STAGEMAKER®

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MASTER SM5

English

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18.9.2008

VERLINDE
LIFTING EQUIPMENT

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Read the instructions supplied with the product before installation and commissioning.

Keep the instructions in a safe place for future reference.

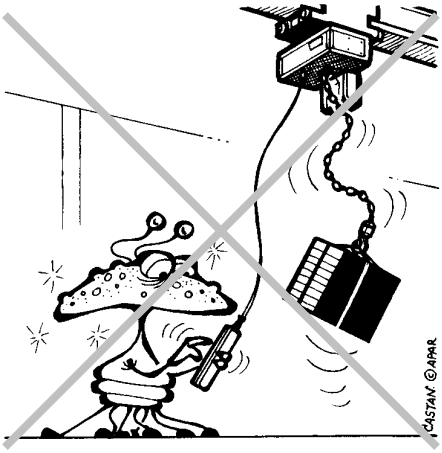
Table of content

2 SAFETY INSTRUCTIONS

WARNING !

THE FOLLOWING INSTRUCTIONS FOR SAFE USE MUST BE FOLLOWED IN ORDER TO AVOID PERSONAL INJURY OR MATERIAL DAMAGE

Do not let an unqualified person use the hoist.



Do not let an unqualified person use the hoist.

Make sure that the safety rules are followed (personal safety equipment, clearance of work areas, posting up of instructions to be followed in the area...).

Always be ready during operation to press the emergency stop button. This makes all functions inactive.

Never lift more than the maximum working load indicated on the hoist. Shocks or accidental collision of the load with objects can cause excess loads.

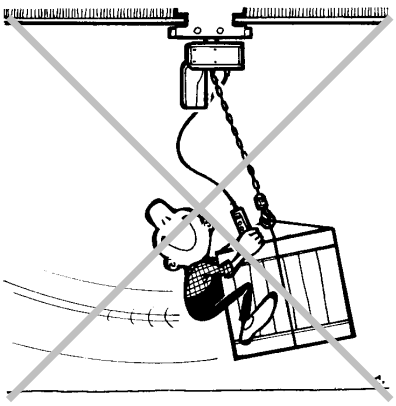
Before operation, check that the load is correctly fastened and installed on the hook. The hook safety latches should be closed correctly.

Do not drive the hook block into the bottom of the hoist. Also do not drive the chain out of the chain bag up to the slack fall stop. These may break the chain and allow the load to drop.

Never use the hoist to transport people.

Never twist the load chains (turning the hook block around...).

Never transport a load with people nearby. Do not pass the hook, with or without a load, above a person. Never go under the load.



Never swing the load intentionally.

Never swing the load intentionally

Never remove the hook safety latches.

Never sling onto the hook jaw (as there is a risk of damage to the hook and of the load falling).

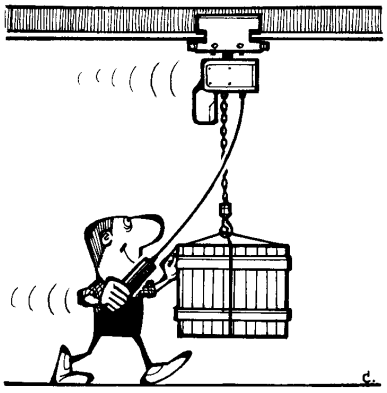
Always lift the load from the floor. Never add load to a lifted hook.

3 Instructions for proper operation and maintenance.

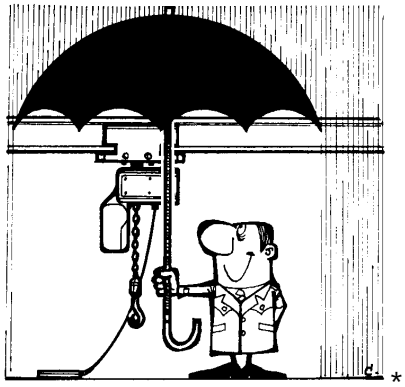
Follow the instructions below in order to keep your equipment in good condition and to keep your product safe

Never move or lift the hoist by the electric cables.
Do not set down the hoist without having an adapted support, to avoid damaging the components on the underside (electric cable, lifting chain, cable gland, chain bucket...).
Never modify the hoist unless the constructor has studied and authorized the modification.
Never modify the values and adjustments of the safety components, outside the limits provided for in the manual, or without the approval of the constructor.
Never try to repair or modify the hoist without the authorization of the constructor or a trained maintenance agent.
Never block, adjust or remove the limit switches or stops installed on the hoist without the authorization of the constructor or a trained maintenance agent.
Never use the hoist to extract, loosen, or pull sideways.
Do not touch the moving components.
Do not operate the hoist if your physical condition does not allow it.
Never use the hoist when in bad repair (wear, deformation...).
Do not subject the hoist to brutal shocks.
Never use the lifting chain as a sling
Never use a hook other than in the vertical position.
Never distract the operator while the hoist is being operated.

Make sure that the hoist is always clean.



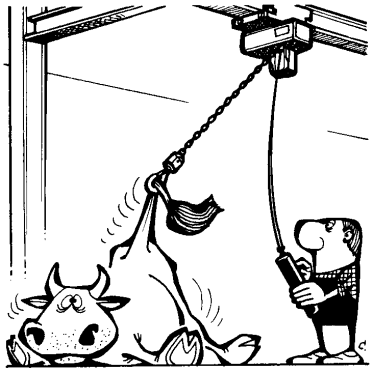
If manually moving the hoist, push the load



Material used outdoors should be protected as well as possible against bad weather conditions.

Never leave a suspended load hanging, if it is not necessary.
Never use the hoist as an earth reference for welding.
Do not use the hoist for a purpose or in an area for which it is not intended.
If manually moving the hoist, push the load.
Do not use the safety components (end buffers, emergency stop,…) as operation components.
Do not use the controls needlessly (avoid inching - stop-start operation of the buttons). This can cause overheating and even damage to the hoist.
Do not use the hoist with a power supply that is different to the one recommended (under-voltage or over-voltage, absence of phase...).

Handle the hoist by its structure, or by the devices provided for this purpose, or in its original packing.
Do not expose the hoist to an aggressive atmosphere (temperature, acidity...).
Make sure that the hoist is always clean and protected from corrosion (lubrication...).
Use the material under normal working conditions (ambient temperature, atmosphere...). Material used outdoors should be protected as well as possible against bad weather conditions. The hoist should be covered to avoid water going inside the chain bucket. In outdoor use a drain hole must be made to the chain bucket's bottom.
Store the hoist in its normal operating position (without load) away from aggressive atmospheres (dust, humidity...).
The hoist should be installed by a competent person
Make sure that the hoist attaching and supporting structure is rigid.
The hoist should be maintained regularly, following the instructions in this manual.
Keep the moving components including the chain clean and oiled as indicated in this manual. The components should only be replaced by original parts that are compatible with the type of hoist. Never use suspect spare parts or parts whose origin is not known.
Make sure that the limit stops are in place.



Never pull the load slantwise.

Never pull the load slantwise, maximum angle 3 degrees.
Make sure that the load is correctly balanced before moving it.
Avoid lifting using only one point of the load. Use adequate accessories (slings, lifting beam...). Pay attention to the center of gravity of the load to be moved.
The elements used to hang the load should be free in relation to the load to be moved (prefer a sling to a rigid beam).
When moving the load, make sure that it is sufficiently raised and clear of surrounding machines and other objects.
Make sure that the hoist is vertical to the load before hoisting.
Avoid swinging the load or the hook when using the travelling trolley or crane. In the case of several speeds, do the starting and braking operations at low speed.
The use of several machines to move a single load should be done by an experienced supervisor. All the necessary precautions should be taken to carefully ensure the distribution of the loads and to avoid overloading a single machine. The machines should be carefully checked before such an operation.
Notify the necessary people after a dangerous operation or if the hoist seems problematic (abnormal noise, abnormal behaviour...).

4 Guarantee

Our electric chain hoists are guaranteed for two years from the date of delivery.
If for a reason outside the control of the vendor, the delivery is delayed, the time lag cannot exceed three months.
If the use (installation) of the hoist is delayed, the corresponding extension of the guarantee (a single extension limited to three months) must be requested, and written confirmation obtained.
The vendor undertakes to eliminate all operating errors originating from the concept, the execution, the components or the materials themselves.

The guarantee does not cover normal wear, nor the failures resulting from lack of regular and periodic maintenance. It does not cover damage due to a lack of supervision, to false operation or to a bad utilization of the hoists, particularly due to overload conditions, slantwise drawing, undervoltage or overvoltage or a connection error.

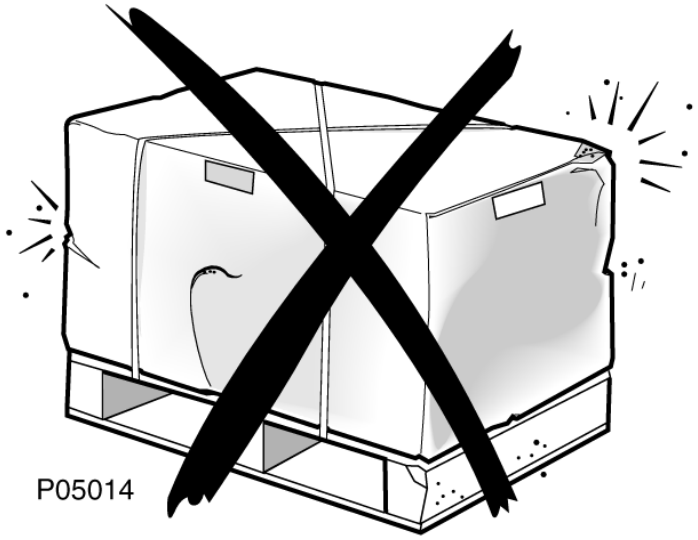
The guarantee does not apply when there is disassembly, modification or replacement of parts (mechanical or electrical) by an unauthorized party or without our prior agreement.
The guarantee only applies for original, factory-installed spare parts.
For the duration of the guarantee, the vendor undertakes to replace or repair, free of charge, the parts that are acknowledged to be damaged following examination by a qualified and authorized technical service.
The guarantee excludes any other services or indemnities. The repairs covered by the guarantee are carried out, as a rule, in the workshops of the vendor or authorized agent. When servicing of the equipment is done outside these workshops, the labor costs for disassembly or assembly of these parts are borne by the vendor when these are done exclusively by his staff or by an authorized agent.
The replaced parts become the property of the vendor and must be returned to the vendor at his expense.
For components of a relative particular importance that are not manufactured by the vendor and which carry the brand name of specialized manufacturers, the manufacturer's guarantee (which can vary according to the manufacturer) is applicable.

The guarantee does not apply for expendable parts defined by the manufacturer :

- Lifting chain
- Chain guide
- Rubber buffer
- Sprockets
- Chain bucket
- Hooks
- Friction and brake discs
- Control box cable

5 Acceptance of the material

Visually inspect the packaging to ensure that it is intact.
If not, notify it as required.
Check that the hoist corresponds to your order.
For transport reasons the chain bucket is delivered disassembled.



6 Description – tecnical charactéristics

6.1 Types de palans

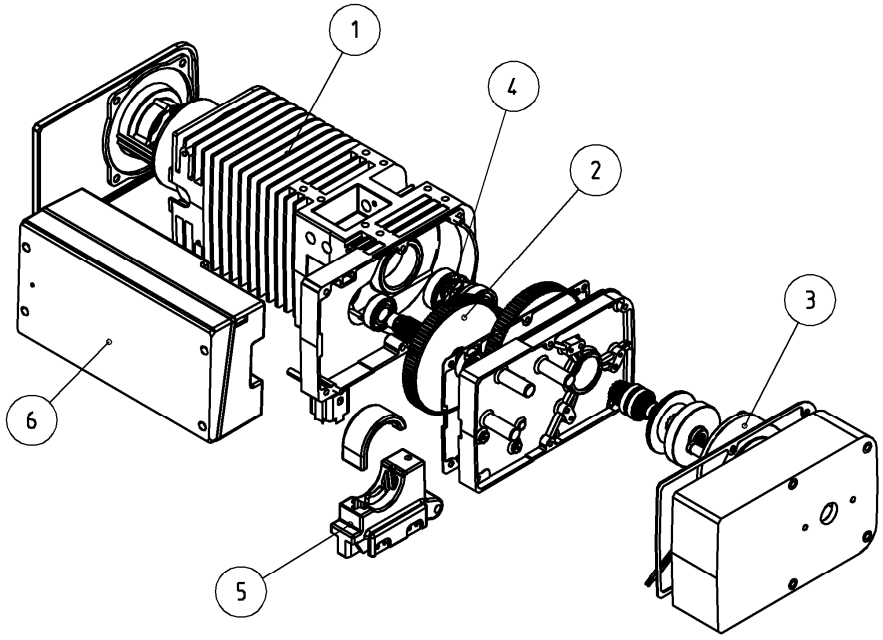
Type	Load Kg	Number of falls	Speed m/min (50Hz)	Speed ft/min (60Hz)	Motor power kW	Speed reducing ratio	FEM Group	Chain d / t
SM5 254 m1	250	1	4	16	0.42	43	1Bm	4,8 / 12,5
SM5 258 m1	250		8	32	0.85	43	1Bm	4,8 / 12,5
SM5 504 m1	500		4	16	0.42	43	1Bm	4,8 / 12,5
SM5 508 m1	500		8	32	0.85	43	1Bm	4,8 / 12,5
SM5 1004 m1	1000	2	4	16	0.85	43	1Bm	4,8 / 12,5
SM5 1002 m1	1000		2	8	0.42	43	1Bm	4,8 / 12,5

☞ The slipping clutch is factory adjusted at a value of 140% (+/- 5%) of a nominal load. Then, for the maintenance operations, the setting value is 125% of the nominal load. This difference is due to the running in of the friction lining.

☞ **EN 14492-2 standard imposes a setting value included between 110 % and 160% of the nominal load. (> 1000 kg)**

✋ **<u>ATTENTION !</u> In case of hoist <u>250 kg 1 fall</u> or <u>500 kg 2 falls</u>, the slipping clutch is factory adjusted at a value of 250% of the hoist nominal load.**

6.2 Main sub-assembly



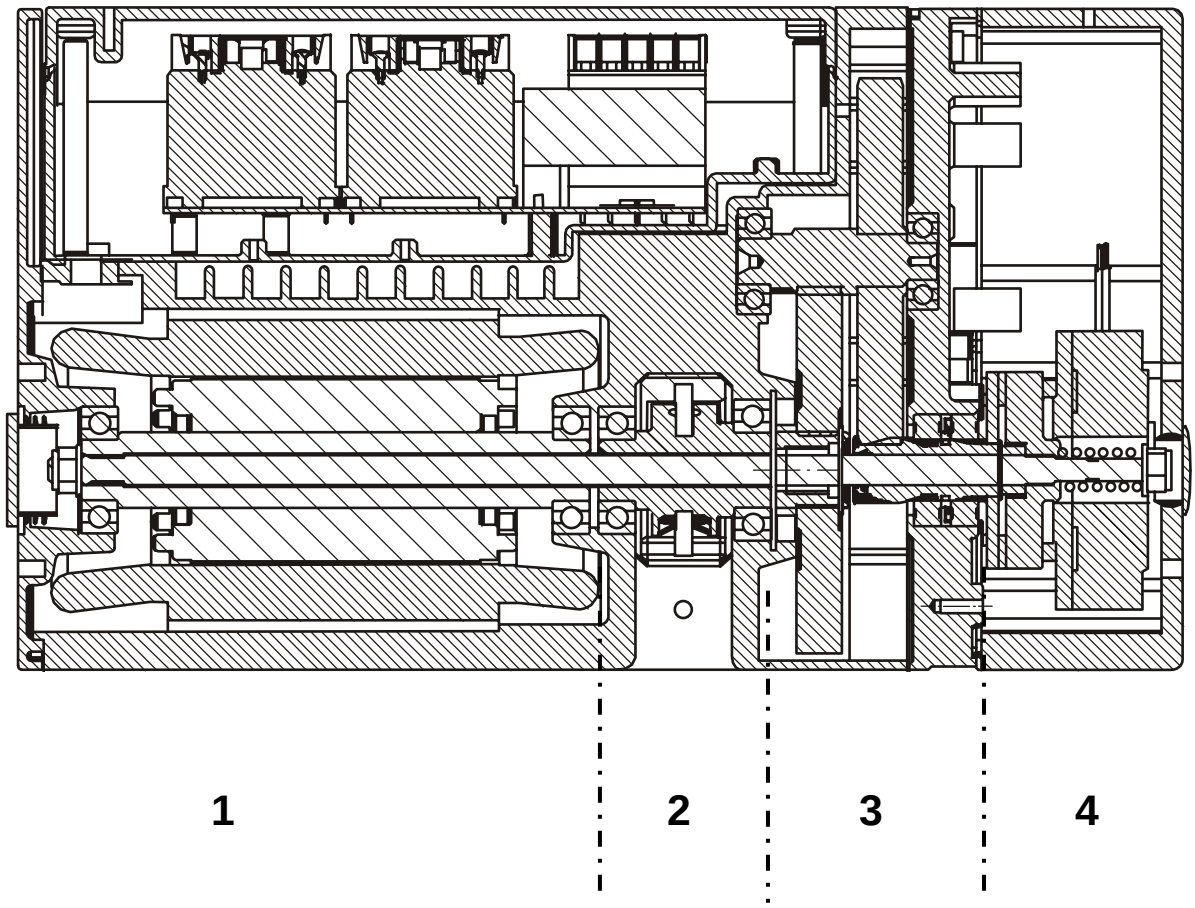
1	Main casing	4	Chain sprocket with output shaft
2	Gears	5	Chain guide
3	Brake/slipping clutch/housing assembly	6	Electrical box

The hoist which you have just purchased should only be used with a maximum load equal to the nominal load (refer to the table above).

The length of its useful service life depends on the demands placed on it, the average operating time, the number of start-ups and its maintenance.

6.3 Operation of the hoist

Kinematic chain



1. Motor
2. Chain sprocket
3. Gear
4. Brake/slipping clutch

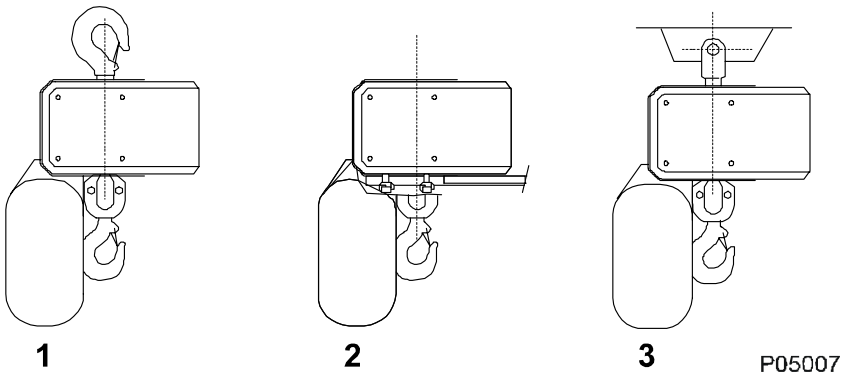
Technical advantage

The position of the slipping clutch allows, should it slip, the load to be held in all cases by releasing the control box button.

6.4 Hoist dimensions and weight

Refer to dimensional drawings

6.5 Attachment of the hoist



- 1. Suspension hook
- 2. Base mounting
- 3. Suspension L or // attachment using the coupling part

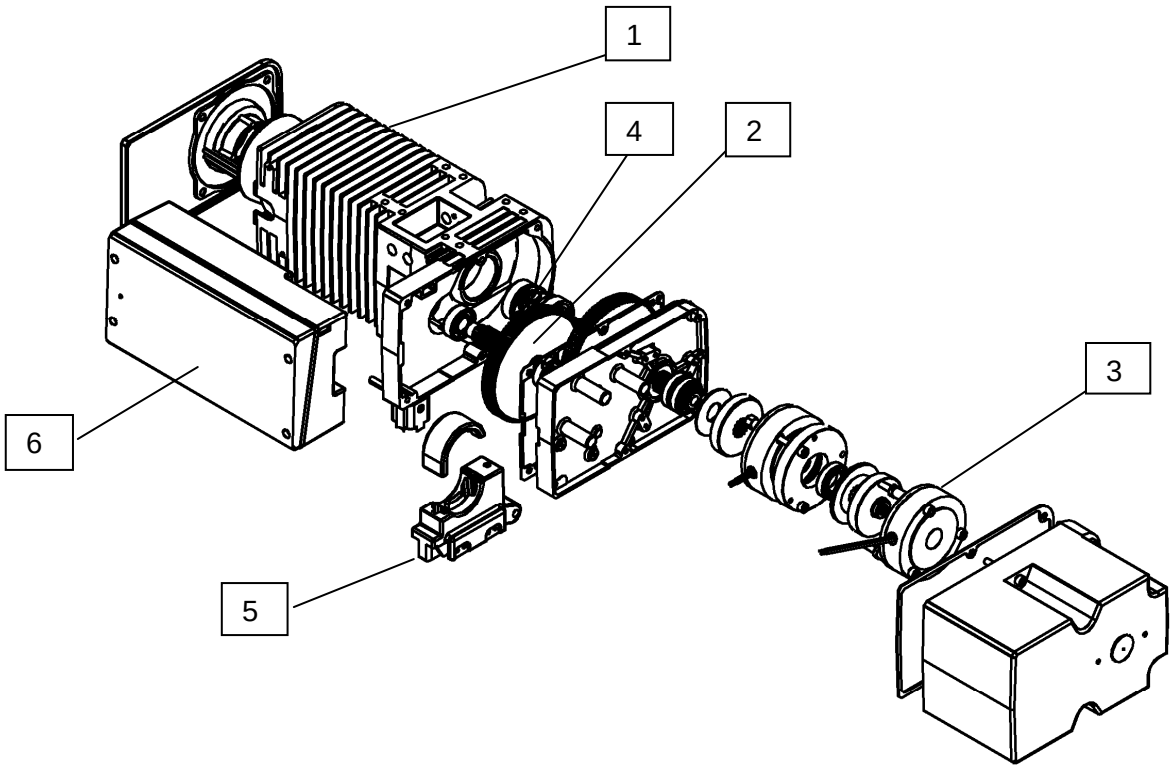
6.6 Environmental data

Ambient temperature : -20°C to +40°C
Protection class : IP55 as standard
Side pulling angle : 3 degrees maximum

Impact on the environment :

Sound level : 70 decibels

6.7 Main sub-assembly (Double brake)



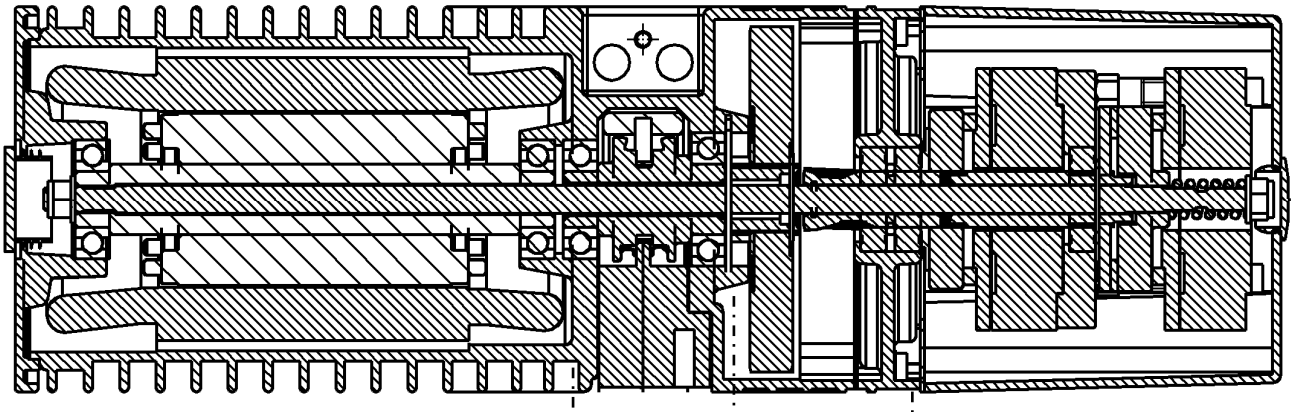
1	Main casing	4	Chain sprocket with output shaft
2	Gears	5	Chain guide
3	Brake/slipping clutch/housing assembly	6	Electrical box

The hoist which you have just purchased should only be used with a maximum load equal to the nominal load (refer to the table above).

The length of its useful service life depends on the demands placed on it, the average operating time, the number of start-ups and its maintenance.

6.8 Operation of the hoist

Kinematic chain



1. Motor
2. Chain sprocket
3. Gear
4. Brake/slipping clutch

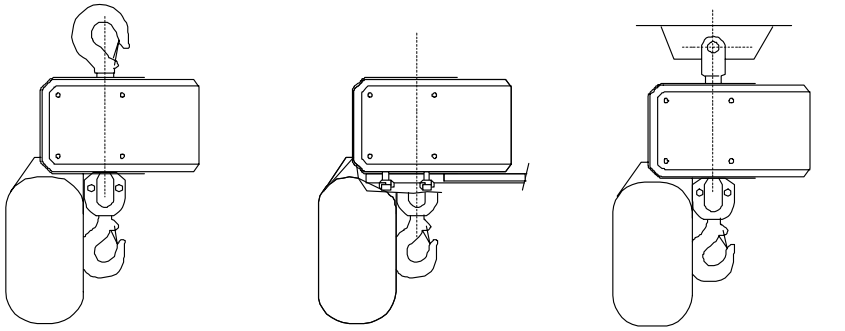
Technical advantage

The position of the slipping clutch allows, should it slip, the load to be held in all cases by releasing the control box button.

6.9 Hoist dimensions and weight

Refer to dimensional drawings

6.10 Attachment of the hoist



- 1. Suspension hook
- 2. Base mounting
- 3. Suspension L or // attachment using the coupling part

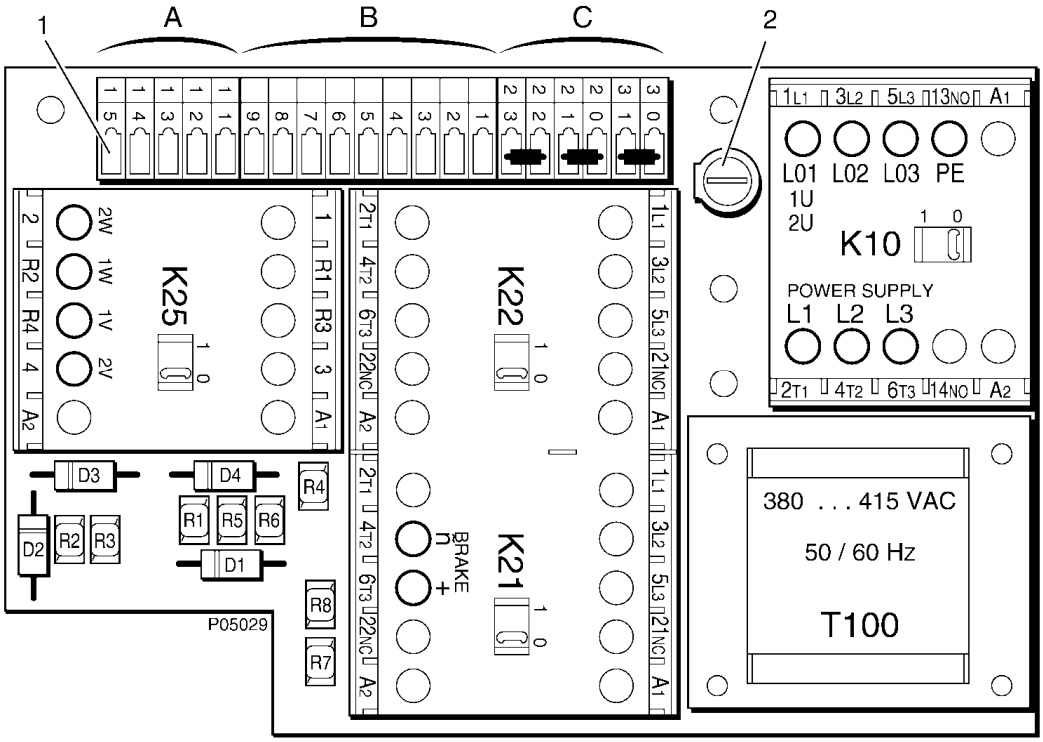
6.11 Environmental data

Ambient temperature : -20°C to +40°C
Protection class : IP55 as standard
Side pulling angle : 3 degrees maximum

Impact on the environment :

Sound level : 70 decibels

6.12 Printed circuit board (2 lifting speeds with emergency stop)



HOIST SUPPLY

L1	hoist supply
L2	hoist supply
L3	hoist supply
BR1	– brake
BR2	+ brake
BR3	– 2nd brake (OPTION)
BR4	+ 2nd brake (OPTION)
1W	motor supply
2W	motor supply
1V	motor supply
2V	motor supply
1U-L01	motor supply
2U-L01	motor supply

GROUND WIRES

ground terminal, 4 connections (see previous page)

PE	motor
PE	p.c. board (K10)
PE	trolley connection
PE	power supply

TROLLEY CONNECTION (X24)

L01	electric trolley supply
L02	electric trolley supply
L03	electric trolley supply

PRINTED CIRCUIT BOARD

Terminal (1)

A Trolley

11	0 V	common
12	48 V	Control power supply
13	F	high speed
14	D2	left
15	D1	right

B Control box

1	Control power supply
2	lifting
3	lowering
4	hoisting speed selector
5	emergency stop
6	right, electric trolley
7	left, electric trolley
8	travelling speed selector

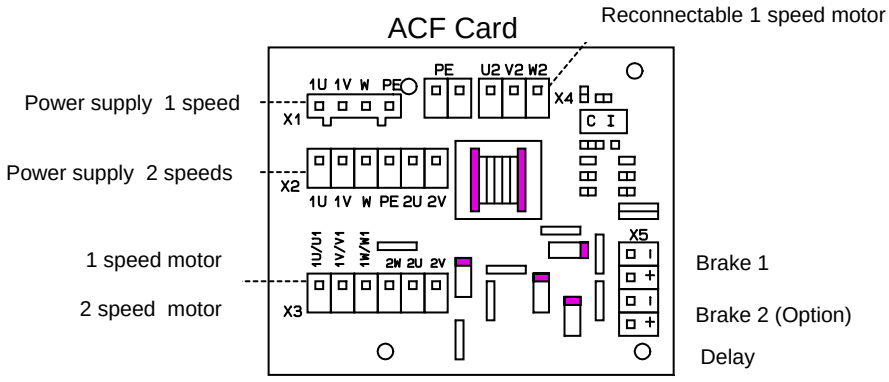
C Options

30-31	thermal protection *(replace the shunt)*
20-21	top limit switch *(replace the shunt)*
22-23	bottom limit switch *(replace the shunt)*
Fuse (2)	See electric drawings
K10	Emergency stop contactor
K21	Lifting contactor
K22	Lowering contactor
K25	Reversal contactor
T100	Control transformer

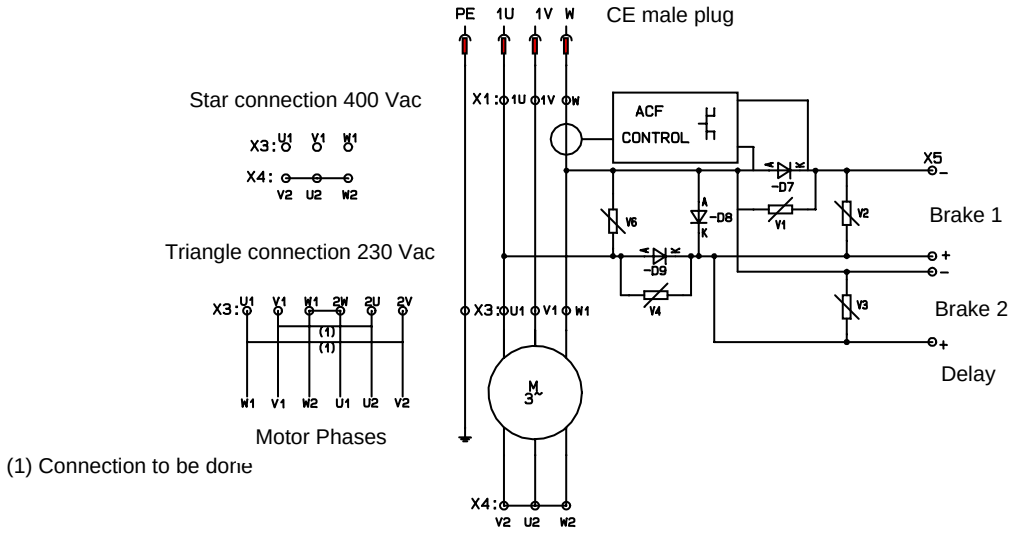
6.13 Electric board (direct voltage control ACF)

ACF board

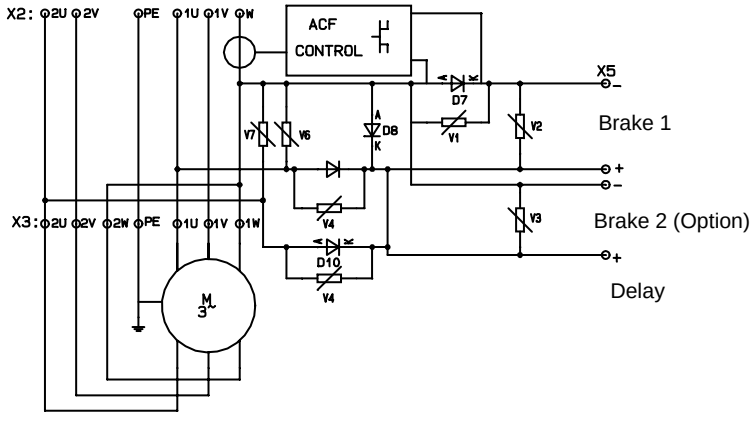
The ACFG board controls electronically the brake. It enables a rapid brake acceleration. (As the hoist is not equipped with contactor control electric's)



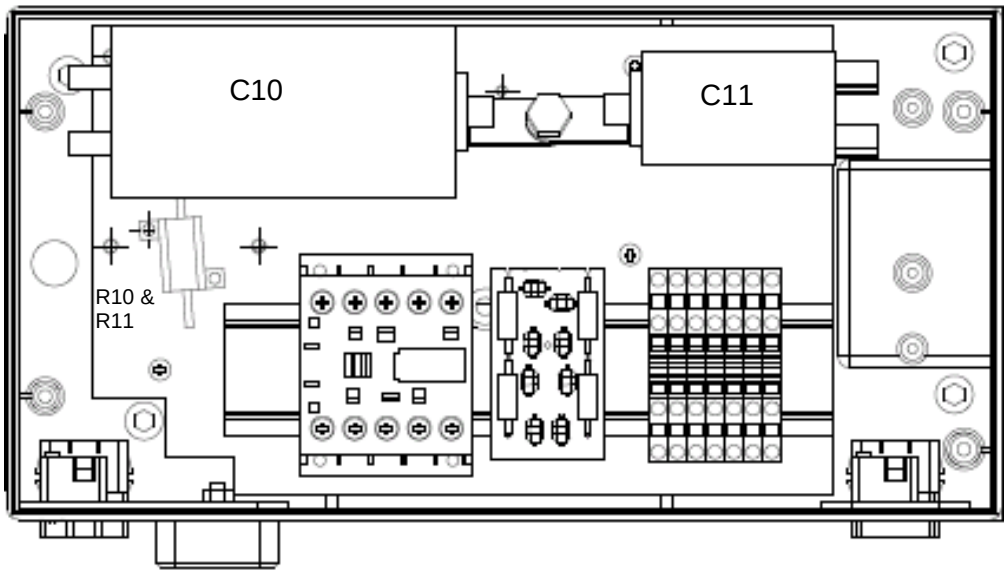
1 Hoisting speed



2 Hoisting speed



6.14 Printed circuit board (1 lifting speed – 1 phase DVC)



HOIST SUPPLY

L1 ou N	Hoist supply or neutral
L2	Hoist supply
BR1	– Brake
BR2	+ Brake
U1	Winding motor U wire 1
V1	Winding motor V wire 1
U2	Winding motor U wire 2
V2	Winding motor V wire 2

GROUND WIRES

ground terminal, 2 connections

PE	motor
PE	power supply

PRINTED CIRCUIT BOARD

Power supply

KAU-1	Hoist supply L1 or N
KAU-3	Hoist supply L2

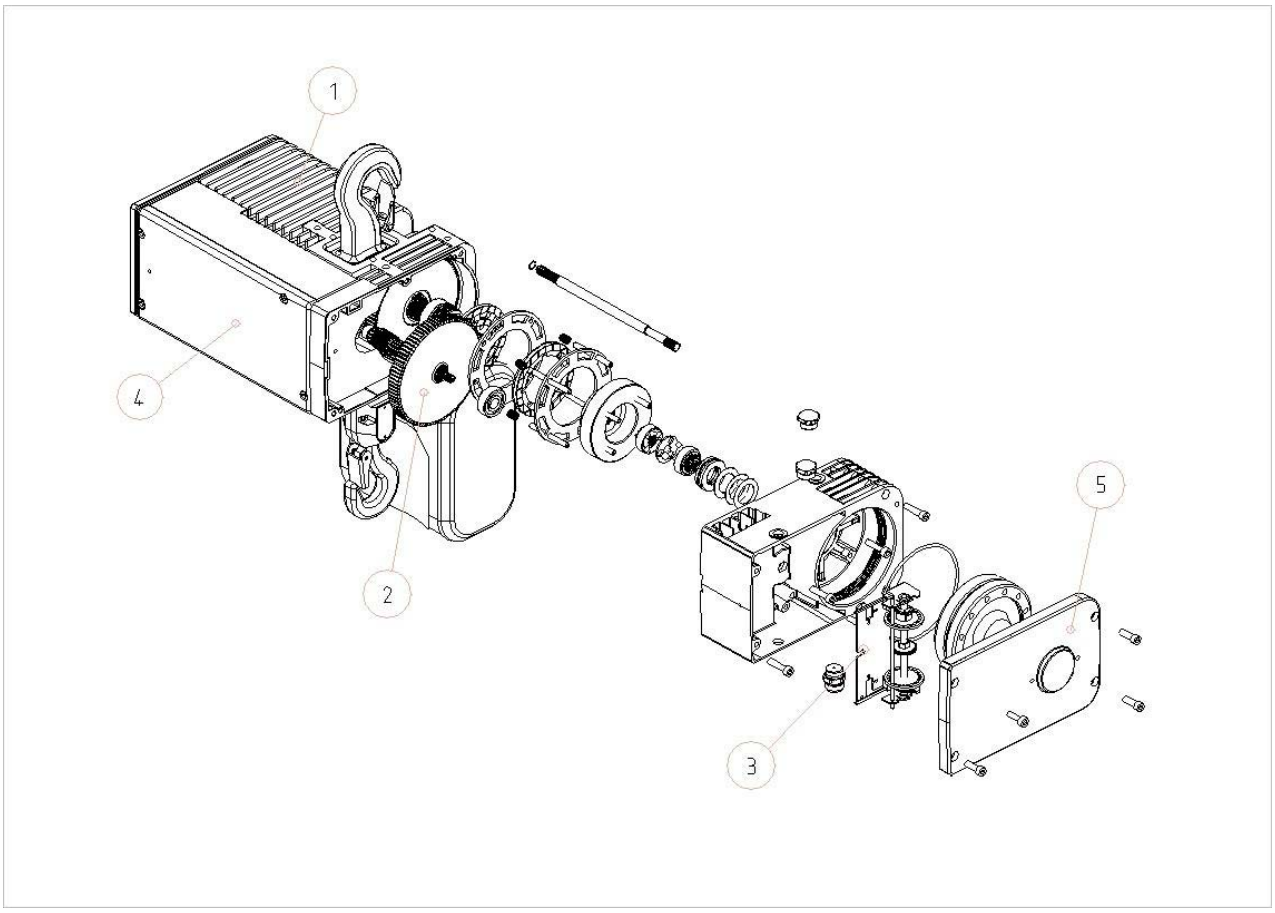
Terminal

1	Terminal for U1 et V1 of the motor
2	Terminal for capacitor and loading resistor
3	Terminal for U2 of the motor
4	Terminal for V2 of the motor
5	Terminal for + of the brake
6	Wire 1 and 2 for brake rectifier

ELEMENTS

C1	Brake rectifier
C10	Main capacitor
C11	Auxilary capacitor
KAU	Emergency stop contactor
R10	Unloading resistor of C10
R11	Unloading resistor of C11

6.15 Main sub-assembly



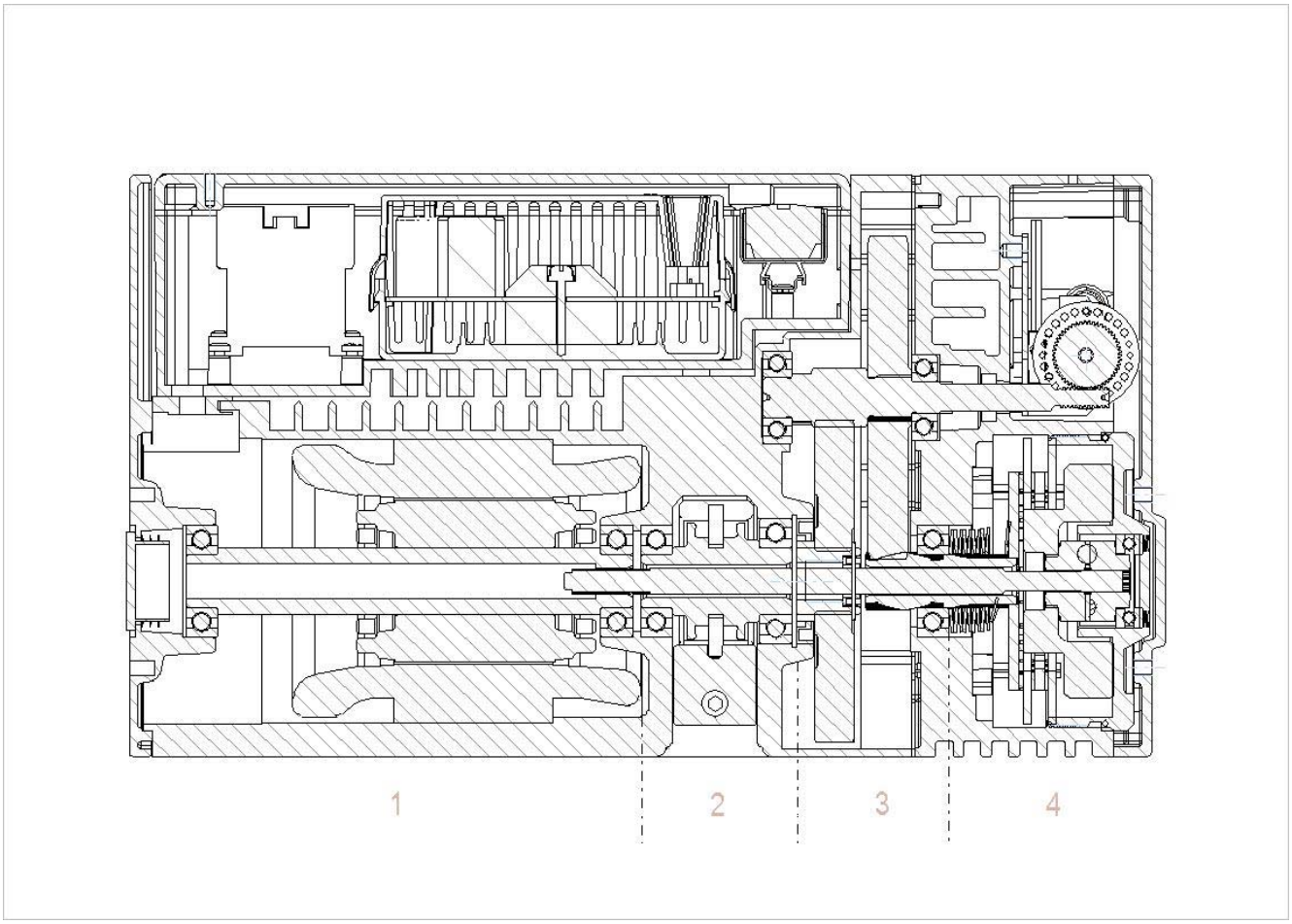
1	Main casing	4	Electrical box
2	Gears	5	Brake flange
3	Brake/slipping clutch/housing assembly		

The hoist which you have just purchased should only be used with a maximum load equal to the nominal load (refer to the table above).

The length of its useful service life depends on the demands placed on it, the average operating time, the number of start-ups and its maintenance.

6.16 Operation of the hoist

Kinematic chain



1. Motor
2. Chain sprocket
3. Gear
4. Brake/slipping clutch

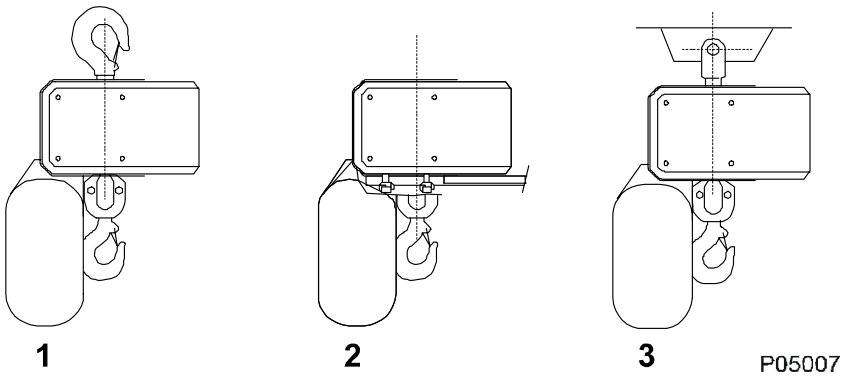
Technical advantage

The position of the slipping clutch allows, should it slip, the load to be held in all cases by releasing the control box button.

6.17 Hoist dimensions and weight

Refer to dimensional drawings

6.18 Attachment of the hoist



- 1. Suspension hook
- 2. Base mounting
- 3. Suspension L or // attachment using the coupling part

6.19 Environmental data

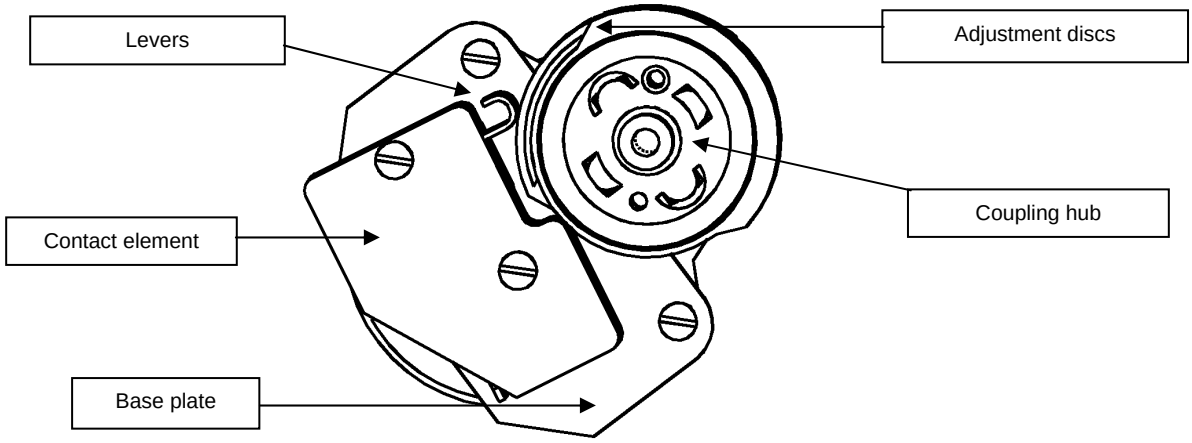
Ambient temperature : -10°C to +40°C
Protection class : IP55 as standard
Side pulling angle : 3 degrees maximum

Impact on the environment :

Sound level : 70 decibels

6.20 Description of Gear limit switch

It is situated into the electric panel of the hoist
Or into the subsidiary panel
Or behind the brake cover
and is adjusted in our works.
This device prevents the operation of torque limiter as upper and lower gear limit switch.
Less solicited, this device is subject to a reduced wear and less adjustment.



To modify this setting or to change it (after load chain replacement for example), proceed as follow :

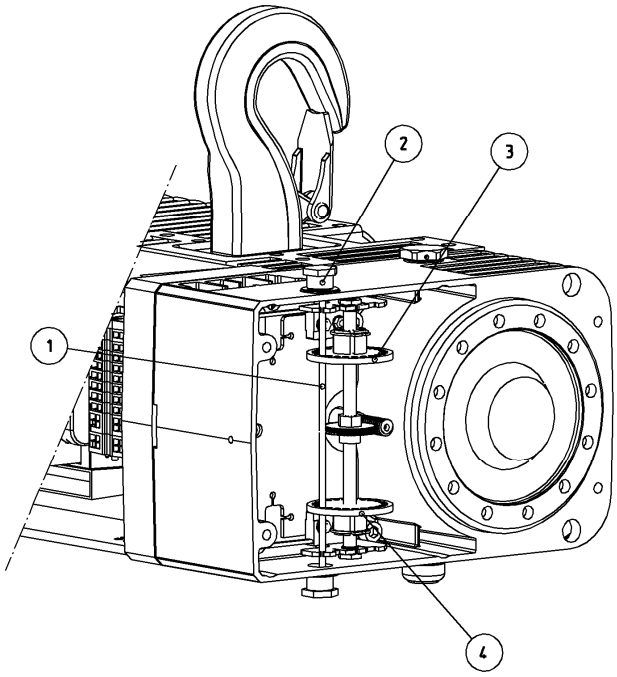
1. For upper limit switch : Move the external adjustment disc
2. For lower limit switch : Move the internal adjustment disc
3. Check the rotation direction of the disc by operating the hoist
4. Each disc includes two movable sectors independent from the other, one red, one grey

Move each of the two, red and grey, discs in the desired direction, keeping a gap of 10 mm between the two discs.(1). Control the limit switch operates in the good position. If not, readjust.
If your hoist is fitted with a chain bucket, you can adjust the upper limit switch so that the load does not touch the bucket.

(1) When lever is down, the hoist can move.
When lever is up, the hoist is stopped.

6.21 Description of the Gear limit switch (stepless)

It is located into the brake cover and is adjusted in our works.
This device limits the path of the hook.



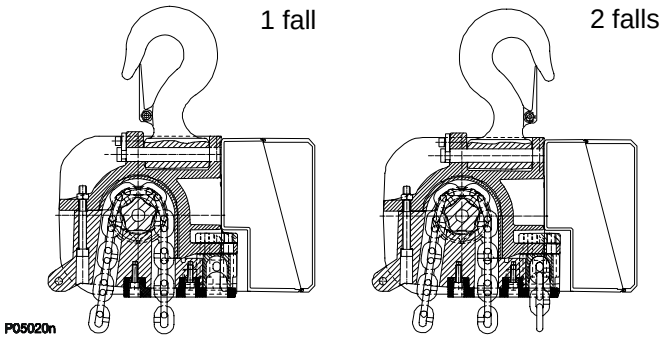
The setting is done as follow (after load chain replacement for example) :

1- Take off the cap of the upper part of the hoist
2- Remove the guiding bar (1)
3- For upper limit switch : Move the adjustment disc (4) (on the bottom side of the hoist)
4- For lower limit switch : Move the adjustment disc (3)
5- Put the guiding bar (1) back into the corresponding holes of the discs.
6- Check that the limit switches stop the direction at the desired positions
   If they don't, restart the adjustment from point 2.
7- Check that the hook or buffer doesn't touch the casing when stopping at high speed.
8- Put back the cap.

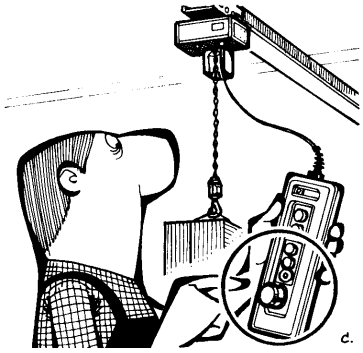
Note : Due to the deceleration ramp of the stepless speed control, the stopping position in high or low speed may vary.

7 Installation of hoist (3 phases)

The service life of the hoist depends on the way it is installed.
The instructions in this manual must be followed carefully for the installation, use and maintenance of the hoist.
Any use contrary to our instructions can be dangerous. In this case, the manufacturer will not accept any responsibility.
Do not use the hoist until this manual has been fully read and assimilated.
Always keep this manual near the hoist, available to the operator and the person in charge of maintenance.
Make sure that the safety rules are followed *(harness, clearance of work areas, posting up of instructions to be followed in the area...).*



Carry out :
The electrical connection
(refer to Electrical connection).
Fitting of the chain bucket
(refer to Chain bucket).
Check that the suspension hook is correctly positioned, depending on whether for 1 or 2 falls.
Check that the tightening torques of the hook blocks, locking plates and chain guide conform to the torques indicated in this manual *(refer to Screw tightening torques)*.
Check that the chain is not twisted.
Check that the slack fall stop is correctly attached in the chain bucket and that the fixed point and the 2-fall chain are correctly held.
Measure the dimension of the opening of the suspension hooks and the hook block. Note it for a follow-up.
Once these checks have been completed, proceed as follows (be ready to press the emergency stop button at all times).
Oil and start to run in the chain by a few movements without load.
Check, when not under load, that the movement of the hook corresponds to the direction of the arrows on the control box.
If not, invert 2 supply phases.
Check the operation of the brake: lift up a nominal load and then lower it.
Check the operation of the limit switch.
Carry out dynamic tests with +10% of the nominal load and static tests with +25% of the nominal load on your installation equipped with our hoist.



7.1 Electricity

Before any operation on the electric box, check that the hoist supply is disconnected.

An isolator switch should be installed at a maximum of 6 meters from the hoist.

7.1.1 Electrical connection

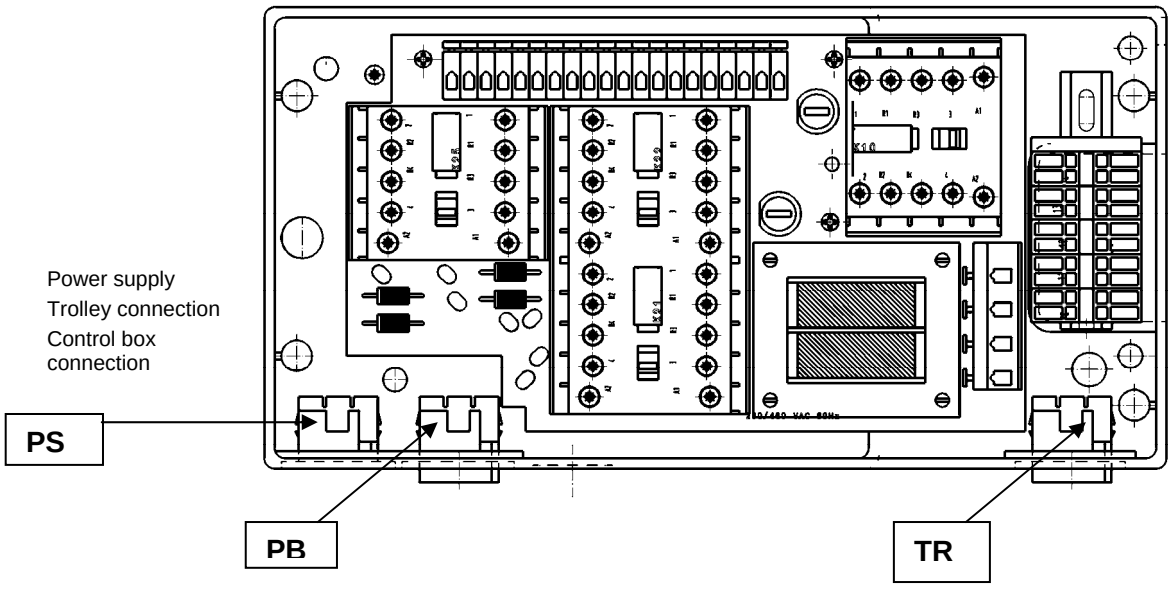
The customer must supply the power supply cable, the fuses and the main isolator switch (refer to the wiring diagram).
Check that the mains system is correct for the hoist.
Check that the voltage does not vary by more than ± 5% from the nominal value.
Neutralize the electric sources.
Make sure that the main hoist electric power switch is off.
Do not use binding posts (luster terminals, etc.) to connect the power supply cable to the hoist.
Do not use rigid cable or cable with a section different to that indicated below to supply the hoist.
Never shunt the isolators, the power switches or the limitation or prevention equipment.
Never block, adjust or remove the limit stops or switches to go higher or lower than these allow.

7.1.2 Connection :

- Remove the control box cover.
- Insert the cable (PS) into the box through the PG cable gland.
- Connect phases L1 - L2 - L3 to contactor K10 (1), and the ground wire to the terminal board (2).
- Check that the terminals are correctly tightened.
- Close the box.
- Check the hoist operation
  - Minimum cable sections :

Power supply :	1,50 mm2
Auxiliary current :	0,75 mm2
Control box/hoist :	1,00 mm2
Fuses (low voltage) :	See electric
power supply (*customer supply*) :	Drawing

PS : Power supply
TR : Trolley connection
PB : Control box connection



The electrical configuration can be different according to the specifications of the hoist. See electrical drawing

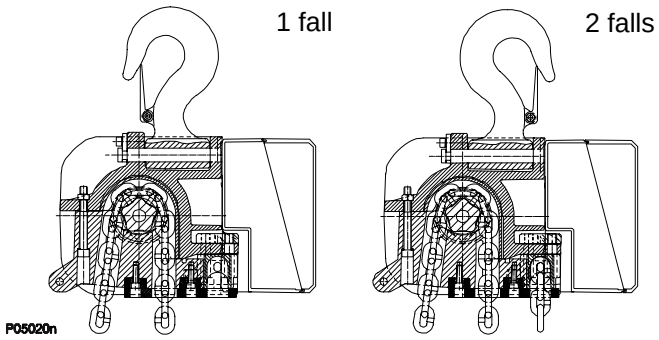
Do not change the travel direction labels in the control box or in the hoist internal wiring.

8 Installation of hoist – stepless (3 phases)

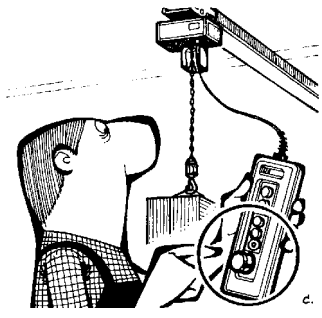
The service life of the hoist depends on the way it is installed.
The instructions in this manual must be followed carefully for the installation, use and maintenance of the hoist.
Any use contrary to our instructions can be dangerous. In this case, the manufacturer will not accept any responsibility.
Do not use the hoist until this manual has been fully read and assimilated.
Always keep this manual near the hoist, available to the operator and the person in charge of maintenance.
Make sure that the safety rules are followed *(harness, clearance of work areas, posting up of instructions to be followed in the area...).*

Install the breather on the upper part of the hoist.

Carry out :
The electrical connection
(refer to Electrical connection).
Fitting of the chain bucket
(refer to Chain bucket).
Check that the suspension hook is correctly positioned, depending on whether for 1 or 2 falls.
Check that the tightening torques of the hook blocks, locking plates and chain guide conform to the torques indicated in this manual *(refer to Screw tightening torques)*.
Check that the chain is not twisted.



Check that the slack fall stop is correctly attached in the chain bucket and that the fixed point and the 2-fall chain are correctly held.
Measure the dimension of the opening of the suspension hooks and the hook block. Note it for a follow-up.
Once these checks have been completed, proceed as follows (be ready to press the emergency stop button at all times).
Oil and start to run in the chain by a few movements without load.
Check, when not under load, that the movement of the hook corresponds to the direction of the arrows on the control box.
If not, invert 2 supply phases.
Check the operation of the brake: lift up a nominal load and then lower it.
Check the operation of the limit switch. Adjust it if needed. (See "Maintenance")
Carry out dynamic tests with +10% of the nominal load and static tests with +25% of the nominal load on your installation equipped with our hoist.



8.1 Electricity

Before any operation on the electric box, check that the hoist supply is disconnected.

An isolator switch should be installed at a maximum of 6 meters from the hoist.

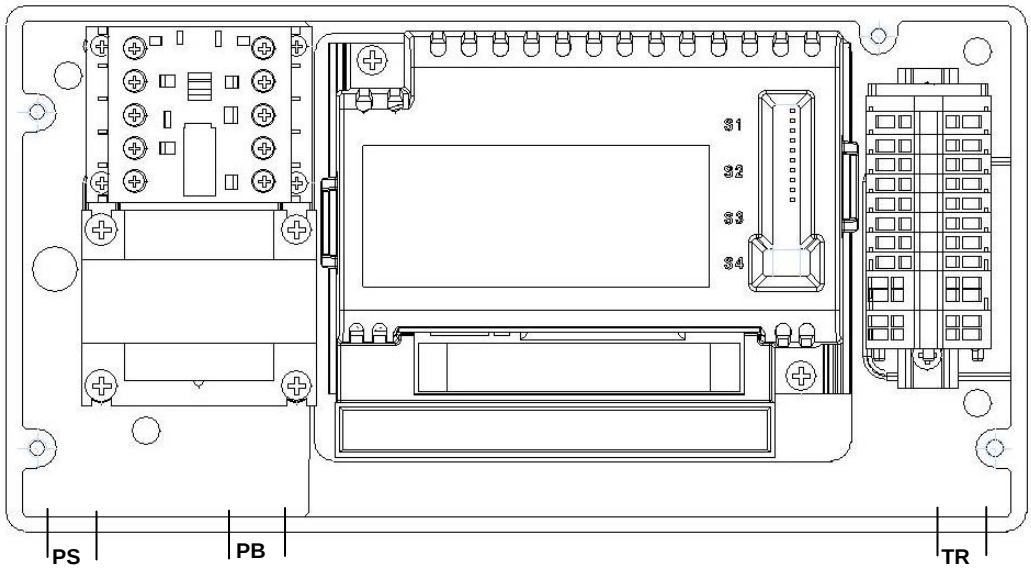
8.1.1 Electrical connection

The customer must supply the power supply cable, the fuses and the main isolator switch (refer to the wiring diagram).
Check that the mains system is correct for the hoist.
Check that the voltage does not vary by more than ± 5% from the nominal value.
Neutralize the electric sources.
Make sure that the main hoist electric power switch is off.
Do not use binding posts (luster terminals, etc.) to connect the power supply cable to the hoist.
Do not use rigid cable or cable with a section different to that indicated below to supply the hoist.
Never shunt the isolators, the power switches or the limitation or prevention equipment.
Never block, adjust or remove the limit stops or switches to go higher or lower than these allow.

8.1.2 Connection :

- - Connect phases L1 - L2 - L3 and the ground on the power supply plug.
- - Connect the plug on the cubicle. Don't forget to add the sealing join with screws
- - Check the hoist operation
- Minimum cable sections :

Power supply :	1,50 mm2
Auxiliary current :	0,75 mm2
Control box/hoist :	1,00 mm2
Fuses (low voltage) :	See electric
power supply (*customer supply*) :	Drawing



PS : Power supply - PB : Control box connection - TR : Trolley connection

☞ The electrical configuration can be different according to the specifications of the hoist. See electrical drawing

Do not change the travel direction labels in the control box or in the hoist internal wiring.

8.2 Lifting assembly

Only a genuine, manufacturer's chain may be used.

Never use the lifting chain as a sling.

Never twist the lifting chain.

Do not bundle the chain into the chain bucket.

Always keep the chain clean and oiled and check that it is in good condition every day.

8.2.1 Slack fall stop (in the chain bucket)

The slack fall stop is a safety component, not a functional one.

A correct length of chain is required to avoid using it.

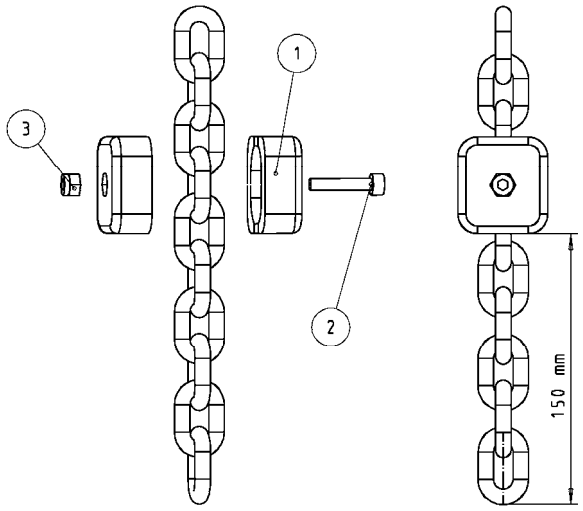
REMOVAL:

- Remove the nut.(3)
- Remove the screw.(2)
- Remove the two halves of the stop.(1)

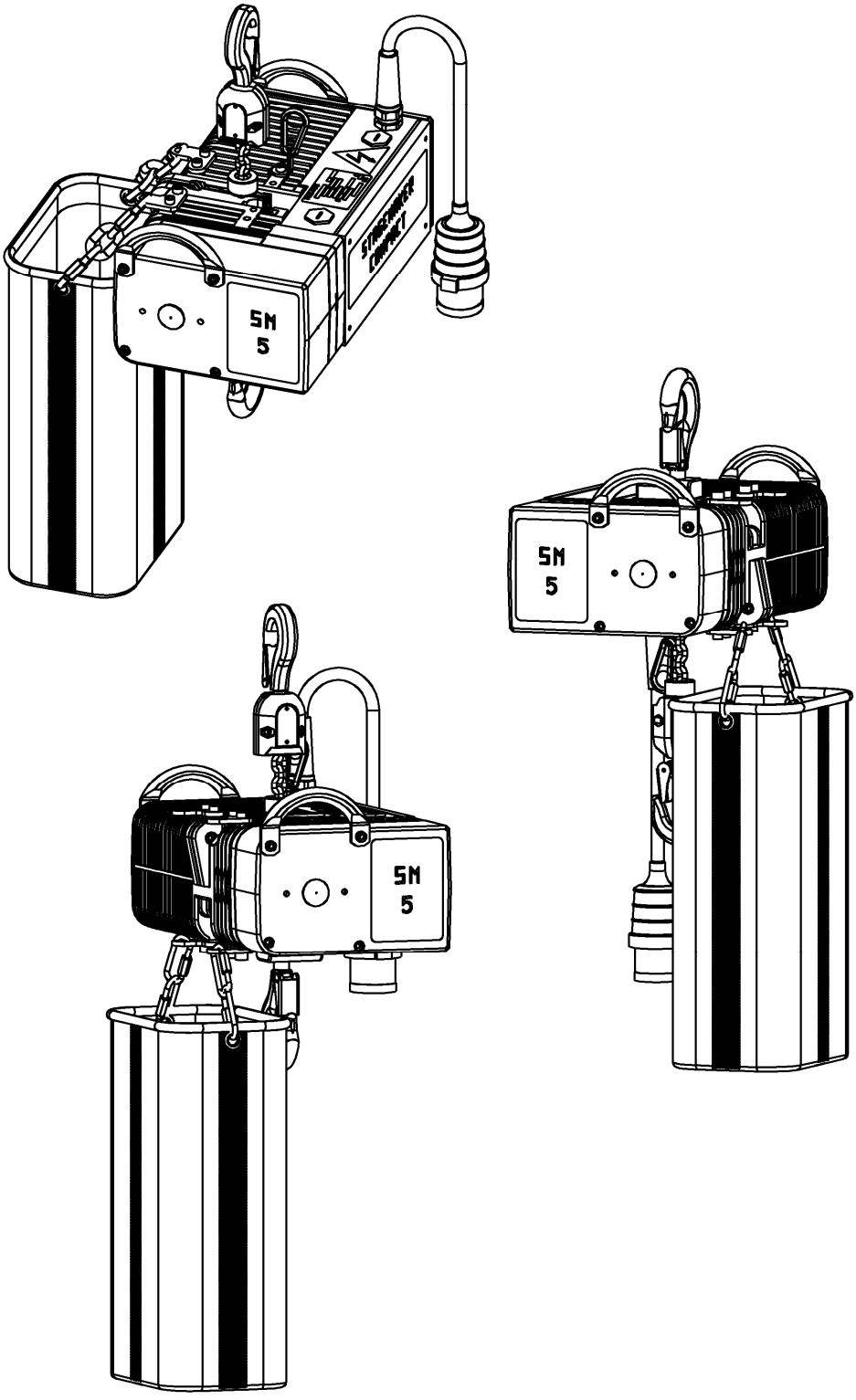
REPLACEMENT:

- Check that there is at least 150 mm of chain under the slack fall stop.
- Position the two halves of the stop around the chain.(1)
- Insert the screw and put the nut.(3)(2)

Make sure that the stop is correctly fitted. The locking tube should be turned towards the hoist.

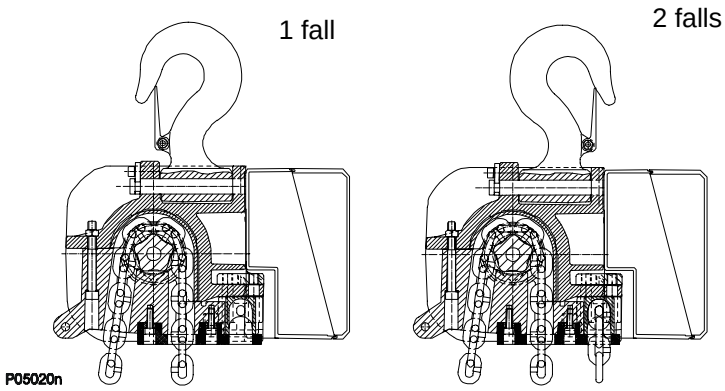


8.2.2 Chain bucket

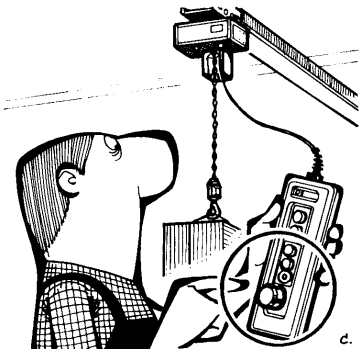


9 Installation of hoist (1 phase)

The service life of the hoist depends on the way it is installed.
The instructions in this manual must be followed carefully for the installation, use and maintenance of the hoist.
Any use contrary to our instructions can be dangerous. In this case, the manufacturer will not accept any responsibility.
Do not use the hoist until this manual has been fully read and assimilated.
Always keep this manual near the hoist, available to the operator and the person in charge of maintenance.
Make sure that the safety rules are followed *(harness, clearance of work areas, posting up of instructions to be followed in the area...).*
Carry out :
The electrical connection
(refer to Electrical connection).
Fitting of the chain bucket
(refer to Chain bucket).
Check that the suspension hook is correctly positioned, depending on whether for 1 or 2 falls.
Check that the tightening torques of the hook blocks, locking plates and chain guide conform to the torques indicated in this manual *(refer to Screw tightening torques)*.



Check that the chain is not twisted.
Check that the slack fall stop is correctly attached in the chain bucket and that the fixed point and the 2-fall chain are correctly held.
Measure the dimension of the opening of the suspension hooks and the hook block. Note it for a follow-up.
Once these checks have been completed, proceed as follows (be ready to press the emergency stop button at all times).
Oil and start to run in the chain by a few movements without load.
Check, when not under load, that the movement of the hook corresponds to the direction of the arrows on the control box.
If not, invert 2 supply phases.
Check the operation of the brake: lift up a nominal load and then lower it.
Check the operation of the limit switch.
Carry out dynamic tests with +10% of the nominal load and static tests
with +25% of the nominal load on your installation equipped with our hoist.



9.1 Electricity

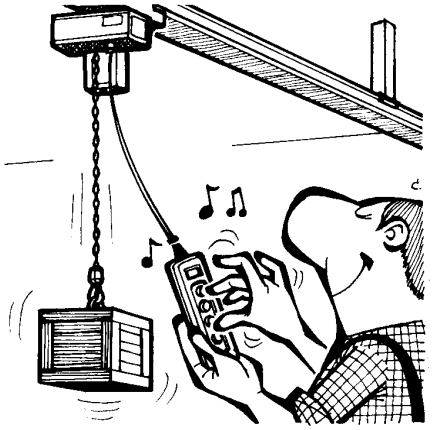
Before any operation on the electric box, check that the hoist supply is disconnected.

The single phase hoists are provided with capacitors. Before any operation in the electric box, please check that the capacitor is unloaded by means of a voltmeter in Vdc setting.

An isolator switch should be installed at a maximum of 6 meters from the hoist.

9.1.1 Electrical connection

The customer must supply the power supply cable, the fuses and the main isolator switch (refer to the wiring diagram).
Check that the mains system is correct for the hoist.
Check that the voltage does not vary by more than ± 5% from the nominal value.
Neutralize the electric sources.
Make sure that the main hoist electric power switch is off.
Do not use binding posts (luster terminals, etc.) to connect the power supply cable to the hoist.
Do not use rigid cable or cable with a section different to that indicated below to supply the hoist.
Never shunt the isolators, the power switches or the limitation or prevention equipment.
Never block, adjust or remove the limit stops or switches to go higher or lower than these allow.



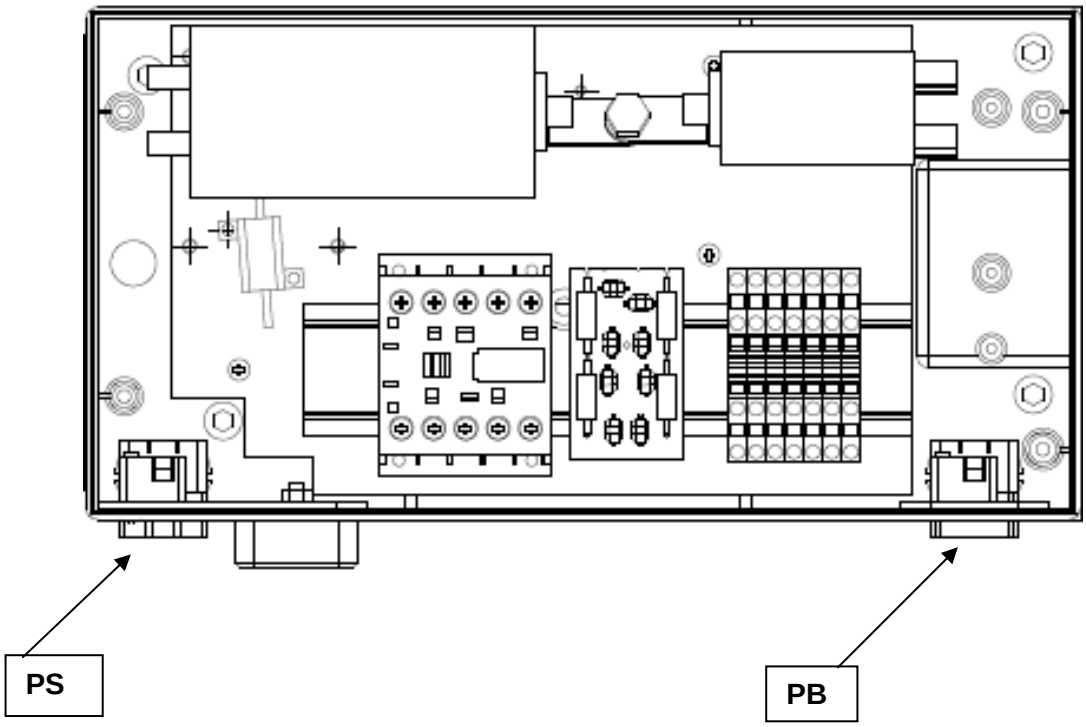
Do not use the controls needlessly (avoid inching-stop-start operation)

9.1.2 Connection :

- Remove the control box cover.
- Insert the cable (PS) into the box through the PG cable gland.
- In case of a power supply with 2 phases, connect L1 and L2 to the terminal 1 and 2. In case of power supply with 1 phase and neutral, connect N (neutral) to the terminal 1 and L2 to the terminal 2.
- Check that the terminals are correctly tightened.
- Close the box.
- Check the hoist operation

Minimum cable sections :

Power supply :	1,50 mm²
Control box/hoist :	1,00 mm²
Fuses (low voltage) :	See electric
power supply (*customer supply*) :	Drawing



PS : Power supply
PB : Control box connection

The electrical configuration can be different according to the specifications of the hoist. See electrical drawing

Do not change the travel direction labels in the control box or in the hoist internal wiring.

10 Maintenance – Replacement of hoist

10.1 Maintenance table

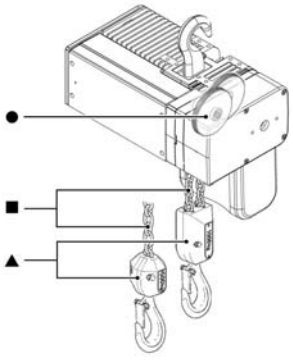
Check	Interval *	Qualification of the customer's personnel
Brake operation	Daily	Operator
Visual inspection of the chain	Daily	Operator
Suspension of the control box by the steel wire	Daily	Operator
Cleanness and lubrication of the chain	Monthly	Operator
Slipping clutch operation	Monthly	Operator
End limit switches operation	Every 3 months	Operator
Measuring of the wear on the chain	Every 3 months	Operator
Measuring of the wear on the hooks	Annually	Qualified mechanic
Tightening of the hook block screws	Every 3 months	Operator
Visual checking of hook and hook bottle	Every 3 months	Operator
Checking of the locking plate screws	Annually	Operator
Checking of the tightness of the brake screws	Annually	Qualified mechanic
Lubrication of the idler sprocket	Annually	Operator
Checking of the screw tightening torques and checking for signs of corrosion	Annually	Qualified mechanic
Adjustment of the slipping clutch and brake	Annually	Qualified mechanic
Lubrication of the gears	Lubricated for life	

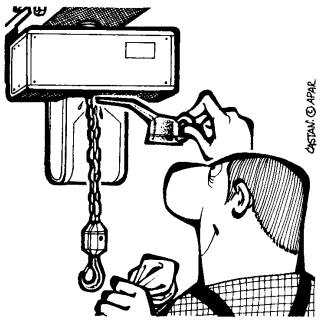
*** These intervals should be shortened depending on national regulations**

These intervals should be shortened if the hoist is used a lot, if it is used with maximum loads or in difficult ambient conditions.

10.2 Lubricants

Lubrication point	Specifications	Possible brands	Quantity
Chain ■	Oil or liquid grease	Chain lubricating fluid (Ceplattyn or similar)	As required
Idler sprocket ▲ slide bearing + bearing	Grease (**without MoS2**) KP 2 (DIN 51 502) Soap-based lithium Approx. drip point + 260°C Worked penetration 265 - 295° Operating temperature - 20°C à + 130°C	**Aral** : Aralub FK 2 **BP** : BP Energrease LS - EP 2 **Esso** : Unirex N2 **Mobil** : Mobilgrease HP **Shell** : Shell Alvanio EP Grease 2 **DEA** : Paragon EP 2 **Fuchs** : Renolit Duraplex EP 2	As required
Gears ●		**Mobil :** MOBILITH SHC 460	7,5 cl

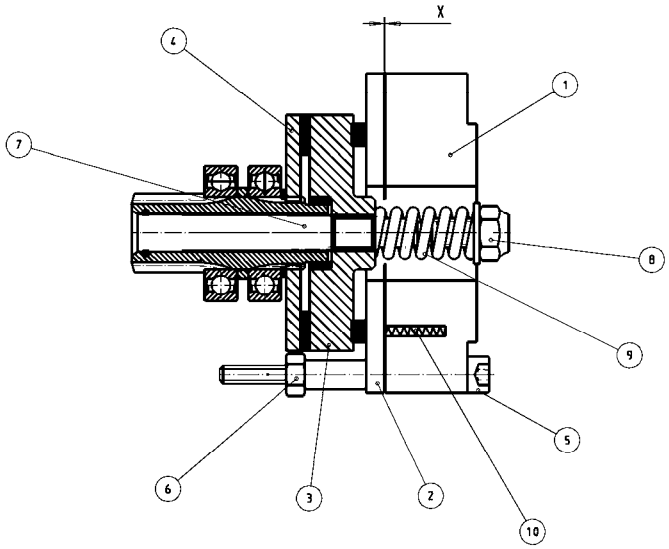




Oil the chain regularly

10.3 Brake/slipping clutch assembly

10.3.1 Operation



The parts of slipping clutch are mounted free on the gear input shaft (1). Other brake parts are mounted on the gear flange.
The spring (9) keeps a pressure between the slipping clutch lining (4) and brake disc (3).
The nut (8) maintains the assembly on the gear input shaft.
When the coil (1) is energized, during lifting or lowering, it pulls the brake disk (3) *(releasing the brake and slipping clutch disc (3) there is a play X for this purpose).*
The disks (3 and 4) turn freely, transmitting the movement to the pinion (7).
Braking occurs when the coil is no longer energized and the spring (10) drives back the brake lining against the disk (3).

10.3.2 Adjustment of the slipping clutch:

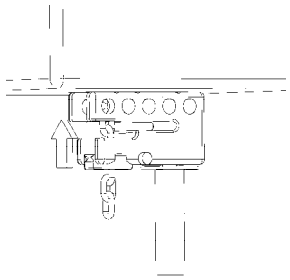
- Hook a load of 1.25 times the nominal load into the hoist.
  Note : The machined adjustment value is 1,4 x the nominal load, because the linings are not run in
- Remove the brake endcap and the sealing.
- Raise the load at slow and fast speed.
- Use a key to turn the adjusting nut (8) in the required direction.
  – Turn the nut clockwise to increase the torque.
  – Turn the nut counterclockwise to decrease the torque.
- Repeat steps 3 and 4 until the load can barely be lifted at fast speed. The slipping clutch is now adjusted.
- Fit the sealing and the brake endcap.
- Check, at fast speed, the lifting of a nominal load.

☞ Remind : The value of the factory setting is 1,4 x the nominal load because friction lining are not running in yet.

That when the slipping clutch is adjusted the brake end cap must be removed and the motor <u>must not</u> be running.

Do no touch the moving components. Before pressing the "lift" button on the control box, check that there is nothing in contact with the adjusting nut *(key, for example).*

To adjust the slipping clutch, it is recommended to use the chain force measuring device. Nevertheless, it is possible to use loads.



10.3.3 Adjustment of the brake

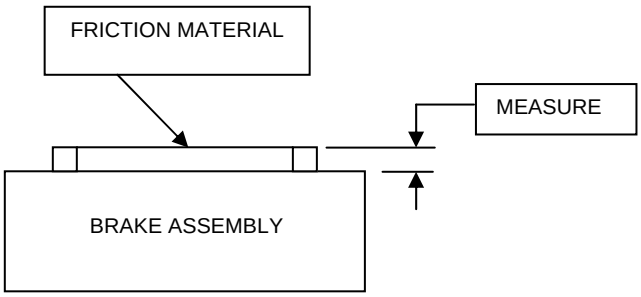
- Before starting the adjustment, remove the load and switch off the power supply.
- Remove the brake endcap and the sealing.
- Use feeler gauge to measure the air gap (**X**) between the brake disk (2) and the electromagnet at at least three points around the electromagnet.
- To ajust the brake :
  - Unscrew one of the locking screw (5).
  - Adjust the air gap by turning the adjusting screw (6) counterclockwise to reduce the airgap, clockwise to increase it.
  - Tightens the locking screw (5).
  - Make the same operation with the 2 other adjustment points.
  - Control the air gap adjustment all around the magnet.
- Check the operation of the brake
- Fit the sealing and the brake endcap

Brake air gap	Minimum air gap (mm)	Maximum air gap (mm)
Between brake disk (2) and coil (1)	X = 0.20	X = 0.50

☞ To replace the brake/slipping clutch assembly, the electromagnet supply wires inside the electric box must first of all be disconnected.

10.4 Thickness of brake lining

Thickness as new	Replace when
9,4 mm	**8,4 mm**



10.5 Chain

10.5.1 Removal of the chain

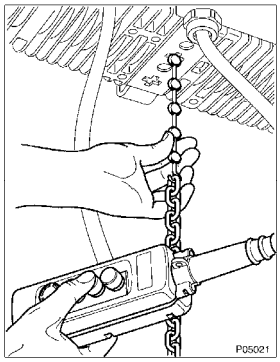
1-fall chain :

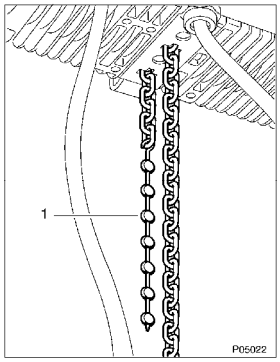
- Remove the load from the hook.
- Disassemble the hook block.

- Lower the chain into the chain bucket.
- Remove the chain bucket and unscrew and remove the lower chain guide.

2-fall chain :

- Raise the hook block to about 30 cm from the hoist body.
- Remove the chain bucket.
- Carefully remove the lower chain guide.
- Disassemble the fixed point of the chain.
- Remove the 2-fall hook block, without disassembling it, letting the chain run through it.
- Let the rest of the chain slide through the chain sprocket.





10.5.2 Replacement of the chain

The chain should always be fitted using the flexible plastic insertion tool (1). Use of this tool always ensures that the chain is fitted correctly.

Don't forget to put the rubber rings around the chain when changing it.

The metallic ring must be oriented towards the hoist body.

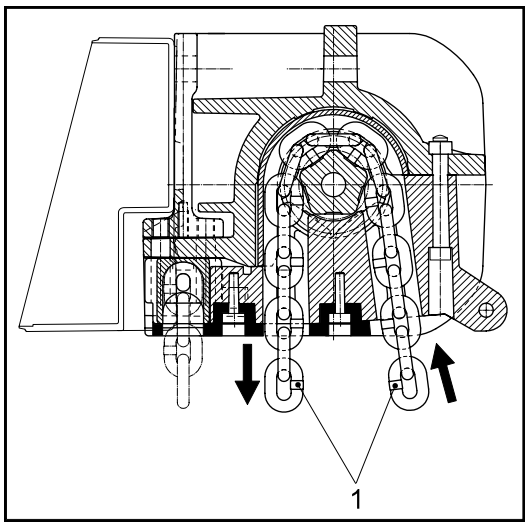
1-fall chain :

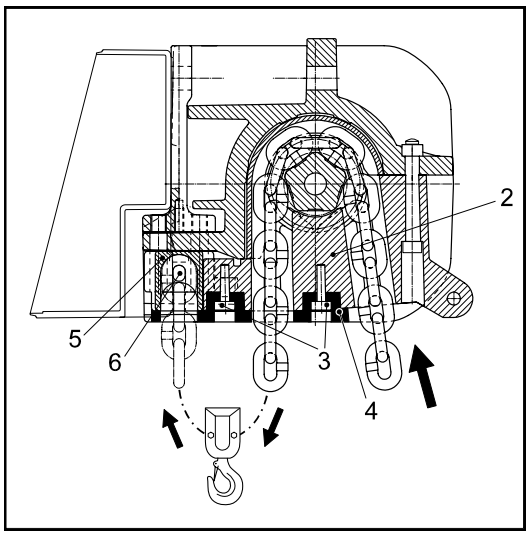
Insert the last link in the small plastic hook of the insertion tool.

- Insert the other side of the tool in the sprocket, chain bucket side.
- Raise the chain at slow speed so that the tool and the chain come out the other side of the sprocket.

2-fall chain :

- Insert the last link in the small plastic hook of the insertion tool.
- Insert the other side of the tool in the sprocket, chain bucket side.
- Raise the chain at slow speed so that the tool and the chain come out the other side of the sprocket. Continue until about 50 cm of chain are visible.
- Put the chain through the idler sprocket, taking care not to twist the chain
- Carefully remove the chain anchor (5) removing the 4 screws. Take out the pin (6).
- Insert the end of the chain into the hole of the chain anchor.
- Insert the pin (6) into the hole of the chain anchor.
- Insert the chain anchor and tighten the 4 screws (torque 20 Nm).





10.5.3 Measuring the wear on the chain

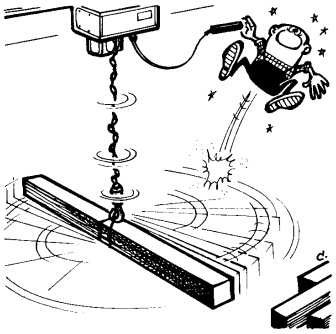
This should be done by measuring the dimensions, at several points of the chain, of one link (d) and (t), and over 11 links (11 t).
Maximum wear allowed :

Minimum link thickness allowed (d) :	4.30 mm
Maximum pitch allowed (t) :	13.10 mm
Maximum length allowed (11 t) :	140.25 mm

☞ If these limits are exceeded**, the chain must be replaced immediately**. In this case, the wear on the guide chain and chain sprocket should also be checked and they should be replaced if necessary.

☞ If a single link is defective in any way whatsoever, **the chain must be replaced**

✋ **A repetitive stop and start at the same point of the chain will create a more important wear on the 2-3 links which are in the chain sprocket**



Never twist the lifting chains
(turning around of the hook block)

10.6 Suspension hook

Removal :

- Remove the screw and the locking plate.
- Remove the two pins.Take the hook out.

Replacement :

- Put the hook into its housing.
- Place the two pins inside the hook
- Fit the screw and the locking plate without forgetting the safety washer.

☞ The hook should be set depending on 1/1 and 2/1 revings.

10.6.1 Measurement of the wear on the suspension and lifting hooks

The wear on the suspension and lifting hooks should be checked regularly. Damage safety catches should be replaced immediately.
Bottom hook (see hook certificate) :
If the maximum dimension (**a2**) on the lifting hook is greater than the initial dimension by more than 15% , the hook should be replaced.

Class :	012	025
a2, max. allowed :	23 mm	30 mm

Top hook :

maximum allowed for the throat opening(dimension 32.5 mm) : 37mm
Please change your hook if the dimension is upper than 37 mm

10.7 Spare parts replacement table

Further to a long storage time or during annual service, check the function and the setting of the safety devices (brake, end limit switch, slipping clutch…).If any component is deformed, or if abnormal wear is noticed, the pieces must be changed.

Disconnect the power supply before replacing any parts.

Spare part	To be replaced by	Qualification of the personnel
Upper chain guide	Authorized manufacturer personnel	Qualified electrician
Output shaft	Authorized manufacturer personnel	Qualified electrician
PG cable gland	Authorized manufacturer personnel	Qualified electrician
Gear input shaft + adjusting nuts	Authorized manufacturer personnel	Qualified mechanic
Motor endcap	Authorized manufacturer personnel	Qualified mechanic
Gearing (1st/2nd stage)	Authorized manufacturer personnel	Qualified electrician
Brake cap/endcap sealing	Customer	Qualified mechanic
Other sealings and O-rings	Authorized manufacturer personnel	Qualified mechanic
Brake-slipping clutch	Authorized manufacturer personnel	Qualified electrician
Brake endcap	Customer	Qualified mechanic
Lower chain guide	Customer	Qualified mechanic
Rubber buffer	Customer	Qualified mechanic
Electric box	Authorized manufacturer personnel	Qualified electrician
PC-board	Authorized manufacturer personnel	Qualified electrician
Plugs	Customer	Qualified electrician
Chain	Customer	Qualified mechanic
Chain bucket	Customer	Qualified mechanic
Slack fall stop	Customer	Qualified mechanic
Suspension hook	Customer	Qualified mechanic
Hook block (1/1; 2/1)	Customer	Qualified mechanic
Control box	Customer	Qualified electrician

Once a part has been replaced, check the operation of the hoist.

10.8 Screw tightening torques (Nm)

	M5	M6	M8	M10	M12
Standard screws	6	10	24	48	83
Self-tapping screws	5	8	20	40	72

10.9 Discarding the hoist

Once the hoist has been used for the FEM class duration, all of the components must be checked by an authorized agent or by the manufacturer. The hoist should no longer be used, *unless agreement is obtained from the authorized agent or the manufacturer*.

Remove all greases and oils from the hoist before discarding it.

11 Maintenance – Replacement of hoist (inverter →250kg)

11.1 Maintenance table

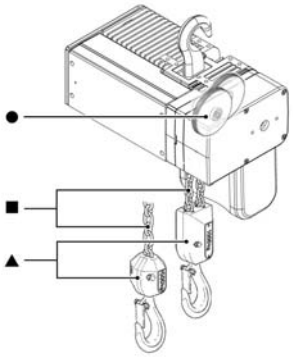
Check	Interval *	Qualification of the customer's personnel
Brake operation	Daily	Operator
Visual inspection of the chain	Daily	Operator
Suspension of the control box by the steel wire	Daily	Operator
Cleanness and lubrication of the chain	Monthly	Operator
Slipping clutch operation	Monthly	Operator
End limit switches operation	Every 3 months	Operator
Measuring of the wear on the chain	Every 3 months	Operator
Measuring of the wear on the hooks	Annually	Qualified mechanic
Tightening of the hook block screws	Every 3 months	Operator
Visual checking of hook and hook bottle	Every 3 months	Operator
Checking of the locking plate screws	Annually	Operator
Checking of the tightness of the brake screws	Annually	Qualified mechanic
Lubrication of the idler sprocket	Annually	Operator
Checking of the screw tightening torques and checking for signs of corrosion	Annually	Qualified mechanic
Adjustment of the slipping clutch and brake	Annually	Qualified mechanic
Lubrication of the gears	Lubricated for life	

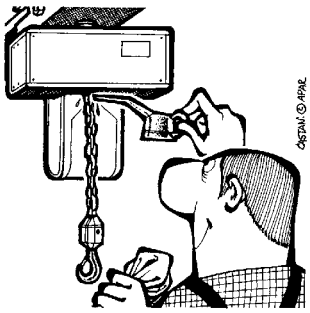
*** These intervals should be shortened depending on national regulations**

These intervals should be shortened if the hoist is used a lot, if it is used with maximum loads or in difficult ambient conditions.

11.2 Lubricants

Lubrication point	Specifications	Possible brands	Quantity
Chain ■	Oil or liquid grease	Chain lubricating fluid (Ceplattyn or similar)	As required
Idler sprocket ▲ slide bearing + bearing	Grease (**without MoS2**) KP 2 (DIN 51 502) Soap-based lithium Approx. drip point + 260°C Worked penetration 265 - 295° Operating temperature - 20°C à + 130°C	**Aral** : Aralub FK 2 **BP** : BP Energrease LS - EP 2 **Esso** : Unirex N2 **Mobil** : Mobilgrease HP **Shell** : Shell Alvanio EP Grease 2 **DEA** : Paragon EP 2 **Fuchs** : Renolit Duraplex EP 2	As required
Gears ●		**Shell** : Transaxle Oil 75W-90	0,6 L

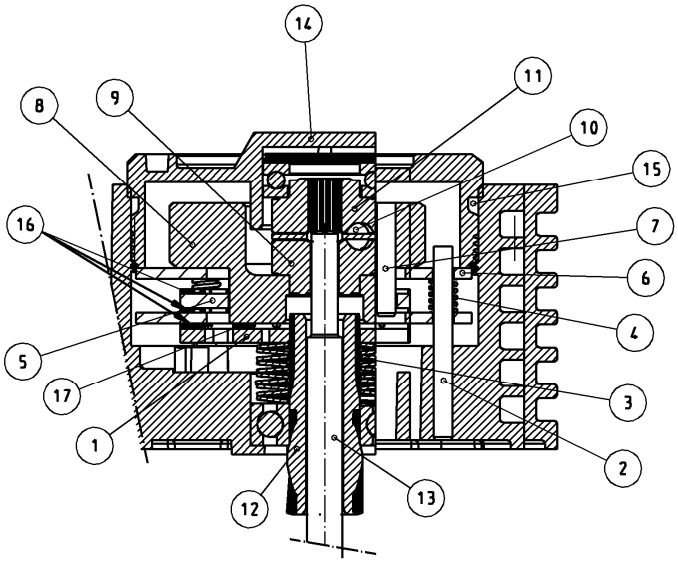




Oil the chain regularly

11.3 Brake/slipping clutch assembly

11.3.1 Operation



Static situation with a load suspended
The torque load is transmitted to brake thru the pinion (12). The brake linings are compressing the anchor discs (3 and 6) due to the force of the springs (4).

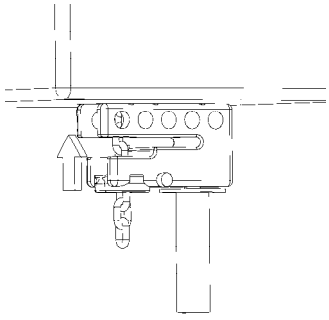
Hoisting movement
The load is creating a counter torque on the gear shaft (12) compared to the motor torque on the shaft (13). Due to that torque, the cam system (9, 10, 11) is opening by compressing the springs (4). When the cam system opens, it releases the brake discs (1 and 5) which can rotate freely from the anchor discs (3 and 6) which are connected to the frame by the pins (2). The flywheel (8) is transmitting the motor torque to the brake disc (1) thru the clutch lining (17). The gearbox is then driven by that brake disc (1) thru the pinion (12).
If an overload occurs while hoisting, the clutch lining (17) slides and the load is not lifted.

Lowering movement
The load torque and the motor torque on the brake are in the same direction. Still, when the motor is powered, the cam system is slightly opened due to the inertia in the flywheel (8) until there is a balance between the load torque and the motor torque. The load is then lowered at the motor speed been kept under the control of the friction of the brake linings (16) and the anchor disc (3 and 6). The heat generated is dissipated in the oil bath.

11.3.2 Adjustment of the slipping clutch :

The brake and the clutch torque are connected to each other. This is due to the fact that the brake lining (16) diameter is twice the clutch lining diameter (17) and that they are activated thru the same spring (4). Then, only a clutch setting is required and no brake setting is afterwards needed.
The clutch is set by tightening or loosening the cover (14) to increase or decrease the hoisting capacity. The clutch setting tool should be connected to the chain to adjust the slipping clutch.
To adjust the slipping clutch, see the documentation of the chain force measuring device.
Value = 625 in case of 1 fall and 1250 in case of 2 falls.

To adjust the slipping clutch, it is recommended to use the chain force measuring device.



11.4 Chain

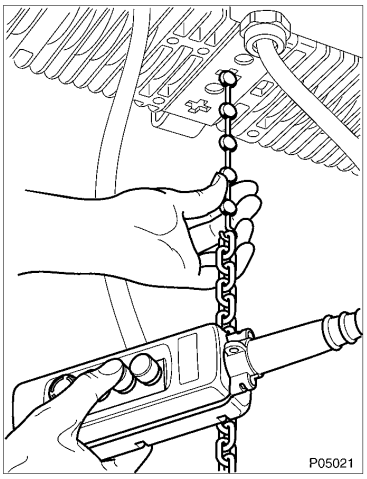
11.4.1 Removal of the chain

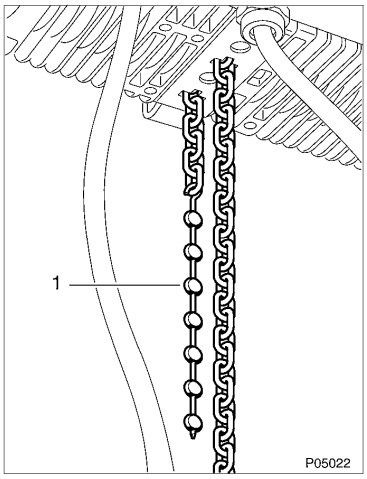
1-fall chain :

- Remove the load from the hook.
- Disassemble the hook block.
- Lower the chain into the chain bucket.
- Remove the chain bucket and unscrew and remove the lower chain guide.

2-fall chain :

- Raise the hook block to about 30 cm from the hoist body.
- Remove the chain bucket.
- Carefully remove the lower chain guide.
- Disassemble the fixed point of the chain.
- Remove the 2-fall hook block, without disassembling it, letting the chain run through it.
- Let the rest of the chain slide through the chain sprocket.





11.4.2 Replacement of the chain

The chain should always be fitted using the flexible plastic insertion tool (1). Use of this tool always ensures that the chain is fitted correctly.

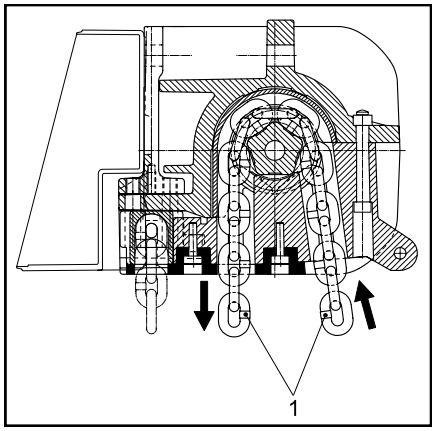
Don't forget to put the rubber rings around the chain when changing it.

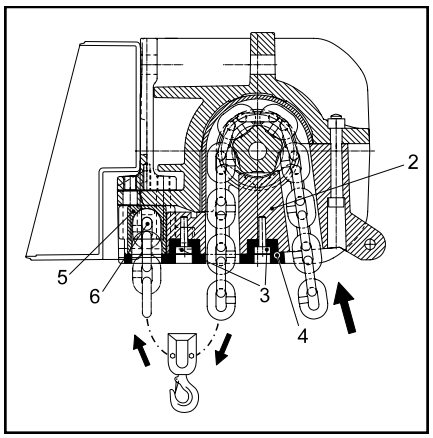
The metallic ring must be oriented towards the hoist body.

1-fall chain :

Insert the last link in the small plastic hook of the insertion tool.

- Insert the other side of the tool in the sprocket, chain bucket side.
- Raise the chain at slow speed so that the tool and the chain come out the other side of the sprocket.





2-fall chain :

- Insert the last link in the small plastic hook of the insertion tool.
- Insert the other side of the tool in the sprocket, chain bucket side.
- Raise the chain at slow speed so that the tool and the chain come out the other side of the sprocket. Continue until about 50 cm of chain are visible.
- Put the chain through the idler sprocket, taking care not to twist the chain
- Carefully remove the chain anchor (5) removing the 4 screws. Take out the pin (6).
- Insert the end of the chain into the hole of the chain anchor.
- Insert the pin (6) into the hole of the chain anchor.
- Insert the chain anchor and tighten the 4 screws (torque 20 Nm).

11.4.3 Measuring the wear on the chain

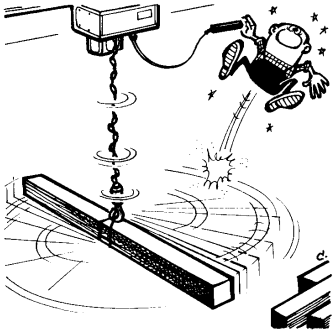
This should be done by measuring the dimensions, at several points of the chain, of one link (d) and (t), and over 11 links (11 t).
Maximum wear allowed :

Minimum link thickness allowed (d) :	4.30 mm
Maximum pitch allowed (t) :	13.10 mm
Maximum length allowed (11 t) :	140.25 mm

☞ If these limits are exceeded**, the chain must be replaced immediately**. In this case, the wear on the guide chain and chain sprocket should also be checked and they should be replaced if necessary.

☞ If a single link is defective in any way whatsoever, **the chain must be replaced**

✋ **A repetitive stop and start at the same point of the chain will create a more important wear on the 2-3 links which are in the chain sprocket**



Never twist the lifting chains
(turning around of the hook block)

11.5 Suspension hook

Removal :

- Remove the screw and the locking plate.
- Remove the two pins.Take the hook out.

Replacement :

- Put the hook into its housing.
- Place the two pins inside the hook
- Fit the screw and the locking plate without forgetting the safety washer.

☞ The hook should be set depending on 1/1 and 2/1 revings.

11.5.1 Measurement of the wear on the suspension and lifting hooks

The wear on the suspension and lifting hooks should be checked regularly. Damage safety catches should be replaced immediately.

Bottom hook (see hook certificate) :

If the maximum dimension (**a2**) on the lifting hook is greater than the initial dimension by more than 15% , the hook should be replaced.

Class :	012	025
a2, max. allowed :	23 mm	30 mm

Top hook :

maximum allowed for the throat opening(dimension 32.5 mm) : 37mm

Please change your hook if the dimension is upper than 37 mm

11.6 Spare parts replacement table

Further to a long storage time or during annual service, check the function and the setting of the safety devices (brake, end limit switch, slipping clutch…).If any component is deformed, or if abnormal wear is noticed, the pieces must be changed.

Disconnect the power supply before replacing any parts.

Spare part	To be replaced by	Qualification of the personnel
Upper chain guide	Authorized manufacturer personnel	Qualified electrician
Output shaft	Authorized manufacturer personnel	Qualified electrician
PG cable gland	Authorized manufacturer personnel	Qualified electrician
Gear input shaft + adjusting nuts	Authorized manufacturer personnel	Qualified mechanic
Motor endcap	Authorized manufacturer personnel	Qualified mechanic
Gearing (1st/2nd stage)	Authorized manufacturer personnel	Qualified electrician
Brake cap/endcap sealing	Customer	Qualified mechanic
Other sealings and O-rings	Authorized manufacturer personnel	Qualified mechanic
Brake-slipping clutch	Authorized manufacturer personnel	Qualified electrician
Brake endcap	Customer	Qualified mechanic
Lower chain guide	Customer	Qualified mechanic
Rubber buffer	Customer	Qualified mechanic
Electric box	Authorized manufacturer personnel	Qualified electrician
Inverter	Authorized manufacturer personnel	Qualified electrician
Plugs	Customer	Qualified electrician
Chain	Customer	Qualified mechanic
Chain bucket	Customer	Qualified mechanic
Slack fall stop	Customer	Qualified mechanic
Suspension hook	Customer	Qualified mechanic
Hook block (1/1; 2/1)	Customer	Qualified mechanic
Control box	Customer	Qualified electrician

Once a part has been replaced, check the operation of the hoist.

11.7 Screw tightening torques (Nm)

	M5	M6	M8	M10	M12
Standard screws	6	10	24	48	83
Self-tapping screws	5	8	20	40	72

11.8 Discarding the hoist

Once the hoist has been used for the FEM class duration, all of the components must be checked by an authorized agent or by the manufacturer. The hoist should no longer be used, *unless agreement is obtained from the authorized agent or the manufacturer*.

Remove all greases and oils from the hoist before discarding it.

12 Maintenance – Replacement of hoist (inverter)

(500kg & +)

12.1 Maintenance table

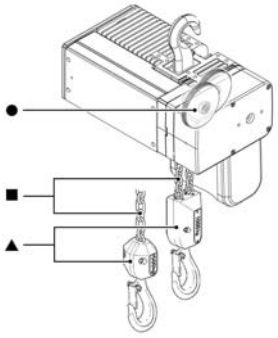
Check	Interval *	Qualification of the customer's personnel
Brake operation	Daily	Operator
Visual inspection of the chain	Daily	Operator
Suspension of the control box by the steel wire	Daily	Operator
Cleanness and lubrication of the chain	Monthly	Operator
Slipping clutch operation	Monthly	Operator
End limit switches operation	Every 3 months	Operator
Measuring of the wear on the chain	Every 3 months	Operator
Measuring of the wear on the hooks	Annually	Qualified mechanic
Tightening of the hook block screws	Every 3 months	Operator
Visual checking of hook and hook bottle	Every 3 months	Operator
Checking of the locking plate screws	Annually	Operator
Checking of the tightness of the brake screws	Annually	Qualified mechanic
Lubrication of the idler sprocket	Annually	Operator
Checking of the screw tightening torques and checking for signs of corrosion	Annually	Qualified mechanic
Adjustment of the slipping clutch and brake	Annually	Qualified mechanic
Lubrication of the gears	Lubricated for life	

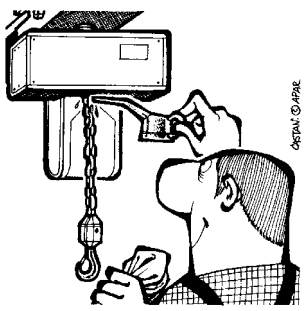
*** These intervals should be shortened depending on national regulations**

These intervals should be shortened if the hoist is used a lot, if it is used with maximum loads or in difficult ambient conditions.

12.2 Lubricants

Lubrication point	Specifications	Possible brands	Quantity
Chain ■	Oil or liquid grease	Chain lubricating fluid (Ceplattyn or similar)	As required
Idler sprocket ▲ slide bearing + bearing	Grease (**without MoS2**) KP 2 (DIN 51 502) Soap-based lithium Approx. drip point + 260°C Worked penetration 265 - 295° Operating temperature - 20°C à + 130°C	**Aral** : Aralub FK 2 **BP** : BP Energrease LS - EP 2 **Esso** : Unirex N2 **Mobil** : Mobilgrease HP **Shell** : Shell Alvanio EP Grease 2 **DEA** : Paragon EP 2 **Fuchs** : Renolit Duraplex EP 2	As required
Gears ●		**Shell** : Transaxle Oil 75W-90	0,6 L

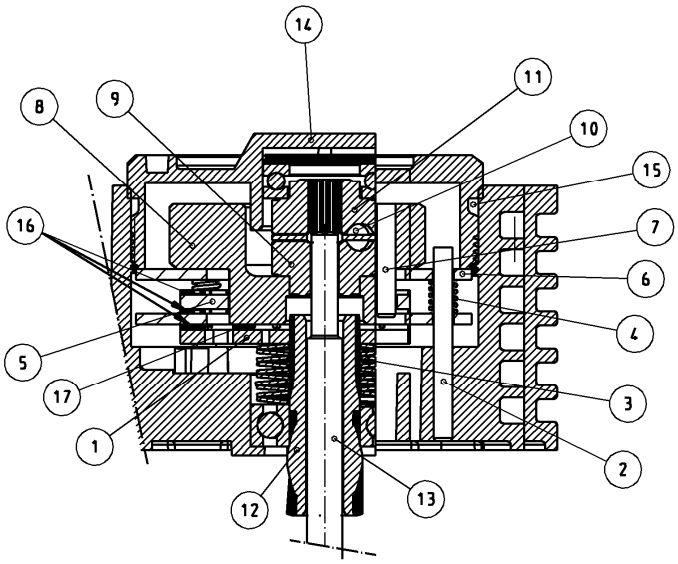




Oil the chain regularly

12.3 Brake/slipping clutch assembly

12.3.1 Operation



Static situation with a load suspended
The torque load is transmitted to brake thru the pinion (12). The brake linings are compressing the anchor discs (3 and 6) due to the force of the springs (4).

Hoisting movement
The load is creating a counter torque on the gear shaft (12) compared to the motor torque on the shaft (13). Due to that torque, the cam system (9, 10, 11) is opening by compressing the springs (4). When the cam system opens, it releases the brake discs (1 and 5) which can rotate freely from the anchor discs (3 and 6) which are connected to the frame by the pins (2). The flywheel (8) is transmitting the motor torque to the brake disc (1) thru the clutch lining (17). The gearbox is then driven by that brake disc (1) thru the pinion (12).
If an overload occurs while hoisting, the clutch lining (17) slides and the load is not lifted.

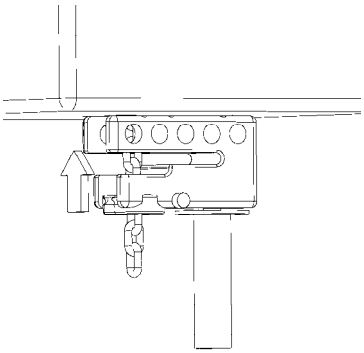
Lowering movement
The load torque and the motor torque on the brake are in the same direction. Still, when the motor is powered, the cam system is slightly opened due to the inertia in the flywheel (8) until there is a balance between the load torque and the motor torque. The load is then lowered at the motor speed been kept under the control of the friction of the brake linings (16) and the anchor disc (3 and 6). The heat generated is dissipated in the oil bath.

12.3.2 Adjustment of the slipping clutch :

The brake and the clutch torque are connected to each other. This is due to the fact that the brake lining (16) diameter is twice the clutch lining diameter (17) and that they are activated thru the same spring (4). Then, only a clutch setting is required and no brake setting is afterwards needed.
The clutch is set by tightening or loosening the cover (14) to increase or decrease the hoisting capacity. The clutch setting tool should be connected to the chain. The clutch should then be adjusted at a level of 125% of the nominal load of the hoist.

☞ Remind : The value of the factory setting is 1,4 x the nominal load because friction lining are not running in yet.

☞ In case of adjustment of 250 kg 1 fall or 500 kg 2 falls, the slipping clutch will be adjusted at 250 % of the nominal load. According to the chain force measuring device documentation : 625 for 1 fall and 1250 for 2 falls



To adjust the slipping clutch, it is recommended to use the chain force measuring device. Nevertheless, it is possible to use loads.

12.4 Chain

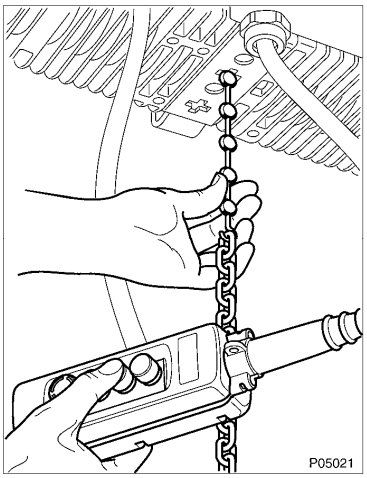
12.4.1 Removal of the chain

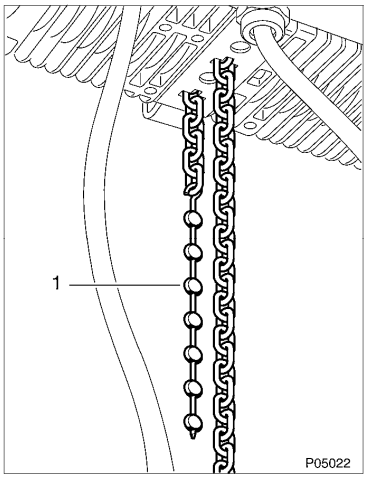
1-fall chain :

- Remove the load from the hook.
- Disassemble the hook block.
- Lower the chain into the chain bucket.
- Remove the chain bucket and unscrew and remove the lower chain guide.

2-fall chain :

- Raise the hook block to about 30 cm from the hoist body.
- Remove the chain bucket.
- Carefully remove the lower chain guide.
- Disassemble the fixed point of the chain.
- Remove the 2-fall hook block, without disassembling it, letting the chain run through it.
- Let the rest of the chain slide through the chain sprocket.





12.4.2 Replacement of the chain

The chain should always be fitted using the flexible plastic insertion tool (1). Use of this tool always ensures that the chain is fitted correctly.

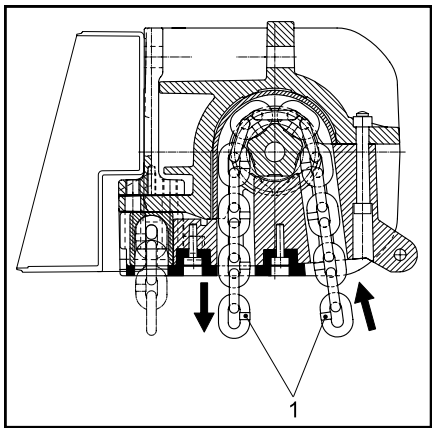
Don't forget to put the rubber rings around the chain when changing it.

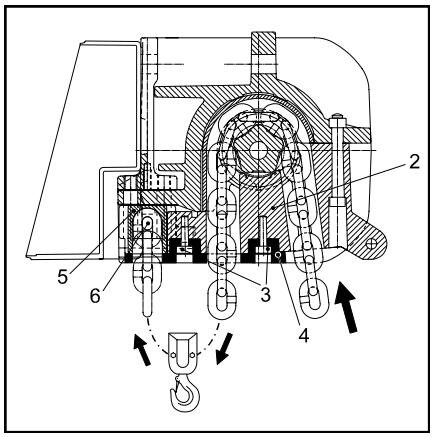
The metallic ring must be oriented towards the hoist body.

1-fall chain :

Insert the last link in the small plastic hook of the insertion tool.

- Insert the other side of the tool in the sprocket, chain bucket side.
- Raise the chain at slow speed so that the tool and the chain come out the other side of the sprocket.





2-fall chain :

- Insert the last link in the small plastic hook of the insertion tool.
- Insert the other side of the tool in the sprocket, chain bucket side.
- Raise the chain at slow speed so that the tool and the chain come out the other side of the sprocket. Continue until about 50 cm of chain are visible.
- Put the chain through the idler sprocket, taking care not to twist the chain
- Carefully remove the chain anchor (5) removing the 4 screws. Take out the pin (6).
- Insert the end of the chain into the hole of the chain anchor.
- Insert the pin (6) into the hole of the chain anchor.
- Insert the chain anchor and tighten the 4 screws (torque 20 Nm).

12.4.3 Measuring the wear on the chain

This should be done by measuring the dimensions, at several points of the chain, of one link (d) and (t), and over 11 links (11 t).

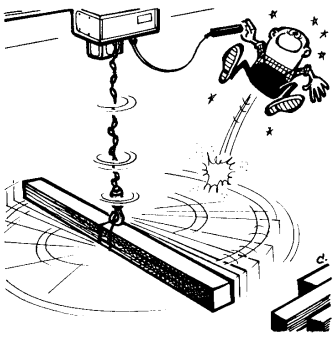
Maximum wear allowed :

Minimum link thickness allowed (d) :	4.30 mm
Maximum pitch allowed (t) :	13.10 mm
Maximum length allowed (11 t) :	140.25 mm

☞ If these limits are exceeded**, the chain must be replaced immediately**. In this case, the wear on the guide chain and chain sprocket should also be checked and they should be replaced if necessary.

☞ If a single link is defective in any way whatsoever, **the chain must be replaced**

✋ **A repetitive stop and start at the same point of the chain will create a more important wear on the 2-3 links which are in the chain sprocket**



Never twist the lifting chains (turning around of the hook block)

12.5 Suspension hook

Removal :

- Remove the screw and the locking plate.
- Remove the two pins.Take the hook out.

Replacement :

- Put the hook into its housing.
- Place the two pins inside the hook
- Fit the screw and the locking plate without forgetting the safety washer.

☞ The hook should be set depending on 1/1 and 2/1 revings.

12.5.1 Measurement of the wear on the suspension and lifting hooks

The wear on the suspension and lifting hooks should be checked regularly. Damage safety catches should be replaced immediately.

Bottom hook (see hook certificate) :

If the maximum dimension (**a2**) on the lifting hook is greater than the initial dimension by more than 15% , the hook should be replaced.

Class :	012	025
a2, max. allowed :	23 mm	30 mm

Top hook :

maximum allowed for the throat opening(dimension 32.5 mm) : 37mm

Please change your hook if the dimension is upper than 37 mm

12.6 Spare parts replacement table

Further to a long storage time or during annual service, check the function and the setting of the safety devices (brake, end limit switch, slipping clutch…).If any component is deformed, or if abnormal wear is noticed, the pieces must be changed.

Disconnect the power supply before replacing any parts.

Spare part	To be replaced by	Qualification of the personnel
Upper chain guide	Authorized manufacturer personnel	Qualified electrician
Output shaft	Authorized manufacturer personnel	Qualified electrician
PG cable gland	Authorized manufacturer personnel	Qualified electrician
Gear input shaft + adjusting nuts	Authorized manufacturer personnel	Qualified mechanic
Motor endcap	Authorized manufacturer personnel	Qualified mechanic
Gearing (1st/2nd stage)	Authorized manufacturer personnel	Qualified electrician
Brake cap/endcap sealing	Customer	Qualified mechanic
Other sealings and O-rings	Authorized manufacturer personnel	Qualified mechanic
Brake-slipping clutch	Authorized manufacturer personnel	Qualified electrician
Brake endcap	Customer	Qualified mechanic
Lower chain guide	Customer	Qualified mechanic
Rubber buffer	Customer	Qualified mechanic
Electric box	Authorized manufacturer personnel	Qualified electrician
Inverter	Authorized manufacturer personnel	Qualified electrician
Plugs	Customer	Qualified electrician
Chain	Customer	Qualified mechanic
Chain bucket	Customer	Qualified mechanic
Slack fall stop	Customer	Qualified mechanic
Suspension hook	Customer	Qualified mechanic
Hook block (1/1; 2/1)	Customer	Qualified mechanic
Control box	Customer	Qualified electrician

Once a part has been replaced, check the operation of the hoist.

12.7 Screw tightening torques (Nm)

	M5	M6	M8	M10	M12
Standard screws	6	10	24	48	83
Self-tapping screws	5	8	20	40	72

12.8 Discarding the hoist

Once the hoist has been used for the FEM class duration, all of the components must be checked by an authorized agent or by the manufacturer. The hoist should no longer be used, *unless agreement is obtained from the authorized agent or the manufacturer*.

☞ Remove all greases and oils from the hoist before discarding it.

13– Troubleshooting (3 phases)

Problem	Cause	Solution
The chain hoist does not work	• The emergency stop button is activated	• Desactivate it
	• Triggered fuse	• Replace the fuse
	• Temperature control *(optional)* activated	• Allow to cool down
	• Contactor terminal screws loose	• Tighten them
	• Main switch is off	• Turn it on
Impossible to lift the load	• Overload	• Reduce the load
	• Slipping clutch worn or incorrectly adjusted	• Adjust or replace it
Braking path of more than 10 cm	• Brake lining worn	• Adjust the brake and replace the brake components if necessary
The travel direction does not correspond to that indicated on the control box	• The power supply is incorrectly connected	• Change two phases of the power supply
Abnormal noises while the load is being moved	• The chain components are not lubricated	• Lubricate the components
	• Chain is worn	• Replace it
	• Sprocket or chain guide is worn	• Replace the sprocket or chain guide
	• Idler sprocket is worn	• Replace it
	• A supply phase is missing	• Check the connection of the 3 phases

14– Troubleshooting (1 phase)

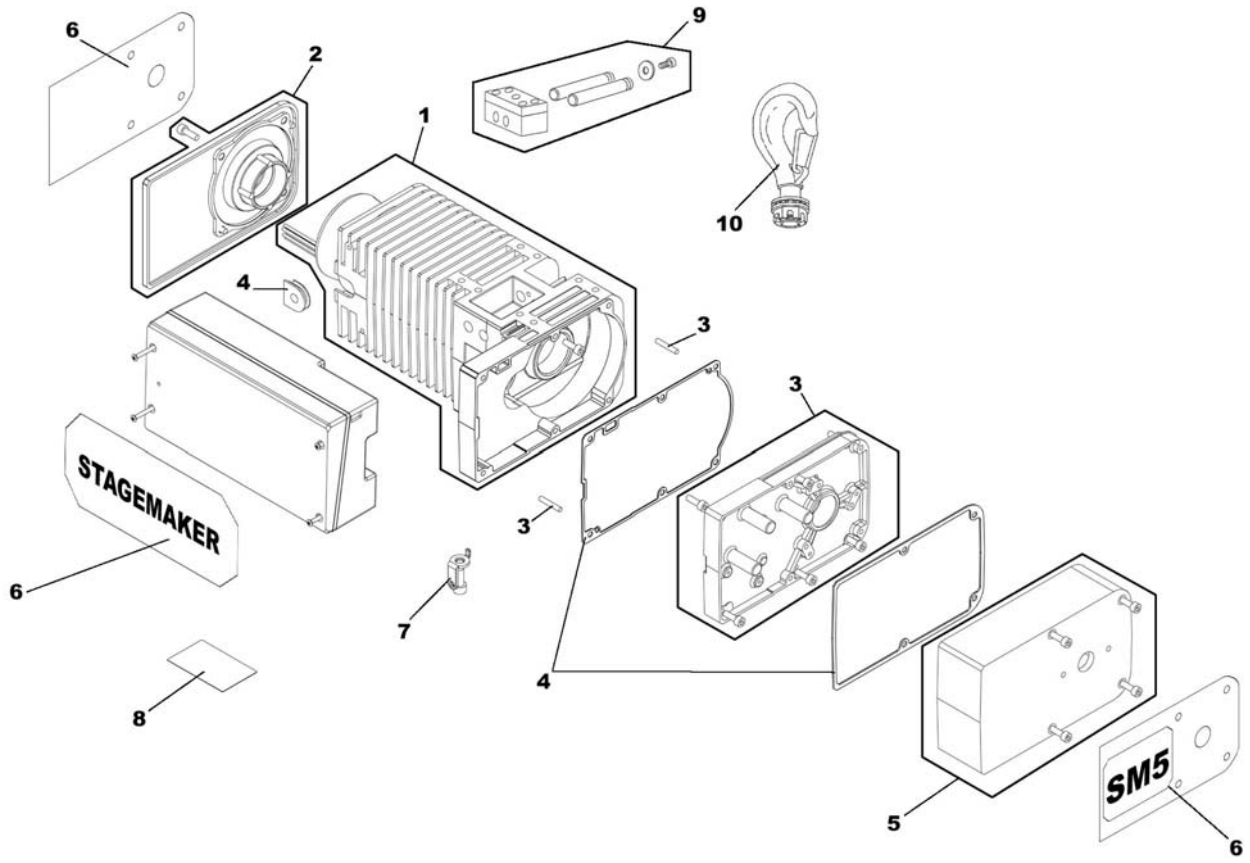
Problem	Cause	Solution
The chain hoist does not work	• The emergency stop button is activated	• Deactivate it
	• Triggered fuse	• Replace the fuse
	• Temperature control *(optional)* activated	• Allow to cool down
	• Contactor terminal screws loose	• Tighten them
	• Main switch is off	• Turn it on
Impossible to lift the load	• Overload	• Reduce the load
	• Slipping clutch worn or incorrectly adjusted	• Adjust or replace it
Braking path of more than 10 cm	• Brake lining worn	• Adjust the brake and replace the brake components if necessary
The travel direction does not correspond to that indicated on the control box	• The motor is incorrectly connected	• Invert the connection of the wire U2 and V2 in the box
Abnormal noises while the load is being moved	• The chain components are not lubricated	• Lubricate the components
	• Chain is worn	• Replace it
	• Sprocket or chain guide is worn	• Replace the sprocket or chain guide
	• Idler sprocket is worn	• Replace it
	• A supply phase is missing	• Check the connection of the 3 phases

15– Troubleshooting (stepless)

Problem	Cause	Solution
The chain hoist does not work The motor does not work	• The emergency stop button is activated	• Deactivate it
	• Triggered fuse	• Replace the fuse
	• Temperature control activated	• Allow to cool down
	• Contactor terminal screws loose	• Tighten them
	• Inverter terminal is badly fixed	• Press on the terminal
	• Main switch is off	• Turn it on
Impossible to lift the load	• Overload	• Reduce the load
	• Slipping clutch worn or incorrectly adjusted	• Adjust or replace it
	• Upper limit switch is activated	• Adjust it
Braking distance longer than 10 cm during an emergency stop	• Brake lining worn	• Adjust the brake Slipping clutch and replace the brake Slipping clutch components if necessary
Slow down distance is too long	• Wrong Inverter setting	• Adjust slow down at inverter level
The direction does not correspond to that indicated on the pendant	• Connections of the pendant are not correct	• Change wiring of pendant
Abnormal noises while the load is being moved	• The chain components are not lubricated	• Lubricate the components
	• Chain is worn	• Replace it
	• Sprocket or chain guide is worn	• Replace the sprocket or chain guide
	• Idler sprocket is worn	• Replace it
	• A supply phase is missing	• Check the connection of the 3 phases

16- Illustrated catalogue

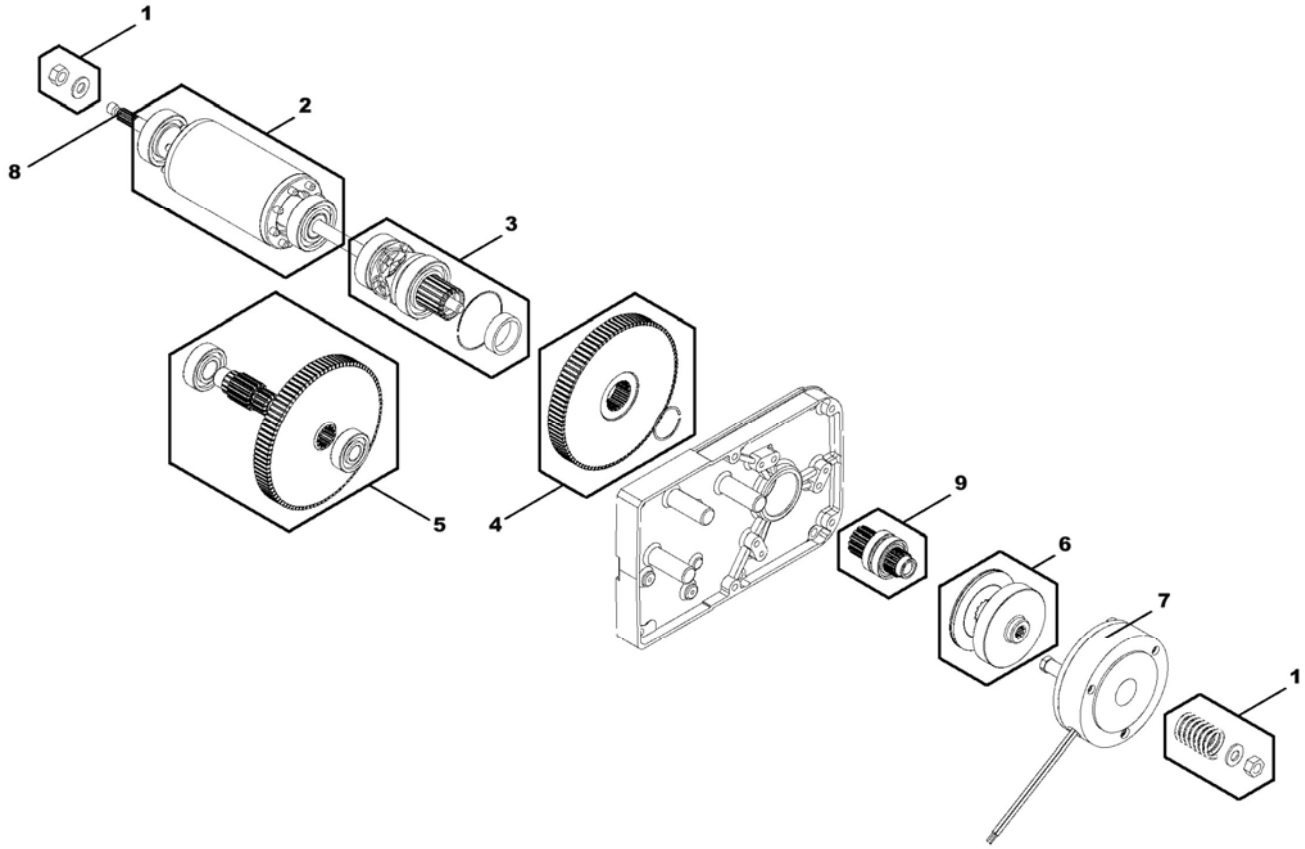
16.1 Casings



Pos	Qty	Code	Description
1	1	52308696	Casing assembled with stator 400V/50Hz3PH.2&8P
1	1	52308697	Casing assembled with stator 230V/50Hz3PH.2&8P
1	1	52308698	Casing assembled with stator 400V/60Hz3PH.2&8P
1	1	52308699	Casing assembled with stator 230V/60Hz3PH.2&8P
1	1	52308700	Casing assembled with stator 500V/50Hz3PH.2&8P
1	1	52391642	Casing assembled with stator 400V/50HzBIM.2&8P
1	1	52308702	Casing assembled with stator 230V/50HzBIM.2&8P
1	1	52308703	Casing assembled with stator 230V/60HzBIM.2&8P
1	1	52308704	Casing assembled with stator 500V/50HzBIM.2&8P
1	1	52308705	Casing assembled with stator 400V/50Hz3PH.4P
1	1	52308706	Casing assembled with stator 230V/50Hz3PH.4P
1	1	52391643	Casing assembled with stator 400V/50HzBIM.4P
1	1	52308708	Casing assembled with stator 500V/50HzBIM.4P
1	1	52308709	Casing assembled with stator 230V/460V60HzBIM.2P

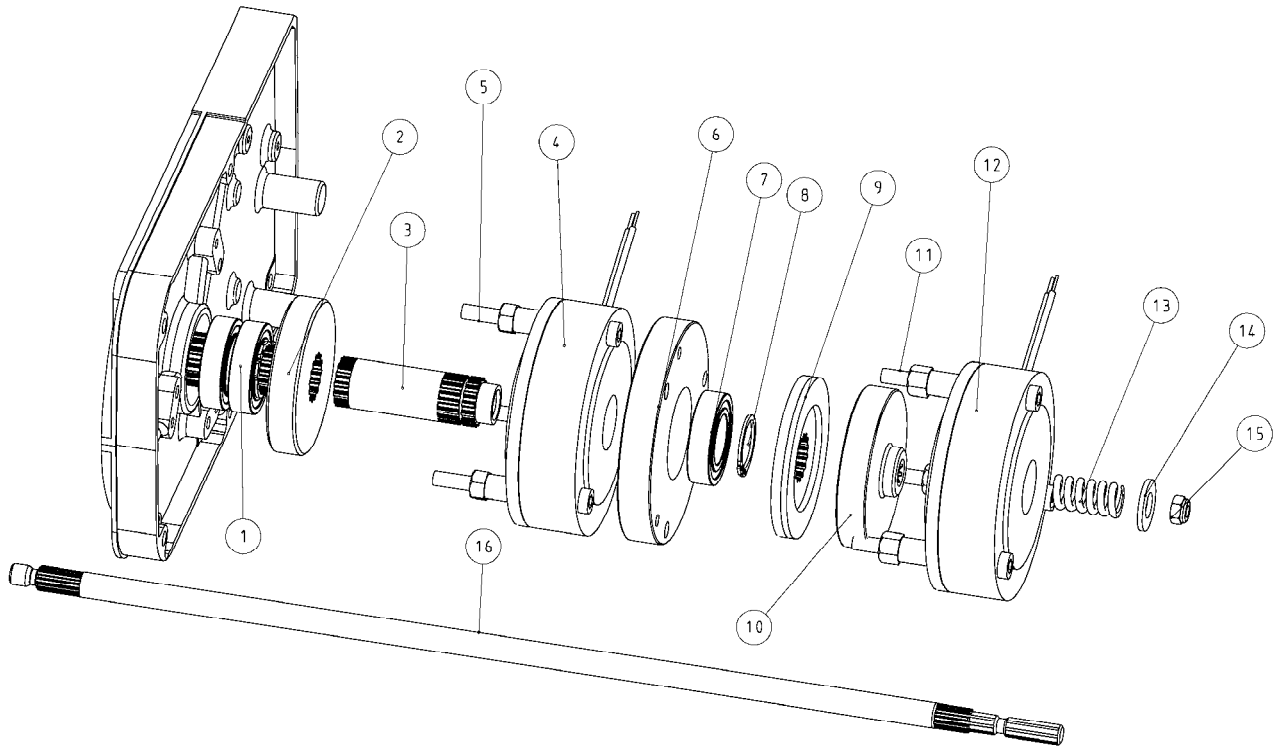
1	1	52308710	Casing assembled with stator 230V/400V60HzBIM.4P
2	1	52308741	Motor flange assy
3	1	52308742	Gear cover set
4	1	52308768	Set of sealings
5	1	52308747	Brake cover set
6	1	52311213	Stickers set for SM5
7	1	2218000	Push button station fixing point
8	1	2219918	Set of load plate 250 Kg (set of 10)
8	1	2219920	Set of load plate 500 Kg (set of 10)
8	1	2219922	Set of load plate 1000 Kg (set of 10)
9	1	52311221	Rotating hook base set
10	1	2217004	Rotating hook
10	1	2217005	Suspension hook (Standard SM5)
-	1	52308744	Caps set
-	1	2212017	Safety catch – steel plate type
	2	52320470	Rotating handle

16.2 Mechanism / brake (3 phases)



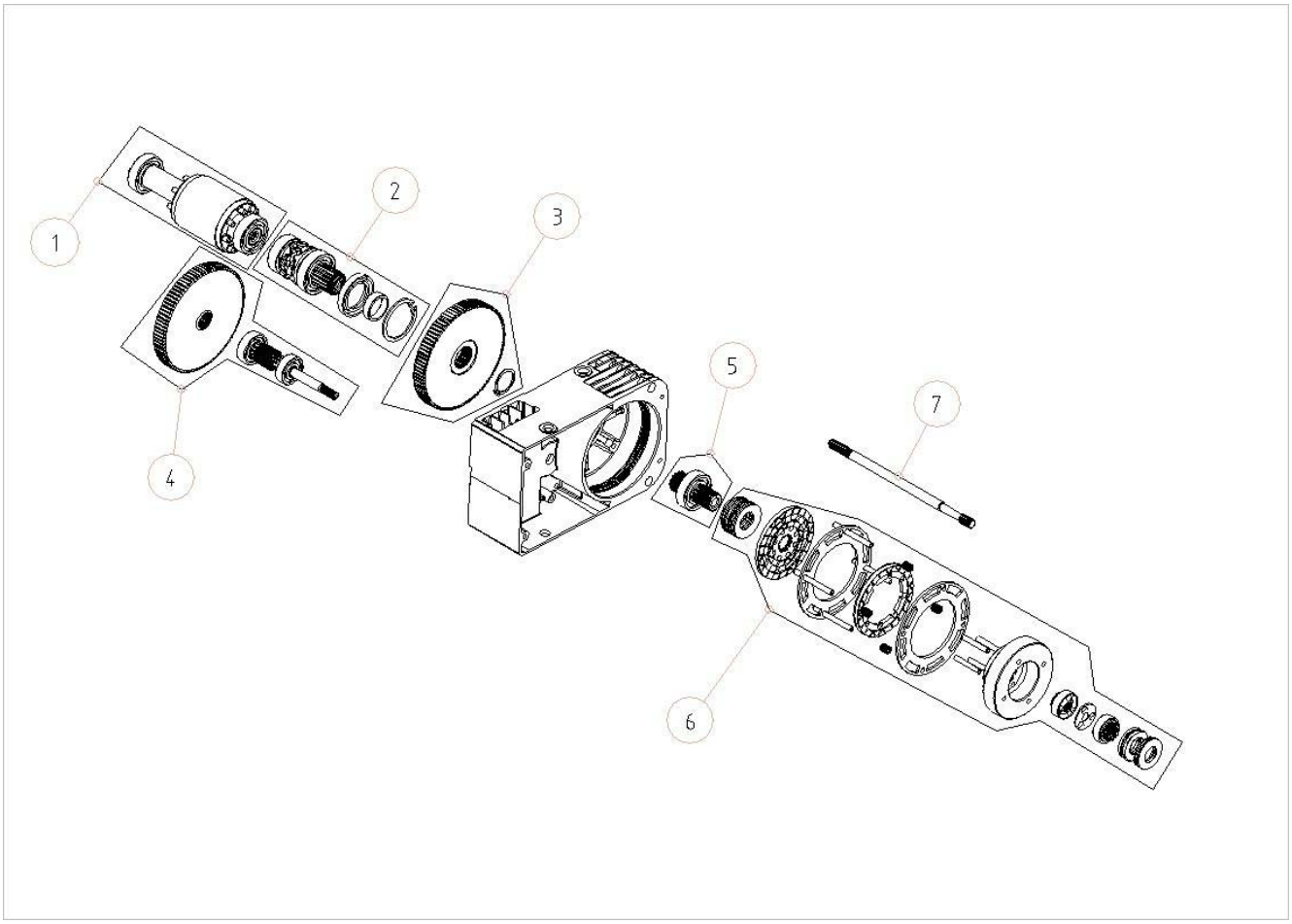
Pos	Qty	Code	Description
1	1	2211016	Slipping clutch spring set
2	1	52305652	Rotor Assembly
3	1	52305659	Chain sprocket assembly
4	1	52305473	Gear wheel set
5	1	52308771	Gear assembly
6	1	52308772	Slipping clutch set
7	1	52305489	Brake 190V/400V
7	1	52305488	Brake 100V/230V
7	1	52305490	Brake 230V/500V-575V
8	1	52305461	Motor shaft
9	1	52305658	Pinion set

16.3 Double Brake Mechanism



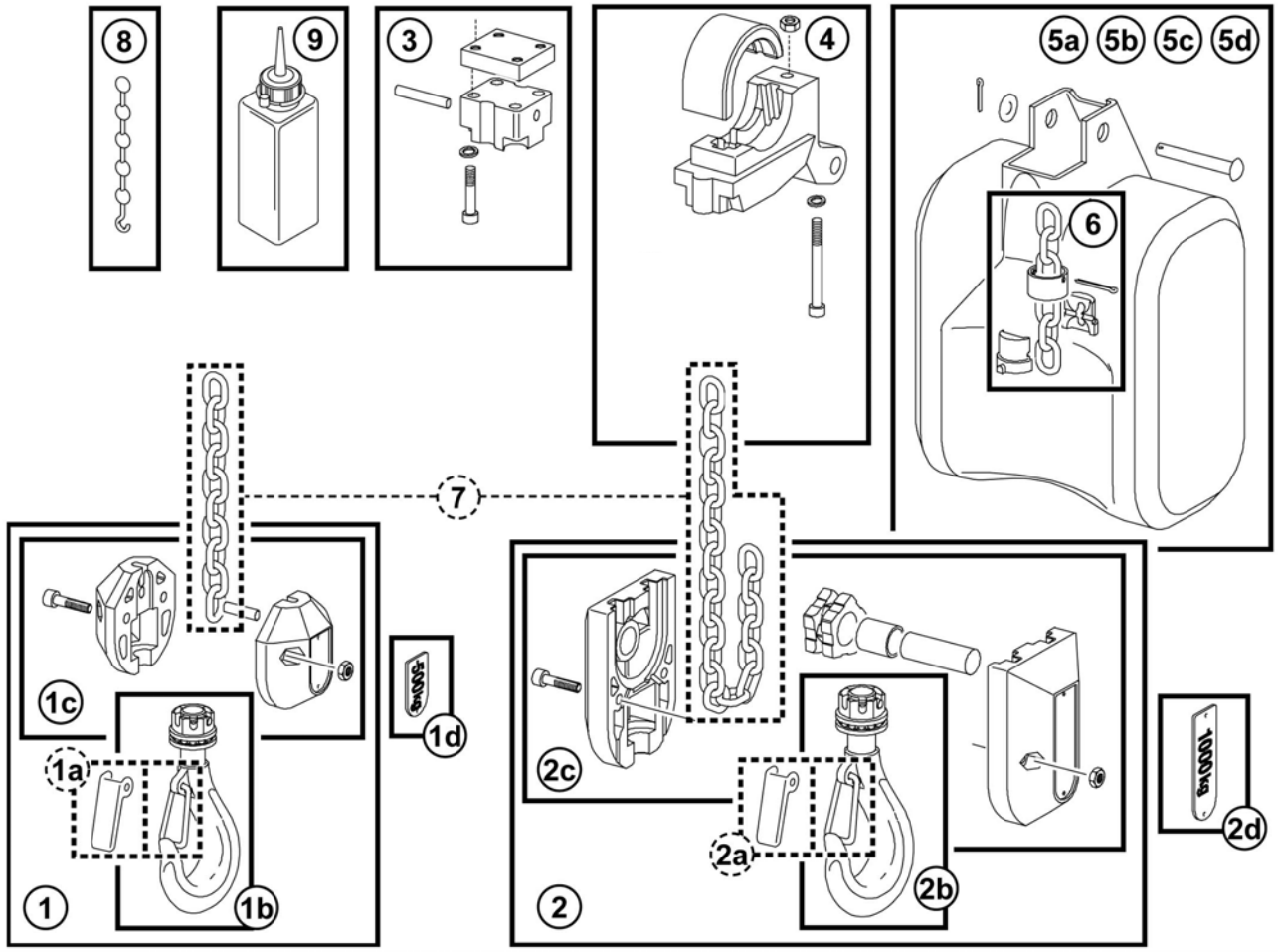
Rep.	Code	Qty	Designation
1	52310083	1	Special gear shaft assembly
2	52305514	1	Double brake Limiter disk
3	52305516	1	Double brake Limiter axle
4		1	Brake
5	52308396	3	Screw
6	52305515	1	Second brake Support
7	52253277	1	Bearing
8	830860	1	Circlips
9	52305485	1	Brake disck set
10	52305483	1	Brake disk Ø 65
11	830934	3	Screw
12		1	Brake
13	2211017	1	Limiter spring
14	550758	1	Washer
15	8030800	1	Tristop nut DIN 980
16	52305512	1	Double brake motor shaft

16.4 Mechanism / brake (Stepless)



Pos	Qty	Code	Description
1	1	52338099	Rotor Assembly
2	1	52339702	Chain sprocket assembly
3	1	52305473	Gear wheel set
4	1	52339704	Gear assembly
5	1	52338100	pinion
6	1	52339705	Brake Slipping clutch set
7	1	52339706	Motor shaft

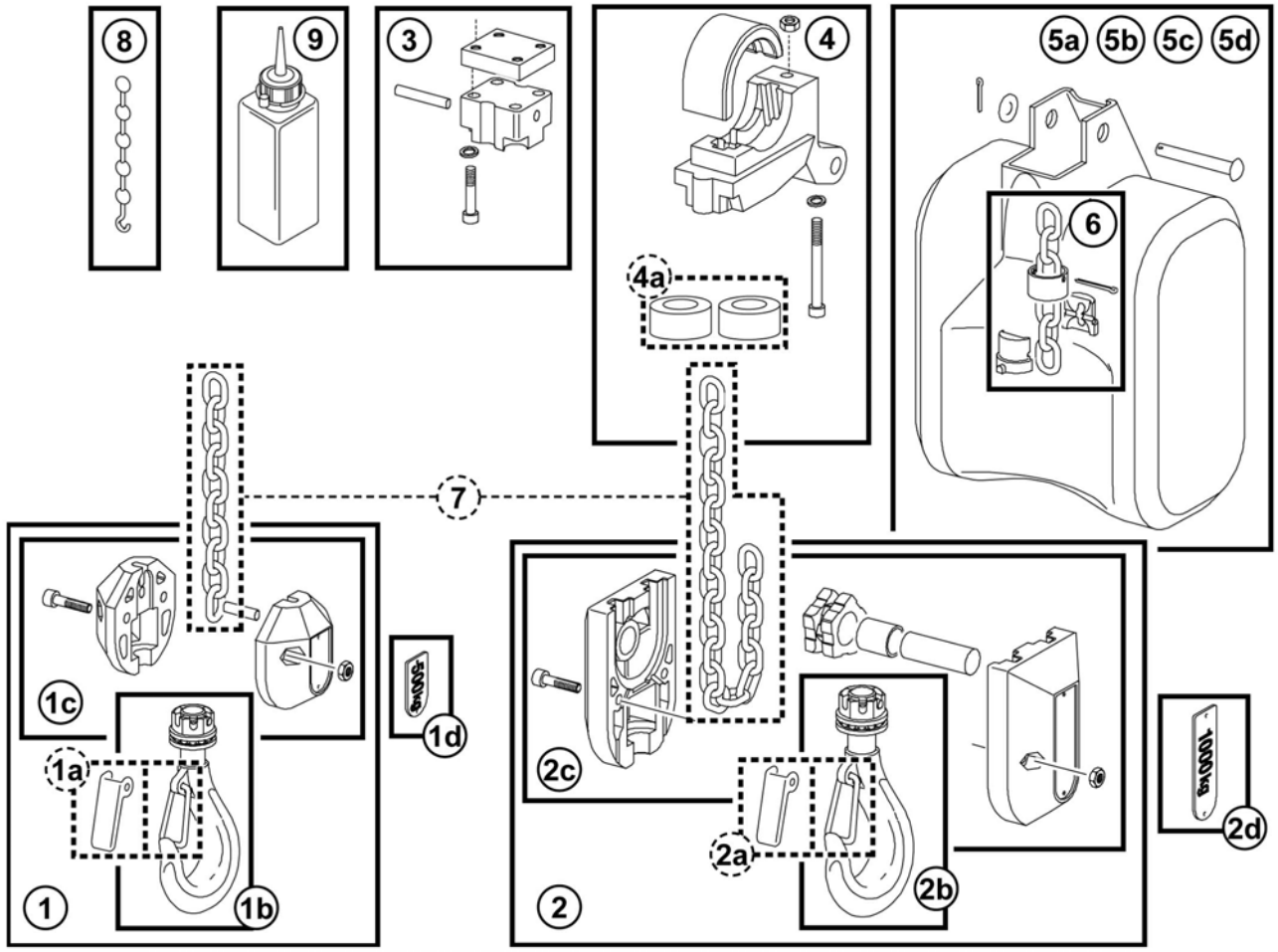
16.5 Lifting assembly



Pos	Qty	Code	Description
1	1	2219902	1-fall lifting hook block - Standard type
1	1	2212018	1 fall lifting hook block - Self-locking type
1a	1	001512	Safety latch - Steel wire type - 1 fall
1a	1	2212016	Safety latch - Steel plate type - 1 fall
1b	1	2212011	1-fall lifting hook - Standard type
1b	1	2217015	1-fall lifting hook - Self-locking type
1c	1	2219985	Set of 2 half-casings with axle and screws
1d	1	2219937	Load plates - 1 fall type - 125Kg (set of 10)
1d	1	2219906	Load plates - 1 fall type - 160Kg (set of 10)
1d	1	2219907	Load plates - 1 fall type - 250Kg (set of 10)
1d	1	2219908	Load plates - 1 fall type - 320Kg (set of 10)
1d	1	2219909	Load plates - 1 fall type - 500Kg (set of 10)
2	1	2212020	2-fall lifting hook - Standard type -
2	1	2212028	2-fall lifting hook - Self-locking type -
2a	1	001515	Safety latch - Steel wire type - 2 falls
2a	1	2212017	Safety latch - Steel plate type - 2 falls
2b	1	2217004	2-fall lifting hook block - Standard type
2b	1	2247015	2-fall lifting hook block - Self-locking type

2c	1	2212029	Set of 2 half-casings, axle, return sprocket, and screws
2d	1	2219910	Load plates - 2 falls type - 320Kg (set of 10)
2d	1	2219911	Load plates - 2 falls type - 500Kg (set of 10)
2d	1	2219912	Load plates - 2 falls type - 630Kg (set of 10)
2d	1	2219913	Load plates - 2 falls type - 1000Kg (set of 10)
3	1	52309350	Chain anchor assembly
4	1	52309351	Upper and lower chain guide assembly
5a	1	2219990	Chain bucket - 8m chain length capacity
5b	1	2249925	Chain bucket - 16m chain length capacity
5c	1	2249926	Chain bucket - 30m chain length capacity
5d	1	2249932	Chain bucket - 50m chain length capacity
6	1	2211050	Slack fall stop assembly
7		2213500	Load chain - Galvanized type
7		2213501	Load chain - Black type
8	1	2211045	Load chain mounting tool
9	1	9995008	Oil can

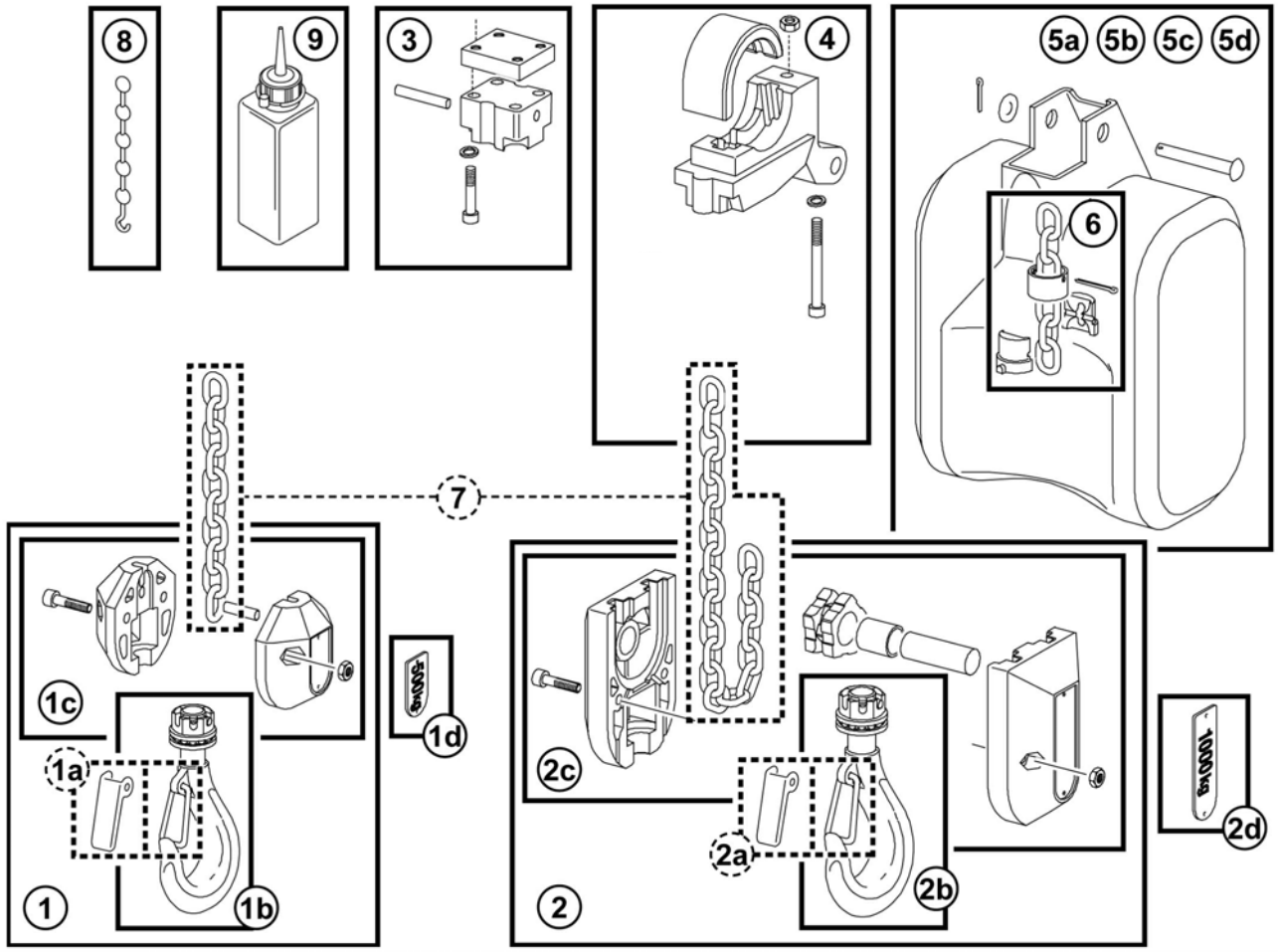
16.6 Lifting assembly



Pos	Qty	Code	Description
1	1	2219902	1-fall lifting hook block - Standard type
1	1	2212018	1 fall lifting hook block - Self-locking type
1a	1	001512	Safety latch - Steel wire type - 1 fall
1a	1	2212016	Safety latch - Steel plate type - 1 fall
1b	1	2212011	1-fall lifting hook - Standard type
1b	1	2217015	1-fall lifting hook - Self-locking type
1c	1	2219985	Set of 2 half-casings with axle and screws
1d	1	2219937	Load plates - 1 fall type - 125Kg (set of 10)
1d	1	2219906	Load plates - 1 fall type - 160Kg (set of 10)
1d	1	2219907	Load plates - 1 fall type - 250Kg (set of 10)
1d	1	2219908	Load plates - 1 fall type - 320Kg (set of 10)
1d	1	2219909	Load plates - 1 fall type - 500Kg (set of 10)
2	1	2212020	2-fall lifting hook - Standard type -
2	1	2212028	2-fall lifting hook - Self-locking type -
2a	1	001515	Safety latch - Steel wire type - 2 falls
2a	1	2212017	Safety latch - Steel plate type - 2 falls
2b	1	2217004	2-fall lifting hook block - Standard type
2b	1	2247015	2-fall lifting hook block - Self-locking type

2c	1	2212029	Set of 2 half-casings, axle, return sprocket, and screws
2d	1	2219910	Load plates - 2 falls type - 320Kg (set of 10)
2d	1	2219911	Load plates - 2 falls type - 500Kg (set of 10)
2d	1	2219912	Load plates - 2 falls type - 630Kg (set of 10)
2d	1	2219913	Load plates - 2 falls type - 1000Kg (set of 10)
3	1	52309350	Chain anchor assembly
4	1	52309351	Upper and lower chain guide assembly
4a	2/3	52305498	Rubber buffer
5a	1	2219990	Chain bucket - 8m chain length capacity
5b	1	2249925	Chain bucket - 16m chain length capacity
5c	1	2249926	Chain bucket - 30m chain length capacity
5d	1	2249932	Chain bucket - 50m chain length capacity
6	1	2211050	Slack fall stop assembly
7		2213500	Load chain - Galvanized type
7		2213501	Load chain - Black type
8	1	2211045	Load chain mounting tool
9	1	9995008	Oil can

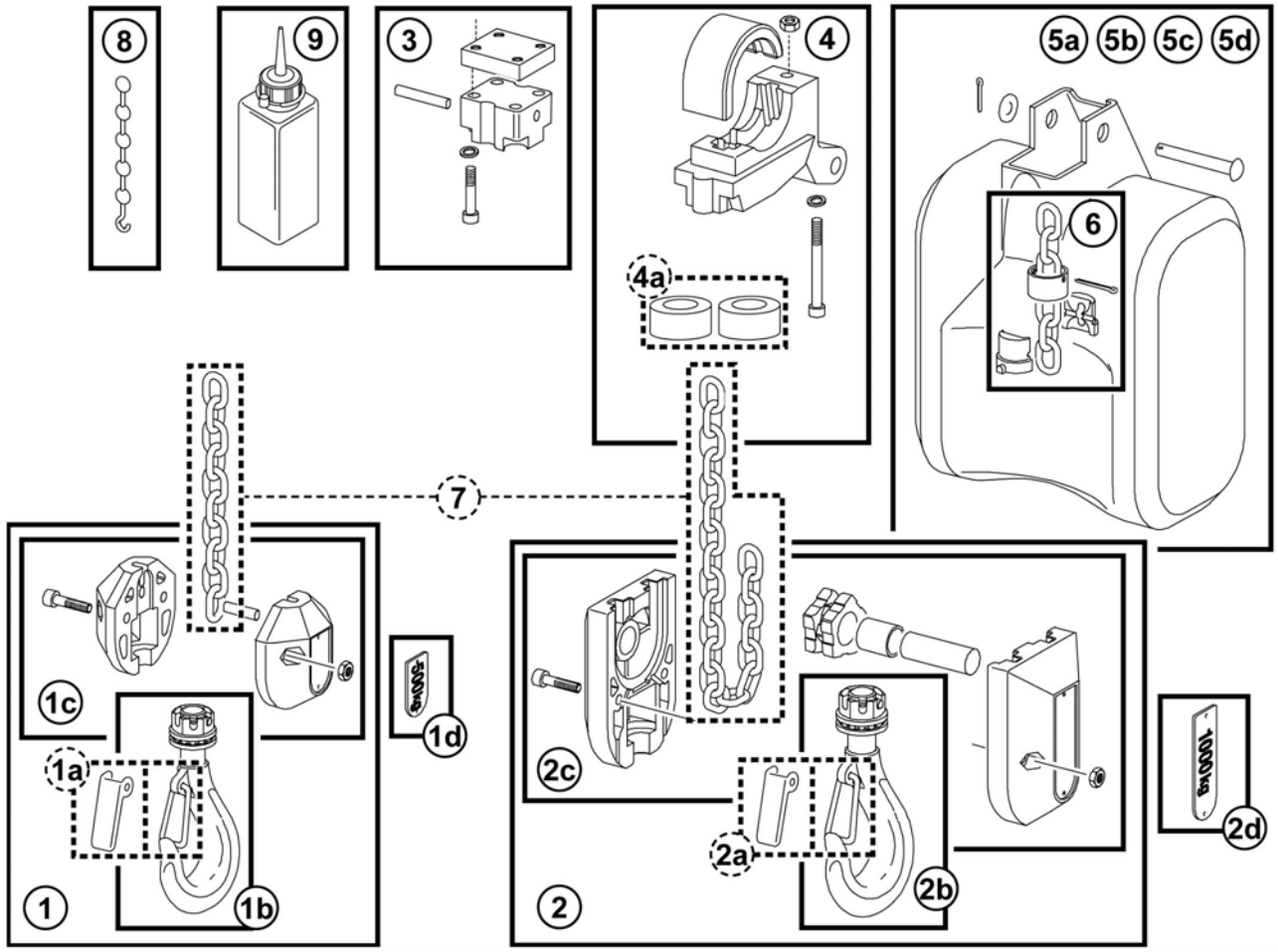
16.7 Lifting assembly



Pos	Qty	Code	Description
1	1	2219902	1-fall lifting hook block - Standard type
1	1	2212018	1 fall lifting hook block - Self-locking type
1a	1	001512	Safety latch - Steel wire type - 1 fall
1a	1	2212016	Safety latch - Steel plate type - 1 fall
1b	1	2212011	1-fall lifting hook - Standard type
1b	1	2217015	1-fall lifting hook - Self-locking type
1c	1	2219985	Set of 2 half-casings with axle and screws
1d	1	2219937	Load plates - 1 fall type - 125Kg (set of 10)
1d	1	2219906	Load plates - 1 fall type - 160Kg (set of 10)
1d	1	2219907	Load plates - 1 fall type - 250Kg (set of 10)
1d	1	2219908	Load plates - 1 fall type - 320Kg (set of 10)
1d	1	2219909	Load plates - 1 fall type - 500Kg (set of 10)
2	1	2212020	2-fall lifting hook - Standard type -
2	1	2212028	2-fall lifting hook - Self-locking type -
2a	1	001515	Safety latch - Steel wire type - 2 falls
2a	1	2212017	Safety latch - Steel plate type - 2 falls
2b	1	2217004	2-fall lifting hook block - Standard type
2b	1	2247015	2-fall lifting hook block - Self-locking type

2c	1	2212029	Set of 2 half-casings, axle, return sprocket, and screws
2d	1	2219910	Load plates - 2 falls type - 320Kg (set of 10)
2d	1	2219911	Load plates - 2 falls type - 500Kg (set of 10)
2d	1	2219912	Load plates - 2 falls type - 630Kg (set of 10)
2d	1	2219913	Load plates - 2 falls type - 1000Kg (set of 10)
3	1	52309350	Chain anchor assembly
4	1	52309351	Upper and lower chain guide assembly (standard)
	1	52391817	Upper and lower chain guide assembly (inverted position)
5a	1	2219990	Chain bucket - 8m chain length capacity
5b	1	2249925	Chain bucket - 16m chain length capacity
5c	1	2249926	Chain bucket - 30m chain length capacity
5d	1	2249932	Chain bucket - 50m chain length capacity
6	1	2211050	Slack fall stop assembly
7		2213500	Load chain - Galvanized type
7		2213501	Load chain - Black type
8	1	2211045	Load chain mounting tool
9	1	9995008	Oil can

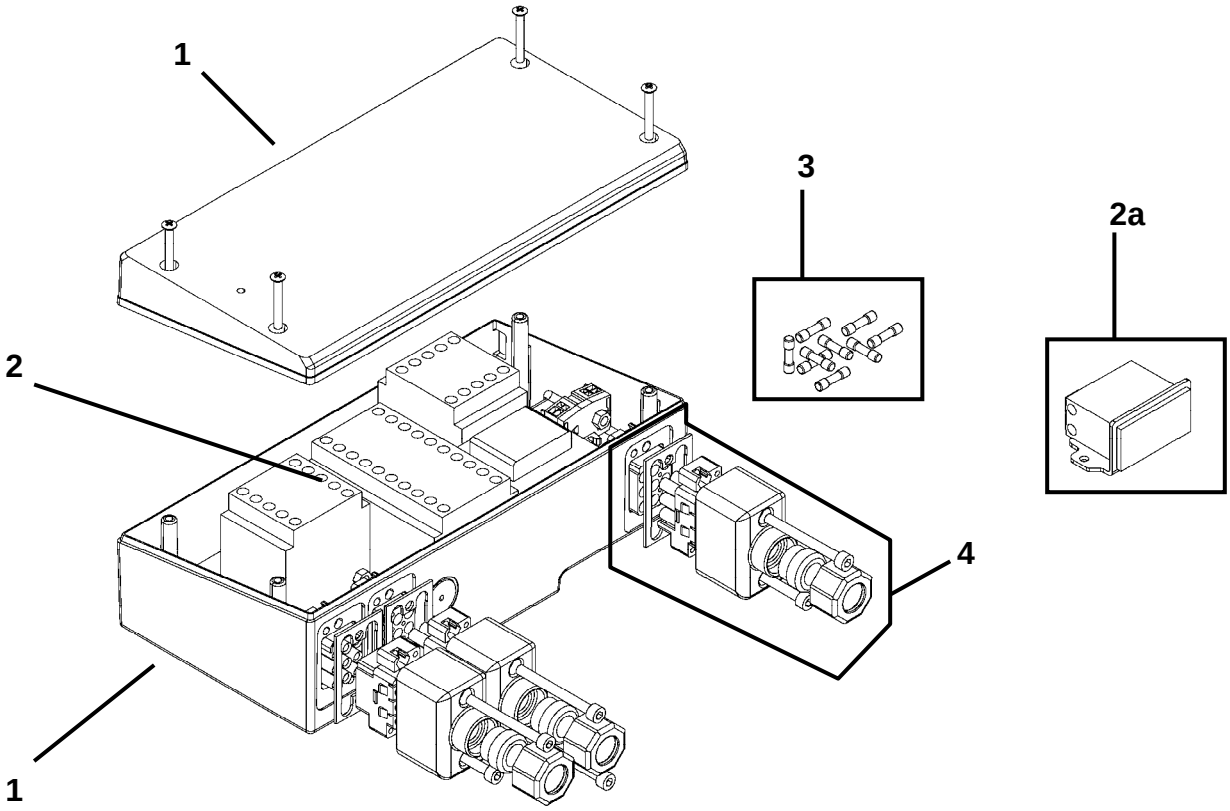
16.8 Lifting assembly



Pos	Qty	Code	Description
1	1	2219902	1-fall lifting hook block - Standard type
1	1	2212018	1 fall lifting hook block - Self-locking type
1a	1	001512	Safety latch - Steel wire type - 1 fall
1a	1	2212016	Safety latch - Steel plate type - 1 fall
1b	1	2212011	1-fall lifting hook - Standard type
1b	1	2217015	1-fall lifting hook - Self-locking type
1c	1	2219985	Set of 2 half-casings with axle and screws
1d	1	2219937	Load plates - 1 fall type - 125Kg (set of 10)
1d	1	2219906	Load plates - 1 fall type - 160Kg (set of 10)
1d	1	2219907	Load plates - 1 fall type - 250Kg (set of 10)
1d	1	2219908	Load plates - 1 fall type - 320Kg (set of 10)
1d	1	2219909	Load plates - 1 fall type - 500Kg (set of 10)
2	1	2212020	2-fall lifting hook - Standard type -
2	1	2212028	2-fall lifting hook - Self-locking type -
2a	1	001515	Safety latch - Steel wire type - 2 falls
2a	1	2212017	Safety latch - Steel plate type - 2 falls
2b	1	2217004	2-fall lifting hook block - Standard type
2b	1	2247015	2-fall lifting hook block - Self-locking type

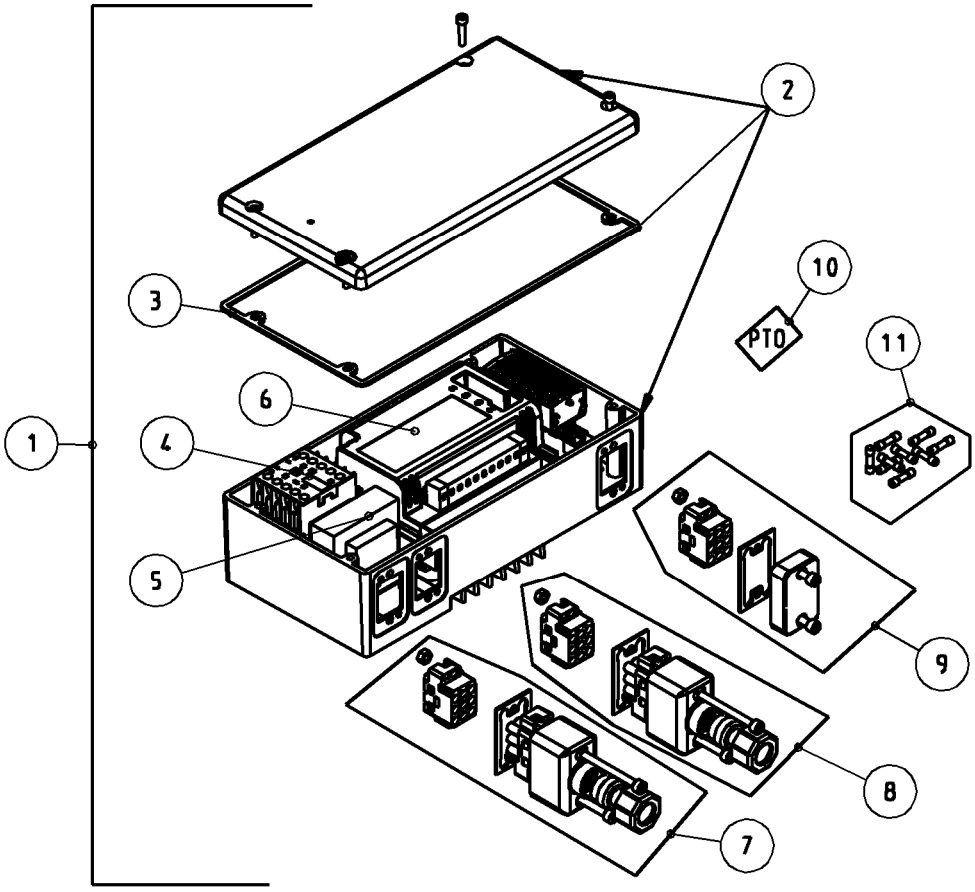
2c	1	2212029	Set of 2 half-casings, axle, return sprocket, and screws
2d	1	2219910	Load plates - 2 falls type - 320Kg (set of 10)
2d	1	2219911	Load plates - 2 falls type - 500Kg (set of 10)
2d	1	2219912	Load plates - 2 falls type - 630Kg (set of 10)
2d	1	2219913	Load plates - 2 falls type - 1000Kg (set of 10)
3	1	52309350	Chain anchor assembly
4	1	52309351	Upper and lower chain guide assembly (standard)
	1	52391817	Upper and lower chain guide assembly (inverted position)
4a	2/3	52305498	Rubber buffer
5a	1	2219990	Chain bucket - 8m chain length capacity
5b	1	2249925	Chain bucket - 16m chain length capacity
5c	1	2249926	Chain bucket - 30m chain length capacity
5d	1	2249932	Chain bucket - 50m chain length capacity
6	1	2211050	Slack fall stop assembly
7		2213500	Load chain - Galvanized type
7		2213501	Load chain - Black type
8	1	2211045	Load chain mounting tool
9	1	9995008	Oil can

16.9 Electric box (3 phases)



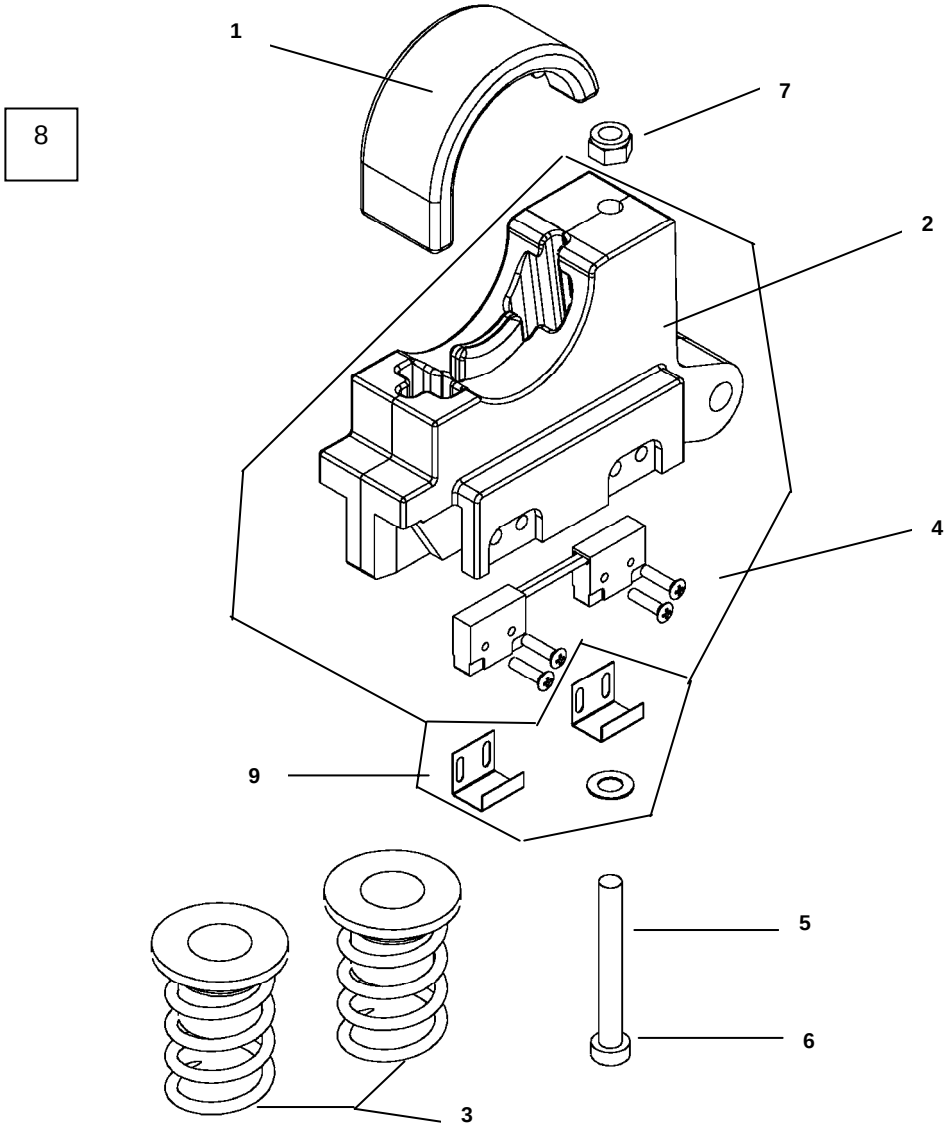
Pos	Qty	Code	Description
1	1	52308791	Control Panel Assembly (Back + cover)
2	1	2213004	PC board 400V50&60Hz48vac
2	1	2213003	PC board 230V50&60Hz48vac
2	1	2213013	PC board 460V60Hz48vac
2	1	2213011	PC board 500V50&60Hz48vac
2	1	2213012	PC board 575V60Hz48vac
2	1	2213025	PC board 400V50&60Hz115vac
2	1	2213014	PC board 460V60Hz115vac
2	1	2213015	PC board 230V60Hz115vac
2	1	2213017	PC board 230V/460V60Hz115vac standard
2	1	2213018	PC board 230V/460V60Hz115vac reconnectable
2	1	833098	Rectifier 230V/400V direct voltage
2	1	833096	Rectifier 500V direct voltage
2a	1	52305692	Hour counter 48V50Hz
2a	1	52305693	Hour counter 48V60Hz
2a	1	52305694	Hour counter 115vac60Hz
3	1	2219988	Set of 10 fuses
4	1	2249945	Push button station plug set
4	1	2249946	Trolley plug set
4	1	2249982	Power supply plug set

16.10 Electric box (Stepless)



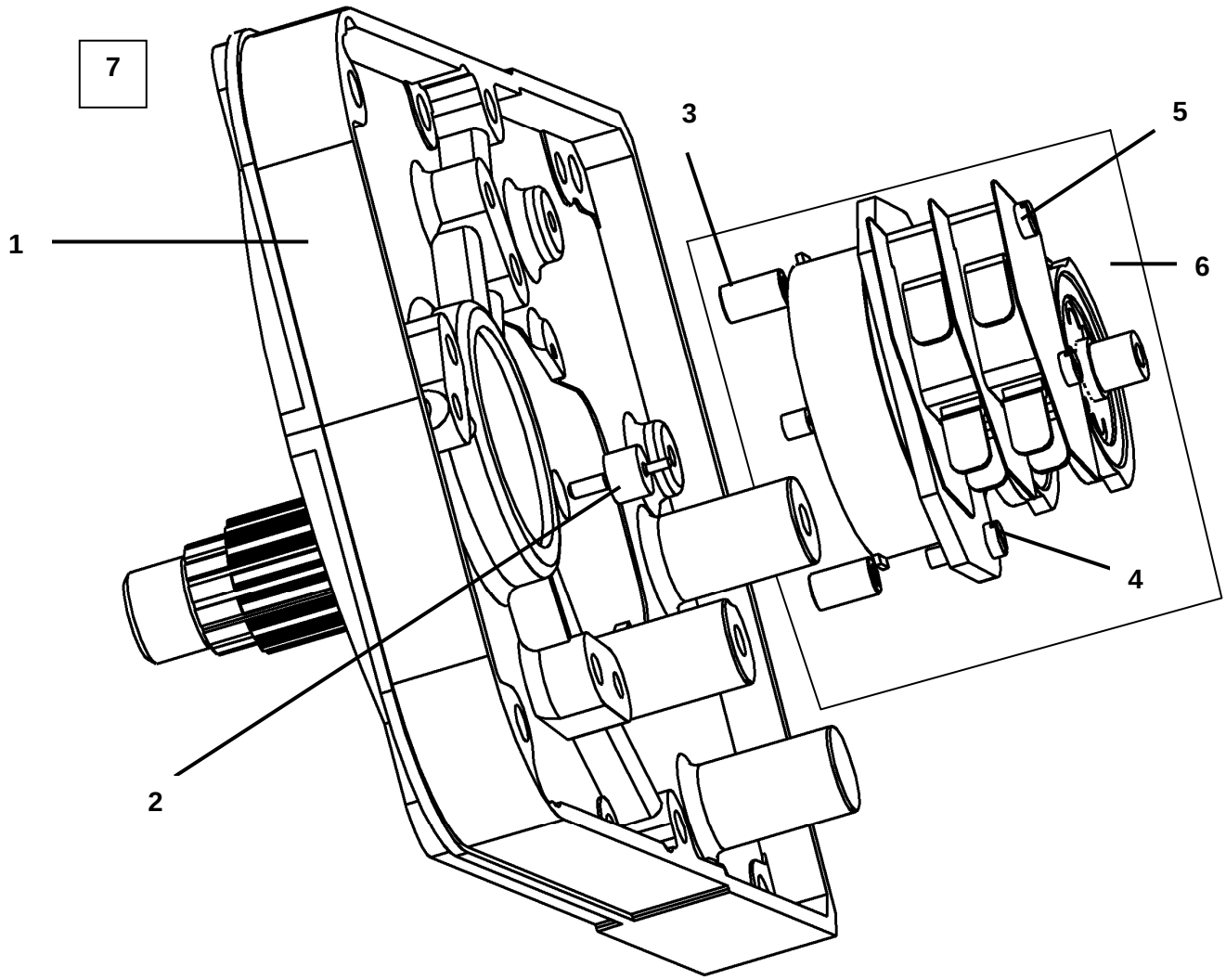
Pos	Qty	Code	Description
1	1	52310090	Electrical cubicle 400V50&60Hz48vac
1	1	52340063	Electrical cubicle 460V50&60Hz115vac
2	1	52340064	Empty cubicle with sealing
3	1	52312998	Sealing for electric cubicle
4	1	7983061	Contactor 48 Vac
4	1	1123051	Contactor 115 Vac
5	1	52314654	Transformer 400V50&60Hz48vac
5	1	52314653	Transformer 460V50&60Hz115vac
6	1	52300287	Inverter-filter set 48 Vac
6	1	52300288	Inverter-filter set 115 Vac
7	1	2249982	Connection plug set for power supply
8	1	2249945	Connection plug set for push-button box
9	1	2249946	Connection plug set for trolley
10	1	52340081	Gear thermal protection
11	1	52340092	Set of 10 fuses 48V
11	1	52340093	Set of 10 fuses 115V

16.11 Standard limit switch up and down



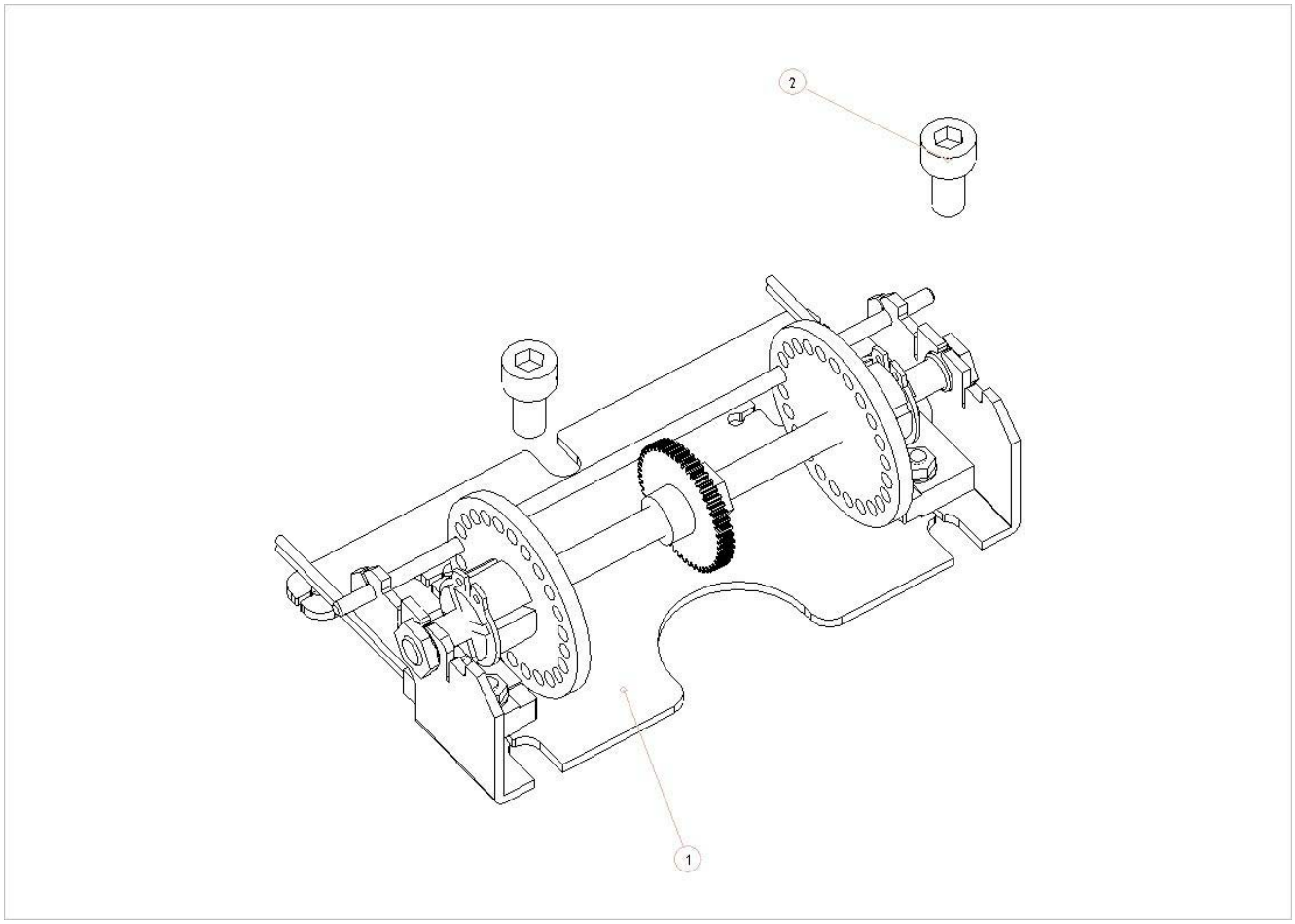
POS .	QTY	CODE	DESCRIPTION
1	1	2214011	Upper chain guide
2	1	52305493	Lower chain guide
3	1	52293583	Set of 3 springs
4	1	52305660	Set of chain guide and limit switches
5	1	52315431	Set of screw (5 + 6 + 7)
8	1	52315430	Complete limit switch
9	2	52337705	Slides

16.12 Gear limit switch (OPTION)



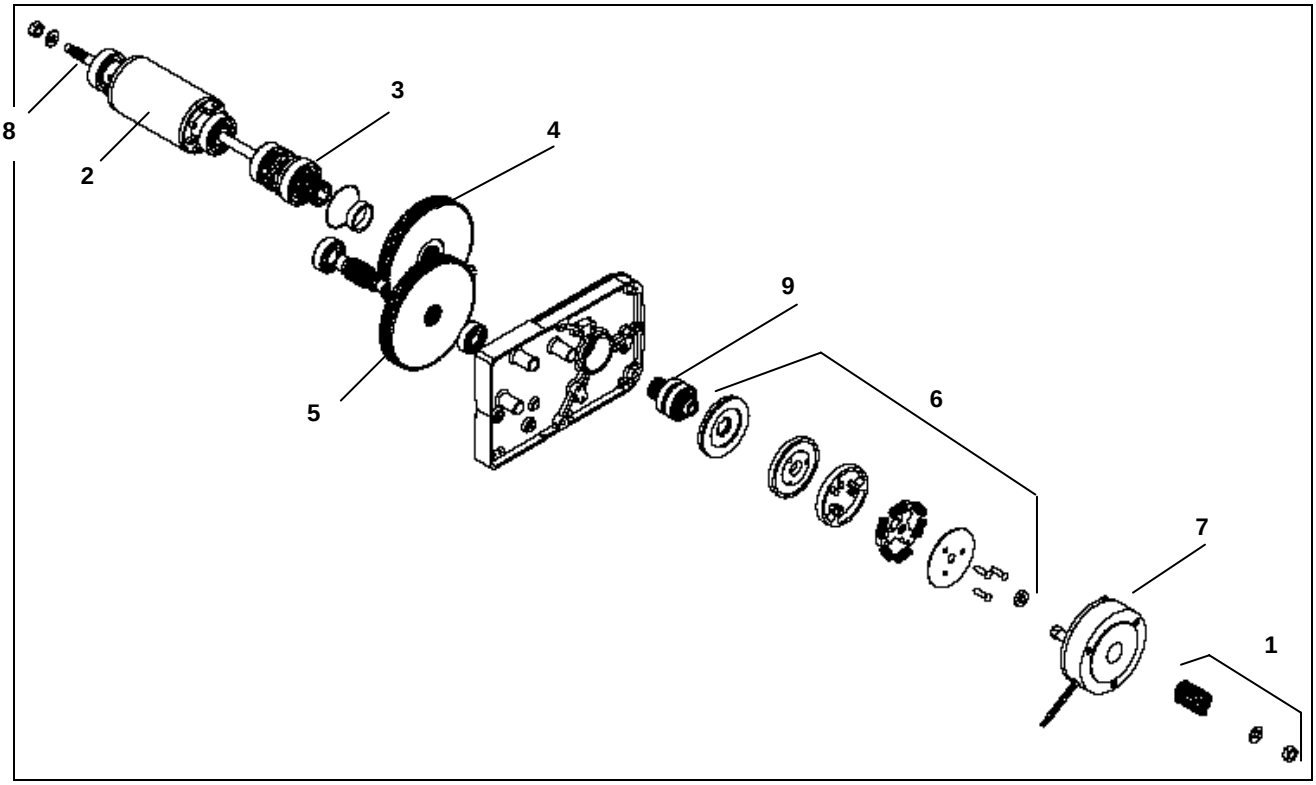
POS	QTY	CODE	Description
1	1	52305505	Set of Gear cover
2	1	52305507	Shaft
3	1	52314475	Set of fixing screw for limit switch + spacer (pieces 3 + 4 + 5)
6	1	52314755	Set of Gea' limit switch 40 m + shaft rep. 2
7	1	52315474	Complete set of gear limit switch

16.13 Adjust limit switch (Stepless)



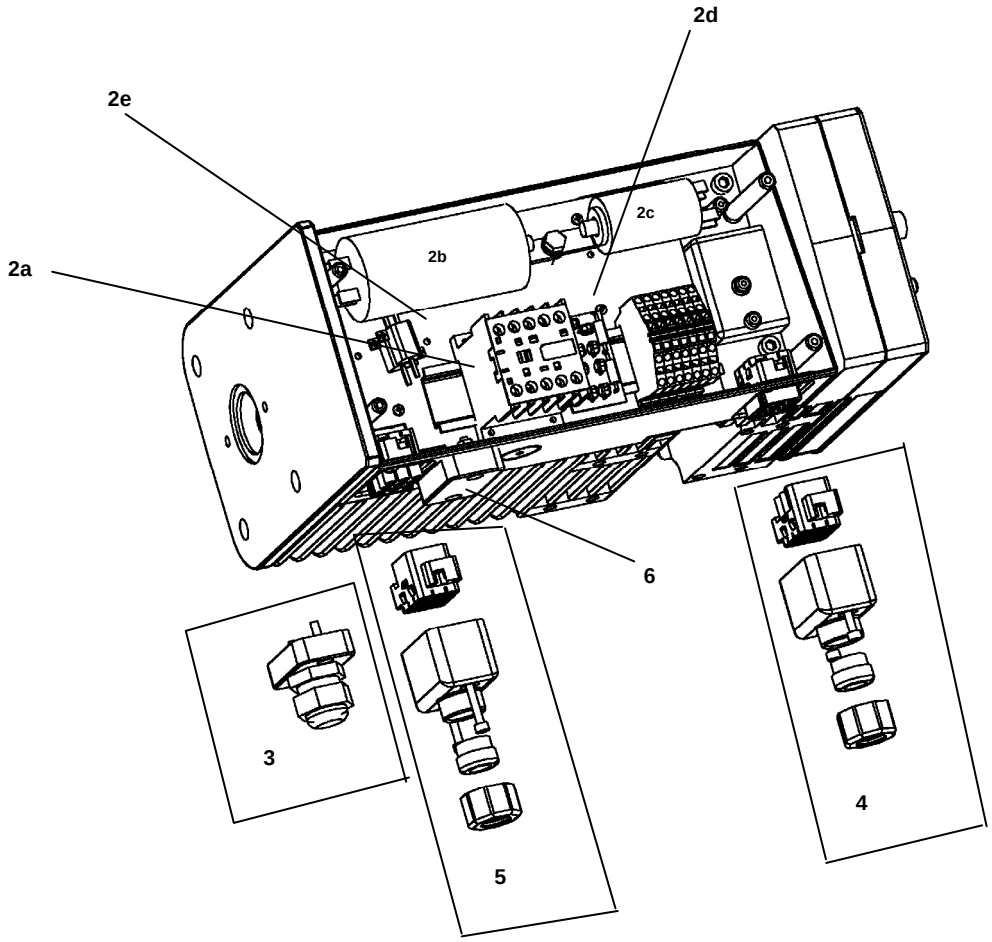
POS	QTY	CODE	Description
1	1	52337490	Set of Gea' limit switch 40 m + shaft rep. 2
2	2	8010612	CHC screws M6x12

16.14 Mechanism / brake (1 phase)



Pos	Qty	Code	Description
1	1	2211016	Slipping clutch spring set
2	1	52315793	Rotor Assembly (hoist with 1PH)
3	1	52305659	Chain sprocket assembly
4	1	52305473	Gear wheel set
5	1	52308771	Gear assembly
6	1	52315403	Slipping clutch set
7	1	52305488	Brake 100V/230V
8	1	52305461	Motor shaft
9	1	52305658	Pinion set

16.15 Electric box (1 phase DVC)



Pos	Qty	Code	Description
1	1	52308791	Control Panel Assembly (Back + cover)
2a	1	1113098	Main contactor KAU 230 Vac 50/60 Hz
2b	1	52314640	Capacitor 40uF for hoist with 1PH 230Vac 50/60 HZ
2c	1	52314641	Capacitor 5uF for hoist with 1PH 230Vac 50/60 HZ
2d	1	2243060	Rectifier 230V / 400v
2e	1	52297342	Unloading resistor
3	1	2249947	Cable gland assembly
4	1	2249945	Push button station plug set
5	1	2249982	Power supply plug set
6	1	2219814	Closing plate assembly