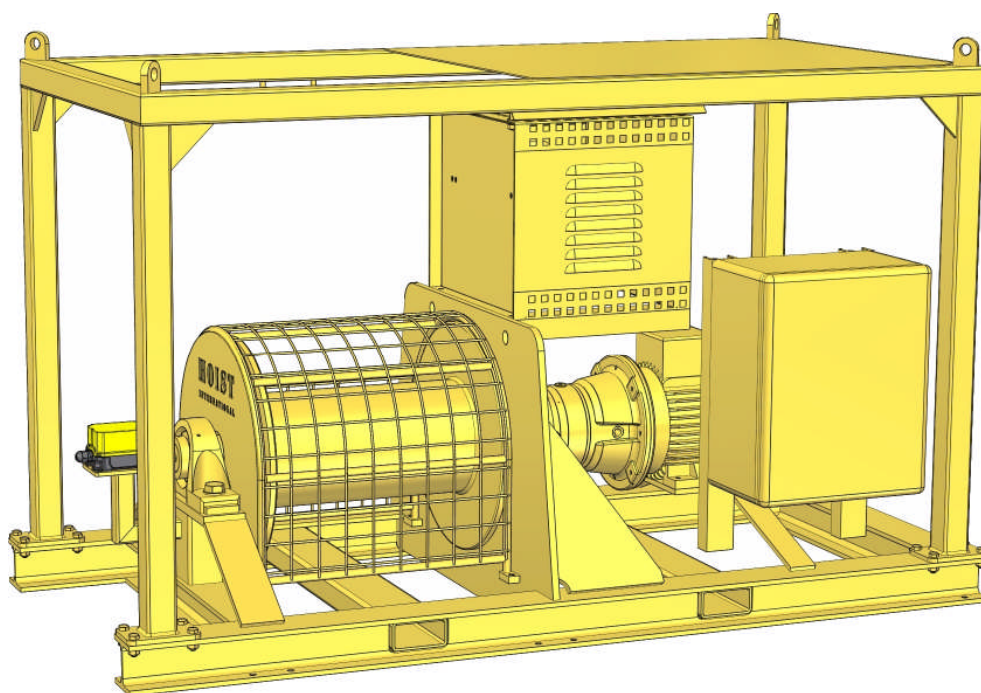


User Manual

Planetary Winches



EMCÉ Winch Model : SB 304 EDS
Fabrication Number : 1001666

Machinefabriek EMCÉ
's Gravendamsseweg 53b
2215 TC Voorhout
The Netherlands

Tel. +31 252 214080
Fax. +31 252 220107
E-mail: info@emce.nl
Http: www.emce.nl

EMCÉ
Winches | Stokvis Group 

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 users 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.

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.

Intellectual property

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

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.

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 users manual is made with great care. EMCÉ cannot be put responsible for errors in this publication or for the impact of this.

This users manual is written by EMCÉ in Voorhout.

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1. 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. Only authorized dealers and qualified mechanics may adjust or repair the winch;
4. 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;
5. Check controls of the product and its operation before operating the winch;
6. Do not operate without testing. (See « Inspection and Testing » procedures).
7. Do not operate winch in a damaged condition.
8. Do not operate winch that has not been properly maintained or equipped.
9. 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.
10. Do not operate winch with any personnel near the line of force or capable of coming into contact with moving parts.
11. All signs and warning notices must be posted permanently on the winch.
12. Ease the slack out of the wire rope when starting a lift. Do not jerk the load.
13. Never leave a suspended load unattended.
14. 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.
15. Periodically check the tightness of all fasteners and tighten if necessary. Replace any damaged fasteners found;
16. Place the winch in a proper position and secure all fixing points with right size bolts correctly tightened;
17. Check oil level and fill up if necessary;
18. Ensure that all personnel and spectators are clear of the load and winch;
19. Should the winch be easily accessible by third parties, realize the protections stated by CE rules (MC 2006/42/CE);
20. Do not lift loads over people;
21. Use proper crane signals while operating the winch;
22. Ensure safe lifting practices are employed while rigging the cargo for lifting. Do not use untested or uncertified lifting appendages;
23. Avoid shock loads on the winch, inch the load into engagement before applying full power;

24. Limit switches are installed as a safety device; they are not suited to be used as positioning devices;
25. Swinging loads will significantly increase the products load and must be avoided;
26. Do not handle wires without accident prevention gloves and never try to move wires under tension;
27. Make sure that wire size and features are compatible with winch ones and check the correct fastening of the wire to the drum. Always maintain three or more wraps of wire rope on the drum;
28. Check the wire winding sense on winch drum for correctness and conformity to the one stated on winch data sheet. The correct winding contributes to extend wire's operational life;
29. Check wire integrity and absence of broken strands or kinks which may cause wire breaking;
30. Check safety device operation and efficiency;
31. Make sure that working conditions conform to winch features;
32. Never lift loads exceeding maximum safe working load (W.L.L.).
33. 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.
34. 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.
35. When ropes become slack on the drum, they will tend to expend, resulting in: "cutting in" of wire when the winch is loaded again or the wire coming off the drum and jamming elsewhere on the winch (e.g. around the winch shaft). Both situations will cause serious damage to the wire requiring replacements.
36. Do not try to move fixed or obstructed loads
37. With winches for lifting and lowering suspended loads, side-pull of load is not allowed.
38. Excessive inching (e.g. giving short pulses to the motor) shall be avoided.

2. INTRODUCTION

2.1 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 1).

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

2.2 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.

 	The applicable ATEX classification for the winch can be found on the EMCÉ ATEX certificate (see annex 1). 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 certificate is based on the combination of all components on the winch. In case of doubt please contact EMCÉ or your local dealer.
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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 1) 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.

2.3 OPTIONS

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

Limit switch:

The safety devices engineered to keep the range of load movements within stated limits. They may be made by revolution counter or sensors. Limit switches are mandatory for lifting applications but only fitted on request.

Pressure roller:

The device engineered to avoid the loosening and the self unwinding from the drum of a slack wire;

Slack Rope device:

The device engineered to avoid a slack wire rope by stopping the winch.

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 **EMCÉ** to the maximum allowed load stated on the winch datasheet. A load limiter is mandatory for lifting applications but only fitted on request.

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 manually or failsafe automatically by means of a hydraulic or pneumatic cylinder. Bandbrakes are used for applications where a second brake, 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. An application of the second could be a wire rope anchor winch.

Clutches:

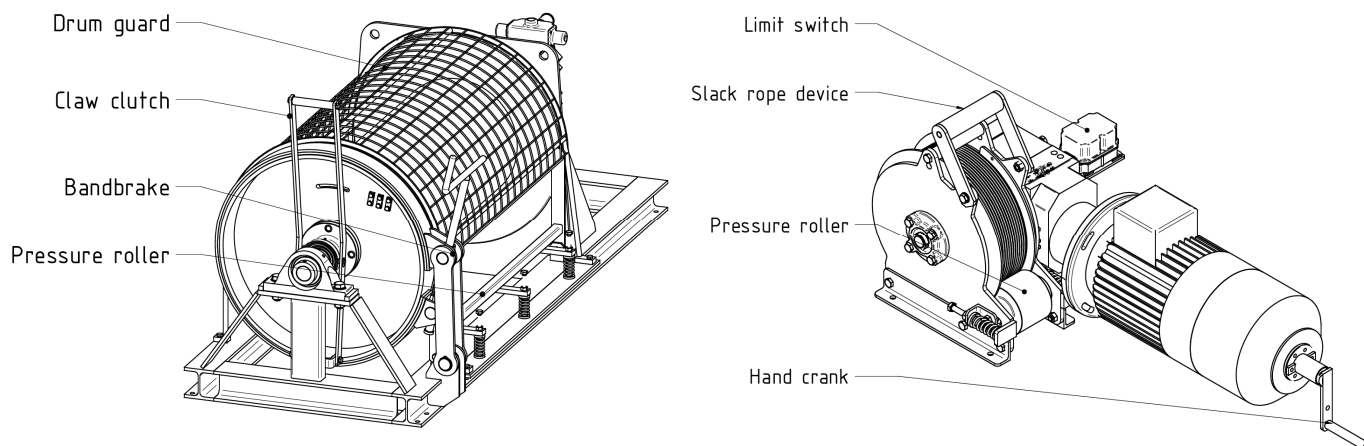
With a clutch the winch drum can be disengaged from the winch drive, which allows free running of the cable. The most common used is the claw clutch, which can't be operated under load, so that the driveline must first be freed of the load (for example using a bandbrake on the winch drum). Claw clutches are always manually operated. Some winches can be equipped with a friction clutch. Friction clutches can be supplied in manual and remote versions. Note that for most lifting applications the use of a clutch in the driveline is not permitted!

Hand crank:

This option is often used on man riding winches to allow operation of the winch in case the main power source fails.

Spooling gear:

When it is not possible to work within the maximal advised fleet angle (see section 3.1) a spooling gear is required on the winch. A standard spooling gear may be used up till a maximum fleet angle of 8°.



Examples of standard options on EMCE winches

3. GENERAL DESCRIPTION OF WINCHES

3.1 GENERAL OPERATING PRINCIPLE

Pulling Winch:

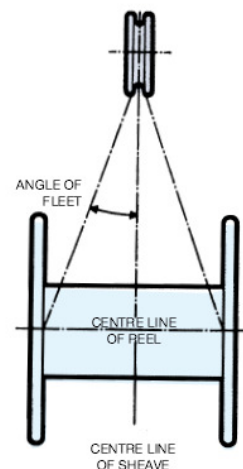
A winch is a pulling winch when transporting a load in horizontal sense. If the wire were to be cut during operation the load would stop moving.

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.

Fleet angle.

To allow the wire to spool correctly it is imperative that the wire comes off the drum at a sufficiently low fleet angle. 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 wire, and centralize to the first sheave. A piece of rope can be useful in determining the correct angle.



	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°

* For spooling > 3 layers cable on a grooved drum the max. fleet angle should be limited to the values for a plain drum

Main components of EMCE winches

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 feeded. The brake acts on the input torque 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:

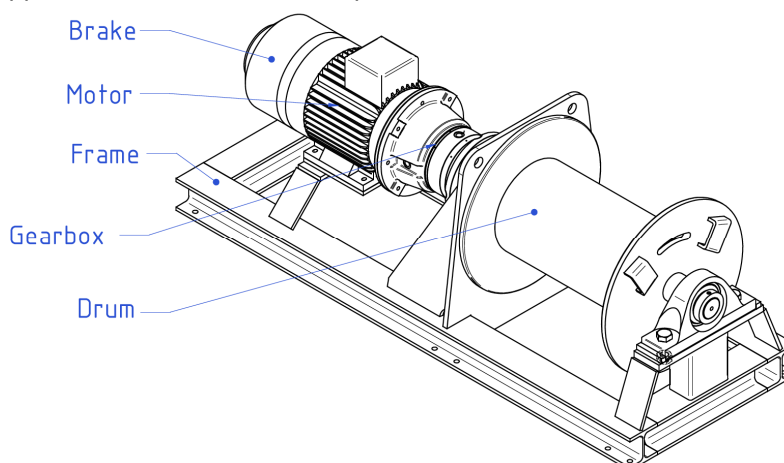
The part which multiplies the torque delivered by the motor to obtain the necessary torque to drive the load.

Drum:

The part which winds the wire rope. Use of a grooved drum smoothens spooling of the wire rope. Drum boundaries are the flanges. For safety reasons the diameter of the flanges is equal to the outer diameter of the upper allowed wire layer increased by two wire diameters.

Frame:

The structure which supports drum and other winch parts.



Main components of an SB series electric winch

3.2 DESCRIPTION OF THE ELECTRIC CIRCUIT

EMCÉ electric winches are standard supplied without controls. The required voltage can be found on the winch datasheet (see annex 1) and on the winch tag plate. The connection details of the motor can be found on the inside of the terminal box cover of the motor. Technical details about the electric components can be found in annex 2.

In case the winch is delivered including control panel the electric diagram of the controls can be found on the inside of the door of the electrical panel.



- A control panel is standard supplied with test wires between the panel and the winch. The testing wires must be replaced by suitable permanent wires during installation of the winch by a skilled electrical engineer. In case of doubt of the correct wires please contact EMCÉ or your local dealer.

3.3 SAFETY INFORMATION

3.3.1 General

EMCÉ winches should be considered “part machines”, as they 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. It's the end users responsibility to install the winch in such a way that it complies with all safety regulations.

3.3.2 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.

3.3.3 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.

3.3.4 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.
- Pneumatic and hydraulic winches must have an isolation ball valve before the motor inlet. Before starting with the maintenance and repair on the winch the users must make sure that there is no pressure left on the components by shortly operating the winch up till the winch does not respond anymore 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.

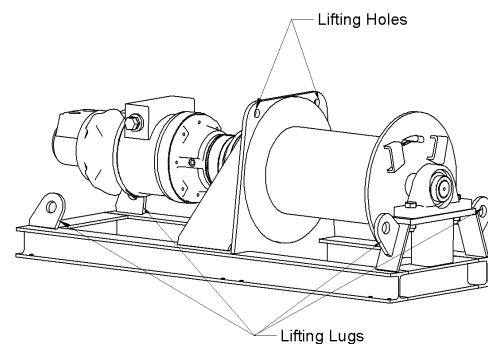


- If the winch is to be serviced in a potentially explosive atmosphere, the operator must first switch off power to the gear unit and ensure that it is out of service, as well as taking all necessary precautions against it being accidentally switched on again or its parts moving without warning.
- Furthermore,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

3.3.5 Handling of the winch

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. INSTALLATION

Every winch is delivered completely assembled, tested and packed on a pallet, unless specified otherwise. Check product integrity on delivery and immediately notify found damages to the transport company. For winch handling see section 3.5.6.

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.

	▪ If the winch is to be serviced in a potentially explosive atmosphere, the operator must first switch 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.).

4.1 INSTALLATION

- 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 and 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 wire pulley is perfectly perpendicular to drum shaft. Small deviations may cause bad winding of the wire on the drum;
- The distance between winch and first pulley shall be such to warrant the correct fleet angle of installed wire.
 - EMCÉ winches should be considered “part machines”, as they 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.
 - 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 gear units classified under Directive 94/9/EC - Category 2D gear units 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 gear unit thoroughly after installation.
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4.2 GEARBOX LUBRICATION

Check the winch datasheet (annex 1) 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 (7).
- Lubricating oil temperature shall never exceed 100 °C.

4.3 WIRE ROPE

4.3.1 Fitting the wire rope to the winch drum



- Before fitting the wire rope the cable anchor on the drum should be positioned to an easily accessible position. During fitting of the wire 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 wire rope.

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

Fit wire dead end from the inside of the drum to the outside through the slotted hole in one of the drum flanges (see picture 4.3.1)

Fastening with pocket and wedge

The wire dead end shall be fitted in the pocket as to make an eye around the wire wedge with free end fitted backwards through the pocket (see picture 4.3.2).

Pull the wire from the opposite side to press wire and wedge into the pocket (see picture 4.3.3). The free end of the wire end shall at all times be 5 times the rope diameter and the rope end shall be prevented from fraying.

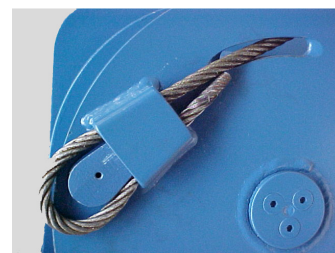
Fitting with wire clamp

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

Tighten wire clamp bolts according to the table in section 4.1 (see picture 4.3.4).



Picture 4.3.1



Picture 4.3.2



Picture 4.3.3



Picture 4.3.4

Other possibilities

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

- A hole in the drum with several fixing bolts
 - Special wire clamps on the drum
-
- Always keep a minimum of 3 wire coils winded around the drum to warrant a safe winch load holding. The wire dead end fastening alone is not sufficient to hold the winch load.
 - Make sure that wire clamp bolts don't pass over the flange plate. If it happens, shorten the bolts to avoid rope damage.
 - Never fit a wire longer than the maximum allowed to avoid excess wire layers non conforming to safety rules.
 - The first winding of the wire to the drum shall be such to obtain a perfect compactness of the wire coils and leave no space between the coils. Keep the wire under tension during the first winding operation. The wire can be easily damaged should it be wedged under load between non compacted under laying coils.



4.3.2 Handling and installation of the wire 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.

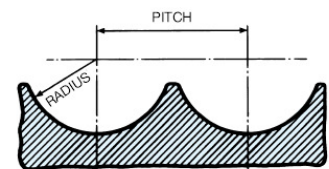
Check the working area around the equipment for any potential hazards which may affect the safe installation of the rope.

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 (see Fig 3)



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.

Rope Guards

Check that any rope guards are correctly fitted and are in good condition.
Check the condition of any wear plates or rollers which are protecting structural members.

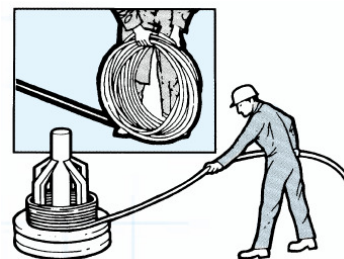


- Failure to carry out any of the above could result in unsatisfactory and unsafe rope performance.

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. These will adversely affect rope performance.

Wrong
Note the kinks forming



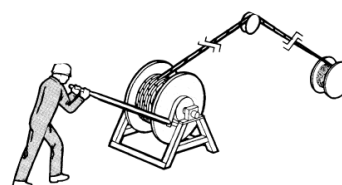
Reels

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.

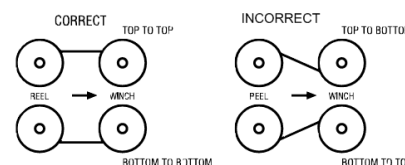
- Position the reel and stand such that the fleet angle during installation is limited to 1.5 degrees.
- If a loop forms in the rope ensure that it does not tighten to form a kink.



- 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.

Ensure that the as-manufactured condition of the rope is maintained during installation.

If installing the new rope with the aid of an old one, one method is to fit a wire rope sock (or stocking) to each of the rope ends. Always ensure that the open end of the sock (or stocking) is securely attached to the rope by a serving or alternatively by a clip (See Fig. 9). Connect the two ends via a length of fibre rope of adequate

strength in order to avoid turn being transmitted from the old rope into the new rope. Alternatively a length of fibre or steel rope of adequate strength may be reeved into the system for use as a pilot/messenger line. Do not use a swivel during the installation of the rope.

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.



- Any looseness or uneven winding will result in excessive wear, crushing and distortion of the rope.

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.

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.

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..

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.

4.4 START UP SEQUENCE

1. Check lubricating oil level and fill up if necessary;
2. Make a few trials without load before fitting the wire to check a correct operation of the system;
3. Fit the wire as described in section (4.3);
4. Make a few lifting trials with reduced load to check the correct operation of the brake and the limit switches (optional), pay attention to excessive or unexplained noises;
5. Check for correct working of the load limiting device (optional).

5. WORKING WITH THE MACHINE

5.1 START, NORMAL OPERATION AND STOP

5.1.1 Check list for prestart preparation

1. Perform the frequent inspection (see chapter 5.2) at the beginning of each shift.
2. Do not operate winch with any personnel near the line of force or capable of coming into contact with moving parts.
3. Ease the slack out of the wire rope when starting a lift. Do not jerk the load.
4. Ensure that all personnel and spectators are clear of the load and winch;
5. Make sure that working conditions conform to winch features;

5.1.2 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 must be physically capable and mentally alert. They must have good hearing, vision and depth perception. 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.

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 wire 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 wire 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 wire 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 wire 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

Emergency stop (optional)

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.

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.

Closing

- Push the handle towards it's outer limit in the direction of the bandbrake rim (overcentre type bandbrake)
- Rotate the handle (clockwise) up till the bandbrake is firmly locked (wind-on type bandbrake)

Opening

- Pull the handle towards you up till it's outer limit (overcentre type bandbrake)
- Rotate the handle (counter clockwise) up till the bandbrake is fully free of the brake rim (wind-on type bandbrake)

Manual operated clutch (optional)

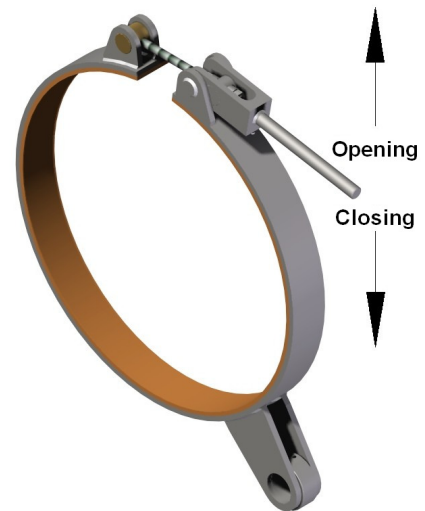
With a clutch the winch drum can be disengaged from the winch drive, which allows to walk out the cable. Below the instructions are given for the operation of the clutch.

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).

Opening

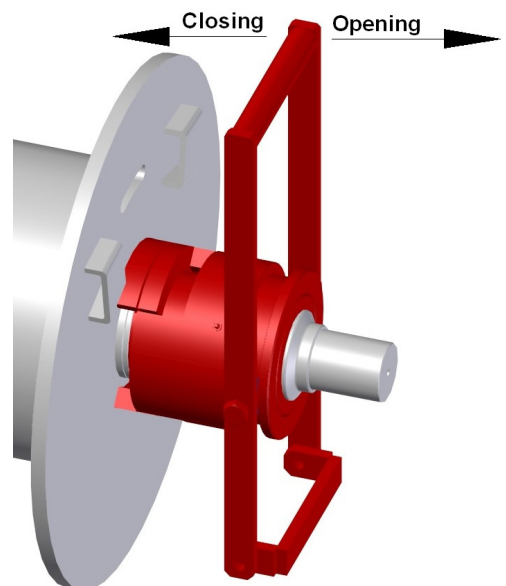
- Close the bandbrake (when available)
- Turn the drum shaft up till the pins/claws of the clutch are not making contact anymore with the corresponding openings on the winch drum. Depending on the type of winch the shaft can be rotated as follows
 - With a hand wheel on the winch drive
 - By operating 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).



Overcentre type bandbrake



Wind-on bandbrake



Manual operated clutch



- 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.

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 a self braking hand crank is fitted the opening on the side of the crank should be placed over the locking pin.



- 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.

5.2 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 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.

Wire Rope Reports

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

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 wire 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. **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.



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

3. **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).
4. **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.
5. **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.
6. **WIRE ROPE REEVING**. Check reeving and ensure wire rope is properly secured to the drum.
7. **LUBRICATION**. Refer to section 7 for recommended procedures and lubricants.

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. **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.

5. ALL COMPONENTS. Externally inspect for wear, damage, distortion, deformation and cleanliness. Clean, replace or lubricate as required.
6. 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 band should be replaced. Clean and replace components as necessary.
7. 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.
8. LABELS AND TAGS. Check for presence and legibility of labels. Replace if damaged or missing.

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.

5.3 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
- Product will not operate.	- No motor power. - Product is overloaded. - Brake is not released.	- Check connections, circuits. - Check the load. - Release or clean the brake. - Check brake circuit.
- Load doesn't stop.	- Brake is slipping. - Product is overloaded. - Spindle limit switch wrong.	- Check air gap of brake or replace brake. - Reduce the load within the rated capacity. - Check direction of limit switch.
- Product is too slow.	- Product is overloaded. - Brake is not released completely. - Gearbox damaged.	- Reduce the load within the rated capacity. - Release or clean the brake. - Check gearbox. (Pay attention for strange sounds)
- Oil leakage.	- Improper oil plug. - Oil ventilation plug at wrong place. - Gasket leakage. - Oil leakage at places other than plug.	- Install right oil plug with gasket. - Put plug at highest place of gearbox. - Fit new gasket. - Check for loose bolts in gearing and tighten. - Check other seals or gaskets of gearbox and replace them if needed.
- Wire doesn't wind correctly on the drum.	- Excess fleet angle. - Winding of slack wire.	- Set fleet angle within acceptable limits - Keep wire under tension during winding.
- Winch vibrates.	- Loose foundation bolts.	- Tighten foundation bolts with due torque.

6. MAINTENANCE

EMCÉ winches are engineered to a bare minimum of maintenance operations. Following maintenance operations are required for all EMCÉ winches. Specific maintenance operations are mentioned in annex 2.

 	▪ 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 an 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 4.1) ▪ On completion of any maintenance work, all seals must be refitted and sealed as prescribed. ▪ Use only original spare parts for repairs.
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6.1 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.

6.1.1 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.

6.1.2 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.

6.1.3 Motor

Electric motors:

Bearings of all electrical motors are lifetime grease packed.

6.1.4 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.

6.2 GEARBOX OIL CHECKS AND CHANGES

For non-lifetime lubricated gearboxes check oil level monthly and top up as necessary with the required oil*.

Oil quantity, oil specifications, oil level- and oil filling plugs can be found in annex 2 and the winch datasheet in annex 1.



- Gearboxes of winch types; **MC250** to **MC750**, **EN200** to **EN500** and **A10** to **A30** are lifetime lubricated with synthetic lubricant type Shell Tivela std.

6.2.1 Worm-gearboxes

All other worm-gearboxes are filled with E.P. (extreme pressure) rated mineral gear oil with ISO viscosity grade: ISO VG 320. Change the oil after the first 300 running hours. Subsequent oil changes are to follow at 4000 running hour intervals, or at least once a year.



- Oil temperatures up to 70 °C are normal.

6.2.2 Helical-bevel-gearboxes

All other helical-bevel-gearboxes are filled with E.P. classed mineral gear oil with ISO VG 220. Change the oil after the first 300 running hours. Subsequent oil changes are to follow at 4000 running hour intervals, or at least once a year.

6.2.3 Planetary gearboxes

All planetary gearboxes require E.P. classed mineral gear oil with ISO VG 150. Change the oil after the first 150 running hours. Subsequent oil changes are to follow at 2000 running hour intervals, or at least once a year.

Gearboxes may in some cases be filled with synthetic oil* (eq. for extreme duty or temperature range) in this case the oil will normally last 8000 hours before requiring a change.



- 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.

6.3 SLEWING GEARS

6.3.1 Lubrication

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:

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

For special applications requiring low temperature grease, please contact EMCÉ.

6.4 BOLT TIGHTENING CHECK

Check periodically the tightening of winch foundation bolts. For correct torque settings see section 4.1..

6.5 BRAKE CLEANING

Electric motors with IP 55 brakes can not 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 from the brake
3. use an air hose to blow the dust from the brake disc
4. fit the dust ring 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

ANNEX I: PRODUCT DATASHEET AND CERTIFICATES

ANNEX II: TECHNICAL INFORMATION COMPONENTS

AC INDUCTION THREE-PHASE 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.

Insulation and temperature rise

Class F insulation to EN 60034-1 is used throughout.

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. Exceptions are shown on the data tables.

Temperature rise (ΔT^*) and maximum temperatures at the hottest points of the winding (T_{max}) according to the temperature classes of EN 60034-1.

	ΔT^*	T_{max}
Class B	80 K	125° C
Class F	105 K	155° C
Class H	125 K	180° C

*Measurement by resistance method.

Output reduction at ambient temperatures over 40° C

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

When a winding is utilized to temperature class F (105K), no output reduction is required up to an ambient temperature of 60° C. This does not apply to motors which in their standard design are already utilized to thermal class F.

AC INDUCTION THREE-PHASE MOTORS

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

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

Starting rate

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

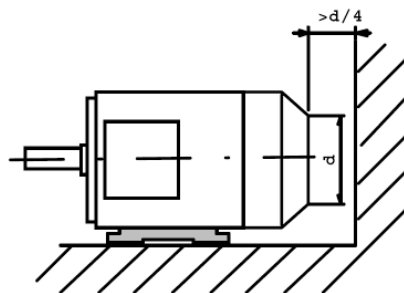
Additional moment of inertia $\leq$ moment of inertia of the rotor: load torque rising with the square of the speed up to nominal torque; starts at even intervals.

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

In case a doubt for your application please consult EMCÉ, indicating the complete operating conditions.

Ventilation

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.



Connection

Choose cable cross-sections in accordance with the rated current. Not used 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.

AC INDUCTION THREE-PHASE MOTORS

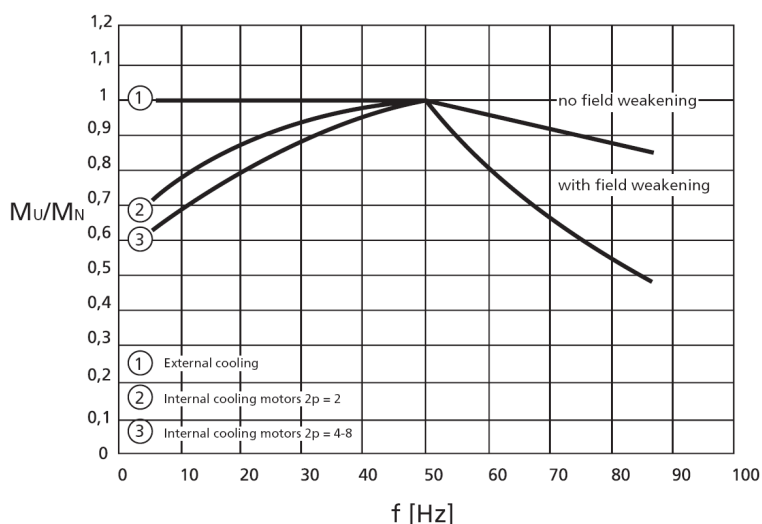
Three-phase cage motors driven by frequency converters

Maximum converter output voltage 500V at peak voltages $\hat{U} \leq 1460 \text{ V}$ and $du/dt \leq 13 \text{ kV/us}$. 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 EMČE for the possibilities.

Maintenance



Before carrying out any work on the motor, disconnect it and secure it against restarting.

Cleaning

Depending on the local conditions, air passages should be cleaned regularly.

Bearing lubrication

Maintenance-free life for motors with permanent lubrication at ambient temperature of 40° C and service at 50 Hz:

2 and 4/2 pole motors : 10,000 h.

4 and more pole motors : 20,000 h.

However, the maximum period of maintenance-free operation is four years. The ball bearings and the bearing caps should then be washed with petrol or benzene. If necessary, replace the bearings. Fill the spaces between the balls and the roller tracks as well as the grease compartments half with grease. Coat shaft bushings in the bearing caps or end shields with a thin layer of grease. Permanently greased bearings (2RS and 2Z bearings) cannot be washed and regreased. Such bearings must therefore be replaced.

Ball bearings with regreasing device and grease slinger

From frame size 280 upwards the motors are equipped with regreasing device and grease slinger.

First lubrication is made with grease K3N to DIN 51 825 (lithium-based, water resistant to DIN 51 807 part 1: grade 0 or 1).

Regreasing interval and required quantity of grease is indicated on the rating plate. Bearings and bearing caps must be washed with petrol or benzene when they have been regreased twelve times.

AC INDUCTION THREE-PHASE MOTORS



Used petrol or benzene in airtight tanks should be disposed of as special refuse with the marking «Petrol» or «Benzene».

Afterwards, with the outer bearing cap open but the inner cap screwed on, the rotor should be turned slowly and grease pressed in through the regreasing device until approximately half the empty space between the rolling elements and the roller tracks is filled with grease.



If a grease with a different soap base is to be used, clean bearing seats thoroughly. Make sure that the bearing grease used meets the following requirements:

Pour point : approx. 190° C

Ash content : 4%

Water content : 0.3%

Lubricant

Grease K 3 N to DIN 51825 (lithium-based, water resistant to DIN 51807 Part 1, grade 0 or 1). Regrease only with a similar grease (e.g. Esso Unirex N 3, Shell-Alvania G 3, Esso Beacon 3, Klüber HQ72-102 etc.).

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 M Ω . The resistance can be lowered considerably by moisture.

If, at room temperature, the resistance is below 0.5 M Ω , 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 M Ω .

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.

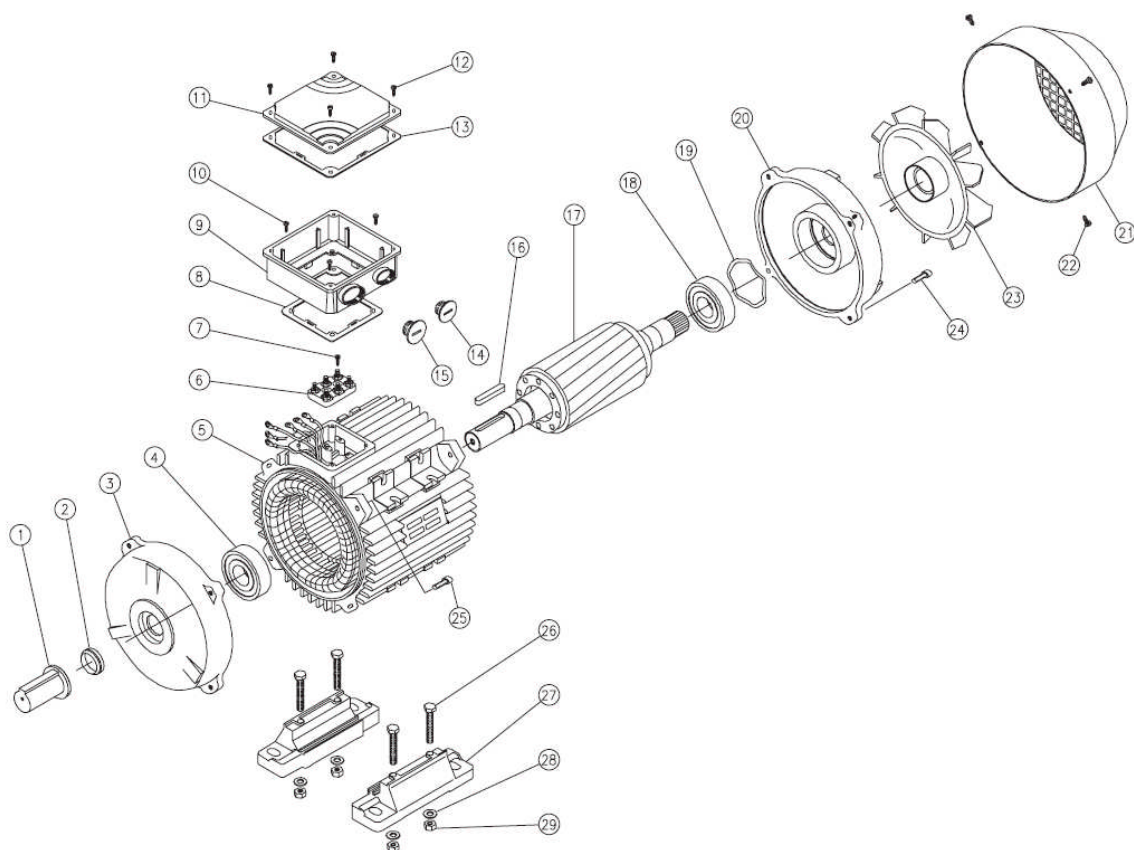
First numeral: protection against contact and ingress of foreign bodies

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.

AC INDUCTION THREE-PHASE MOTORS

Spare parts for three-phase motors



Part 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		

In case spare parts needs to be ordered please state always: Designation of spare part, motor type and the fabrication number of the winch.

K BRAKE

SERVICING AND REPAIRING

All parts of the brake must be checked frequently as the friction work depends on a number of factors, namely the brake inertia, the braking speed and the operating frequency. In order to know the operating times you must refer to table page "Graphics".

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 3 mm consumption of friction material.

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.

Proper working order of the brake is guaranteed only if original components are used.

Note: when the air-gap value is 0,7 mm you must bring it necessarily to its nominal value.

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.

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 (page Characteristics). The minimum braking torque adjustment must be always higher than 30% of its nominal value.

AIR-GAP ADJUSTING

Adjusting of the air-gap is made operating the adjusting-screws (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. 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+0/ 0.1, which added to the value of the air-gap brings to the maximum air-gap value.

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. You can calculate when it's necessary to adjust the air-gap using the formula shown at page "Dimensional Calculation" of this catalogue.

OPERATING TIMES

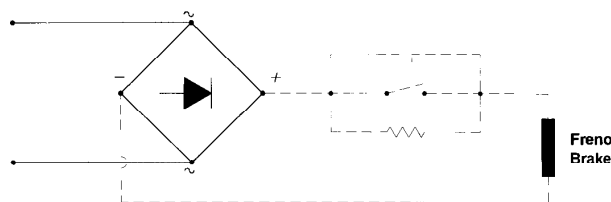
Freno Brake	Tempo di diseccitazione dell'elettromagnete Disengagement braking time (ms)	Tempo di eccitazione dell'elettromagnete Engagement time (ms)	Tempo veloce di eccitazione dell'elettromagnete Quick engagement time (ms)
K1	10	45	20
K2	15	50	30
K3	15	55	30
K4	15	65	40
K5	20	75	45
K6	25	180	85
K7-K7/D	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.

K BRAKE

ELECTRICAL CONNECTIONS

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



BRAKING TORQUE ADJUSTMENT

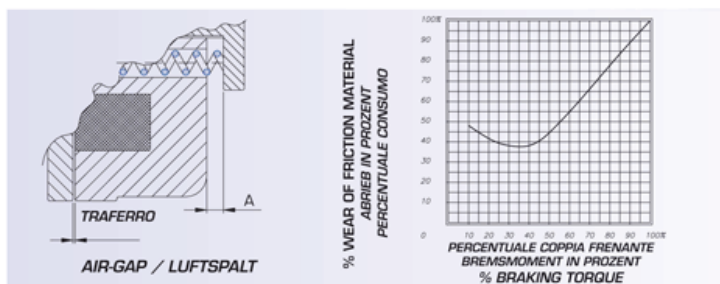
- The model "K" allows the adjustment of the braking torque. The user will adjust the braking torque according to the load, the motor rotation speed and the braking time.
- The chart below shows the distance (mm) between the adjusting-ring and the electromagnet (see drawing) in order to obtain the braking torque (Nm) requested.
- 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.

Tipo Model	DISTANZA TRA LA GHIERA DI REGOLAZIONE E L'ELETTROMAGNETE "A" [mm] DISTANCE BETWEEN ADJUSTING-RING AND ELECTROMAGNET "A" [mm]									
	9 mm	8 mm	7 mm	6 mm	5 mm	4 mm	3 mm	2 mm	1 mm	A = 0 mm
K1	–	–	–	0.7 Nm	1.4 Nm	2.1 Nm	2.8 Nm	3.5 Nm	4.3 Nm	5 Nm
K2	–	–	–	–	2 Nm	4,5 Nm	7 Nm	9,5 Nm	12 Nm	12 (14%) Nm
K3	–	–	–	–	2.6 Nm	5.3 Nm	8.0 Nm	10.6 Nm	13.2 Nm	16 Nm
K4	–	–	–	–	–	4 Nm	8 Nm	12 Nm	16 Nm	20 Nm
K5	4 Nm	8 Nm	12 Nm	16 Nm	20 Nm	24 Nm	28 Nm	32 Nm	36 Nm	40 Nm
K6	–	4 Nm	11 Nm	18 Nm	25 Nm	32 Nm	39 Nm	46 Nm	53 Nm	60 Nm
K7	–	–	–	13 Nm	25 Nm	38 Nm	51 Nm	64 Nm	77 Nm	90 Nm
K8	20 Nm	40 Nm	60 Nm	80 Nm	100 Nm	120 Nm	140 Nm	160 Nm	180 Nm	200 Nm
K9	30 Nm	60 Nm	90 Nm	120 Nm	150 Nm	180 Nm	210 Nm	240 Nm	270 Nm	300 Nm
K7D	–	–	–	26 Nm	52 Nm	77 Nm	103 Nm	128 Nm	156 Nm	180 Nm
K8D	40 Nm	80 Nm	120 Nm	160 Nm	200 Nm	240 Nm	280 Nm	320 Nm	360 Nm	400 Nm
K9D	60 Nm	120 Nm	180 Nm	240 Nm	300 Nm	360 Nm	420 Nm	480 Nm	520 Nm	600 Nm
K9T	80 Nm	160 Nm	240 Nm	320 Nm	400 Nm	480 Nm	560 Nm	640 Nm	720 Nm	800 Nm
K10	75 Nm	150 Nm	225 Nm	300 Nm	375 Nm	450 Nm	525 Nm	600 Nm	675 Nm	750 Nm
K10D	150 Nm	300 Nm	450 Nm	600 Nm	750 Nm	900 Nm	1050 Nm	1200 Nm	1350 Nm	1500 Nm
Valore della coppia frenante (Nm) al variare della distanza Braking Torque Value (Nm.) with different distances										Coppia massima Max Torque

* Valore di coppia solo con avvolgimenti in S2.

* Torque Value only with S2 coil.

Area critica
Critical area



ASSEMBLING

The assembling and disassembling sequence is represented in the picture in section "Characteristics". Place first the armature plate (2) and the electromagnet (1), in which you must insert the torque springs.

Hold the fixing screws (9) tight on the mounting flange by means of a dynamometric key with a lock out of M4=2,8 Nm, M5=5,6 Nm, M6=9,6 Nm, M8=23,2 Nm, M10=46,4Nm. The mounting flange must be made of steel or cast iron and must have a flat surface machined with 1,6 Ra roughness.

In order to comply with safety legislation the following operations should be carefully carried out:

- Drill the motor cover with an helical drill bit with diameter M4=3,2, M5=4,2, M6=5, M8=6,75, M10=8,6 (UNI 5699).

K BRAKE

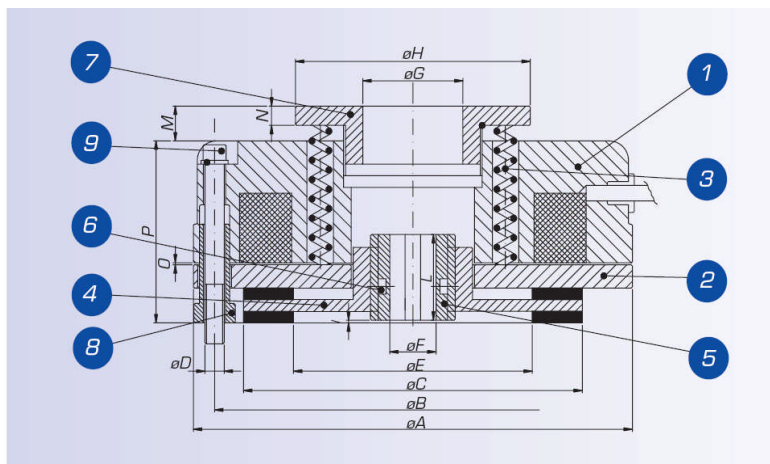
b. Make sure the drilling is made within tolerance.

c. With the correct size thread tap and lubricant, cut the threads.

If the brake is provided already assembled, remove the air-gap adjusting devices after mounting the brake. Check and modify, if necessary, the air-gap value. To adjust the braking torque operate the adjusting ring (7) according to the instructions at page "Braking Torque".

CHARACTERISTICS OF MODEL "K" BRAKE

- ① Elettromagnete • Electromagnet
Elektromagnet
- ② Ancora • Armature plate
Anker
- ③ Molle di coppia • Torque springs
Bremsfedern
- ④ Disco • Disc • Scheibe
- ⑤ Mozzo • Splined hub • Nabe
- ⑥ O-ring
- ⑦ Ghiera • Adjuster ring
Einstellring
- ⑧ Registri • Adjuster nuts
Einstellschrauben
- ⑨ Viti di fissaggio • Fixing screws
Feststellschrauben



Tipo Brake Model		K1	K2	K3	K4	K5	K6	K7	K7/D	K8	K8/D	K9	K9/D	K9/T	K10
Coppia frenante statica Static Braking Torque	(Nm)	5	12	16	20	40	60	90	180	200	400	300	600	800	da 650 a 1000
Velocità max di rotazione del motore Max Speed of the motor	(rpm)	3600	3600	3600	3600	3600	3600	3600	3600	1800	1800	1800	1800	1800	1200
Potenza / Input Power	(W)	15	20	25	30	45	50	55	55	60	60	65	65	65	140
Max rumorosità Max noisiness	(≤ dB-A)	68	69	68	69	70	70	70	70	70	69	69	69	70	40
Peso / Weight	(Kg.)	1,1	1,85	2,55	2,84	4,8	7	12	15	14,3	18	23	28	34	45
A		84	104	114	124	148	159	189	189	218	218	248	248	248	270
B		72	90	103	112	132	145	170	170	196	196	230	230	230	245
C		61	77	88	98	119	128	151	151	176	176	204	204	204	220
D		3xM4	3xM5	3xM5	3xM6	3xM6	3xM8	3xM8	3xM8	6xM10	6xM10	6xM10	6xM10	9xM10	8xM10
E		35	44	62	69	79	80	90	90	103	103	132	132	132	160
Tolleranza foro fino a K3 H7 altri +0,01/-0,01 Tolerance hole till size K3 H7, others +0,01/-0,01	F	10-11 12	11-14 15	11-15	14-25	24-25 28	25-30 34	25-30 34	25 H40 34 H60	24-34	34 H60 48	44-45 48	44-45 48	44-45 48-50	Z28ø50 Z38ø58 Z45ø70
G		20	26	26	42	60	60	60	60	60	60	60	60	60	103
H		50	61	61	79	104	104	104	104	104	104	104	104	104	-
I		1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
L		18	20	20	20	25	30	30	60	40	60	40	60	80	40
M (max)		9	9	9	9,5	18	16	14	14	18	18	18	18	18	34
N		4	4	4	5,5	8	8	8	8	8	8	8	8	8	24
O min/max		0,15/0,5	0,2/0,6	0,2/0,6	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7
P		38,5	41,5	47	46,5	64	69,5	79	101,5	78	98	83	108	130	116

Note:

- When the brake is run in, the static braking torque value could change by 20% from the reported value.
- The values shown in the table can be changed by the producer firm without notice.

1.0 GENERAL INFORMATION

1.1 Symbols



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.

1.2 Glossary and terminology

Some of the frequently occurring terms used in this manual are described below so as to unequivocally define their meaning.

Routine maintenance: the set of operations required for maintaining the functionality and efficiency of the gear unit. These operations are usually scheduled by the Manufacturer, who defines the qualifications required and tasks in question.

Non-routine maintenance: the set of operations required for maintaining the functionality and efficiency of the gear unit. These operations are not scheduled by the Manufacturer and must be done by an expert maintenance technician.

Expert maintenance technician: an authorised technician selected by means of having the qualifications, skills and mechanical and electrical training to do repairs and non-routine maintenance work on the gear unit.

Overhaul: an overhaul consists in the replacement of bearings and/or other mechanical components which have worn to such an extent as to compromise the operation of the gear unit. The overhaul also includes verification of the condition of all gear unit components (keys, seals, gaskets, vents, etc.). If any such components are damaged they must be replaced and the reason for the damage identified.

1.3 Requesting technical assistance

For any technical service needs, contact the Manufacturer's sales network, quoting the information on the unit's nameplate, the approximate hours of service and the type of defect.

2.0 TECHNICAL INFORMATION

Operating limits and conditions

Ambient conditions :

- Ambient temperature: min. -20°C



The gearboxes of EMCE winches are standard filled with oil suitable for a minimal ambient temperature of -10°C. Please consult EMCE in case of doubt of the suitable oil for lower temperatures.

- Do not use the gear unit, if not explicitly intended for the purpose, in a potentially explosive atmosphere or where the use of explosion-proof equipment is specified.
- Noise – Vibration

During operational testing at the Manufacturer's premises, the acoustic pressure measured under full load at a distance of 1 m from the unit and 1.6 m above ground level without vibration was less than 85 dB(A). The vibrations produced by the gear unit do not constitute a health risk for personnel. Excessive vibration may be the result of a fault and should be immediately reported and eliminated.

3.0 SAFETY INFORMATION

3.1 Safety standards

- Carefully read the instructions given in this manual and those posted directly on the gear unit, especially those regarding safety.
- Persons charged with working on the gear unit at any time in its service life must be trained specifically for the purpose with special abilities and experience in this area as well as being equipped with the appropriate tools and individual safety equipment (as per Legislative Decree 626/94). Failure to meet these requirements constitutes a risk to personal health and safety.

INSTALLATION, USE AND SERVICE MANUAL 300-SERIES GEARBOXES

- Use the gear unit only for the applications envisaged by the Manufacturer. Improper use can result in risks to personal health and safety and economic damages.
- Keep the gear unit at its maximum efficiency by following the routine maintenance schedule. Good maintenance enables the unit to operate at maximum performance over a long service life in compliance with safety regulations.
- When working on the unit in areas which are difficult to access or hazardous, ensure that adequate safety precautions have been taken for the operator and others in compliance with the provisions of law on health and safety at work.
- All maintenance, inspection and repairs must only be done by an expert maintenance technician fully familiar with the attendant hazards. It is, therefore, essential to implement operating procedures which address potential hazards and their prevention for the entire machine. The expert maintenance technician must always work with extreme caution in full compliance with applicable safety standards.
- During operation wear only the apparel and safety equipment indicated in the User instructions provided by the Manufacturer or laid down by applicable laws on safety at work.
- Replace worn components with original spare parts. Use the lubricants (oil and grease) recommended by the Manufacturer.
- Do not dump polluting materials into the environment. Dispose of all such materials as stipulated by applicable legislation.
- After replacing lubricants clean the gear unit's surfaces and the walk-on surfaces around the work area.

4.0 STORAGE

Some recommendations for storing the gear unit are indicated below.

1. Do not store the unit in excessively humid conditions or where it is exposed to the weather (do not store outdoors).
2. Do not place the gear unit directly on the ground.
3. Place the gear unit on a stable base and make sure that it is not subjected to accidental displacement.
4. Store the packaged gear unit (if allowed) in accordance with the instructions on the packaging itself.

If the gear unit is stored for more than 6 months, the following additional precautions must be taken:

5. Cover all machined external surfaces with a rust roofing product such as Shell Ensio or equivalent product with similar properties and application range.
6. Fill the unit with lubricating oil and make sure the vent plug is positioned uppermost. Before putting the unit into service, the oil used for storage must be drained and replaced with the correct quantity of recommended operating lubricant.

5.0 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.

	INDUSTRIAL INSTALLATIONS			MOBILE MACHINES	
	ISO standards .. with EP characteristics			SAE standards .. with API GL5 characteristics	
Ambient temperature	-10°C / +30°C	+10°C / +45°C	-20°C / +60°C	-20°C / +30°C	+10°C / +45°C
	ISO VG 150	ISO VG 220	ISO VG 150-220	SAE 80W/90	SAE 85W/140
AGIP	BLASIA 150	BLASIA 220	BLASIA S220	ROTRA MP	ROTRA MP
ARAL	DEGOL BG 150	DEGOL BG 220	DEGOL GS 220	GETRIEBEOL HYP	GETRIEBEOL HYP
BP-MACH	ENERGOL GR XP 150	ENERGOL GR XP 220	ENERSYN HTX 220	HYPOGEAR EP	HYPOGEAR EP
CASTROL	ALPHA SP 150	ALPHA SP 220	ALPHASYN PG 150	HYPOY	HYPOY
CHEVRON	N.L. GEAR COMPOUND 150	N.L. GEAR COMPOUND 220		UNIVERSAL GEAR LUBRICANTE	UNIVERSAL GEAR LUBRICANTE
ELF	REDUCTELF SP150	REDUCTELF SP 220	ELF ORITIS 125 MS ELF SYNTERMA P20	TRANSELF8	TRANSELF8
ESSO	SPARTAN EP 150	SPARTAN EP 220	GLYCUBE 220	GEAR OIL GX	GEAR OIL GX
				PONTONIC MP	PONTONIC MP
FINA	GIRAN 150	GIRAN 220			
I.P.	MELLANA150	MELLANA220	TELESIA OIL 150	PONTIAX HD	PONTIAX HD
KLUBER	KLUBEROIL GEM1-150	KLUBEROIL GEM1-320	KLUBERSYNT GH 6-220		
Q8	GOYA 150	GOYA 220	EL GRECO 220		
MOBIL	MOBILGEAR 629	MOBILGEAR 630	SHC 630	MOBILUBE HD	MOBILUBE HD
SHELL	OMALA EP150	OMALA EP220	TIVELA OIL SA	SPIRAXHD	SPIRAX HD
TOTAL	CARTER EP 150	CARTER EP 220		TRANSMISSION TM	TRANSMISSION TM

■ Synthetic oil.

INSTALLATION, USE AND SERVICE MANUAL 300-SERIES GEARBOXES

Brake lubrication

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

6.0 COMMISSIONING THE GEAR UNIT

The gear unit has been factory tested by the Manufacturer. Before starting the unit, check that:

- The machine incorporating the gear unit complies with the provisions of the "Machinery Directive" 98/37/EC and any other applicable safety legislation.
- The electrical power supply and control systems are suitable and operational as stipulated in standard The motor power supply corresponds to that prescribed and is within $\pm 5\%$ of the rated value.
- The oil level is as prescribed and that there are no leaks from the plugs or gaskets.
- The unit does not run noisily or with excessive vibration.

7.0 MAINTENANCE



Maintenance and replacement work must be done by expert maintenance technicians trained in the observance of applicable laws on health and safety at work and the special ambient problems attendant on the installation.



Before doing any work on the unit, the operator must first switch 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 (due to suspended loads or similar external factors). Furthermore, all additional environmental safety precautions must be taken (e.g. elimination of residual gas or dust, etc)

- Before doing any maintenance work, activate all safety equipment and, if necessary, inform persons working in the vicinity. In particular, mark off the area around the unit and prevent access to any equipment which, if activated, might be the cause of unexpected health and safety hazards.
- Replace worn components with original spare parts only.
- 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.
- The above instructions are aimed at ensuring efficient and safe operation of the gear unit.

The Manufacturer declines all liability for injury and damage to components due to the use of non-original spare parts and non-routine work which modifies the safety requirements without the express prior authorization of the Manufacturer. Refer to the specific spare parts catalogue when ordering spare parts for the gear unit.



Do not dump polluting liquids, worn parts and maintenance waste into the environment. Dispose of all such materials as stipulated by applicable legislation.

7.1 Routine 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
after 200 h.	Original consignment lubricant	Replace	Replace with new lubricant
	Gear unit casing	Check that external temperature does not exceed 70-75 °C	Stop the machine and contact EMCE
	External fasteners	Check locking torque	Tighten down to specified torque
1000 hrs.	External seals and gaskets	Check oil level Check for leaks by eye	Maintain or replace components as required
2500 hrs.			
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.

7.2 Oil change

1. Place an adequate container under the drain plug.
2. Remove the filler and drain plugs and allow the oil to drain out.



The oil will drain better if it is warm.

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.



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.

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. Do not dump into the environment and dispose of in compliance with applicable legislation.



If a leak is found, identify the cause of the fault, repair it and refill with lubricant before operating the gear unit.

7.3 Checking efficiency

- Remove dust deposits from the gear unit and motor casings.
- Check that noise at constant load does not vary. Excessive vibration or noise can indicate wear of the gear train or failure of a bearing.
- Check the power absorption and voltage against the nominal values given on the motor's nameplate.
- Check the wear of linings on the brake motor (if used) and, if necessary, adjust the gap.
- Check for lubricant leaks from the gaskets/seals, caps and casings.
- Check all bolted couplings for wear, deformation or corrosion and tighten them down fully without over tightening.

7.4 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.

8.0 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.

INSTALLATION, USE AND SERVICE MANUAL 300-SERIES GEARBOXES

9.0 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
<i>Bearing temperature too high</i>	<i>Oil level too low</i>	<i>Top up oil level</i>
	<i>Oil too old</i>	<i>Replace oil</i>
	<i>Defective bearings</i>	<i>Contact authorized workshop</i>
<i>Operating temperature too high</i>	<i>Oil level too high</i>	<i>Check oil level</i>
	<i>Oil spent</i>	<i>Replace oil</i>
	<i>Contaminant in oil</i>	<i>Replace oil</i>
<i>Abnormal running noise</i>	<i>Gears damaged</i>	<i>Contact authorized workshop</i>
	<i>Bearing axial backlash too high</i>	<i>Contact authorized workshop</i>
	<i>Bearings defective or worn</i>	<i>Contact authorized workshop</i>
	<i>Excessive load applied</i>	<i>Correct service load to nominal values given in winch datasheet</i>
	<i>Contaminant in oil</i>	<i>Replace oil</i>
<i>Abnormal noise at gear unit mounting</i>	<i>Mounting bolts loose</i>	<i>Tighten down to specified torque</i>
	<i>Mounting bolts worn</i>	<i>Replace bolts</i>
<i>Oil leaks</i>	<i>Oil level too high</i>	<i>Check oil level</i>
	<i>Casing/coupling seals inadequate</i>	<i>Contact authorized workshop</i>
	<i>Gaskets worn</i>	<i>Contact authorized workshop</i>
<i>Gear unit does not run or runs with difficulty</i>	<i>Oil viscosity too high</i>	<i>Replace oil (see table of recommended lubricants)</i>
	<i>Oil level too high</i>	<i>Check oil level</i>
	<i>Excessive load applied</i>	<i>Correct service load to nominal values given in winch datasheet</i>
<i>Output shaft does not turn with motor running</i>	<i>Gears damaged</i>	<i>Contact authorized workshop</i>

INSTALLATION, USE AND SERVICE MANUAL 300-SERIES GEARBOXES

ANNEX 1 – LUBRICANT FILL QUANTITY:

3_L Series

		Mounting position		
		A	T	O
300	L1	0.6	1.0	0.9
	L2	0.9	1.3	1.2
	L3	1.2	1.6	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 position		
		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

N.B. 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.

INSTALLATION, USE AND SERVICE MANUAL 300-SERIES GEARBOXES

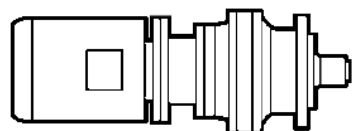
3_R Series

		Mounting position		
		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

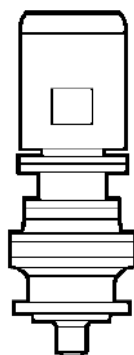
		Mounting position		
		B0	U ₋	P ₋
309	R2	6.5	8.5	7.5
	R3	7.5	9.5	8.5
	R4	8.0	10	9.0
310	R2	13	15	14
	R3	11	13	12
	R4	12	14	13
311	R2	14	19	17
	R3	16	21	19
	R4	17	22	20
313	R2	16	21	19
	R3	19	24	22
	R4	20	25	23
314	R3	25	33	29
	R4	28	36	32
315	R3	27	35	31
	R4	30	38	34
316	R3	30	38	34
	R4	33	41	37
317	R3	38	52	48
	R4	42	56	52
318	R4	48	63	58

N.B. 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.

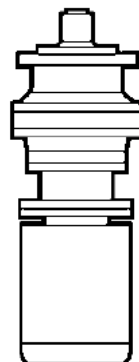
ANNEX 2 - Mounting positions



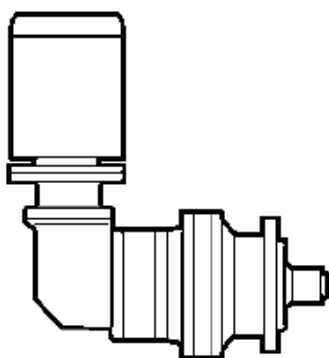
A



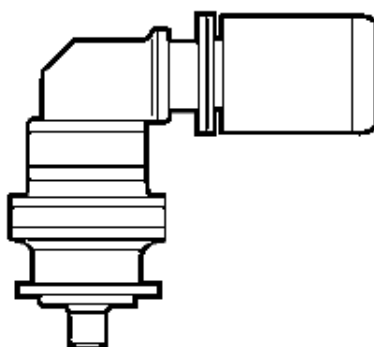
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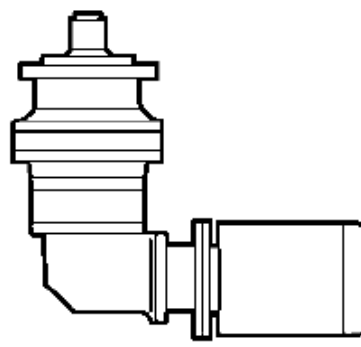
O



B



U



P

INSTALLATION, USE AND SERVICE MANUAL 300-SERIES GEARBOXES

ANNEX 3 - Plug positions

(A10)

TUTTI I RIDUTTORI

- 1 Tappo carico e sfiato
- 2 Tappo di livello
- 3 Tappo scarico
- 4 Comando freno

RIDUTTORI LINEARI AD 1 STADIO

- 1A Tappo carico e sfiato
- 3A Tappo scarico

RIDUTTORI LINEARI A 2 STADI

- 1b Tappo carico e sfiato
- 3A Tappo scarico

ALL GEARBOXES

- Filling/breather oil plug
- Oil level plug
- Oil draining plug
- Brake port

1 STAGE INLINE GEARBOXES

- Filling/breather oil plug
- Oil draining plug

2 STAGE RIGHT ANGLE GEARBOXES

- Filling/breather oil plug
- Oil draining plug

ALLE GETRIEBE

- 1 Einfüll- und Ablassschraube
- 2 Ölstandsschraube
- 3 Ölablassschraube
- 4 Bremsöffnung

LINEAR GETRIEBE MIT 1 STUFEN

- 1A Einfüll- und Ablassschraube
- 3A Ölablassschraube

RECHTWINLIG GETRIEBE MIT 2 STUFEN

- 1B Einfüll- und Ablassschraube
- 3A Ölablassschraube

TOUTES REDUCTEURS

- Bouchon de remplissage et reniflard
- Bouchon de niveau
- Bouchon de vidange
- Commande frein

REDUCTEURS COAXIALE AVEC 1 TRAIN DE REDUCTION

- Bouchon de remplissage et reniflard
- Bouchon de vidange

REDUCTEURS A RENVOI D'ANGLE AVEC 2 TRAINS DE REDUCTION

- Bouchon de remplissage et reniflard
- Bouchon de vidange

A
E

B1
B3
I1
I3

B2
I2

B0
I0

300-307

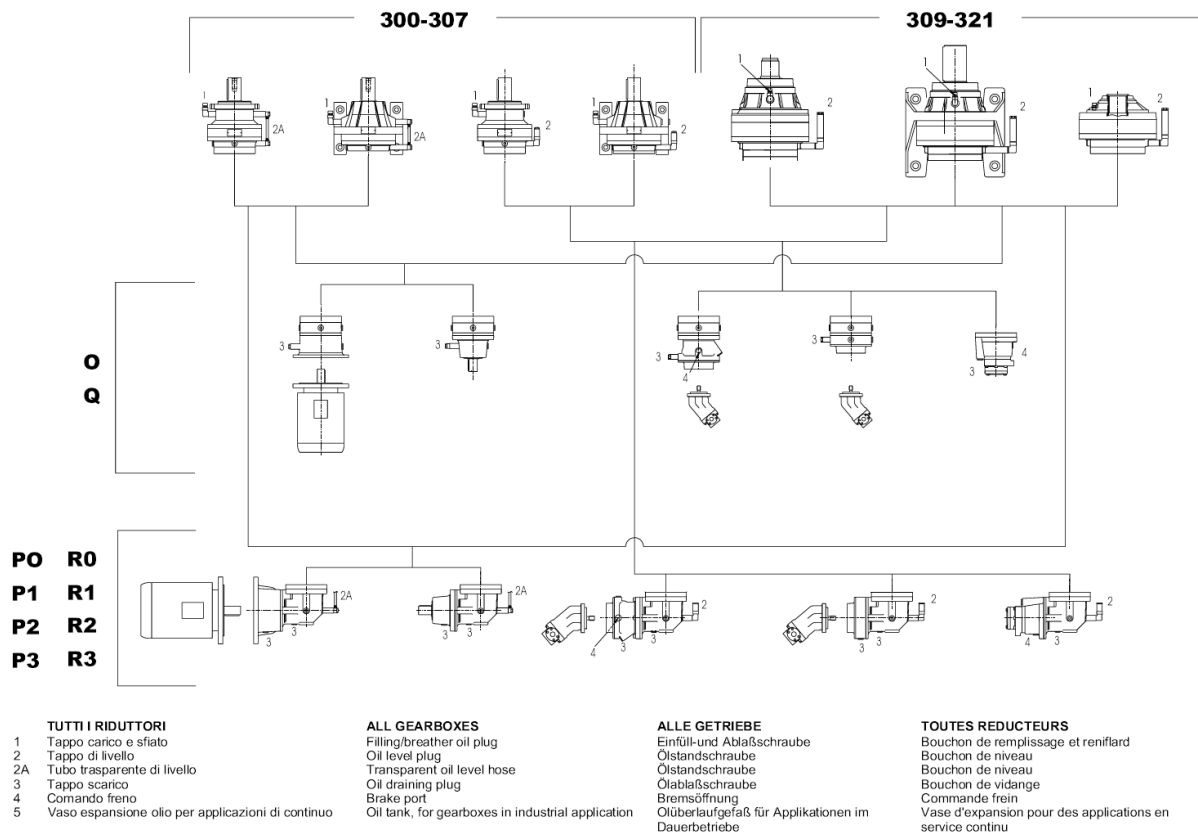
309-321

300-307

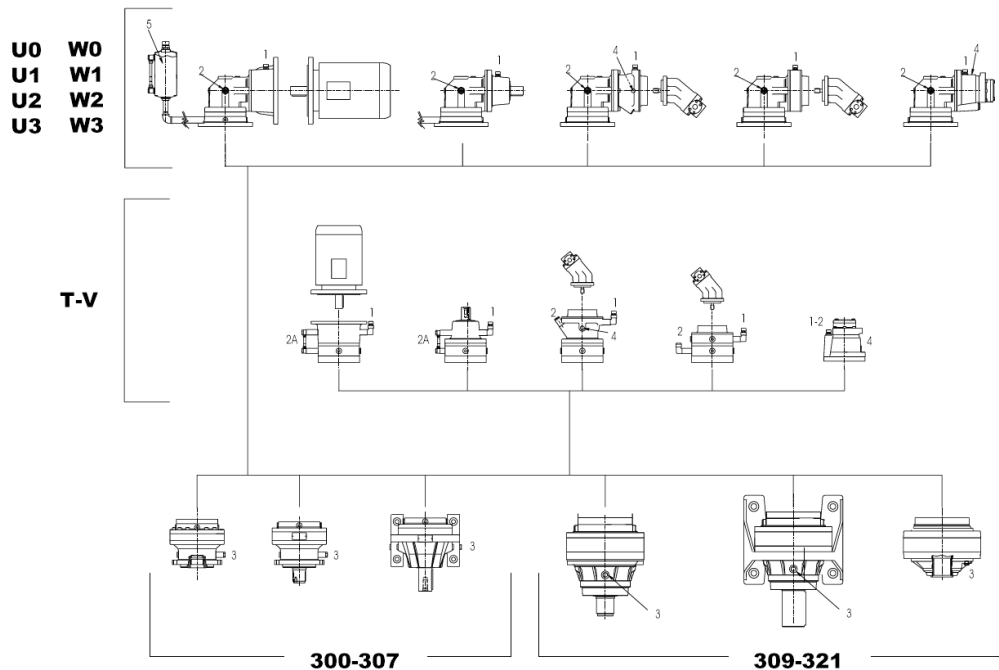
309-321

INSTALLATION, USE AND SERVICE MANUAL 300-SERIES GEARBOXES

(A11)



(A12)



SPINDLE LIMIT SWITCH (FCN)

Function

This device limits the winch to running within 2 or 4 points depending on the number of cams fitted inside the spindle limit switch. The upper and lower positions can be adjusted. It also allows a guarantee of the 3 'dead' safety windings on the drum and stop the winch when the highest and lowest position are reached. Before putting the winch in operation the outer limits of the spindle limit switch must first be set with a test load in the cable.

Main features

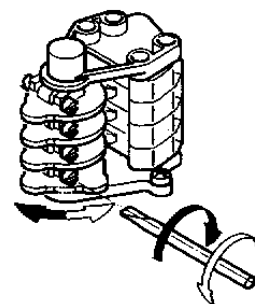
Insulation voltage	250V~
Maximum exercise voltage	250V~
Black lower casing	nylon
Yellow cover casing	thermoplastic material with high mechanical and temperature variation resistance
Operating temperature range	-20 °C + 60 °C
Drive	worm screw
Maximum rotation speed	1200 rpm
Cable entries	PG 11
Insulation	according to EN 60947-5-1
Protection degree	IP 55 (EN 60529)
In compliance with rules	EN 60947-5-1 EN 60529 CSA 22.2 - 14
Protection against contact voltages	double insulating (EN 60439-1)
Weight	about 460 gr.

Electrical features of contact elements

Limit switches		At guaranteed opening contacts						With deviation contacts or double steps NC contacts					
Insulation voltage		250 V ~						250 V ~					
Test voltage		2000 V ~						2000 V ~					
Operating current		10(3) A						10(3) A					
Breaking power		according to EN 60947-5-1						according to EN 60947-5-1					
Mechanical life		2x10 ⁶ op.						2x10 ⁶ op.					
Clamps		at screw						at screw					
Performances	AC 15	V	24	48	110	230		V	24	48	110	230	
		A	10	10	6	3		A	10	10	6	3	
	DC 13	V	24	48	110	220		V	24	48	110	220	
		A	3	1,5	1	0,5		A	3	1,5	1	0,5	

Driving Cams

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 long time guarantee.



Cams regulation

SPINDLE LIMIT SWITCH (FCN)

Potentiometer (Optional)

BE SURE THAT THE LOCKING SCREW IS TURNED OUT

Anticlockwise rotation (A):

Potentiometer from "0" up to "10" K Ω

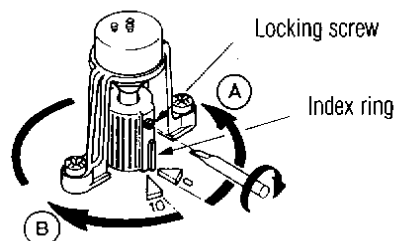
- Turn the ring up to the "0"
- Clamp the locking screw
- The "MAXIMUM" value is achieved by a 340° anticlockwise rotation

Clockwise rotation (B):

Potentiometer from "0" up to "10" K Ω

- Turn the ring up to the "10"
- Clamp the locking screw
- The "ZERO" value is achieved by a 340° clockwise rotation

Standard regulation

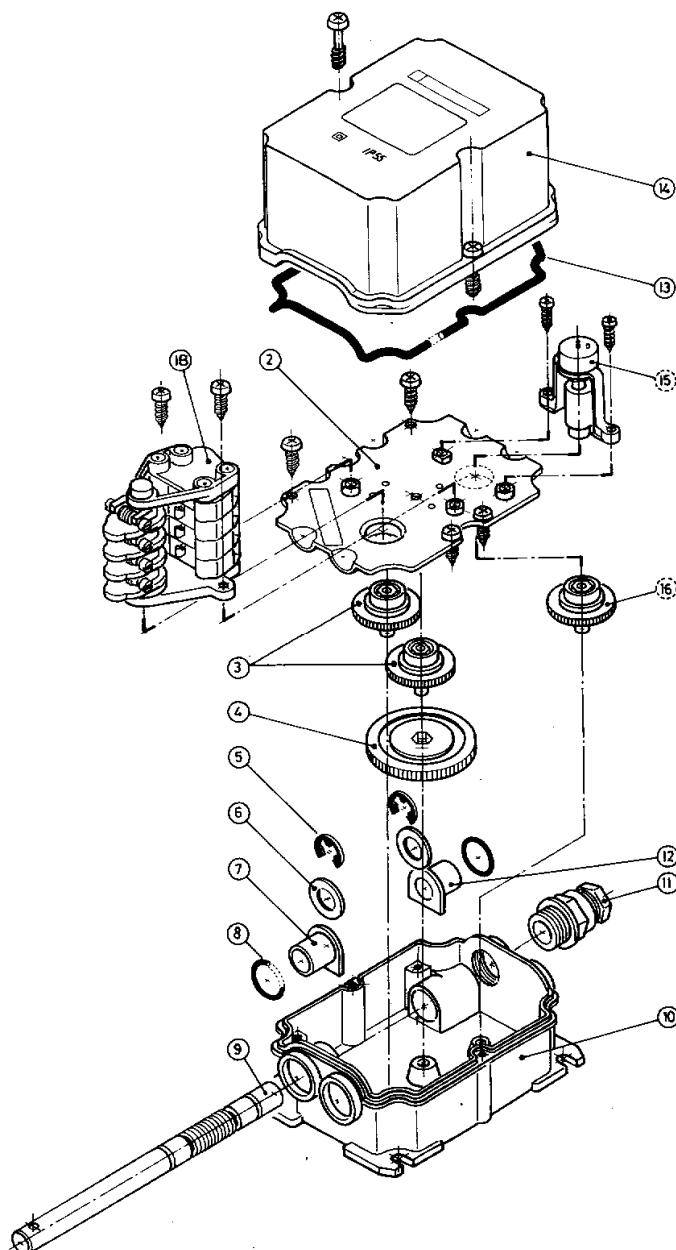


Standard ohm value

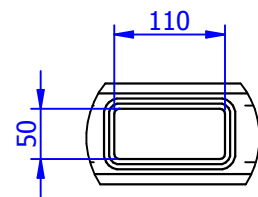
10 K Ω (others on request)

Part list

1. Cam set
2. Support
3. Gears set
4. COG-wheels
5. Ring 8 UNI 7435-75
6. Washer
7. Passing bushing
8. Gasket
9. Worm screw
10. Case
11. PG 11 cable entry
12. Blind bushing
13. Cover gasket
14. cover
15. Potentiometer group (Optional)
16. Potentiometer gear (Optional)



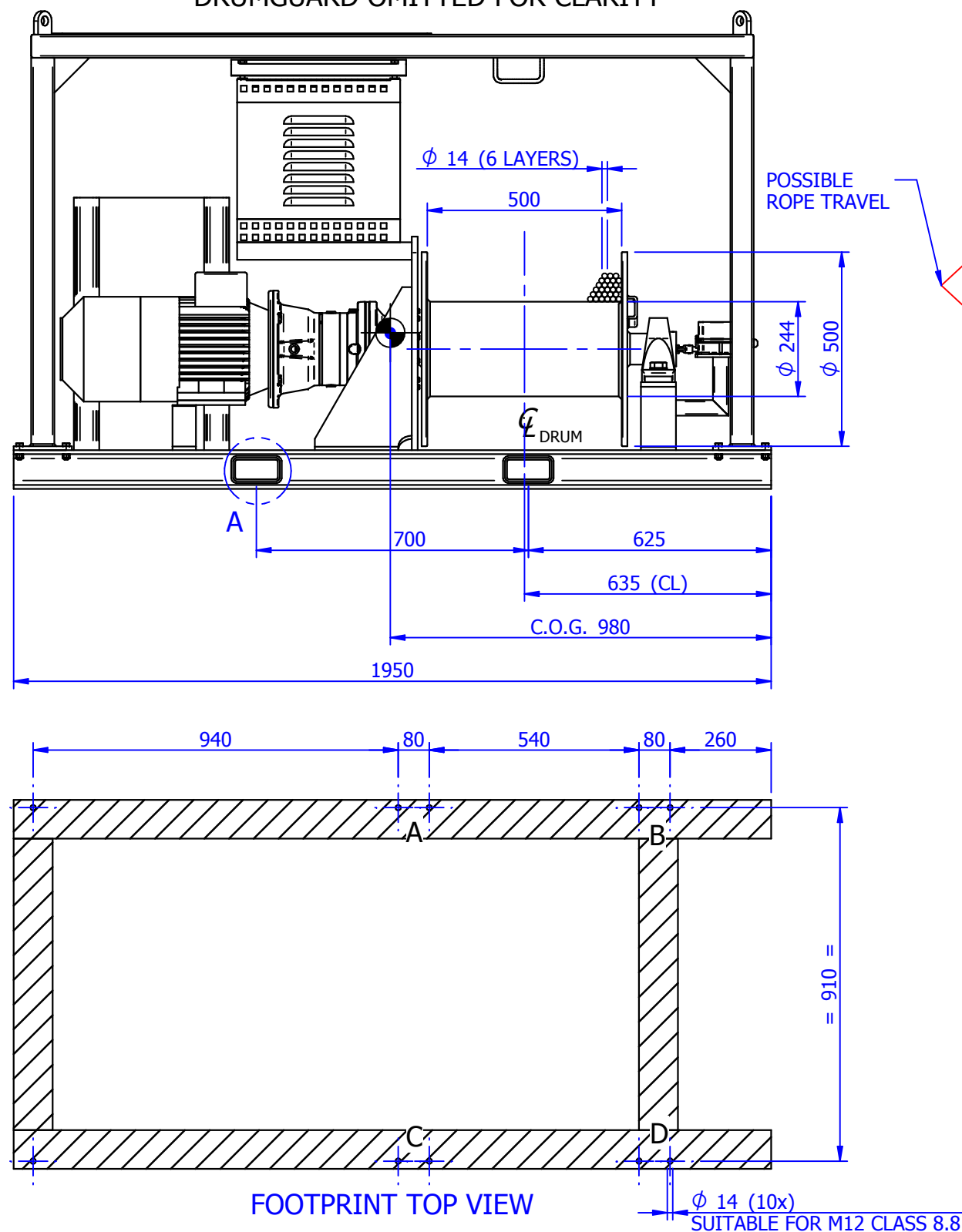
ANNEX III: DRAWINGS & SCHEMATICS



DETAIL A

PLEASE INDICATE ROPE TRAVEL,
IF DIFFERENT FROM POSITION AS DRAWN.

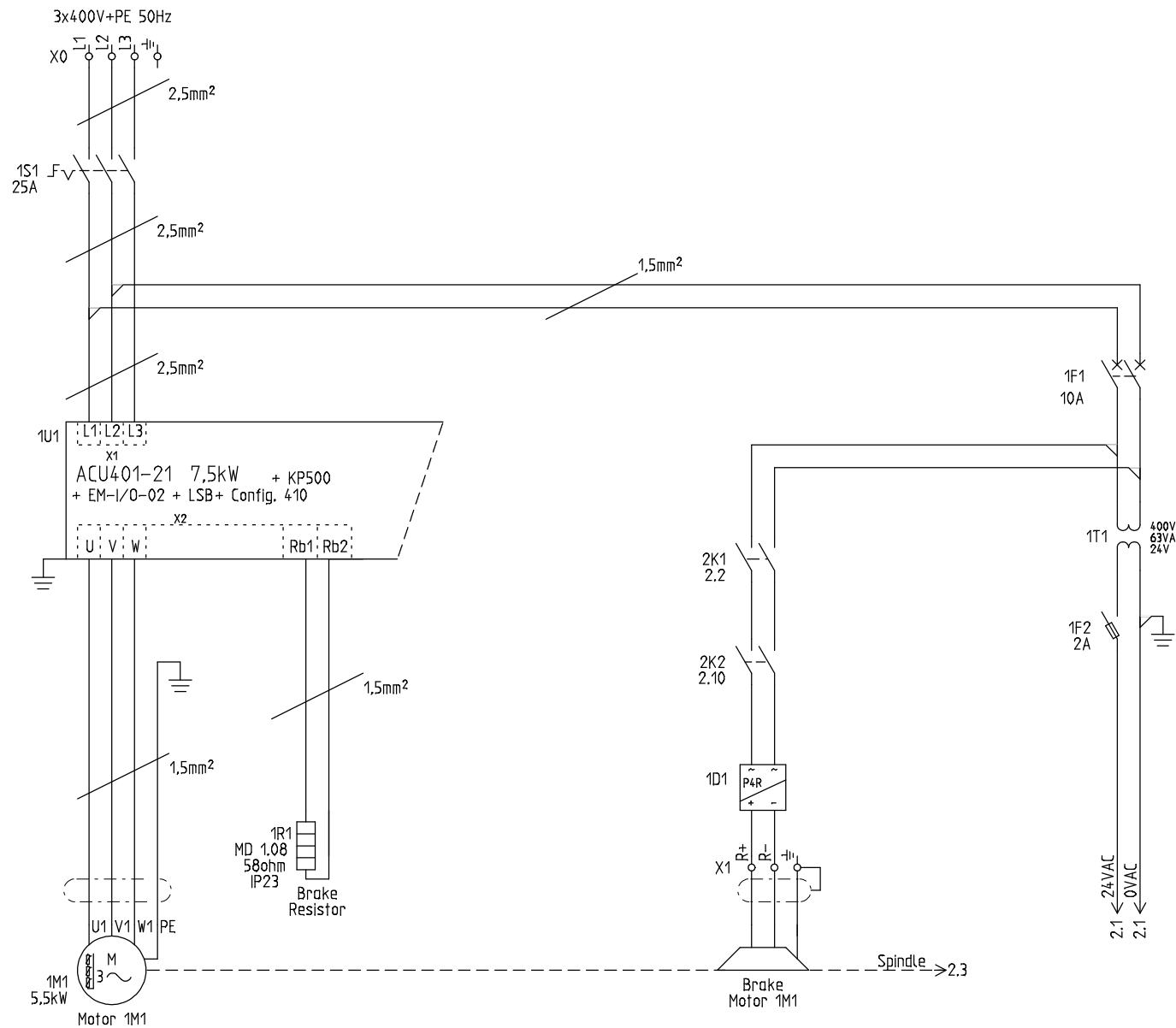
DRUMGUARD OMITTED FOR CLARITY

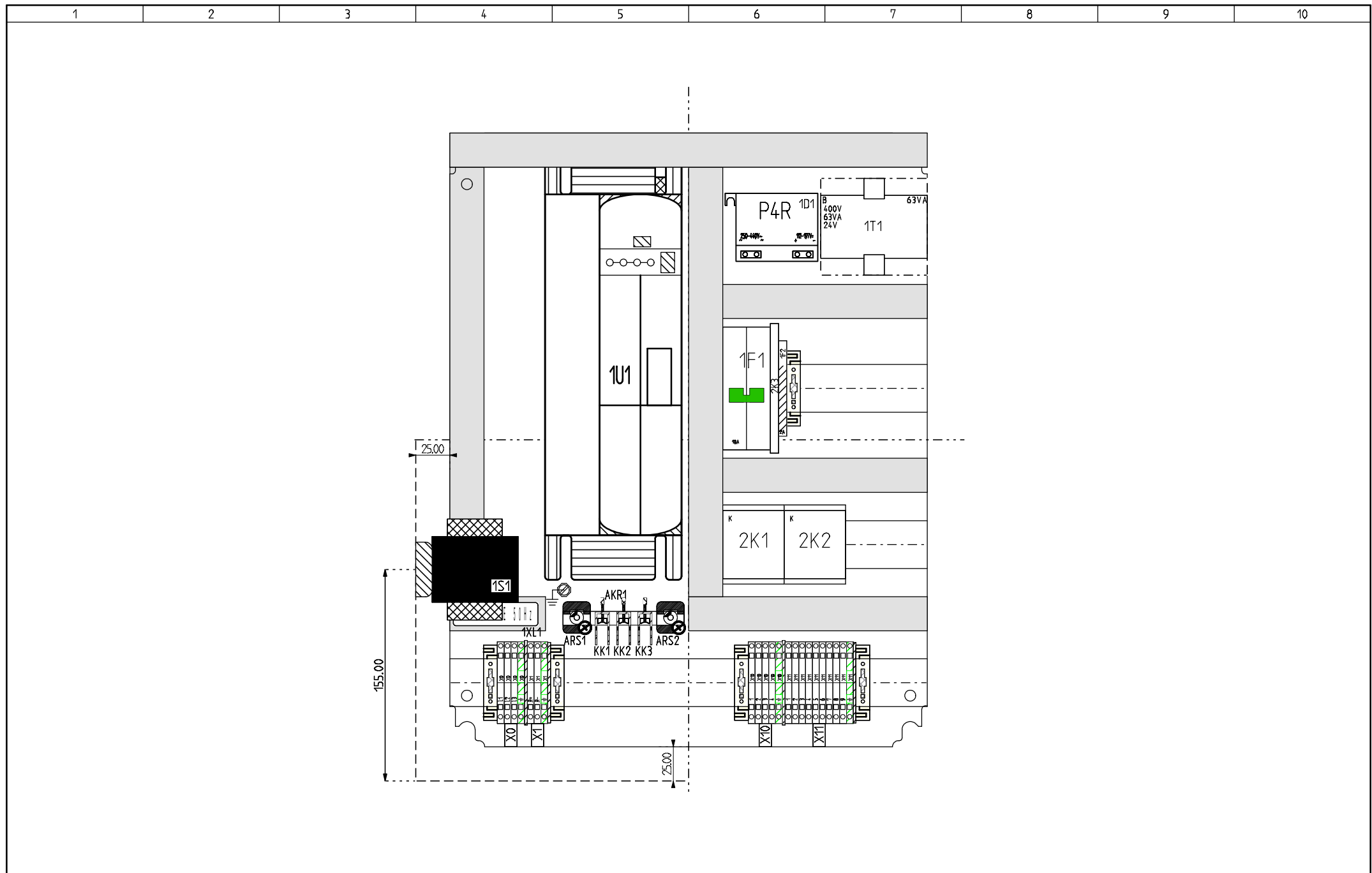


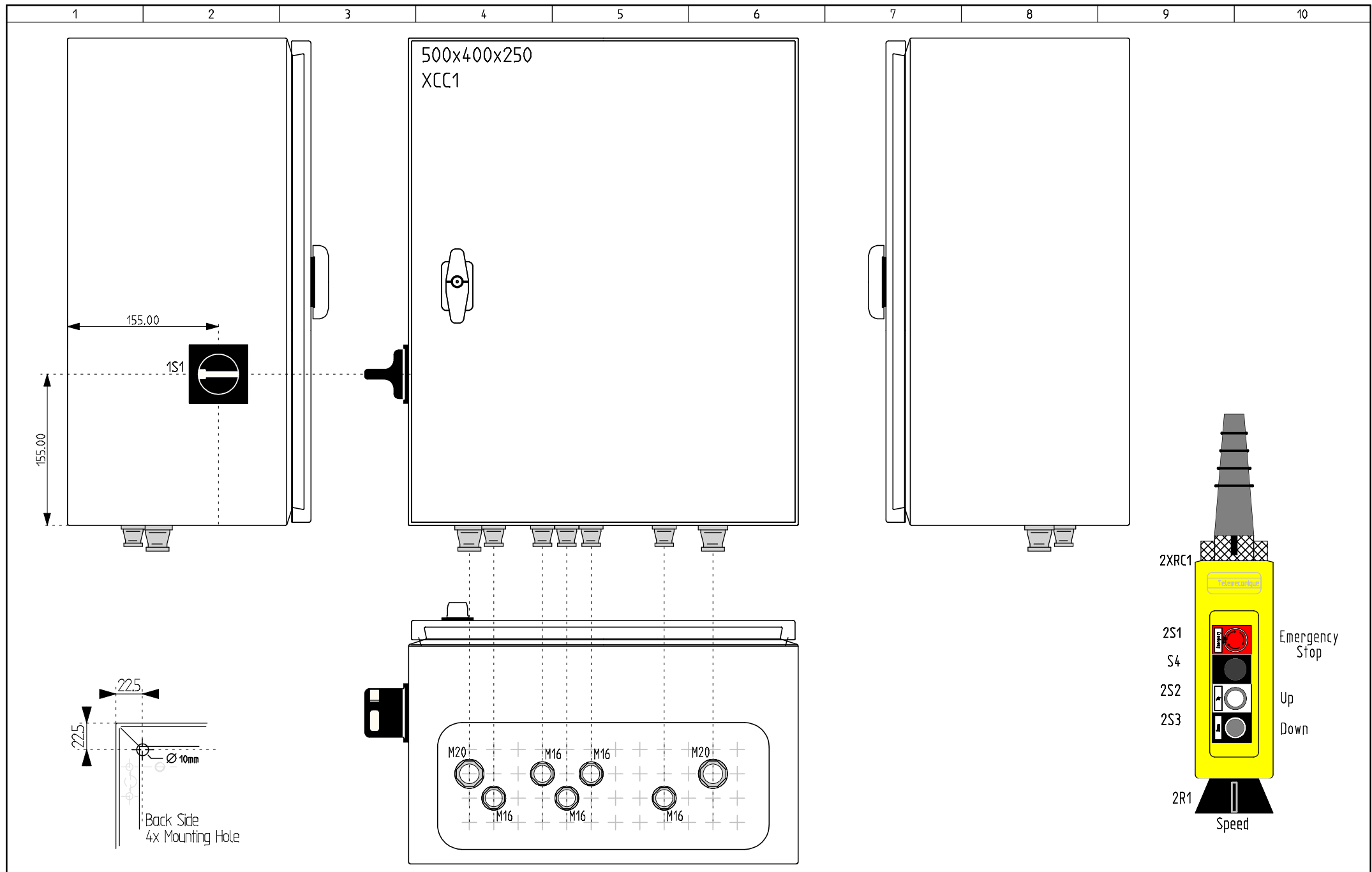
FOOTPRINT TOP VIEW

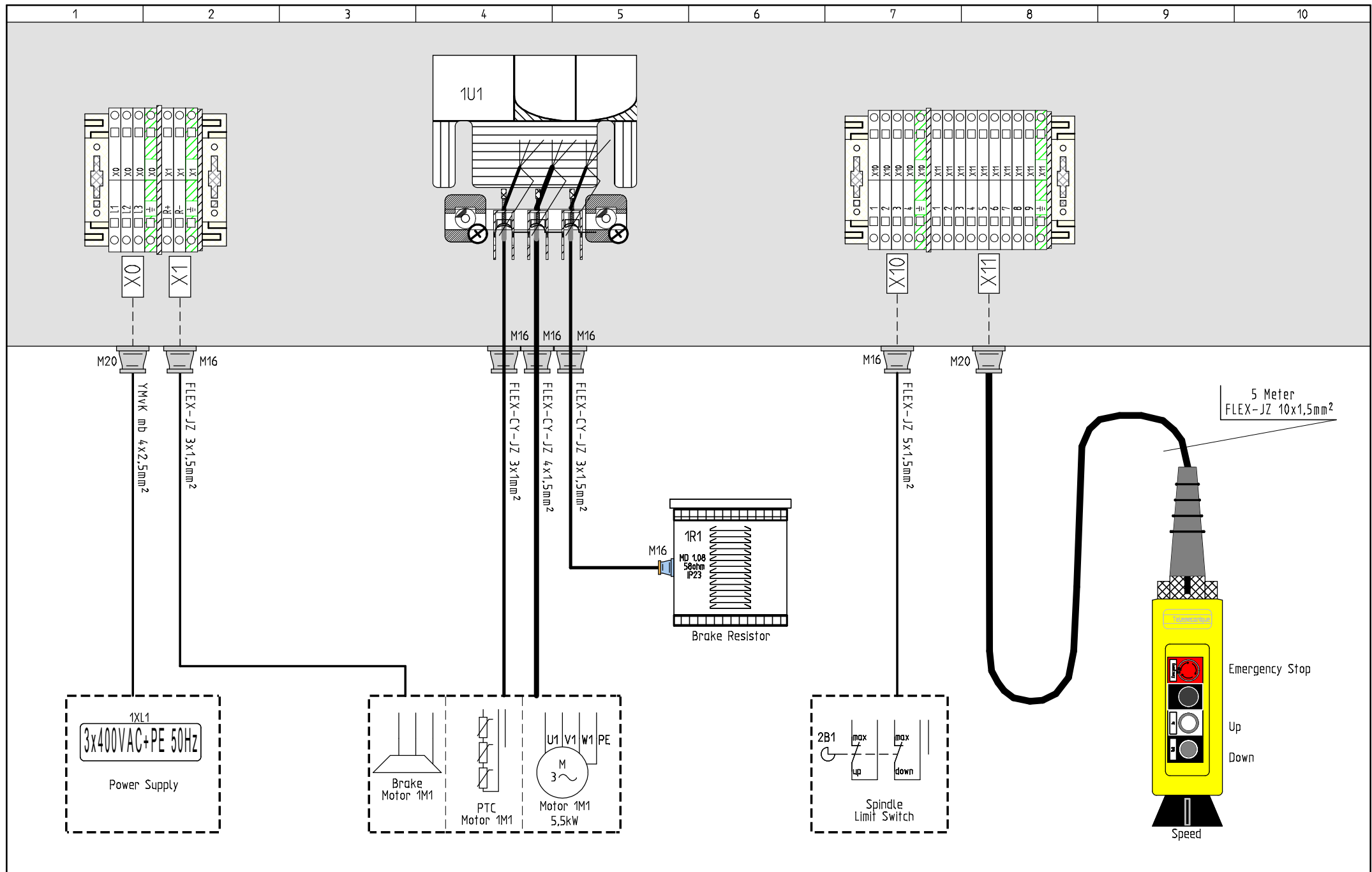
$\phi 14$ (10x)
SUITABLE FOR M12 CLASS 8.8

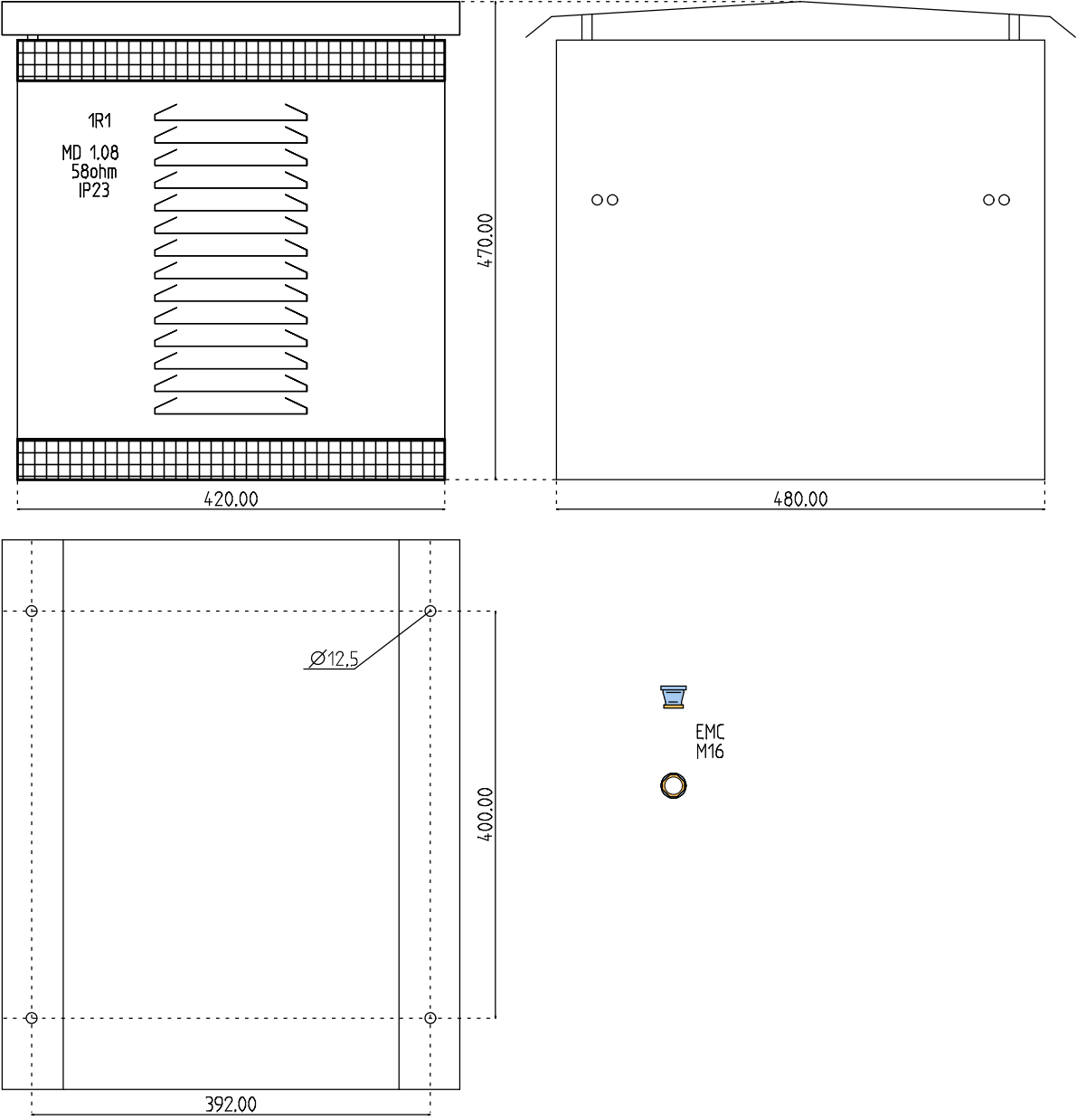
REVISION	DRAWN BY	DESCRIPTION	DATE	APPROVED ENGINEER												
1.1	dsch	APPROVED	8-1-2013													
GENERAL NOTES:																
1. THIS DRAWING IS SUBJECT TO FURTHER ENGINEERING DEVELOPMENT.																
TECHNICAL DATA:																
WINCH	ISO-FEM CLASS OPERATING TEMP. DUTY RATED CAPACITY, 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		T3-L3-M4 0 to +40 °C. LIFTING 2000 KG 3085 KG 9 m/min 14 m/min ± 650 KG.													
CABLE REQ.	Ø MAXIMUM NUMBER OF LAYERS LENGTH MINIMUM BREAK LOAD (M.B.L.)		14 mm 6 205 m 137 kN													
DRUM	BARREL Ø LENGTH FLANGE Ø GROOVE PITCH RADIUS DEPTH BRAKE FACTOR		244 mm 500 mm 500 mm NONE mm mm mm x W.L.L.													
MOTOR	TYPE PROTECTION CLASS POWER VOLTAGE FREQUENCY BRAKE FACTOR		ELECTRICAL BRAKE MOTOR IP 54 5,5 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><th colspan="2">REACTION FORCES ON FOUNDATION WITH BRAKE FORCE</th></tr><tr><th>POSITION</th><th>FORCE (kN) (+UPWARDS)</th></tr><tr><td>A</td><td>+19</td></tr><tr><td>B</td><td>+17</td></tr><tr><td>C</td><td>-25,5</td></tr><tr><td>D</td><td>-23,6</td></tr></table>					REACTION FORCES ON FOUNDATION WITH BRAKE FORCE		POSITION	FORCE (kN) (+UPWARDS)	A	+19	B	+17	C	-25,5	D	-23,6
REACTION FORCES ON FOUNDATION WITH BRAKE FORCE																
POSITION	FORCE (kN) (+UPWARDS)															
A	+19															
B	+17															
C	-25,5															
D	-23,6															
PROJECT CLIENT NAME: HOIST INTERNATIONAL B.V.																
DRAWING DESCRIPTION: SB 304 EDS GENERAL ARRANGEMENT WINCH DATASHEET																
CLIENT REFERENCE No.: 48003931																
		© 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.														
PROJECTIE: 	THIRD PROJECTION	DRAWN BY: D. Schuiling	SCALE: 1:15	SIZE: A3												
DATE DRAWN: 12-12-2012		ORDER NUMBER: 1001666	DRAWING NUMBER: SB0.0304.00.010													
			REVISION: 1.1													
			SHEET: 1													











1	2	3	4	5	6	7	8	9	10			
Collector materiallist-detail												
Quantity	Type	Description							Manufacturer			
1.00	TR172.90	TRANSFORMER 63VA 400/24V							BELPA			
1.00	179675001	I/O-EXTENSION MODULE EMIO 02							BONFIGLIOLI VECTRON			
1.00	179675500	OPERATING UNIT KP-500							BONFIGLIOLI VECTRON			
1.00	ACU401-21	TYPE ACU401-21 7,5 KW 3X400V WITH INTERN FILTER							BONFIGLIOLI VECTRON			
1.00	5K POT LANGE AS	5K POTENTIOMETER LONG AX							ELSTO			
1.00	MD 1.08	BRAKE RESISTOR 4000 WATT IP23							ELSTO			
7.00	B1463	WIRING GUTTER 60X25MM							Licatec			
1.00	D2210	CIRCUIT BREAKER 2 POLE 10A							Kopp			
3.00	Q4604	DIN-RAIL PERFORATED							HALEK			
1.00	X2202	FUSEHOLDER 5X20MM							MORSETTITALIA			
1.00	52103310	SKINDICHT NUT SM-M 16x1,5 EMC							Lapp			
5.00	53111410	SKINTOP GLAND ST-M 16x1,5 RAL 7035 SGY 4,5-10mm							Lapp			
2.00	53111420	SKINTOP GLAND ST-M 20x1,5 RAL 7035 SGY 7-13mm							Lapp			
1.00	53112620	SKINTOP GLAND MS-SC-M 16x1,5 ENC 4,5-9mm							Lapp			
5.00	53119013	SKINTOP NUT GMP-GL-M 16x1,5 RAL 7035 SGY							Lapp			
2.00	53119023	SKINTOP NUT GMP-GL-M 20x1,5 RAL 7035 SGY							Lapp			
1.00	LA1KN203	CONTACTOR SPRING 2NO							TELEMECANIQUE			
2.00	LC1K0901B7	CONT 9A 1NC 24V AC							TELEMECANIQUE			
1.00	NSYS3D5425P	STEEL HXWXD 500 x 400 x 250							Schneider Electric			
1.00	VBD0	MAIN SWITCH DISCON.25A 3P							TELEMECANIQUE			
1.00	XACA04	EMPTY PENDANT CONTROL STATION XACA 4							TELEMECANIQUE			
1.00	XACA9411	HEAD PUSHBUTTON SPRINGRETURN ROUND WHITE							TELEMECANIQUE			
1.00	XACA9412	HEAD PUSHBUTTON SPRINGRETURN ROUND BLACK							TELEMECANIQUE			
1.00	XACA982	GUARD							TELEMECANIQUE			
1.00	ZA2BS834	HEAD PUSHBUTTON D=30 RED							TELEMECANIQUE			
3.00	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			
 Carolus Clusiuslaan 1 2215 RV Voorhout Tel. +31 (0)252 219123 - Fax. +31 (0)88 7865899 www.elstocontrols.nl		Hoist International BV			Hoist International BV		Drawingnr.: 1001666		Projectname: Hois1001666		Drawn:	
							Ordernr.: 1001685		Projectnr Customer:		CvR	
							Date:		Date revision:		Collector materiallist detail:	
							12-12-2012		17-12-2012		Page: 1	
										From: 2		

1	2	3	4	5	6	7	8	9	10
Collector materiallist-detail									
Quantity	Type	Description							Manufacturer
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	P4R	BRAKE RECTIFIER 250-440VAC - 112-197VDC							TEMPORITI
1.00	2A 5x20mm	3431368 GLASS FUSE 5X20MM 2A							FERRAZ
2.00	AB/SS-M	1730246 Support foot rack for collector rail							Phoenix Contact
1.00	NLS-CU 3/10 SN	7600984 Shield Collector rail , 3 mm X 10 mm							Phoenix Contact
3.00	SK 8	7601990 SHIELDING CONNECTOR FOR COLLECTOR RAIL							TU
1.00	TEMBJ6-150	GROUNDLEACH 6MM² - 150MM² 448993							Erico
1.00	CC15/60KMC	1877310000 LABEL 15X60MM ADHESIVE							WEIDMULLER B.V.
24.00	DEK5/5MC	1609801044 LABEL 5X5MM FOR TERMINAL							WEIDMULLER B.V.
2.00	ESG8/17MC	1674740000 LABEL 8X17MM FOR RELAIS ETC.							WEIDMULLER B.V.
10.00	ESG9/17K	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER							WEIDMULLER B.V.
1.00	MRZ24VDC1CO	8533660000 MRZ 24VDC 1CO							WEIDMULLER B.V.
2.00	ZAP/TW4	1632090000 ZAP/TW 4							WEIDMULLER B.V.
2.00	ZAPTW1beige	1608740000 ZAP TW 1 BEIGE							WEIDMULLER B.V.
18.00	ZDU2.5	1608510000 ZDU 2.5/E							WEIDMULLER B.V.
5.00	ZEW35/2	8630740000 Endbracket							WEIDMULLER B.V.
4.00	ZPE2.5	1608640000 ZPE 2.5							WEIDMULLER B.V.

1	2	3	4	5	6	7	8	9	10
Material-Detail									
Comp	Type	Quantity	Description						Manufacturer
AKR1	NLS-CU 3/10 SN	1	7600984 Shield Collector rail , 3 mm X 10 mm						Phoenix Contact
ARS1	AB/SS-M	1	1730246 Support foot rack for collector rail						Phoenix Contact
ARS2	AB/SS-M	1	1730246 Support foot rack for collector rail						Phoenix Contact
KK1	SK 8	1	7601990 SHIELDING CONNECTOR FOR COLLECTOR RAIL						TU
KK2	SK 8	1	7601990 SHIELDING CONNECTOR FOR COLLECTOR RAIL						TU
KK3	SK 8	1	7601990 SHIELDING CONNECTOR FOR COLLECTOR RAIL						TU
S4	ZB2BY2101	1	LEGEND 30X40MM BLACK/ RED SIDES						TELEMECANIQUE
S4	ZB2SZ3	1	BLANKING PLUG BLACK						TELEMECANIQUE
U2	B1463	1	WIRING GUTTER 60X25MM						Licatec
U3	B1463	1	WIRING GUTTER 60X25MM						Licatec
U4	B1463	1	WIRING GUTTER 60X25MM						Licatec
U5	B1463	1	WIRING GUTTER 60X25MM						Licatec
U6	B1463	1	WIRING GUTTER 60X25MM						Licatec
U7	B1463	1	WIRING GUTTER 60X25MM						Licatec
U8	Q4604	1	DIN-RAIL PERFORATED						HALEK
U9	Q4604	1	DIN-RAIL PERFORATED						HALEK
U10	Q4604	1	DIN-RAIL PERFORATED						HALEK
U11	B1463	1	WIRING GUTTER 60X25MM						Licatec
W7	53111420	1	SKINTOP GLAND ST-M 20x1,5 RAL 7035 SGY 7-13mm						Lapp
W7	53119023	1	SKINTOP NUT GMP-GL-M 20x1,5 RAL 7035 SGY						Lapp
W8	53111420	1	SKINTOP GLAND ST-M 20x1,5 RAL 7035 SGY 7-13mm						Lapp
W8	53119023	1	SKINTOP NUT GMP-GL-M 20x1,5 RAL 7035 SGY						Lapp
W9	53111410	1	SKINTOP GLAND ST-M 16x1,5 RAL 7035 SGY 4,5-10mm						Lapp
W9	53119013	1	SKINTOP NUT GMP-GL-M 16x1,5 RAL 7035 SGY						Lapp
W10	53111410	1	SKINTOP GLAND ST-M 16x1,5 RAL 7035 SGY 4,5-10mm						Lapp
W10	53119013	1	SKINTOP NUT GMP-GL-M 16x1,5 RAL 7035 SGY						Lapp
W11	53111410	1	SKINTOP GLAND ST-M 16x1,5 RAL 7035 SGY 4,5-10mm						Lapp
W11	53119013	1	SKINTOP NUT GMP-GL-M 16x1,5 RAL 7035 SGY						Lapp
W12	53111410	1	SKINTOP GLAND ST-M 16x1,5 RAL 7035 SGY 4,5-10mm						Lapp
W12	53119013	1	SKINTOP NUT GMP-GL-M 16x1,5 RAL 7035 SGY						Lapp
 elsto controls Stokvis Group Carolus Clusiuslaan 1 2215 RV Voorhout Tel. +31 (0)252 219123 - Fax. +31 (0)88 7865899 www.elstocontrols.nl		Hoist International BV			Hoist International BV		Drawingnr.: 1001666 Projectname: Hois1001666 Ordernr.: 1001685 Projectnr Customer: Date: 17-12-2012 Date revision: 17-12-2012 Materiallist detail:		Drawn: CvR Page: 9 From: 4

1	2	3	4	5	6	7	8	9	10
Material-Detail									
Comp	Type	Quantity	Description						Manufacturer
W14	53111410	1	SKINTOP GLAND ST-M 16x1,5 RAL 7035 SGY 4,5-10mm						Lapp
W14	53119013	1	SKINTOP NUT GMP-GL-M 16x1,5 RAL 7035 SGY						Lapp
W15	52103310	1	SKINDICHT NUT SM-M 16x1,5 EMC						Lapp
W15	53112620	1	SKINTOP GLAND MS-SC-M 16x1,5 ENC 4,5-9mm						Lapp
X0	DEK5/SMC	4	1609801044 LABEL 5X5MM FOR TERMINAL						WEIDMULLER B.V.
X0	ZDU2.5	3	1608510000 ZDU 2.5/E						WEIDMULLER B.V.
X0	ZPE2.5	1	1608640000 ZPE 2.5						WEIDMULLER B.V.
X1	DEK5/SMC	3	1609801044 LABEL 5X5MM FOR TERMINAL						WEIDMULLER B.V.
X1	ZAP/TW4	1	1632090000 ZAP/TW 4						WEIDMULLER B.V.
X1	ZDU2.5	2	1608510000 ZDU 2.5/E						WEIDMULLER B.V.
X1	ZPE2.5	1	1608640000 ZPE 2.5						WEIDMULLER B.V.
X2	ZAP/TW4	1	1632090000 ZAP/TW 4						WEIDMULLER B.V.
X4	ZAPTW1beige	1	1608740000 ZAP TW 1 BEIGE						WEIDMULLER B.V.
X5	ZAPTW1beige	1	1608740000 ZAP TW 1 BEIGE						WEIDMULLER B.V.
X10	DEK5/SMC	5	1609801044 LABEL 5X5MM FOR TERMINAL						WEIDMULLER B.V.
X10	ZDU2.5	4	1608510000 ZDU 2.5/E						WEIDMULLER B.V.
X10	ZPE2.5	1	1608640000 ZPE 2.5						WEIDMULLER B.V.
X11	DEK5/SMC	10	1609801044 LABEL 5X5MM FOR TERMINAL						WEIDMULLER B.V.
X11	ZDU2.5	9	1608510000 ZDU 2.5/E						WEIDMULLER B.V.
X11	ZPE2.5	1	1608640000 ZPE 2.5						WEIDMULLER B.V.
XCC1	NSYS3D5425P	1	STEEL HXWXD 500 x 400 x 250						Schneider Electric
XCC1	TEMBJ6-150	1	GROUNDLEACH 6MM² - 150MM² 448993						Erico
XL1	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.
XL2	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.
XL3	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.
XL6	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.
XT1	ZEW35/2	1	8630740000 Endbracket						WEIDMULLER B.V.
XT2	ZEW35/2	1	8630740000 Endbracket						WEIDMULLER B.V.
XT3	ZEW35/2	1	8630740000 Endbracket						WEIDMULLER B.V.
XT4	ZEW35/2	1	8630740000 Endbracket						WEIDMULLER B.V.
 Carolus Cluslustaan 1 2215 RV Voorhout Tel. +31 (0)252 219123 - Fax. +31 (0)88 7865899 www.elstocontrols.nl		Hoist International BV			Hoist International BV		Drawingnr.: 1001666 Projectname: Hois1001666		Drawn:
							Ordernr.: 1001685 Projectnr Customer:		CvR
							Date: 17-12-2012 Date revision: 17-12-2012		Materiallist detail: Page: 2 From: 4

1	2	3	4	5	6	7	8	9	10					
Material-Detail														
Comp	Type	Quantity	Description						Manufacturer					
XT5	ZEW35/2	1	8630740000 Endbracket						WEIDMULLER B.V.					
1D1	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.					
1D1	P4R	1	BRAKE RECTIFIER 250-440VAC - 112-197VDC						TEMPORITI					
1F1	D2210	1	CIRCUIT BREAKER 2 POLE 10A						Kopp					
1F1	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.					
1F2	2A 5x20mm	1	3431368 GLASS FUSE 5X20MM 2A						FERRAZ					
1F2	DEK5/SMC	1	1609801044 LABEL 5X5MM FOR TERMINAL						WEIDMULLER B.V.					
1F2	X2202	1	FUSEHOLDER 5X20MM						MORSETTITALIA					
1R1	MD 1.08	1	BRAKE RESISTOR 4000 WATT IP23						ELSTO					
1S1	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.					
1S1	VBD0	1	MAIN SWITCH DISCON.25A 3P						TELEMECANIQUE					
1T1	ESG9/17K	1	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.					
1T1	TR172.90	1	TRANSFORMER 63VA 400/24V						BELPA					
1U1	179675001	1	I/O-EXTENSION MODULE EMIO 02						BONFIGLIOLI VECTRON					
1U1	179675500	1	OPERATING UNIT KP-500						BONFIGLIOLI VECTRON					
1U1	ACU401-21	1	TYPE ACU401-21 7,5 KW 3X400V WITH INTERN FILTER						BONFIGLIOLI VECTRON					
1U1	ESG9/17K	2	1674760000 LABEL 9X17MM ADHESIVE FOR TRANSFORMER						WEIDMULLER B.V.					
1XL1	CC15/60KMC	1	1877310000 LABEL 15X60MM ADHESIVE						WEIDMULLER B.V.					
2K1	ESG8/17MC	1	1674740000 LABEL 8X17MM FOR RELAIS ETC.						WEIDMULLER B.V.					
2K1	LA1KN203	1	CONTACTOR SPRING 2NO						TELEMECANIQUE					
2K1	LC1K0901B7	1	CONT 9A 1NC 24V AC						TELEMECANIQUE					
2K2	ESG8/17MC	1	1674740000 LABEL 8X17MM FOR RELAIS ETC.						WEIDMULLER B.V.					
2K2	LC1K0901B7	1	CONT 9A 1NC 24V AC						TELEMECANIQUE					
2K3	DEK5/SMC	1	1609801044 LABEL 5X5MM FOR TERMINAL						WEIDMULLER B.V.					
2K3	MRZ24VDC1CO	1	8533660000 MRZ 24VDC 1CO						WEIDMULLER B.V.					
2R1	5K POT LANGE AS	1	5K POTENTIOMETER LONG AX						ELSTO					
2R1	XACA982	1	GUARD						TELEMECANIQUE					
2R1	ZB5AD912	1	HEAD POTENTIOMETER OP.						TELEMECANIQUE					
2S1	ZA2BS834	1	HEAD PUSHBUTTON D=30 RED						TELEMECANIQUE					
2S1	ZB2BE101	1	SPRING RETURN CONTACT BLOCK 1 NO FRONT M						TELEMECANIQUE					
 elsto controls Stokvis Group Carolus Clusiuslaan 1 2215 RV Voorhout Tel. +31 (0)252 219123 - Fax. +31 (0)88 7865899 www.elstocontrols.nl		Hoist International BV			Hoist International BV		Drawingnr.: 1001666		Projectname: Hois1001666		Drawn:			
							Ordernr.: 1001685		Projectnr Customer:		CvR			
							Date: 17-12-2012		Date revision: 17-12-2012		Materiallist detail:		Page: 3 From: 4	

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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]

EMCÉ 's-Gravendamsseweg 53b 2215 TC The Netherlands www.emce.com			
SERIAL NO.:		ISO-FEM CLASS:	
TYPE:		DUTY:	
RATED CAPACITY:		KG, ON THE TOP LAYER	
MAX. CAPACITY:		KG, ON THE 1 ST LAYER	
RATED SPEED:		m/min, ON THE 1 ST LAYER	
MAX. SPEED:		m/min, ON THE TOP LAYER	
CABLE Ø:	mm	MAX. LAYERS:	
LENGTH:	m	MBL:	kN
MOTOR TYPE:			
POWER:	kW (S)		PROT. CLASS:
VOLTAGE:	VAC	FREQUENCY:	Hz.
OPERATING PRESSURE:		bar	
VOLUME FLOW:			
GEARBOX TYPE:		RATIO:	
MANUFACTURED:		MASS:	KG
THIS WINCH IS NOT SUITABLE FOR THE LIFTING AND LOWERING OF PERSONNEL			




 **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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DO NOT REMOVE THIS LABEL

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