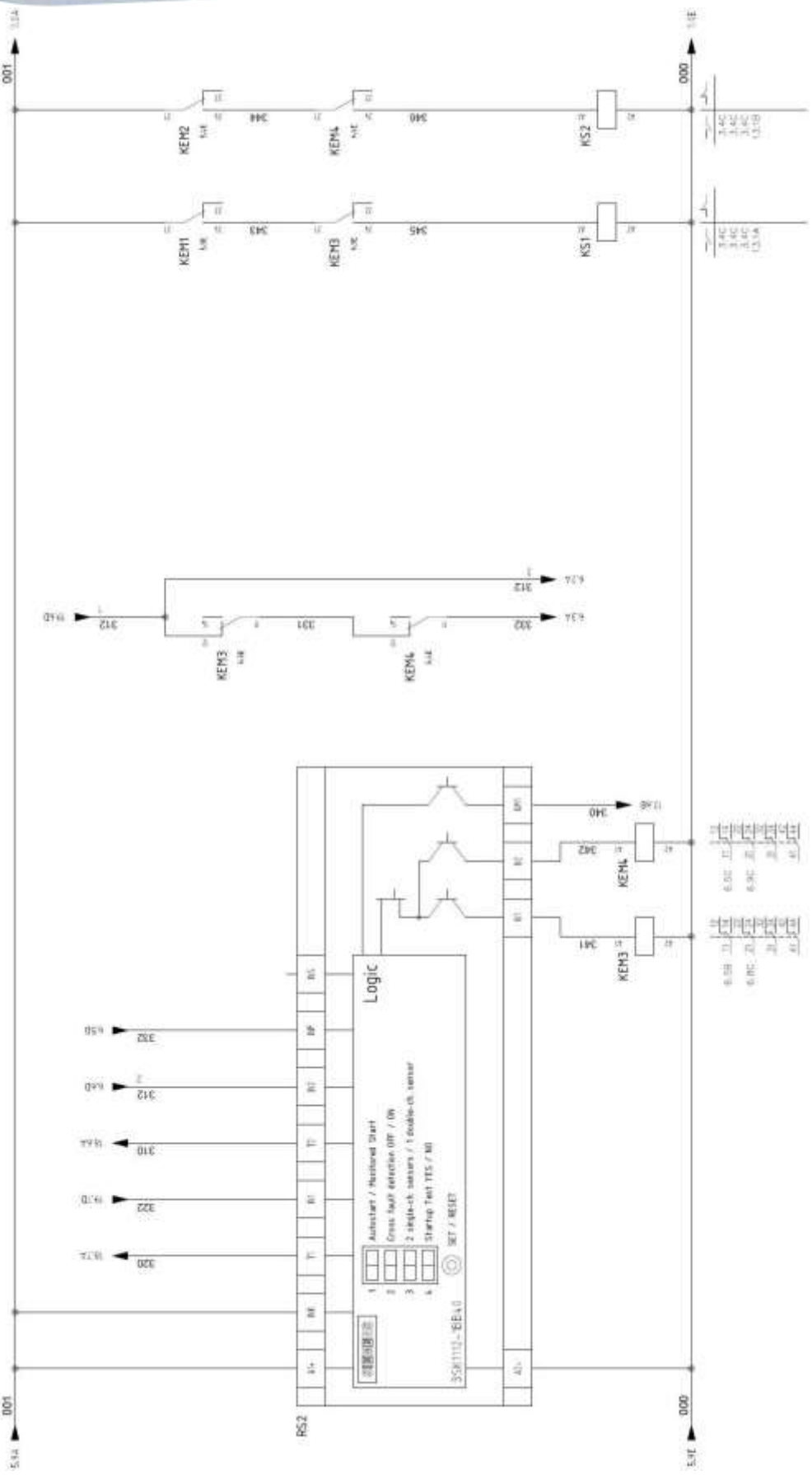
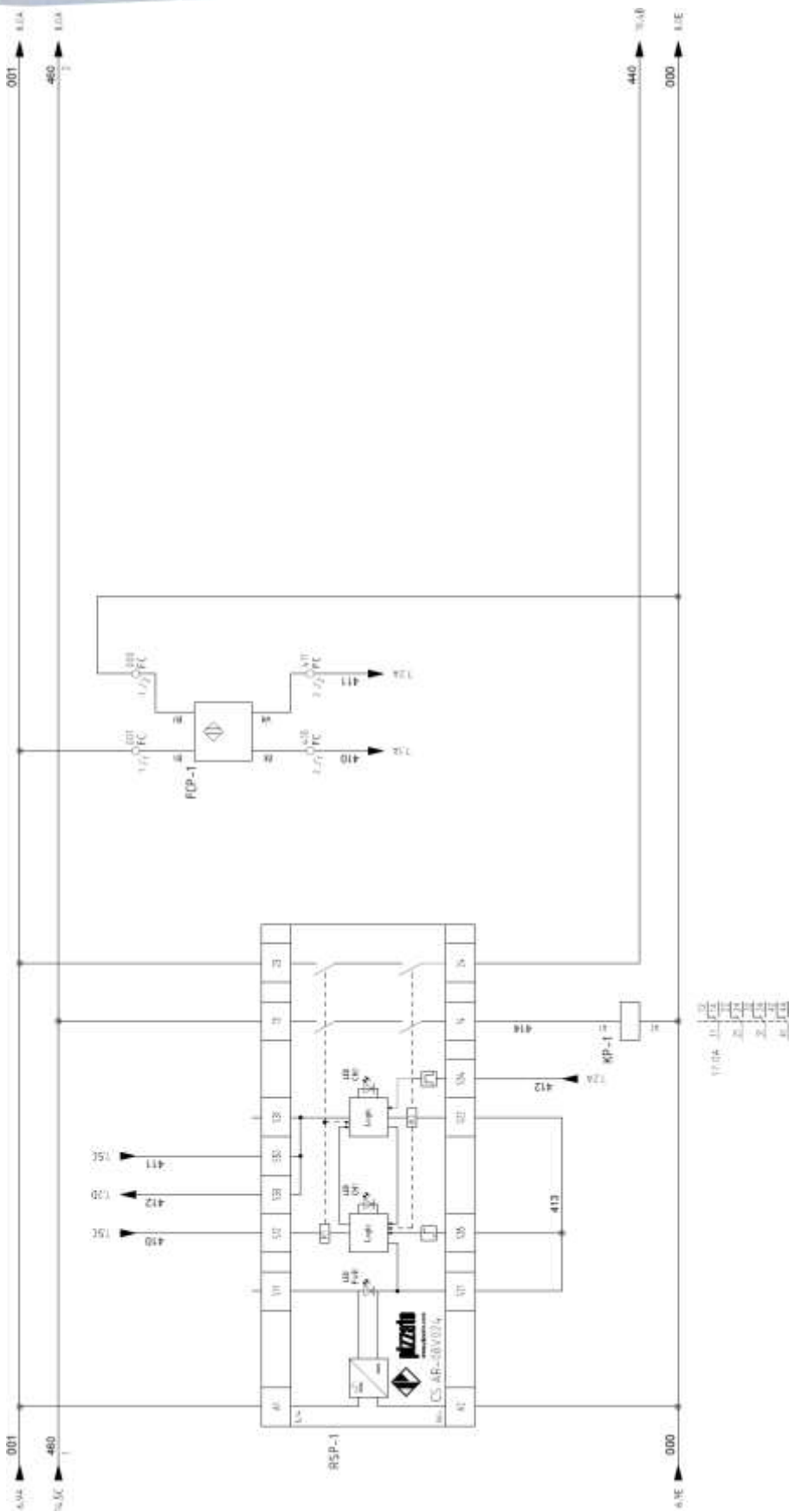

001
000
KEM2
KEM4
KS2
KEM1
KEM3
KS1
KEM3
KEM4
340
342
341
Logic
332
312
310
322
320
001
000
RS2



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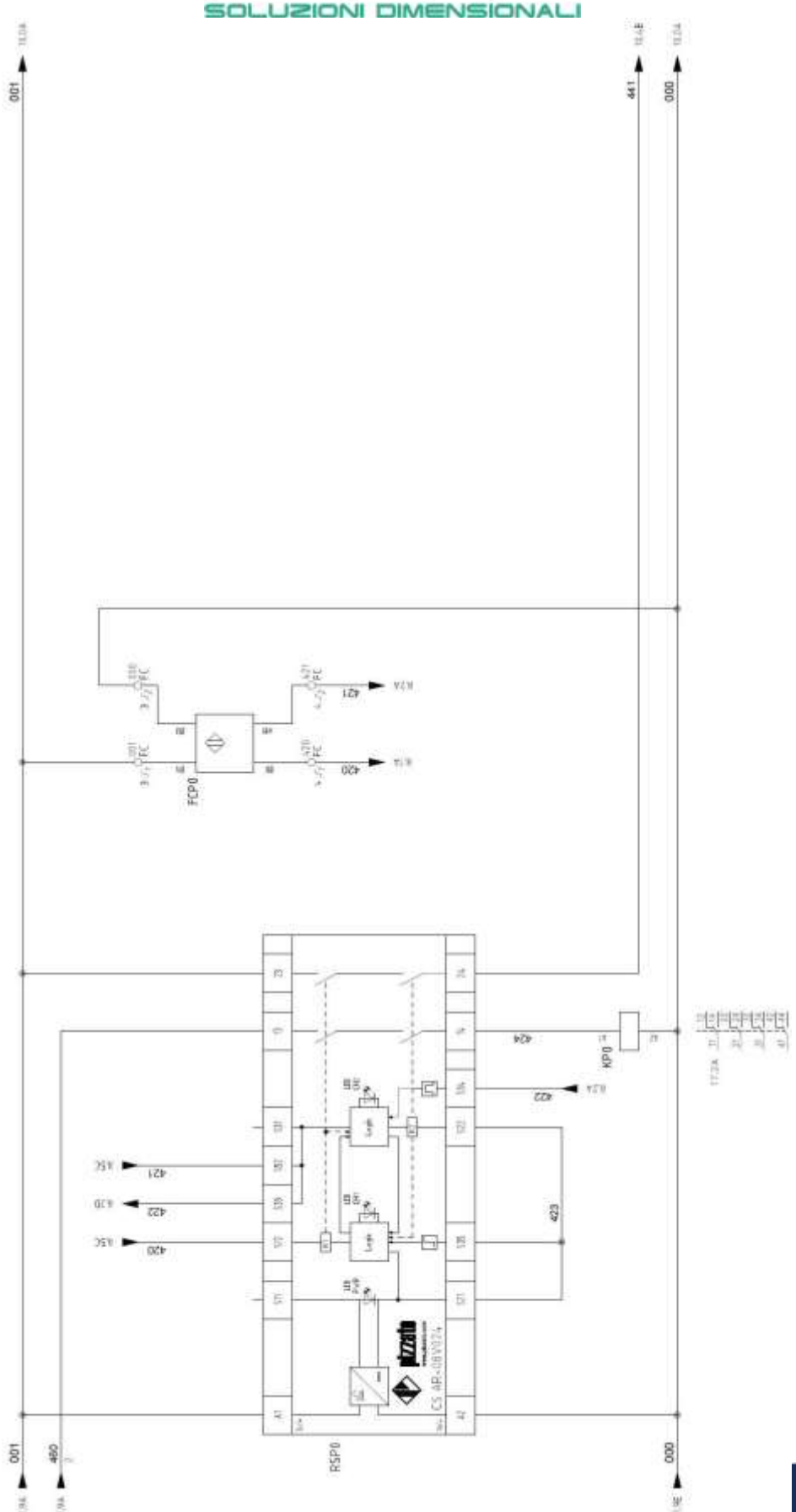
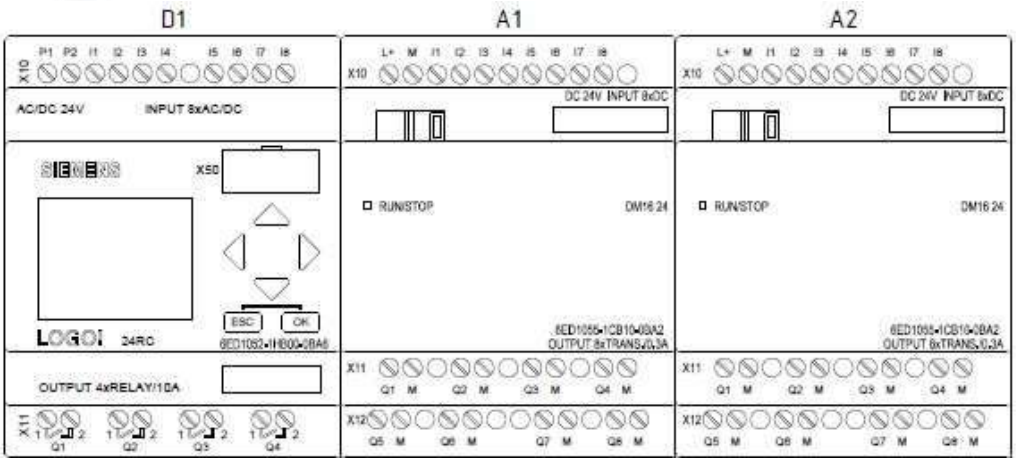
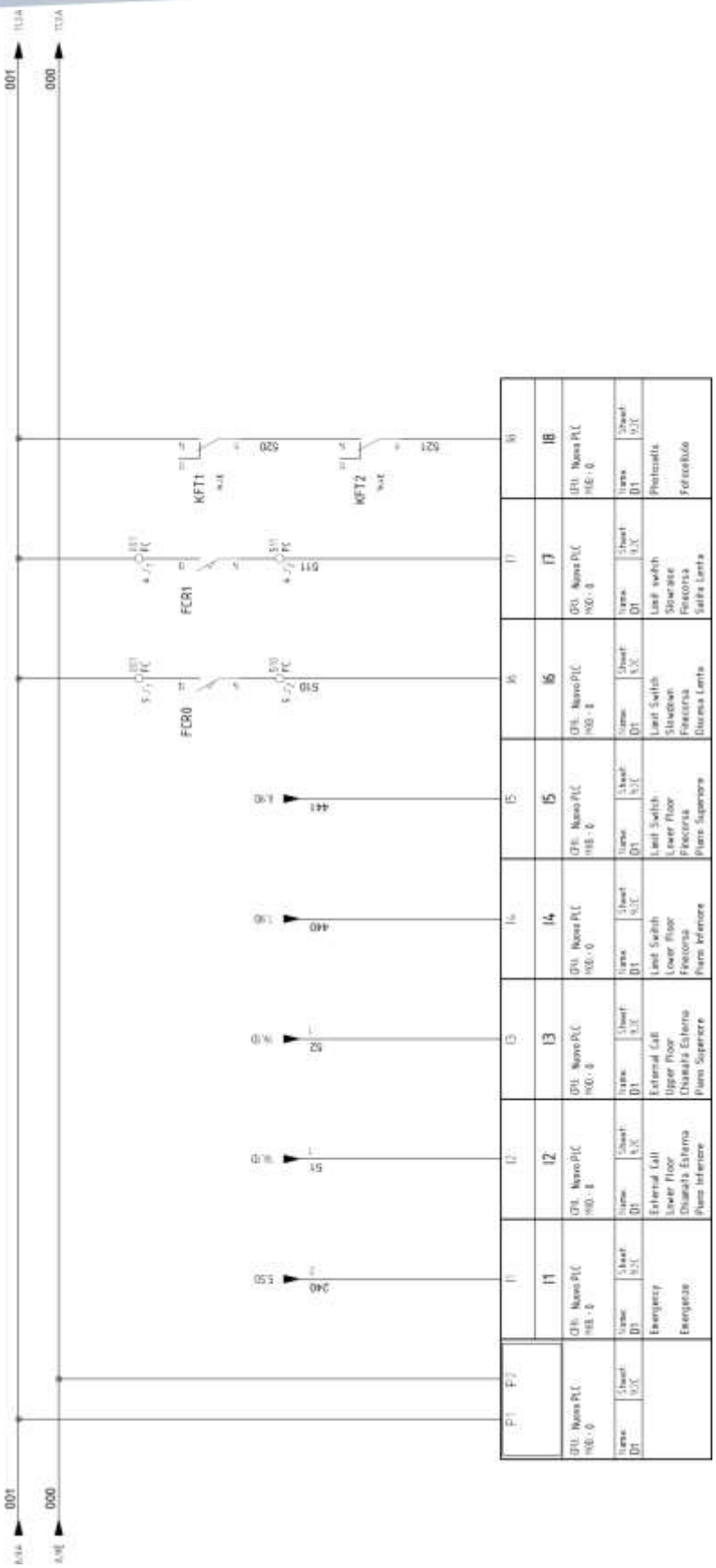
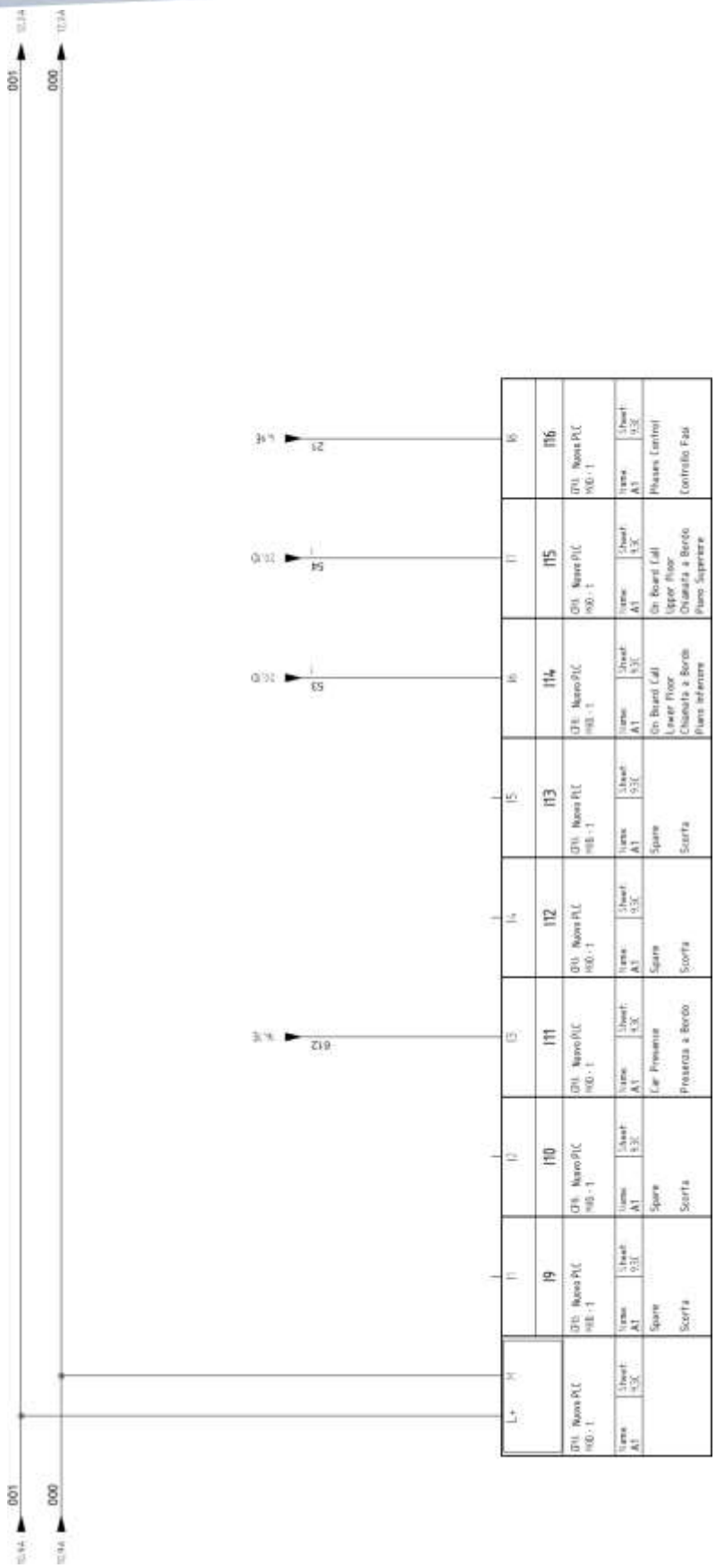
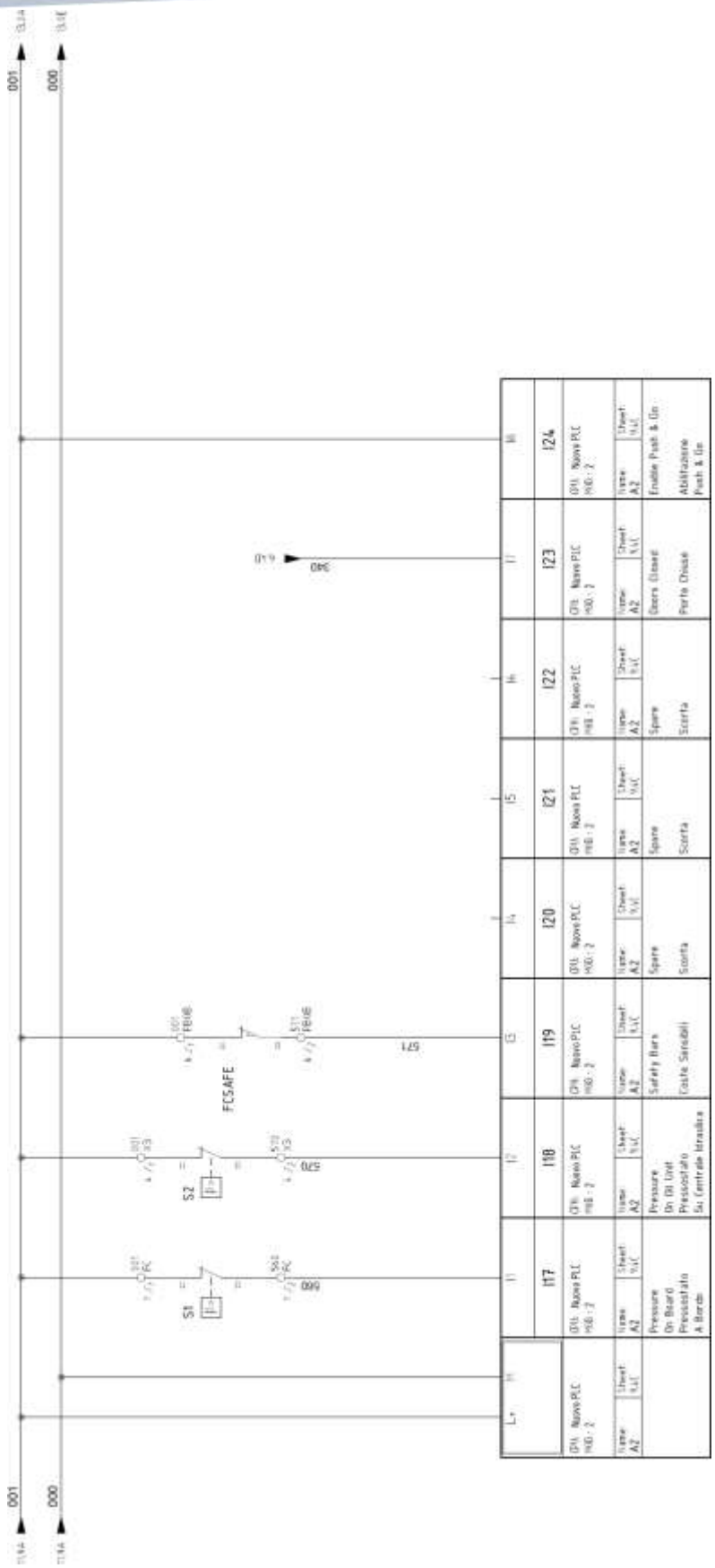
ECOSPACE
SOLUZIONI DIMENSIONALI

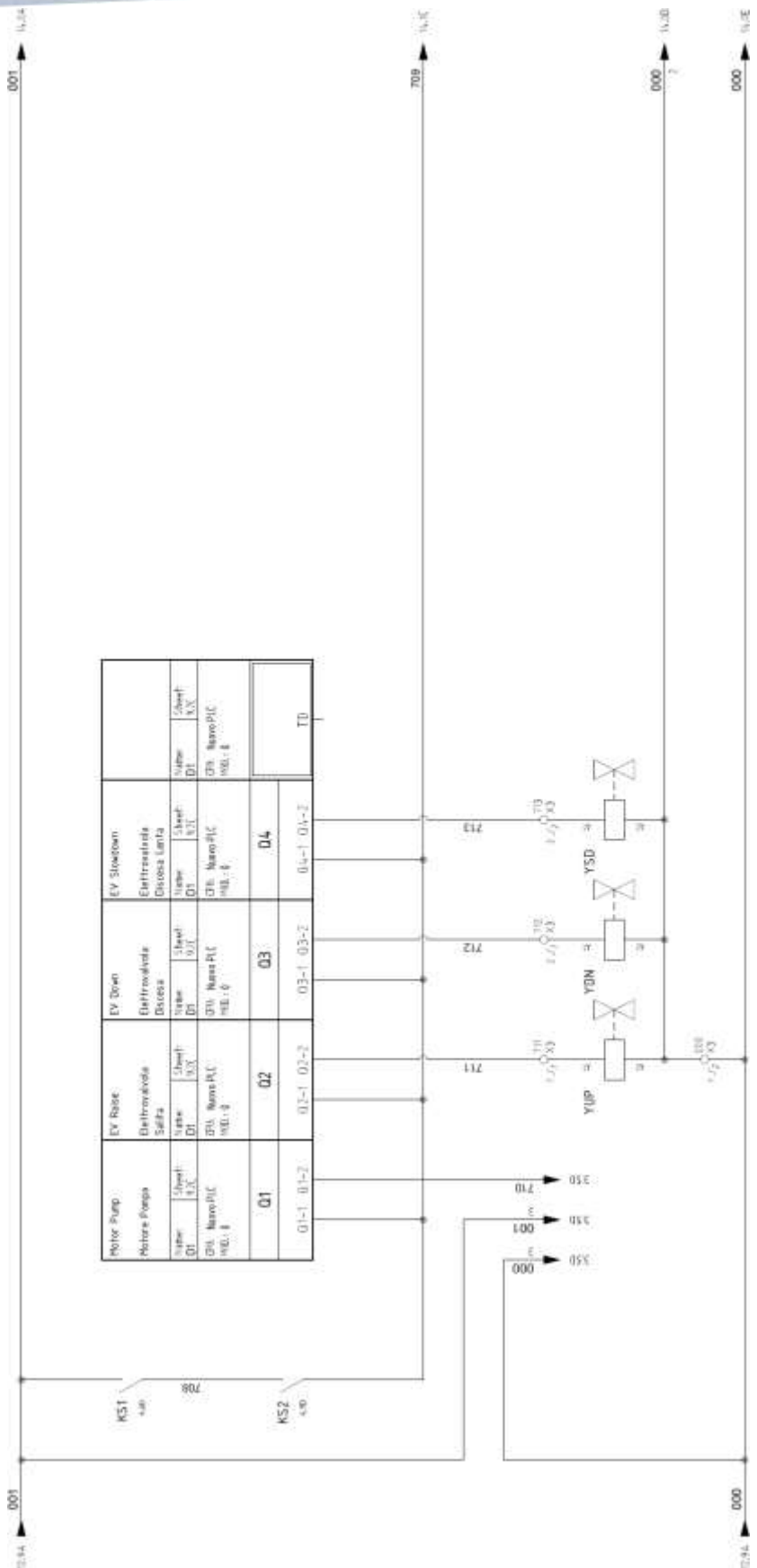


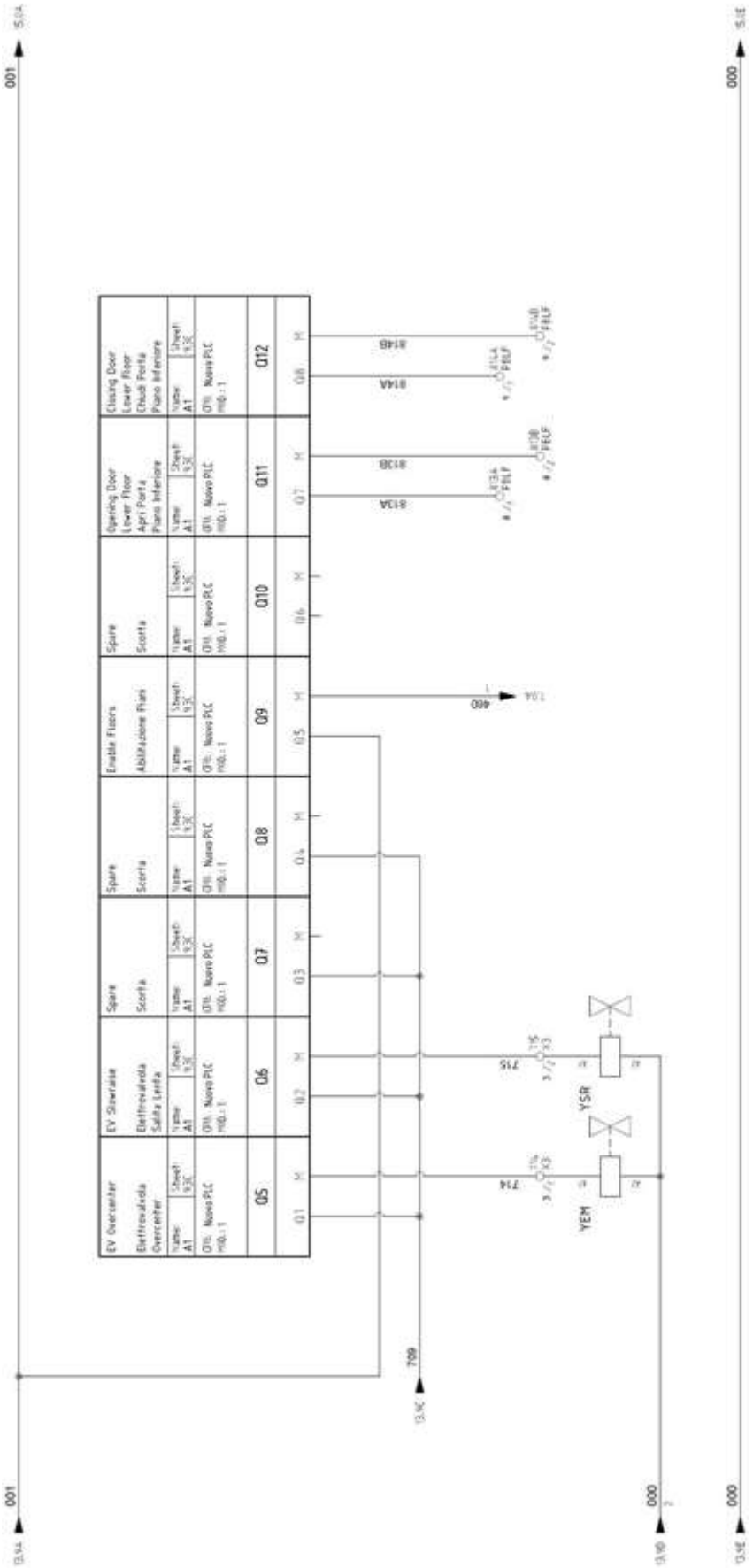

D1
A1
A2
AC/DC 24V
INPUT 8xAC/DC
DC 24V INPUT 8xDC
RUN/STOP
DM16 24
LOGO! 24RC
ESC
OK
OUTPUT 4xRELAY/10A
OUTPUT 8xTRANS/0,3A


100
000
KFT1
KFT2
FCR1
FCR0
I1
I2
I3
I4
I5
I6
I7
I8


001
000
I9
I10
I11
I12
I13
I14
I15
I16
L+
Spare
Scorta
Car Presence
Presenza a Bordo
On Board Call
Lower Floor
Chiamata a Bordo
Piano Inferiore
On Board Call
Upper Floor
Chiamata a Bordo
Piano Superiore
Phases Control
Controllo Fasi


001
000
FCSAFE
S1
S2
117
118
119
120
121
122
123
124
Pressure On Board Pressostato A Bordo
Pressure On Oil Unit Pressostato Su Centrale Idraulica
Safety Bars Coste Sensibili
Spare Scorta
Spare Scorta
Spare Scorta
Doors Closed Porte Chiuse
Enable Push & Go Abilitazione Push & Go


001
709
000
000
Motor Pump
Motore Pompa
EV Raise
Elettrovalvola Salita
EV Driven
Elettrovalvola Discesa
EV Slowdown
Elettrovalvola Discesa Lenta
Q1
Q2
Q3
Q4
TD
YUP
YDN
YSD
KS1
KS2
708
001
000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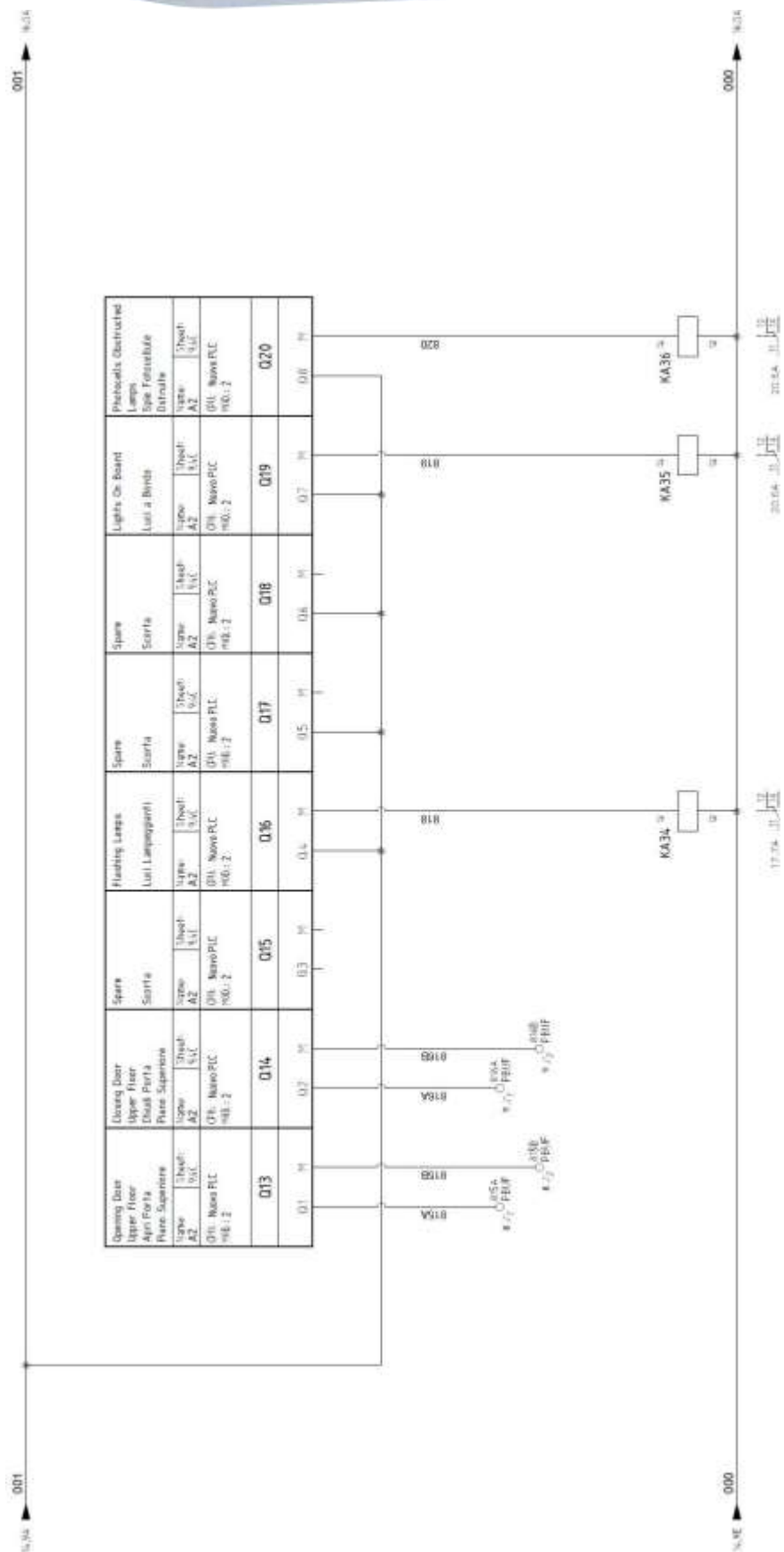
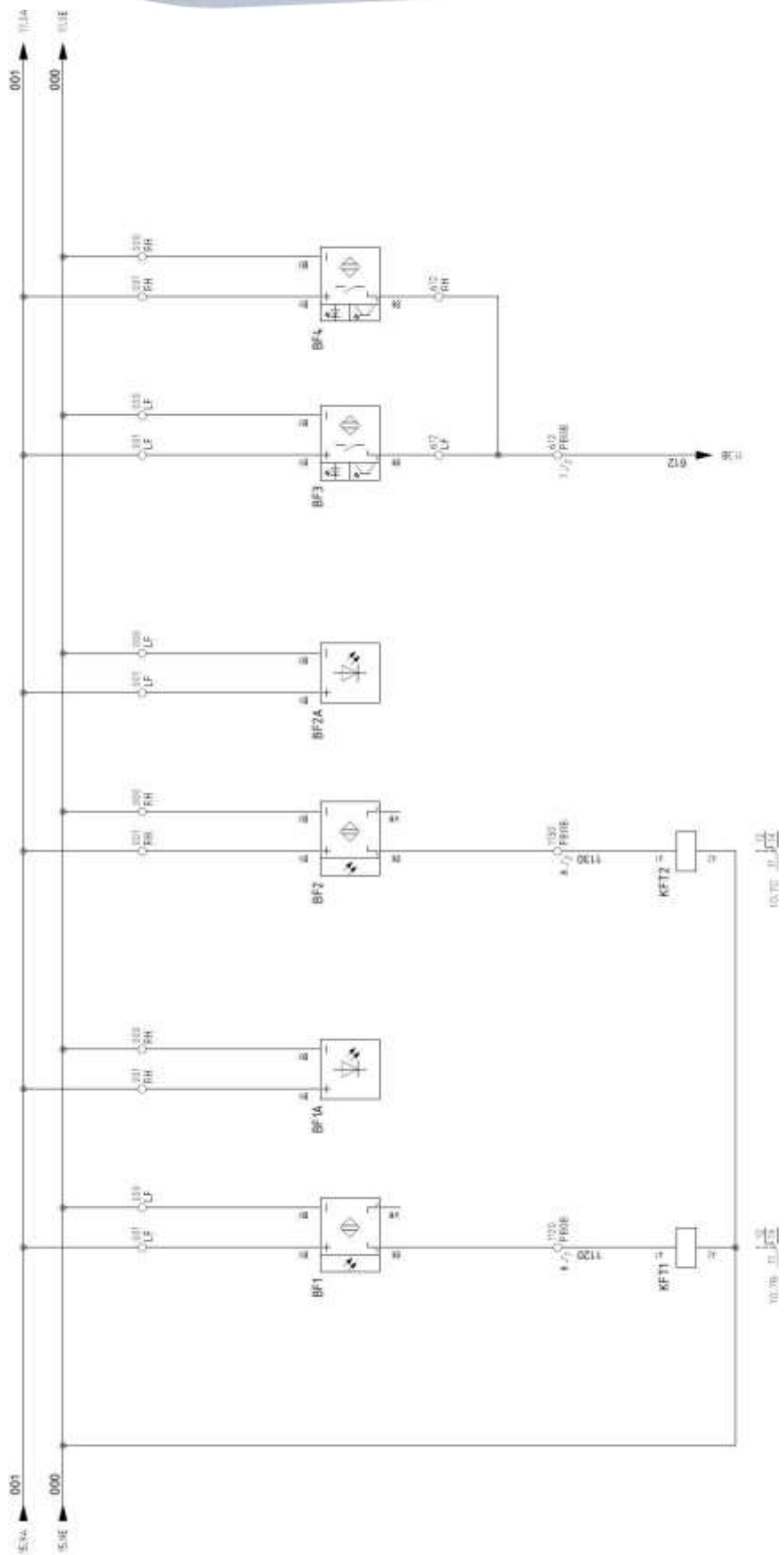
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
YEM
YSR
460
709


001
000
Opening Door Upper Floor Apri Porta Piano Superiore
Closing Door Upper Floor Chiudi Porta Piano Superiore
Spare Scorta
Flashing Lamps Luci Lampeggianti
Spare Scorta
Spare Scorta
Lights On Board Luci a Bordo
Photocells Obstructed Lamps Spie Fotocellule Ostruite
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
KA36
KA35
KA34



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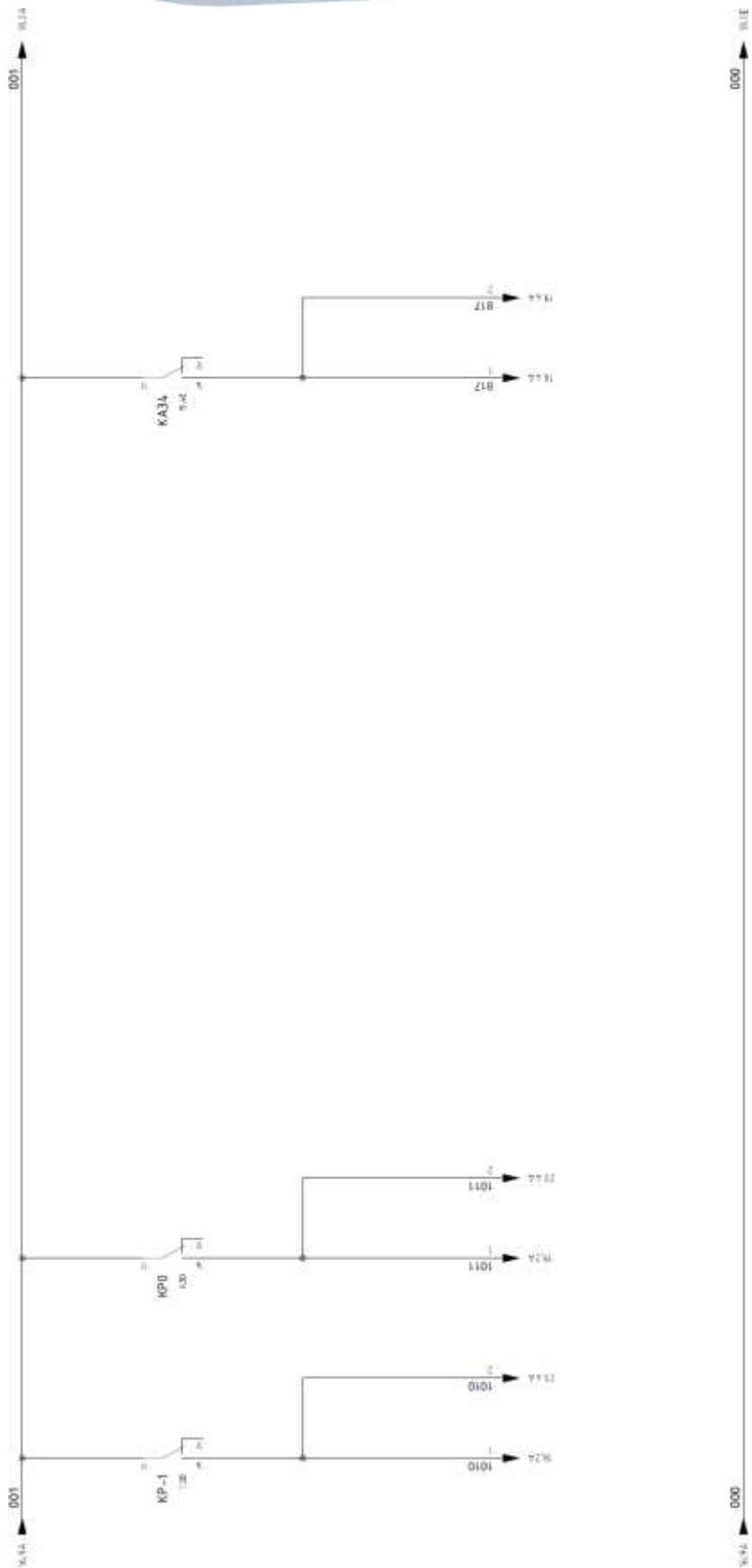
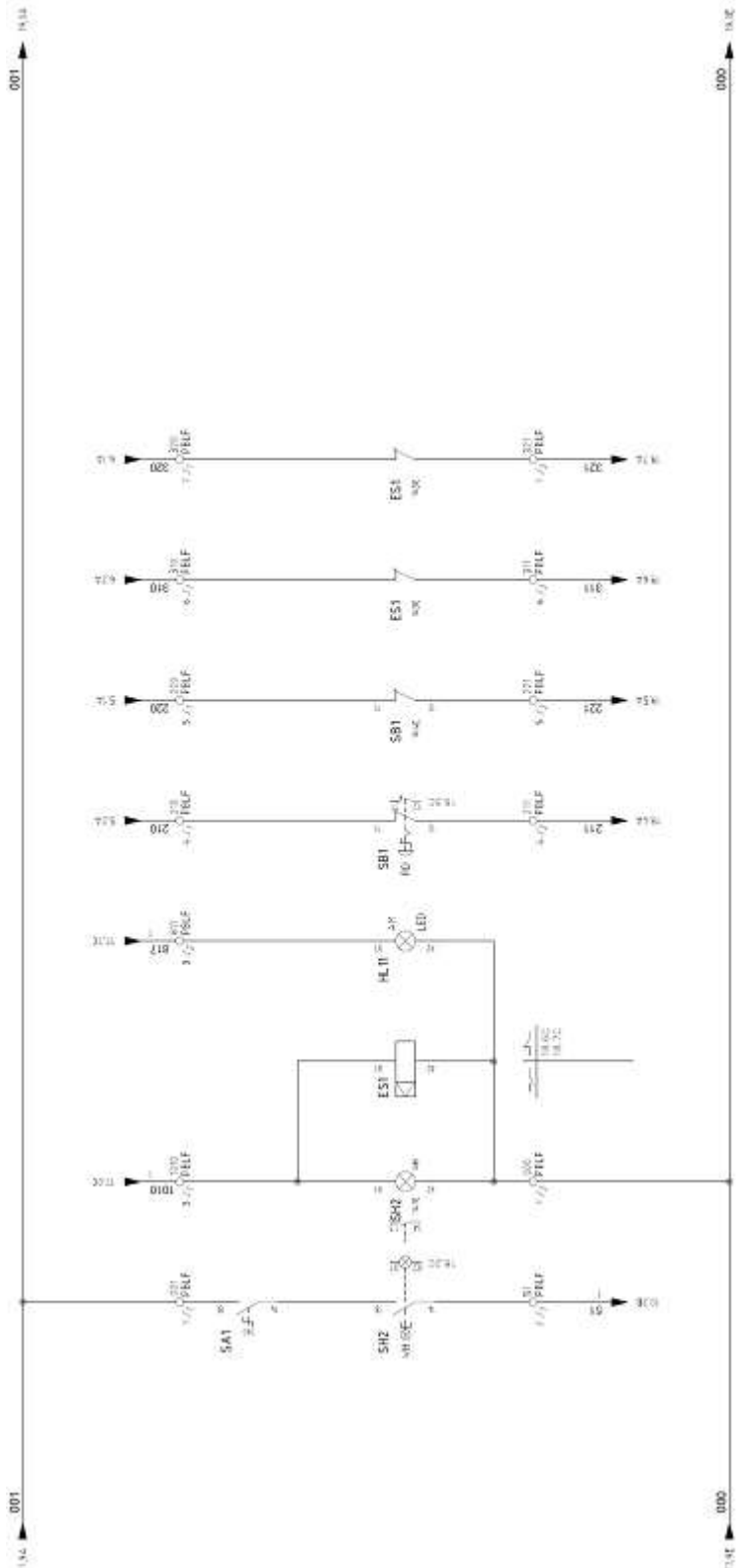

100
KA34
817
817
KP0
1011
1011
KP-1
1010
1010
100
000
000


001
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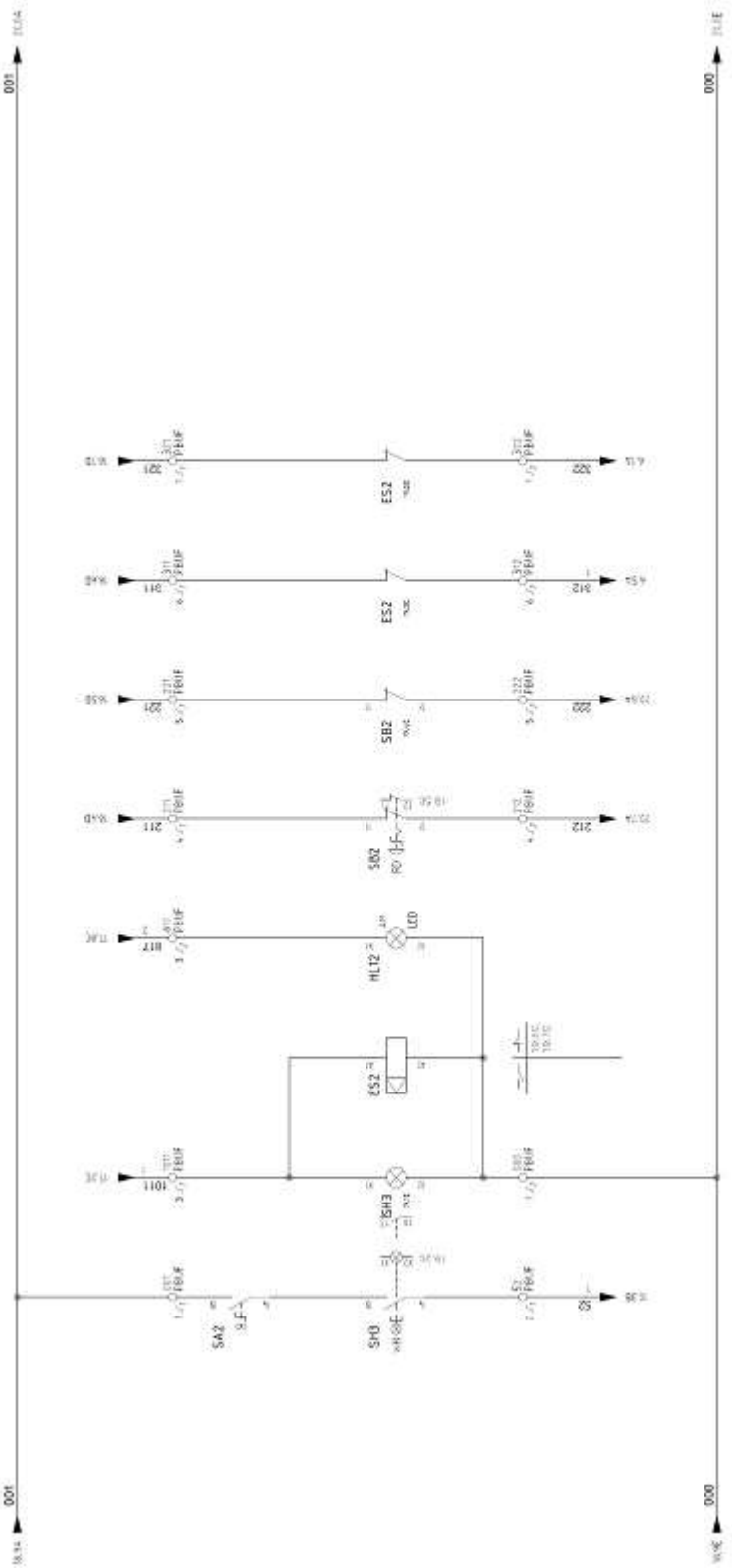
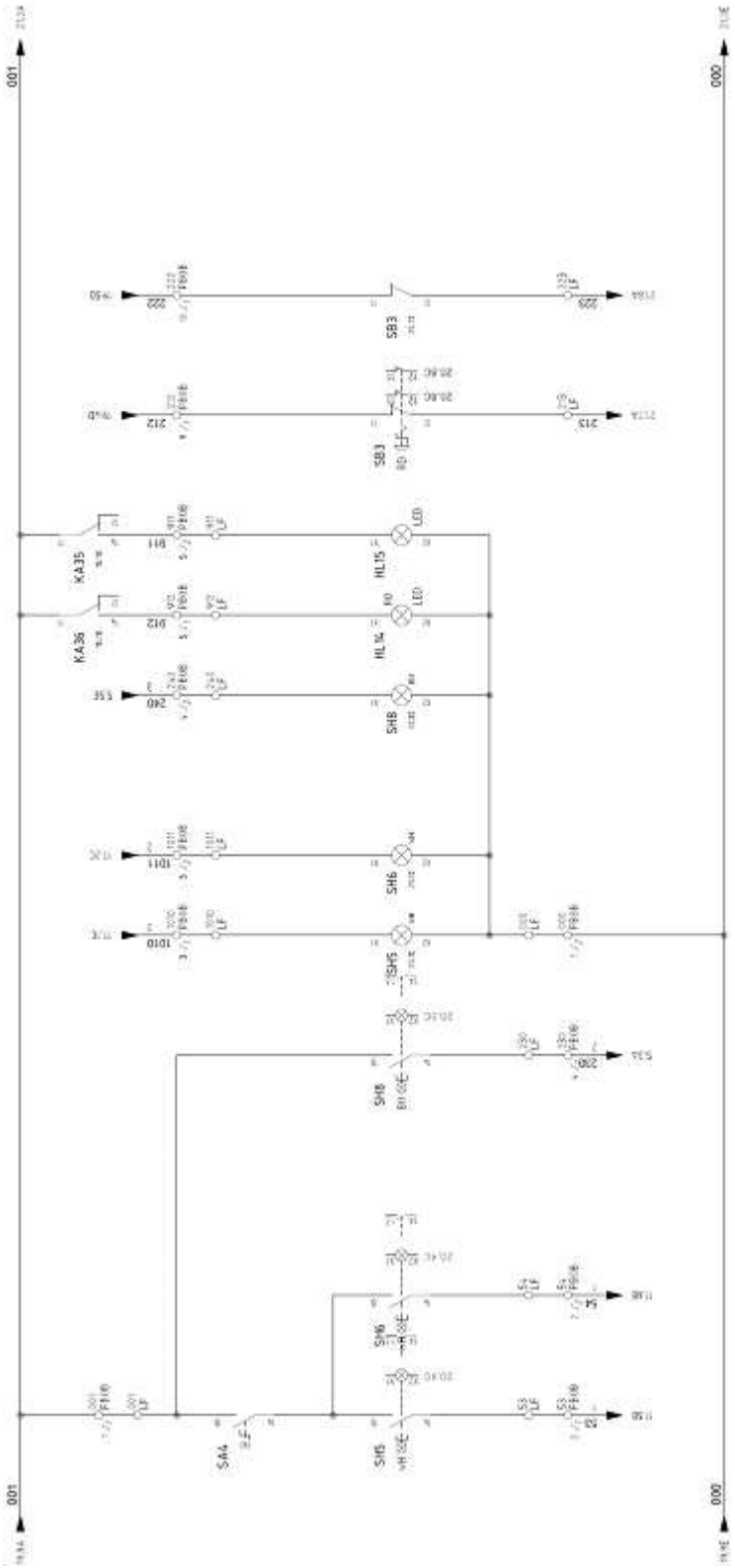
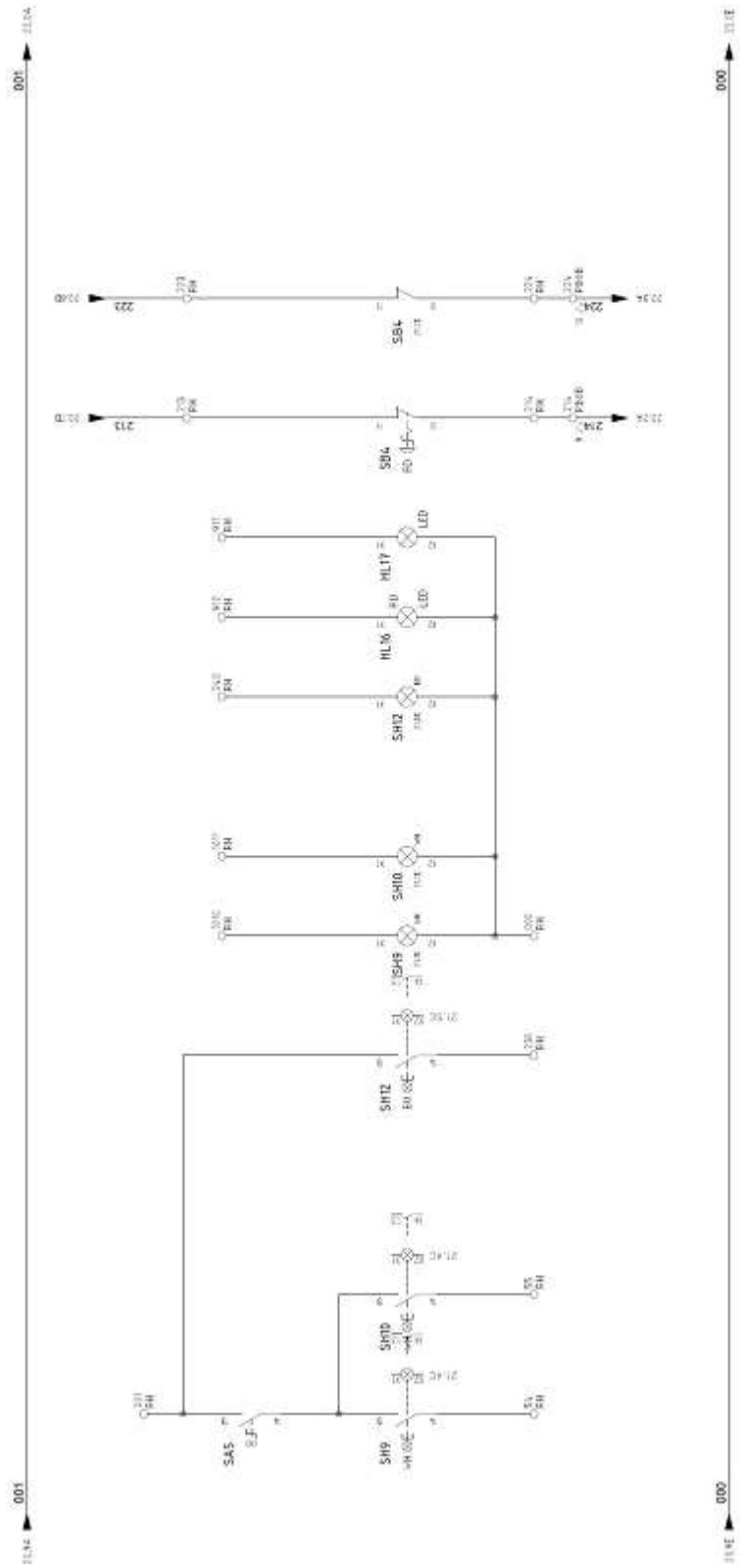
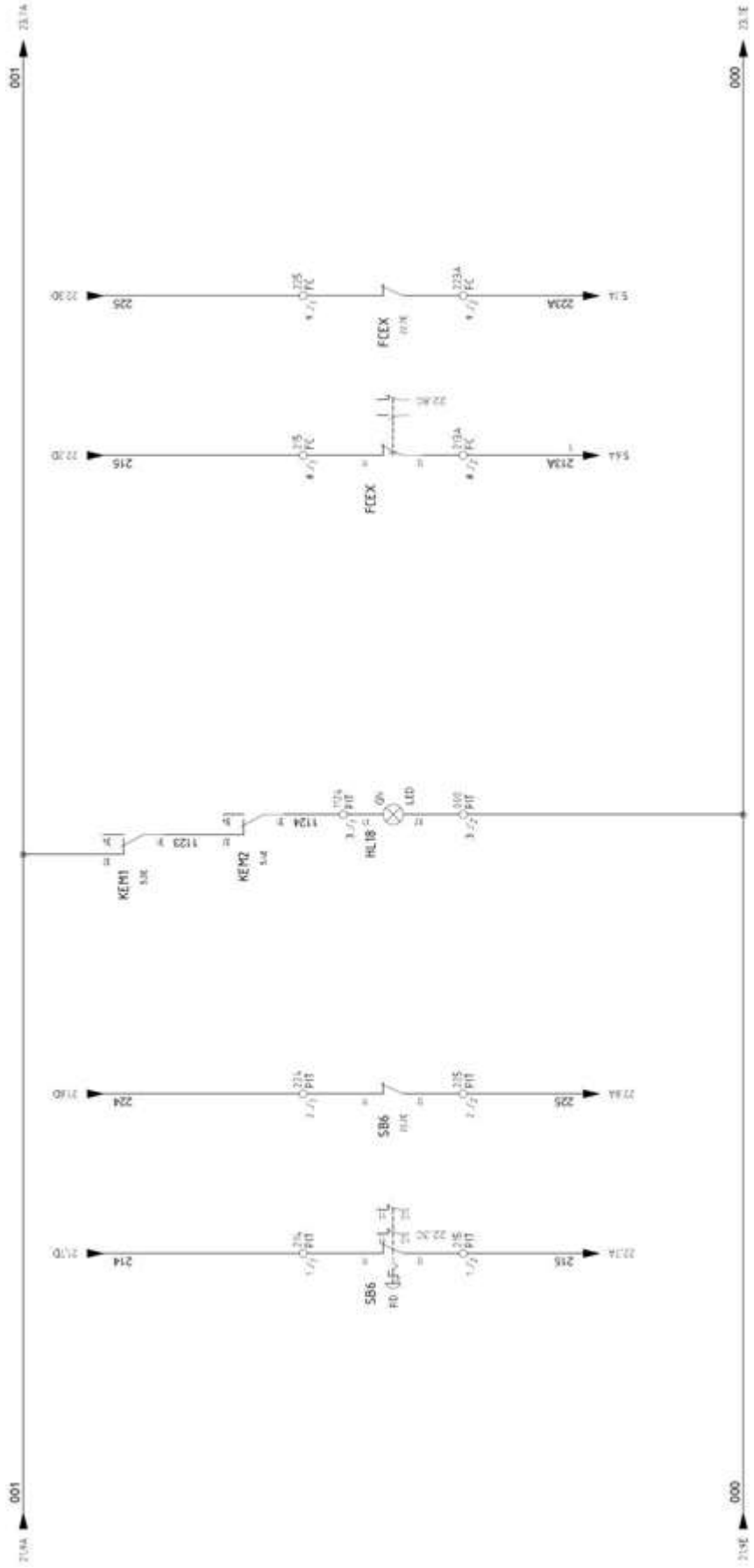
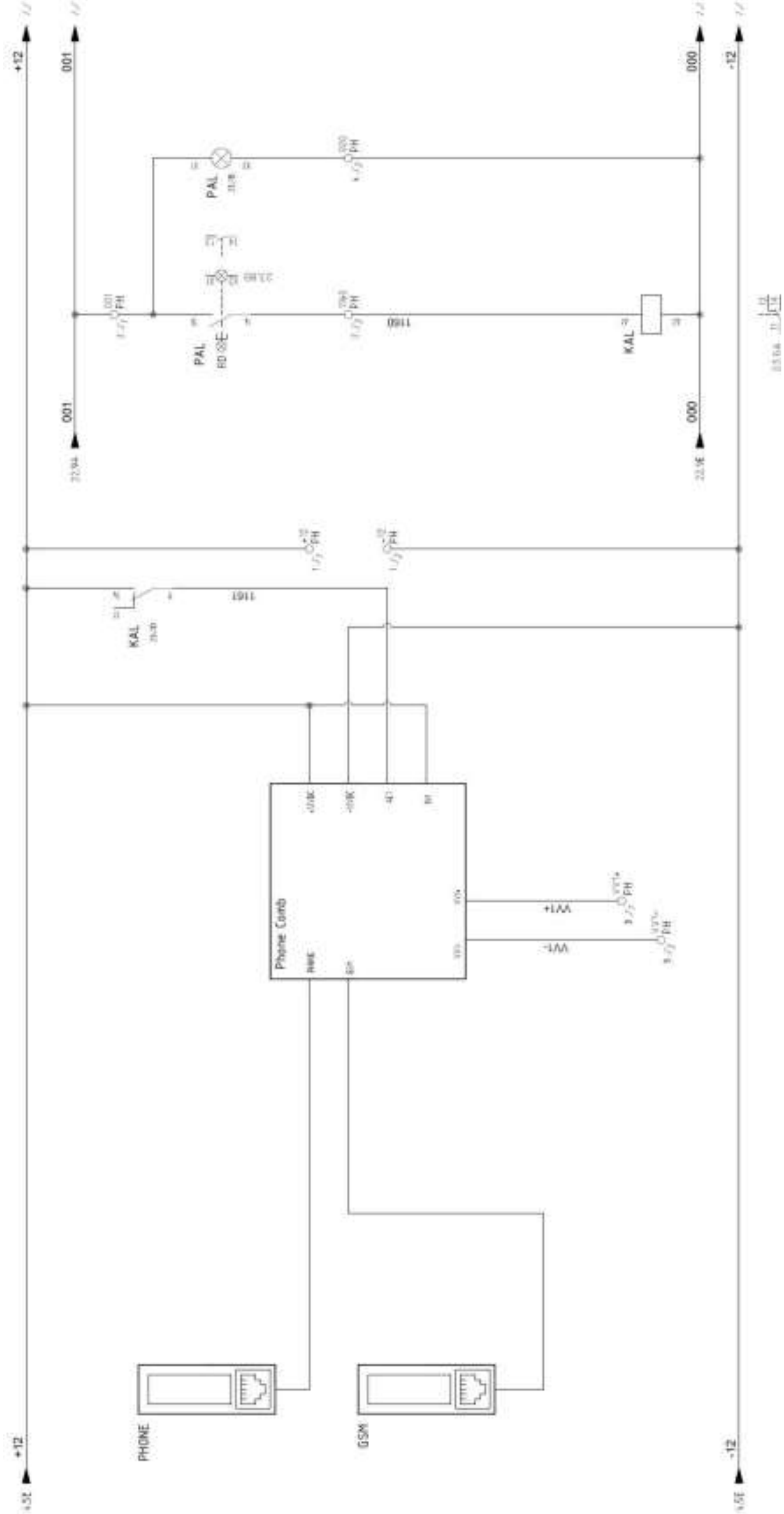
ES1
ES1
SB1
SB1
HL II
LED
SA1
SH2

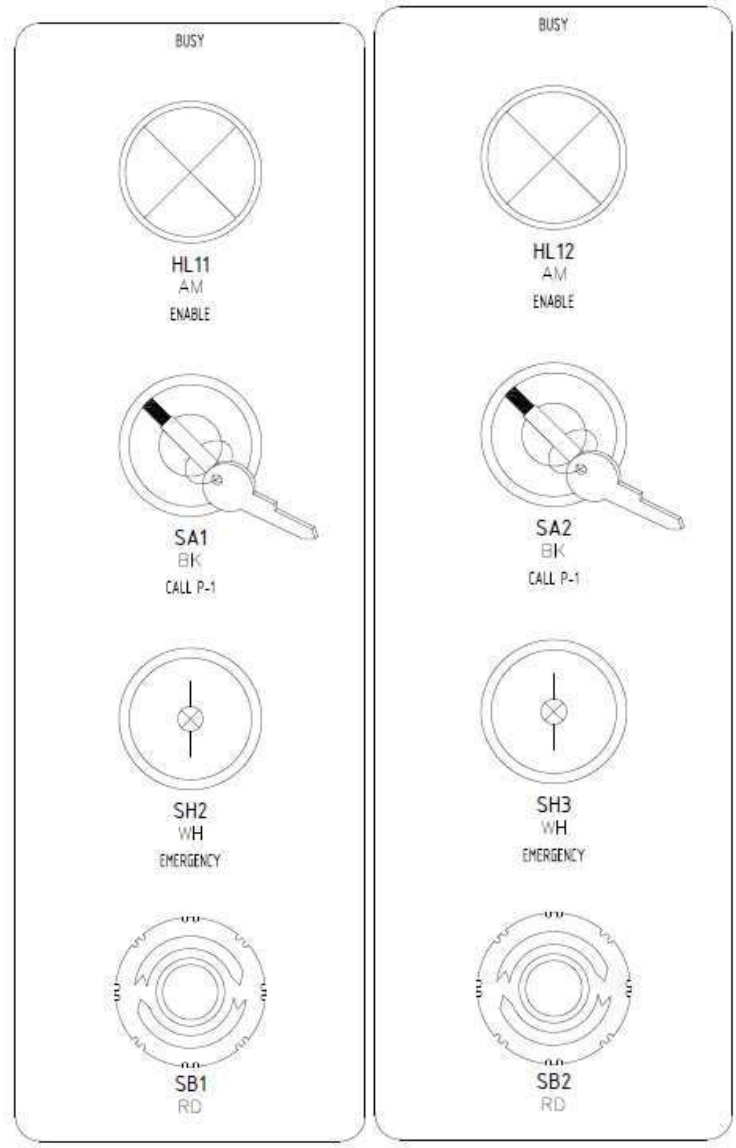

100
100
ES2
ES2
SB2
SB2
HL12
LCD
ES2
SH3
SA2
SH3

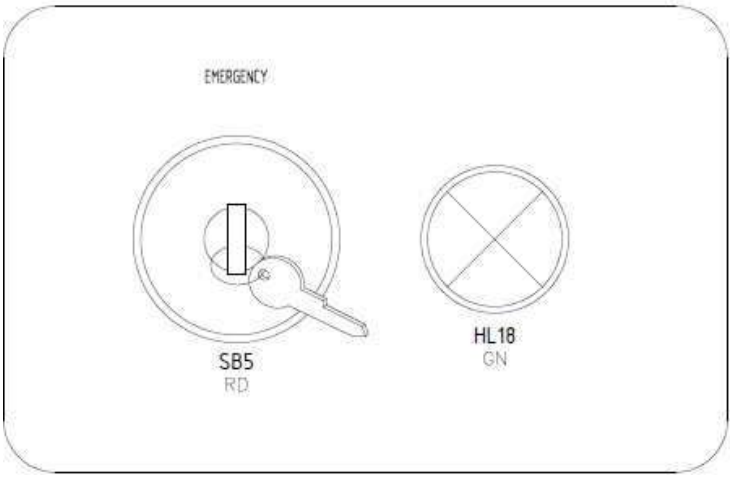

001
000
SB3
SB3
KA35
KA36
HL15
HL16
SH8
SH6
SH5
SH8
SH6
SH5
SA4


100
001
000
SB4
SB4
HL17
HL16
SH12
SH10
SH9
SH12
SH10
SH9
SA5

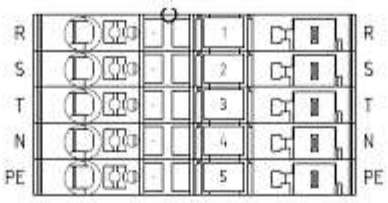

001
000
FCEX
KEM1
KEM2
HL18
LED
SB6
FD


+12
001
000
-12
PAL
KAL
1160
1161
Phone Comb
+VV1
-VV1
PHONE
GSM

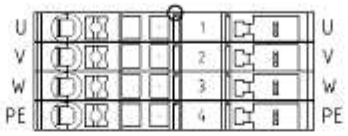

BUSY
HL11
AM
ENABLE
SA1
BK
CALL P-1
SH2
WH
EMERGENCY
SB1
RD
BUSY
HL12
AM
ENABLE
SA2
BK
CALL P-1
SH3
WH
EMERGENCY
SB2
RD


EMERGENCY
SB5
RD
HL18
GN

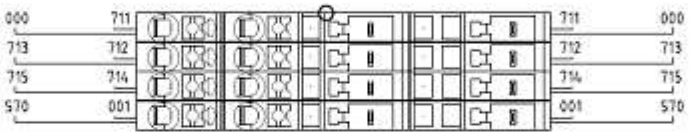
+QG - X1
Power Supply



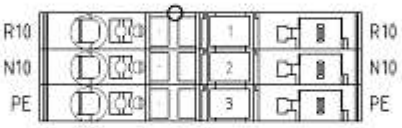
+QG - X2
Hydraulic Pump



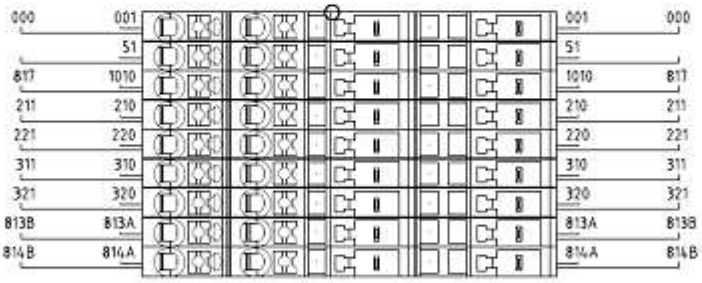
+QG - X3
Electric Valves Group



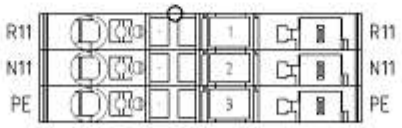
+QG - X4
Lower Door Supply



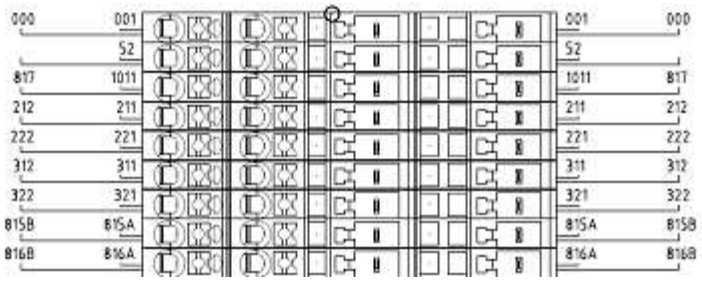
+QG - PBLF
Lower Floor Pushbutton



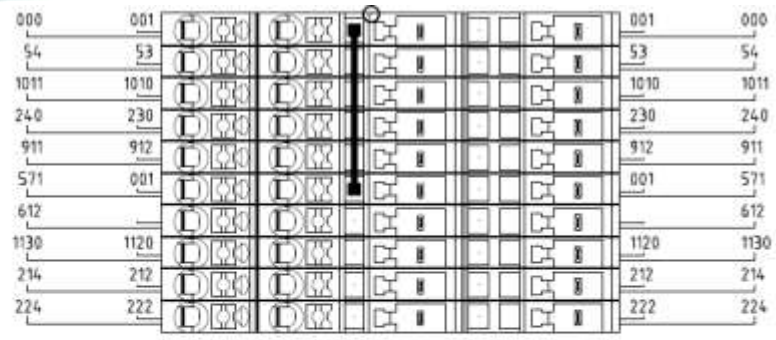
+QG - X5
Upper Door Supply



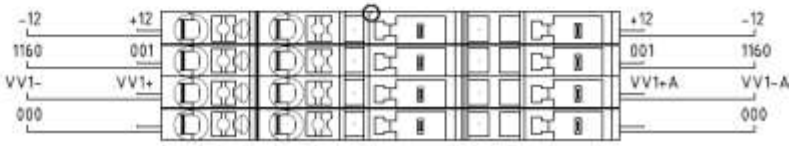
+QG - PBUF
Upper Floor Pushbutton



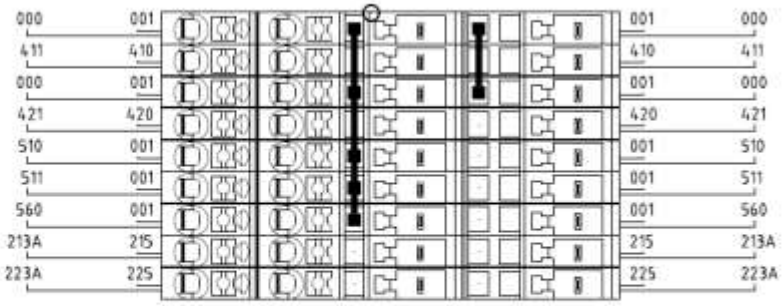
+QG - PBOB
On Board Pushbutton



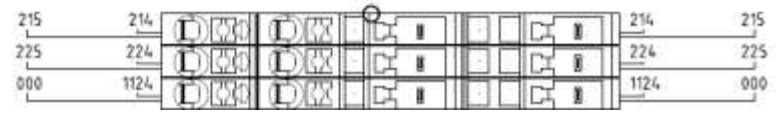
+QG - PH
Phone Combiner



+QG - FC
Limit Switches Group



+QG - PIT
Emergency on Pit



LEGENDA SIMBOLI \ SYMBOLS LEGEND

Simbolo	Ref.	Descrizione	Description
		Convertitore di corrente AC-DC monofase	
		File :	GI
	LG1	Lampada di segnalazione a diodo elettroluminescente	
		File :	H25
		Relè ad aggancio meccanico	
		File :	K9
		Motore asincrono trifase	
		File :	M2
		Inter. automatico bipolare magnetotermico con diff	
		File :	Q14
		Inter. automatico tripolare con prot. max corrente e termica	
		File :	Q23
		Sezionatore tetrapolare	
		File :	Q68
		Sezionatore unipolare con fusibile	
		File :	Q81
		Sezionatore bipolare con fusibili	
		File :	Q82
		Comando con chiave NO	
		File :	S6
		Comandato dalla pressione (pressostato) NC	
		File :	S8C

Simbolo	Ref.	Descrizione	Description
		Fine corsa NO	
		File :	S10
		Fine corsa NC	
		File :	S10C
		Pulsante con lampada di segnalazione incorporata NO	
		File :	S15
		Pulsante di emergenza a posizione stabile ajcare per sbloccare NC	
		File :	S8C
		Presa di corrente bipolare con contatto PE	
		File :	X1
		Elettrovalvola aperta (in chiusura)	
		File :	Y1
		Bobina Relè Aux	
		File :	KA1
		Bobina contattore	
		File :	KM1
		Interruttore fotoelettrico. Emettitore alimentato in D.C	
		File :	BFE93C_A
		Interruttore fotoelettrico. Ricevitore L rel NO/NC alimentato in D.C	
		File :	BFR93E
		Relè controllo corretta sequenza fasi	
		File :	PCB

LEGENDA SIMBOLI \ SYMBOLS LEGEND

Simbolo	Ref.	Descrizione Description
		File : UPS1
		Interruttore fotoelettrico. Emettitore-Ricevitore 3 fili NO alimentato in D.C. File : BFE20IC
		File : COMBINATORE
		Categoria 4 secondo EN 954-1, 2NO, 24 VAC File : CS AR-08
		SIRIUS 3SK1 dispositivo base Standard Circuiti di abilitazione a sensicendattore. Alimentazione 24 V DC. File : ELE_SIEMENS_3SK1112_0BA40
		File : PHONE
		Dispositivo di pressonda' File : SENSORE SICK
		Digital module LOGO! DM16 24 – 8 ingressi digitali e 8 uscite a transistor – Alimentazione 24 V DC File : SIE_LOGO8_DM16_24
		Basic unit LOGO! 24RC (AC/DC) – 8 ingressi digitali e 4 uscite a transistor – Alimentazione 24 V AC/DC File : SIE_LOGO_24RC
		File :
		File :

LISTA FUNZIONI \ FUNCTIONS LIST

Componente	Ref.	Funzione Function	Componente	Ref.	Funzione Function	Componente	Ref.	Funzione Function
	A1 +QG 3	PLC first expansion		GD1 +QG 4	Power Supply 24VDC		KM +QG 13	Pump Contactor
	A2 +QG 9	PLC second expansion		GD2 +QG 4	Power Supply 12VDC		KP0 +QG 8	Lower floor relais
	O1 +QG 9	PLC Control Unit		GSM +QG 23	GSM		KP-1 +QG 7	Lower floor relais
	ES1 +QG 18	Electric Lock	LED	HL1 +QG 5	Light in power unit		KS1 +QG 6	Safety Contactor 1
	ES2 +QG 19	Electric Lock	LED	HL12 +QG 19			KS2 +QG 6	Safety Contactor 1
	FCEX +QG 22	Extra run Limit Switch		IG1 +QG 3	General Switch		M1 +QG 3	Hydraulic Pump
	FCP0 +QG 8	Limit switch lower floor		KAL +QG 23	Alarm Call Relay		PAL +QG 23	Alarm Call Pushbutton
	FCP-1 +QG 7	Limit switch lower floor		KEM1 +QG 5	Emergency Relais 1		PER1 +QG 4	Phases Control Relay
	FCR0 +QG 10	Slowdown Limit Switch		KEM2 +QG 5	Emergency Relais 2		PHONE +QG 23	
	FCR1 +QG 10	Slowraise Limit Switch		KEM3 +QG 6	Emergency Relais 3	Phone Comb	Phone Comb +QG 23	Phone Combiner
	FCSAFE +QG 12	Safety Bars		KEM4 +QG 6	Emergency Relais 4		QF1 +QG 3	Pump Protection

LISTA FUNZIONI \ FUNCTIONS LIST

Componente	Ref.	Funzione Function	Componente	Ref.	Funzione Function	Componente	Ref.	Funzione Function
	QF2 +QG 3	UPS Protection		SA2 +QG 19				
	QF3 +QG 4	Socket under UPS Protection		SB2 +QG 19				
	QF4 +QG 4	Lower Door Power Supply Protection		SH3 +QG 19				
	QF5 +QG 4	Upper Door Power Supply Protection		UPS +QG 3	Gruppo di continuità			
	QU1 +QG 4	Primary 24VDC Fuse Protection		XS1 +QG 3	Presa UNEL			
	QU2 +QG 4	Secondary 24VDC Fuse Protection		XS2 +QG 4	Presa UNEL sotto gruppo di continuità			
	QU3 +QG 4	Primary 12VDC Fuse Protection						
	RS1 +QG 5	Emergency safety device						
	RS2 +QG 6	Doors closed safety device						
	BSP0 +QG 8	Safety device limit switch upper floor						
	RSP-1 +QG 7	Safety device limit switch lower floor						

Nome/Item	Tipo/Type	Descrizione/Description	Costruttore/Marke	Quadro/Board	Fg/Sh	Q.ta/Q.ty
A1	6ED1055-1CB10-0BA2	Digital module LOGO! DM16 24 - 8 ingressi digitali e 8 uscite a transistor - Alimentazione 24 V DC	Siemens	+0G	9	1
A2	6ED1055-1CB10-0BA2	Digital module LOGO! DM16 24 - 8 ingressi digitali e 8 uscite a transistor - Alimentazione 24 V DC	Siemens	+0G	9	1
D1	6ED1052-1HB00-0BA6	Basic unit LOGO! 24RC (AC/DC) - 8 ingressi digitali e 4 uscite a transistor - Alimentazione 24 V AC/DC	Siemens	+0G	9	1
FC	3210811	PTTB 2,5/2P - 22 A, morsetto a due piani, Grigio	Phoenix Contact	+0G		9
FCEX		Fine corsa NC		+0G	22	1
FCR0		Fine corsa NO		+0G	10	1
FCR1		Fine corsa NO		+0G	10	1
FCSAFE		Fine corsa NC		+0G	12	1
GD1	S8VKC24024	Alimentatore- 24V/10AClasseADIN	Omron	+0G	4	1
GD2	S8VKC24024	Alimentatore- 24V/10AClasseADIN	Omron	+0G	4	1
GSM				+0G	23	1
HL1		Lampada di segnalazione a diodo elettroluminescente		+0G	5	1
HL12	3SU1550-0AA10-0AA0	Supporto senza modulo, Metallo	Siemens	+0G	19	1
	3SU1001-6AA00-0AA0	Indicatore luminoso con lente liscia, ambra	Siemens			1
	3SU1401-1BB00-1AA0	Modulo LED ambra per fissaggio su piastra frontale, 24 V AC/DC, Morsetti a vite	Siemens			1
IG1	3LD2514 1TL51	INT. PRINC. 4X63A FIX FONDO BLP	Siemens	+0G	3	1
KAL	345170240010	MINI RELE PER C.S.EMR RELE' INTERFACCIA	Finder	+0G	23	1
	93010240	ZOCCOLO CON MORSETTI A BUSSOLA RELE' INTERFACCIA	Finder			1
KEM1	553490240040	RELE INDUSTRIALE	Finder	+0G	5	1
	9505SPA	ZOCCOLO CON MORSETTI A BUSSOLA	Finder			1
KEM2	553490240040	RELE INDUSTRIALE	Finder	+0G	5	1
	9505SPA	ZOCCOLO CON MORSETTI A BUSSOLA	Finder			1
KEM3	553490240040	RELE INDUSTRIALE	Finder	+0G	6	1
	9505SPA	ZOCCOLO CON MORSETTI A BUSSOLA	Finder			1
KEM4	553490240040	RELE INDUSTRIALE	Finder	+0G	6	1
	9505SPA	ZOCCOLO CON MORSETTI A BUSSOLA	Finder			1
KM	3RT20281BB40	CONT.18,5KW,1L+1R,DC 24V,50 VT	Siemens	+0G	13	1
KP-1	553490240040	RELE INDUSTRIALE	Finder	+0G	7	1
	9505SPA	ZOCCOLO CON MORSETTI A BUSSOLA	Finder			1
KP0	553490240040	RELE INDUSTRIALE	Finder	+0G	8	1
	9505SPA	ZOCCOLO CON MORSETTI A BUSSOLA	Finder			1
KS1	3RT20281BB40	CONT.18,5KW,1L+1R,DC 24V,50 VT	Siemens	+0G	6	1
KS2	3RT20281BB40	CONT.18,5KW,1L+1R,DC 24V,50 VT	Siemens	+0G	6	1
M1		Motore asincrono trifase		+0G	3	1
PAL	3SU1400-1AA10-1BA0	Modul di contatti per fissaggio su piastra frontale, 1 NO, morsetti a vite	Siemens	+0G	23	1
	3SU1401-1BB20-1AA0	Modulo LED rosso per fissaggio su piastra frontale, 24 V AC/DC, Morsetti a vite	Siemens			1
	3SU1550-0AA10-0AA0	Supporto senza modulo, Metallo	Siemens			1
	3SU1001-0AB20-0AA0	Pulsante luminoso con bottone piatto, standard, ad impulso, rosso	Siemens			1
PBLF	3210811	PTTB 2,5/2P - 22 A, morsetto a due piani, Grigio	Phoenix Contact	+0G		9
PBDB	3210811	PTTB 2,5/2P - 22 A, morsetto a due piani, Grigio	Phoenix Contact	+0G		10
PBUF	3210811	PTTB 2,5/2P - 22 A, morsetto a due piani, Grigio	Phoenix Contact	+0G		9
PCR1	3UG45121AR20	Relè contr. fase 3x 160-690V 1W	Siemens	+0G	4	1
PH	3210811	PTTB 2,5/2P - 22 A, morsetto a due piani, Grigio	Phoenix Contact	+0G		4
PHONE				+0G	23	1
Phone Comb				+0G	23	1

Nome/Item	Tipo/Type	Descrizione/Description	Costruttore/Marke	Quadro/Board	Fg/Sh	Q.ta/Q.ty
PIT	3210811	PTTB 2,5/2P - 22 A, morsetto a due piani, Grigio	Phoenix Contact	+OG		3
QF1	3RV20214FA10	INT AUT S0, 3A-40A,VT	Siemens	+OG	3	1
QF2	5SU13531KK16	MTD 4,5KA 6KA 1P+N C16 TIPO AC 30MA	Siemens	+OG	3	1
QF3	5SU13531KK10	MTD 4,5KA 6KA 1P+N C10 TIPO AC 30MA	Siemens	+OG	4	1
QF4	5SU13531KK10	MTD 4,5KA 6KA 1P+N C10 TIPO AC 30MA	Siemens	+OG	4	1
QF5	5SU13531KK10	MTD 4,5KA 6KA 1P+N C10 TIPO AC 30MA	Siemens	+OG	4	1
QU1	3NW7023	BASE SEZ.X FUS. CILINDR.10X38 2P 32A 2UM	Siemens	+OG	4	1
QU2	3NW7013	BASE SEZ.X FUS. CILINDR.10X38 1P 32A 1UM	Siemens	+OG	4	1
QU3	3NW7023	BASE SEZ.X FUS. CILINDR.10X38 2P 32A 2UM	Siemens	+OG	4	1
RS1	3SK1112-1BB40	SIRIUS 3SK1 dispositivo base Standard. Circuiti di abilitazione a semiconduttore. Alimentazione 24 V DC. Numero di uscite: 2 di abilitazione + 1 di segnalazione. Connessioni a vite	Siemens	+OG	5	1
RS2	3SK1112-1BB40	SIRIUS 3SK1 dispositivo base Standard. Circuiti di abilitazione a semiconduttore. Alimentazione 24 V DC. Numero di uscite: 2 di abilitazione + 1 di segnalazione. Connessioni a vite	Siemens	+OG	6	1
RSP-1	CS AR-08V024	Modulo di sicurezza per arresti di emergenza e di controllo finecorsa per ripari mobili	Pizzato Elettrica	+OG	7	1
RSP0	CS AR-08V024	Modulo di sicurezza per arresti di emergenza e di controllo finecorsa per ripari mobili	Pizzato Elettrica	+OG	8	1
SA2	3SU1550-0AA10-0AA0	Supporto senza modulo. Metallo	Siemens	+OG	19	1
	3SU1400-1AA10-1BA0	Modul di contatti per fissaggio su piastra frontale. 1 NO, morsetti a vite	Siemens			1
	3SU1000-4BF01-0AA0	Selettore a chiave 2 posizioni (0+I). Permanente. 90°. Tipo di serratura: RONIS, SB30. Posizione selettore per estrazione chiave: 0	Siemens			1
SB2	3SU1550-0AA10-0AA0	Supporto senza modulo. Metallo	Siemens	+OG	19	1
	3SU1000-1GB20-0AA0	Pulsante a fungo di ARRESTO DI EMERGENZA, sblocco a rotazione, diametro 33,8 mm, 2 posizioni	Siemens			1
	3SU1400-1AA10-1CA0	Modul di contatti per fissaggio su piastra frontale. 1 NC, morsetti a vite	Siemens			2
SH3	3SU1550-0AA10-0AA0	Supporto senza modulo. Metallo	Siemens	+OG	19	1
	3SU1400-1AA10-1BA0	Modul di contatti per fissaggio su piastra frontale. 1 NO, morsetti a vite	Siemens			1
	3SU1001-0AB60-0AA0	Pulsante luminoso con bottone piatto, standard, ad impulso, bianco	Siemens			1
	3SU1401-1BB60-1AA0	Modulo LED bianco per fissaggio su piastra frontale, 24 V AC/DC, Morsetti a vite	Siemens			1
UPS				+OG	3	1
X1	3211942	PT 4/1P-PE - 32 A, morsetto passante, Giallo-verde	Phoenix Contact	+OG		1
	3212007	PT 4/1P BU - 32 A, morsetto passante, Blu	Phoenix Contact			1
	3211931	PT 4/1P - 32 A, morsetto passante, Grigio	Phoenix Contact			3
X2	3210059	PT 2,5/1P-PE - 24 A, morsetto passante, Giallo-verde	Phoenix Contact	+OG		1
	3210033	PT 2,5/1P - 24 A, morsetto passante, Grigio	Phoenix Contact			3
X3	3210811	PTTB 2,5/2P - 22 A, morsetto a due piani, Grigio	Phoenix Contact	+OG		4
X4	3211942	PT 4/1P-PE - 32 A, morsetto passante, Giallo-verde	Phoenix Contact	+OG		1
	3212007	PT 4/1P BU - 32 A, morsetto passante, Blu	Phoenix Contact			1
	3211931	PT 4/1P - 32 A, morsetto passante, Grigio	Phoenix Contact			1
X5	3211942	PT 4/1P-PE - 32 A, morsetto passante, Giallo-verde	Phoenix Contact	+OG		1
	3212007	PT 4/1P BU - 32 A, morsetto passante, Blu	Phoenix Contact			1
	3211931	PT 4/1P - 32 A, morsetto passante, Grigio	Phoenix Contact			1
XS1	20246	Presa Unel 10/16A	Gewiss	+OG	3	1
	26410	Adattatore 2M per barra DIN	Gewiss			1
XS2	20246	Presa Unel 10/16A	Gewiss	+OG	4	1
	26410	Adattatore 2M per barra DIN	Gewiss			1

ELECTRIC CABINET

Hercules Carparking Systems 2004
ABN: 67 077 434 452
Unit 1, 87 Reserve Road
ARTARMON NSW 2064

Hercules Carparking Systems (Melbourne)
ABN: 72 622 520 281
Unit 6 / 1 Bell Street
PRESTON VIC 3072

Hercules Carparking Systems (Qld)
ABN: 30 625 912 469
Unit 1, 87 Reserve Road
ARTARMON NSW 2064

Hercules Carparking Systems (WA)
ABN: 29 617 098 487
41 Esplanade
NEDLANDS WA 6009

ACCESSORIES
SWITCHING AUTOMATION LIGHT GRIDS

Detailed technical data

Features

Technology	Sender/receiver
Task	Switching light grid
Minimum detectable object (MDO)	Parallel beam: ≥ 15 mm ... 65 mm Cross beam: ≥ 10 mm ... 35 mm
Number of beams	6 ... 80

Performance

Maximum range	13 m ... 17 m
Minimum range	≥ 0 mm ... ≥ 900 mm
Response time [1]	Parallel beam: 28 ms ... 390 ms Cross beam: depending on type

[1] With resistive load.

Interfaces

Connection type	Connector M12, 4-pin Connector M12, 5-pin Cable 5 m Cable 15 m
Test input	PNP

Mechanics/electronics

Wave length	880 nm
Supply voltage V_s [1]	DC 15 V ... 30 V
Power consumption sender [1]	< 100 mA
Power consumption receiver [1]	< 100 mA
Ripple	< 5 V_{pp}
Output current $I_{max.}$	100 mA
Output load capacitive	100 5F
Output load inductive	1 H
Initialization time	1 s
Dimensions (W x H x D)	34 mm x 226 mm x 29 mm ... 34 mm x 3,196 mm x 29 mm
Housing material	Aluminum
Indication	LED
Enclosure rating	IP 65
Circuit protection	V_s connections reverse-polarity protected Output Q short-circuit protected Interference suppression
Weight	800 g ... 7,700 g
Pulse rate	250 kHz 500 kHz 313 kHz
Front screen	PMMA
Output mode [2]	Q dark switching [2], light switching [3]

[1] Typical values.
[2] ELG3/6: Q = active in case one beam is interrupted; /Q = active in case all beams are free.
[3] ELG3/6-Relay: NC = closed in case one beam is interrupted, NO = closed in case all beams are free.

Ambient data

Protection class	III
EMC	EN 60947-5-2
Ambient temperature	Operation: –25 °C ... +55 °C Storage: –40 °C ... +70 °C
Ambient light safety [1]	Indirect: ≤ 150,000 lux
Vibration resistance	5 g, 10 Hz ... 55 Hz (IEC 68-2-6)
Shock load	10 g / DIN EN 60068-2-29 / 16 ms

[1] Sunlight.

Specific data

Beam separation	Model name	Ordering information
30 mm	ELG3	30
	ELG3-Relay	31
60 mm	ELG6	31
	ELG6-Relay	32

Ordering information

The type code on page 32 helps describe the coding of the ELG types. Further variants only upon request.

Please note: Sender and receiver are only offered as a pair.

ELG3

- **Beam separation:** 30 mm

Working range	Evaluation beams	Detection height	Switching output	Model name	Part no.
9 m	Parallel beam	210 mm	2 x NPN (Q and /Q)	ELG3-0210N541	1047484
12 m	Parallel beam	210 mm	2 x PNP (Q and /Q)	ELG3-0210P561	1046812
		450 mm	2 x PNP (Q and /Q)	ELG3-0450P561	1027894
		150 mm	2 x PNP (Q and /Q)	ELG3-0150P521	1026475
			2 x NPN (Q and /Q)	ELG3-0150N521	1047932
		210 mm	2 x PNP (Q and /Q)	ELG3-0210P521	1025574
			2 x NPN (Q and /Q)	ELG3-0210N521	1025613
		450 mm	2 x PNP (Q and /Q)	ELG3-0450P521	1025440
			2 x NPN (Q and /Q)	ELG3-0450N521	1025614
		570 mm	2 x PNP (Q and /Q)	ELG3-0570P521	1025885
		690 mm	2 x PNP (Q and /Q)	ELG3-0690P521	1025568
			2 x NPN (Q and /Q)	ELG3-0690N521	1025615
		810 mm	2 x PNP (Q and /Q)	ELG3-0810P521	1025577
		930 mm	2 x PNP (Q and /Q)	ELG3-0930P521	1025511
			2 x NPN (Q and /Q)	ELG3-0930N521	1025616
		1,050 mm	2 x PNP (Q and /Q)	ELG3-1050P521	1025570
		1,170 mm	2 x PNP (Q and /Q)	ELG3-1170P521	1025579
			2 x NPN (Q and /Q)	ELG3-1170N521	1025617
		1,410 mm	2 x PNP (Q and /Q)	ELG3-1410P521	1025502
			2 x NPN (Q and /Q)	ELG3-1410N521	1025618
		1,650 mm	2 x PNP (Q and /Q)	ELG3-1650P521	1025503
			2 x NPN (Q and /Q)	ELG3-1650N521	1025620

Working range	Evaluation beams	Detection height	Switching output	Model name	Part no.
12 m	Parallel beam	1,890 mm	2 x PNP (Q and /Q)	ELG3-1890P521	1025504
			2 x NPN (Q and /Q)	ELG3-1890N521	1025621
		2,070 mm	2 x PNP (Q and /Q)	ELG3-2070P521	1025505
		2,370 mm	2 x PNP (Q and /Q)	ELG3-2370P521	1025573
	Multiple scan	810 mm	2 x PNP (Q and /Q)	ELG3-0810P523	1026177
		1,170 mm	2 x PNP (Q and /Q)	ELG3-1170P523	1040580
		1,410 mm	2 x PNP (Q and /Q)	ELG3-1410P523	1026179
		1,890 mm	2 x PNP (Q and /Q)	ELG3-1890P523	1026826
		2,070 mm	2 x PNP (Q and /Q)	ELG3-2070P523	1025572
		2,370 mm	2 x PNP (Q and /Q)	ELG3-2370P523	1026178

ELG3-Relay

- **Beam separation:** 30 mm

Working range	Evaluation beams	Detection height	Switching output	Model name	Part no.
12 m	Parallel beam	450 mm	Relay (DC 60 V, AC 25 V)	ELG3-0450R221	1024268
		930 mm	Relay (DC 60 V, AC 25 V)	ELG3-0930R121	1025785
				ELG3-0930R221	1026176
				ELG3-0930R521	1025449
		1,890 mm	Relay (DC 60 V, AC 25 V)	ELG3-1890R121	1026180
	Multiple scan	930 mm	Relay (DC 60 V, AC 25 V)	ELG3-0930R523	1026537

ELG6

- **Beam separation:** 60 mm

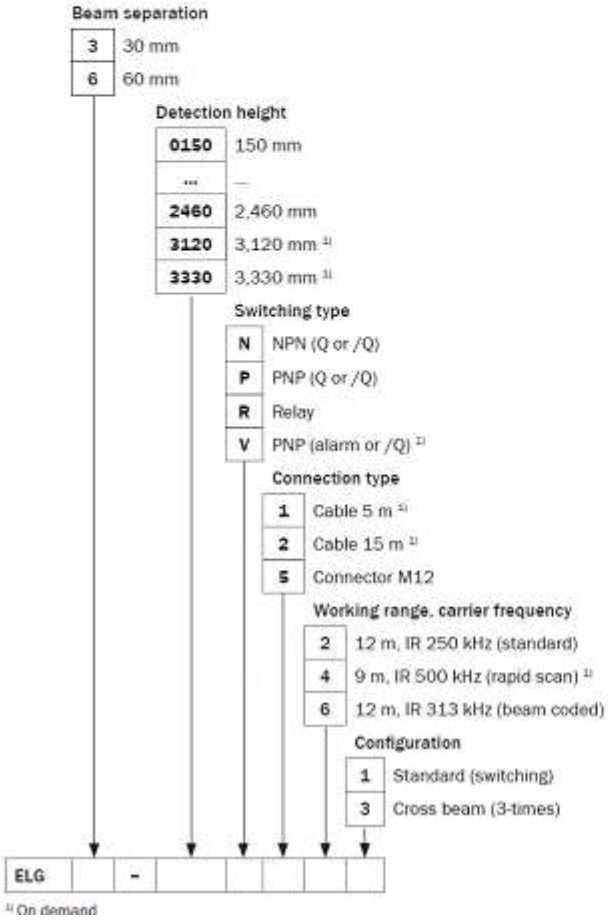
Working range	Evaluation beams	Detection height	Switching output	Model name	Part no.
9 m	Parallel beam	900 mm	2 x NPN (Q and /Q)	ELG6-0900N541	1041568
12 m	Parallel beam	900 mm	2 x PNP (Q and /Q)	ELG6-0900P521	1025447
		1,080 mm	2 x PNP (Q and /Q)	ELG6-1080P521	1025586
		1,200 mm	2 x PNP (Q and /Q)	ELG6-1200P561	1044292
		1,380 mm	2 x PNP (Q and /Q)	ELG6-1380P521	1043870
				ELG6-1380P561	1025587
		1,620 mm	2 x PNP (Q and /Q)	ELG6-1620P521	1040686
		1,860 mm	2 x PNP (Q and /Q)	ELG6-1860P521	1025589
		2,340 mm	2 x PNP (Q and /Q)	ELG6-2340P521	1025596
		3,120 mm	2 x PNP (Q and /Q)	ELG6-3120P521	1047475
	Multiple scan	1,380 mm	2 x PNP (Q and /Q)	ELG6-1380P523	1025588
		1,860 mm	2 x PNP (Q and /Q)	ELG6-1860P523	1025593
		2,040 mm	2 x PNP (Q and /Q)	ELG6-2040P523	1025594
		2,460 mm	2 x PNP (Q and /Q)	ELG6-2460P523	1024293

ELG6-Relay

- **Beam separation:** 60 mm

Working range	Evaluation beams	Detection height	Switching output	Model name	Part no.
12 m	Parallel beam	900 mm	Relay (DC 60 V, AC 25 V)	ELG6-0900R521	1026181
		1,860 mm	Relay (DC 60 V, AC 25 V)	ELG6-1860R521	1026182
		2,460 mm	Relay (DC 60 V, AC 25 V)	ELG6-2460R521	1026183
	Multiple scan	900 mm	Relay (DC 60 V, AC 25 V)	ELG6-0900R523	1025453
		1,380 mm	Relay (DC 60 V, AC 25 V)	ELG6-1380R523	1025451
		1,860 mm	Relay (DC 60 V, AC 25 V)	ELG6-1860R523	1026458

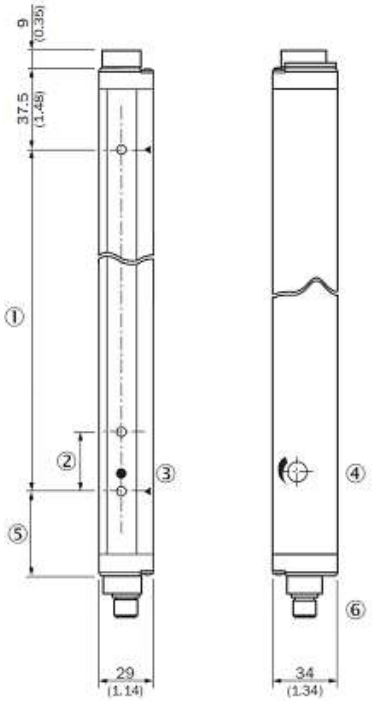
Type code



1) On demand

Dimensional drawings

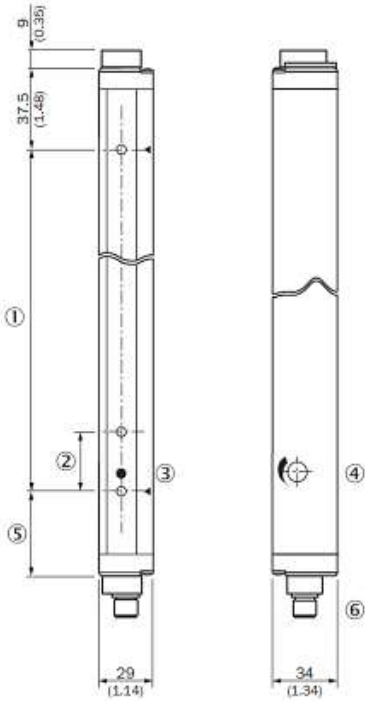
ELG3/ELG6



All dimensions in mm (inch)

① Detection height
② Beam separation ELG3: 30 mm/ELG6: 60 mm
③ Status indicator (ELGE)/power on (ELGS)
④ Sensitivity adjustment
⑤ Distance to first beam ELG3: 38.5 mm/ELG6: 68.5 mm
⑥ Connector M12, 4-pin

ELG3-Relay/ELG6-Relay

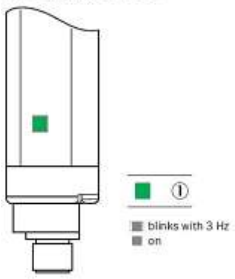


All dimensions in mm (inch)

① Detection height
② Beam separation ELG3: 30 mm/ELG6: 60 mm
③ Status indicator (ELGE)/power on (ELGS)
④ Sensitivity adjustment
⑤ Distance to first beam ELG3: 38.5 mm/ELG6: 68.5 mm
⑥ Connector M12, 5-pin

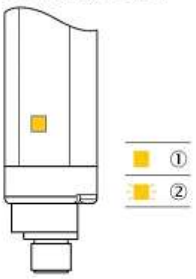
Adjustments

LED display sender



① Supply voltage

LED display receiver



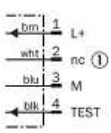
① No object in the light path
② Pollution indication

Connection type and diagram

ELG3/ELG6

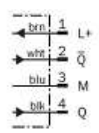
Sender Connector M12, 4-pin

Sender



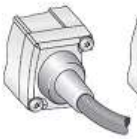
Receiver Connector M12, 4-pin

Receiver

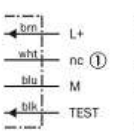


ELG3-Relay

Sender Cable 4-pin

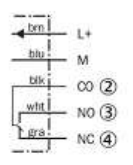


Sender



Receiver Cable 5-pin

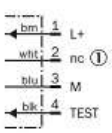
Receiver



ELG3-Relay/ELG6-Relay

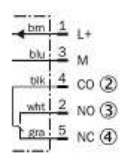
Sender Connector M12, 4-pin

Sender



Receiver Connector M12, 5-pin

Receiver

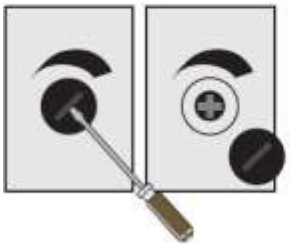


① Not connected
② Change over
③ Normally open
④ Normally closed

Special functions

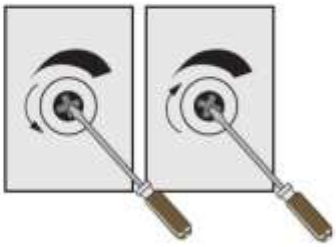
Sensivity adjustment

1. Remove cap



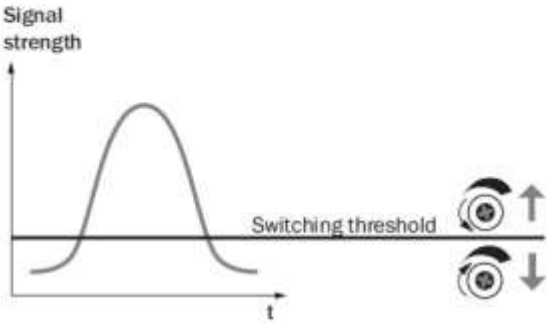
Remove cap with screw driver.

2. Potentiometer adjustment

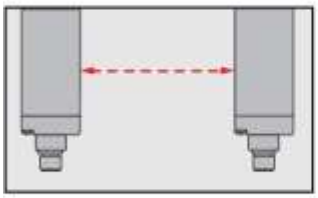


Turn left = for a lower range.
Turn right = for a higher range.

Sensitivity adjustment



Optical synchronisation



The light grid communicates via the light beams. A cable is not necessary for the optical synchronisation.

GL10, DC, optimized for logistics applications, detection of stretch foil wrapped objects

- **Sensor principle:** Photoelectric retro-reflective sensor
- **Supply voltage:** 10 V DC ... 30 V DC
- **Switching frequency max.:** 500 Hz
- **Light spot size (distance):** Ø 58 mm (5 m)
- **Type of light:** visible red light
- **Adjustment:** no/fix

Sensing range max.	Output type	Switching mode	Connection	Connection diagram	Items supplied	Model name	Part no.
0.15 m ... 12 m [1] 0.15 m ... 10 m [2]	PNP	Light switching	Connector M12, 4-pin	Cd-066	–	GL10-P4551	1064702
					Q-Lock mounting system BEF-KH-SQ12R01	GL10-P4554	1065893
		Light/dark-switching			–	GL10-P4151	1069860
		Complementary switching output		Cd-083		GL10-F4551	1071153
					Q-Lock mounting system BEF-KH-SQ12R01	GL10-F4554	1071170
	NPN	Light switching	Cable, 3-wire, 2 m, PVC	Cd-044	–	GL10-N1551	1065892

[1] PL80A.
[2] P250.

GL10, AC/DC

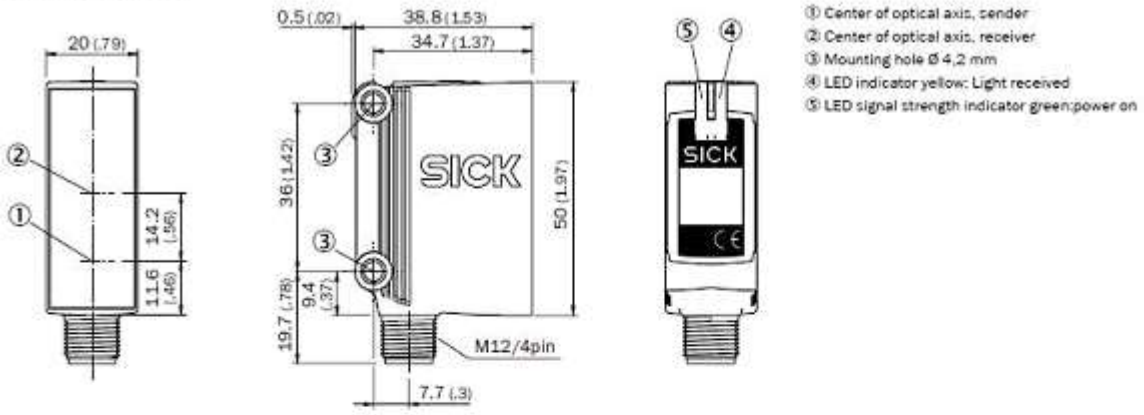
- **Sensor principle:** Photoelectric retro-reflective sensor
- **Detection principle:** Standard optics
- **Supply voltage:** 24 V AC/DC ... 240 V AC/DC
- **Switching frequency max.:** 20 Hz
- **Light spot size (distance):** Ø 58 mm (5 m)
- **Type of light:** visible red light
- **Output type:** relay
- **Connection:** Cable, 5-wire, 2 m, PVC

Sensing range max.	Adjustment	Connection diagram	Items supplied	Model name	Part no.
0.08 m ... 15 m [1] 0.08 m ... 12 m [2]	–	Cd-163	–	GL10-R3711	1065896
			Mounting bracket BEF-G10UC01, Reflector P250	GL10-R3712	1065897
	Potentiometer, 270 °	Cd-163	–	GL10-R3811	1064689
			Mounting bracket BEF-G10UC01, Reflector P250	GL10-R3812	1065898

[1] PL80A.
[2] P250.

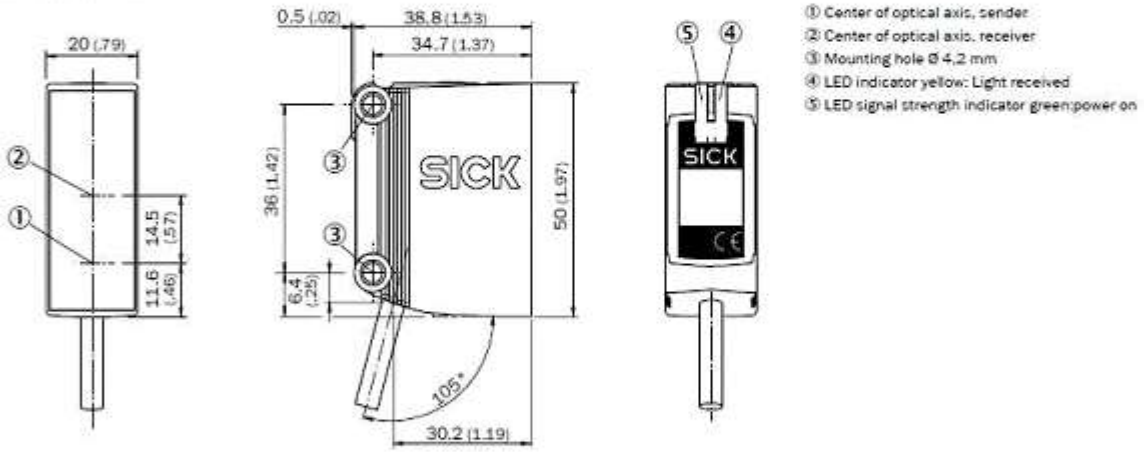
Dimensional drawings (Dimensions in mm (inch))

GL10, DC, connector



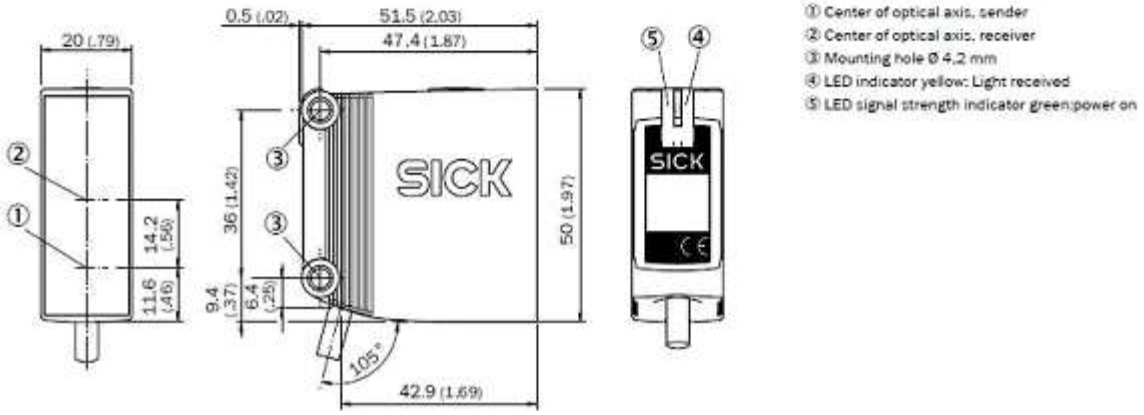
① Center of optical axis, sender
② Center of optical axis, receiver
③ Mounting hole Ø 4.2 mm
④ LED indicator yellow: Light received
⑤ LED signal strength indicator green:power on

GL10, DC, cable



① Center of optical axis, sender
② Center of optical axis, receiver
③ Mounting hole Ø 4.2 mm
④ LED indicator yellow: Light received
⑤ LED signal strength indicator green:power on

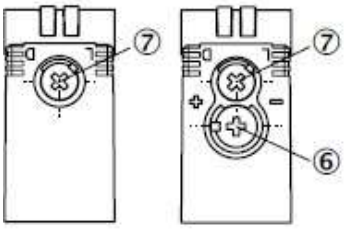
GL10, AC/DC, cable



① Center of optical axis, sender
② Center of optical axis, receiver
③ Mounting hole Ø 4.2 mm
④ LED indicator yellow: Light received
⑤ LED signal strength indicator green:power on

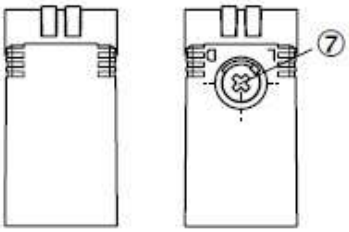
Adjustments

GL10, DC



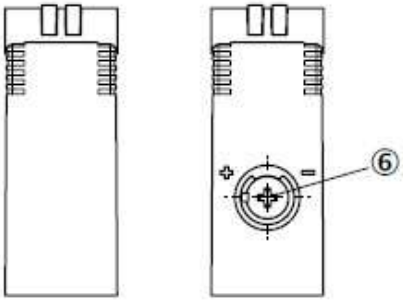
⑥ Sensing range adjustment
⑦ Light/dark selector

GL10, logistics, DC



⑦ Light/dark selector

GL10, AC/DC

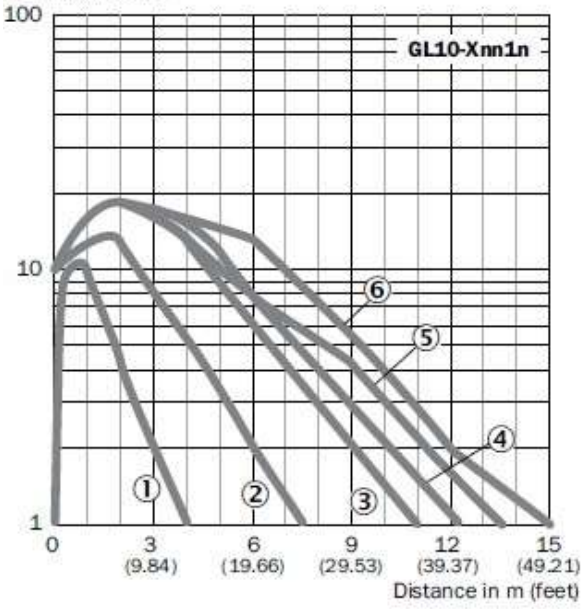


⑥ Sensing range adjustment

Sensing range

GL10, DC, AC/DC

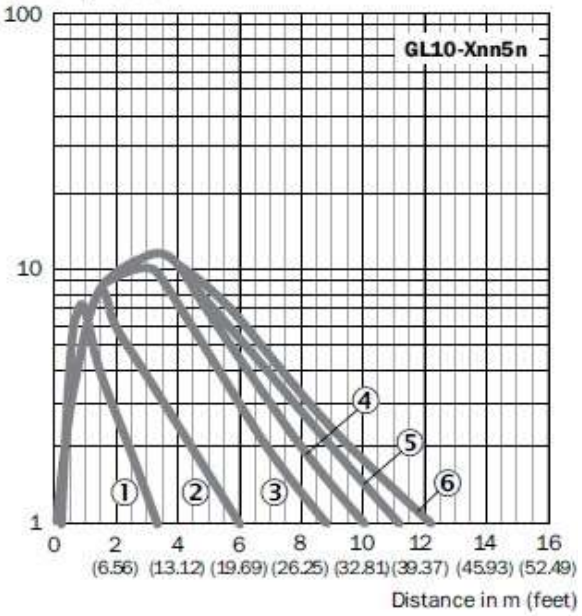
Operating reserve



① REF-IRF-56
② PL20A
③ PL30A
④ P250
⑤ PL40A
⑥ PL80A

GL10, logistics, DC

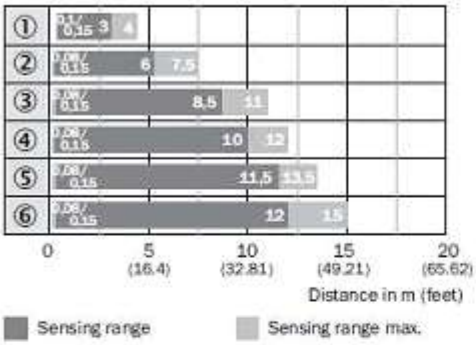
Operating Reserve



① REF-IRF-56
② PL20A
③ PL30A
④ P250
⑤ PL40A
⑥ PL80A

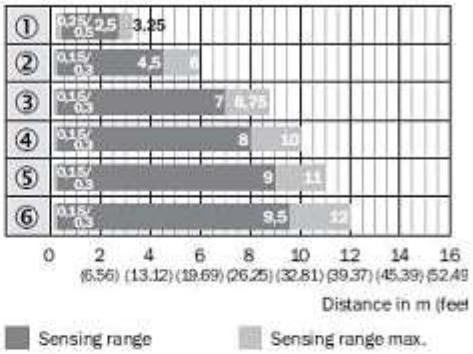
Bar diagrams

GL10, DC, AC/DC



① REF-IRF-56
② PL20A
③ PL30A
④ P250
⑤ PL40A
⑥ PL80A

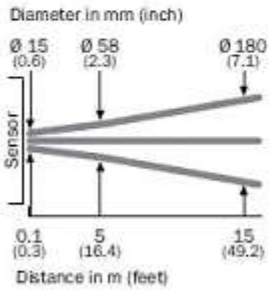
GL10, logistics, DC



① REF-IRF-56
② PL20A
③ PL30A
④ P250
⑤ PL40A
⑥ PL80A

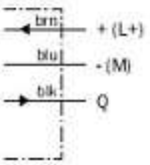
Light spot diameter

GL10

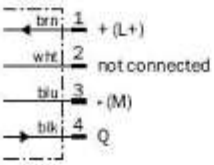


Connection diagram

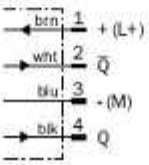
Cd-044



Cd-066



Cd-083



Cd-163