

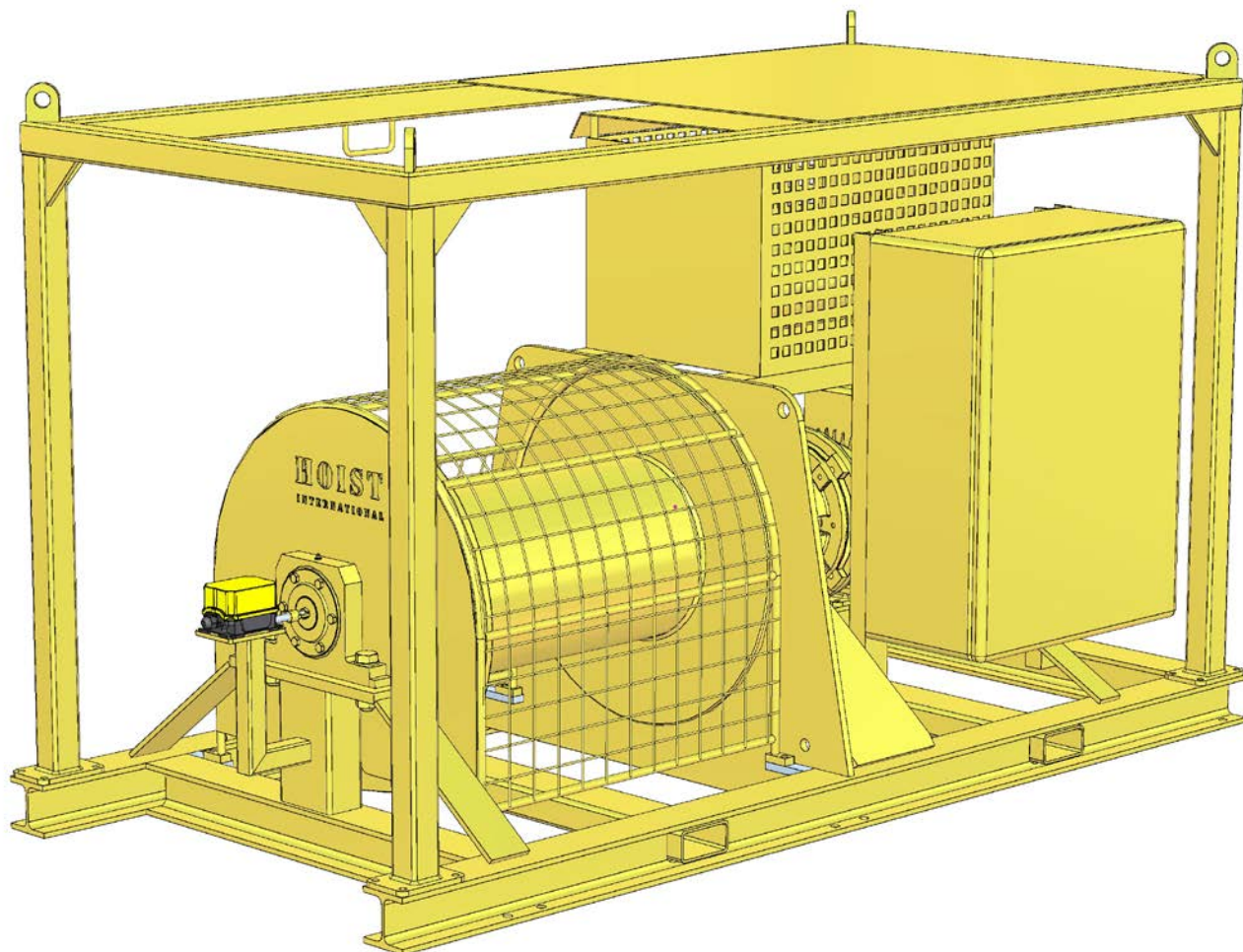
EMCÉ

Winches | Stokvis Group

Winch Model:

SB 306 EDS

Fabrication Number: **1006881**



Planetary Winches

Industry

Offshore

Marine



USER MANUAL

PURPOSE OF THE MANUAL

This manual has been compiled by the Manufacturer to provide information on the safe transport, handling, installation, maintenance and repair of winches

Failure to adhere to the information provided herein may result in risk to personal health and safety, and may incur economic damages.

The documentation must be stored by a person with the correct authority and must always be made available for consultation. A copy of the user manual can best be kept close the working area of the winch.

The manual reflects the state of the art at the time of commercialization of the winch. The Manufacturer reserves the right to modify, supplement and improve the manual, without the present publication being for that reason considered inadequate.

Intellectual property

Winch models, drawings and design are of our exclusive property. It is expressly forbidden to copy, use or hand over to third parties such information without specific written permission.

Warranty

EMCÉ warrants to the original user its winches to be free of defects in material and workmanship for a period of one year from the date of purchase. EMCÉ will repair, without cost, any product found to be defective, including parts and labor charges, or at its option, will replace such products or refund the purchase price less a reasonable allowance for depreciation, in exchange for the product.

If any product proves defective within its original one year warranty period, it should be returned to any authorized EMCÉ dealer, transportation prepaid with proof of purchase or winch data sheet / test certificate.

This warranty does not apply to products which EMCÉ has determined to have been misused or abused, improperly maintained by the purchaser; or where the malfunction or defect can be attributed to the use of non-genuine EMCÉ parts.

EMCÉ makes no other warranty, and all implied warranties including any warranty of merchantability or fitness for a particular purpose are limited to the duration of the expressed warranty period as set forth above. EMCÉ's maximum liability is limited to the purchase price of the product and in no event shall EMCÉ be liable for any consequential, indirect, incidental, or special damages of any nature arising from the sale or use of the product, whether based on contract, tort, or otherwise.



With a missing TAG plate the product is not conform the current CE machine construction standards and warranty will expire.

All tenders and contracts for the performance of deliveries by us inside and outside the Netherlands are governed by the FME General Conditions for the sales and supply for mechanical and electrical industry of October 19th 1998 filed under reference nr. 119/1998 at the district court in The Hague.

EMCÉ do reserve the right to modify and upgrade the winches they fabricate at any moment and without advance notice and will not be liable for any difference between winch features and the specifications of present use and maintenance manual.

Contact the EMCÉ technical department in case extra information is required about for example maintenance and repair. This user manual is made with great care. EMCÉ cannot be put responsible for errors in this publication or for the impact of this.

This user manual is written by EMCÉ in Voorhout.

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1. INTRODUCTION

1.1 GENERAL

Depending on the specifications EMCÉ winches are used for lifting and/or pulling materials and/or person. The application of the winches is mentioned on the winch tag plate and the winch datasheet (see annex I).

Pulling Winch:

A winch is a pulling winch when transporting a load in horizontal sense. If the rope were to be cut during operation the load would stop moving.

Lifting Winch:

A lifting winch is any winch which moves a load vertically during part or all of its operation. This may be directly vertical or up a slope. If the rope were to be cut during any part of the operation, the load will move.

Any other use than mentioned on the tag plate or winch datasheet excludes EMCÉ of every responsibility.

1.2 SPECIFICATIONS

Identification data and specifications are mentioned on the identification plate attached to the winch. This data can be copied to the plate on the back cover of this manual for your reference.

Standard winches are designed for an ambient temperature of 0° to +40° C. Optional motors can be supplied for ambient temperatures of -20° to +55° C. Before use check the winch datasheet (see annex I) for the applicable design temperature of your winch. In case of doubt please contact EMCÉ.

Standard electric winches have motors with protection class IP 54. These winches are suitable for indoor use. For outdoor applications onshore IP 55 motors can be supplied. For offshore applications motors with protection class IP 56 TENV can be supplied.

	The applicable ATEX classification for the winch can be found on the EMCÉ ATEX certificate (see annex I). Although some components of the winch could have higher classifications than on the EMCÉ ATEX certificate is mentioned the winch may only be used according to the classification on the EMCÉ ATEX certificate as this certificates is based on the combination of all components on the winch. In case of doubt please contact EMCÉ or your local dealer.
	

1.3 CONFORMITY

EMCÉ supplies winches for incorporation into an assembly consisting of a platform, a suspensions system, etc.... Such winches are intended for incorporation into an assembly consisting of a platform, a suspensions system, etc... Therefore, they are delivered without the CE mark, but with a Declaration of Incorporation. However, since they are equipped with selected safety options, when the user applies for EC compliance of the entire system, the winch "part" will meet the EC requirements.

EMCÉ can also supply winches that fully comply with the Machinery Directive 2006/42/EC. Such winches are supplied with CE mark on the winch and delivered including EC declaration of conformity.

It's the end users responsibility to check the type of declaration supplied with the winch (See Annex I) and install the winch in such a way that it complies with all safety rules and regulations.

2. GENERAL DESCRIPTION OF WINCHES

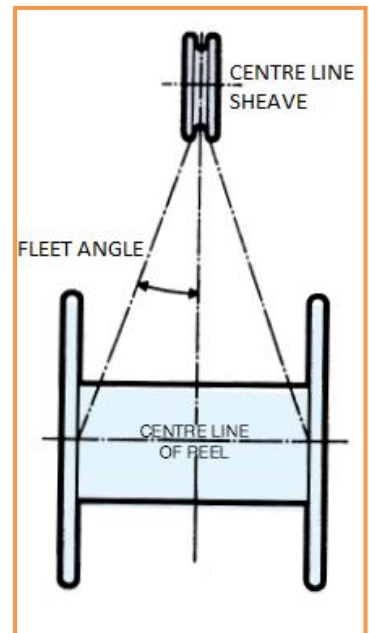
2.1 GENERAL OPERATING PRINCIPLE

Fleet angle.

To allow the rope to spool correctly it is imperative that the rope comes off the drum at a sufficiently low fleet angle. The fleet angle is based on the distance between the centre line of the winch drum and the centre line of the deflection sheave.

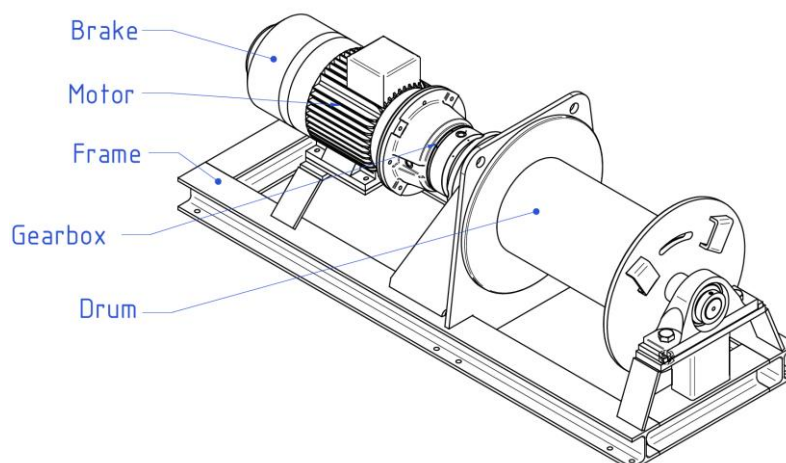
In the below table the minimal and maximal fleet angles are given for plain and grooved drums. Higher fleet angles will result in excessive wear, grinding noise and bad spooling. To obtain a correct fleet angle, line out the products drum at a right angle to the rope, and centralize to the first sheave. A piece of rope can be useful in determining the correct angle.

If it is not possible to comply with the required fleet angle it would be required to use a winch with spooling gear. A standard spooling gear may be used up till a maximum fleet angle of 8°. When using a spooling gear the design of the deflection sheave should also be taken into account as standard fixed sheaves may normally only be used up till a maximum fleet angle of 3° to 4°.



	Plain drum			Grooved drum 1 layer cable only			Grooved drum multi-layer spooling*		
	Min.	Recom. max.	Max.	Min.	Recom. max.	Max.	Min.	Recom. max.	Max.
Standard cables	0,5°	1,5°	2,0°	0°	2,5°	4,0°	0,5°	1,5°	2,5°
Rotating free cables	0,5°	1,2°	1,5°	0°	1,5°	2,0°	0,5°	1,5°	2,0°
Cables including spooling gear	0,0°	4,0°	8,0°	0,0°	4,0°	8,0°	0,0°	4,0°	8,0°
* For spooling > 3 layers cable on a grooved drum the max. fleet angle should be limited to the values for a plain drum									

2.2 MAIN COMPONENTS OF EMCÉ WINCHES



Main components of an SB series electric winch

Motor:

The part delivering the torque for driving the load.

Brake:

The safety device delivering the torque opposite to the load when the motor is not powered. The brake is fitted onto the motor and normally features 1.5 times the driving torque. A further safety brake, directly acting on the drum, can be delivered on request.

Reduction gear:

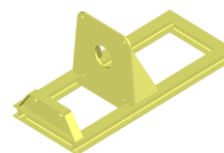
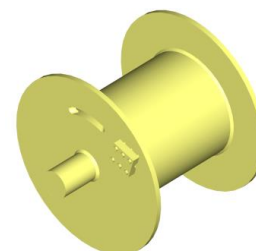
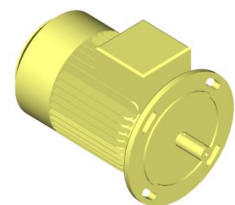
A reduction gear is fitted between the motor and the winch drum to multiply the torque delivered by the motor to obtain the necessary torque to drive the winch drum.

Drum:

The part which winds and stores the rope. Use of a grooved drum smoothens spooling of the rope. Drum boundaries are the drum flanges. For safety reasons drum flange end plates shall protrude beyond the rope wound on the drum at the top layer by at least 1,5x to 2,5x the nominal rope diameter depending on the design standard of the winch. Most design standards require that the drum flange end plates protrude with at least 2x the nominal rope diameter.

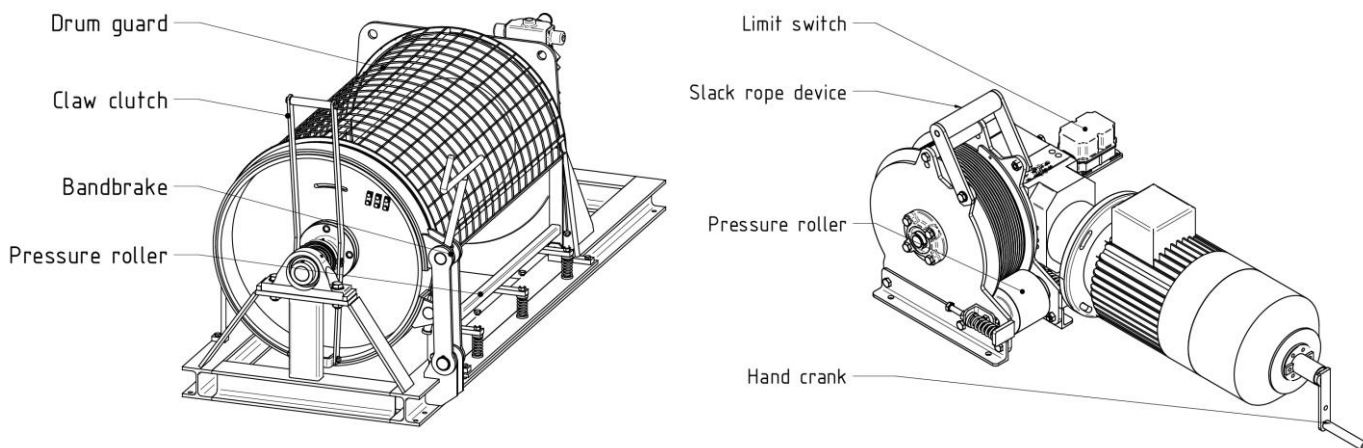
Frame:

The structure which supports drum and other winch parts. The winch frame is the part of the winch that is used to fix the winch onto its foundation.



2.3 OPTIONS

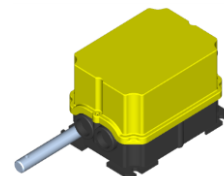
EMCÉ winches can be supplied with a large number of options. The most common options are mentioned below in this paragraph.



Examples of standard options on EMCÉ winches

Limit switch:

The safety devices engineered to keep the range of load movements within stated limits. Limit switches are mandatory for lifting applications but only fitted on request. The most common type of limit switches are spindle limit switches, which are used to limit the upper and lower limit of a lifting operation. The actuation point is based on the number of revolutions of the winch drum. The actuation point of the limit switches is based on an adjustable cam position for each switch.



Pressure roller:

A pressure roller is designed to avoid the loosening and the self-unwinding of slack rope from the winch drum.



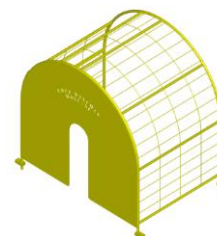
Slack Rope device:

A slack rope device is used to avoid that slack rope is paid out from the winch drum.



Drum guard:

This option prevents that persons near the winch can touch a rotating winch drum. A drum guard is mandatory on a winch located in an easily accessible position but only fitted on request.



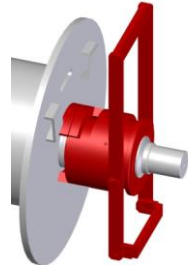
Bandbrake:

Bandbrakes can be provided with manual operation or failsafe automatically by means of a hydraulic or pneumatic cylinder. Bandbrakes are used for applications where a second brake or a drum brake is required. By instance for man riding applications or for applications where the static load is a multiple of the dynamic working load limit (for example anchor winches).



Clutches:

With a clutch the winch drum can be disengaged from the winch drive, which allows free running of the cable. Most common used is a claw clutch, which can't be operated under load. To operate a claw clutch the driveline must first be freed of the load (for example using a bandbrake on the winch drum). Claw clutches are nearly always manually operated. Some winches can be equipped with a friction clutch. Friction clutches can be supplied in manual and remote operated versions.



Note that for lifting applications the use of a clutch in the driveline is not permitted!

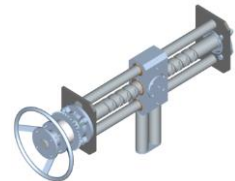
Hand crank:

To operate a winch in case of a power failure a hand crank can be supplied as an option. This option is often used on man riding winches to allow operation of the winch in case the main power source fails. As the effort applied on a hand crank is limited this option is normally only possible on winches with a relative low working load limit.



Spooling gear:

When it is not possible to comply within the maximal advised fleet angle (see section 2.1) a spooling gear is required on the winch to ensure proper spooling of the rope on a winch drum. A standard spooling gear may be used up till a maximum fleet angle of 8°.



Load limiting device:

The safety device engineered to prevent the winch from lifting loads exceeding the allowed maximum or from being subject to abnormal loads. Before delivery the load limiting device is pre-rated by EMCE to the maximum allowed load stated on the winch datasheet. A load limiter is mandatory for lifting applications but only fitted on request.

3. SAFETY INSTRUCTIONS

3.1 SYMBOLS USED IN THIS MANUAL

Particularly significant sections of the manual and important specifications are highlighted by symbols whose meanings are given below.



DANGER-WARNING

This symbol indicates situations of serious danger which, if ignored, may result in serious risks to the health and safety of personnel.



CAUTION-ATTENTION

This symbol indicates the need to adopt specific precautions to avoid risks to the health and safety of personnel and possible economic damages.



IMPORTANT

This symbol indicates import and technical information.



The instructions indicated on a grey background next to these symbols refer exclusively to equipment conforming to the "ATEX" Directive 94/9/EC.

The operations highlighted by these symbols must be carried out by qualified professionals specially trained in the safety requirements for zones characterized by potentially explosive atmospheres.



Failure to observe these instructions may result in serious risks to personal and environmental safety.

3.2 SAFETY SYMBOLS USED ON THE WINCH

On the winch warning stickers the below warning signs are used. The meanings of the symbols are:



Read manual carefully before start, use or maintenance operation on the winch.



Danger, hazard due to a moving/rotating parts.



Wear hearing protection when operation the winch.



Do not lift persons with the winch.



Danger, electrical shock risk.

3.3 GENERAL SAFETY INSTRUCTIONS



THE WINCH MAY NOT BE USED FOR LIFTING OR MOVING PERSONS UNLESS IT IS CLASSIFIED AS A MAN RIDING WINCH.



Read manual carefully before start, use or carry out any maintenance operation on the winch.



This manual is issued with the scope to be a guide for the correct and safe use of the winch and for its rational maintenance. After careful reading keep present manual in unabridged condition and near the winch in order to be always available. In case of non-understanding of the manual or parts of such, we recommend to contact EMCÉ.



For any kind of technical assistance please contact EMCÉ or an official dealer of EMCÉ.



EMCÉ cannot know of, or provide all the procedures by which product operations or repairs may be conducted and the hazards and/or results of each method. If operation or maintenance procedures not specifically recommended by the manufacturer are conducted, it must be ensured that product safety is not endangered by the actions taken. If unsure of an operation or maintenance procedure step, personnel should place the product in a safe condition and contact supervisors and/or the factory for technical assistance.



On various parts of the winch warning labels are used. Observe the warnings on these labels, if you have a question concerning the meaning of a label, then go to your supervisor.

1. Only qualified personnel may operate the winch;
2. The winch operator must read the instructions and familiarize with the product before operation;
3. Wear suitable protective clothing such as overalls, industrial gloves, helmet, eye protectors and safety footwear during installation, operation and maintenance of the winch.
4. Ensure that there is sufficient lighting available to safely work with the winch.
5. Only authorized dealers and qualified mechanics may adjust or repair the winch;
6. Before performing any maintenance or close inspection to the winch, ensure that the product is not under load and that the power supply is switched off and disconnected;
7. Check controls of the product and its operation before operating the winch;
8. Do not operate without testing. (See « Inspection and Testing » procedures).
9. Do not operate winch in a damaged condition.
10. Do not operate winch that has not been properly maintained or equipped.
11. Do not attach winch to unsafe foundation. All bolts and foundations for winch attachment should have a higher load carrying capacity than the reaction forces of the winch.
12. Do not operate winch with any personnel near the line of force or capable of coming into contact with moving parts.
13. All signs and warning notices must be posted permanently on the winch.
14. Ease the slack out of the rope when starting a lift. Do not jerk the load.
15. Never leave a suspended load unattended.
16. Do not use limit switch settings to regulate the winch stopping points. Limit switches are designed as a backup to operator accidental over travel only.
17. Periodically check the tightness of all fasteners and tighten if necessary. Replace any damaged fasteners found;
18. Place the winch in a proper position and secure all fixing points with right size bolts correctly tightened;
19. Check oil level and fill up if necessary;
20. Ensure that all personnel and spectators are clear of the load and winch;
21. Should the winch be easily accessible by third parties, realize the protections stated by CE rules (MC 2006/42/CE);
22. Do not lift loads over people;
23. Use proper crane signals while operating the winch;

24. Ensure safe lifting practices are employed while rigging the cargo for lifting. Do not use untested or uncertified lifting appendages;
25. Avoid shock loads on the winch, inch the load into engagement before applying full power;
26. Limit switches are installed as a safety device; they are not suited to be used as positioning devices;
27. Swinging loads will significantly increase the products load and must be avoided;
28. Do not handle ropes without accident prevention gloves and never try to move ropes under tension;
29. Make sure that rope size and features are compatible with winch ones and check the correct fastening of the rope to the drum. Always maintain three or more wraps of rope on the drum;
30. Check the rope winding sense on winch drum for correctness and conformity to the one stated on winch data sheet. The correct winding contributes to extend rope's operational life;
31. Check rope integrity and absence of broken strands or kinks which may cause rope breaking;
32. Check safety device operation and efficiency;
33. Make sure that working conditions conform to winch features;
34. Never lift loads exceeding maximum safe working load (W.L.L.).
35. Beware of snatch loads on the winch. Any sudden loading can cause excessive acceleration forces on the winch system, resulting excessive wear or even complete failure. Snatch loads are usually only found in pulling applications or traversing systems. One way of avoiding them is using a rope leader of sufficient safety factor (usually SF6) which will stretch when loaded.
36. Some applications such as windlasses, mooring winches and towing winches require significantly higher than normal break loads. Ensure that the winch is suitable for these applications.
37. When ropes become slack on the drum, they will tend to expend, resulting in: "cutting in" of rope when the winch is loaded again or the rope coming off the drum and jamming elsewhere on the winch (e.g. around the winch shaft). Both situations will cause serious damage to the rope requiring replacements.

3.4 **EMERGENCY STOPS**

The winch controls must be equipped with an emergency stop that allows to switch of the winch in case of an emergency situation. The operators of the winch must be instructed about the location of the emergency stop(s).



- The emergency stop(s) may only be used during emergency situations.
- The functioning of the emergency stop(s) must be checked frequently.

3.5 **SAFETY GUARDS**

Drum and other running parts of a winch located in an easily accessible position shall be protected by opportune guards, only removable when the machine is stopped, according to safety rules in force (MC 2006/42/EC). Drum guards can be optional supplied by EMCÉ.

3.6 **SAFETY PRECAUTIONS DURING MAINTENANCE AND REPAIR**



- During maintenance and repair the winch must be isolated from the main supply.
- Electric winches must be isolated from the supply voltage with for example a main switch on the controls.
- The motor and gearbox can become hot during operation. Before starting any maintenance or repair on these components they first must cool down.

 	▪ If the winch is to be serviced in a potentially explosive atmosphere, the operator must first witch off power to the gear unit and ensure that it is out of service, as well as taking all necessary precautions against it being accidentally switched on again or its parts moving without warning. ▪ Furthermore, all additional environmental safety precautions must be taken (e.g. elimination of residual gas or dust, etc.).
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4. TRANSPORT AND STORAGE

4.1 PACKAGING OF THE WINCH

Every winch is delivered completely assembled, tested and packed, unless specified otherwise. Check product integrity on delivery and immediately notify found damages to the transport company.

The standard packaging, if supplied and unless otherwise agreed, is not proofed against rainfall and is intended for shipping by truck and not sea, and for storage in areas which are under cover and not humid. The material can be stored in suitable conditions for a period of 6 months under cover at a temperature between -15° C and +50° C at a relative humidity not in excess of 80%. Storage in all other conditions requires specific packaging. In case of doubt please consult EMCÉ.

The most frequent types of packaging are:

- Packaging on pallet
- Packaging in a wooden crate

Pallets and wooden crates are suitable for handling by a forklift.



Check the packing weight of the winch on the shipment documents before trying to handle the crate or pallet with a forklift to ensure that the forklift is able to handle the crate or pallet weight.

4.2 HANDLING INSTRUCTIONS

Handle packages as per the Manufacturer's instructions and those marked on the packages themselves. Since the weight and shape of the packages may make manual handling unfeasible, special equipment must be used to avoid damage and injury. Persons authorized for this purpose must be trained and experienced in the work in question to avoid risks to themselves and others.



- The person authorized to handle the product must take all necessary precautions to safeguard his safety and that of all other persons involved

4.2.1 Handling the packages

- Prepare a suitable, delimited area with a level floor or surface for unloading the packages.
- Prepare the equipment required to handle the package. The lifting and handling equipment (e.g. crane or lift truck) must be of adequate capacity for the weight and size of the load, taking into account attachment points and center of gravity. This information is indicated on the shipment documents or the package itself. Harness heavy packages with chains, belts and steel ropes after checking that they are suitable for the weight of the packages.
- When handling the load keep it level to avoid tipping and instability.

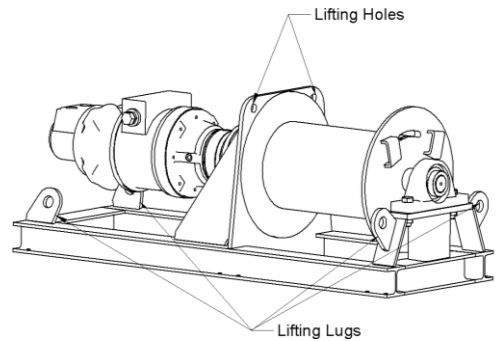
4.2.2 Handling the winch



- When lifting, use accessories such as shackles, hooks, straps, chains, ropes, etc which are certified and adequate for the load in question. The weight of the winch excluding rope can be found on the product datasheet. In case the winch is lifted with the rope spooled on the winch drum the weight of the rope should also be taken into account.

For lifting the winch following possibilities should be used, starting from the top.

1. Use the lifting lugs on the frame (if applied)
2. Use the holes in the main plate (if applied)
3. Use a sling around the drum



4.3 STORAGE OF THE WINCH

The following recommendations should be followed when storing the winch.

- Do not store the unit in excessively humid conditions or where it is exposed to the weather (do not store outdoors).
- Place the winch on a stable base and make sure that it is not subject to accidental displacement.
- Store the packaged winch (if allowed) in accordance with the instructions on the packaging itself.



- Control panels with frequency inverters should be electrical powered for at least once a year for a period of 1 hour to ensure that the frequency inverter stays in proper condition. An electrical supply to the control panel is sufficient for this purpose. The winch does not have to be in operation during this 1 hour period.

5. INSTALLATION



- The person authorized to install the product must take all necessary precautions to safe-guard his safety and that of all other persons involved

	▪ If the winch is to be serviced in a potentially explosive atmosphere, the operator must first switch off power to the winch ensure that it is out of service, as well as taking all necessary precautions against it being accidentally switched on again or its parts moving without warning.
	▪ Furthermore, all additional environmental safety precautions must be taken (e.g. elimination of residual gas or dust, etc.).

5.1 WINCH INSTALLATION



- The entire installation process must be planned as early as the general design phase of the machine. The person authorized to do the work must, if necessary, set out a safety plan to protect the health and safety of all persons directly involved and apply all applicable legislation.
- Carefully remove all packaging and protective residue from the winch.
- Pay particular attention to the mating surfaces.
- Check that the data on the nameplate correspond to those specified in the purchase order.
- Ensure that the structure to which the winch is to be mounted is sufficiently robust and rigid to support its weight and operating stresses.
- EMCÉ winches are standard supplied for placement on a horizontal floor unless otherwise specified in the purchase order and winch drawings. Most winches can also be used in different positions with some small adjustments to the gearbox. In case of doubt about the installation position of the winch please contact EMCÉ or your local dealer.
- Winch foundation shall be flat and stiff to avoid anomalous tensions which could cause the quick wear of internal parts;
- Position the winch onto the foundation and check winch foundation feet for perfect sticking to;
- Fit opportune shim plates before foundation bolt tightening should any gap be found between foundation and winch feet;
- Use grade 8.8 or higher foundation bolts through all existing foundation holes. The required grade, size and quantity of foundation bolts are indicated on the winch general arrangement drawing. Tighten all bolts with due torque;

Size (mm)	torque 8.8 (Nm)	torque 10.9 (Nm)
M 8	25	35
M 10	50	70
M 12	87	122
M 16	211	299
M 18	289	412
M 20	412	578
M 24	711	1000
M 27	1049	1481
M 30	1422	2010
M 33	1932	2716
M 36	2481	3491
M 39	3223	4530

- Winch installation shall be such to warrant that the line connecting the middle of the drum to the first rope pulley is perfectly perpendicular to drum shaft. Small deviations may cause bad winding of the rope on the drum;
- The distance between winch and first pulley shall be such to warrant the correct fleet angle of installed rope.



- Drum and other running parts of a winch located in an easily accessible position shall be protected by opportune guards, only removable when the machine is stopped, according to safety rules in force (MC 2006/42/EC).

 	Installation of winches classified under Directive 94/9/EC ▪ Category 2D winches must be installed in compliance with the provisions of standards EN 1127-1 and EN 50281-1-2. The installer must, therefore, be fully informed and trained for this application. ▪ The installation technician must be aware of the ATEX class of the installation area, as well as the risks associated with the presence of a potentially explosive atmosphere, with particular attention to explosion and fire hazards, and thereby adopt the necessary safety precautions. ▪ All maintenance, assembly and disassembly work must be done outside the explosion hazard area by trained personnel. ▪ Check that all accessory components (cables, joints, cable glands, cooling units, etc.) comply with the Essential Health and Safety Requirements of the ATEX directives. Handle them with extreme care to avoid altering their characteristics. ▪ Clean the winch thoroughly after installation.
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5.2 ELECTRICAL INSTALLATION



- Switch off electrical power to the winch to ensure that it is out of service before working on the electrical components of the winch. Also take all necessary precautions against it being accidentally switched on again.

 	▪ The surface of flameproof joints HAVE NOT TO BE MACHINED OR PAINTED. These surfaces must be kept clean, against corrosion and to prevent the water from entering, with a thin layer of silicon-based grease. ▪ The unused openings of explosion proof equipment must be sealed so as to guarantee that the flame-proof properties are maintained. The means foreseen to achieve this goal must be such so as to ensure that the sealing plug can only be removed with the help of a tool (according to EN 50014).
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5.2.1 Electric motor

The connection details of the motor can be found on the inside of the terminal box cover of the motor.

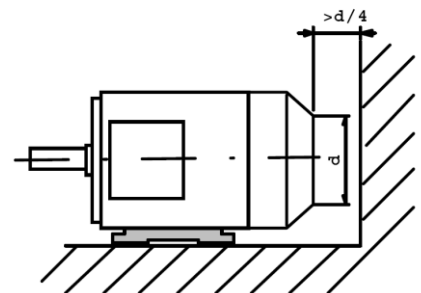
Choose cable cross-sections in accordance with the rated current. Unused cable entries must be closed by compression glands. The supply cables must be connected with special care to ensure permanent and reliable contact (without loose cable ends); use suitable terminals for the connection cables. Supply cables must be stress-relieved so that no cantilever loads are exerted on the terminals.



- Ensure a good connection of the protective conductor.

Make sure that no foreign matter is left in the terminal box, and that it is clean and dry. Cable entries which are not used and the terminal box itself have to be sealed dust and water-tight. In order to maintain the degree of protection, always make sure that the original gaskets are used when closing the terminal box.

The distance between air intake of the motor and walls or other machinery must be at least 1/4 of the diameter of the air intake opening (not applicable for totally enclosed non ventilated motors). Cooling airflows from the non-drive end towards the drive end. Air leaving the motor must not be drawn in again by the fan. Keep air inlets and outlets clean.



5.2.2 Control panel

EMCÉ electric winches are optionally supplied with controls. The required winch voltage can be found on the winch datasheet (see annex I) and on the winch tag plate. Technical details about the electric components can be found in annex II.

In case the winch is delivered including control panel the documentation of the controls can be found in Annex III and in the inside of the control panel door.



- A control panel is supplied with test cables between the panel and the winch, unless otherwise agreed. The test cables must be replaced by suitable permanent cables during installation of the winch by a skilled electrical engineer. The documentation supplied along with the control panel includes a cabling lay-out with the minimum required cable cross-section. In case of doubt of the correct cables please contact EMCÉ or your local dealer.

5.3 GEARBOX LUBRICATION

Check the winch datasheet (annex I) for the type of oil used for your winch.



- EMCÉ winches are usually delivered with lubricating oil. Nevertheless check oil level at installation and fill up if necessary. For further details see section (8).

5.4 ROPE INSTALLATION

5.4.1 Preparations before installing the rope

Handling and installation of the rope should be carried out in accordance with a detailed plan and should be supervised by a competent person.



- Incorrectly supervised handling and installation procedures may result in serious injury to persons in the vicinity of the operation as well as those persons directly involved in the handling and installation.

Wear suitable protective clothing such as overalls, industrial gloves, helmet, eye protectors and safety footwear



- Failure to wear suitable protective clothing and equipment may result in skin problems from over exposure to certain types of rope lubricants and dressing

Ensure that the correct rope has been supplied by checking to see that the description on the Certificate is in accordance with that specified in the purchaser's order.

Check by measurement that the nominal diameter of the new rope conforms to the nominal size stated on the Certificate. Examine the rope visually to ensure that no damage or obvious signs of deterioration have taken place during storage or transportation to the installation site.

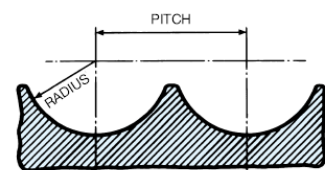
Check the working area around the equipment for any potential hazards which may affect the safe installation of the rope.

Check the condition of the rope-related equipment in accordance with the OEM's instructions. Include the following:

Drum

Check the general condition of the drum.

If the drum is grooved, check the radius and pitch and ensure that the grooves will satisfactorily accommodate the size of the new rope.



Sheaves

Ensure that the grooving is of the correct shape and size for the new rope
Check that all sheaves are free to rotate and in good condition.



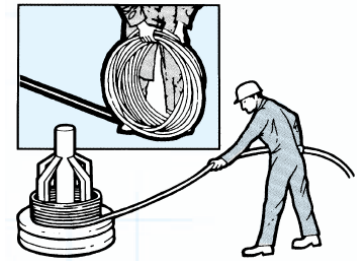
- Failure to carry out any of the above could result in unsatisfactory and unsafe rope performance.

5.4.2 Positioning the rope coil or reel

Coils

Place the coil on the ground and roll it out straight ensuring that it does not become contaminated with dust/grit, moisture or any other harmful material.

If the coil is too large to physically handle it may be placed on a 'swift' turntable and the outside end of the rope pulled out allowing the coil to rotate.



- Never pull a rope away from a stationary coil as this will induce turn into the rope and kinks will form. This will adversely affect rope performance.

Wrong
Note the kinks forming



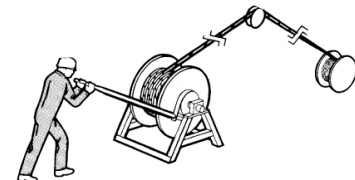
Reels

Pass a shaft through the reel and place the reel in a suitably anchored stand which allows it to rotate and be braked to avoid overrun during installation. Where multi-layer coiling is involved it may be necessary for the reel to be placed in equipment which has the capability of providing a back tension in the rope as it is being transferred from reel to drum. This is to ensure that the underlying (and subsequent) laps are wound tightly on the drum.

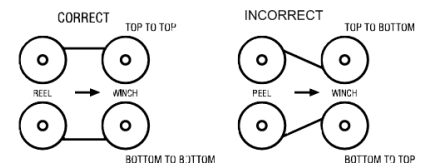
- Position the reel and stand such that the fleet angle during installation is limited to 1.5 degrees.
- If a loop forms in the rope ensure that it does not tighten to form a kink.



- A kink can severely affect the strength of a six strand rope and can result in distortion of a rotation- resistant or low rotation rope leading to its immediate discard.



Ensure that the reel stand is mounted so as not to create a reverse bend during reeving (i.e. for a winch drum with an overlap rope, take the rope off the top of the reel).



Ensure that any equipment or machinery to be roped is correctly and safely positioned and isolated from normal usage before installation commences. Refer to the OEM's instruction manual and the relevant 'Code of Practice'.

When releasing the outboard end of the rope from a reel or coil, ensure that this is done in a controlled manner. On release of the bindings and servings used for packaging, the rope will want to straighten itself from its previously bent position. Unless controlled, this could be a violent action. Stand clear.



- Failure to control could result in injury.

5.4.3 Fitting the rope to the winch drum



- Switch off power to the winch to ensure that it is out of service before fitting the rope to the winch drum. Also take all necessary precautions against it being accidentally switched on again.
- Before fitting the rope the cable anchor on the drum should be positioned to an easily accessible position. During fitting of the rope the winch must be isolated from the main supply.
- On winches with a pressure roller the spring tensions must be removed before and during the installation of the rope.
- To access the rope dead end connection it is normally required to remove the drum guard. Ensure that the drum guard is placed back onto the winch before the power to the winch is switched on.

Changing the winch rotation by reversing the rope dead end connection is only possible when the winch is equipped with two wedge pockets or two cable clamp mounting positions.

Fit rope dead end from the inside of the drum to the outside through the slotted hole in one of the drum flanges (see picture 5.4.1).

Fastening with pocket and wedge

The rope dead end shall be fitted in the pocket as to make an eye around the rope wedge with free end fitted backwards through the pocket (see picture 5.4.2).

Pull the rope from the opposite side to press rope and wedge into the pocket (see picture 5.4.3). The free end of the rope end shall at all times be 5 times the rope diameter and the rope end shall be prevented from fraying.

Fitting with rope clamp

Fit the rope as shown on picture 1 and through the rope clamp on the drum flange.

Tighten rope clamp bolts according to the table in section 5.1 (see picture 5.4.4).



Picture 5.4.1



Picture 5.4.2



Picture 5.4.3



Picture 5.4.4

If more than 1 rope clamp is fitted to the drum flange, all rope clamps must be used to properly secure the rope dead end.

Other possibilities

In some cases a different fastening of the rope than mentioned before is provided. In these cases the rope is fastened by means of:

- A hole in the drum with several fixing bolts
- Special rope clamps on the drum
- For steel wire rope always keep a minimum of 3 rope coils wound around the drum to warrant a safe winch load holding. The rope dead end fastening alone is not sufficient to hold the winch load.
- For fiber rope always keep a minimum of 8 rope coils wound around the drum to warrant a safe winch load holding. The rope dead end fastening alone is not sufficient to hold the winch load.
- Make sure that rope clamp bolts don't pass over the flange plate. If it happens, shorten the bolts to avoid rope damage.
- Never fit a rope longer than the maximum allowed to avoid excess rope layers non-conforming to safety rules.



5.4.4 Spooling the rope on the winch drum

Ensure that the as-manufactured condition of the rope is maintained during installation. Monitor the rope carefully as it is being pulled into the system and make sure that it is not obstructed by any part of the structure or mechanism which may cause the rope to come free.



- Failure to monitor during this operation could result in injury.

This entire operation should be carried out carefully and slowly under the supervision of a competent person.

When coiling a rope on a plain (or smooth) barrel drum ensure that each lap lies tightly against the preceding lap. The application of tension in the rope greatly assists in the coiling of the rope.



- Refer to section 5.5 for instructions regarding the spooling gear (optional)
- Check that the new rope is spooling correctly on the drum and that no slack or cross laps develop. Apply a back tension in the order of 2% to 5% of the strength of the rope in order to achieve tight and even coiling especially on the first layer.
- Any looseness or uneven winding will result in excessive wear, crushing and distortion of the rope.
- The first winding of the rope to the drum shall be such to obtain a perfect compactness of the rope coils and leave no space between the coils. Keep the rope under tension during the first winding operation. The rope can be easily damaged should it be wedged under load between non compacted under laying coils.

When multi-layer coiling has to be used it should be realized that after the first layer is wound on a drum, the rope has to cross the underlying rope in order to advance across the drum in the second layer. The points at which the turns in the upper layer cross those of the lower layer are known as the cross-over points and the rope in these areas is susceptible to increased abrasion and crushing. Care should be taken when installing a rope on a drum and when operating a machine to ensure that the rope is coiled and layered correctly.

Where multi-layer coiling is unavoidable, succeeding layers should coil evenly on the preceding layers of rope.



- Irregular coiling usually results in severe surface wear and rope malformation, which in turn is likely to cause premature rope failure.

Ensure that the as-manufactured condition of the rope is maintained throughout the whole of the handling and installation operation.



- Limit switches, if fitted, must be checked and re-adjusted, if necessary, after the rope has been installed.

Record the following details on the Certificate after installation has been completed: type of equipment, location, plant reference number, duty and date of installation and any re-rating information/signature of competent person. Then safely file the Certificate.

Run in' the new rope by operating the equipment slowly, preferably with a low load, for several cycles. This permits the new rope to adjust itself gradually to working conditions.



- Unless otherwise required by a certifying authority, the rope should be in this condition before any proof test of the equipment or machinery is carried out.

5.5 PLACING THE SPOOLING GEAR ROLLERS IN THE CORRECT POSITION (OPTIONAL)



- Switch off power to the winch to ensure that it is out of service before adjusting the spooling gear. Also take all necessary precautions against it being accidentally switched on again.

Before adjusting the spooling gear it is recommended to wind three windings of cable on the drum as show in figure 5.5.1. Now measure the distance between the drum flange and the inner side of the departing cable.

For a mechanical spooling gear the connection between the drum and the spooling gear must be disconnected before the position of the guide rollers can be adjusted. Depending on the technical specifications of the spooling gear this must be done the following way.

- If a manual adjustment is foreseen, pull out the hand wheel on the spooling shaft.
- If no manual adjustment is foreseen, loosen the chain which connects the winch drum and the spooling gear

The guide rollers on the spooling gear can now be adjusted by either turning the hand wheel (if applicable) or the shaft of the spooling gear. The spooling block should be positioned in such a way that the left side of the right guide roller has the same distance towards the drum flange as the before measured length of departing cable. The dimension of distance (A) should be zero, see figure 5.5.2. Be sure that the spooling blocks travels the same direction as the cable. Push in the hand wheel (if applicable) or lock the chain to reconnect the spooling gear with the winch drum, from now the spooling gear should work properly.

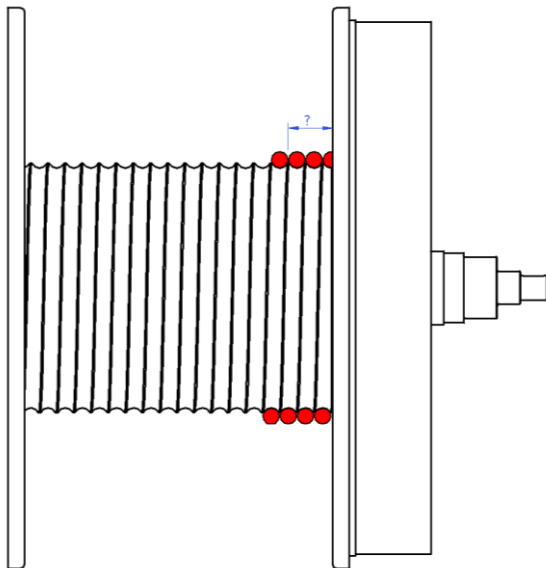


Figure 5.5.1

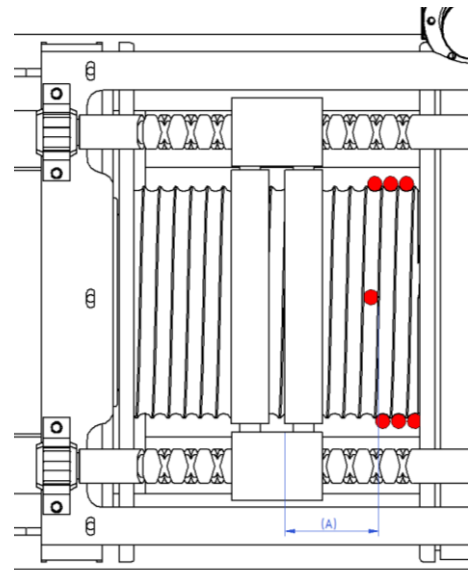


Figure 5.5.2

5.6 SPINDLE LIMIT SWITCH ADJUSTMENT (OPTIONAL)

Limit switches should be used on lifting winches to ensure that the rope could only be used between the upper and lower position allowed position. Limit switches also allow a guarantee of the required "dead" safety windings on the drum and stop the winch when the highest and lowest position are reached.

After installation of the rope onto the winch drum the upper and lower limit switch must be adjusted to ensure that they are applied at the correct position of the rope.



- See Annex II for specific instructions for the spindle limit switch model fitted on your winch and the method to adjust the cams of the spindle limit switch.

Adjustment

1. Install a test load to the rope for setting up purposes.
2. Remove the cover from the spindle limit switch enclosure.
3. Lift the test load to the upper limit of the rope.



- The adjustment of the top (upper) limit switch must be done at the minimum safety distance of 2 meters from the return sheave block or from the highest point the rope can reach.

4. Adjust the cam of the upper limit switch up till the limit switch is actuated.
5. Lower the test load a bit.
6. Lift the test load until the limit switch is actuated.

If the setting of the upper limit is correct proceed with point 7, otherwise repeat point 3 till 6.

7. Lower the test load to the lower limit of the rope.



- Ensure that at least 3 “dead” safety windings remain on the winch drum at the lower position when using steel wire rope.
- Ensure that at least 8 “dead” safety windings remain on the winch drum at the lower position when using fiber rope.

8. Adjust the cam of the lower limit switch up till the limit switch is actuated.
9. Raise the test load a bit.
10. Lower the test load until the limit switch is actuated.

If the setting of the upper limit is correct proceed with point 11, otherwise repeat point 7 till 10.

11. Refit the cover to the limit switch enclosure.



- Spindle limit switches on a winch are considered as safety device in case of human error and not as a positioning switch. In case it is required to position a load with limit switches it is required to use sensors that detect the position of the load moved by the winch. When limit switches are used for positioning it is often required to have two switches for each position ea. a switch for normal operation and a backup switch. A risk assessment based on the complete operation should be done to determine the need of a second limiter if positioning by limit switches is required.

5.7 SLACK ROPE DEVICE (OPTIONAL)

Make sure the rope is properly wound on the drum. The rope must pass underneath the rollers when coming out of the drum, so that when a tension is applied on the end of the rope, the slack rope device arm is lifted.

Ensure that the rope angle from the winch drum complies with angle as indicated on the winch general arrangement drawing in Annex III.

6. START UP SEQUENCE

Before the winch is placed into service the following initial operating checks should be performed.



- Equipment which has been in storage for a period of over six months shall be given a complete inspection conforming with the requirements of "Periodic Inspection" before being placed into service.

1. Check lubricating oil level and fill up if necessary;
2. Check if all safety guards are fitted to the winch.
3. Prior to operation, visually inspect winch housings, controls, brakes and drum for indications of damage.
4. Check connections of power supply. Electric wiring connections, if in doubt check phase cycle, voltage dip during operation and current supply. (Fix loose wiring or exposed wiring or connections).
5. Make a few trials without load to check correct operation of the system.
 - Verify response to control is quick and smooth. If winch responds slowly or movement is unsatisfactory, do not operate winch until all problems have been corrected.
 - Check for correct functioning of the pressure roller (optional).
6. Fit the rope as described in section 5.
7. Make a few lifting trials with reduced load to check the correct operation, pay attention to excessive or unexplained noises;
 - Brakes must hold load without slipping. Automatic brakes must release when winch motor is operated. If brakes do not hold load, or do not release properly, the brakes must be adjusted or repaired.
 - Visually inspect the rope. Inspect for wear and damage indicated by distortion of rope such as kicking, "birdcaging", core protrusion, main strand displacement, corrosion, broken or cut strands. If damage is evident, do not operate winch until the discrepancies have been reviewed and inspected further by personnel instructed in the operation, safety and maintenance of this winch.
 - Check rope spooling and ensure the rope is properly secured to the drum.
 - Check for correct working of the limit switches and adjust if necessary (optional).
 - Check for correct working of the slack rope device and adjust if necessary (optional).
8. Make a few lifting trials with full load to check the correct operation, pay attention to excessive or unexplained noises;
 - Brakes must hold load without slipping. Automatic brakes must release when winch motor is operated. If brakes do not hold load, or do not release properly, the brakes must be adjusted or repaired.
 - Check the functioning of the emergency stop button(s) during operation of the winch.
 - Check brake for safe operation by means of a power failure simulation.
9. Check for correct working of the load limiting device (optional).

7. WORKING WITH THE MACHINE

7.1 START, NORMAL OPERATION AND STOP

7.1.1 Check list for prestart preparation

1. Perform the frequent inspection (see chapter 7.2) at the beginning of each shift.
2. The operator must be physically capable and mentally alert. They must have good hearing, vision and depth perception.
3. The winch operator must read the instructions and familiarize with the product before operation;
4. Do not operate winch with any personnel near the line of force or capable of coming into contact with moving parts.
5. Ensure that all personnel and spectators are clear of the load and winch;
6. Make sure that working conditions conform to winch features;
7. The operator must make sure all conditions are safe for operations. If the operator feels that anything is unsafe, or even questionable, do not proceed until properly evaluated or corrected.

7.1.2 Main operating instructions

The following descriptions cover the functional operation of the winch controls only. It does not cover any operations performed using the winch. It is the operators responsibility to understand all facets of the operation.



- The operator shall initiate movements of the load with the lowest available speed. The rope shall be tightened and shall not be in the slack-condition when the load movement begins.
- It is forbidden to move loads above the rated capacity of the winch.
- Do not try to move fixed or obstructed loads
- With winches for lifting and lowering suspended loads, side-pull of load is not allowed.
- Excessive inching (e.g. giving short pulses to the motor) shall be avoided.

Standard our products are delivered without control. Below an operating instruction is given about the optional controls EMCÉ can deliver. In case controls are obtained from another supplier please use the instruction manual from the supplier for safe use.



- On winches with an optional manual operated bandbrake, the bandbrake must first be released before the below operation of the winch can be performed.
- On winches with an optional manual operated clutch, the clutch must be engaged before the below operation of the winch can be performed.

Before start up

- Turn speed control potentiometer on main control panel in position "0" (only applicable for controls with a frequency inverter).

"Paying in"

- Press the "in" button on the main control panel. Check if the cable is spooling correct and if the load in the winch rope is stable.
- Turn the speed control potentiometer on main control panel up till the winch is slowly rotating. Before increasing the speed of the winch check if the cable is spooling correct and if the load in the winch rope is stable (only applicable for controls with a frequency inverter).

"Paying out"

- Press the "out" button on the main control panel. Check if the cable is spooling correct and if the load in the winch rope is stable.
- Turn the speed control potentiometer on main control panel up till the winch is slowly rotating. Before increasing the speed of the winch check if the cable is spooling correct and if the load in the winch rope is stable (only applicable for controls with a frequency inverter).



- For winches with frequency inverters that do not have motors with forced ventilation the running times of the winch at slow speed are limited due to the reduced cooling capacity of the motor at slow speeds. For such winches we recommend to use the winch mainly on slow speed during starting, stopping and positioning.

To stop the winch

- Turn speed control potentiometer on main control panel in position “0” (only applicable for controls with a frequency inverter).
- Release “in” or “out” button

7.1.3 Safety devices (optional)



- The functioning of the safety devices must be checked frequently.

Emergency stop

Turn the button for normal operation (button in upper position). To stop the winch push the button down. To reset the emergency stop turn the button to the upper position.



- The emergency stop(s) may only be used during emergency situations.
- The operators of the winch must be instructed about the location of the emergency stop(s).

Load limiting device

When a load limiter is activated the winch can only be operated in the lowering direction. Operating the winch in the lowering direction will reset the load limiting device.

To verify the functioning of the load limiting device attach a load of about 125% of the working load limit of the winch to the cable (see Annex I for the 1st and top layer working load limit) and try to lift this load. The winch should be unable to lift the load and only be allowed to lower the load. In case the load limiter is not actuated please contact EMCÉ for adjustment instructions.

Spindle limit switch

When the upper limit switch is activated the winch will stop and can only be operated in the lowering direction. A minimum safety distance of 2 meters from the return sheave block or from the highest point the rope can reach should be taken into account.

When the lower limit switch is activated the winch will stop and can only be operated in the lifting direction.



- Ensure that at least 3 “dead” safety windings remain on the winch drum at the lower position when using steel wire rope.
- Ensure that at least 8 “dead” safety windings remain on the winch drum at the lower position when using fiber rope.
- The upper limit switch must be actuated at a minimum safety distance of 2 meters from the return sheave block or from the highest point the rope can reach.

Slack rope switch

When a slack rope is detected (when the winch is paying out rope) the winch will stop. When the slack rope switch is applied the winch can only be operated in the lifting direction up till there is no slack rope detected anymore.

7.1.4 **Manual operated bandbrake (optional)**

The bandbrake on a winch can be used to lock the winch drum during maintenance or when the disengagement clutch on the drum is released. When a load remains in the cable after the job with the winch is finished the bandbrake should also be engaged to prevent that the loads remains on the winch drive when the winch is not in use. Before the winch is taken back into service the bandbrake must first be released. Below the instructions for the bandbrake operation are given.

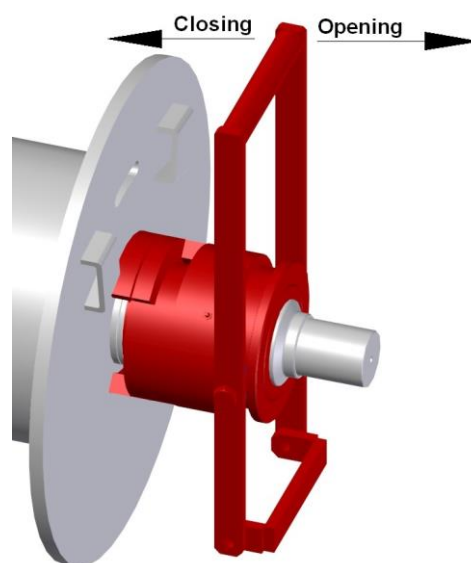
Overcentre type bandbrake 	Wind-on bandbrake 
<u>Closing</u> - Push the handle towards it's outer limit in the direction of the bandbrake rim <u>Opening</u> - Pull the handle towards you up till it's outer	<u>Closing</u> - Rotate the handle (clockwise) up till the bandbrake is firmly locked <u>Opening</u> - Rotate the handle (counter clockwise) up till the bandbrake is fully free of the brake rim

7.1.5 **Manual operated clutch (optional)**

With a clutch the winch drum can be disengaged from the winch drive, which allows to walk out the cable. Below the instructions are given for the operation of the clutch.

Closing

- Close the bandbrake (when available)
- Turn the drum shaft up till the pins/claws of the clutch are placed before the corresponding openings on the winch drum. Depending on the type of winch the shaft can be rotated as follows
 - With a hand wheel on the winch drive
 - By operating the winch at a slow speed
- When the above methods are not possible the last option is to rotate the drum manually up till it is in the correct position compared to the pins/claws of the clutch.
- Move the handle in the direction of the winch drum up till the clutch is fully closed.
- Open the bandbrake before the winch is used (when available).



Manual operated clutch

Opening

- Close the bandbrake (when available)
- Turn the drum shaft up till the pins/claws of the clutch are not making contact anymore with the corresponding openings on the winch drum. Depending on the type of winch the shaft can be rotated as follows
 - With a hand wheel on the winch drive
 - By operating the winch at a slow speed
- When the above methods are not possible the last option is to rotate the drum manually up till it is in the correct position compared to the pins/claws of the clutch.
- Move the handle in the drum support bearing up till the clutch is fully free of the winch drum.
- Open the bandbrake before the winch is used (when available).



- On a winch without bandbrake the clutch may only be operated when there is no load in the cable.
- The winch drum may only be rotated manually when there is no load in the cable.
- Before rotating the winch drum manually, the winch must be isolated from the main supply. A dangerous occurrence is likely to occur if the motor is powered.

7.1.6 Emergency hand crank (optional)



- Before engaging the emergency hand crank, the winch must be isolated from the main electrical, hydraulic or air supply. A dangerous occurrence is likely to occur if the motor is powered with the crank handle engaged.
- The crank handle is connected to the winch frame by mean of a wing nut. Remove the handle from the winch frame.
- Depending on the winch type the hand crank should be fitted as follows
 - On the gearbox input shaft opposite to the motor is a recessed shaft protected by a nylon plug. Remove the plug and slot the crank handle onto the keyway.
 - On the back of the motor is a recessed shaft protected by a nylon plug. Remove the plug and slot the crank handle onto the keyway.
- Ascertain the direction of rotation by turning the crank handle two or three revolutions.
- Thereafter, continue to wind in the direction required to recover the load or person suspended from the winch rope.



- In case the winch is supplied with one or more brakes, carefully release the brakes before use of the emergency hand crank. To make sure that the load not drops when releasing the brakes, the emergency crank must be locked during release of the brakes or hold tight by an operator. In case the winch is equipped with a self-braking worm gearbox (reduction of 80 to 100) the load will be sustained by the gearbox even when the brakes are released.
- In case a self-braking hand crank is fitted the opening on the side of the crank should be placed over the locking pin.

7.2 INSPECTIONS



- Before use, free the unit from snow, ice, sand, gravel or other interfering matter.
- All new, altered or modified equipment should be inspected and tested by personnel instructed in safety, operation and maintenance of this equipment to ensure safe operation at rated specifications before placing equipment in service.
- Never use a winch when inspection indicates it is damaged. Frequent and periodic inspections should be performed on equipment in regular service.



- Observe the routine inspection and maintenance schedule to ensure suitable operating conditions and the effective explosion protection of the unit.

Frequent inspections are visual examinations performed by operators or service personnel during routine winch operation. Periodic inspections are thorough inspections performed by personnel trained in inspection of the winch. Inspection intervals depend upon the nature of the critical components of the equipment and the severity of usage. Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous. Deficiencies revealed through inspection, or noted during operation, must be reported to an appointed person. A determination must be made as to whether a deficiency constitutes a safety hazard before resuming operation of the winch.

Records and Reports

Some form of inspection record must be maintained for each winch, listing all points requiring periodic inspection. A written report should be made monthly on the condition of the critical parts of each winch. These reports should be dated, signed by the person who performed the inspection, and kept on file where they are readily available for review.

Rope Reports

Records should be maintained as part of a long-range rope inspection program. Records should include the condition of rope removed from service. Accurate records will establish a relationship between visual observations noted during frequent inspections and the actual condition of rope as determined by periodic inspections.

7.2.1 Frequent Inspection

On equipment in continuous service, frequent inspection should be made by operators at the beginning of each shift. In addition, visual inspections should be conducted during regular operation for indication of damage or evidence of malfunction (such as abnormal noises).

1. WINCH. Prior to operation, visually inspect winch housings, controls, brakes and drum for indications of damage. Do not operate the winch unless the rope feeds into the drum smoothly. Any discrepancies noted must be reviewed and inspected further by authorized personnel instructed in the operation, safety and maintenance of this winch.
2. STEEL WIRE ROPE. Visually inspect all wire rope which can be expected to be in use during the day's operations. Inspect for wear and damage indicated by distortion of wire rope such as kicking, "birdcaging", core protrusion, main strand displacement, corrosion, broken or cut strands. If damage is evident, do not operate winch until the discrepancies have been reviewed and inspected further by personnel instructed in the operation, safety and maintenance of this winch.
3. FIBER ROPE. It is important to inspect your rope before and after each use. This inspection must be done at all times and also applies to new rope prior to it being put into service. The fiber rope should be thoroughly inspected visually and manually (with bare hands) over the entire length of the rope. It is the users' responsibility to know the history of the rope and to make the decision as to when the rope should be retired. The manufacturer cannot guarantee the specifications of used rope.



- The full extent of rope wear cannot be determined by visual inspection. At any indication of wear inspect the rope in accordance with instructions in "Periodic Inspection."

4. ELECTRIC SYSTEM. Check connections of power supply. Electric wiring connections, if in doubt check phase cycle, voltage dip during operation and current supply. (Fix loose wiring or exposed wiring or connections).
5. CONTROLS. During operation of winch, verify response to control is quick and smooth. If winch responds slowly or movement is unsatisfactory, do not operate winch until all problems have been corrected.
6. BRAKES. During winch operation test brakes. Brakes must hold load without slipping. Automatic brakes must release when winch motor throttle is operated. If brakes do not hold load, or do not release properly, the brakes must be adjusted or repaired.
7. ROPE REEVING. Check reeving and ensure rope is properly secured to the drum.
8. SAFETY DEVICES. Check functioning of the emergency stop, limit switches and slack rope device if fitted on the winch (see section 7.1.3).
9. LUBRICATION. Refer to section 8 for recommended procedures and lubricants.

7.2.2 Periodic Inspection

Frequency of periodic inspection primarily depends on the severity of usage :

NORMAL	: semi-annually
HEAVY	: quarterly
SEVERE	: monthly

Keep accumulative written records of periodic inspections to provide a basis for continuing evaluation. Inspect all items listed in "Frequent Inspection". Also inspect the following :

1. **FRAME and UPRIGHT.** Check for deformed, or cracked or corroded main components. If external evidence indicates the need for additional inspection return winch to your nearest EMCÉ service repair center.
2. **FASTENERS.** Check retainer rings , split pins, cap screws, nuts, and other fasteners on winch, including mounting bolts. Replace if missing or damaged and tighten if loose.
3. **DRUM AND SHEAVES.** Check for cracks, wear or damage. Replace if necessary.
4. **STEEL WIRE ROPE.** In addition to Frequent Inspection requirements, also inspect for the following:
 - a. Build-up of dirt and corrosion. Clean with steam or a stiff wire brush to remove dirt and corrosion if necessary.
 - b. Loose or damaged end connection. Replace if loose or damaged
 - c. Check wire rope anchor is secure in drum.
 - d. Verify wire rope diameter. Measure the diameter of the wire rope from crown-to-crown throughout the life of the rope. Recording of the actual diameter should only be done with the wire rope under equivalent loading and in the same operating section as accomplished during previous inspections. If the actual diameter of the wire rope has decreased more than 0.4 mm (1/64inch) a thorough examination of the wire rope should be conducted by an experienced inspector to determine the suitability of the wire rope to remain in service.
 - e. A wire rope must be discarded if at least one of the following applies:
 - Broken wires
 - Wear
 - Corrosion
 - Reduced diameter
 - External damage and/or deformation
 - Broken strands

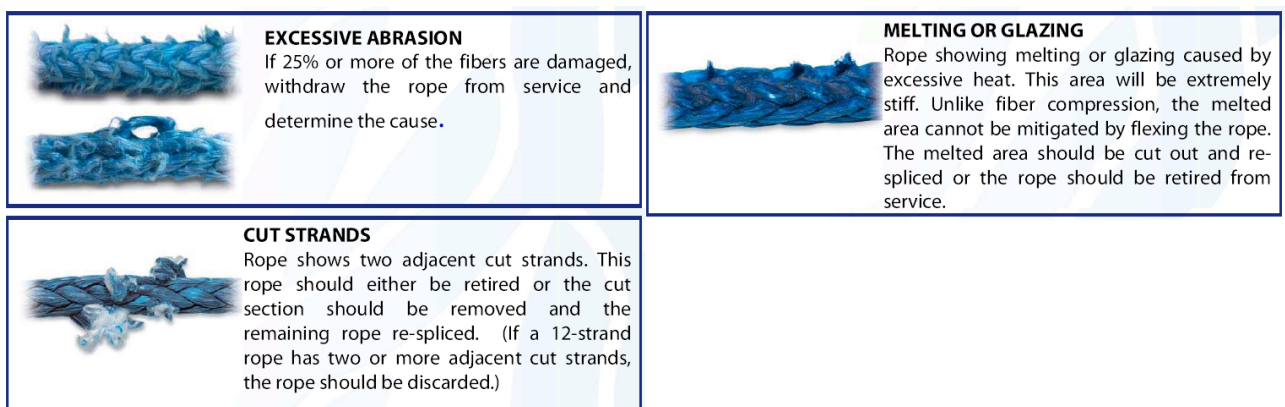
The discard criteria listed above must relate to the worst part of a wire rope, and the evaluation figures must be established in accordance with the below table according ISO 4309:

Steel wire rope construction	Number of loadbearing wires in all outer strands of the rope	Number of visible broken wires – replacement required			
		ISO group M1, M2		ISO group M3, M4, M5, M6, M7, M8	
		Over a length of 6x rope diameter	Over a length of 30x rope diameter	Over a length of 6x rope diameter	Over a length of 30x rope diameter
6x36	216	9	18	18	35
19x7	84	4	8	8	16
35x7	119	5	10	10	19

5. **FIBER ROPE:** In addition to Frequent Inspection requirements, also inspect for the following:
 - a. Build-up of dirt. Remove dirt if necessary.
 - b. Loose or damaged end connection. Replace if loose or damaged
 - c. Check whether the fiber rope is secured properly to the drum.
 - d. Rope conditions (a sample or photo of unused rope is required at all times for comparison to other ropes in use along with the ropes inspection record and history).
 - e. The following list contains general guidelines that can assist you in deciding when to retire a fiber rope.
 - *Abrasion:* if rope strands are reduced by 25% or more through abrasion.
 - *Cut Fiber strands:* rope displaying two or more adjacent cut strands.

- **Shock loading:** rope that has been subjected to severe shock loading.
- **Overloading:** rope that has been subjected to the kind of overload for which it was not designed, such as towing or lifting heavy objects beyond the working load limits.
- **Chemical contamination:** unless the chemical is specifically known to be harmless, it should be considered a contaminant.
- **Texture inconsistency:** soft, mushy places or hard spots (localized or over an extended area).
- **Age:** the rope is simply worn out from use.
- **Diameter inconsistency:** a visible change in diameter: localized diameter reduction, flat areas, lumps and bumps in rope.
- **Loss of confidence:** the rope was used by persons whom you suspect may not have taken proper care of it.

Although there is no conclusive evidence from manufacturers, we recommend that a rope be taken out of service within five years of the manufacturing date. Seek proper instruction in the correct techniques and use of all ropes and equipment. A novice's lack of experience is often the reason ropes are inadvertently exposed to situations that cause premature rope damage.



6. **ALL COMPONENTS.** Externally inspect for wear, damage, distortion, deformation and cleanliness. Clean, replace or lubricate as required.
7. **BRAKE.** Test brake to ensure proper operation. Brake must hold 150% rated load with full drum without slipping. If poor operation or visual damage, return winch to an authorized service center for repair; Check all brake surfaces for wear, deformation or foreign deposits. If brake lining thickness appears to be worn, contaminated or damaged brake lining should be replaced. Clean and replace components as necessary.
8. **SAFETY DEVICES.** Check functioning of the load limiter if fitted on the winch (see section 7.1.3).
9. **FOUNDATION OR SUPPORTING STRUCTURE.** Check for distortion, wear and continued ability to support winch and rated load. Ensure winch is firmly mounted and that fasteners are in good condition and tight.
10. **LABELS AND TAGS.** Check for presence and legibility of labels. Replace if damaged or missing.
11. **PAINT.** Inspect the winch for paint damage and touch up all the nicks and scratches you encounter, in order to prevent further corrosion.

7.2.3 Winches Not in Regular Use

1. Equipment which has been idle for a period of one month or more, but less than six months, shall be given an inspection conforming to the requirements of "Frequent Inspection" before being placed into service.
2. Equipment which has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of "Periodic Inspection" before being placed into service.
3. Standby equipment shall be inspected at least semi-annually in accordance with the requirements of "Frequent Inspection". In abnormal operating conditions equipment should be inspected at shorter intervals.
4. Control panels with frequency inverters should be electrical powered for a at least once a year for a period of 1 hour to ensure that the frequency inverter stays in proper condition. An electrical supply to the control panel is sufficient for this purpose. The winch does not have to be in operation during this 1 hour period.

8. MAINTENANCE

EMCÉ winches are engineered to a bare minimum of maintenance operations. Following maintenance operations are required for all EMCÉ winches. Specific maintenance operations for optional items and accessories are mentioned in annex II.



- Maintenance and replacement work must be done by expert maintenance technicians trained in the observance of applicable laws on health and safety at work.
- Switch off power to the winch to ensure that it is out of service before working on the winch. Also take all necessary precautions against it being accidentally switched on again.
- Before servicing or repairing components, allow the unit to cool down completely so as to avoid burns from parts which are still hot.



- For installation in zones 21 and 22 the user must schedule and implement a regular cleaning program for all surfaces and recesses to avoid dust build ups of more than 5 mm in depth.
- Before servicing or repairing internal components, allow the gear unit to cool down completely before opening the casing so as to avoid burns from parts which are still hot.
- Make sure, on completion of maintenance work, that all safety measures and equipment have been applied and reset.
- Clean the gear unit thoroughly after maintenance work and repairs.
- On completion of maintenance work, tighten all vent, filler and level plugs to their specified torque (see table in chapter 5.1)
- On completion of any maintenance work, all seals must be refitted and sealed as prescribed.
- Use only original spare parts for repairs.

8.1 LUBRICATION

Lubrication intervals are based on intermittent operation of the winch eight hours each day, five days per week. At more intensive use lubrication intervals increase. Also, the lubrication types are based on operation in an environment relatively free of dust, moisture, and corrosive fumes.

8.1.1 Pinions and Screw Threads

Thread lubricant or an antiseize compound use is recommended for threaded shafts, cap screws and nuts. Remove old lubricant, clean the part with an acid free solvent and apply a new coating of lubricant to the part before assembly.

8.1.2 Bearings and Pivot Points

Lubricate all grease fittings monthly with a grease gun, or more frequently, depending on severity of service. For temperatures -29° to 10°C use a multipurpose lithium-based EP 1 grease. For temperatures 0° to 49°C use a multipurpose lithium-based EP 2 grease. EMCÉ standard applies BP ENERGREASE LS-EP2 as first fill.

8.1.3 Steel wire rope

Follow the wire rope manufacturer's instructions. At a minimum, observe the following guidelines.

1. Clean with a brush or steam to remove dirt, rock dust or other foreign material on the surface of the wire rope.
2. Lubricate the wire rope by means of heavy viscosity oils or light greases containing adhesive additives together with graphite, molybdenum bisulphide or sodium triphosphate.
3. Brush, dip or spray lubricant weekly, or more frequently, depending on severity of service.



- Always check wire rope integrity before winch operation. Fitting a suitable new wire rope is necessary if the existing one has been squeezed or has broken strands.



In potentially explosive atmospheres it is very important that the wire rope is fully lubricated. Failure to do so may result in sparks during contact of the wire rope with other steel components.

8.1.4 Spooling gear (optional)

Lubricate all grease fittings on bearing blocks and spooling block monthly with a grease gun, or more frequently, depending on severity of service. For temperatures –29° to 10°C use a multipurpose lithium-based EP 1 grease. For temperatures 0° to 49° C use a multipurpose lithium-based EP 2 grease. EMCÉ standard applies BP ENERGREASE LS-EP2 as first fill.

The spooling gear shafts and drive chain must be greased with the same interval as the grease fittings of the unit. Before greasing the spooling gear shafts and drive chain Remove old lubricant and dirt, clean the part with an acid free solvent and apply a new coating of lubricant to the part.

The spooling gear shafts must be lubricated with the same EP 1 or EP 2 grease as the bearings.

The spooling gear drive chain(s) must be lubricated with an open gear lubricant. EMCÉ standard applies BP ENERGOL OGL 461 open gear lubricant on the drive chain(s).

8.1.5 Slewing gear (optional)

The slewing gear and pinions should be greased. The grease should be brushed or sprayed on the gear teeth and must cover the sides of the gear completely. When it is not possible to visually check the presence of grease we recommend greasing every three months according to the use of the winch. For lubrication the gear teeth the following grease types are recommended:

- BP ENERGOL OGL 461
- SAGUS 60
- ENERGOL WRL
- SURRET FLUID NX
- MALLEUS FLUID C
- MOBILTAC 81

EMCÉ standard applies BP ENERGOL OGL 461 open gear lubricant on slewing gears. For special applications requiring low temperature grease, please contact EMCÉ.

8.2 GEARBOX MAINTENANCE

- Use the lubricants (oil and grease) recommended by the Manufacturer.
- When working on the gear unit always replace gaskets and seals with new original ones.
- If a bearing requires replacement, it is good practice to also replace the other bearing supporting the same shaft.
- We recommend replacing the lubricating oil after all maintenance work.

8.2.1 Routine gearbox maintenance



- Keep the gear unit at its maximum efficiency by following the routine maintenance schedule specified by the Manufacturer. Good maintenance enables the unit to operate at its maximum performance over a long service life in compliance with safety regulations.

Frequency	Component	Type of work	Action
24 hrs.	Gear unit	Check for noise and vibrations	Stop the machine and trace the cause (see section 9)
200 hrs.	Gear unit casing	Check that external temperature does not exceed 70-75 °C	Stop the machine and contact EMCÉ
750 hrs. or every 6 months	Gear lubrication	Check oil level	Fill up if necessary
	External seals and gaskets	Check that there are no signs of lubricant leaks near to the gear unit.	Maintain or replace components as required
2000 hrs.	Bolts , connection flanges	Check tightness of fixing bolts, connecting flanges and torque transmitting components.	Tighten to the correct torque if required.
	Lubrication oil	Check condition of lubrication oil for presence of contaminants, especially water.	Replace lubrication oil in case contaminants are found.
5000 hrs.	Gear unit seals and gaskets	Inspect carefully for wear/ageing of external seals.	Replace if aged/worn

Life lubricated gearboxes which are not subject to external contamination do not normally require periodic lubricant changes. For other types of gearboxes the first oil change must take place after about 200 hours of operation, carefully flushing the gear unit using suitable detergents. If the same type of oil as that already in use is not available, drain the gear unit casing completely and wash its interior thoroughly with a light solvent before refilling with the new lubricant.

On life lubricated gearboxes it is often not possible to check the oil level without (partial) disassembly of the winch. In case the level plug is not accessible the 750 hrs. inspection would only require a check that there are no signs of lubricant leaks near to the gear unit. If an oil leak is found consult EMCÉ for a winch disassembly instruction to gain access to the gearbox for maintenance, repair and refilling.

8.2.2 Gearbox lubrication oil

The gearbox oil type used for the winch can be found in winch datasheet in Annex I.



- Gearboxes filled with synthetic oil (eq. for extreme duty or temperature range) are considered as life lubricated. We only recommend replacing synthetic lubricating oil after maintenance work on the gearbox or after 8000 running hours of the winch.
- Oil temperatures up to 80°C are normal.
- Lubricating oil temperature shall never exceed 95 °C.

Gearbox type	Recommended oil type ¹		Oil Change interval (hours)	
	Mineral oil	Synthetic oil	Mineral oil ²	Synthetic oil ³
Worm gear	CASTROL ALPHA SP 320	SHELL OMALA S4WE 320 CASTROL ALPHASYN GS 220	2000	8000
Helical gear	CASTROL ALPHA SP 220	SHELL OMALA S4WE 320 CASTROL ALPHASYN GS 220	2000	8000
Planetary gear	CASTROL ALPHA SP 150	CASTROL ALPHASYN GS 220	2000	8000

1. The recommended oil types are normally used by EMCÉ as first fill of the gearbox. On the winch datasheet in Annex I the type of gearbox oil used for your winch can be found. In Annex II a table with alternative allowed lubricants can be found.
2. Mineral oil is only recommended for an ambient temperature range of -10° to +40° C and intermittent use.
3. Synthetic oil is recommended for an ambient temperature range of -20° to +60° C and heavy duty use.

8.2.3 Gearbox lubrication oil change

Oil quantity, oil specifications, oil level- and oil filling plugs can be found in Annex II.



- The oil will drain better if it is warm.
- The quantity of oil to be filled is specified in the winch datasheet. This specification is, however, approximate, and reference must always be made to the centre of the level plug.
- If a leak is found, identify the cause of the fault, repair it and refill with lubricant before operating the gear unit.
- As in doubt of the condition of the oil, analysis by a laboratory is recommended.
- Old lubricating oils shall be disposed according to applicable rules.

1. Place an adequate container under the drain plug.
2. Remove the filler and drain plugs and allow the oil to drain out.
3. Wait for a few minutes until all the oil has drained out, then screw the drain plug back on with a new gasket.
4. Fill the gear unit with the new oil until it reaches the level mark. **Do not mix oils of different makes or specifications and check that the oil is highly resistant to foaming and is EP rated.**
5. Tighten down the filler plug after fitting a new gasket.



Lubricants, solvents and detergents are toxic/harmful to health:

- They may cause irritation in direct contact with the skin.
- They may cause intoxication if inhaled.
- They can be fatal if swallowed.

Handle them with care using suitable individual safety equipment.

8.3 **ELECTRIC MOTOR MAINTENANCE**

Electric motors have a robust structure and need no particular maintenance. The motor must be cleaned in regular intervals (depending on environment), especially the entry openings on the fan as to guarantee a sufficient air flow for the cooling system.

Bearings of electrical motors are lifetime grease packed.

 	▪ All screws utilized must be tightened fully ▪ The surface of flameproof joints (terminal board cover/terminal beard; joints for the shaft) HAVE NOT TO BE MACHINED OR PAINTED. These surfaces must be kept clean and, against corrosion and to prevent the water from entering, with a thin layer of silicon-based grease. ▪ Repairs to the explosion proof motors must be executed according to the criteria specified in the IEC 79-19 standard and have to be carried out only by the manufacturer or by the workshops authorized by himself.
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8.4 **ELECTRIC MOTOR BRAKE MAINTENANCE (OPTIONAL)**

The applicable brake on your winch can be found on the product data sheet in Annex I. Technical details of the brake can be found in Annex II.

All parts of the brake must be checked frequently as the brake wear depends on a number of factors, namely the brake inertia, the braking speed and the operating frequency. Brake checking must be carried out as indicated in Annex II.

Occasionally we recommend to use an air jet to eliminate dust or other particles that may have settled on the braking surface.

Electric brakes with a dust ring (mainly used for with IP55 protection or higher) cannot dispose the braking dust. In order to remove the brake dust the following procedure must be followed:

1. remove the fan cover from the motor
2. remove the dust ring or cover from the brake
3. use an air hose to blow the dust from the brake disc
4. fit the dust ring or cover back to the brake (replace it by a new ring when it's damaged)
5. fit the fan cover back to the motor.

Frequency of the brake cleaning depends on the severity of usage :

NORMAL : half yearly
HEAVY : quarterly
SEVERE : monthly

8.5 **BOLT TIGHTENING CHECK**

Check periodically the tightening of winch foundation bolts. For correct torque settings see section 5.1.

8.6 **SPARE PARTS ORDERING INFORMATION**

The following information is required to ensure reliable delivery of spare parts:

Fabrication number (Fabr. No.)..... (on factory TAG plate)
Product type..... (on factory TAG plate)
Spare part number..... (from manual)
Additional information such as type and/or description of the parts.....(from manual)



EMCÉ cannot guarantee a smooth delivery of spare parts unless the above information is not fully submitted. If the TAG plate is removed or damaged, contact your dealer or supplier.

9. TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Winch does not lift the load.	No motor power.	Check connections and circuits.
	Product is overloaded.	Check the load. Check functioning of the load limiter.
	Upper limit switch is activated.	Lower the load to return to the allowed working range of the winch. Adjust the upper limit switch to the allowed working range of the winch.
	Brake is not released.	Release, clean or replace the brake. Check brake circuit.
Winch does not lower the load.	No motor power.	Check connections and circuits.
	Slack rope device is activated.	Operate the winch in the lifting direction up till there is no slack rope detected anymore. Adjust the rope angle from the drum to the correct angle for the slack rope device.
	Lower limit switch is activated.	Lift the load to return to the allowed working range of the winch. Adjust the lower limit switch to the allowed working range of the winch.
	Brake is not released.	Release, clean or replace the brake. Check brake circuit.
Load doesn't stop.	Brake is slipping.	Check air gap of brake or replace brake.
	Product is overloaded.	Reduce the load within the rated capacity.
	Limit switches are not actuated.	Check functioning of the limit switches. Adjust the limit switches to the allowed working range of the winch.
	Wrong brake connection.	Check the brake circuit. Brakes must be switched externally via the control panel. A load that is lowered can back drive the motor, turning it into a generator. Due to this it is not allowed to switch the brake via the main motor terminals. For DC brakes a fast switching rectifier is required.
Product is too slow.	Product is overloaded.	Reduce the load within the rated capacity.
	Brake is not released completely.	Release or clean the brake.
	Gearbox damaged.	Check gearbox, pay attention for strange sounds.
	Gearbox oil viscosity too high.	Replace oil (see Annex II for recommended lubricants)
Oil leakage.	Gearbox oil level too high.	Drain oil from the gearbox until the oil level is at the center of the level plug.
	Improper oil plug.	Install right oil plug with gasket.
	Gearbox breather plug at the wrong position.	Place the breather plug at the correct position (see Annex II)
	Gasket leakage	Fit new gasket
	Oil leakage at other places	Check for loose bolts in gearing and tighten.
Rope doesn't winch correctly on the drum.	Excess fleet angle.	Ensure that the fleet angle is within acceptable limits.
	Winding of slack rope.	Keep rope under tension during winding.
	Spooling gear not functioning correct.	Adjust the spooling gear rollers to the proper position.
		Check if the rope diameter is according to the winch specifications.

Abnormal noises or vibrations.	Loose foundation bolts.	Tighten foundation bolts with due torque.
	Impurities in gearbox oil.	Replace gearbox oil.
	No oil in gearbox.	Check gearbox for leaks. Fill gearbox with the required amount of oil.
	Gearbox damaged.	Contact authorized workshop.
	Bearings defective or worn.	Contact authorized workshop.
Gearbox overheating.	Oil level too high.	Check oil level.
	Oil too old.	Replace oil.
	Impurities in oil.	Replace oil.
	Too high ambient temperature.	Check the allowed ambient operating temperature of the winch. Place a sunroof over the winch to avoid overheating due to direct sunlight.

ANNEX I: PRODUCT DATASHEET AND CERTIFICATES

FABRIEKSCERTIFICAAT TEST CERTIFICATE PRÜFUNGSZERTIFIKAT CERTIFICAT DE TEST



Doc. Datum / Doc. Date / Dok. Datum / Doc. Date : 24-4-2017

Beschrijving van het apparaat / Description of the equipment / Beschreibung der Geräte und Maschinen / Description de l'équipement

Model / Modell / Model / Modele	SB 306 E
Toepassing / Duty / Anwendung / Facteur de service	Hijsen / Lifting
Fabr.Nr. / Fabr.No. / Fabr.Nummer / N°defabrication	1006881
Nominale capaciteit / Rated capacity / Nennkapazität / Capacité Nominale	3000 kg top laag / top layer / Oberschicht / Top Layer
Maximum capaciteit / Maximum capacity / Höchstkapazität / Capacité maximale	4450 kg 1ste laag / 1st layer / 1st schicht / 1er Layer
Snelheid / Speed / Geschwindigkeit / Vitesse	12 m/min 1 ^{ste} laag / 1 st layer / 1 st schicht / 1 ^{er} Layer

Uitgevoerde test / Performed test / Prüfungen / Test effectués	Opmerkingen / Remarks / Bemerkungen / Remarques
Visuele inspectie / Visual inspection / Sichtprüfung / Inspection visuelle	☒
Functionele test / Functional test / Funktionsprüfung / Test Fonctionnel	☒
Dynamische test / Dynamic test / Dynamische Prüfung / Test dynamique	☒
Statische test / Static test / Statische Prüfung / Test statique	☒
Snelheids test / Speed test / Geschwindigkeitsprüfung / Test de vitesse	☒

Geteste opties / Tested options / Geprüfte Optionen / Tested options	Opmerkingen / Remarks / Bemerkungen / Remarques
Koppeling / Clutch / Clutch / Embrayage	☐
Bandrem / Bandbrake / Bandbremse / Bande de frein	☐
Aandrukrol / Pressure roller / Andrückrolle / Pression des rouleaux	☐
Eindschakelaar / Limit switch / Endschanter / Contact fin de course	☒
Slappe draad beveiliging / Slack wire switch / Slack Draht-Schalter / Slack à commande par câble	☐
Opspoel inrichting / Spooling gear / Spooling Gang / Spooling engins	☐
Bediening / Controls / Bedienung / Contrôles	☒
Noodstop / Emergency stop / Not-Aus / Arrêt d'urgence	☒
Lastbegrenzer / Load limiter / Überlastschutz / Limiteur de charge	☒
Ontluchtingsplug / Breather plug / Ablasschraube / Bouchon de reniflard	☒
Smering / Lubricants / Schmierung / Lubrification	☒
Build and tested according to IEC 60204-32	☒

Alle tests goed bevonden / All test to be found satisfactory / Alle Prüfungen bestanden / Tous les tests sont satisfaisants:

**HIJS GEEN ZWAARDERE LASTEN DAN DE NOMINALE
CAPACITEIT!!!**

**DO NOT LIFT HEAVIER LOADS THAN THE RATED
CAPACITY!!!**

**ACHTUNG: WINDEN NIEMALS ÜBERLASTEN!!!
NE PAS EXCÉDER LA CAPACITÉ NOMINALE DE
LEVAGE!!!**

Test Datum / Date / Datum / Date:

24-04-2017

Getest door / Tested by / Name / Testé par:



Test Engineer
P. de Jong

EC DECLARATION OF INCORPORATION

According to the Machinery Directive 2006/42/EC

The manufacturer:

Machinefabriek EMCÉ b.v.
's Gravendamseweg 53b
2215 TC Voorhout
The Netherlands

Tel. : +31 252 21 4080
Fax : +31 252 22 0107
E-mail: info@emce.nl
Http: www.emce.nl

A copy of the technical file for this equipment is available from:

Complete construction file and calculations are available on request of the national authorities at the address of the manufacturer as mentioned above.

Description of the equipment:

Machinery type	: Electric winch
Model	: SB 306E
Application	: Lifting
Fabrication number	: 1006881

The following Directives, Harmonized Standards and other National standards or technical specifications have been used:

- EN 14492-1 Cranes – Power driven winches and hoist – Part 1: power driven winches
- EN-ISO 12100 Safety of machinery – General principles for design, risk assessment and risk reduction
- EN 60204-32 Safety of machinery ; Electrical equipment of machines – Part 32: Requirements for hoisting machines
- FEM 1.001, booklets 1, 2, 3, 4, 8 and 9
- ISO 4301-1 Cranes and lifting appliances – Classification – Part 1: General
- ISO 4308-1 Cranes and lifting appliances – Selection of wire ropes – Part 1: General

This winch must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with the provisions of the machinery directive. The below point(s) have been identified by the manufacturer as relevant items that needs to be taken into account before the winch is put into service:

1. Winches with a rated capacity of 1000 kg or more shall be fitted with a rated capacity limiter (EN 14492-1 section 5.2.2.1)
2. Winches shall be fitted with lifting and lowering limiters (EN 14492-1 section 5.2.41).
3. Drum and other running parts of a winch located in an easily accessible position shall be protected by opportune guards (MC 2006/42/EC).
4. A personnel lifting winch may not be taken into service before a notified body has issued an EC type examination certificate for the winch.

Note: In Annex IV of the user manual delivered along with the winch a short explanation is given about the above points.

Voorhout, The Netherlands

Date: 24 April 2017

Signed on behalf of:
EMCÉ
Winches | Holland
P.B. Stokvis
Managing Director

PRODUCT DATA SHEET PRODUKT DATA BLAD

Identification / Identificatie Model / Model Fabr.No. / Fabr.Nr. Quantity / Aantal	SB-306 EDS 1006881 1	
Use conditions / Gebruikscondities Duty / Toepassing ISO-FEM class / ISO-FEM klasse Operating temperature / Bedrijfstemperatuur	Lifting / Hijzen T4 - L3 - M5 0° to +40°	According / volgens ISO 4301-1 - FEM 1.001 Celsius
Capacity / Capaciteit Rated / Nominaal Maximum / Maximum	3000 kg 4450 kg	on the top layer / in de bovenste laag on the 1 st layer / in de 1 ^{ste} laag
Speed / Snelheid Rated / Nominale Maximum / Maximum	12 m/min 18 m/min	on the 1 st layer / in de 1 ^{ste} laag on the top layer / in de bovenste laag
Cable requirements / Kabel eisen Diameter / Diameter Working length / Werklengte MBL / MBL Maximum no. layers / Maximum aantal lagen	18 mm 315 m. 226 kN 6	
Motor / Motor Type / Type Size / Grootte Class / Klasse Rated speed / Nominaal toerental Power / Vermogen Voltage / Spanning Frequency / Frequentie	Electric - 3 phase IEC160 IP 54 1500 -1/min 11 kW S1 400 VAC 50 Hz.	
Gearbox / Vertragingskast Type / Type Model / Model Oil type / Olie type Amount / Inhoud	in line planetary gear 306 L3 MZ i=141 EOA Mineral - ISO VG 150 3,6 l.	
Brake / Rem Model / Model Brake torque / Remkoppel	K08 200 Nm	
Drum size / Trommel afmetingen Diameter / Diameter Flanges / Flenzen Length / Lengte	355 mm 700 mm 700 mm	
Paint / Verf ISO class / ISO klasse Color / Kleur	C2-Low RAL 1023	According/volgens ISO 12944
Weight / Gewicht	1080 kg	excluding cable / exclusief kabel
Options / Opties / Optionen / Option Drum guard Spindle limit switch IP 55 incl. 2 contacts Protective frame around winch Control panel with frequency inverter and IP 23 brake resistor, fitted onto winch frame		

ANNEX II: TECHNICAL INFORMATION COMPONENTS

GENERAL INFORMATION 3-PHASE ELECTRIC MOTORS

Rated voltage

For the rated voltage of the motors, EN 60 034-1 allows a tolerance of $\pm 5\%$. According to IEC 60038, the mains voltages may have a tolerance of $\pm 10\%$.

Therefore the motors are designed for the following rated voltage ranges (exceptions are shown in the data tables):

Mains voltage to DIN IEC 38	Rated voltage range of motor
230 V $\pm 10\%$	218-242 V $\pm 5\%$
400 V $\pm 10\%$	380-420 V $\pm 5\%$
690 V $\pm 10\%$	655-725 V $\pm 5\%$

Within the rated motor voltage range, the permissible maximum temperature is not exceeded. When the motors are operated at the limits of the voltage tolerance, the permissible over temperature of the stator winding may be exceeded by 10 K.

Rated frequency

50 Hz motors can also be operated on 60 Hz mains, provided the mains voltage increases proportionally to the frequency. The relative values for starting and breakaway torque remain nearly unchanged and slightly increase for the starting current. The rated speed increases by the factor 1.2 and output by factor 1.15. Should a motor designed for 50 Hz be operated at 60 Hz without the voltage being increased, the rated output of the motor cannot be increased. Under these operating conditions, rated speed increases by factor 1.2. The relative values for starting and breakaway torque are reduced by factor 0.82 and for starting current by factor 0.9.

Connection diagrams

The connection diagrams of the motors are placed on the inside of the terminal box lid. In case of doubt or missing, please consult EMCÉ for the connection diagram for the motor as supplied on your winch.

Output reduction at ambient temperatures over 40° C

In standard design motors are intended for operation at 40° C ambient temperature with class B temperature rise only, with an over temperature limit of 80 K. This also applies for the rated voltage range to IEC 60038.

If motors are used at ambient temperatures over 40° C the output reduction as shown in the below table should be taken into account.

Ambient temperature	45° C	50° C	55° C	60° C
Reduction of nominal output to approx.	95%	90%	85%	80%

Installation at altitudes of more than 1000 m above sea level (see also EN 60034-1)

In standard design motors are intended for operation at 40° C ambient temperature at an altitude up to 1000 meter. If motors are used at a higher altitude the output reduction as shown in the below table should be taken into account.

Altitude of installation	2000 m	3000 m	4000 m
At 40°C ambient temperature and thermal class B Rated output reduced to approx.	92 %	84 %	76 %
At 40°C ambient temperature and thermal class F Rated output reduced to approx.	89 %	79 %	68 %
Full nominal output to data tables with thermal class B and ambient temperature of	32° C	24° C	16° C
Full nominal output to data tables with thermal class F and ambient temperature of	30° C	19° C	9° C

GENERAL INFORMATION 3-PHASE ELECTRIC MOTORS

Starting rate

The permissible number of starts per hour can be taken as given in the table below, provided the following conditions are met:

Additional moment of inertia $\leq$ moment of inertia of the rotor: load torque rising with the square of the speed up to nominal torque; starts at even intervals.

Shaft height	Permissible No. of starts per hour for 2p		
	= 2	= 4	≥ 6
56 - 71	100	250	350
80 - 100	60	140	160
112 - 132	30	60	80
160 - 180	15	30	50
200 - 225	8	15	30
250 - 315	4	8	12



- The above table is based on direct online starting of the motor. In case a frequency inverter is used the above table is not applicable.
- In case a doubt for your application please consult EMCÉ, indicating the complete operating conditions.

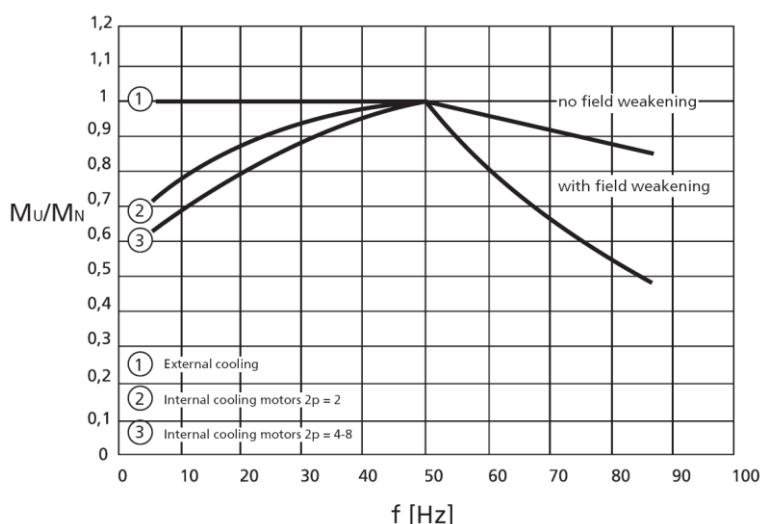
3-phase motors driven by frequency converters

Maximum converter output voltage 500V at peak voltages $\hat{U} \leq 1460$ V and $du/dt \leq 13$ kV/us. For higher converter output voltages or stresses, a special insulation is required.

With square characteristic of the load torque, motors can be driven with their rated torque.

For constant torque, the rated torque of motors with internal cooling must be reduced due to reduced cooling air inlet. Depending on the control range, the use of an external fan would be advisable.

See the below diagram for the thermal maximum-torque curve for approximate determination of the required torque reduction with constant load torque curve.



- Some electric motors with brake are limited to a maximum speed of 1500 rpm (50 Hz with 4 poles motors) due to the construction of the brakes. In case speeds over 50 Hz. are required with braked motors please consult EMCÉ for the possibilities.

GENERAL INFORMATION 3-PHASE ELECTRIC MOTORS

Insulation resistance:



- Before commissioning check the insulation resistance. With values $\leq 1\text{k}\Omega$ per Volt rated voltage, dry the winding.

Check the insulation resistance of each phase against earth by means of a hand-driven generator (max. 630 V DC) until the measured value is constant. The insulation resistance of new windings is above $10\text{ M}\Omega$. The resistance can be lowered considerably by moisture.

If, at room temperature, the resistance is below $0.5\text{ M}\Omega$, the winding must be dried. In this case the winding temperature must not exceed 80°C . For drying connect the space heater or another heating device, or apply an AC voltage of 5 or 6 % (connect in delta) of the rated motor voltage to terminals U1 and V1. Repeat the measurement. The motor can be put into operation when the resistance is above $0.5\text{ M}\Omega$.

Insulation resistance is temperature-dependent, i.e. if the temperature is increased/decreased by 10 K, the resistance value is halved/doubled, respectively.

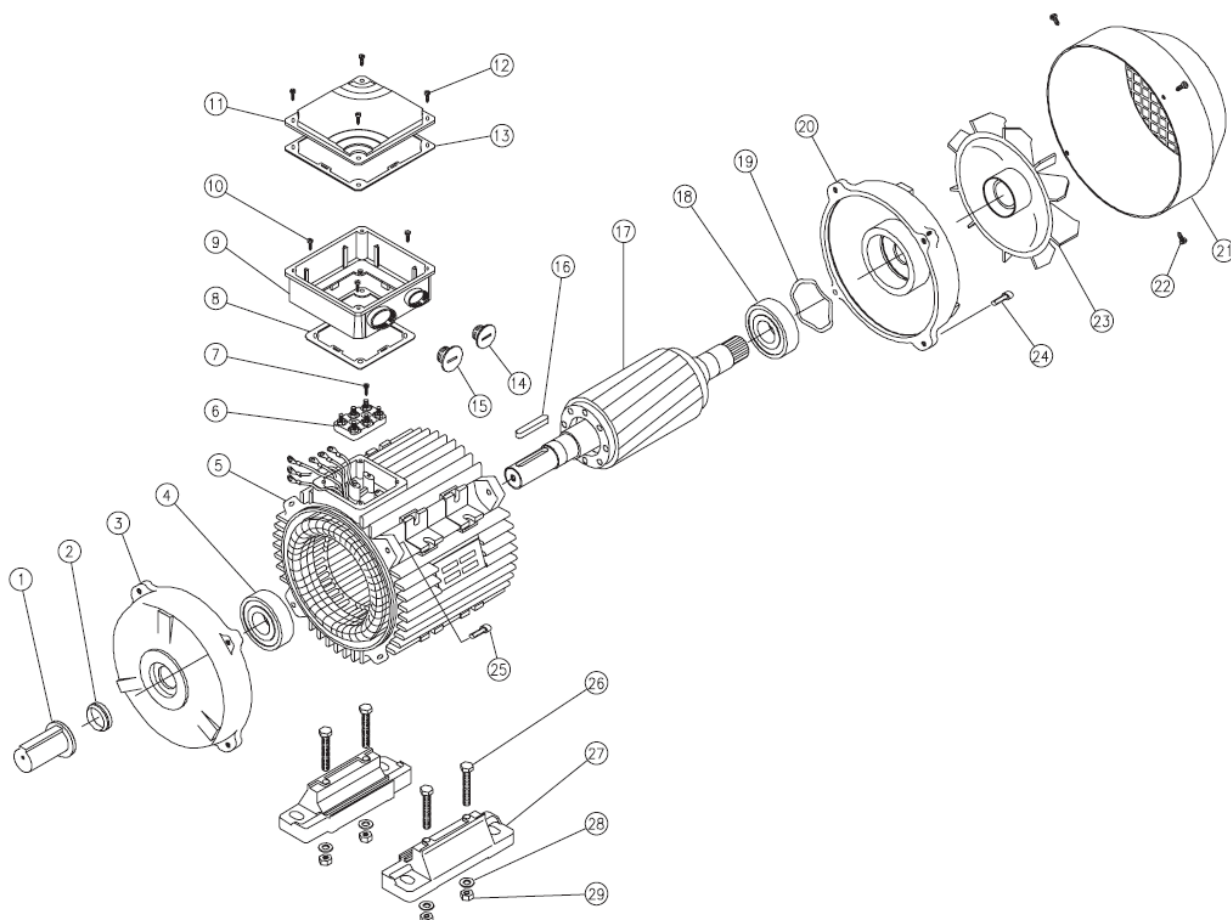
Degrees of protection

Degrees of protection for mechanical machines are designed in accordance with IEC 60034-5 by the letters IP and two characteristic numerals.

First numeral: Protection against contact and ingress of foreign bodies		Second numeral: Protection against ingress of water	
IP	Description	IP	Description
0	No special protection	0	No special protection
1	Protection against solid foreign bodies larger than 50 mm (Example: inadvertent contact with the hand)	1	Protection against vertically falling water drops (condensation)
2	Protection against solid foreign bodies larger than 12 mm (Example: inadvertent contact with the fingers)	2	Protection against dropping water when inclined by up to 15°
3	Protection against solid foreign bodies larger than 2.5 mm (Example: wires, tools)	3	Protection against water spray at up to 60° from vertical.
4	Protection against solid foreign bodies larger than 1 mm (Example: wires, bands)	4	Protection against water splashed from any direction
5	Protection against dust (harmful deposits of dust)	5	Protection against water projected by a nozzle from any direction
6	Complete protection against dust. Is not described for electrical machines to IEC 34-5.	6	Protection against heavy seas or water projected in powerful jets
		7	Protection when submerged between 0.15 and 1 meter
		8	Protection when continuously submerged in water at conditions agreed between the manufacturer and the user.

GENERAL INFORMATION 3-PHASE ELECTRIC MOTORS

Main components for 3-phase motors



Pos.	Description	Pos.	Description
1	Shaft protection	16	Key
2	Dust seal drive end	17	Rotor complete
3	End shield drive end	18	Bearing non-drive end
4	Bearing drive end	19	Pre-load washer
5	Stator frame	20	End shield non-drive end
6	Terminal board	21	Fan cover
7	Fixing screw terminal board	22	Fixing screw fan cover
8	Gasket terminal box	23	Fan
9	Terminal box	24	Fixing bolt end shield non-drive end
10	Fixing screw terminal box	25	Fixing bolt end shield drive end
11	Terminal box lid	26	Fixing bolt motor feet
12	Fixing screw terminal box lid	27	Motor feet
13	Gasket terminal box lid	28	Fixing washer motor feet
14	Blank gland plug	29	Fixing nut motor feet
15	Blank gland plug		



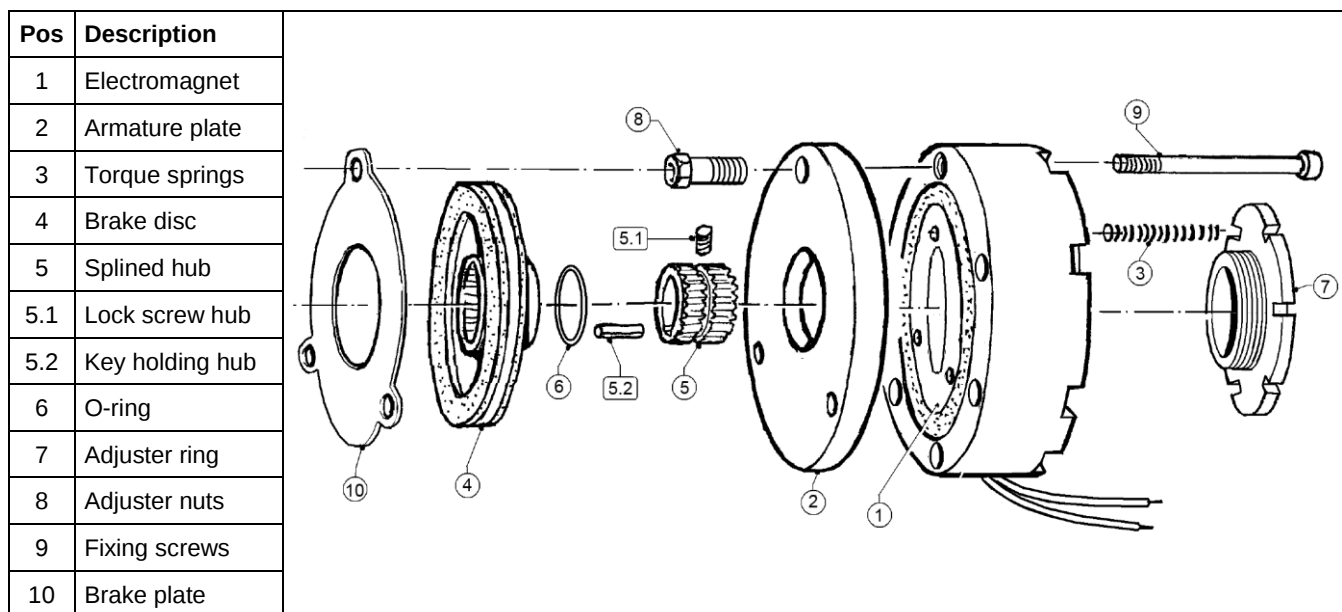
- The above exploded view is a typical example of an electric motor. It allows you to identify the main components of an electric motor in case replacement parts are required. The exploded view is not a 100% exact copy of the motor on your winch.
- In case spare parts needs to be ordered please state always: Designation of the component, motor type (see motor tag plate) and the fabrication number of the winch.

TECHNICAL DATA K BRAKE

Operating principle

The brake disc (item 4) is fitted to the motor with a splined hub (item 5). The brake plate (item 10) and the brake housing (item 4) are fitted by means of 3 inner hexagon screws to the motor housing and cannot rotate in relation to the motor housing. The brake plate can move axially in relation to the motor- and brake housings. This is achieved by an electro magneto (item 1) which (when powered) pulls the brake plate away from the brake disc, which itself can then move away from the brake surface on the motor housing. The space available between the components for the brake plate and disk to move around in is called the air gap.

Main components (typical)



Warning

Proper working order of the brake is guaranteed when operating at room temperature. In case of greasy places or extreme temperatures, please contact our technical department. When operating at low temperatures or in damp places it's necessary to use covers or guards to avoid the attachment of the friction material on the braking surfaces when the brake hasn't been working for a long time.

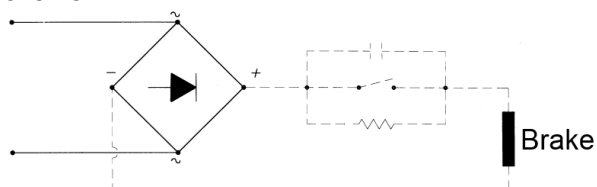


- For humid and extreme temperatures brakes using anti-sticking friction material are available, the variation of the torque may be - 30/35% of the nominal when using anti-sticking friction material.

Important: no braking action is generated from the disk by completely loosening the adjuster ring. The minimum value of the braking torque, is highlighted in the chart of the regulation of the braking torque. The minimum braking torque adjustment must be always higher than 30% of its nominal value.

Electrical connections

Brakes models K must be fed in direct current. The electrical connections must be made acc. to the following scheme:



- Brakes must be switched externally via the control panel. A load that is lowered can back drive the motor, turning it into a generator. Due to this it is not allowed to switch the brake via the main motor terminals.

TECHNICAL DATA K BRAKE

Operating Times

Brake model	Disengagement braking time (ms)	Engagement time (ms)	Quick engagement time (ms)
K1	10	45	20
K2	15	50	30
K3	15	55	30
K4	15	65	40
K5	20	75	45
K6	25	180	85
K7-K7/D	50	200	95
K8-K8/D	60	210	100
K9-K9/D	350	310	135



- If using P-PR rectifiers with working on continuous duty higher than 15/operations per minute, a dropout of 2 seconds between each operation is necessary.

Servicing and repairing

All parts of the brake must be checked frequently as the brake wear depends on a number of factors, namely the brake inertia, the braking speed and the operating frequency.

The substitution of the disk must be carried out considering the following principles:

- Wear of the disk; the friction material must be substituted before, if put under considerable stress due to the high working temperatures;
- The disk must be substituted after a 3mm total (1,5 mm for side) consumption of friction material. The friction material has an initial thickness of 3 mm for each friction ring. For the KF series the replacement must be done with 0,8mm of air gap value. After checking make sure that the air-gap is correctly regulated.

Brake checking must be carried out as indicated in this catalogue in "Assembling" and "Air-gap adjusting" instructions, after checking earthing carefully and when the brake is disconnected. The proper brake functioning can only be guaranteed using original components supplied by our Company.

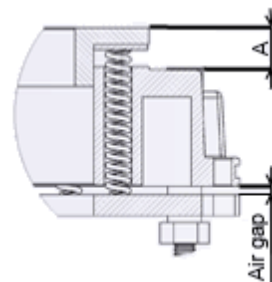


- When the air-gap value is 0,7 mm you must bring it necessarily to its nominal value, and in case of KF model replace the disc.

Air-gap adjusting

The air gap value determines the ability of the brake to release. If the value is set to high (gap to large) the electro magneto is not strong enough to open the brake, if the gap value is set to low (gap to narrow or nonexistent) the brake is in permanent full or partial contact. Also a common faults that the brake gap is set unevenly with the gap being too narrow in one place and to large in another.

Adjusting of the air-gap is made operating the adjuster-nuts (8) after loosening the fixing screws (9). Please allow for a cooling down period before adjusting the air-gap after brake operating.



The nominal value for the air-gap (tolerance +0.05-0) is reported in the page "Characteristics". The maximum value allowed for the air-gap is 0,7 mm (for most models).



- See the table 'Characteristics of model K brake' for the minimum and maximum allowed air gap for each brake model.

The performances of the brake could be modified if this value is passed due to the consumption of friction material. The maximum admissible consumption is of 0.5+O/ 0.1, which added to the value of the air-gap brings to the maximum air-gap value.

TECHNICAL DATA K BRAKE

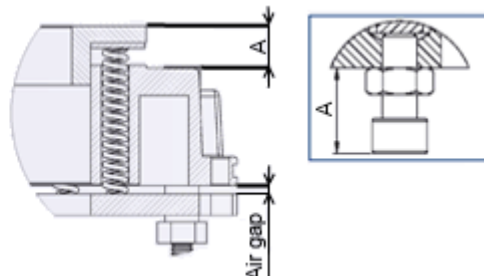
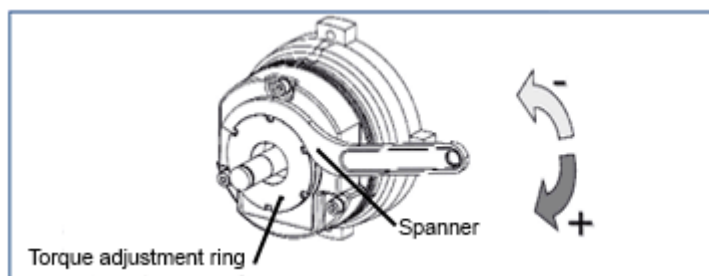
Incorrect maintenance of the air-gap adjustment will prevent brake to work properly during motor revolution this causing an overheating of all the parts of the brake and an inevitable interruption of the working.



- Make sure the air gap has the same value around the whole brake, check with a (clean) feeler gauge. All misalignments lead to accelerated brake wear!

Braking Torque adjustment

The model "K" allows the adjustment of the braking torque. The user will adjust the braking torque according to the load, the motor rotation speed and the braking time.



In the table below are highlighted indicative distances (dependent on the tolerances of the mechanical components) in mm of the adjuster nut by the electromagnet, in order to obtain the desired braking torque, which must always be verified after assembly of the brake and prior to use on the machine (see drawing).

You can adjust the braking torque, if the load allows it, under the 100% value in order to have a less wear of the friction material. You'll find this variation (%) in the graph below. The highlighted area delimits the safety value.

		Braking torque according to the "A"							
		Model K1-K9D: "A" = Distance upper plane torque adjusting ring – magnet							
		K1	K2	K3	K4	K5	K6	K7	K7/D
100%	A (mm) Torque¹ (Nm)	5.2 5.0	4.6 12	4.6 16	5.9 20	8.2 40	8.2 60	8.2 90	8.2 180
75%	A (mm) Torque¹ (Nm)	6.9 3.75	6.1 9	6.2 12	7.1 15	10.7 30	10.3 45	9.9 67	9.9 135
50%	A (mm) Torque¹ (Nm)	8.7 2.5	7.6 6	7.6 6	8.5 10	13.2 20	12.5 30	11.7 45	11.7 90

		Braking torque according to the "A"							
		Model K1-K9D: "A" = Distance upper plane torque adjusting ring – magnet plane Model K10-K11: "A" = Distance head TCEI screw plate – magnet plane							
		K8	K8/D	K9	K9/D	K10 ²	K10/D ²	K11 ²	K11/D ²
100%	A (mm) Torque¹ (Nm) %	8.2 200	8.2 400	8.2 300	8.2 600	18.6 800 100%	18.6 1500 100%	22.4 1700 100%	22.4 2550 100%
75%	A (mm) Torque¹ (Nm) %	10.7 150	10.7 300	10.7 225	10.7 600	20.6 762 95.2%	20.6 1430 95.2%	23.4 1666 98.0%	23.4 2499 98.0%
50%	A (mm) Torque¹ (Nm) %	11.2 100	11.2 200	13.2 150	13.2 300	22.6 725 90.6%	22.6 1361 90.6%	25.4 1599 94.0%	25.4 2399 94.0%

- The values reported in the tables are approximate.
- Braking torque adjustment made by TCEI screws and not by adjusting ring. In the table there is the percentage (%) value obtained with the regulation.

TECHNICAL DATA K BRAKE

Characteristics of model "K" brake

Brake model		K1	K2	K3	K4	K5	K6	K7	K7/D
Static braking torque	Nm	5	12	16	20	40	60	90	180
Maximum motor speed	Rpm	3600	3600	3600	3600	3600	3600	3600	3600
Input power	W	15	20	25	30	45	50	55	55
Minimum air gap	mm	0.15	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Maximum air gap	mm	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.7
Weight	kg	1.1	1.85	2.55	2.84	4.8	7	12	15
Outer diameter (A)	mm	84	104	114	124	148	160	189	189
Height (P)	mm	38.5	41.5	47	46.5	64	69.5	79	101.5

Brake model		K8	K8/D	K9	K9/D	K10 ²	K10/D ²	K11 ²	K11/D ²
Static braking torque	Nm	200	400	300	600	500 800	1000 1500	1000 1500	2000 2800
Maximum motor speed	Rpm	1800	1800	1800	1800	1000	-	1000	-
Input power	W	60	60	65	65	140	-	155	-
Minimum air gap	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Maximum air gap	mm	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Weight	kg	14.3	18	23	28	45	-	50	-
Outer diameter (A)	mm	218	218	248	248	270	-	333	-
Height (P)	mm	78	98	83	108	116	-	118	-



- The value of the static braking torque may vary of +/-20% from the plate value for brakes that have not been run-in.
- For brakes using anti-sticking friction material, the variation of the torque may be - 30/35% of the nominal torque before the running or even less, depending of the mechanical tolerances of the mechanical components and of the braking surfaces. The environmental conditions may affect this value.
- For high speed operation special balanced versions of the brake models K9, K10 and K11 are available.

Trouble shooting

PROBLEM	CAUSE	SOLUTION
Nonfunctional brake.	Broken brake springs.	Remove all springs for inspection and replace them if required.
	Fault in control circuit.	Make sure the brake is connected in the right way. Check the functioning of the brake rectifier.
	Worn out brake plate.	The disk must be substituted after a 3mm total (1,5 mm for side) consumption of friction material. The friction material has an initial thickness of 3 mm for each friction ring.
Burned out or quickly worn out brake .	The brake is slipping due to an overload in the winch.	Prevent overloading of the winch. Check the working conditions.
	Brake does not open fully with motor running.	Check brake and adjust air gap if required.
	Brake does not reach full brake torque, causing the load to back drive the winch.	Check brake torque and adjust if required.
Brake does not open when the winch is powered.	Defective brake coil, loose and/or faulty connections.	Check brake and electrical circuits. Listen if a clear clicking sound can be heard when the brake is energized.

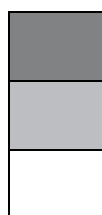
TECHNICAL DATA 300-SERIES PLANETARY GEARBOXES

Lubrication

Before putting the gear unit into service, check the oil level. This must be done with the gear unit in the mounting position in which it will be used in the application. If necessary, if or top up the lubricant to the filling mark.

The lubricant and its relative viscosity should be selected from the following chart, in accordance with the type of duty and ambient temperature. See the winch product data sheet for details of the lubricant used as first fill for the winch gearbox.

T _a	-10 °C / + 30 °C	+ 10 °C / + 30 °C	- 20 °C / + 30 °C	0 °C / + 60 °C
	ISO VG 150	ISO VG 220	ISO VG 150	ISO VG 220/320
Shell			Omala S4 WE 150	Omala S4 WE 320
	Omala S2 G 150	Omala S2 G 220	Omala S4 GX 150	Omala S4 GX 220
Mobil	Mobilgear XMP 150	Mobilgear XMP 220	Mobil SHC 629	Mobil SHC 630
	Mobilgear 600 XP 150	Mobilgear 600 XP 220	Mobil SHC XMP 150	Mobil SHC XMP 220
Kluber	Kluberoil GEM1-150	Kluberoil GEM1-220	Klubersynt EG 4 150	Klubersynt EG 4 220
AGIP	Blasia 150	Blasia 220	Blasia SX 150	Blasia SX 220
Aral	Degol BG 150	Degol BG 220	Degol PAS 150	Degol PAS 220
BP	Energol GR XP 150	Energol GR XP220	Eversyn EXP 150	Eversyn EXP 220
Castrol			Alphasyn GS 220	Alphasyn GS 220
	Alpha SP 150	Alpha SP 220	Alphasyn EP 150	Alphasyn EP 220
Cepsa	Engranajes HP 150	Engranajes HP 220	Engranajes HPX 150	Engranajes HPX 220
Chevron	N.L. Gear Compounds EP 150	N.L. Gear Compounds EP 220	Tegra Synthetic gear EP 150	Tegra Synthetic gear EP 220
Fuchs	Renolin CKC 150	Renolin CKC 220	Renolin unisyn CKC 150	Renolin unisyn CKC 220
Molycote	L-0115	L-0122	L-2115	L-2122
Q8	Goya 150	Goya 220	El Greco 150	El Greco 220
Repsol		Super Tauro 220	Super Tauro Sintetico 150	Super Tauro Sintetico 220
Total	Carter EP 150	Carter EP 220	Carter SH 150	Carter SH 220



PAG base oil (Polyglycole) for applications with operation temperatures above the indicated range

PAO base oil (Polyalphaolefin) for demanding applications, for the average power committed and / or operating temperatures, within the indicated range

Mineral oil with EP additives



- Oils of different bases should not be mixed together.



- Only synthetic lubricants may be used on gear units conforming to European Directive 94/9/EC. Refer to the above chart for the brand and type.

Brake lubrication

The optional hydraulic multi-disk brakes are lubricated with the same oil as the gear unit

Cleaning

Remove all dust and process waste from the gear unit. Do not use solvents or other products that are incompatible with the unit's construction material and do not direct high pressure jets of water at the gear unit.

Replacing parts:

- Do not hesitate to replace parts and/or components if they are not able to guarantee safe and reliable operation.
- Never improvise repairs.
- The use of non-original spare parts not only voids the warranty but can compromise gear unit operation.

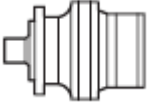
Troubleshooting

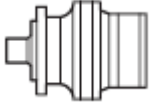
The following information is intended to serve as an aid in identifying and correcting defects and faults. In some cases, such problems may be caused by the plant or machine onto which the gear unit is assembled, and hence, the cause and eventual solution can be found in the Manufacturer's technical documentation for the machine/plant in question.

PROBLEM	CAUSE	SOLUTION
Bearing temperature too high	Oil level too low	Top up oil level
	Oil too old	Replace oil
	Defective bearings	Contact authorized workshop
Operating temperature too high	Oil level too high	Check oil level
	Oil spent	Replace oil
	Contaminant in oil	Replace oil
Abnormal running noise	Gears damaged	Contact authorized workshop
	Bearing axial backlash too high	Contact authorized workshop
	Bearings defective or worn	Contact authorized workshop
	Excessive load applied	Correct service load to nominal values given in winch datasheet
	Contaminant in oil	Replace oil
Abnormal noise at gear unit mounting	Mounting bolts loose	Tighten down to specified torque
	Mounting bolts worn	Replace bolts
Oil leaks	Oil level too high	Check oil level
	Casing/coupling seals inadequate	Contact authorized workshop
	Gaskets worn	Contact authorized workshop
Gear unit does not run or runs with difficulty	Oil viscosity too high	Replace oil (see table of recommended lubricants)
	Oil level too high	Check oil level
	Excessive load applied	Correct service load to nominal values given in winch datasheet
Output shaft does not turn with motor running	Gears damaged	Contact authorized workshop

TECHNICAL DATA 300-SERIES PLANETARY GEARBOXES

Lubricant fill quantity for inline gearboxes (3_L)

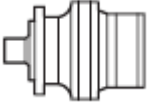
		Mounting positions		
		A	T	O
300	L1	0.6	1.0	0.9
	L2	0.9	1.3	1.2
	L3	1.2	1.9	1.5
	L4	1.5	1.9	1.8
301	L1	0.8	1.2	1.1
	L2	1.1	1.5	1.4
	L3	1.4	1.8	1.7
	L4	1.7	2.1	2.0
303	L1	1.3	2.3	2.0
	L2	1.6	2.6	2.3
	L3	1.9	2.9	2.6
	L4	2.2	3.2	2.9
304	L1	1.4	2.4	2.2
	L2	1.9	2.9	2.7
	L3	2.2	3.2	3.0
	L4	2.5	3.5	3.3
305	L1	1.6	2.6	2.4
	L2	2.1	3.1	2.9
	L3	2.4	3.4	3.2
	L4	2.7	3.7	3.5
306	L1	2.5	3.5	3.2
	L2	3.3	4.3	4.0
	L3	3.6	4.6	4.3
	L4	3.9	4.9	4.6
307	L1	3.5	5.0	4.5
	L2	4.5	6.0	5.5
	L3	5.0	6.5	6.0
	L4	5.3	6.8	6.3
309	L1	4.0	5.5	5.0
	L2	5.0	6.5	6.0
	L3	5.5	7.0	6.5
	L4	5.8	7.3	6.8

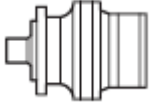
		Mounting positions		
		A	T	O
310	L1	5.0	6.5	6.0
	L2	6.3	7.8	7.3
	L3	7.1	8.6	8.1
	L4	7.4	8.9	8.4
311	L1	7.0	12	10
	L2	9.0	14	12
	L3	10	15	13
	L4	11	16	14
313	L1	9.0	14	12
	L2	12	17	15
	L3	13	18	16
	L4	13	18	16
314	L2	17	25	21
	L3	19	27	23
	L4	20	28	24
315	L2	19	27	23
	L3	21	29	25
	L4	22	30	26
316	L2	22	30	26
	L3	24	32	28
	L4	25	33	29
317	L2	26	41	36
	L3	29	44	39
	L4	30	45	40
318	L3	40	55	50
	L4	43	58	53
319	L3	50	70	60
	L4	53	73	63
321	L3	56	76	66
	L4	60	80	70
323	L3	Contact EMCÉ		
	L4			

The quantities indicated are approximate only. Fill the unit according to the position of the level plug or level rod supplied with the gear unit.

TECHNICAL DATA 300-SERIES PLANETARY GEARBOXES

Lubricant fill quantity for right-angle gearboxes (3_R)

		Mounting positions		
		B0	U_	P_
300	R2	1.2	1.7	1.5
	R3	1.5	2.0	1.8
	R4	1.8	2.3	2.1
301	R2	1.6	2.1	1.9
	R3	1.9	2.4	2.2
	R4	2.2	2.7	2.5
303	R2	2.2	2.8	2.6
	R3	2.5	3.1	2.9
	R4	2.8	3.4	3.2
304	R2	2.3	2.9	2.7
	R3	2.8	3.4	3.2
	R4	3.1	3.7	3.5
305	R2	2.5	3.1	2.9
	R3	3.0	3.6	3.4
	R4	3.3	3.9	3.7
306	R2	4.0	5.0	4.8
	R3	4.8	5.8	5.6
	R4	5.1	6.1	5.9
307	R2	6.0	8.0	7.0
	R3	7.0	9.0	8.0
	R4	7.5	9.5	8.5
309	R2	6.5	8.5	7.5
	R3	7.5	9.5	8.5
	R4	8.0	10	9.0

		Mounting positions		
		B0	U_	P_
310	R2	13	15	14
	R3	11	13	12
	R4	12	14	13
311	R2	14	19	17
	R3	16	21	19
	R4	17	22	20
313	R2	16	21	19
	R3	19	24	22
	R4	20	25	23
314	R3	25	33	29
	R4	28	36	32
315	R3	27	35	31
	R4	30	38	34
316	R3	30	38	34
	R4	33	41	37
317	R3	38	52	48
	R4	42	56	52
318	R4	48	63	58
319	R4	55	70	65
321	R4	60	75	70

The quantities indicated are approximate only. Fill the unit according to the position of the level plug or level rod supplied with the gear unit.

TECHNICAL DATA 300-SERIES PLANETARY GEARBOXES

Mounting positions and plug positions

ALL GEARBOXES

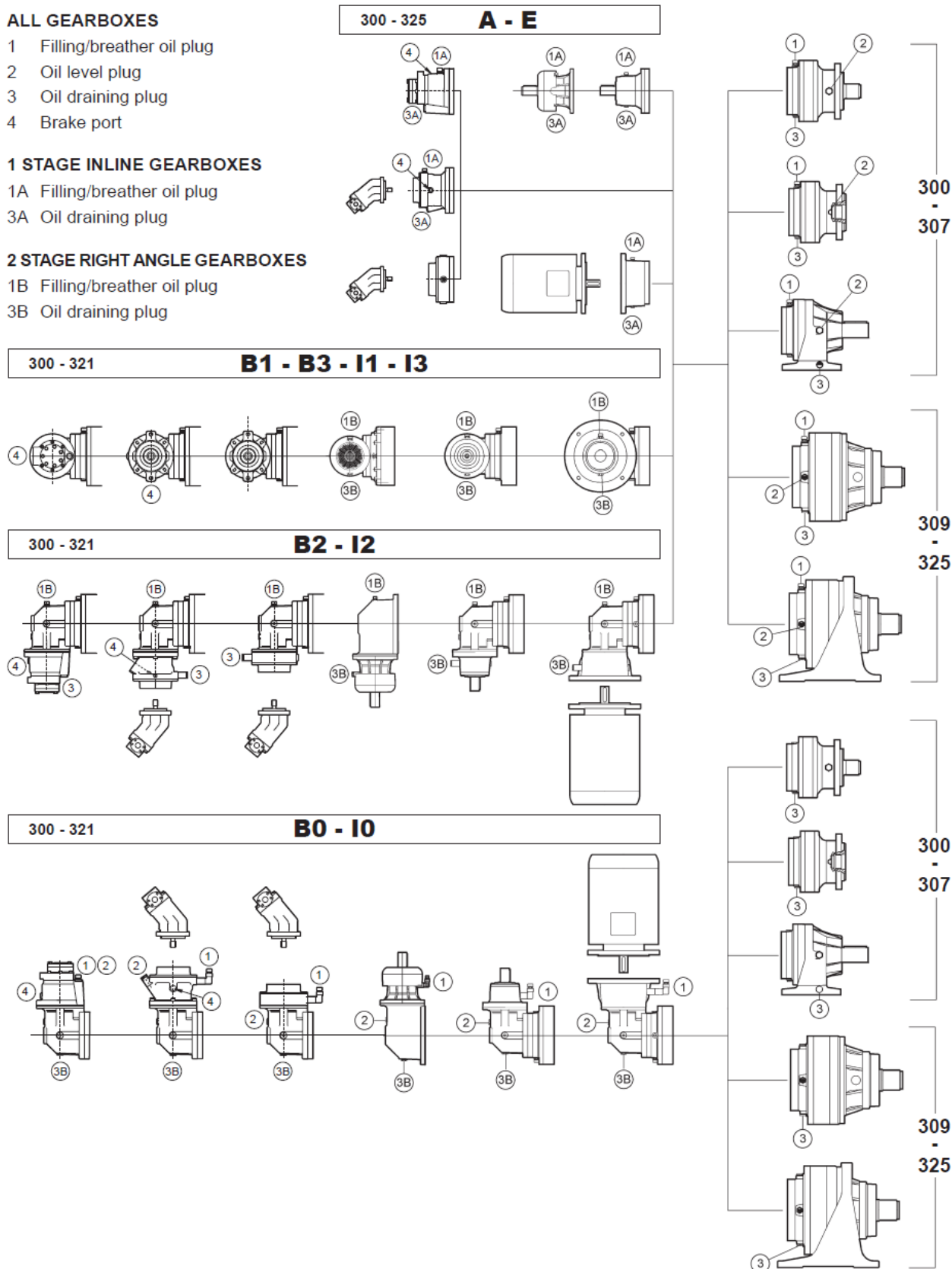
- 1 Filling/breather oil plug
- 2 Oil level plug
- 3 Oil draining plug
- 4 Brake port

1 STAGE INLINE GEARBOXES

- 1A Filling/breather oil plug
- 3A Oil draining plug

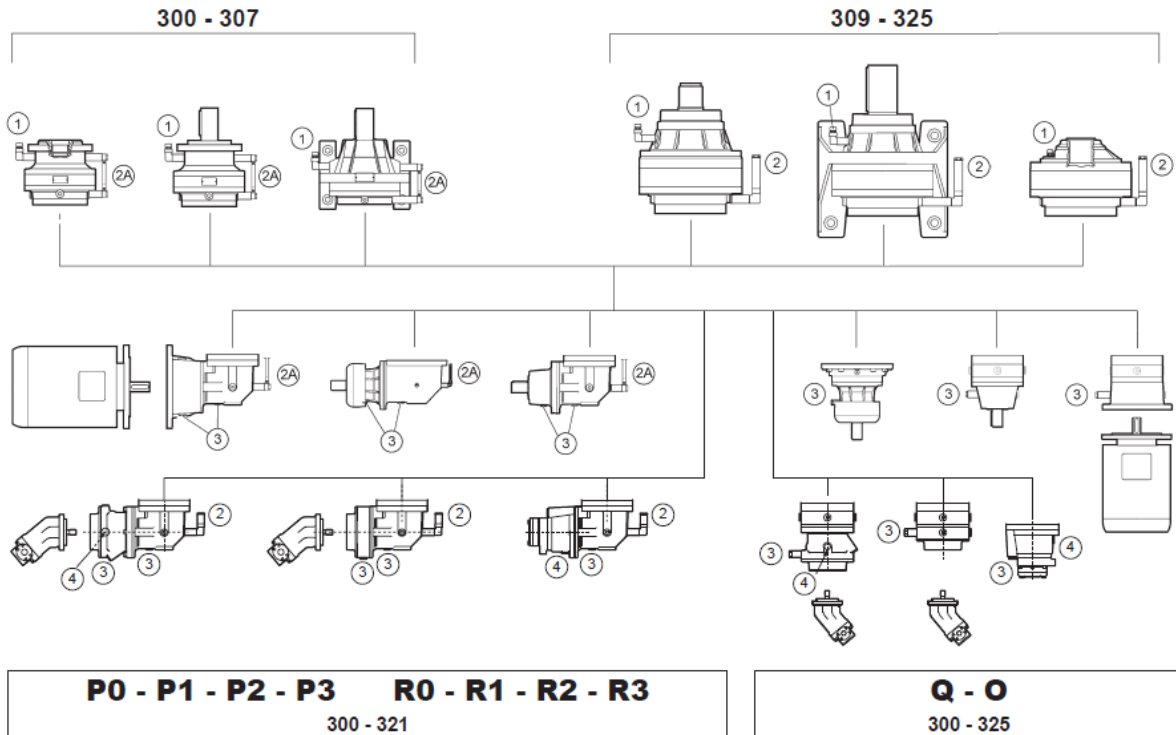
2 STAGE RIGHT ANGLE GEARBOXES

- 1B Filling/breather oil plug
- 3B Oil draining plug



TECHNICAL DATA 300-SERIES PLANETARY GEARBOXES

Mounting positions and plug positions (continued)

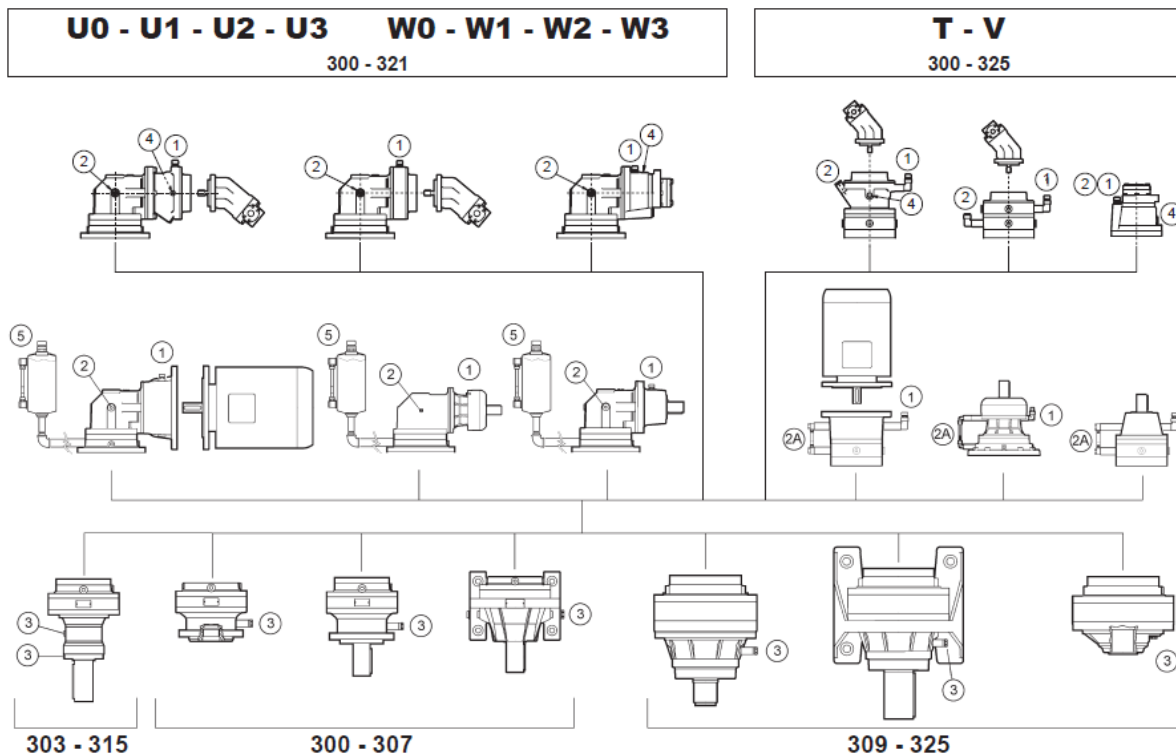


ALL GEARBOXES

- 1 Filling/breather oil plug
- 2 Oil level plug

- 2A Transparent oil level hose
- 3 Oil draining plug

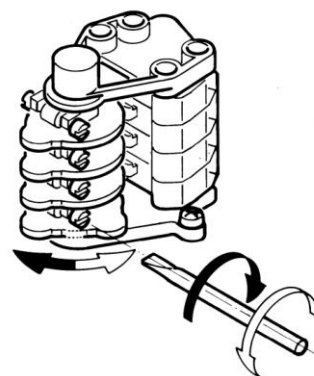
- 4 Brake port
- 5 Oil tank, for gearboxes in industrial application



TECHNICAL DATA FCN SPINDLE LIMIT SWITCH

Driving cams adjustment

Each lever has a single micrometric register screw. this screw exclusively works on its own combined lever, excluding any mechanical contact with any other next to it. the regulation is easily made by use of a small cut screw driver on the register screw. the special friction system assures a rapid and precise adjustment as well as a stable, constant and longtime guarantee.



Potentiometer adjustment (optional)

Regulation

- Ensure that the locking screw (A) is loosened.
- Set the desired resistance value by means of the instruments by rotating the regulating ring (B) clockwise (C) to reduce it, or anti-clockwise (D) to increase it.
- Tighten the lock screw (A)

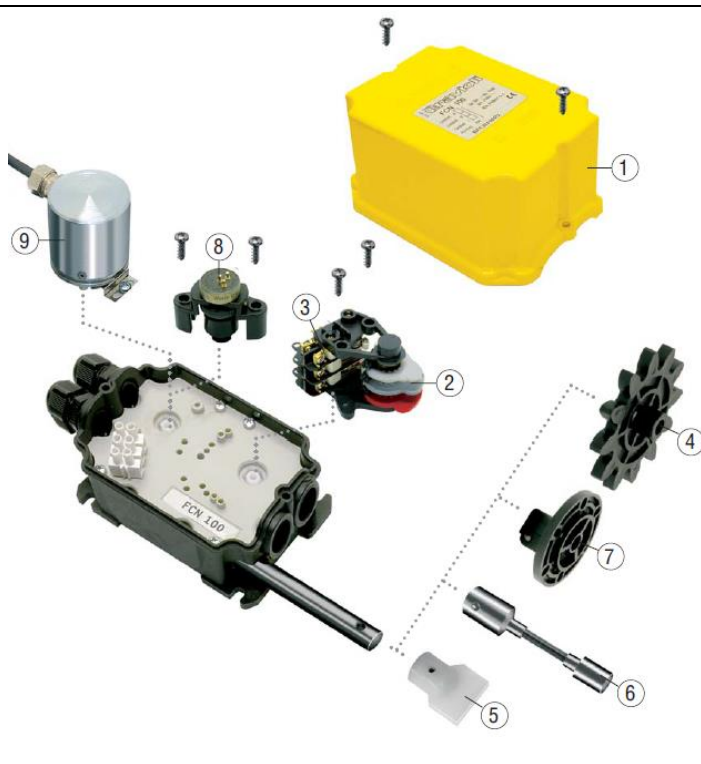


Important:

The potentiometer follows the cams rotation direction.

Spare parts and accessories

Pos.	Article no.	Description
1	B50454 B50442 B50447	Cover 2-3 contacts Cover 4 contacts Cover 5 contacts
2	BLEVFCNA BLEVFCNB BLEVFCNC BLEVFCND	White cam A Grey cam B Red cam C White cam D
3	BFCNAPINT BFCNDINT BAP02PRFC BAP11FC	Contact 1NC slow (P) Contact 1NO 1NC quick (D) Contact 2NC prog. slow (M) Contact 1NO 1NC slow (MD)
4	BMOD5FC BMOD6FC BMOD8FC BMOD10FC BMOD14FC	Cog wheel mod 5 Z12 Cog wheel mod 6 Z11 Cog wheel mod 8 Z12 Cog wheel mod 10 Z12 Cog wheel mod 14 Z10
5	BINNFC	Male connection
6	BAFLESFC	Flexible shaft
7	BFLANFCN	Attachment flange
8	-	Potentiometer
9	-	Encoder on demand



TECHNICAL DATA FCN SPINDLE LIMIT SWITCH

Main specifications

Compliance with EEC Directives	98/37/CE, 2006/95/CE
Compliance with rules	EN 60947-1, EN 60947-5-1, EN 60204-1, EN 60529
Insulation voltage	250V ~
Maximum exercise voltage	250V ~
Operating temperature range	- 20 °C to + 60 °C
Drive	Worm screw
Cable entries	PG 11
Insulation	According to EN 60947-5-1
Protection degree	IP 55 EN 60529
Protection against contact voltages	Double insulation EN 60439-1

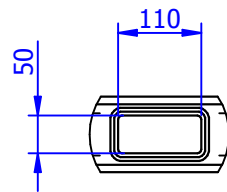
Contacts specifications

Micro switches	1NC slow, type P 1NO 1NC rapid, type D 2NC progressive, type M 1NO 1NC slow type, MD					
Insulation voltage	250V ~					
Test voltage	2000V ~					
Operating current	10 (3) A					
Breaking power	According to EN 60947-5-1					
Mechanical lifetime	2x10 ⁶ op.					
Terminals	With screws					
Performances	AC 15	V	24	48	110	230
		A	10	10	6	3
	DC 13	V	24	48	110	230
		A	3	1,5	1	0,5

Potentiometer electrical specifications (optional)

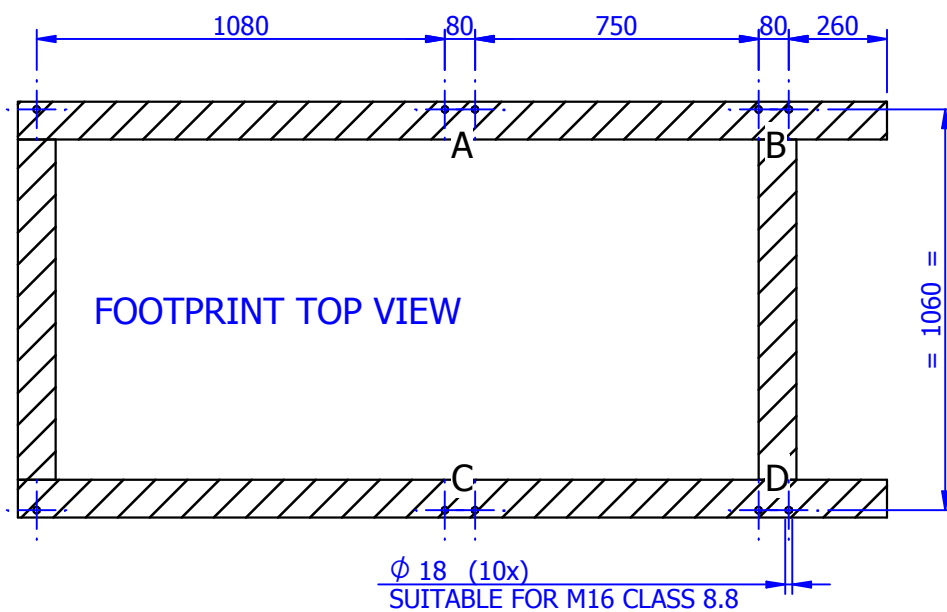
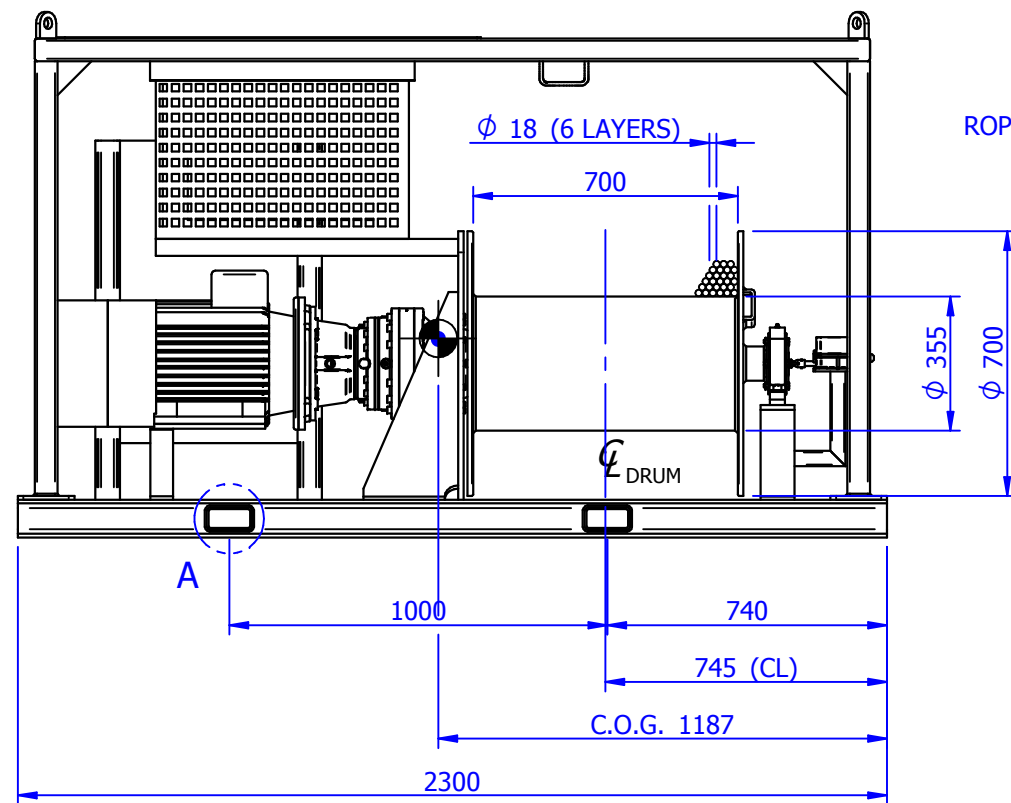
Total resistance R_t	5 -10 k
R_t tolerance at 20°C	± 20%
Maximum power dissipated at 70 °C	0,3 W
Actual electric angle (AEA)	340° ± 5°
Useful electrical angle	AEA -3°
Independent linearity	± 2%
Output voltage stability	0,1% max
Cursor current (in cont. duty)	1 mA max
Contact load resistance	>1000 x R_t
Insulation resistance	1000 M - 500 Vcc
Dielectric rigidity	>500 V _{eff} - 50 Hz

ANNEX III: DRAWINGS & SCHEMATICS

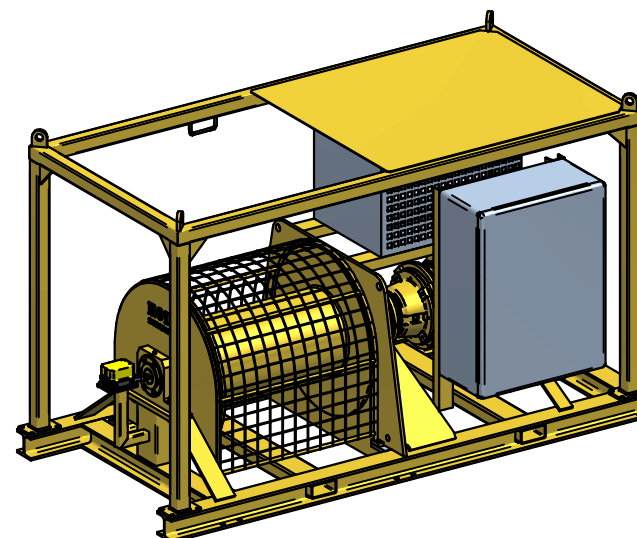
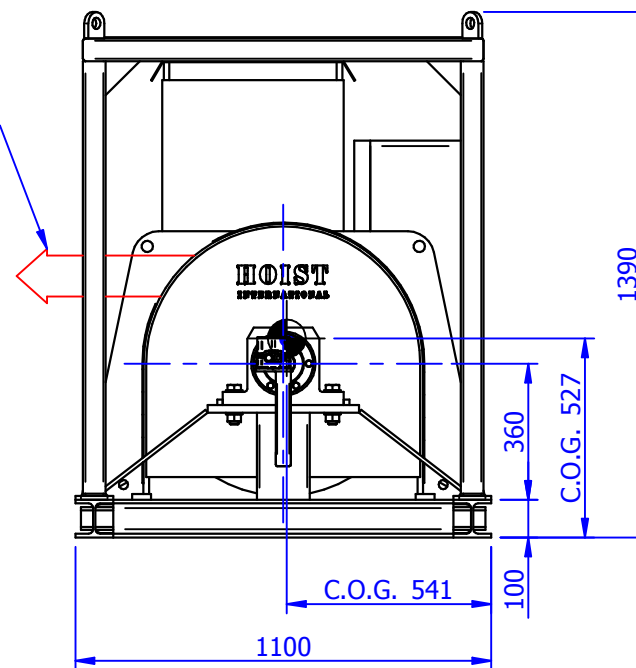


DETAIL A

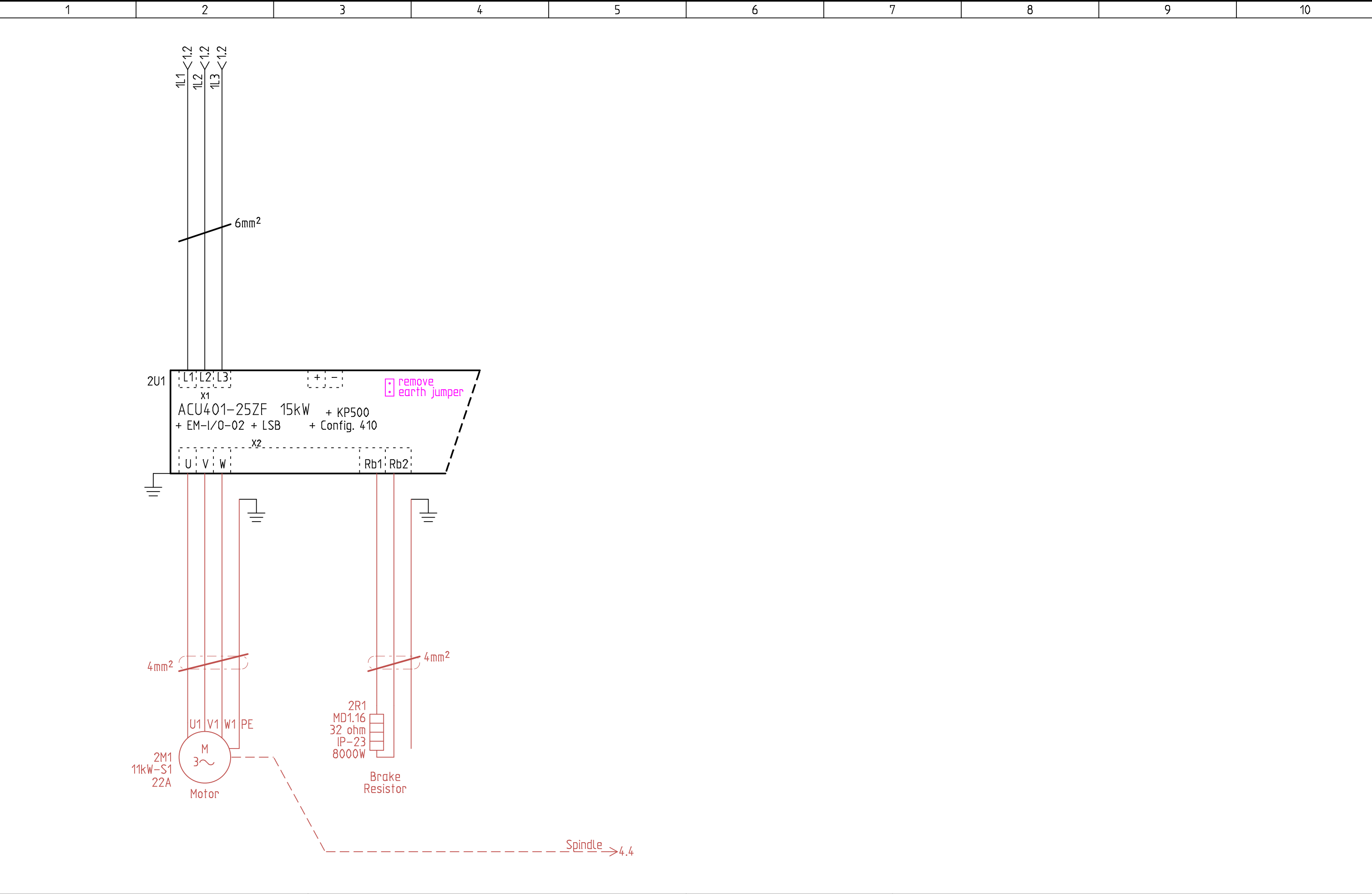
DRUMGUARD OMITTED FOR CLARITY

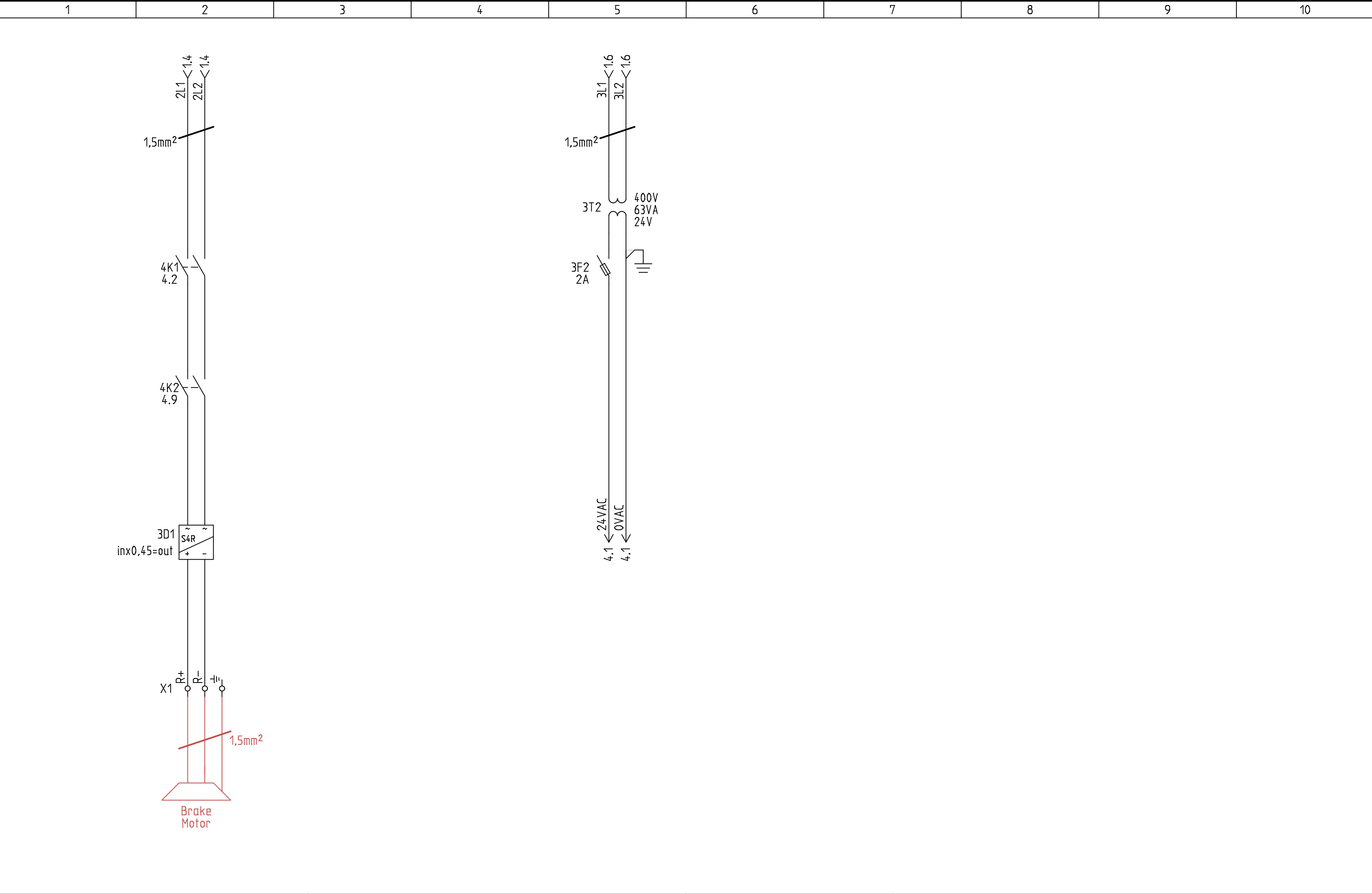


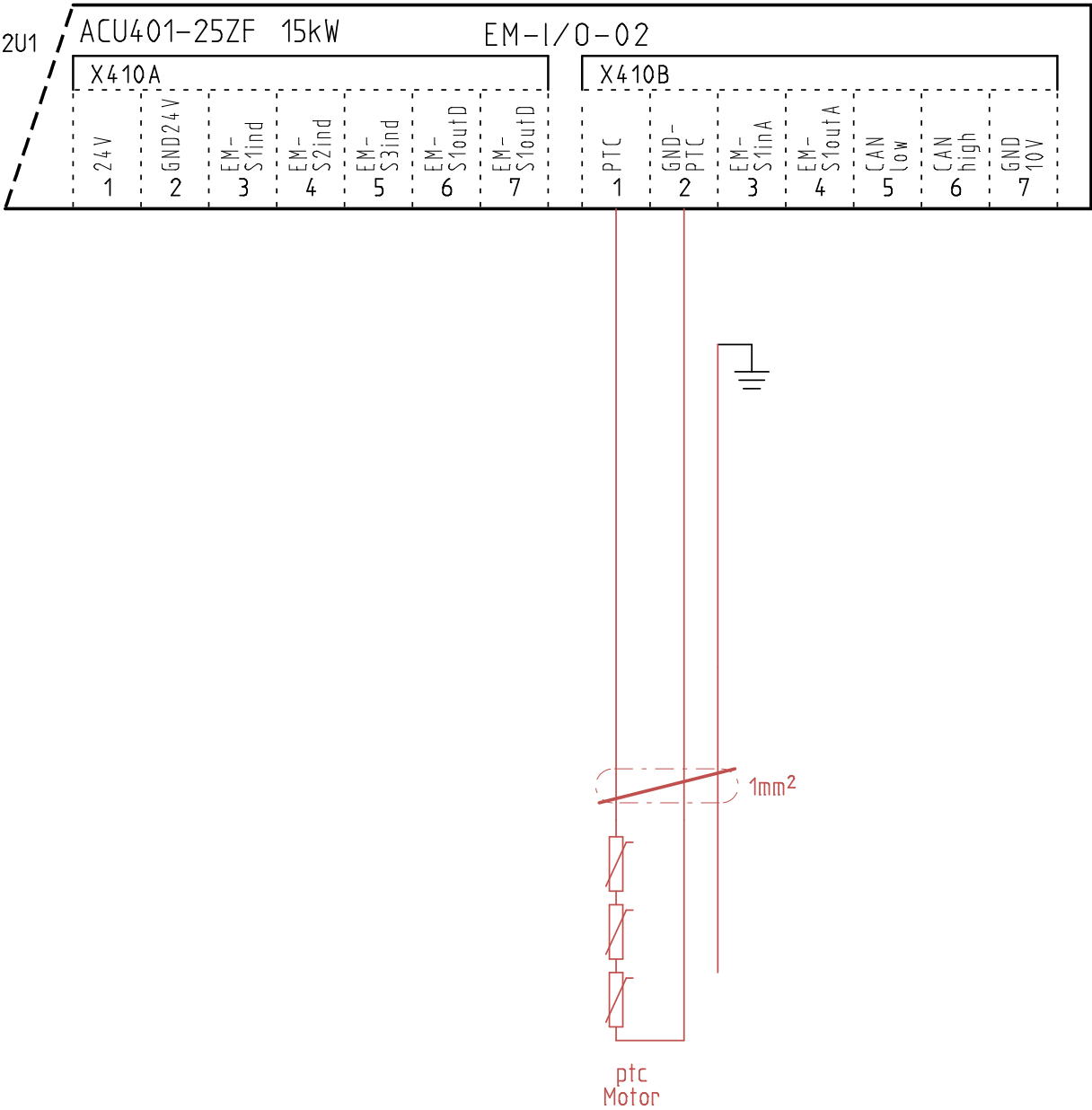
ROPE TRAVEL

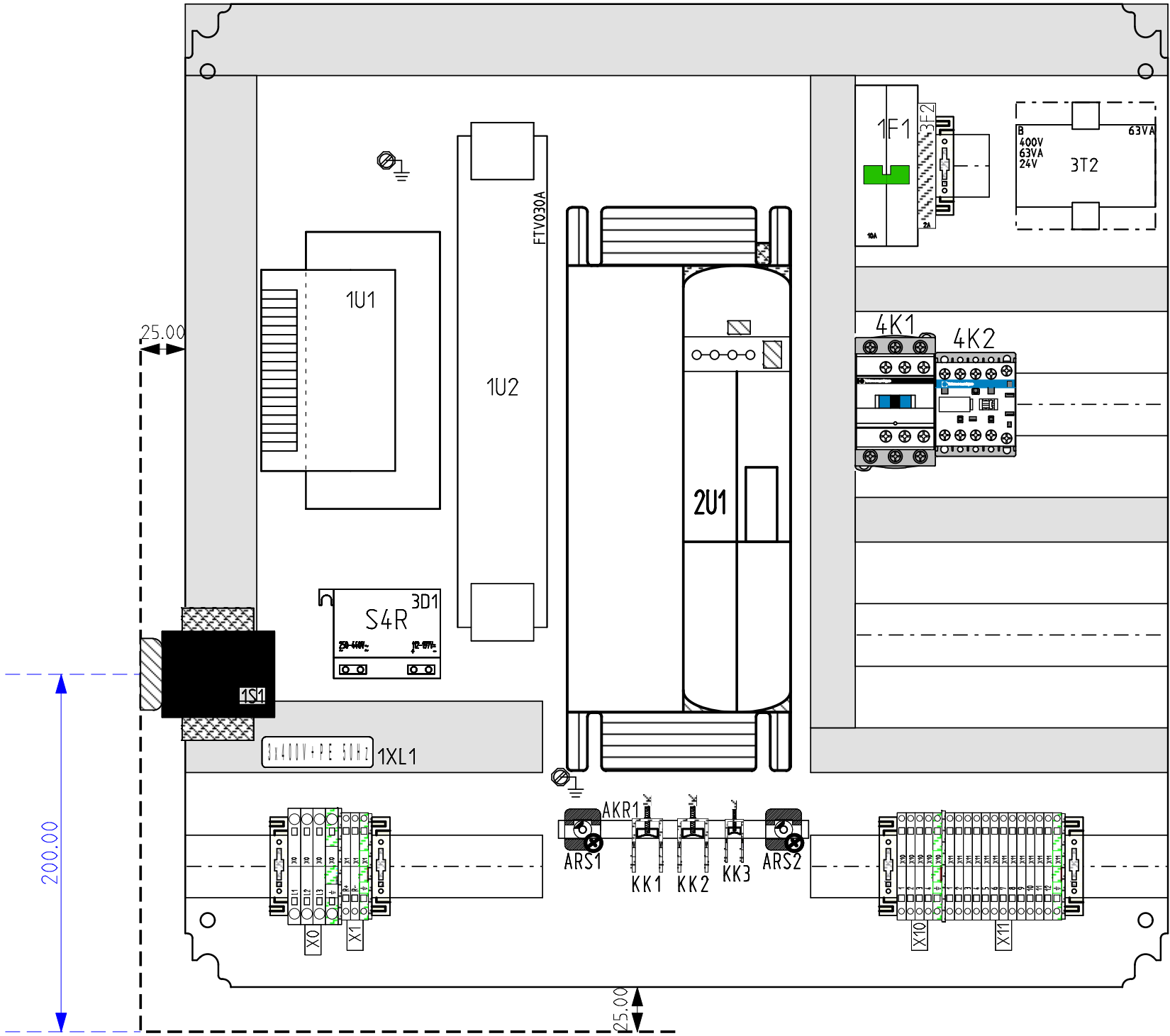


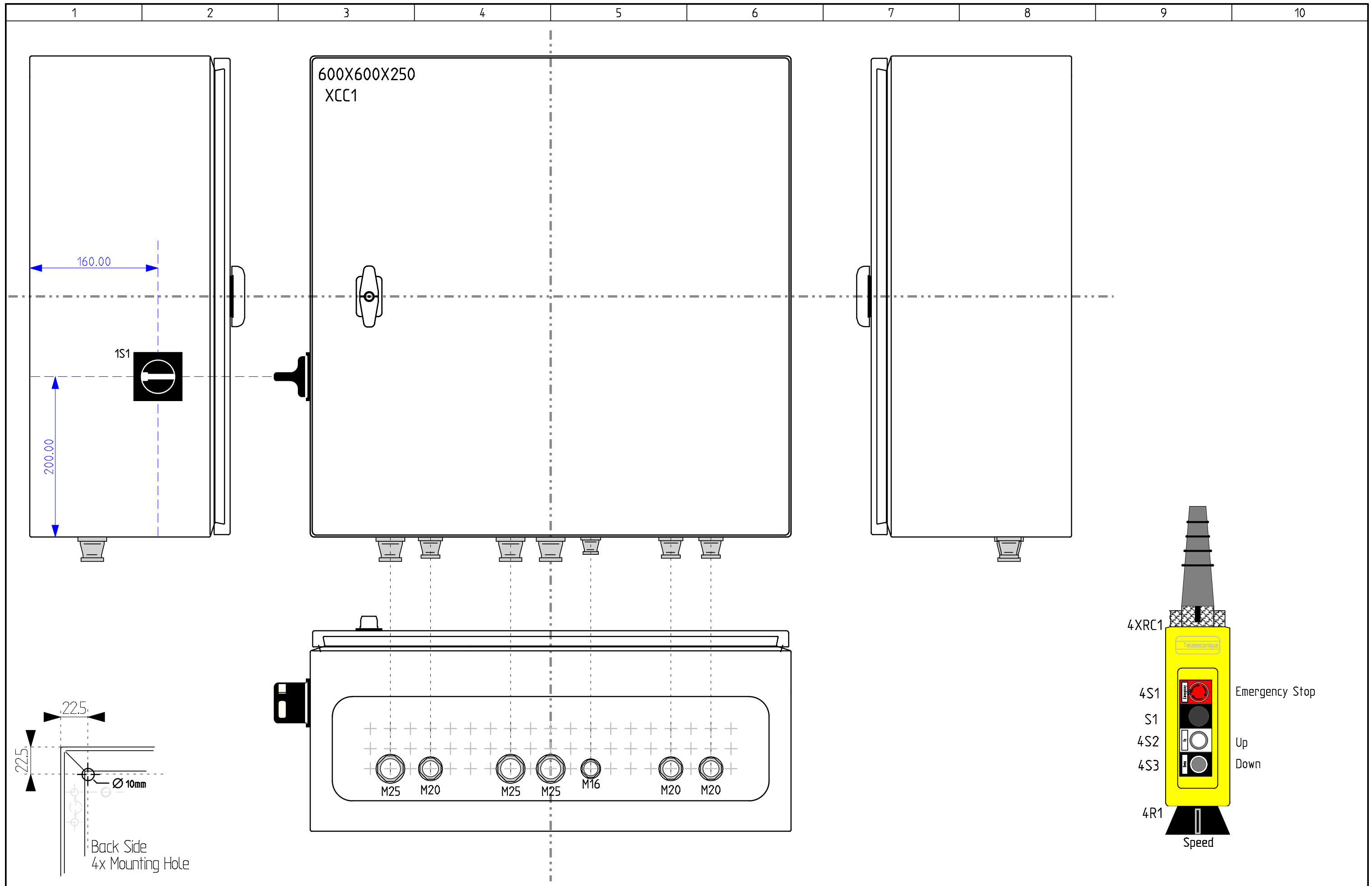
REVISION	DRAWN BY	DESCRIPTION	DATE	APPROVED ENGINEER																																													
1.1	aste	FOR INFORMATION	23-3-2017																																														
GENERAL NOTES: 1. THIS DRAWING IS SUBJECT TO FURTHER ENGINEERING DEVELOPMENT.																																																	
TECHNICAL DATA:																																																	
WINCH	ISO-FEM CLASS OPERATING TEMP. DUTY RATED CAPACITY, ON THE TOP LAYER MAX. CAPACITY, ON THE 1ST LAYER RATED SPEED, ON THE 1ST LAYER MAX. SPEED, ON THE TOP LAYER MASS WINCH EXCL. CABLE		T4-L3-M5 0 to +40 °C. LIFTING 3000 KG 4450 KG 12 m/min 18 m/min ± 1080 KG.																																														
CABLE REQ.	Ø MAXIMUM NUMBER OF LAYERS LENGTH MINIMUM BREAK LOAD (M.B.L.)		18 mm 6 315 m 226 kN																																														
DRUM	BARREL Ø LENGTH FLANGE Ø GROOVE PITCH RADIUS DEPTH BRAKE FACTOR		355 mm 700 mm 700 mm NONE mm mm mm x W.L.L.																																														
MOTOR	TYPE PROTECTION CLASS POWER VOLTAGE FREQUENCY BRAKE FACTOR		ELECTRICAL BRAKE MOTOR IP 54 11 kW, S1 400 VAC 50 Hz 1,5 x W.L.L.																																														
GEARBOX	TYPE GEAR		PLANETARY GEARBOX HIGH QUALITY																																														
EXTRA(S)	DRUMGUARD SPINDLE LIMIT SWITCH																																																
<table><tr><td colspan="3">TOLERANCES FOR MACHINED PART DIMENSIONS WITHOUT TOLERANCE</td></tr><tr><td colspan="3">NOMINAL DIMENSION</td></tr><tr><td>GREATER THAN</td><td>UP TO</td><td>TOLERANCE</td></tr><tr><td>-</td><td>6</td><td>±0,1</td></tr><tr><td>6</td><td>30</td><td>±0,2</td></tr><tr><td>30</td><td>120</td><td>±0,3</td></tr><tr><td>120</td><td>400</td><td>±0,5</td></tr><tr><td>400</td><td>1000</td><td>±0,8</td></tr><tr><td>1000</td><td>2000</td><td>±1,2</td></tr><tr><td>2000</td><td>4000</td><td>±2</td></tr><tr><td>4000</td><td>-</td><td>±3</td></tr></table> <table><tr><td colspan="2">REACTION FORCES ON FOUNDATION WITH BRAKE FORCE</td></tr><tr><td>POSITION</td><td>FORCE (kN) (+UPWARDS)</td></tr><tr><td>A</td><td>+31</td></tr><tr><td>B</td><td>+28</td></tr><tr><td>C</td><td>-42</td></tr><tr><td>D</td><td>-39</td></tr></table> FOR INFORMATION DATE: 23-3-2017 APPROVAL IS ALREADY CONFIRMED, PRODUCTION STARTED					TOLERANCES FOR MACHINED PART DIMENSIONS WITHOUT TOLERANCE			NOMINAL DIMENSION			GREATER THAN	UP TO	TOLERANCE	-	6	±0,1	6	30	±0,2	30	120	±0,3	120	400	±0,5	400	1000	±0,8	1000	2000	±1,2	2000	4000	±2	4000	-	±3	REACTION FORCES ON FOUNDATION WITH BRAKE FORCE		POSITION	FORCE (kN) (+UPWARDS)	A	+31	B	+28	C	-42	D	-39
TOLERANCES FOR MACHINED PART DIMENSIONS WITHOUT TOLERANCE																																																	
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PROJECT CLIENT NAME: HOIST INTERNATIONAL B.V.																																																	
DRAWING DESCRIPTION: SB 306 EDS GENERAL ARRANGEMENT WINCH DATASHEET																																																	
CLIENT REFERENCE No.: 48008285																																																	
		© EMCÉ WINCHES, 2010 THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION WHICH, UNLESS OTHERWISE EXPRESSLY AGREED TO IN WRITING BY EMCÉ, REMAINS THE SOLE PROPERTY OF EMCÉ, AND MAY NOT BE DISCLOSED, COPIED, REDISTRIBUTED, RETRANSMITTED, PUBLISHED OR USED TO CREATE DERIVATIVE WORKS.																																															
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DATE DRAWN: 23-3-2017		ORDER NUMBER: 1006881	DRAWING NUMBER: SB0.0306.00.071																																														
			REVISION: 1.1	SHEET: 1																																													

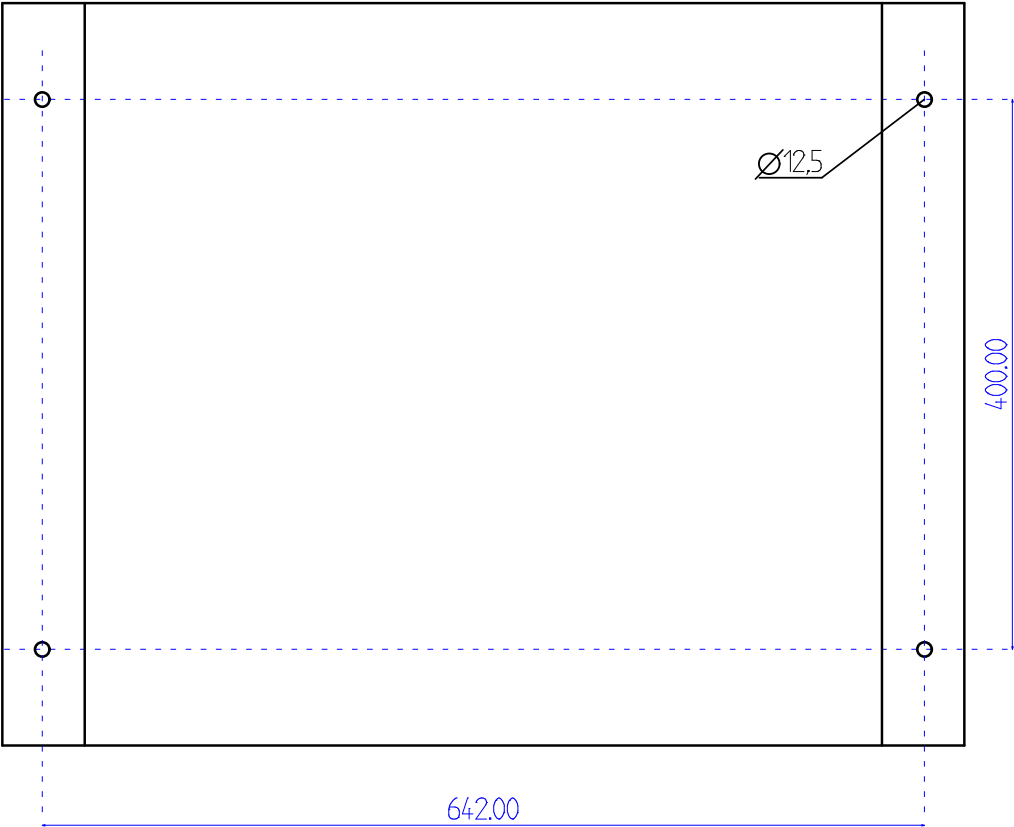
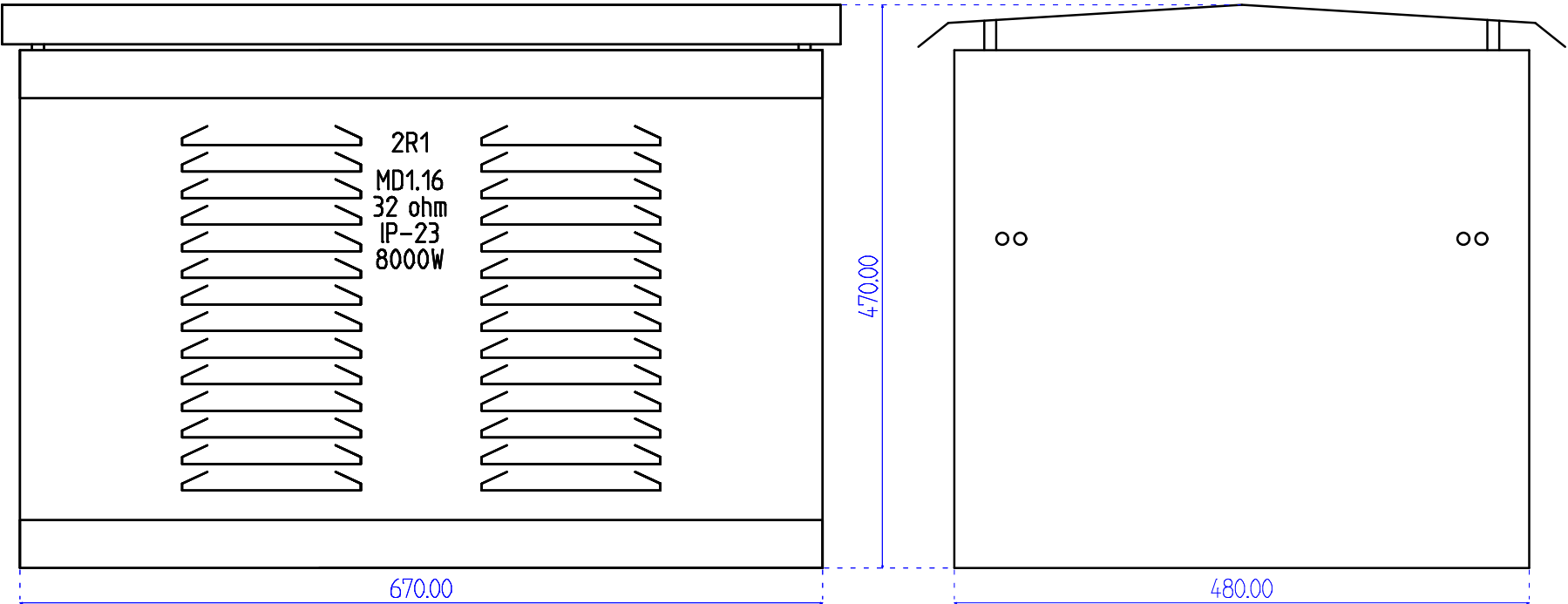


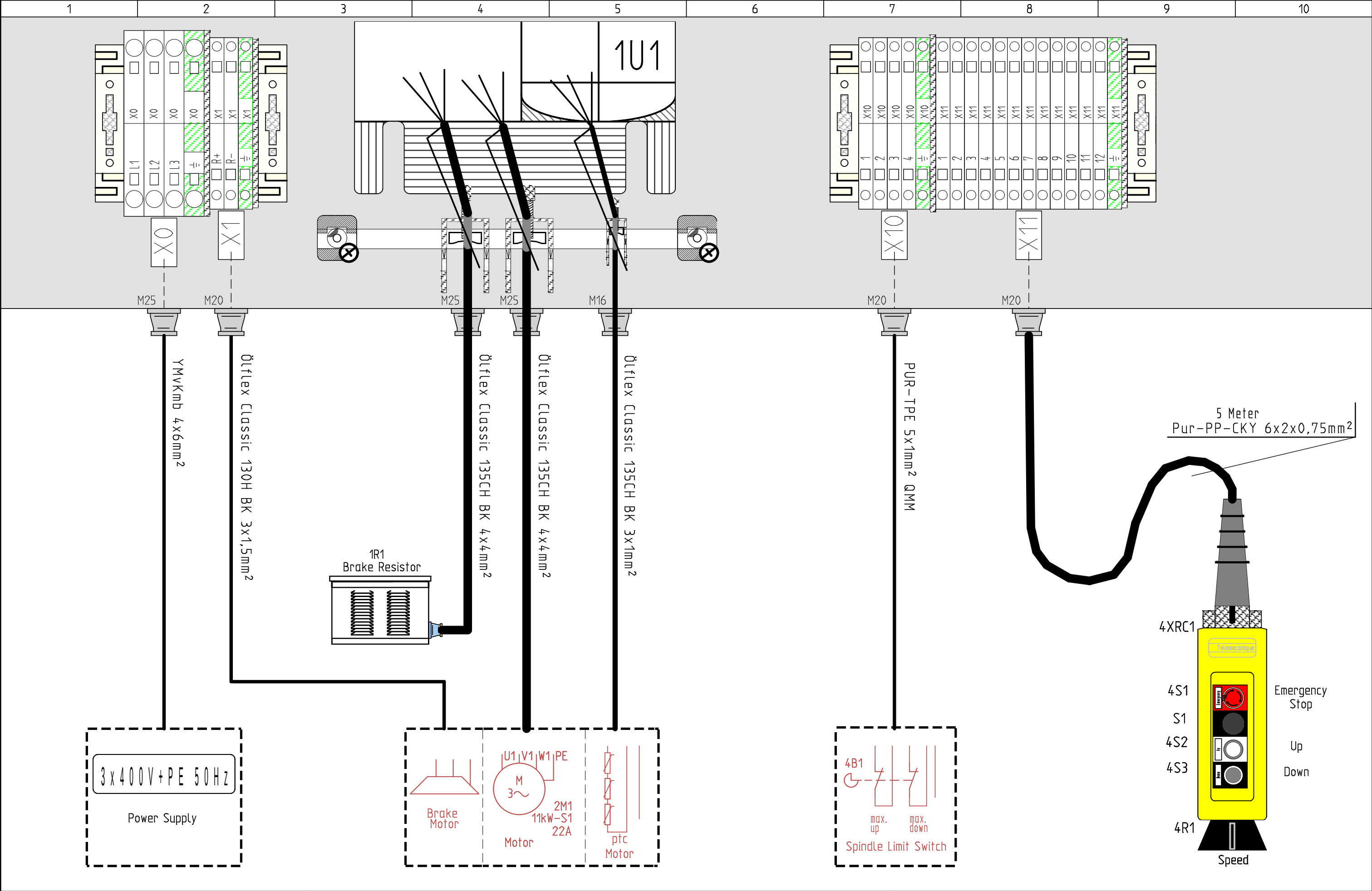












Collector materiallist-detail

Quantity	Type	Description	Manufacturer
1.00	TR172.90	Transformer 63VA 400/24V	Belpa
1.00	179675001	I/O-Extension Module EM-IO-02	Bonfiglioli Vectron
1.00	179675500	Operating Unit KP-500	Bonfiglioli Vectron
1.00	184420034	Line Choke for ACU401-25 LCVT034	Bonfiglioli Vectron
1.00	185691030	EMI Filter for ACU401-22,23,25 FTV030A	Bonfiglioli Vectron
1.00	ACU401-25ZF	ACU401-25ZF 15,0 KW 3X400V Without Filter Framesize 4	Bonfiglioli Vectron
825.00	34TS35F6	Din-Rail Perforated	Calpe
1.00	TEMBJ6-150	Groundleach 6mm ² - 150mm ² 448993	Erico
1.00	2A 5x20mm	3431368 Glass Fuse 5X20mm 2A	Ferraz
1.00	MD 1.16	Brake Resistor 8000 Watt IP23	HPR
1.00	Y4225	Perfect Gland M25 EMC 50.625 M/EMV 11-16mm	JACOB
1.00	KBONA60206	Potentiometer 5K Ohm Long Axe	KB ELECTRONICS,INC.
1.00	D2210	Circuit Breaker 2P 10A/400VAC B-Characteristic	Kopp
1.00	52103330	Skindicht Glandnut SM-PE-M M25 EMC	Lapp
1.00	53111410	Skintop Gland Plastic ST-M M16 RAL7035 4,5-10mm	Lapp
3.00	53111420	Skintop Gland Plastic ST-M M20 RAL7035 7-13mm	Lapp
3.00	53111430	Skintop Gland Plastic ST-M M25 RAL7035 9-17mm	Lapp
1.00	53119013	Skintop Glandnut GMP-GL-M M16 RAL7035	Lapp
3.00	53119023	Skintop Glandnut GMP-GL-M M20 RAL7035	Lapp
3.00	53119033	Skintop Glandnut GMP-GL-M M25 RAL7035	Lapp
915.00	B1463	Wiring Gutter 60x25mm	Licatec
1100.00	B1464	Wiring Gutter 60x40mm	Licatec
1.00	X2202	Fuseholder 4mm ² 5x20mm	Morsettitalia
2.00	AB/SS-M	1730246 Support Foot Rack For Collector Rail	Phoenix Contact
140.00	NLS-CU 3/10 SN	7600984 Shield Collector rail , 3 mm X 10 mm	Phoenix Contact
1.00	LADN203	Auxiliary Contact Spring 2NO	Schneider Electric
1.00	LC1D09B7	Contactor 9A 24VAC 1NC+1NO 50/60Hz	Schneider Electric
1.00	LC1K0901B7	Contactor 3P+1NC 9A 24VAC 50/60Hz	Schneider Electric
1.00	NSYS3D6625P	Steel Cabinet HxWxD 600 x 600 x 250 With Mountingplate	Schneider Electric
1.00	XACA04	Empty Pendant Control 4 Holes	Schneider Electric
1.00	XACA982	Protection Cover For XACA Pendant Control	Schneider Electric

Collector materiallist-detail

Quantity	Type	Description	Manufacturer
1.00	VBD1	Main Switch Disconnecter 32A 3P	TELEMECANIQUE
1.00	XACA9411	Pushbutton Springreturn White For XACA Pendant Control	TELEMECANIQUE
1.00	XACA9412	Pushbutton Springreturn Black For XACA Pendant Control	TELEMECANIQUE
1.00	ZA2BS834	HEAD PUSHBUTTON D=30 RED	TELEMECANIQUE
2.00	ZB2BE101	SPRING RETURN CONTACT BLOCK 1 NO FRONT M	TELEMECANIQUE
1.00	ZB2BE102	SPRING RETURN CONTACT BLOCK 1 NC FRONT M	TELEMECANIQUE
1.00	ZB2BY2101	LEGEND 30X40MM BLACK/ RED SIDES	TELEMECANIQUE
1.00	ZB2BY2330	LEGEND PLATE EMERGENCY STOP	TELEMECANIQUE
1.00	ZB2BY2904	LEGEND 30X40MM BLACK LEFT OR LOWER SLOW	TELEMECANIQUE
1.00	ZB2BY4901	LEGEND 30X40MM WHITE RAISE OR RIGHT SLOW	TELEMECANIQUE
1.00	ZB2SZ3	BLANKING PLUG BLACK	TELEMECANIQUE
1.00	ZB5AD912	HEAD POTENTIOMETER OP.	TELEMECANIQUE
1.00	ZBE101	SCREW TERMINAL CONTACT NO	TELEMECANIQUE
1.00	S4R	Brake Rectifier 250-440VAC - 112-197VDC	TEMPORITI
2.00	SK 14	7602006 Shielding 14mm Connector for rail	TU
1.00	SK 8	7601990 SHIELDING CONNECTOR FOR COLLECTOR RAIL	TU
1.00	CC15/60KMC	1877310000 Label 15x60mm Adhesive	WEIDMULLER B.V.
26.00	DEK5/5MC	1609801044 Label 5x5mm For Terminal	WEIDMULLER B.V.
2.00	ESG8/17MC	1674740000 Label 8x17mm For Relais ETC.	WEIDMULLER B.V.
13.00	ESG9/17K	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
1.00	ZAP/TW4	1632090000 ZAP/TW 4	WEIDMULLER B.V.
2.00	ZAPTW1beige	1608740000 ZAP TW 1 BEIGE	WEIDMULLER B.V.
1.00	ZAPTW5	1608830000 ZAPTW5	WEIDMULLER B.V.
18.00	ZDU2.5	1608510000 ZDU 2.5/E	WEIDMULLER B.V.
3.00	ZDU6	1608620000 ZDU 6	WEIDMULLER B.V.
5.00	ZEW35/2	8630740000 Endbracket	WEIDMULLER B.V.
3.00	ZPE2.5	1608640000 ZPE 2.5	WEIDMULLER B.V.
1.00	ZPE6	1608670000 ZPE 6	WEIDMULLER B.V.

Material-Detail

Comp	Type	Quantity	Description	Manufacturer
AKR1	NLS-CU 3/10 SN	140.00	7600984 Shield Collector rail , 3 mm X 10 mm	Phoenix Contact
ARS1	AB/SS-M	1.00	1730246 Support Foot Rack For Collector Rail	Phoenix Contact
ARS2	AB/SS-M	1.00	1730246 Support Foot Rack For Collector Rail	Phoenix Contact
KK1	SK 14	1.00	7602006 Shielding 14mm Connector for rail	TU
KK2	SK 14	1.00	7602006 Shielding 14mm Connector for rail	TU
KK3	SK 8	1.00	7601990 SHIELDING CONNECTOR FOR COLLECTOR RAIL	TU
S1	ZB2BY2101	1.00	LEGEND 30X40MM BLACK/ RED SIDES	TELEMECANIQUE
S1	ZB2SZ3	1.00	BLANKING PLUG BLACK	TELEMECANIQUE
U4	B1464	550.00	Wiring Gutter 60x40mm	Licatec
U5	B1464	350.00	Wiring Gutter 60x40mm	Licatec
U6	B1464	200.00	Wiring Gutter 60x40mm	Licatec
U7	B1463	175.00	Wiring Gutter 60x25mm	Licatec
U8	B1463	200.00	Wiring Gutter 60x25mm	Licatec
U9	B1463	365.00	Wiring Gutter 60x25mm	Licatec
U10	B1463	175.00	Wiring Gutter 60x25mm	Licatec
U11	34TS35F6	175.00	Din-Rail Perforated	Calpe
U12	34TS35F6	175.00	Din-Rail Perforated	Calpe
U13	34TS35F6	75.00	Din-Rail Perforated	Calpe
U14	34TS35F6	200.00	Din-Rail Perforated	Calpe
U15	34TS35F6	200.00	Din-Rail Perforated	Calpe
W19	52103330	1.00	Skindicht Glandnut SM-PE-M M25 EMC	Lapp
W19	Y4225	1.00	Perfect Gland M25 EMC 50.625 M/EMV 11-16mm	JACOB
W20	53111430	1.00	Skintop Gland Plastic ST-M M25 RAL7035 9-17mm	Lapp
W20	53119033	1.00	Skintop Glandnut GMP-GL-M M25 RAL7035	Lapp
W21	53111420	1.00	Skintop Gland Plastic ST-M M20 RAL7035 7-13mm	Lapp
W21	53119023	1.00	Skintop Glandnut GMP-GL-M M20 RAL7035	Lapp
W22	53111430	1.00	Skintop Gland Plastic ST-M M25 RAL7035 9-17mm	Lapp
W22	53119033	1.00	Skintop Glandnut GMP-GL-M M25 RAL7035	Lapp
W23	53111430	1.00	Skintop Gland Plastic ST-M M25 RAL7035 9-17mm	Lapp
W23	53119033	1.00	Skintop Glandnut GMP-GL-M M25 RAL7035	Lapp
W24	53111410	1.00	Skintop Gland Plastic ST-M M16 RAL7035 4,5-10mm	Lapp

Material-Detail

Comp	Type	Quantity	Description	Manufacturer
W24	53119013	1.00	Skintop Glandnut GMP-GL-M M16 RAL7035	Lapp
W25	53111420	1.00	Skintop Gland Plastic ST-M M20 RAL7035 7-13mm	Lapp
W25	53119023	1.00	Skintop Glandnut GMP-GL-M M20 RAL7035	Lapp
W26	53111420	1.00	Skintop Gland Plastic ST-M M20 RAL7035 7-13mm	Lapp
W26	53119023	1.00	Skintop Glandnut GMP-GL-M M20 RAL7035	Lapp
X0	DEK5/5MC	4.00	1609801044 Label 5x5mm For Terminal	WEIDMULLER B.V.
X0	ZDU6	3.00	1608620000 ZDU 6	WEIDMULLER B.V.
X0	ZPE6	1.00	1608670000 ZPE 6	WEIDMULLER B.V.
X1	DEK5/5MC	3.00	1609801044 Label 5x5mm For Terminal	WEIDMULLER B.V.
X1	ZDU2.5	2.00	1608510000 ZDU 2.5/E	WEIDMULLER B.V.
X1	ZPE2.5	1.00	1608640000 ZPE 2.5	WEIDMULLER B.V.
X2	ZAP/TW4	1.00	1632090000 ZAP/TW 4	WEIDMULLER B.V.
X3	ZAPTW1beige	1.00	1608740000 ZAP TW 1 BEIGE	WEIDMULLER B.V.
X4	ZAPTW1beige	1.00	1608740000 ZAP TW 1 BEIGE	WEIDMULLER B.V.
X5	ZAPTW5	1.00	1608830000 ZAPTW5	WEIDMULLER B.V.
X10	DEK5/5MC	5.00	1609801044 Label 5x5mm For Terminal	WEIDMULLER B.V.
X10	ZDU2.5	4.00	1608510000 ZDU 2.5/E	WEIDMULLER B.V.
X10	ZPE2.5	1.00	1608640000 ZPE 2.5	WEIDMULLER B.V.
X11	DEK5/5MC	13.00	1609801044 Label 5x5mm For Terminal	WEIDMULLER B.V.
X11	ZDU2.5	12.00	1608510000 ZDU 2.5/E	WEIDMULLER B.V.
X11	ZPE2.5	1.00	1608640000 ZPE 2.5	WEIDMULLER B.V.
XCC1	NSYS3D6625P	1.00	Steel Cabinet HxWxD 600 x 600 x 250 With Mountingplate	Schneider Electric
XCC1	TEMBJ6-150	1.00	Groundleach 6mm² - 150mm² 448993	Erico
XL2	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
XL3	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
XL4	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
XL5	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
XT1	ZEW35/2	1.00	8630740000 Endbracket	WEIDMULLER B.V.
XT2	ZEW35/2	1.00	8630740000 Endbracket	WEIDMULLER B.V.
XT3	ZEW35/2	1.00	8630740000 Endbracket	WEIDMULLER B.V.
XT4	ZEW35/2	1.00	8630740000 Endbracket	WEIDMULLER B.V.

Material-Detail

Comp	Type	Quantity	Description	Manufacturer
XT5	ZEW35/2	1.00	8630740000 Endbracket	WEIDMULLER B.V.
1F1	D2210	1.00	Circuit Breaker 2P 10A/400VAC B-Characteristic	Kopp
1F1	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
1S1	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
1S1	VBD1	1.00	Main Switch Disconnecter 32A 3P	TELEMECANIQUE
1U1	184420034	1.00	Line Choke for ACU401-25 LCVT034	Bonfiglioli Vectron
1U1	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
1U2	185691030	1.00	EMI Filter for ACU401-22,23,25 FTV030A	Bonfiglioli Vectron
1U2	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
1XL1	CC15/60KMC	1.00	1877310000 Label 15x60mm Adhesive	WEIDMULLER B.V.
2R1	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
2R1	MD 1.16	1.00	Brake Resistor 8000 Watt IP23	HPR
2U1	179675001	1.00	I/O-Extension Module EM-I0-02	Bonfiglioli Vectron
2U1	179675500	1.00	Operating Unit KP-500	Bonfiglioli Vectron
2U1	ACU401-25ZF	1.00	ACU401-25ZF 15,0 KW 3X400V Without Filter Framesize 4	Bonfiglioli Vectron
2U1	ESG9/17K	2.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
3D1	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
3D1	S4R	1.00	Brake Rectifier 250-440VAC - 112-197VDC	TEMPORITI
3F2	2A 5x20mm	1.00	3431368 Glass Fuse 5X20mm 2A	Ferraz
3F2	DEK5/5MC	1.00	1609801044 Label 5x5mm For Terminal	WEIDMULLER B.V.
3F2	X2202	1.00	Fuseholder 4mm2 5x20mm	Morsettitalia
3T2	ESG9/17K	1.00	1674760000 Label 9x17mm Adhesive For Transformer	WEIDMULLER B.V.
3T2	TR172.90	1.00	Transformer 63VA 400/24V	Belpa
4K1	ESG8/17MC	1.00	1674740000 Label 8x17mm For Relais ETC.	WEIDMULLER B.V.
4K1	LADN203	1.00	Auxiliary Contact Spring 2NO	Schneider Electric
4K1	LC1D09B7	1.00	Contacto 9A 24VAC 1NC+1NO 50/60Hz	Schneider Electric
4K2	ESG8/17MC	1.00	1674740000 Label 8x17mm For Relais ETC.	WEIDMULLER B.V.
4K2	LC1K0901B7	1.00	Contacto 3P+1NC 9A 24VAC 50/60Hz	Schneider Electric
4R1	KB0NA60206	1.00	Potentiometer 5K Ohm Long Axe	KB ELECTRONICS,INC.
4R1	XACA982	1.00	Protection Cover For XACA Pendant Control	Schneider Electric
4R1	ZB5AD912	1.00	HEAD POTENTIOMETER OP.	TELEMECANIQUE

Material-Detail	
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ANNEX IV: GUIDELINES TO COMPLY WITH THE MACHINERY DIRECTIVE 2006/42/EC

Rated capacity limiters:

Winches with a rated capacity of 1000 kg or more shall be fitted with a rated capacity limiter in accordance with EN 14492-1 section 5.2.2.1.

The rated capacity limiter shall be designed to prevent overloading of the winch. It shall also limit the forces transmitted to the supporting structure, which are to be provided by the manufacturer. Overloading means exceeding the designed operating forces.

For electric winches normally an indirect acting rated capacity limiter is used. The triggering factor of an indirect acting rated capacity limiter should be equal or less than 125% off the rated capacity of the winch in the first layer of the drum. Most common is to use a device that limits the running current of the electric motor. If such a device is used care must be taken to allow the motor to overcome the starting current before the rated capacity limiter is activated. Alternative methods may for example be a load measurement with a load pin on a diverter sheave, a dynamometer or a torque limiter programmed in a frequency inverter.

When the rated capacity limiter is activated the winch should stop lifting and should only be able to lower. Normally the controls are designed such that the rated capacity limiter is reset when the controls for lowering are applied.

Controls

Devices for starting and stopping manually controlled winches shall be fitted with hold-to-run control elements so that the drive energy supply is interrupted when the actuating elements are released.

Controls for electric winches shall be in accordance with EN 60204-32. For electric powered winches guide lines are given in EN 14492-1 section 5.12.

The electrical devices on a winch shall contain a device for isolation of the electrical equipment from the mains power supply so that work may be performed without the risk of a electric shock or burning. Besides an isolation switch on the control panel this function may also be fulfilled by a crane-supply switch, a crane switch, or as described in EN 60204-32, 5.3.2, letter d), a plug/socket combination.

Lifting and lowering limiters

Winches shall be fitted with lifting and lowering limiters in accordance with EN 12077-2 section 5.6.1.

The following prescriptions shall apply in addition to those stated in EN 12077-2.

- Electrical limiters shall have a positive opening system.
- After operation of a limiter, it shall be ensured that the limiter does not return to its original position until the corresponding restricted area has been left by the actuating parts.
- The lowering limiter shall ensure that the minimum engagement of the lifting medium is maintained at all times during operation. The lowering limiter shall also stop the motion to prevent unwanted coiling in the reverse direction.
- For normal operation a second limiter, as defined in EN 12077-2 section 5.6.1.1 is not necessary. A risk assessment based on the particular application may result in the need of a second limiter for certain motions. This second limiter shall not be approached during normal operation, whereas the first limiter can be approached during normal operation.

For most winches a spindle limit switch on the drum shaft with 2 contacts is used as an upper and lower limit switch. In case the limit switches are also used as position switches local switches actuated by the lifted structure should be used.

Protective guards

Drum and other running parts of a winch located in an easily accessible position shall be protected by opportune guards. For winches in an easily accessible position a drum guard is required.

ANNEX V: WINCH CLASSIFICATION ACCORDING TO ISO 4301-1

Class of utilization of mechanisms		
Class of utilization	Total duration of use (h)	Remarks
T0	200	Irregular use
T1	400	
T2	800	
T3	1600	
T4	3200	Regular light use
T5	6300	Regular intermittent use
T6	12500	Irregular intensive use
T7	25000	Intensive use
T8	50000	
T9	100000	

Nominal load spectrum factor for mechanisms, K_m		
State of loading	Nominal load spectrum factor K_m	Remarks
L1 - Light	0,125	Mechanisms subjected very rarely to the maximum load and, normally, to light loads.
L2 - Moderate	0,25	Mechanisms subjected fairly frequently to the maximum load but, normally, to rather moderate loads.
L3 - Heavy	0,50	Mechanisms subjected frequently to the maximum load and, normally, to loads of heavy magnitude.
L4 – Very heavy	1,00	Mechanisms subjected regularly to the maximum load.

Group classification of the mechanism as a whole											
State of loading	Nominal load spectrum factor K_m	Class of utilization of mechanisms									
		T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
L1 - Light	0,125			M1	M2	M3	M4	M5	M6	M7	M8
L2 - Moderate	0,25		M1	M2	M3	M4	M5	M6	M7	M8	
L3 - Heavy	0,50	M1	M2	M3	M4	M5	M6	M7	M8		
L4 – Very heavy	1,00	M2	M3	M4	M5	M6	M7	M8			

[illegible]

⚠ WARNING



Failure to follow these warnings may result in death, severe injury or property damage.

BEFORE OPERATING WINCH:

- Do not operate before reading manual(s) supplied with this winch.
- Inspect winch, wire rope and rigging prior to every shift.
- Ensure all winch components and attachments are functioning and properly adjusted.
- Do not use for lowering or transporting people.
- Ensure winch anchors and supporting structure are secure and in good condition.
- Ensure winch supply cables and/or hoses are in good condition and connections are tight.
- Do not operate if malfunctioning or damage is found.
- Use only approved rigging methods.
- Do not make unauthorized modifications.
- Use guards to avoid possible hazards.
- Ensure an accessible main switch/shut off valve has been installed in the power supply line.
- Use caution when operating in extremely cold temperatures.
- Comply with other federal, state and local rules.
- Check the SWL/WLL on serial tag plate.

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DO NOT REMOVE THIS LABEL

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⚠ WARNING (CONTINUED FROM OTHER SIDE)

WHEN OPERATING WINCH:

- Do not lift people or loads over people.
- Keep hands, clothing, jewelry, etc. away from wire rope, drum and other moving parts.
- Stop winch before touching wire rope.
- Ensure wire rope spools evenly across drum width and each wrap is tight to drum and previous wrap.
- Ensure tension is applied to wire rope when spooling.
- Be aware of load position at all times to avoid moving load into hazardous situations.
- Do not lift or pull load into support structure or winch.
- Do not run wire rope over sharp edges, use approved diameter sheaves.
- Ensure load does not exceed winch, wire rope & rigging ratings.
- Keep everyone clear of load path.
- Keep a minimum of three wraps of wire rope on drum at all times.
- Immediately stop operating if load does not respond to winch control.
- Wear hearing and eye protection.
- Ensure brakes hold prior to making complete lift by lifting load a short distance and releasing control.
- Use only in a well ventilated area.
- Keep clear of motor exhaust in case of air driven winch.
- Do not allow wire rope storage to exceed drum flange diameter.
- Always shut off air or power supply before servicing or leaving winch unattended.
- Do not remove or obscure this or any other warning label.

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De Gravendamsweg 53b
2215 TC The Netherlands
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SERIAL NO.:1006881		ISO-FEM CLASS: T4-L3-M5	
TYPE:SB 306 E		DUTY: LIFTING	
RATED CAPACITY:		3000 KG, ON THE TOP LAYER	
MAX. CAPACITY:		4450 KG, ON THE 1 ST LAYER	
RATED SPEED:		12 m/min, ON THE 1 ST LAYER	
MAX. SPEED:		18 m/min, ON THE TOP LAYER	
CABLE Ø:	18 mm	MAX. LAYERS:	6
LENGTH:	315 m	MBL:	226 kN
MOTOR TYPE: Electric 3 Phase			
POWER:	11 kW (S1)	PROT. CLASS:	IP 54
VOLTAGE:	400 VAC	FREQUENCY:	50 Hz
OPERATING PRESSURE:		bar	
VOLUME FLOW:			
GEARBOX TYPE:	306 L3 MZ	RATIO:	i = 141
MANUFACTURED:	04-2017	MASS:	1080 KG

THIS WINCH IS NOT SUITABLE FOR
THE LIFTING AND LOWERING OF PERSONNEL