



Italkrane s.r.l.
YOYO CHAIN HOIST
DESCRIPTION
INSTALLATION
MAINTENANCE

FOREWORD

Estimated Customer,

*Thank you for choosing an **Italkrane.s.r.l.** product. All our products are built in conformity with the European rules and regulations in force.*

*This operation manual conforms with the provisions of MACHINERY DIRECTIVE 89/392/EEC and amendments thereof, concerns cranes, lifting winches and GO*UP electric wire rope hoist, single or multiple speed, in various construction forms, and the relevant monorail, bi-rail and minimum headroom trolleys. Machines are built in conformity with FEM - ISO – EN rules and regulations and updated on the basis of the latest safety provisions.*

Our state-of-the-art construction systems together with the rigorous in-house tests, guarantee the safety and quality of all components.

To get the best results, you are strongly advised to follow the simple check, installation and startup procedures carefully.

For your own safety and in order to avoid temporary stoppages of the machine, it is advisable to carry out all the maintenance procedures indicated in this manual.

Worn out or broken parts should be replaced with original spare parts only. Our guarantee will not cover products that are worn out or broken due to failure to comply with this operation manual. We also reserve the right to make constructive changes or to modify one or more features of our machines without notice, with a view to improving and updating the product with new technologies.

The main purpose of the instructions contained in this manual is to help users to get to know the machines so as to allow them to take all measures as well as prepare human and material means necessary to a safe use of the machine and to guarantee a long working life.

Italkrane s.r.l. wishes you a pleasant work.

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GENERAL DEFINITIONS AND IMPORTANT INFORMATION

CONTENTS AND ADDRESSEES OF THE MANUAL

This manual defines the "intended use" of the lifting equipment (hereinafter called "machines") listed in the foreword, their technical, performance and functional characteristics, their use and their maintenance. It is meant for:

- the plant, workshop and /or construction site manager
- operators employed on using the lifting equipment
- operators employed on transportation, handling and installation
- staff members employed on maintenance

The manual must be stored and guarded by a clearly identifiable person responsible for it, in a suitable location and should be kept in the best possible conditions; it must always be available for consultation.

In case of wear and tear and/or loss, apply immediately to the manufacturer for a replacement copy.

N.B. Italkrane s.r.l. reserves the material and intellectual property rights of this manual and forbids its divulgation and reproduction, even partial, without prior written consent.

DEFINITIONS

User

A user (entrepreneur/company) is the person/entity that uses and employs hoisting equipment (crane/winch/hoist) or has them used by capable and trained for the purpose staff.

Trained Staff

Trained staff consists of individuals that have been explained their assignments and the potential dangers inherent in the use of hoisting equipment and have become familiar with the safety devices and measures as well as with accident prevention rules and regulations.

Operator

Person assigned to the use of hoisting machinery.



Electrical Maintenance Man



Qualified individual capable of servicing the lifting device under standard use conditions and assigned to routine electrical maintenance, adjustment and repair operations.

He/she is capable of working in the presence of voltage on the switchboards.

Mechanical Maintenance Man



Qualified individual capable of servicing the lifting device under standard use conditions and assigned to routine mechanical maintenance, adjustment and repair operations

Electrician



Qualified technician authorized to perform operations of a complex and extraordinary electrical nature.

Mechanic



Qualified technician authorized to perform operations of a complex and extraordinary mechanical nature.

RELATION WITH THE USER

This manual is an integral part of the hoisting machine and reflects the state-of-the-art at the moment of its release on the market. Any integration provided for by the manufacturer should be kept together with the original manual.

In the event of alienation of the hoisting machine to a third party, the first user is bound to supply, together with the machine, this manual and the relevant documents attached to it. (declaration of conformity, diagrams, check register etc.)

MANUFACTURER LIABILITY AND GUARANTEE

The buyer, in order to avail themselves of the guarantee, shall scrupulously comply with the instructions contained herein, In particular the buyer shall:

- Use the machine within the prescribed usage limits.
- Perform a careful and punctual maintenance.
- Assign the use of the machine to capable and duly trained operators (please, bear in mind the minimum age prescribed by the law).
- Prevent individuals under the effects of drugs, alcohol and medicines slowing down reflexes, from performing machine maintenance, control, repair or disassembly operations.
- Use original spare parts only.
- Not alter nor modify, without prior authorization, the machine or parts of it.



The intended use and configuration provided for the machine are the only admissible ones.

This manual's contents do not substitute for, but rather complete, the obligations under the accident prevention rules and regulations in force in the Country where the machine is installed.

PERIODIC CHECKS

Hoisting equipment must be checked at least once a year - even more often, according to the Country regulations – by a qualified technician who will verify their fitness. The check report is to be kept inside the machine's dossier.

Check and verification schedule must be adapted to the actual use of the machine. Intensive use demands for shorter intervals between maintenance operations.



NOISE LEVELS

The level of acoustic pressure produced by our machines with a full load is always inferior to 85 dB (A).

This value does not include the contributions and effects of environmental characteristics such as, for example, the transmission and reflection of sound through metal frames

PACKING



Hoist only

Over land

It consists of a pallet to which the machine is fastened; the block is carefully gathered on its side thus avoiding bending or crushing of the rope.

Particular protection is granted to delicate parts, namely limit switches, power supply cables and terminals.

On request, waterproof protection can be provided. For distant destinations everything is protected by a wooden crate inside which the machine is waterproofed against rain.

Over sea

The machine is packed in a strong **IK** standard size case, or as the client requires. Markings showing weights, lifting-points and storage are included. The instructions given must be carefully followed in order to avoid lubricant-leakage.

HOIST WITH OTHER COMPONENTS

If the hoist is shipped along with other parts of bridge cranes or similar machines, the packaging is specifically designed for the relevant order. The various components are carefully positioned, with reliable fixed supports so as to avoid internal movements or collisions during transportation, loading and unloading, taking into consideration total weight and center of gravity.

FORWARDING



Transport must be entrusted to qualified forwarders if the goods are to be moved with proper care. **IK** does not accept any responsibility in the event equipment is forwarded by the client and /or by forwarders of their choice.

No other goods must be placed on top of the machines being forwarded, nor on the corresponding cases or crates.

During transportation goods must be protected against rain. When transported by sea, the goods must be kept away from spray and wet winds. If large crane girders are transported using articulated lorries or trucks joined by tow bars it is recommended that the girders are not placed under transversal or torsional stress during transport.

During the anchorage of the girders onto the means of transport, special care must be taken that the bindings do not distort nor bend the edges of the structures nor scratch the paint. Therefore, attach wooden wedges or protective angulars to edges and take particular care to provide suitable horizontal support for girders and their parts, using appropriate stands. To avoid oil-leakage or alterations in the settings of electric components during transportation and handling, level, positioning and adherence to the securing points indicated must be complied with.



HANDLING

- Prepare a clearly delimited unloading area of a size befitting that of the item to be handled (pallet, crate, etc.), with a flat surface.
- In consideration of the kind of packing, prepare all the necessary equipment for unloading and handling the machine and any accessories or parts thereof taking into account their weight, size, overall dimensions as well slings, yokes and other hoisting gear.
- Handle loads with great care in the previously delimited area, avoiding swings, oscillations and dangerous unbalances.
- Once the handling is completed, check that packing is intact and that no damages have been made.

UNPACKING

Open carefully from the top, undo the various parts, and lift them out vertically with great care after having secured them carefully.

CHECK FOR MISSING PARTS

During unpacking check against the packing list, that the machine is complete and none of its parts are missing. Also check that all the accessories essential to installation and connections (e.g. nuts and bolts, brackets, small particulars of electric lines) are present. Should you believe a part to be missing, contact the manufacturer.



Provide for the disposal of waste packing in conformity with the relevant provisions of the law in force in the area where the machine is installed, according to their nature (plastic, wood, cardboard, etc.), having previously separated them, as necessary.



STORAGE

Packed goods can normally be stored in a closed warehouse for up to five years provided that the temperature is no lower than -20°C nor higher than $+70^{\circ}\text{C}$ and humidity levels do not exceed 70%; special packing would need to be designed for different temperature values.

Protect, where protection is not already provided, mechanisms and worked surfaces using anti-oxidizing products.

If, for whatever reason, humidity levels were to exceed $+70\%$ or storage were to continue for a longer period it would be necessary to carry out some extra preliminary operations before setting the machine to work. No other packages must be placed on top of the crates.

FUNCTIONING AND INTENDED USE

The machine supplied is to be used only for vertical lifting, and when fitted with a trolley, horizontal travel.

Particular cases in which hoist or winches are to be used for specific work, or horizontal pulling, or at angles other than vertical, are indicated in the technical documentation and technical tables enclosed. In order to set the limit-switches the machine's working paths must be established so as to study whether they are suitable or not for the work in hand. If there are any doubts with regard to this, please contact the manufacturer before setting the machine to work.

Depending on the amount of work the machine is subjected to, a working life of at least 10 years can be expected, after which all of the manufacturers responsibilities expire.

To allow an estimate of the residual lifetime of a machine, a record of use for the first 10 years of operation is recommended. This

record is to show the history of the machine and should include statistics relating to operating times, average hoisting heights and loadings. Failure to keep such a record could invalidate any claims regarding possible machine defects within the first 10 years of operations.

CONTROL MODES

All hoisting (up and down), travel (left and right) and sliding (back and forth) movements, but in case of manual executions, are electrically activated and can be controlled by means of a push button control pendant or of a radio remote control.

All movements can be activated either by means of push buttons or of actuators which activate the function as they are pressed. Slow auxiliary speeds, if provided, can be activated as follows:

- By means of separate actuators or push buttons, that activate "slow" speeds independently of "fast" ones.
- By means of a sole double snap scaled actuator or push button, where the first snap controls the "slow" speed while the second controls the "fast" speed.

The push button control panel, if supplied, is equipped with an emergency stop red mushroom push button which stops the machine, when pressed all the way down.

To restart the machine, it is necessary to bring the stop push button back into its "lifted" position, thus permitting the consent to start, and then push the start button.

The push button control panel allows the operator to operate near the load.


The machine can be controlled also by means of a radio control, the push buttons' or actuators' functioning remains unchanged from that of the push button control panel in its hanging or sliding execution.



"EX" version radio remote control



Standard version radio remote control

 If the machine is operated by means of a radio control, the push button control panel is not connected to the machine, therefore operator in order not to prejudice their own and/or other people's safety.

GENERAL SAFETY RULES



Before operating the machine, it is necessary to:

- Read carefully the technical documentation.
- Know which safety devices are installed on the machine and where they are located.
- Learn how to operate the emergency stop devices and their location.

Some activities such as assembly and maintenance (e.g. assembly of wire rope) may expose operators to dangerous situations, it is therefore crucial to follow the following instructions:

- The expressly trained staff should be familiar with the operating procedures they must follow, with the potential danger situations which might arise as well as with the best ways to avoid them.
- If, in order to allow a particular maintenance operation, technical intervention, inspection or repair, staff members in charge have to completely or partially deactivate, remove or open protections, it will be their duty, when that particular operation is finished, to bring the machine back into use checking that no foreign objects (e.g. parts, tools etc.) were left behind which may cause malfunctioning and damages to persons or things.
- In order to preserve their own as well as other people's safety, staff members in charge of maintenance, inspections and repairs shall, before performing their duty and inasmuch as possible, take all necessary safety measures.

They shall, in particular:

Ensure electrical power to the machine was disconnected and the relevant preventive measures (blocking devices, warning notices etc.) were taken in order to prevent the machine from being accidentally started.

Pay great attention if, in case of electrical maintenance or repair, they have to service the machine while the power supply is connected.

RESIDUAL RISKS



WARNING

Following an in-depth analysis of all hazards present in the operation and use phases of machines in any possible configuration and of the relevant accessories, all necessary measures were taken in order to eliminate, inasmuch as possible, risks to operators and/or limit or reduce relative risks from dangers which can not completely be eliminated at the source.

Yet, the following residual risks remain, which can be avoided or reduced through the following prevention activities.

RISKS DURING USE

DANGERS/RISK	PROHIBITION/WARNING	OBLIGATION/PREVENTION
<p>Risk from danger of crushing During the handling of the suspended load in case of exposure of the operator and/or other people in area within the load's path.</p>	<ul style="list-style-type: none"> • It is forbidden to hoist loads while people is crossing the handling area. • It is forbidden to transit, stop and operate under a suspended load. 	<ul style="list-style-type: none"> • The operator responsible for the hoisting equipment must comply with the prescriptions of the user's manual to guarantee the best safety conditions. • Obligation to periodic inspection of rope, hook and lifting accessories.
<p>Risk from danger of snagging and/or crushing As a result of contact with ropes or sheaves.</p>	<ul style="list-style-type: none"> • Caution! Exposure to moving parts can cause dangerous situations. • It is forbidden to touch moving parts. 	<ul style="list-style-type: none"> • Obligation to wear protective gloves during rigging operations.

RISKS DURING MAINTENANCE / REPAIR

DANGERS/RISK	PROHIBITION/WARNING	OBLIGATION/PREVENTION
<p>Risk from danger of electrocution When working on electric equipment without cutting the power off.</p>	<ul style="list-style-type: none"> • It is forbidden to operate on electric equipment and installations before cutting them off from their power source. 	<ul style="list-style-type: none"> • Entrust electrical maintenance to qualified personnel only. • Comply with the prescriptions of the user's manual for the maintenance of electrical installations.
<p>Risk from danger of snagging and/or crushing As a result of contact with ropes, sheaves, drums, joints or other rotating parts.</p>	<ul style="list-style-type: none"> • Caution! Exposure to moving parts can cause dangerous situations. • It is forbidden to restart the equipment before re-installing the temporarily removed protection devices. 	<ul style="list-style-type: none"> • Entrust mechanical maintenance to qualified personnel only. • Obligation to wear protective gloves.

WORKING LIMITS

CLASSIFICATION OF HOISTING EQUIPMENT

ISO 4301/1 rule and FEM 1.001 and fem 9.511 technical regulations, allow the classification of hoisting equipment according to their use. The factors to be taken into consideration are:

- 1) **Working conditions**(i.e. operating cycles and actual duty hours of mechanisms which can be spent during the entire expected life span of the hoisting equipment)
- 2) **Loading rate** (i.e the stress conditions of the equipment based on the type of load)

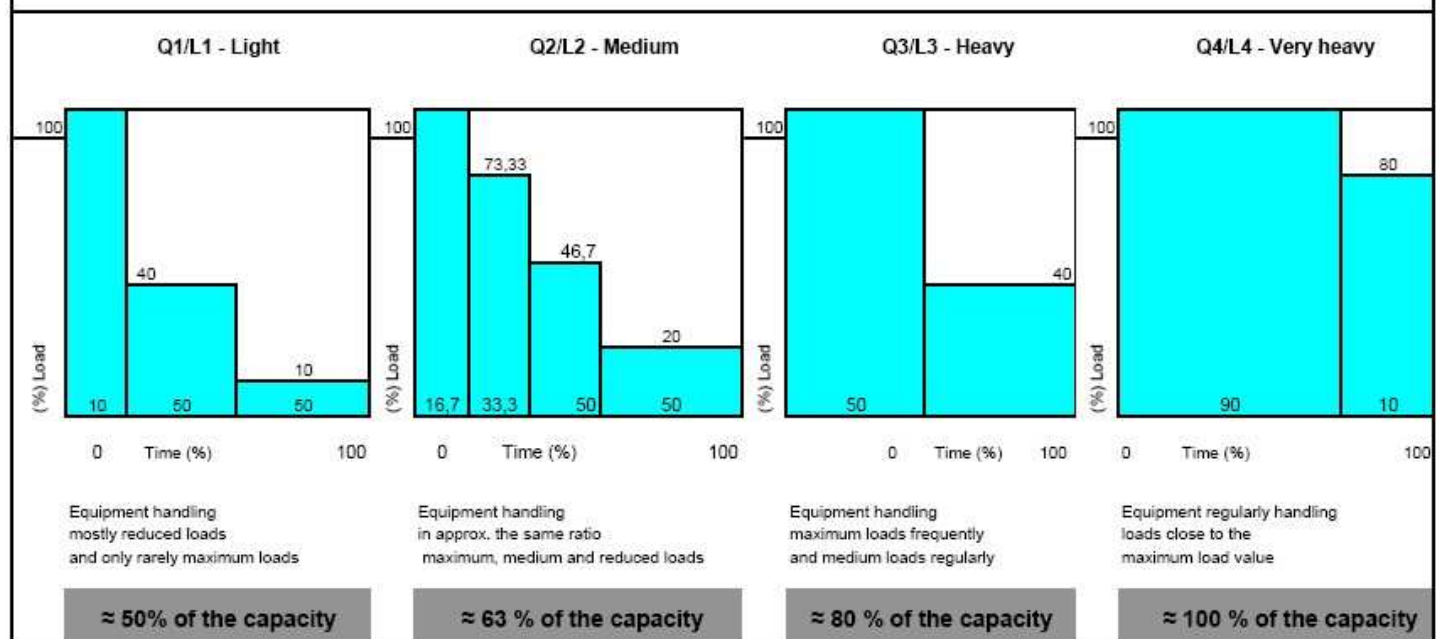
1) Working conditions				2) Loading rate		
(Equipment as a whole)				Type of load	Type of use	
Working conditions	Maximum n° of operating cycles	Working conditions	Frequency of use		Type of load	Type of use
			Total duration in hours			
U0	16.000	T0	200	Erratic	Light Q1/L1 = 50 %	Equipment handling mostly reduced loads and only rarely maximum loads
U1	32.000	T1	400			
U2	63.000	T2	800			
U3	125.000	T3	1.600			
U4	250.000	T4	3.200	Light and regular	Medium QA/L2 = 63 %	Equipment handling in approx. the same ratio maximum, medium and reduced loads
U5	500.000	T5	6.300	Regular and intermittent	Heavy Q3/L3 = 80 %	Equipment handling maximum loads frequently and medium loads regularly
U6	1.000.000	T6	12.500	Regular and intensive		
U7	2.000.000	T7	25.000	Intensive	Very heavy Q4/L4 = 100 %	Equipment regularly handling loads close to the maximum load value
U8	4.000.000	T8	50.000			
U9	> di 4.000.000	T9	100.000			

CLASSIFICATION OF HOISTING EQUIPMENT

• he loading rate is determined based on the type of use of the equipment, in connection with the percentage division (%) of the actual exploitation of its nominal capacity

- Q refers to the loading rate of the equipment as a whole (structures)
- L refers to the loading rate of mechanisms

Loading rate according to ISO 4301/1 (= FEM 1.001) and fem 9.511



CLASSIFICATION OF HOISTING EQUIPMENT

- After determining the working condition and the loading rate, the equipment and its mechanisms in the service group are classified

Class of the mechanism of the hoisting equipment - Service group

Load type	Loading rate		Working conditions and duration in hours										
	According to the rule/regulation		U0	U1	U2	U3	U4	U5	U6	U7	U8	U9	
Q1	Light	≈ 50 %	ISO 4301/1 (= FEM 1.001)	□	□	A1	A2	A3	A4	A5	A6	A7	A8
Q2	Medium	≈ 63 %	ISO 4301/1 (= FEM 1.001)	□	A1	A2	A3	A4	A5	A6	A7	A8	□
Q3	Heavy	≈ 80 %	ISO 4301/1 (= FEM 1.001)	A1	A2	A3	A4	A5	A6	A7	A8	□	□
Q4	Very heavy	≈ 100 %	ISO 4301/1 (= FEM 1.001)	A2	A3	A4	A5	A6	A7	A8	□	□	□

Class of the mechanism of the hoisting equipment - Service group

Load type	Loading rate		Working conditions and duration in hours										
	According to the rule/regulation		TO	T1	T2	T3	T4	T5	T6	T7	T8	T9	
Q1	Light	≈ 50 %	ISO 4301/1 (= FEM 1.001)	□	□	M1	M2	M3	M4	M5	M6	M7	M8
			FEM 9.511	□	□	1Dm	1Cm	1Bm	1Am	2m	3m	4m	□
Q2	Medium	≈ 63 %	ISO 4301/1 (= FEM 1.001)	□	M1	M2	M3	M4	M5	M6	M7	M8	□
			FEM 9.511	□	1Dm	1Cm	1Bm	1Am	2m	3m	4m	5m	□
Q3	Heavy	≈ 80 %	ISO 4301/1 (= FEM 1.001)	M1	M2	M3	M4	M5	M6	M7	M8	□	□
			FEM 9.511	1Dm	1Cm	1Bm	1Am	2m	3m	4m	5m	□	□
Q4	Very heavy	≈ 100 %	ISO 4301/1 (= FEM 1.001)	M2	M3	M4	M5	M6	M7	M8	□	□	□
			FEM 9.511	1Cm	1Bm	1Am	2m	3m	4m	5m	□	□	□

CLASSIFICATION OF HOISTING EQUIPMENT

- Based on the classification of the equipment as a whole and of its mechanisms, determined in several service groups, operating cycles and life span in hours, are:

Max. N° of theoretical operating cycles,
in connection with the service group and with the loading rate

ISO 4301/1 (= FEM 1.001) Service Group

Type	Loading rate		ISO 4301/1 (= FEM 1.001) Service Group							
	Load	Load %	A1	A2	A3	A4	A5	A6	A7	A8
Q1	Light	≈ 50 %	63.000	125.000	250.000	500.000	1.000.000	2.000.000	4.000.000	4.000.000
Q2	Medium	≈ 63 %	32.000	63.000	125.000	250.000	500.000	1.000.000	2.000.000	4.000.000
Q3	Heavy	≈ 80 %	16.000	32.000	63.000	125.000	250.000	500.000	1.000.000	2.000.000
Q4	Very heavy	≈ 100 %	□	16.000	32.000	63.000	125.000	250.000	500.000	1.000.000

Theoretical life span in hours,
in connection with the service group and with the loading rate

ISO 4301/1 (= FEM 1.001) / fem 9.511 Service group

Type	Loading rate		ISO 4301/1 (= FEM 1.001) / fem 9.511 Service group							
	Load	Load %	M1/1Dm	M2/1Cm	M3/1Bm	M4/1Am	m5/2M	M6/3m	M7/4m	M8/5m
L1	Light	≈ 50 %	800	1.600	3.200	6.300	12.500	25.000	50.000	100.000
L2	Medium	≈ 63 %	400	800	1.600	3.200	6.300	12.500	25.000	50.000
L3	Heavy	≈ 80 %	200	400	800	1.600	3.200	6.300	12.500	25.000
L4	Very heavy	≈ 100 %	□	200	400	800	1.600	3.200	6.300	12.500

CLASSIFICATION OF HOISTING EQUIPMENT

• In order to choose the hoisting equipment fit for its intended duty, the following factors must be taken into account:

1. **The actual capacity** (determined by the maximum load to be handled)
2. **The loading rate** (it is the stress conditions based on the type of load)
3. **The average daily working time T_m** (hours)

	T_m (hours)	$\frac{C_e \times C/h \times T_i}{30 \times V}$
For hoisting operations:		

C_e = Actual hook path (m) - It is the average length L of the trolley or bridge path

C/h = Operating cycles (N° of cycles per hour) - It is the number of complete lowering and hoisting operations performed in an hour

Where: T_i = Service time (hours) - It is the time the equipment is used during the whole day

V = Hoisting speed (m/ min) - It is the distance the load can cover in one minute of uninterrupted hoisting

	T_m (hours)	$\frac{P_m \times C/h \times T_i}{30 \times V}$
For travelling and hoisting operations:		

P_m = actual average journey (m) = L/2 - It is the mean of the length L of the trolley or bridge path

C/h = operating cycles (N° of cycles per hour) - It is the number of complete traveling or sliding movements performed in an hour

Where: T_i = Service time (hours) - It is the time the equipment is used during the whole day

V = Traveling speed (m/min) - It is the distance the load can cover in one minute of uninterrupted traveling or sliding

CLASSIFICATION OF HOISTING EQUIPMENT

• The following information are determined based on the loading rate and average daily working time:

• The classification of the service group of the mechanisms of the hoisting equipment as a whole

• The correlation between the service group and the motor selection (FEM 9.683 regulation)

Loading rate			Average daily working time - T_m = Hours								
L1	Light load	= 50 % of the capacity	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 8	≤ 16	≤ 16	1	
L2	Medium load	= 63 % of the capacity	≤ 0.25	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 8	≤ 16	≤ 16	
L3	Heavy load	= 80 % of the capacity	≤ 0.125	≤ 0.25	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 6	≤ 16	
L4	Very heavy load	= 100 % of the capacity	0	≤ 0.125	≤ 0.25	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 8	
Service group of mechanisms		ISO 4301/1	M1	M2	M3	M4	M5	M6	M7	M8	
		FEM 9.511	1Dm	1Cm	1Bm	1Am	2m	3m	4m	5m	
Use for intermittent duty according to FEM 9.683 regulation	Hoist	Intermittence ratio (RI%)	15	20	25	30	40	50	60	60	
		N° of starting per hour (A/h)	90	120	150	180	240	300	360	360	
			N° of cycles per hour (C/h)	15	20	25	30	40	50	60	60
	Trolley and crane	Intermittence ratio (RI%)	10	15	20	25	30	40	50	60	
N° of starting per hour (A/h)		60	90	120	150	180	240	300	360		
		N° of cycles per hour (C/h)	10	15	20	25	30	40	50	60	
Two-speed double-polarity motors	N° of starting per hour (A/h)	Main speed	1/3 (33.3 % of the total N° of starting per hour)								
		Low speed	2/3 (66.7 % of the total N° of starting per hour)								
	Daily service time T_m	Main speed	2/3 (66.7 % of the average daily service time)								
		Low speed	1/3 (33.3 % of the average daily service time)								
Use in temporary duty	Time of operation at main speed (Min)		7,50	7,50	15	15	30	30	60	> 60	
	Time of operation at slow speed (Min)		7,50	2	2,5	3	3,5	4	5	6	
	Max. n° of starting per hour (A/h)		10	10	10	10	10	10	10	10	

RULES AND REGULATIONS

The following chief technical rules and regulations were taken into account while designing and building our lifting machinery:

- EN-292, Section 1a and 2a "Safety of Machinery"
- EN-60204 –1 "Safety of Machinery. Electrical Equipment of Machines"
- EN-60204 -32" Safety of Machinery. Electrical Equipment of Machines. Requirements for Hoisting Machines"
- EN-60439 -1 "Low-Voltage Switchgear and Control gear Assemblies"
- EN-60529 "Specification for Degrees of Protection Provided by Enclosures (IP code)"
- ISO 4301 "Classification of Cranes and Lifting Appliances"
- ISO 4308-1 "Selection of wire ropes"
- UNI 7670 "Calculation of Mechanisms for Lifting Equipment "
- UNI 9466 "Calculation of the drums"
- DIN 15401 "Selection of lifting hooks"
- FEM 1.001/94 "Calculation of Lifting Equipment"
- FEM 9.511/86 "Classification of Mechanisms"
- FEM 9.661/86 "Selection of wire rope drums and pulleys"
- FEM 9.761/93 "Load Limiting Device"
- FEM 9683/95 "Choice of hoisting and traveling motors"
- FEM 9.755/9 "Safe Working Periods"
- FEM 9.941/95 "Control Symbols"
- FEM. 1.001 3rd edition 1987: volume;
- CNR-UNI 10021/85: "Steel Structures for Lifting Equipment";
- UNI EN1993-6:2007: Eurocode 3 – Design of Steel Structures - Part 6: Crane Supporting Structures

SAFETY SIGNS

Hazard Signs



Caution



Caution, High Voltage



Caution, Overhead Load



Caution, Risk of Crushing



Caution, Moving Machinery



Caution, Hot Surface



Caution, Dangerous Atmosphere

Prohibition Signs



Do not start. Men working on machine



Do not remove guards

Mandatory Signs



Wear Protective Gloves



Wear Protective Footwear



Wear Safety Harness



Read the Instructions Before Use

ADMISSIBLE AND INADMISSIBLE LOADS



Loads shall be:

- of a mass, bulk, balance and temperature suitable for the characteristics of the place where they are to be handled, besides being compatible with the machine performance.
- equipped with suitable grip points and/or secured with special contrivances and/or gear that prevent their accidental fall.
- perfectly stable and not subject to changing their own statical (e.g. barycentre) or physical configuration while they're being handled.



Not admissible loads include (non-exhaustive list):

- loads whose weight exceeds the machine's nominal capacity;
- loads which may change their chemical/physical statical configuration or their barycentre;
- loose food products which may become contaminated by coming into contact with the hook or machine's lubricants;
- toxic and noxious products and substances, when not handled in special containers;
- loads with surfaces which may not be resistant to the pressure applied, for example, by slings.

HOISTING GEAR



Usually admitted gear:

- Hoisting gear interposing themselves between the lifting hook and the load, such as for example: clamps, horizontal lifting bars, suckers, magnets, etc.
- Slings made with ropes and/or chains and/or textile or plastic bands.
- Lifting gear must be used according to the instructions provided by their manufacturers.

Usually not admitted gear:

- Gear fed by independent electric lines
- Gear that, during operations, may collide with parts of the lifting machine.
- Gear limiting load handling.
- Gear whose functional characteristics may induce dynamic overstress exceeding acceptable limits or accidental overload..



MACHINE USE AND SAFETY MEASURES



To obtain the best performance from the machine, it is recommended to use it observing the following instructions:

- **ALWAYS** follow the rules given in the operation and maintenance manual.
- **ALWAYS** take heed of the rules and warnings written on the machine. Warning plates on the machines are safety notices and must be perfectly readable at all times.
- **ALWAYS** stop using the machine if any of the following occurs: machine not working properly, a suspicion that something is broken, incorrect movements, unusual noises, or any other unusual detectable fault.
- **ALWAYS** follow the maintenance schedule with great care and record, for each check, any observations with regard to, in particular, hooks, wire ropes, brakes, limit switches and load limiter.
- **ALWAYS** keep the brakes, limit switches, load limiter and all other safety devices under constant check.
- **ALWAYS** check periodically the degree of wear and tear and of efficiency of wire ropes and hooks (see the relevant paragraphs).
- **ALWAYS** make sure that slings are well fastened to the hook and pull them tight carefully and slowly, prior to lifting the load.
- **ALWAYS** use of the machine only after its full efficiency has been assessed and allow its use to specifically trained staff only.
- **ALWAYS** all machinery, big or small, indoors or outdoors, while not in operation, must never be left unattended unless all safety measures have been implemented.
- **ALWAYS** check the "emergency stop" push button works properly.
- **ALWAYS** make sure the machine operates in a duly protected from atmospheric agents (rain, wind, snow, etc.) environment or, if located outdoors, that it has suitable protections.
- **ALWAYS** make sure movements correspond to the relevant controls.
- **ALWAYS** warn all people at risk that handling operations are about to start.
- **ALWAYS** check the machine and its main components (the push button control pendant, for example) are suitably maintained properly maintained (cleaning, lubrication).
- **ALWAYS** verify the machine's performance is suitable to the service it is intended for.
- **ALWAYS** verify the fitness and functioning of the electrical control panel and the correct functioning of motors in particular.
- **ALWAYS** verify the fitness and efficiency of the sling (chains, straps, ropes, etc.) checking there are no patent damages such as deformations, tears etc.
- **ALWAYS** make sure the machine's hook is centered with respect to the perpendicular prior to slinging and handling the load.
- **ALWAYS** work outside the operating range of the hoisted load.
- **ALWAYS** work in the best possible conditions as to lighting and visibility of the load and of the relevant operating area.
- **ALWAYS** use "slow" speeds for approaching and lowering operations.
- **ALWAYS** avoid using combined movements and swinging the load.
- **ALWAYS** report any anomalies such as failures, suspected breakages, incorrect movements, excessive noisiness etc., to the competent person in charge and discontinue use of the machine.
- **ALWAYS** switch-off power supply to the machine in the event of maintenance, inspections or repairs and when done with using the machine.
- **ALWAYS** make sure the load meets no obstacles during handling operations.
- **ALWAYS**, when the work is finished, bring the machine to a "parking" position with regard to ropes, hooks and push button control pendants so that they are not at risk of collision.
- **ALWAYS** wear suitable working clothes and, if necessary, personal protective equipment.

IMPROPER USE

Improper use of the machine and want of maintenance may jeopardize the operator's and other people's health and safety as well as damage the working environment and compromise the machine's functioning and safety.

The actions listed hereunder, which of course do not exhaust all possible "improper uses" of the machine, represent the most common and obvious ones.

They are hence to be absolutely avoided:

- **NEVER** lift loads with people moving across the working area.
- **NEVER** drag nor draw loads.
- **NEVER** lift loads which are glued to the ground by ice.
- **NEVER** operate without paying the due attention during handling.
- **NEVER** discharge the load abruptly.
- **NEVER** leave the load unattended.
- **NEVER** use the machine for uses which are not consistent with the ones it is intended for, nor for other operations such as replacing lamps, or as a mobile scaffolding, etc.
- **NEVER** lift or lower loads at maximum speed.
- **NEVER** lift loads suspended in such a manner that the point of lift is outside of the center of gravity
- **NEVER** swing a load in order to suspended in such a manner that the point of lift is outside of the center of gravity.
- **NEVER** use the machine without wearing the suitable working clothes as well as, if necessary, personal protective equipment.
- **NEVER** lift loads by the hook's tip.
- **NEVER** lift guided loads without first having planned and put to effect suitable safety measures.
- **NEVER** leave loads suspended when the machine is out of operation.
- **NEVER** handle loads without having clear vision, an effective system of visual contact, or audio communication.
- **NEVER** lift a load which is exposed to winds, such as to make loading conditions not acceptable.
- **NEVER** consistently handle loads that are close to the maximum capacity of the machine without taking into consideration the machines duty rating
- **NEVER** consistently operate so as to activate the load limiter.
- **NEVER** get into the habit of using the emergency stop device for routine operations.
- **NEVER** allow unqualified or unsuitable personnel to use the machine.
- **NEVER** modify the machine's, or its accessories', performances or features in order to change its originally intended use.
- **NEVER** lower a load by manual operation in the event of power failure, unless a special device has been fitted to this purpose by the manufacturer.
- **NEVER** perform maintenance, repairs or inspections without putting the machine out of operation first.
- **NEVER**, while performing maintenance operations, lean ladders against the machine, use unsuitable tools, work without wearing personal protective equipment (helmet, goggles, gloves, safety harness etc.).
- **NEVER** do not reverse abruptly during handling operations.
- **NEVER** leave the machine, after finishing work, without bringing the hook to a height of 2.5 m. minimum.
- **NEVER** use the machine on temporary supports, suspensions or provisionally installed raceways.
- **NEVER** use temporary electric connections using unsuitable or uninsulated provisional cables or with unbalanced phases which do not correspond to the direction of the machine's lifting path.
- **NEVER** use a crane with twin travel motors, when one of them is broken or not correctly connected, as this may cause the crane to derail and fall.
- **NEVER** use the machine with electric lines which are not in perfect working order (jammed loops, off-line or dirty raceways, loop feeder trolleys not sliding properly). A torn electric cable might have disastrous consequences.
- **NEVER** use the machine with wire ropes that are unsuitable, torn, deformed, unlubricated or have broken strands.
- **NEVER** use an hook which is frayed, open, without safety spring catch or not properly secured by its nut.
- **NEVER** activate repeatedly (repeated impulses) control push buttons or actuators (e.g. push button control pendant).
- **NEVER** use the machine if limit switches are not working, anticollision is switched off or electric current is out of phase.
- **NEVER** use the machine if brakes are released or their lining is worn out.
- **NEVER** use push button control panels which are cracked or whose wires come out of the sheath of the suspension cables, are frayed or uninsulated.
- **NEVER** apply under-hook accessories which are not suitable as to their weight and safety level to the hook or the machine in general. In any case, the accessory's mass must be taken into consideration when considering the nominal working capacity.
- **NEVER** touch revolving pulleys, moving wire ropes, taut slings where they are in contact with the load or between hook and slings.
- **NEVER** tamper with the settings of safety devices (limit switches, load limiter etc.).
- **NEVER** go on lowering the hook after having placed the load so that the ropes run free.

NOTE

Automatic limit switches are emergency safety devices, not to be used under normal service conditions. In particular, the hoist limit switch shall be adjusted in such a way that the block can approach the fixed lower parts of the winch by not less than 0.3 - 0.5 m; on its rundown the hook shall stop at 0.2 - 0.3 m from floor level (see page 137).

When the hook is in the lowest position at least two rope spare turns for each drawing ends shall be still wound on the drum.

INSTALLATION

In setting the machines to work all the rules of good technical practice and the manufacturer's instructions given in this user's manual must be followed, particularly:

- The first ever setting to work of the machine must be performed by trained staff.
- The technical characteristics of the machine must correspond to what was ordered as well as to the use for which it is intended.
- The lifting capacity of the machine must be equal to or higher than the loads to be lifted and the lifting path must not be shorter than necessary.
- The power supply voltage available must correspond to the machine's (+/- 10 % of the nominal value): it is not possible to use the machine if the voltage or the frequency are different from the ones required.
- The electric power supply cables must be adequate as to cross-section and insulation to the power indicated and extension cords and temporary sockets must never be used.
- The mono rail or crane gantry beams which carry the machine must be correctly sized, based on the reaction force defined by the manufacturer.
- Always check rails/monorails are not damaged. They must be free from obstacles, depressions or foreign bodies.
- Always check the working area is free from anything which may interfere..
- Working intensity must correspond to the one the machine was designed or purchased for, otherwise it may result in the reduction of the machine's life and safety.
- Check there is no leakage of lubricant.
- Check travel limit switches and the relevant actuators are properly positioned and locked.
- Make sure there are end stops for the bridge and/or the trolley.
- Check that the moving direction coincides with the function envisaged for the pressed push button/actuator. Otherwise, immediately stop maneuvering and reverse two phases of the incoming feeding line on the control panel, or else reverse the connection to the relevant motors.
- Road test the wire rope by hoisting a light load at "slow" speed. This allows the wire rope to adapt itself to the working conditions, thus permitting the adjustment of strands and wires and prolonging the rope's life.

RUNNING CHECKS

Before using the machine a preliminary test must be carried out to give the best guarantee of service. Even if all the machines up to 20-Ton capacity undergo a dynamic lifting test with a 10% overload (unless otherwise requested on purchase) in the factory it is preferable that the client satisfies himself with a more realistic test after assembly. This test is also useful for the following checks:

- a) actual working conditions
- b) running difficulties (correct assembly check)
- c) potential running hindrances (check on railways and their installation tolerances)
- d) setting the load limiter

SAFETY DEVICES

Power supply to the machine must be cut off by disconnecting the switch/disconnecting switch and/or pressing the "emergency stop" push button located on the push button panel. In order to return the emergency push button to its normal position, turn it anticlockwise. An electrical and/or mechanical interlock prevents two opposite rotation direction command signals from being simultaneously transmitted to motors, both at "slow" or at "fast" speed.


The lack of voltage causes the motors to stop at once thanks to the immediate action of electromagnetic brakes.

Safety snap hooks are installed on lifting hooks to avoid accidental unhooking of slings and/or loads.

Position limit switches (e.g. hoisting and traveling) define the maximum motion range. They are emergency devices and should not be used as either stop or consent devices for subsequent operations.

The load limiter prevents the machine from being used under overloading conditions (the limit of intervention is usually set at 115% of regular load)

Controls (push buttons and/or manipulators), when they are not pressed by the operator, automatically commute to the 0 position, thus stopping the movement ("dead man" control).

 Should, when the control (push button and/or manipulators) is operated, the movement and/or direction not coincide with the one selected due to a malfunctioning, release the control. If, in spite of the control being released, the movement does not stop, press the "emergency stop" push button immediately.

TESTS**(in conformity with machinery EC directive 98/37/EC)**

Before setting the machine to work it must be tested in overload under the following condition:

DYNAMIC TEST

The dynamic test is carried out with an overload coefficient of 1.1 (110% of the nominal load) all movements must then be carefully carried out without checking the speeds or heating of the motors.

STATIC TEST

The static test is carried out with an overload coefficient of 1.25 (125% of the nominal load).

This test must be carried out in the absence of wind.

It consists of lifting the nominal load a minimum distance from the ground and then adding the extra weight without jerks.

**Remarks**

Loads used in functional tests must be checked with precision dynamometers complete with a certificate to attest its efficiency and an adequate metrological sensitivity. Certified loads may be used as an alternative.

At the same time as the static test, a measurement of the main girder's deformation is usually taken.

Unless otherwise indicated in the contract there are no compulsory limits to the elastic sags.

The old rule of judging the strength of a machine on the basis of the lowest sag has fallen into disuse.

In practice the value of the sag should be considered exclusively on the basis of the use of the machine.

DOCUMENTATION

Unless otherwise requested in the contract, the following certificates guaranteeing the quality and strength of the components are supplied with the machine.

- Certificate for the wire rope installed on the machine with all the construction features and the manufacturer's name.
- Certificate for the hook giving the quality of the material, size and the manufacturer's name.
- Declaration of conformity according to European Community Directive 90/37/EC (and amendments thereof).

**IMPORTANT WARNINGS**

If the machine is to work in hazardous areas we guarantee that all components are made in conformity with European regulations and all electric parts are legally certified in compliance with EN 60079. All of the electric components enclosed in explosion-proof cases are supplied with certificates issued by authorized European Institutes.

SPECIAL EXECUTION

Machinery in special versions are available, specifically designed for demanding environmental conditions and service such as: steel-works, foundries, galvanic baths, refineries, cement-works, marine, tropical regions, power stations, nuclear power plants, petrochemical plants.

Some special optional features:

- *No aluminum alloys*
- *No copper alloys*
- *Anti-spark rope-guide and wheels*
- *Stainless steel screws and bolts*
- *Stainless steel wire ropes*
- *Fail-safe additional brakes*
- *Anti-condensation heaters for motors and equipment*
- *Double-grooved drum for precision vertical lifting*
- *Special paint*
- *Explosion proof wiring with explosion proof cases*
- *Traveling trolleys for curved railways*
- *Sequence input phases control- input phase failure*
- *Feed-forward or feed-back control of all movements*



EXPLOSION-PROOF EXECUTION EQUIPMENT FOR HAZARDOUS AREAS



Hazardous areas are locations where, under given conditions, potentially explosive atmospheres may develop. An explosive atmosphere consists of air mixed with: combustible gas, vapor or dust. In an explosive atmosphere, a rapidly spreading combustion (explosion) may take place following its ignition at atmospheric pressure caused by a triggering source such as a hot surface, a spark, either of an electric or mechanic nature, the presence of a flame or an exothermic reaction. In order for an explosion to take place it is therefore necessary that air, or other gaseous mixture containing oxygen, inflammable material and a triggering source should all be present at the same time.

The first big difference between components operating in hazardous atmospheres is determined by the environment in which they operate. Electrical appliances are divided into two groups.

Group I: electrical appliances for use in mines with firedamp gas

Group II: electrical appliances for use in other explosive atmospheres

Italkrane is mainly involved with Group II appliances. The dissertation hereunder refers to this Group.

Under the 1999/92/EC directive, regarding Group II, the user is required to classify hazardous areas, subdividing them into zones on the basis of the frequency and duration of the presence of explosive atmosphere. That same European Directive divides appliances into three categories with different levels of protection and connects them with the areas of use so as to guarantee the same level of safety in all zones.

In proportion to the kind of substances present in classified areas, areas are divided in zone 1, 2, 3 and zone 20, 21, 22. When the risk is due to the presence of flammable gases, vapors or mists, the classification made based on EN60079-10 regulation, originates three possible zones which are defined as follows:

- Zone 0 = areas where an explosive atmosphere is permanently, or for long periods, present
- Zone 1 = areas where the formation of explosive atmospheres is probable, or possible, under normal conditions
- Zone 2 = areas where explosive atmosphere is not usually present and, when it is present, it is so for short periods. When hazard is due to the presence of combustible dust, the classification gives rise to three danger zones named Zone 20, 21 and 22 where the level of risk is defined as above.

Directive 96/9/EC (ATEX) divides appliances into three categories with different levels of protection depending on the zone of installation in order to guarantee always the same level of protection.

COMBUSTIBLE SUBSTANCES	GAS AND VAPORS			DUST		
	ZONES	0	1	2	20	21
APPLIANCE CATEGORIES	1G	2G	3G	1D	2D	3D

CLASSIFICATION OF ELECTRICAL APPARATUS FOR EXPLOSIVE GAS, OR VAPOR, ATMOSPHERE.

Electrical apparatus in presence of gas or vapors are protected according to different methods of protection. The most common in ITALKRANE applications are "D" protections, where the triggering source is contained in a closed explosion proof case designed in compliance with EN 60079-1 rule, and "M" protections in which the triggering source is resin encapsulated in compliance with EN 60079-18 rule.

For some methods of protection (for "D" method of protection in particular), Gas Group II subdivides into three gas subgroups: Group IIA, Group IIB, Group IIC.

A case belonging to a certain group is appropriate for lower level case groups too: a group IIB case is also appropriate for group IIA; a group IIC case is also appropriate for groups IIA and IIB.

TEMPERATURE CLASSES

Electrical apparatus in presence of gas or vapors are divided into 6 temperature classes according to their maximum surface temperature. Maximum surface temperature is the highest temperature reached by any point on the surface of the electrical equipment operating under nominal conditions. In cases:

- * the temperature on the external surface for "D" and "P" methods of protection;
- * the temperature on any internal or external point for "E" and "N" methods of protection.

Ignition Temperature of an Explosive Mixture [C]	Temperature Class	Maximum surface temperature of electrical equipment at an environment temperature of 40°C	
		[C]	[F]
over 450	T1	450	842
from 300 to 450	T2	300	572
from 200 to 300	T3	200	392
from 135 to 200	T4	135	275
from 100 to 135	T5	100	212
from 85 to 100	T6	85	185

Example of case classification in presence of gas:



Table with different types of gas in connection with different temperature classes

Enclosure Group Reference	Temperature Class					
	T1	T2	T3	T4	T5	T6
I		Methane (Firedamp)				
IIA	Ammonia Toluene Coke-oven Gas Carbon Monoxide Acetone Benzene Naphthalene	Propylene Propane Ethyl chloride Butane Styrene Ethane Iso-octane Xylene Methyl ethyl propyl butyl oxyl amyl acetate	Pentane Heptane Hexane Ciclohexane Kerosene	N-Decane Butyric aldehyde Benzaldehyde Octane	Acetic-aldehyde Methyl-ether	Ethyl nitrate
IIB	Town Gas	Ethylene Ethylene Oxide	Sulphurized - Hydrogen	Methyl ethyl ether	Ethyl ether	
IIC	Hydrogen Water gas					

CLASSIFICATION OF ELECTRICAL APPARATUS FOR USE IN THE PRESENCE OF COMBUSTIBLE DUST.

Electrical apparatus in presence of combustible dust are protected according to different methods of protection. The most common in ITALKRANE applications are tD A21 and tD A22 protections, in which the protection against combustible dust is obtained by means of an explosion-proof enclosure with mechanical protection in compliance with EN 61241-1 rule, and "mD" protections where the triggering source is resin encapsulated.

- TEMPERATURE CLASSES FOR COMBUSTIBLE DUST

Electrical apparatus in the presence of combustible dust are classified according to the maximum surface temperature. Such temperature must be inferior to either the ignition temperature of the dust cloud in the explosive atmosphere or the temperature of a dust layer that may collect on the enclosures

Maximum Surface Temperature of Enclosure at 40° [°C]	Maximum Ignition Temperature of the Dust Cloud at 40° Considering the Safety Factor [°C]	Maximum Ignition Temperature of a 5 mm Dust layer at 40° Considering the Safety Factor [°C]
450	675	525
300	450	375
200	300	275
135	202.5	210
100	150	175
85	127.5	160

Example of classification of enclosures in presence of combustible dust:



COMPLIANCE WITH CONSTRUCTION RULES

The following European safety rules are complied with:

EN 60079-0	General rules and regulations
EN 60079-1 (CEI 31-58)	Explosion-proof Enclosures "D"
EN 60079-7 (CEI 31-65)	Increased Safety Method of Protection "E"
EN 60079-18	Encapsulation "M"
EN 60529 (CEI 70-1)	Enclosure Protection Degree (IP)
EN 50.020 (CEI 31-9)	Intrinsic Safety Method of Protection "I"
EN 61241-1	Electrical Installations for Use in the Presence of Combustible Dust

The maintenance and inspection of all electric components and explosion-proof equipment should be carried out by specially appointed skilled personnel only. The explosion-proof cases must be opened using specifically designed spanners (hexagonal, triangular etc.).

Always:

- Scrupulously check that cases have been properly closed after inspection.
- Carefully remove all dust from the case surface.
- Do not put gaskets, sealing fluids or other products between case and cover, but only use a very thin layer of vaseline or siliconic grease. The siliconic grease layer acts as an antioxidant as well as guarantees the protection grade indicated on the cases' tags (e. g. IP 55).
- Take the greatest care so as to prevent cables from being trampled on or tampered with, maintain festoon lines, which should be checked often, always in good conditions, with cable suspension trolleys sliding smoothly on the track to prevent cables from being torn or damaged.
- Wire ropes of lifting equipment must be assiduously checked and replaced if showing even the slightest damage. Please note that breakage of strands induced by jerks generates sparks.
- In addition all mechanical members (supports, wheels, buffers, joints, shafts) must be carefully and frequently checked so as to eliminate possible causes of friction (the wheel-rims for example) and the resulting danger of over-heating.
- Brakes also must be constantly checked so as to prevent disks and shoes from being used when badly worn out.

All explosion-proof equipment must be used with the utmost care so as to avoid countercurrents and repeated starts.

During load preparation carefully plan harnessing points and the relevant fastenings and hoist slowly so as to prevent ropes from sliding over hooks and to avoid friction or breakage.

Markings, as well as the certificate of conformity, are issued by an officially recognized laboratory, after it has run all the required tests and inspections on the member's prototype. (E.g. CESI, Ineris).

TABLE OF HAZARDOUS AREAS

ACCORDING TO ATEX DIRECTIVE

Areas	Motor classes		
	1G	2G	3G
0	X		
1	X	X	
2	X	X	X

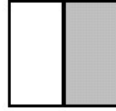
Gas

Areas	Motor classes		
	1D	2D	3D
20			
21		X	
22	conductive dusts	X	X
		non-conductive dusts	X

Dusts

Protection methods			
EEEx-d	EEEx-de	EEEx-e	EEEx-p
			EEEx-nA
Temperature class by casing group	Temperature class by casing group	Temperature class	Temperature class
Temperature class by casing group	Temperature class by casing group	Temperature class	Temperature class

Protection methods	
IP6x	IP5x
Temperature class	
Temperature class	
Temperature class	Temperature class



A certification issued by Notified Bodies is required
A declaration issued by the manufacturer is acceptable



Group	Temperature classes					
	T1	T2	T3	T4	T5	T6
I	Methane (redamp)					
IIA	Ethyl acetate	Butyl acetate	Cyclohexane			
	Methyl acetate	Propyl acetate	Cyclohexanol			
	Acetone	Amylic alcohol	Decane			
	Methane	Ethyl alcohol	Heptane			
	Acetic acid	n-butyl alcohol	Hexane			
	Methyl alcohol	Acetic anhydride	Diesel oil			
	Carbon monoxide	Cyclohexanone	Kerosene			
	Ammonia	Liquid gas	Naphta			
	Propane	Neutral gas	Pentane			
	Benzene	1,3-butadiene	Petroleum			
	Toluene	Ethylbenzene	Hydrogen sulphide			
	Xylene	Ethylene	Isoprene			
	IIB	Coke gas	Osido di silene			
Steam						
IIC	Hydrogen					
	Acetylene					

*depending on the chemical composition

Temperature classes		Calculation of DUSTS ignition temperature	
Temperature class	Maximum specified temperature of electric equipment at an ambient temperature of 40°C	Dust ignition temperature	Layer: T5mm
T1	450°C	↓	
T2	300°C	↓	Ts1=2/3Tcd
T3	200°C	↓	Ts2=T5mm-75K
T4	135°C	↓	Tamm=the lower value between Ts1 and Ts2
T5	100°C		
T6	85°C		Motor's surface temperature ≤ Tamm

Gas

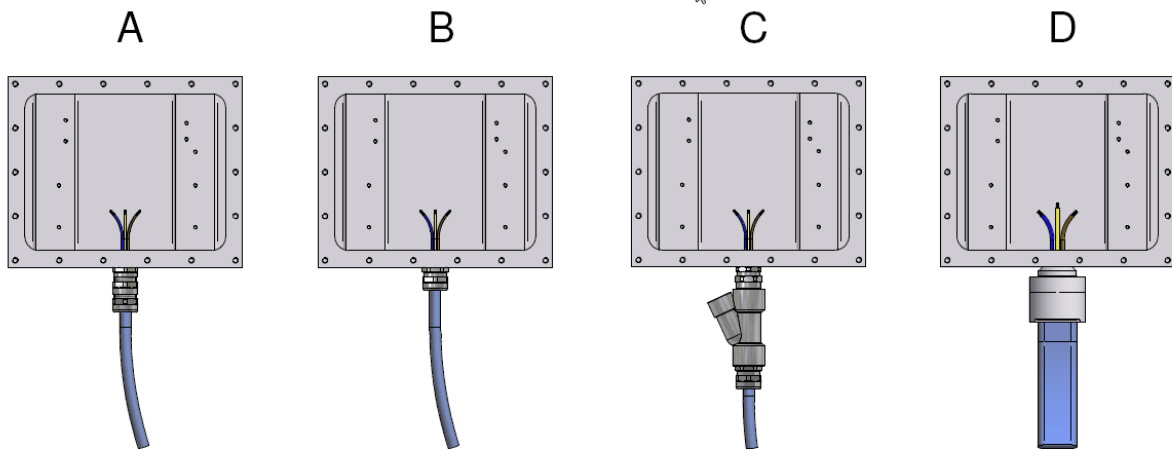
Polveri

Gruppo	I	IIA	IIB	IIC	*in funzione delle
	Metano (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	
	Acetilene (g)	Acetilene (g)	Acetilene (g)	Acetilene (g)	

CABLE ENTRANCE IN EX CASES

The entry-points of the electric cables with the explosion-proof cases can be made in four different ways:

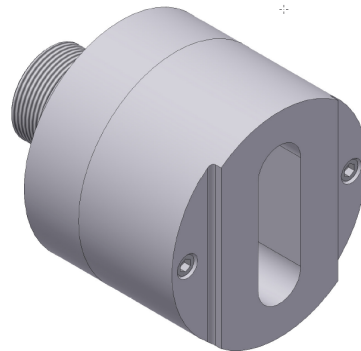
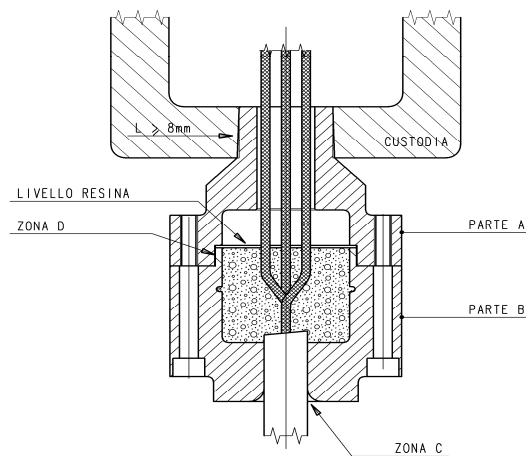
- A) EEx d type cable glands of the compression type with no sealing
- B) Traditional cable glands for EEx e (normally made in metal or plastic), "stuffing" type
- C) Sealing EEx d type joints for round cables.
- D) Sealing EEx d type joints for flat cables.



ASSEMBLY INSTRUCTIONS FOR "D" TYPE (TOR) CABLE GLANDS

1. Clean carefully the cable sheath and the internal surfaces of the cable gland
2. Strip the cable back to the indicated length.
3. Add the hardener to the resin in proportion as specified in the table hereunder and mix thoroughly avoiding air bubble formation. The mixing operation must be carried out at room temperature (15°C ± 25°C).
4. In order to prevent resin mixture from leaking out, fill the C area of the cable gland with suitable material (e.g.: plaster, glass fabric, etc.).
5. Pour the mixture filling the B section of the cable gland up to the level indicated.
6. Remove any traces of resin from the coupling point (zone D)
7. Do not move the cable during the drying/hardening phase (t ≥ 12 hrs). During hardening, it is recommended that sudden changes in temperature of 10K/h or more are avoided.
8. Fit Part A of the cable gland on the enclosure (L ≥ 8 mm). In case of cylindrical thread, do use Loctite thread locker for anti-loosening action.
9. Connect part B to part A using the screws provided.

Resin	Hardener	Proportion in Weight
Camattini MC 62/W363	W363	100:13
Mascherpa EP 149/EPI 220	EPI 220	100:9



WARNING:

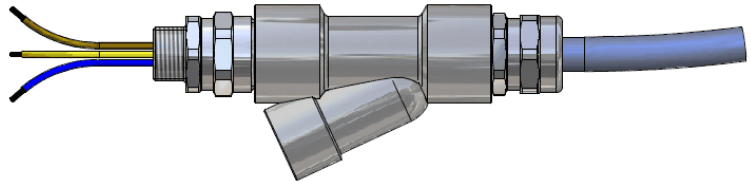
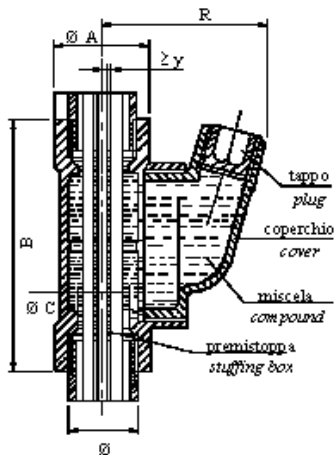
FAILURE TO COMPLY WITH THE ASSEMBLY INSTRUCTIONS, WITH PARTICULAR REFERENCE TO RESIN POURING, AFFECTS THE EXPLOSION-PROOF QUALITY OF THE COMPONENT AND RELIEVES ITALKRANE FROM ANY AND ALL LIABILITIES FOR ANY POSSIBLE RESULTING DAMAGES.

HOW TO SEAL C TYPE JOINTS

After having completed assembly and testing, seal the joints which are placed at the entry of the various explosion proof components, with a proprietary two part urethane rubber potting compound.

The resins must be prepared observing the proportions and times indicated by the manufacturer.

Handle these resins with care and avoid all direct contact with the skin. Store the ingredients in a cool dry place.



- 1) Unscrew the joint from position (1) and place it in position (2).
- 2) Put asbestos scraps (or similar fire-proof material) on the bottom and press them well between the two conductors.
- 3) Pour in the sealing mixture which will have been prepared as described below.
- 4) Fill the joint up to the level of the lower thread for **C** type and until 1 mm under rim for **D** type.
- 5) As soon as the mixture has become hard, replace cap and put the joint back in its original position (1).

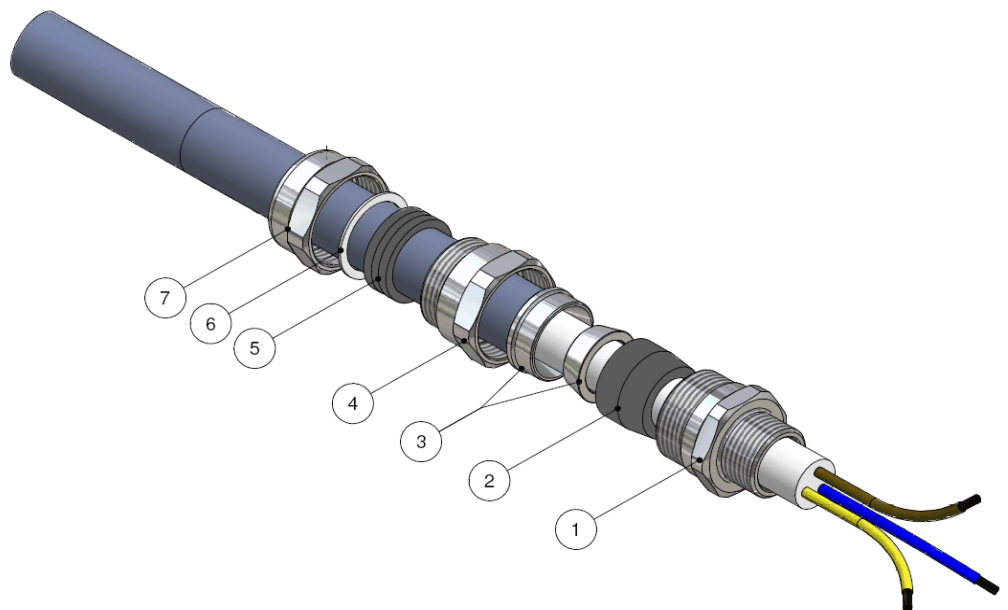
Preparation of the mixture

- A) Pour a small amount of the contents of the tin into a plastic cup.
- B) Add the correct proportion of hardener.
- C) Immediately mix well for about 30 seconds using a stick.
- D) Pour the mixture over the joints immediately, before it hardens.

Mixing operations must be performed at an ambient temperature of 15 °C or above.

“A” TYPE CABLE GLAND (SCREENED OR ARMORED ROUND CABLE)


- 1 - Body
- 2 - Inner rubber seal
- 3 - Armour locking rings
- 4 - Intermediate socket
- 5 - Outer rubber seal
- 6 - Anti-friction ring
- 7 - Head

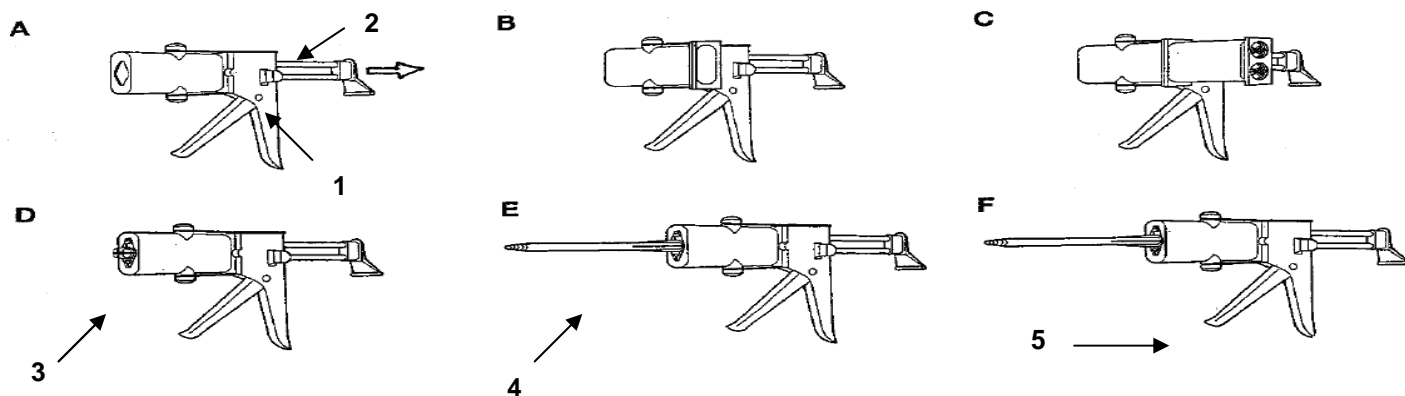


WARNING:

The tightening of parts 1 (body), 4 (intermediate socket) and 7 (head) should be checked periodically.


PREPARATION OF RESIN MIXTURE FOR "A" TYPE CABLE GLANDS

 **Warning!** To prevent resin from hardening inside the mixing nozzle (max. 15 minutes), make sure all cable glands are ready for sealing.



How to proceed:

- **A** Press lever **1** and pull out plunger **2**
- **B** Twist the cartridge holder
- **C** Insert cartridge
- **D** Remove protective cap from **3** cartridge
- **E** Insert mixing nozzle **4**
- **F** Pull trigger **5** only when cable glands are ready for sealing

 **WARNING:** ALL THE CABLE GLANDS WITH THE FOLLOWING WARNING TAG HAVE TO BE SEALED UP BEFORE THE COMMISSIONING OF THE DEVICE ON WHICH THEY ARE ASSEMBLED. FAILURE TO COMPLY WITH THE INSTRUCTIONS, WITH PARTICULAR REFERENCE TO RESIN POURING, AFFECTS THE EXPLOSION-PROOF QUALITY OF THE COMPONENT AND RELIEVES **ITALKRANE s.r.l.** FROM ANY AND ALL LIABILITIES FOR ANY POSSIBLE RESULTING DAMAGES.

**SEAL-UP CABLE GLAND WITH
ITS OWN SEALING COMPOUND** 



ELECTRIC COMPONENTS



MOTORS

The different types of motor on cranes and hoists are all provided with six-stud terminal boards.

Single-speed motors have terminal boards fitted for star or delta connections. Double-speed motors are fitted only for the nominal voltage required; three terminals are used for low speeds and the other for high speeds.

Terminal arrangement is given on each motor rating plate.

Before carrying out crane tests make sure that the rating plate voltage, referring to the motor connections, is the same as your mains. Motors do not require any special maintenance and bearings are pre-greased for a very long service period.

To ensure cooling make sure that the casing is kept clean and as free of dust as possible. Also make sure that couplings attached to parts projecting from the shaft are well secured and not loose; if loose, repeat keying immediately (change fiat-key or half-coupling). It must be remembered that if the motor does not start with a suspended load perhaps the power supply voltage is lower than the nominal voltage; starting with a full suspended load is only possible when the voltage at the motor terminals on take-off is no lower than 5% the one on the rating plate, unless otherwise specified.

AUTOMATIC LIMIT SWITCHES

Automatic limit switches are emergency devices, therefore they must not be used in normal service conditions.

If they are needed for normal conditions additional limit switches will be installed in such a way that they work before the emergency ones.

The limit switches which are normally installed on the three movements of the crane are auxiliary switches; they function on the low voltage current so as to open the corresponding control contactor.

On request, for particularly demanding service, it is possible to install power limit switches which directly cut off two or three phases at the motor power supply.

However, these devices must be released by hand.

TROLLEY TRAVELING AND BRIDGE SLIDING AUTOMATIC SWITCHES

These switches may be either roller type or "double-lyre" shaped. In both cases, in order to alter the bridge or Trolley approach operations, the fixed catches must be moved without touching the switch.

The trolley stop distance is set on construction, while the crane stop catch has to be installed during assembly following the same procedure as for the trolley.

The roller type limit switches for the bridge require rather long shoes (at least twice the braking distance) while the double-"lyre" limit stop switches a catch to act on the "lyre" is needed.

Limit switches are devices, that should not be abused and frequently inspected.

ANTI-COLLISION

When two machines are running along the same railways, automatic stop devices must be installed to prevent collision when the safety distance is exceeded.

These devices are placed in such a way that the two machines will not collide even at maximum speed. The brakes must be set for short-distance braking and kept under constant check.

TROLLEY FEEDING LINE

For the power supply of moving equipment, round or fiat form flexible cable in loop arrangement are normally used, thus allowing the cable to stretch along a section parallel to the hoist trolley or crane bridge.

The loops are supported by saddles which are attached to trolleys sliding along their raceway.

The flexible cables can be either single or multiple according to service requirements as it is possible to have low voltage conductors or mains voltage conductors the main switch must be in the "OFF" position before any repairs or maintenance are carried out.

No maintenance is required for this type of line apart from inspection of the trolleys to check they slide properly, and constant checking of the screw which holds the joints and the suspensions.

Special care must be taken during the assembly of the track; flush the joints so as to avoid the loop feeders jamming and the resulting tearing of the cables.

The conductors are sheathed in PVC. thus allowing a service temperature range of -20° to +70°C, unless otherwise specified.

An alternative to festooned lines which is often used is the cable supporting chain, which is supported by raceways fitted on the crane frame.

CONTROL GEAR

A metal panel contains all the electric equipment for the starting, protection and control of the motors.

Auxiliary voltage is supplied via a transformer which is kept constantly connected. When required, auxiliary protection can be provided by means of fuses and protections of suitable capacity on the main currents to the motors. Control equipment, inside its case, requires periodic maintenance.

If a contactor does not close properly (single-phase current is supplied to the motors or the brakes) change the contact or change the broken part completely.

If the crane has to work in a dusty environment, clean the remote control switches by blowing between them. In very humid conditions (with the crane working outside) all electric components should be periodically sprayed with commercially available modern water-repellent silicone-based product (make sure they are suitable for electric equipment).

Make sure fuses are inserted tightly; when replacing them see they are the same type.

Panel must not vibrate too much during crane operations so periodically check that the bolts are tight.

It is a good rule, at the end of each shift, to open the line main remote control switch by pressing the "stop" button.

For detailed information of the power and control circuits refer to the provided circuit drawings.

PUSH-BUTTON CONTROL PENDANT

Control pendants are essential to the crane or hoist function, and can be subject to abuse.

It is necessary, therefore, to keep it constantly under check thus avoiding loss of work-hours, and operator safety. We particularly suggest;

- Make sure it does not come into contact with oily substances, dampness or dirt; avoid bangs and squashing; do not pull or twist the supporting cable; if needed move the panel gently; do not use the cable to pull the hoist; do not allow knots or eyelets to form in the cable.
- Replace the hanging cable if any conductor has been damaged.
- Always keep a spare panel and corresponding cable in stock



Starting class for lifting motors (according to FEM 9683/95 regulation)

FEM – SO Group	Starting	Intermittence (limited to 10')
M1	90	15%
M2	120	20%
M3	150	25%
M4	180	30%
M5	240	40%
M6	300	50%
M7	360	60%
M8	≥360	60%

Starting class for traveling motors (according to FEM 9683/95 regulation)

FEM – SO Group	Starting	Intermittence (limited to 10')
M1	60	10%
M2	90	15%
M3	120	20%
M4	150	25%
M5	180	30%
M6	240	40%
M7	300	50%
M8	≥300	60%

The manufacturer accepts no responsibility for improper use or for exceeding the number of cycles/working time given in the project data.

PRE ERECTION VERIFICATION

- Check that no damage has occurred to the various parts of the machine during transportation. Pay particular attention to the rope, push-button control panel and its cable, limit switches, and electric connection cables.
- Check that the voltage indicated on the hoists data plate and on those on the motors corresponds to the rate power available.
- Check if the motor and brake terminal boards are correctly connected in accordance with the indications given on the relevant data plates.
- Check that the ropes, with regard to their securing points, are in the right place. If not, put them right (clamps, wedges and pulleys).
- Check that the reduction units are filled with oil to the right level. Hoist reduction units are normally supplied with oil.
- Check that all required components are available.
- Prior to assembly, check that all components are whole and undamaged.
- Check that clearances, overall dimensions etc correspond to the contract data.
- Check that runway beams and rails are installed in accordance with the appropriate standard.
- Check length, capacity and suitability of the electrical supply system, paying particular attention to voltage range, conductors cross section and rating of mains switch.
- Check availability and suitability of the equipment required to assemble the machine and install same, prior to the commencement of assembly.
- Ensure that there is adequate space for maneuvering the machine into position.
- Ensure that the orientation of the machine corresponds to the appropriate drawings.
- Make sure the available personnel have adequate skill and experience
- When possible, carry out tests on assembled machine prior to installation.
- Check all slinging points and ensure that the machine is secure and evenly balanced, the method depending on the availability and type of rigging equipment.

ASSEMBLY OF HOIST

Remove the hoist from its packaging without damaging the ropes and the various electric components.

- **A fixed hoist** is secured mechanically to the base structure using high-strength bolts which are very slightly smaller than the diameter of the holes on the frame. If necessary insert spacers to ensure perfect planarity.
- **A monorail hoist** requires more careful erection, usually the trolley can be inserted front-first on to the girder.

If this is not possible, disassemble the wheel-bearing flanges loosening the **TIE RODS** which hold the hoist. Upon re-assembly check that the nuts are well tightened to ensure a good sliding movement the wheel/web axial gap should usually be around 2-4 mm.

The wheels are shaped to work correctly on both level (IPE) and slanted (INP - IPS) railways.

When welded girders (double T shaped or box-type) remove all unevenness and the remnants of soldering.

Any girder joints must be leveled and smoothed without hollows or interruptions.

The girders must also be straight (unless the trolley is designed for working on curves) and the supports must not be on different levels

- Before lifting the hoist make sure the fastenings are placed so as not to damage parts and that the machine is well-balanced so as to avoid the supporting ropes slipping out and the hoist falling.
- **The bi-rail electric hoist** is laid on its rails which are already precisely gauged, perfectly parallel and strictly horizontal. The wheel thread, measured on the bottom of its rims must be 5-10 mm wider than the rail.
- Before setting the machine to work, check the space available in relation to the size of the hoist to ensure there is no interference with fixed structures.
- Install suitable, sturdy fixed fingers or saddles at the ends of the horizontal paths to activate the limit switches.
- Install a sturdy end stop onto the sliding girder at the same height as the buffer to avoid overshooting or prevent the hoist from falling.
- Make sure the limit switches for horizontal movements stop the trolley, at maximum speed, a few centimeters before the buffer hits the stop plate.

If the monorail hoist on crane is supplied with an electric power supply line.

- Arrange the brackets 1.5 meters from each other, securing them to the upper flanges of the girder or similar with the relative clips.
- Arrange the loops in the saddles, insert the whole trolleys into the raceway, and secure the terminal boards to the feeding point. Insert the driving bracket on the hoist into the appropriate trolley and connect up the machine electrically. All the setting operations for the limit switches and the resetting of safety distances must be carried out by specialized electricians with the authorization by respective section heads.

SERPES LINE WITH "ZECCA" SYSTEM SUSPENSION



The raceway on which the suspension trolleys of festoon lines travel, is supported by brackets which are attached to the upper rim of the crane's girder (see Pict. 1)

Brackets are secured to the girder by means of a "ZECCA" clamp system the rigid connection of which is granted by friction, thanks to two wedges assembled by means of one single screw.

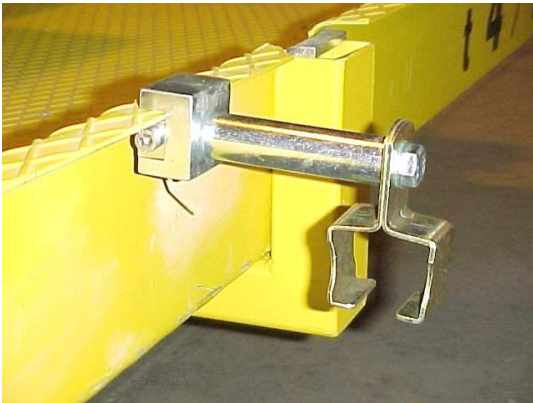
The angle of the wedges is such that it guarantees a firm grip and it prevents loosening.

The installation on the prearranged points (usually marked on the girder) is extremely easy.

Simply attach the "ZECCA" onto the girder's rim (see picture 2) and firmly tighten the screw that holds the wedges together.

The cable raceway is now installed.

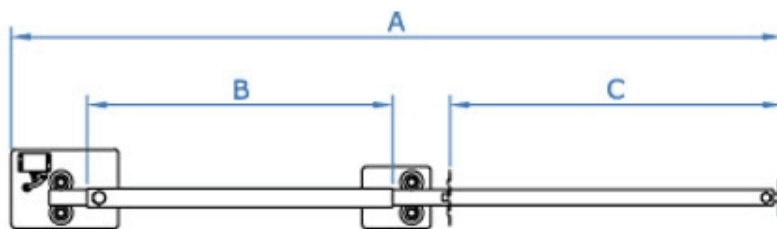
To release the "ZECCA", loosen the screw and deal a few mallet blows to separate wedges.



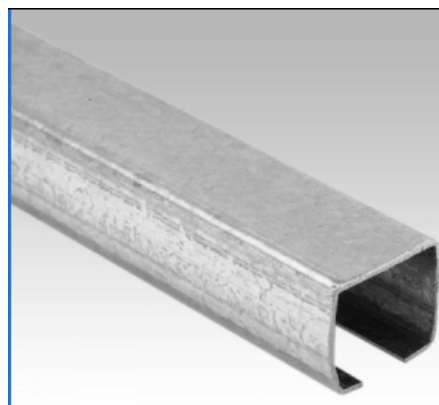
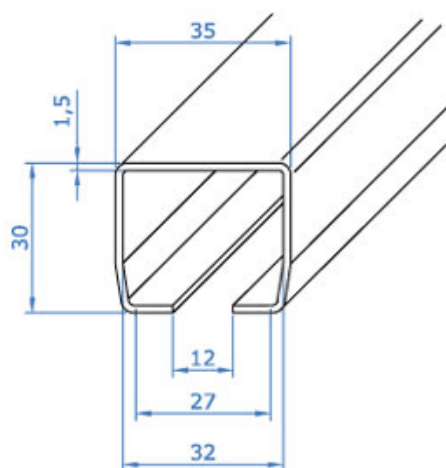
Picture1



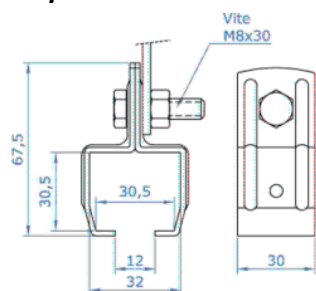
Picture 2

ELECTROMECHANICAL ANTI-COLLISION SYSTEMS

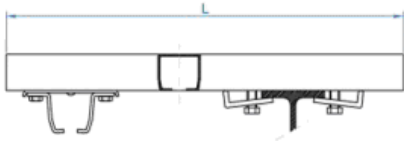
PATH	A	B	C
1600 path anti-collision	2170	1400	1600
2000 path anti-collision	4190	1900	2000
2500 path anti-collision	5190	1900	2500

FESTOONED LINES (MAIN ELEMENTS)**Raceway**

Type	EUROPEAN
Material	Fe PO2 zinc coated steel
Thickness	1.5 mm
Instant inertia	1.9 cm ⁴
Resisting moment	1.1 cm ³
Weight	1.19 kg/m
Distance between suspensions	1.5 m
Capacity	30 kg every 1.5 m

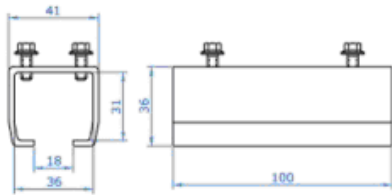
Suspensions

Brackets

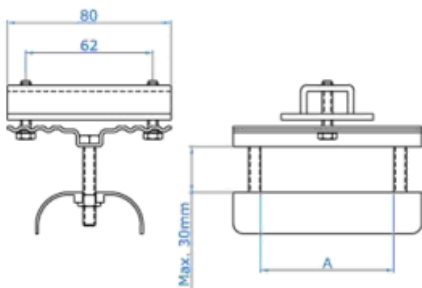


	L= 350 mm	L= 450 mm	L= 550 mm	L= 650 mm	L= 800 mm
Weight	721 g	840 g	959 g	1078 g	1257 g
Capacity	35 kg	30 kg	25 kg	20 kg	15 kg

Joints

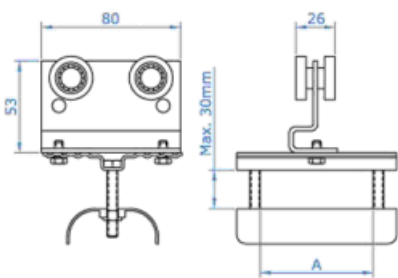


Fixed trolley

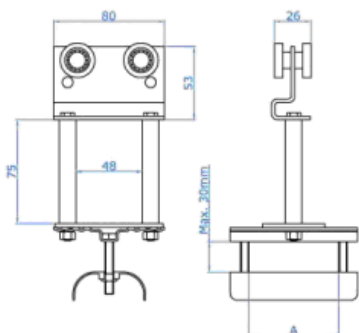


Saddle	Weight
A= 25mm	265 g
A= 35mm	285 g
A= 55mm	320 g
A= 65mm	340 g
A= 80mm	365 g
A= 100mm	400 g

Cable trolleys



Saddle	Weight
A= 25mm	310 g
A= 35mm	330 g
A= 55mm	365 g
A= 65mm	385 g
A= 80mm	410 g
A= 100mm	445 g

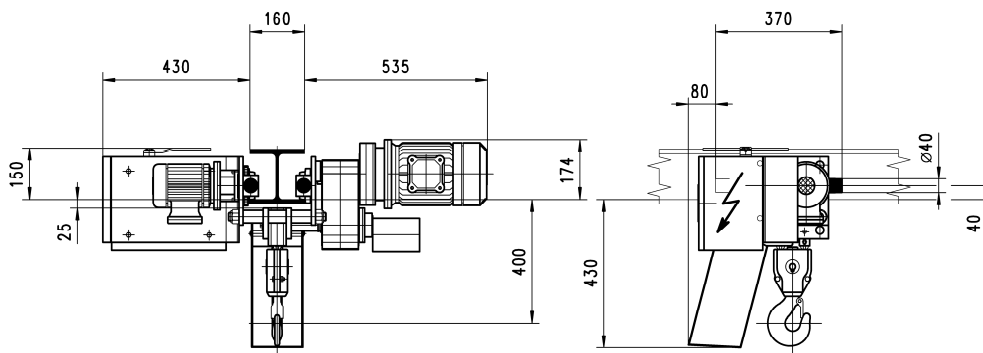


Saddle	Weight
A= 25mm	485 g
A= 35mm	505 g
A= 55mm	540 g
A= 65mm	560 g
A= 80mm	585 g
A= 100mm	620 g

“YOYO” ELECTRIC CHAIN HOISTS

Electric chain hoist of the YOYO range and the relevant electric traveling trolleys are manufactured according to the concept of modular components which allow the production of different executions, both standard and special. Base components, motor and reducer, thanks to their extreme compactness are assembled to one another on a coaxial line, so as to guarantee the maximum exploitation of the hook's path as well as the hoist's minimum overall dimensions. They are manufactured using the most advanced technologies which are based on highly industrialized production processes and allow the production, through economy of scale, of totally reliable and technologically innovative machinery.

The high quality standard is guaranteed and verified by the quality system certified according to UNI EN ISO 9001:2000.



Main dimensions of hoist, E execution

PROTECTION AND INSULATION OF ELECTRICAL PARTS:

Self-braking hoisting and traveling motors: IP55 protection – “F” grade insulation

Baco Brake IP 65

Limit switches: Minimum protection IP65 – Max. voltage of insulation: 500V

Cables: CEI 20/22 II – Maximum Voltage of Insulation 750/1000 V

Non-standard protections and insulations may be supplied upon request.

ELECTRIC SUPPLY:

Standard DMK electric chain hoists are designed to be supplied with alternating current at the following voltage:

three-phase 400 V– 50 Hz in conformity with IEC 38-1

Non-standard voltages and frequencies may be supplied upon request.

NOMINAL CONDITIONS OF USE IN STANDARD EXECUTIONS:

Working temperature: min. – 10°C; max. + 40°C

Max. relative humidity: 80%

Max. altitude above sea level: 1,000 m.

The machine should be placed under some kind of roof, in a well-aired, free from corrosive vapors (e.g. acid vapors, salty mists, etc.) environment

Special executions for different environmental conditions or for outdoor operations may be supplied upon request.

NOISE LEVEL

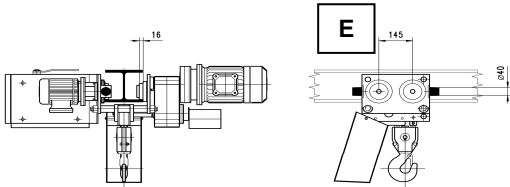
The level of acoustic pressure produced by the full load hoist is always inferior to 85 dB (A). The impact of environmental characteristics such as sound transmission through metallic frames, reflection due to the combination of machinery and walls, is not included in the above value.

STANDARD EXECUTIONS

YOYO hoist's flexibility of use allows for 5 standard executions.

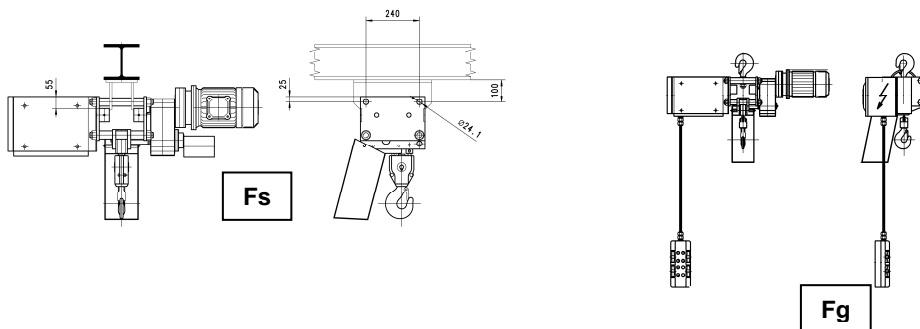
EXECUTION WITH ELECTRIC TROLLEY:

(E) it is used for heavy service or when the load can not be pushed by hand; traveling is guaranteed by the trolley to which the hoist is secured, which is controlled by the hoist's push button control panel.



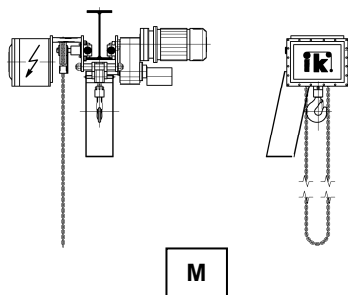
FIXED EXECUTION

(F) the hoist is suspended by means of a support (Fs) or of a hook. (Fg)



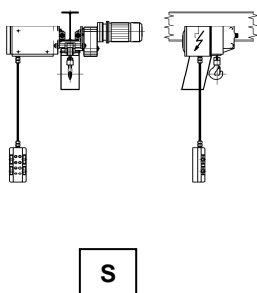
EXECUTION WITH MECHANICAL CHAIN TROLLEY

(M) traveling is obtained by means of a maneuvering chain controlled by the operator which conveys motion to the trolley wheels. It is employed for applications with a limited number of maneuvers, on short journeys or where micrometrical movements are needed.



EXECUTION WITH PUSH TROLLEY

(S) horizontal traveling happens through the load being pushed by hand; it is used for light operations or on quite short journeys.



DESCRIPTION OF MAIN COMPONENTS

(see picture 1 for references)

HOISTING AND TRAVELING ELECTRIC MOTOR

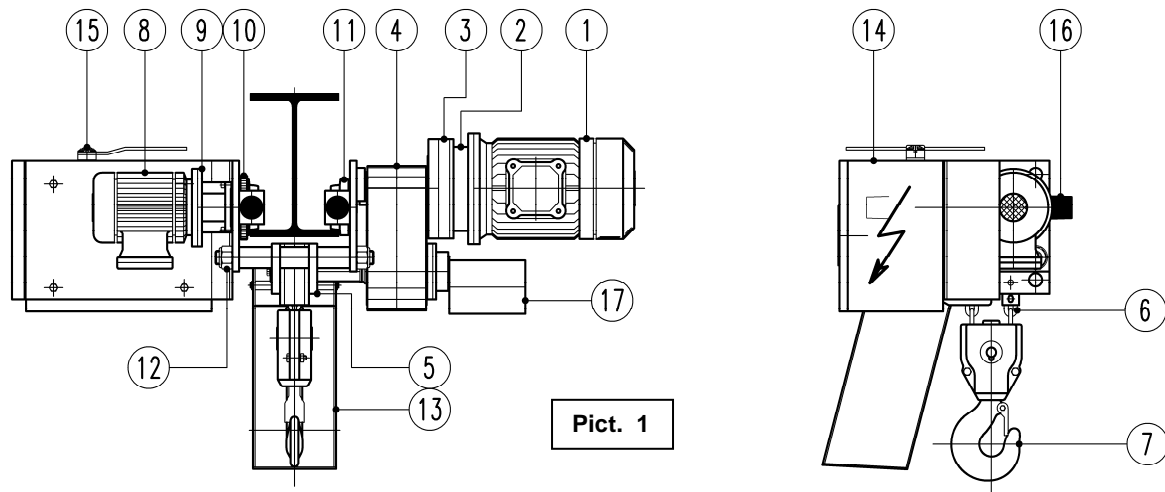
(1-8) Three-phase asynchronous, designed for S3 intermittent duty, executed in compliance with European rules and regulations. Closed mechanical protection so as to prevent dust and water from entering, wherever they may come from. Flange-mounted application (B5 shape), on the outside of the hoist, therefore it benefits from a perfect cooling thanks to the frame's fins. Available with single polarity, for single speed hoists, with double polarity for double speed ones.

CLUTCH LOAD LIMITER

(2) Emergency device, works as a load limiter in the event of overloading [RES. 4.2.1.4. Enclosure I – Machinery Directive]. Asbestos-free clutch disks.

BRAKE

(3) Load holding is guaranteed by a powerful disk brake assisted by a toroidal electromagnet which is fed at the same time as the motor is. Designed for a braking torque which exceeds the necessary one by 60%, but which is adjustable according to the different requirements, it is equipped with an easy system for the temporary compensation of the wear and tear of brake linings.



HOISTING REDUCER

(4) Compact parallel axles execution, with cylindrical gearing in alloyed, hardened and tempered steel, refaced and grinded fast gears, supported by ball bearings and lubricated in oil bath. The frame is made of aluminum alloy to increase heat dissipation.

SPROCKET – CHAIN GUIDE

(puller/insertor) (5)

Thermally treated, it has five hollows which are machined using high-precision automatic machinery. It transmits motion to the chain ensuring its optimal running. The chain guide guarantees the housing and the pulling of the chain's links with respect to the sprocket's hollows, both while hoisting or lowering [RES. 4.1.2.4. Enclosure I Machinery Directive]

CHAIN

(6) Calibrated and made of high grade steel rod, of a special quality with high dynamic stability, 80 kg/mm² minimum breaking load and minimum elongation at fracture of over 10%. The safety factor of use is always above 5 [RES. 4.1.2.4. – Enclosure I Machinery Directive]. The thermal and galvanic treatments it undergoes confer it high resistance to wear and tear, ageing and corrosion.

LOADING HOOK

(7) Made of high grade steel, it is equipped with a safety device (spring catch) against accidental unhooking of the load [RES. 4.1.2.6. e – Enclosure I Machinery Directive] and revolves on a thrust bearing.

HOOK TACKLE

(single fall hoists) (7)

It connects the chain to the revolving hook. Made of steel, it is equipped with a thermally treated increased section pin for chain locking

BLOCK

(double fall hoists) (7)

Aluminum cast, completely closed, it is equipped with a thermally treated high grade rotating sprocket, with chain housing hollows.

MOTOR REDUCER WITH SELF-BRAKING MOTOR:

(9) transmits motion to the trolley's gear wheels for the E Type Electric version [RES. 4.1.2.6. c – Enclosure I Machinery Directive].

TRAVELING TROLLEYS

(10-11) used for horizontal traveling of the load, they are manufactured in three different versions: thrust manual hoist; mechanical chain hoist; electric hoist. They slide along the girder's lower flange and can be adjusted according to the width of the same girder's flange; made of steel plate, they are equipped with anti-fall and anti-derailment brackets [RES. 4.1.2.2. Enclosure I Machinery Directive] and shock absorbing buffers. Trolleys are equipped with mechanically worked pressed steel wheels which revolve on permanent lubrication ball bearings.

CHAIN CONTAINER

(13) Required for containing the hanging length of chain, it is available in several sizes according to the hook's run; it is made of shock-resistant plastic and it equipped with suspensions which confer it functional mobility.

ELECTRIC CONTROLS**AC 48 V – 50HZ LOW VOLTAGE ELECTRIC EQUIPMENT,**

(14) including: the transformer for low voltage supply of control circuits, the main line contactor, the contactors for controlling the hoists motors and the electric trolley (if any), the transformer's protection fuses and the terminal box for the connection of auxiliary and power circuits. Components are contained in a IP 55 protection grade watertight case, made of shock-resistant thermoplastic. The control equipment is located on the motor side of the hoist.

TRAVEL LIMIT SWITCHES

(15): they limit the horizontal travel of the electric trolley along the girder [RES. 4.1.2.6. a – Enclosure I Machinery Directive].

HOIST ELECTRIC LIMIT SWITCH

(17) Supplied as standard, they limit the hook's hoisting and lowering path [RES. 4.1.2.6. a – Enclosure I Machinery Directive]. Consisting of two precision micro-switches which work according to the "slow positive opening" principle and act upon the auxiliary circuit of the control device of the hoisting motor.

STOPS

They are fitted on the descending length of the chain and on the load-bearing one on single fall hoists, they act as regulators and limiters for the hook's path [RES. 4.1.2.6. a – Enclosure I Machinery Directive]; they are made of pressed steel and are equipped with a shock-absorbing insert.

SUSPENSION

Available in the execution with hook or in the 90° version for longitudinal hoists.

TOW ARM:

the tow arm is available for all types of trolley. It connects the trolley to the feeding line. It is easily adjustable in all directions and represents a fundamental element for towing the feeding line so as to avoid tearing of the cables.



YOYO HOIST – ELECTRICAL FEATURES OF MOTORS AND FUSES

HOISTING

1 speed

Capacity kg	Speed m/min	Hoist	Chain falls	Motor	kW (50 Hz)	Cos ϕ	Ia/In	In (380 V)	Delayed Universal Fuses	Brake Type
500	4	YY 500-4	1	80L 4	0,75	0,85	4,5	1,8	4	BY 80
	8	YY 500-8	1	80L 2	1,5	0,75	4,8	4,1	8	BY 80
1000	4	YY 1000-4	1	90S 4	1,1	0,85	4,5	1,8	4	BY 90
	8	YY 1000-8	1	80L 2	1,5	0,75	4,8	4,1	8	BY 80
2000	4	YY 2000-8	2	80L 2	1,5	0,75	4,8	4,1	8	BY 80

2 speeds

Capacity kg	Speed m/min	Hoist	Chain falls	Motor	kW (50 Hz)	Cos ϕ	Ia/In	In (380 V)	Delayed Universal Fuses	Brake Type
500	8/2	YY 500-8/2	1	80L 8/2	0,75/0,18	0,78/0,7	4,5/3,7	2,1/0,6	4	BY 80
1000	8/2	YY 1000-8/2	1	90L 8/2	1,1/0,25	0,75/0,7	4,8/4,2	4,1/4,2	8	BY 90
2000	4/1	YY 2000-4/1	2	90L 8/2	1,1/0,25	0,75/0,7	4,8/4,2	4,1/4,2	8	BY 90

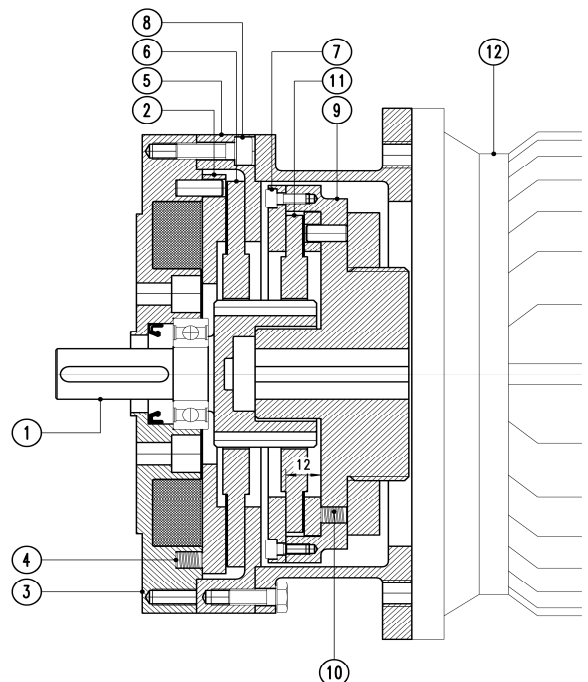
TRAVELING

Capacity Kg.	Speed m/min	Trolley	Motor	KW (50 Hz)	Cos ϕ	Ia/In	In (380 V)	Delayed Universal Fuses
500	10	MO 80	63L 4	0,18	0,72	3,5	0,6	2
to 2000	20	MO 80	63L 2	0,25	0,76	4,1	0,8	2

BACO BRAKE-CLUTCH UNIT

COMPONENTS

- 1 Slotted hub
- 2 Mobile keeper
- 3 Magnetic core
- 4 Brake springs
- 5 Brake fixed disk
- 6 Brake mobile disk
- 7 Clutch assembly screw
- 8 Brake/clutch assembly screw
- 9 Clutch body
- 10 Clutch springs



- 11 Clutch mobile disk
- 12 Hoisting motor

DESCRIPTION OF BRAKE FUNCTIONING:

When the core (3) is fed, magnetic force overcomes the action exerted by the springs (4), attracts the keeper (2) which disengages the disk (6) and enables the shaft (1), which is dragged by the clutch, to rotate freely.

Upon power supply failing, the keeper detaches due to the action of the springs and generates a pressure on the fixed disk (5) thus blocking, through the hub (1), the rotation of the shaft that is connected to the reducer.

DESCRIPTION OF CLUTCH FUNCTIONING:

The motor shaft (12) transmits its torque through the pressure exerted by the springs (10) between the body (9) and the disk (11) and the slotted hub (1).

Springs' power and number are calculated so as to allow the transmission of a torque equal to the nominal torque of the motor increased by 25% - 60%.

As a result, in case of loads exceeding the one which the hoist can tolerate, the clutch will skid thus preventing all the mechanical members below from undergoing abnormal stress.

This particular clutch guarantees a double protection for both the hook at minimum height and the overload on hoisting.

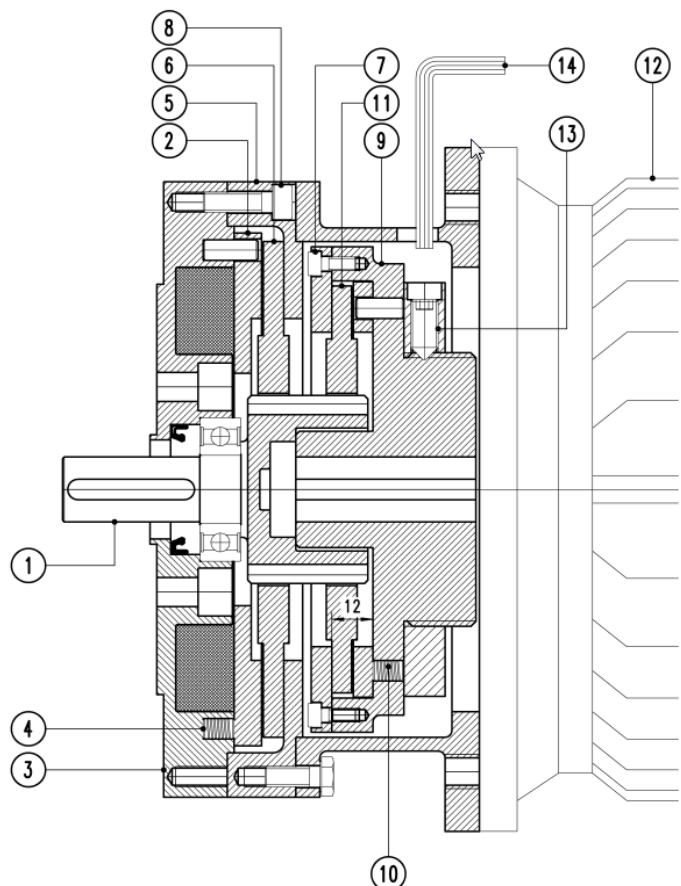
The clutch should only be used for brief periods of time (1 or 2 seconds) in order to avoid wear or overheating.

PERIODIC CHECKS OF THE BACO UNIT

After a year of service or in the event of poor braking it is advisable to verify the degree of wear and tear of the brake disk (6). Separate the motor/clutch unit by working on the screws (8), remove the fixed disk (5) and check the degree of wear and tear of the brake disk and the springs' (4) functionality. Replace if the thickness of the disk's braking band is less than 5 mm. Simultaneously to this operation, verify the degree of wear and tear of the clutch by untightening the screws (7) and removing the locking ring. For the clutch too, the friction surface minimum thickness should be 5 mm or higher.

CLUTCH SETTING

- a) Discontinue power supply to the motor by acting on the main line disconnecting switch.
- b) Remove the lid from the motor fan
- c) Remove the plastic cap located in the BACO's neck
- d) Introduce a 4 mm hexagonal wrench (14) into the hole
- e) Using the fan, rotate the motor shaft in one direction till the hexagonal wrench fits into the screw seat (13). Unscrew the screw approx. two turns.
- f) Using the hexagonal wrench, keep the BACO's rotor still and rotate the motor a few degrees by means of the fan. Rotating the motor clockwise decreases the torque. Anti-clockwise rotation increases the torque.
- g) Tighten the screw back (13)
- h) Pull the wrench out. Connect the hoist to the power supply with great care (mind the fan) and run a test
- i) If the result does not meet the requirement, start again from a) till the required setting is achieved.
- j) In the event of particular needs and settings, We would like to remind you that YoYo hoists can be equipped with "Motor-Sentry" electronic load limiter acting on the motor's ammetric absorption. In this case, the BACO will act as a limit switch only.



LUBRICANTS

QUANTITY OF LUBRICANT (with reference to the reducer) Kg

GO 71 type hoisting reducer: 0,7 Kg.

TYPES OF LUBRICANT

TYPE OF LUBRICANT (valid for temperatures from -10° to +80°C)								
MEMBERS TO BE LUBRICATED	AGIP	ROLOIL	ESSO	SHELL	TOTAL	MOBIL		ISO 3498 UNI 7164
HOIST (HOISTING REDUCER)	BLASIA 220	ARM EP 220	SPARTAN EP 220	OMALA 220	CARTER EP 220	MOBILGE AR630	OIL	CC 220
TROLLEY REDUCER, WHEELS GEARING AND HOISTING CHAIN	GR MU EP 2	LITEX EP 2	BEACON EP2	ALVANIA EP 2	MULTIS EP 2	MOBILUX EP2	GREASE	XM2



For use in aggressive environments use silicone grease or molybdenum disulfide grease once a week

All hoists are supplied complete with lubricant.

Hoisting and traveling reducers are supplied complete with a five years supply of lubricant.

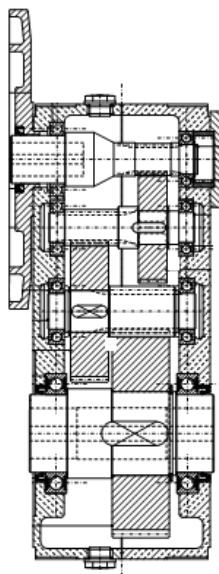
All rolling bearings, the supports and the chain come already lubricated and therefore further lubrication prior to putting the machine into operation.

“GO” SERIES HOISTING REDUCER

Disassembling this reducer is extremely easy; just remove the hoist limit switch and extract the reducer by slipping it off the shaft.

It is advisable to perform washing or oil change on the workbench.

Check the degree of wear of locking rings by verifying the presence of signs of seeping. In any case, it is advisable to replace the rings every 5 years. Locking rings should be spread with sealant prior to being mounted.



SPARE PARTS CARD

Pos	NAME	REPLACE EVERY				QUANTITY	
		24	36	48	60	per machine	spares
1	Hoisting brake's mobile disks	0		0		1 set	1 set
2	Brake's magnetic core			0		1	1
3	Sprocket		0				
4	Chain guide		0			1	1
5	Chain			0		1	1
6	Block				0	1	
7	Trolley brake's mobile disks		0			1	1
8	Trolley wheels			0		1 set	1 set
9	Wheels' bearings			0		1 set	
10	Trolley pinion	0		0		i	1
	Clutch disks. Foundation frame			0		1 set	
12	Trolley limit switch				0	i	1
13	Fuses					1 set	3 sets
14	Transformer				0	1	
15	Brake's power supply bridge			0		1	i
16	Push button control pendant with cable	0		0		1	1
17	Trolleys for trolley line				0	1 set	1 set

SCHEDULED MAINTENANCE (up to 60 months)

Check and maintenance operations	1 year (12 months)	2 years (24 months)	3 years (36 months)	4 years (48 months)	5 years (60 months)
Hoisting brake	0	0	0	0	0
Clutch		0		0	
Chain ⁽¹⁾	0	0	0	0	0
Chain guide		0		0	
Travel limit switch	0	0	0	0	0
Push button pendant	0	0	0	0	0
Trolley wheels		0		0	
Electrical equipment		0		0	
Power line			0		
Block		0		0	
Slackening of structural elements			0		
Motors					0
Hoisting reducer					0
Traveling reducer					0
Hoisting sprocket	0	0	0	0	0

(1) The chain must be replaced according to its degree of wear and tear. The mandatory periodical check is governed by the rules and regulations prescribed by the law.

SPECIAL USAGE MODES FOR YOYO HOISTS



Check once a week that:

- The hoisting brake works properly
- The clutch is efficient
- The limit switches' (if any) functionality
- The push button control pendant and the relevant connections are not damaged
- The hoisting chain is efficient and lubricated

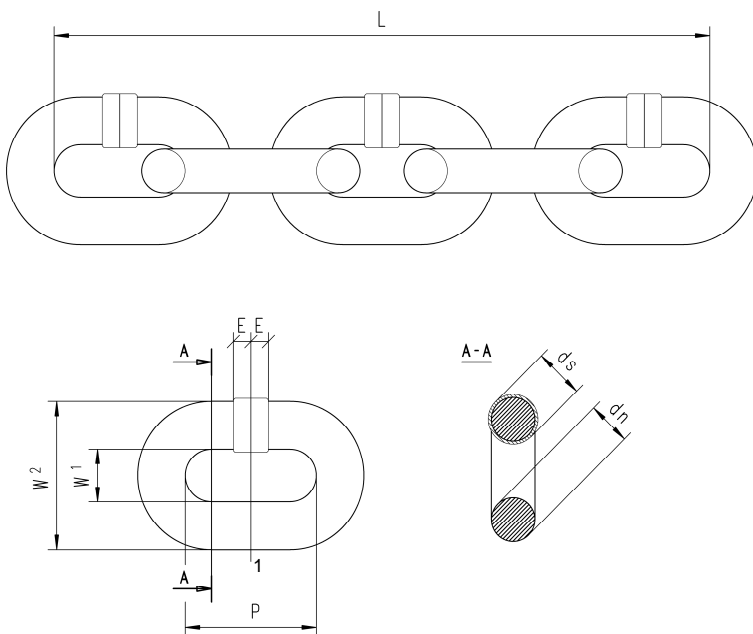
CHAIN

The hoist's chain undergoes constant stress; it is important to be familiar with this member so as to avoid any trouble, consequently:

- If the hoist operates in aggressive or abrasive environments lubricate with dry molybdenum disulfide aerosol lubricant.
- Where avoiding dripping is mandatory, use silicone grease.
- The chain life is determined by the lubrication degree as well as by the intensity of service. Lubrication and check operations should therefore be proportioned to the hours of service.
- The chain should be checked by visually verifying the degree of wear according to the nominal values shown in the table
- Replace the chains in the event even only one link has stretched or worn by over 5%.
- Replace the chain in the event a stretching of over 2% on a length of 11 links is detected.

Chain Type: RB 80

Nominal dimension d_n	Tolerance on material's diameter	Pitch		Width		Working length		Weld's diameter d_s max.
		P_n	tolerance ¹⁾	Internal w_3 min.	external W_2 max.	$11 \times p_n$	tolerance ¹⁾	
7	± 0.3	21	0.4	8.4	23.8	231	1.1	7.6



DIMENSIONS OF HOIST CHAIN AND LINKS

1 link's central cross line

L multiple length of the pitch

P pitch

Dn Chain diameter as measured

Ds welding diameter

E length affected by the weld

W1 inner width at welding point

W2 outer width above welding point

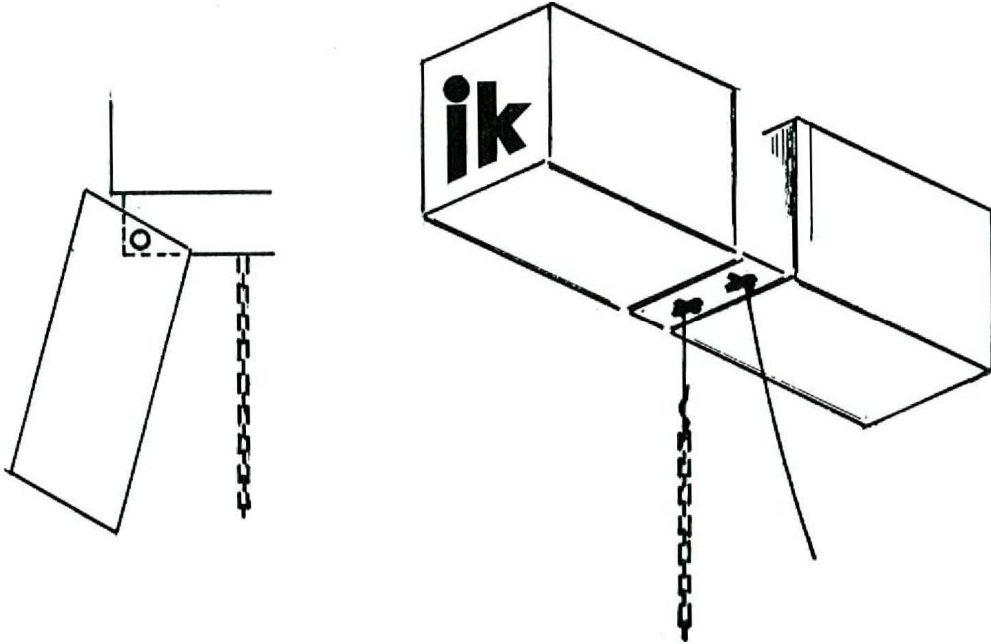
REPLACING THE CHAIN



If the chain vibrates or squeaks checking its efficiency is mandatory.

Should there be any doubts with regard to cracks, bucklings, wear, replace the chain and, preferably, the sprocket too.

- *Remove the chain container and unhook the stop on the end of the chain.*
- *Connect the first link of the new chain to the last link of the old chain by means of a small flexible cable, then run the old chain downwards.*
- *Please bear in mind that the side of the chain where the welding point is must be external with respect to the sprocket.*
- *Put the end stop and the chain container back into place.*



YOYO HOIST HOISTING CHAIN'S CERTIFICATE



pewag austria GmbH
 A-8605 Kapfenberg, Mariazeller StraBe 143
 Phone: +43 (0) 3862 / 22 1 33-0 Fax: +
 43 (0) 3862 / 22 1 33-700
office@pewag.com
www.pewag.com

Inspection Certificate acc. to EN 10204 3.1

Customer	Specifications according to EN 818-1, EN 818-7		
FAS S.P.A.			
VIA DEI LAVORATORI 118 I 20092 CINISELLO BALSAMO (MI)	Certificate No.:	200803729118	
Order-No.: 3971PW/08	Works Ref. No.:	7603300	

Technical specifications of the chain:

Norm-Designation:	HE WN-G80 RAS- 7X21	GZN	
Ident-No.:	11093		
Surface:	ELECTRO GALVANIZED, BLUE CHROMATED, CONSERVED,		
Stamp:	H16 DAT A		
Additional information:			
Pieces	Length [m]	Weight [kg]	Materia'
8	100	867	special steel

			Nominai data
Working load limit	M5/M3	kg	10001250
Proof load min.		kN	40
Breaking load min.		kN	60
Elongation at rupture min.		%	10
Nominai diameter		d mm	7 +0,101-0,10
Max. diameter at the weld		ds mm	7,5
Pitch		it mm	21 +0,251-0,15
Length of measurement		11 t mm	231 +0,70/-0,40
Outside width		b2 mm	Max. 23,6
Inside width		bl mm	Min. 8,4
Surface hardness			NV10 580-700
Hardness at the core			HV10 CA.380
Case depth		mm	0,21-0,35

Declaration of manufacturer:

We declare under our sole responsibility that the product to which this declaration relates is in conformity with the regulations of 98/37EG and its amendments. Applies for the use in load suspension devices only, if the latter also meets the regulations.

Result of test	Kapfenberg, the	Quality department	This certificate was generateti by computer and is valid without a signature.
WITHOUT ANY OBJECTION	16.06.08	i.A. Ing. Kurt Gaber (acceptance representative)	

This test certificate must be kept far ten years resp. during the entire service life.

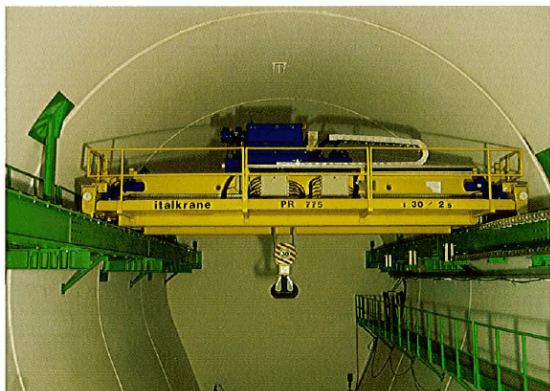
Rechtsform: Gesellschaft mbH, Stz: Graz
 Firmenbuchnummer: FN 35 3031
 Firmenbuchgericht: Landesgericht Graz iOr ZAS
 ATU 26809901, ARA-Lizenznr.: 1269 1SO
 9001 zertifizierles Werk

Bankverbindunggerr
 Raiffeiserilandesbank Sterermark, Ktn.-Nr.: 7441900, BLZ 38000
 Swift RZSTAT2G, IBAN: AT 86 3800 0090 0744 1900
 Rank Austria AG, Kto-Nr.: 760 131 807 00, BLZ 12000
 SWIFT: BKAUATWW, IBAN: AT 15 1209 0760 1318 6700



WORKING CHECKS

- Check that the voltage available corresponds to that indicated on the motor-rating-plates.
 - Lubricate the rope, the drum, the pulley groove, the rope guide-ring and the gears of the monorail trolley drive wheels without contaminating the mono rail beam.
 - Check that the colored limit switch rod is in vertical position, up for monorail trolleys, down for bi-rail trolleys.
 - Once the connections with the power supply line are made, check that the direction of the movements corresponds to the symbols on the push-button control panel, proceed as follows; push the "on" button and then one brief push on one of the lower buttons check that the hook actually moves down. This is the only way for the limit switches to work regularly.
- Otherwise invert two phases at the power supply.**
- Perform all movements in no-load conditions and record the setting of electric limit switches if necessary.



CLEANING AND LUBRICATION



Cleaning may be performed by not highly qualified personnel. The hook, block and push button control panel (or radio-control) must be kept as clean as working conditions allow.

Any cleaning operation at height must be performed by qualified personnel wearing the suitable personal protective equipment.

Such operations must be performed within the scheduled periodical checks.

- Cleaning may be performed using means, utensils and detergents or solvents normally employed for cleaning industrial equipment.
- Remove any foreign and soiling substances with the aid of vacuum cleaners, cloths etc.
- Dry any oil and/or grease in excess that may be present on the machine's parts.

⚠ The careful lubrication of the machine's mechanisms is one of the conditions required in order to guarantee the efficacy, efficiency and long life of the machine.

HOIST AND CRANE WITH HOIST

All cranes equipped with an **electric hoist** meant for service within Europe are supplied fully lubricated. Hoisting, trolley traveling and bridge sliding reducers are filled with lubricant which is sufficient and suitable for at least 3 years of service.

All rolling bearings, ball supports and wire ropes are already lubricated and therefore further lubrication prior to starting up the machine is not necessary.

Nevertheless, you are kindly requested to check reducers' levels through the relevant indicator caps.

MAINTENANCE

To ensure good, long-lasting service, suitable maintenance on the various electromechanical parts of the machine is essential.

The maintenance intervals given in the enclosed table apply to machinery working indoors in normal climatic conditions for an average working cycle during which normal loads are lifted (rarely maximum load).

When the machine is outdoors, or only under a protective roof, or exposed to the elements or to a saline atmosphere it is necessary to intensify maintenance, up to reducing normal intervals by half.

Pay attention to the following instructions:

- Cut off the power supply by means of the main isolating switch
- Employ specially appointed skilled personnel only
- Comply with the maintenance intervals given in the table, shorten them for particularly intensive work cycles or if work is carried out in severe environmental conditions (see paragraph above)
- Follow the procedures given in our instructions
- Only use original spare parts to replace worn ones
- Always keep the machine clean using suitable products
- Observe the life working limit and carry out a complete service on its expiry
- Our company is ready to help or advise you at any time, and provide personnel to carry out maintenance duties.

TABLE OF LUBRICATING OILS OF THE MOST IMPORTANT BRANDS

Produttore Manufacturer	Oli Minerali Mineral oils			Oli Sintetici Polialfaolefine (PAO) Poly-Alpha-Olefin synthetic oils (PAO)			Oli Sintetici Poliglicoli (PG) Polyglycol synthetic oils (PG)		
	ISO VG	ISO VG	ISO VG	ISO VG	ISO VG	ISO VG	ISO VG	ISO VG	ISO VG
	150	220	320	150	220	320	150	220	320
AGIP	Blasia 150	Blasia 220	Blasia 320	-	Blasia SX 220	Blasia SX 320	Blasia S 150	Blasia S 220	Blasia S 320
ARAL	Degol BG 150 Plus	Degol BG 220 Plus	Degol BG 320 Plus	Degol PAS 150	Degol PAS 220	Degol PAS 320	Degol GS 150	Degol GS 220	Degol GS 320
BP	Energol GR-XP 150	Energol GR-XP 220	Energol GR-XP 320	Energol EPX 150	Energol EPX 220	Energol EPX 320	Energol SG 150	Energol SG-XP 220	Energol SG-XP 320
CASTROL	Alpha SP 150	Alpha SP 220	Alpha SP 320	Alphasyn EP 150	Alphasyn EP 220	Alphasyn EP 320	Alphasyn PG 150	Alphasyn PG 220	Alphasyn PG 320
CHEVRON	Ultra Gear 150	Ultra Gear 220	Ultra Gear 320	Tegra Synthetic Gear 150	Tegra Synthetic Gear 220	Tegra Synthetic Gear 320	HiPerSYN 150	HiPerSYN 220	HiPerSYN 320
ESSO	Spartan EP 150	Spartan EP 220	Spartan EP 320	Spartan S EP 150	Spartan S EP 220	Spartan S EP 320	Glycolube 150	Glycolube 220	Glycolube 320
KLÜBER	Klüberoil GEM 1-150	Klüberoil GEM 1-220	Klüberoil GEM 1-320	Klüberoil EG 4-150	Klüberoil EG 4-220	Klüberoil EG 4-320	Klüberoil GH 6-150	Klüberoil GH 6-220	Klüberoil GH 6-320
MOBIL	Mobilgear XMP 150	Mobilgear XMP 220	Mobilgear XMP 320	Mobilgear SHC XMP 150	Mobilgear SHC XMP 220	Mobilgear SHC XMP 320	Glygoyle 22	Glygoyle 30	Glygoyle HE320
MOLIKOTE	L-0115	L-0122	L-0132	L-1115	L-1122	L-1132	-	-	-
OPTIMOL	Optigear BM 150	Optigear BM 220	Optigear BM 320	Optigear Synthetic A 150	Optigear Synthetic A 220	Optigear Synthetic A 320	Optiflex A 150	Optiflex A 220	Optiflex A 320
Q8	Goya 150	Goya 220	Goya 320	El Greco 150	El Greco 220	El Greco 320	Gade 150	Gade 220	Gade 320
SHELL	Omala 150	Omala 220	Omala 320	Omala HD 150	Omala HD 220	Omala HD 320	Tivela S 150	Tivela S 220	Tivela S 320
TEXACO	Meropa 150	Meropa 220	Meropa 320	Pinnacle EP 150	Pinnacle EP 220	Pinnacle EP 320	-	Synlube CLP 220	Synlube CLP 320
TOTAL	Carter EP 150	Carter EP 220	Carter EP 320	Carter SH 150	Carter SH 220	Carter SH 320	Carter SY 150	Carter SY 220	Carter SY 320
TRIBOL	1100/150	1100/220	1100/320	1510/150	1510/220	1510/320	800/150	800/220	800/320

Lubrificanti sintetici per uso alimentare / Food-grade synthetic lubricants

AGIP				Rocol Foodlube Hi-Torque 150	—	Rocol Foodlube Hi-Torque 320			
ESSO				—	Gear Oil FM 220	—			
KLÜBER				Klüberoil 4 UH1 N 150	Klüberoil 4 UH1 N 220	Klüberoil 4 UH1 N 320			
MOBIL				DTE FM 150	DTE FM 220	DTE FM 320			
SHELL				Cassida Fluid GL 150	Cassida Fluid GL 220	Cassida Fluid GL 320			

* OIL for ambient temperatures <math>< -10^{\circ}\text{C}</math>
>math>> 80^{\circ}\text{C}</math>

SPARTANS EP220
GLYCOLUBE Range 220

* GREASE

for ambient temperatures <math>< -10^{\circ}\text{C}</math> (mm -54) BEACON
>math>> 80^{\circ}\text{C}</math> (max 120) BEACON



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

- They may cause irritation if put in direct contact with the skin.
- If inhaled they may cause serious intoxication.
- Swallowing them may result in death.
- They must be handled with care, using adequate personal protective equipment (e.g. gloves)
- Do not disperse in the environment. Dispose of as toxic/injurious waste in compliance with local and national regulations.

SCHEDULED MAINTENANCE (up to 60 months)



NOTE

Staff members employed in the maintenance of the machine must:

- Be properly trained
- Be familiar with this user's manual
- Have an in-depth knowledge of accident prevention rules and regulations
- All non-authorized personnel must keep outside the working area during operations



Before starting the machine after a breakdown event, the machine must be carefully inspected and checked in order to detect any damages; start up operations must be performed anew. Never interfere, unless specifically required for repairs, with the settings or the arrangement of the safety devices. Tampering with them may result in serious damages to the machine.



When it is not needed, cut off power supply to the machine while performing maintenance operations on it. Put up a notice saying: MACHINE UNDER MAINTENANCE – DO NOT CONNECT TO POWER SUPPLY.



Never cut off safety and protection devices fitted on the machine: should it be necessary to do so, display warning signs inviting to operate with the greatest caution.



Always verify the existence and suitability of grounding connections as well as their compliance with rules and regulations. Failure to ground electric equipment may result in serious injury to persons.



Avoid using flammable or toxic solvents (benzine, ether, alcohol, etc.) Avoid prolonged contact with solvents and inhaling their vapors. In particular, avoid using them in the proximity of open flames.



Always make sure, before starting the machine, that maintenance men are at safety distance and that tools and materials were not left on or by the machine.



Always use protective gloves while performing maintenance operations.



All accessible moving parts and transmission members, excluding the wire rope and block only, must be protected against accidental contacts. Fit protections back into place before putting the machine back into operation.



In the event of a fire, never use water; disconnect all power supply and use suitable fire extinguishers.



Ensure the tools to be employed are in perfect conditions and have insulating handgrips, if required.



Pay the utmost attention to all RESIDUAL RISKS highlighted on board of the machine and in this user's manual.

QUALIFICATION OF SERVICEMEN

In order to be in a position to properly perform maintenance operations on the machines and their accessories, maintenance men must:

- know the laws in force with regard to accident prevention for maintenance operations on machines with motor transmission and be capable of applying them;
- be able to use and refer to this documentation
- be involved in the functioning of the machine
- detect any irregularity and, if need be, take the necessary measures.

Authorized workers in charge of servicing hoists are:



THE OPERATOR EMPLOYED IN THE USE OF THE MACHINE

TYPICAL MAINTENANCE ACTIVITIES:

- *verifying the correct functioning of the machine. Co-operation with members of the staff in charge of periodical and/or extraordinary maintenance, upon timely notice given by the same operator in the event he/she detects an anomaly.*
- *cleaning and lubricating the machine's part he/she is usually in contact with (push button control pendant and hook) and maintenance operations which do not require to work aloft (e.g. lubrication of the hook's thrust block).*

• **Required technical knowledge:**

- *knowledge of the use and functions of the machine*
- *knowledge of lubricants employed on the machine and of the dangers connected to them*

• **Required qualification:**

fitness for work with regard to specific operating and environmental characteristics.

MECHANICAL MAINTENANCE MAN



• **Typical maintenance activities:**

- *adjustment of backlash of brakes and mechanisms*
- *verification of the execution of movements and adjustment of safety devices*
- *checking backlashes and wear and tear degree of components (wire rope, drum, pulleys)*
- *replacement of components subject to wear (wire rope, rope guide, pulleys) according to this manual*
- *ordinary maintenance of mechanic units and replacement of worn parts with original spares*

• **Required technical knowledge:**

- *good knowledge of mechanical hoisting and handling motor systems*
- *good knowledge of safety devices fitted on the machine (limit switches, brakes, load limiter, etc.)*
- *basic knowledge of simple electric control and adjustment technique (adjustment of limit switches, replacement of fuses, connection of motors, etc.)*
- *knowledge of measuring and testing methods to establish the actual conditions of the machine (verification of: brakes, degree of wear and tear of wire rope and hook, abnormal noisiness, etc.)*
- *methods of logical research of non complex breakdowns and evaluation of the results*
- *ability to organize the measures fit for bringing the machine back to its function and performance*
- *ability to draw up a maintenance operation report*

• **Required qualification:**

- *Full training as an industrial engineer complete with specialization and experience in servicing industrial hoisting and handling systems.*

ELECTRICAL MAINTENANCE MAN



• **Typical maintenance activities:**

- *servicing electric equipment starting from functional diagrams*
- *verification of the execution of movements and electric adjustment of safety devices*
- *verification of wear and tear of electric components (contacts of electric equipment)*
- *repair of electric units and replacement of worn parts with original spares*

• **Required technical knowledge:**

- *good knowledge of electric equipment and installations*
- *good knowledge of electric components and safety devices fitted on the machine (limit switches, brakes, load limiter, etc.)*
- *basic knowledge of simple electric control and adjustment technique (replacement according to*

the original diagram of: motors, limit switches, push button panels, control boards, cables and wires, etc.)

- basic knowledge of simple mechanic control and adjustment technique (verification of wear and tear, adjustment of mechanic stops, etc.)
- knowledge of measuring and testing methods to establish the actual conditions of the machine (verification of electrical equipment's efficiency and reliability)
- knowledge of methods of research of breakdowns and failures and experience in electric control systems for hoisting and handling machinery
- ability to organize the measures fit for bringing the hoist back to its function and performance
- ability to draw up a maintenance operation report

- **Required qualification:**



- Full training as an electrical industrial engineer complete with specialization and experience in servicing industrial hoisting and handling systems

ELECTRO-MECHANICAL MAINTENANCE MAN:



He/she is an operator whose working profile, besides having the electrical serviceman's typical characteristics, gathers and epitomizes the technical competence and capacity required of a mechanical serviceman.

MECHANICAL ENGINEER



- **Typical technical activities:**

- mechanical adjustment of safety devices, settings and tests (proof load tests)
- ordinary maintenance operations and replacement of complex and/or critical, with regard to safety, mechanic components (reducers, motors, etc.)
- repairs of mechanical units following extraordinary maintenance (repairs of structural parts with welding filling material, mechanical on board processing, etc.)

- **Required technical knowledge:**

- knowledge of mechanical industrial hoisting and handling systems certified by specific training
- specific knowledge of safety devices fitted on the machine (limit switches, brakes, load limiter, etc.)
- essential knowledge of electric control and adjustment technique (verification of motors)
- specific competence with regard to measuring and testing for determining the actual conditions of the machine (verification of: brakes, push button control pendant, limit switches, etc.)
- specific competence with regard to the methods of logic research for breakdowns and evaluation of the results
- ability to direct the measures fit for bringing the machine back to its function and performance
- ability to draw up a maintenance operation report

- **Required qualification:**

- Full training as an industrial mechanical engineer complete with specialization and specific competence in hoisting and handling systems

ELECTRICAL ENGINEER

- **Typical maintenance activities:**



- electrical adjustment of safety devices, settings and tests (proof load tests)
- ordinary maintenance operation following the replacement of complex and/or safetywise critical electric components (limit switches, motors, L.V. switchboard)
- repair of electric units following extraordinary maintenance operations (repair of electric motors with partial replacements, replacement of limit switches with changes in the set-up, etc.).

- **Required technical knowledge:**

- extremely good knowledge of electrical installations and wiring on industrial hoisting and handling equipment

- specific knowledge of electric components and of the safety devices fitted on the machine (limit switches, brakes, load limiter, etc.)
- experience in control and electric adjustment techniques (ability to operate on the original diagram in order to make improvements to: limit switches, push button control pendants, control switchboards, cables and wires, etc.)
- knowledge of the control and mechanic adjustment (verification of wear and tear degree, verification of the performance of the performance of mechanic components; adjustment of mechanic stops, verification of noise level, etc.)
- specific competence with regard to measuring and testing methods for determining the actual conditions of the hoist (verification of electrical equipment's efficiency and reliability)
- specific competence with regard to the methods of logic research for breakdowns and evaluation of the results on control electric equipment and check of hoisting equipment
- ability to direct the measures fit for bringing the hoist back to its function and performance
- ability to draw up a maintenance operation report.

• **Required qualification:**

- Full training as an industrial electrical engineer complete with specialization and specific competence in electrical apparatus of hoisting and handling systems.

ELECTROMECHANICAL ENGINEER:



He/she is a highly qualified and specifically trained operator, whose working profile gathers and epitomizes, besides the knowledge and competence typical of an electrical engineer, those of a mechanical engineer too.



Special recommendations with regard to maintenance:

1. Maintenance operations, if performed correctly, guarantee the safety of operators employed in the use of the hoist and reduce downtime following breakdowns.
2. A timely performed repair prevents the machine from further deteriorating.
3. Always use, as far as possible, original spare parts and products
4. Before putting the machine under maintenance, follow the instructions hereunder:
 - The members of the staff employed in ordinary and extraordinary maintenance operations must have read and fully understood all information included in this chapter and in chapter 3
 - Extraordinary maintenance is only to be performed by authorized, qualified and purposely trained personnel.



All maintenance operations should be performed, when possible, with the machine off and under conditions of safety, using suitable tools and adequate individual protective equipment, according to the indications of the rules and regulations in force, displaying a notice board reading: "MACHINE UNDER MAINTENANCE".



In the event of problems or to order spare parts, please contact Technical Assistance at **Italkrane S.r.l.**

MAINTENANCE SCHEDULE

The maintenance schedule includes ordinary maintenance, which consists of inspections, checks and verifications carried out by the machine operator and/or by qualified personnel employed in the company and periodical maintenance, including part replacement, adjustment and lubrication operations performed by technical staff which has been trained to the purpose by means of specific classes or publications.



As maintenance operations may be performed at dangerous height from the ground, maintenance staff members shall have recourse to adequate equipment (scaffolding, platform, ladders, etc.) allowing them to safely perform their work.



Personnel members shall furthermore be equipped with the individual protective equipment (I.P.E.) prescribed by the laws in force.

DAILY AND PERIODICAL MAINTENANCE

It includes maintenance operations which can be directly performed by the machine operator or by qualified personnel, as prescribed in this publication and/or in papers herewith attached, which do not require the use of special tools or equipment.

Maintenance operations are divided into:



DAILY OPERATIONS, FOR THE CARE OF THE HOIST OPERATOR:

- *generic visual checks*
- *functional verifications: motor check, limit switch check, brake test with no load, test of the “stop” button and of other functions of the push button control panel*
- *check of the conditions of wire rope and hook.*

MONTHLY OPERATIONS, PERFORMED BY QUALIFIED PERSONNEL:

- *visual check of each mechanism and of lubricant leaks, if any*
- *functional test of brakes with a full load*
- *check for anomalous noises and/or vibrations*
- *greasing of mechanisms and limit switches in order to ensure regular operations and limit their wear and tear*
- *check of functionality and integrity of the push button control panel and cable thereof.*


























QUARTERLY OPERATIONS, PERFORMED BY QUALIFIED PERSONNEL:

- *verification of efficiency and wear and tear degree of: hook, wire rope and rope guide*
- *verification of the wear and tear degree of drum and pulleys*
- *verification of the wear and tear degree of wheels, pinions, traveling trolley's and/or bridge's guide rollers*
- *verification of efficiency and functionality of load limiter*
- *visual check of the switchboard's inside to ascertain any presence of dusts*
- *verification of oxidized contacts: after cleaning, they are to be covered with a very thin layer of a specific product*
- *verification of greasing of traveling trolleys of the festooned line, if any, and check of cables*
- *verification of the efficiency and integrity of the power supply line and of its components*
- *verification of motors and brakes and check of their wear and tear degree*

RECURRENCE AND DEADLINES OF MAINTENANCE OPERATIONS

The recurrence of the following operations refers to machines which are used under standard operation conditions and are valid up to the M5 service group (ISO 4301/88 rule), or 2m (FEM 9.511 rule). If the hoist is normally and properly used on a 8-hour daily shift, its overhauling may be carried out after a period of use of 10 years approx. (FEM 9.755 – S.W.P. rule). If the hoist is employed on more than one shift per day, maintenance intervals shall be reduced accordingly.

TABLE OF PERIODIC CHECK AND MAINTENANCE OPERATIONS

Object	Periodic Checks				Notes at page
	Daily	Monthly		Annual	
Checks Inspections - Tests	 Generic visual checks Verification of correct functioning	 General visual inspections	 Verification of wear and tear	  Annual test	
Structural elements Weldings Pins and hinges				 Verification of efficiency and wear and tear degree Verification of bolted/welded joints	
Lifting chain Fixing elements	 Visual inspection		 Verification of efficiency and wear and tear degree		
Hoisting hook	 Visual inspection and verification of spring catch		 Verification of efficiency and wear and tear degree		
Block sproket Rotating sproket			 Verification of efficiency and wear and tear degree		
Lifting sproket Chain guide			 Verification of efficiency and wear and tear degree		
Hoisting reducer Traveling reducer		 Verification of noisiness			
Hoisting motor Traveling motor	 Verification of correct functioning		Tests with load		
Hoisting brake Traveling brake	 Verification of correct functioning	 Tests of braking distances with load	 Tests with load Verification of wear and tear degree		
Wheels and pinions Guiding rollers			Verification of wear and tear degree		
Buffers Trolley				Verification of wear and tear degree	
Wiring Push button control panel or radio-control	 Verification of correct functioning	 Visual inspection of external breaks of push button control panel/cable	 Verification of wear and tear degree and efficiency		
Load Limiter (clutch)			Tests with load	 Verification of setting	
Hoist limit switches Travel limit switches Slide limit switches	 Verification of correct functioning		 Tests with load Verification of wear and tear degree and efficiency		
Cleanliness and lubrication	 Verification of the correct state of cleanliness and lubrication	 Inspection of general lubrication	Verification of leaks. Lubricate wire ropes, hook and mechanisms		



All operations must be logged in a check register prepared to this purpose.

OPERATIONS TO BE PERFORMED

The long-life, economical use and efficiency of lifting equipment depend on the scheduled maintenance given in this table. These are general maintenance procedures and should be considered the minimum requirement. Naturally, reference to 60 months of scheduled maintenance doesn't guarantee that the machine will work perfectly, in addition to maintenance other factors are important: appropriate use, the intensity of working cycle, and environmental conditions.

We strongly advise compliance with the maintenance intervals given below, checks concerning parts subject to wear tear as well as the consumption of lubricant.

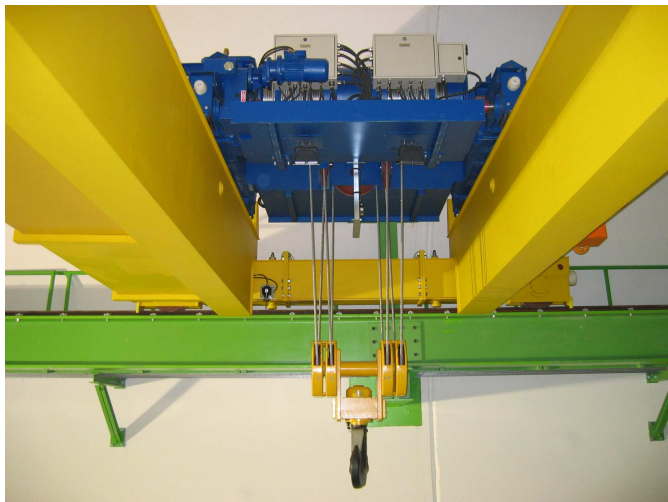
IMPORTANT

Intervals between servicing should decrease when hoists and cranes are operating in extreme environmental conditions, or have a high Duty Rating, (eg. Monthly instead of yearly checks).

EVERY	COMPONENTS TO BE INSPECTED	REPLACEMENTS	VERIFICATIONS AND ADJUSTMENTS	LUBRICATIONS
1 YEAR (12 months)	BRAKES		Air Gap – Springs Lining wear and tear	Cleaning
	LIFTING CHAIN		Crushing, broken wires	Cleaning and greasing
	CHAIN GUIDE		Sprocket clearance and wear and tear degree	
	PUSH BUTTON CONTROL PANEL		Broken push buttons and blocked terminals	Cleaning
	WHEELS OF THE MONORAIL TROLLEY		Wear and tear degree Toothing play Pinion keying	Cleaning of sliding surfaces and greasing of the toothing
	LIMIT SWITCH		Working order Stop limits	



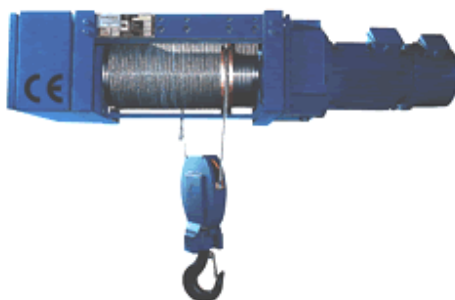
EVERY	COMPONENTS TO BE INSPECTED	REPLACEMENTS	VERIFICATIONS AND ADJUSTMENTS	LUBRICATIONS
2 YEARS (24 months)	BRAKES		Air gap - Springs Lining wear and tear	Cleaning
	LIFTING CHAIN		Crushing, broken wires	Cleaning and greasing
	CHAIN GUIDE		Sprocket play and wear and tear degree	
	PUSH BUTTON CONTROL PANEL		Broken push buttons and blocked terminals	Cleaning
	WHEELS OF THE MONORAIL TROLLEY		Wear and tear degree Toothing play Pinion keying	Cleaning of sliding surfaces and greasing of toothing
	LIMIT SWITCHES		Working order Stop limits	Oil top-up
	HOISTING SPEED REDUCER		Oil leakage Noise level	Oil top-up
	TRAVELING REDUCERS		Oil leakage Noise level Shock absorber play	
	FLEXIBLE ELECTRIC CABLES		Insulation-broken conductors	
	SWITCHGEARS		Working order State of protections	



EVERY	COMPONENTS TO BE INSPECTED	REPLACEMENTS	VERIFICATIONS AND ADJUSTMENTS	LUBRICATIONS
3 YEARS (36 months)	BRAKES	Brake linings for bridge and trolley hoisting	Air gap - Springs Braking distances	Cleaning
	LIFTING CHAIN		Crushing, broken threads	Cleaning and greasing
	CHAIN GUIDE	Rope guide ring		
	PUSH BUTTON CONTROL PANEL		Broken push buttons and blocked terminals	Cleaning
	WHEELS OF THE MONORAIL TROLLEY		Wear and tear degree Toothing play Pinion keying	Cleaning of sliding surfaces and greasing of the toothing
	LIMIT SWITCHES	Hoist limit switches	Stop limits	
	HOISTING REDUCER		Wear and tear degree of gearing	Oil change
	TRAVELING REDUCERS		Wear and tear degree of gearing	Oil change
	SWITCHGEAR		Working order, setting, protections and timers	Cleaning
	FLEXIBLE ELECTRIC CABLES		Insulation – broken conductors	
	CONNECTING AND FIXING BOLTS AND NUTS		Nuts locking Hinge functionality	
	WHEEL UNITS FOR TROLLEY TRAVELING		Position of pins Wear and tear of dampers	
	ELECTRIC MOTORS		Working order Terminal boards	
	BLOCK		Wear and tear of hook and sproket	Greasing of thrust bearings
	ROTATING AND COMPENSATING SPROKET		Wear and tear degree and flowability State of supports	Cleaning
	METALLIC FRAMES		Check of joints State of the paint	
FIXED ELECTRIC CONNECTIONS		Cable fixing Blocked terminals Insulation		

EVERY	COMPONENTS TO BE INSPECTED	REPLACEMENTS	VERIFICATIONS AND ADJUSTMENTS	LUBRICATIONS
4 YEARS (48 months)	<i>BRAKES</i>	<i>Servo brake</i>	<i>Air gap - Springs Wear and tear of linings</i>	<i>Cleaning</i>
	<i>LIFTING CHAIN</i>	<i>Wire rope</i>		<i>Cleaning and greasing</i>
	<i>CHAIN GUIDE</i>		<i>Sprocket play and wear and tear degree</i>	
	<i>PUSH BUTTON CONTROL PANEL</i>	<i>Push button control panel and cable</i>	<i>Maneuvering directions</i>	
	<i>WHEELS OF THE MONORAIL TROLLEY</i>	<i>Wheels, pinions, bearings</i>	<i>Wear and tear degree Toothing play Pinion keying</i>	<i>Cleaning of sliding surfaces and greasing of the toothing</i>
	<i>LIMIT SWITCHES</i>		<i>Working order Stop limits</i>	
	<i>HOISTING REDUCER</i>		<i>Oil leakage</i>	<i>Oil top-up</i>
	<i>TRAVELING REDUCERS</i>		<i>Oil leakage</i>	<i>Oil top-up</i>
	<i>SWITCHGEAR</i>		<i>Working order, setting, protections and timers</i>	<i>Cleaning</i>
	<i>FLEXIBLE ELECTRIC CABLES</i>		<i>Insulation – broken conductors</i>	<i>Cleaning</i>
	<i>CONNECTING AND FIXING BOLTS AND NUTS</i>		<i>Nut locking</i>	
	<i>UNITS FOR TROLLEY TRAVELING</i>	<i>Reducer dampers</i>		<i>Cleaning</i>
	<i>ELECTRIC MOTORS</i>		<i>Working order Terminal boards</i>	
	<i>BLOCK</i>		<i>Wear and tear of hook and sproket</i>	
	<i>ROTATING AND COMPENSATING SPROKET</i>		<i>Wear and tear degree</i>	
	<i>METALLIC FRAMES</i>		<i>Check of joints State of the paint</i>	
<i>FIXED ELECTRIC CONNECTIONS</i>		<i>Cable fixing</i>	<i>Cleaning</i>	

ALWAYS REQUIRE OUR HOIST FOR YOUR UNIT



EVERY	COMPONENTS TO BE INSPECTED	REPLACEMENTS	VERIFICATIONS AND ADJUSTMENTS	LUBRICATIONS
5 YEARS (60 months)	BRAKES		Air gap - Springs Wear and tear of linings	Cleaning
	LIFTING CHAIN		Crushing, broken threads	Cleaning and greasing
	CHAIN GUIDE		Drum play and wear and tear degree	
	PUSH BUTTON CONTROL PANEL		Broken push buttons and blocked terminals	Cleaning
	WHEELS OF THE MONORAIL TROLLEY		Wear and tear degree Toothing play Pinion keying	Cleaning of sliding surfaces and greasing of the toothing
	LIMIT SWITCHES	Limit switches of trolley	Stop limits	
	HOISTING REDUCER		Wear and tear degree of gearing	Oil top-up
	TRAVELING REDUCERS		Wear and tear degree of gearing	Oil top-up
	SWITCHGEAR	Transformer	Functionality Setting, protections and timers	
	FLEXIBLE ELECTRIC CABLES		Insulation – broken conductors	Cleaning
	CONNECTING AND FIXING BOLTS AND NUTS		Locking of nuts and of fixing members	
	UNITS FOR BRIDGE SLIDING	Wheels' bearings	Position of pins Wear and tear of dampers	Cleaning
	ELECTRIC MOTORS		Functionality Terminal boards	
	BLOCK	Sprocket	Bearings	Greasing of thrust bearings and bearings
	ROTATING AND COMPENSATING SPROKET	Sprocket	Bearings	
	METALLIC FRAMES		Check of joints State of the paint	
FIXED ELECTRIC CONNECTIONS		Cable fixing	Cleaning	

AUTHORIZED PERSONNEL FOR OPERATIONS IN THE EVENT OF BREAKDOWN

Personnel authorized to operate in the majority of breakdowns, or where not otherwise indicated, are maintenance men who are experienced or qualified through a specific training on mechanical and electrical parts. Where indicated, operations must be performed by specialized, or specifically trained, staff members or by technical staff sent by the manufacturer.

BREAKDOWN

The machine does not work.

If, when control push buttons are pressed, the machine does not work:

- Do not insist pressing push buttons
- Check main or auxiliary fuses are not loosened or blown
- Check limit switches, as some contacts may have remained open
- It is possible that a conductor inside the push button control panel's cable is interrupted due to crushing caused by transportation or assembly
- The brake is jammed for lack of power supply; check the brake's functioning separately from the motor's
- If disk brakes vibrate excessively it means that:
 - a) they are fed with two phases only
 - b) feeding voltage is too low
 - c) the air gap between magnetic parts is too large.
- The push button control panel is faulty
- The low voltage transformer is blown (check the output voltage)
- If the crane has a tendency to start and then stop, it is possible that one of the bridge motors has two phases which are inverted with respect to the other motor
- If the bridge tends to go out of square or one of the wheels to get over the rails:
 - a) one of the motors is not working properly
 - b) one of the two brakes is jammed
 - c) one of the driving wheels does not touch the raceway (verify tolerances on raceways).
- The hoist can not lift the nominal load, has trouble getting started, does not resume the suspended load:
 - a) the power supply line is under-dimensioned, voltage drops by over 8%.
 - b) voltage is to be checked between the phases at the starting of the hoisting motor
 - c) the hoisting motor is not connected properly (check the terminal board).

Repair

Operating modes in the event of emergency:



- If one of the hoisting brakes has a faulty servo brake:
 - a) manually loosen the braking action and let the load down very slowly and with the greatest caution
 - b) if the system has two working speeds, let the load down using the active one
- If one of the bridge sliding motors is stalled:
 - a) in the event either the servo brake or the feeder are faulty, loosen both brakes and use the crane with the greatest caution
 - b) if one of the motors is blown, remove the faulty motor reducer by slipping it off the hollow shaft and provisionally use the crane, with great caution, at the lowest available speed and, if possible, with the load nearer to the efficient motor.



In both cases, have the machine fully repaired as soon as possible.

In the event of breakage regarding which no qualified hands are available, do not hesitate to contact us for assistance.

WHAT TO DO IF

FUNCTION  BREAKDOWN 	<i>Hoist lifting</i>	<i>Trolley traveling</i>	Possible cause of breakdown
Does not start	X		<ul style="list-style-type: none"> • hoist/lower limit switches • hoisting/lowering contactor • hoisting/lowering push button • load limiter • hoist motor • Hoisting motor fuses
Does not start	X	X	<ul style="list-style-type: none"> • hoist/trolley power supply cable • power supply line • low voltage transformer • line contactor • line fuses
Does not start	-	X	<ul style="list-style-type: none"> • left/right limit switches • left/right contactor • left/right push button • trolley motor • traveling motor fuses
starts partially (in one direction only)	X	X	<ul style="list-style-type: none"> • limit switch, contactor or push button of the inhibited function (independent from one another) • One phase loss
the movement does not finish in the due distance	X <i>besides, the load slides down and is not held</i>	X	<ul style="list-style-type: none"> • function brake
the movement does not finish within the due limits	X	X	<ul style="list-style-type: none"> • function brake • function limit switches
the movement continues in its function also after releasing the relevant push button	X	X	<ul style="list-style-type: none"> • faulty direction push button • relevant contactor • "false contact"
hoisting reducer excessively noisy	X	-	<ul style="list-style-type: none"> • scarce lubrication • service off cycle
trolley reducer excessively noisy	-	X	<ul style="list-style-type: none"> • clearance between wheel and girder's flange is too narrow • scarce lubrication • not correct/excessively intensive service
screeching brake screeching noise during braking	X	X	<ul style="list-style-type: none"> • presence of dust • excessive clearance • worn out braking lining
screeching wheels (jerk motion)	-	X	<ul style="list-style-type: none"> • wrong clearance between wheel and girder's flange • scarce lubrication • not correct/excessively intensive service
screeching lifting chain and/or sprokets	X	-	<ul style="list-style-type: none"> • worn out wire rope or drum/pulleys • scarce lubrication • not correct/excessively intensive service
the hoist bumps during traveling	-	X	<ul style="list-style-type: none"> • non correct contact between rail and wheel • non aligned joints of sliding beam
the hoist and/or trolley move slowly or the hoist has difficulty lifting the load	X	X	<ul style="list-style-type: none"> • voltage drop • overloading (in the absence of the load limiter) • beginning of reducer seizing • non correct contact between rail and wheel
electric current in the hook	X	-	<ul style="list-style-type: none"> • faulty or damaged wiring
the trolley skids on the rails and does not travel	-	X -	<ul style="list-style-type: none"> • clearance between wheel and girder's flange is too narrow • obstacle on the girder's flange • oil and grease on the girder's flange

BREAKDOWN OF COMPONENTS AND POSSIBLE REMEDIES

Causes of poor functioning of single parts and possible remedies

Type of breakdown	Possible causes of breakdown	Possible remedy
the wire rope ascends "jerkily" and screeches	<ul style="list-style-type: none"> breakdown of the lifting chain and/or sprockets scarce lubrication 	<ul style="list-style-type: none"> replace the lifting chain and, if necessary, the sprockets lubricate the lifting chain, and the sprockets
brake skidding	<ul style="list-style-type: none"> wear and tear of the braking lining presence of oil/grease 	<ul style="list-style-type: none"> adjust the clearance or replace the lining clean the lining
Overheating brake	<ul style="list-style-type: none"> non correct service wrong adjustment it works in unsuitable environmental conditions 	<ul style="list-style-type: none"> restore the correct working conditions adjust the brake
the brake does not unlock	<ul style="list-style-type: none"> lack of power supply wrong adjustment 	<ul style="list-style-type: none"> restore voltage values adjust the brake
the brake tends to "stick"	<ul style="list-style-type: none"> it works in unsuitable environmental conditions or off service condition 	<ul style="list-style-type: none"> restore adequate conditions
the limit switch is locked open won't restore	<ul style="list-style-type: none"> clogged activating head incorrect correspondence interrupted connections 	<ul style="list-style-type: none"> clean it and restore right conditions
the control panel push buttons are locked "closed"	<ul style="list-style-type: none"> clogged push button control panel 	<ul style="list-style-type: none"> cleaning check conductors
contactors have "glued" contacts	<ul style="list-style-type: none"> use in unsuitable environmental conditions or for not intended service 	<ul style="list-style-type: none"> restore right use conditions
the motor is too hot	<ul style="list-style-type: none"> voltage fluctuations are > 10% poor cooling environmental temperature > to the one expected the hoist usage does not conform to the service condition provided for 	<ul style="list-style-type: none"> provide the right voltage restore the correct air circulation adapt the motor's characteristics adapt the service conditions to the ones provided for
the motor does not start	<ul style="list-style-type: none"> blown fuses or not adjusted thermal the contactor interrupted the power supply overloading, blocking due to high starting frequencies, insufficient protection 	<ul style="list-style-type: none"> replace the fuse and/or adjust the thermal check the function's contactor rewind the motor and guarantee a better protection check the switchgear
the motor has difficulties starting	<ul style="list-style-type: none"> upon starting, the voltage or the frequency become lower than their nominal values 	<ul style="list-style-type: none"> improve the power supply line or network conditions
the motor buzzes and absorbs too much current	<ul style="list-style-type: none"> faulty winding, the rotor touches the stator the power supply lacks one phase the motor reducer is blocked the brake is blocked short circuit in the power supply cables short circuit in the motor 	<ul style="list-style-type: none"> have a qualified technician making the repair check the power supply and/or the contactor request a qualified technician's intervention check and, if necessary, adjust the brake eliminate the short circuit request a qualified technician's intervention
short circuit in the motor's winding	<ul style="list-style-type: none"> falty winding 	<ul style="list-style-type: none"> rewind the motor
false contact	<ul style="list-style-type: none"> accidental activation of the function 	<ul style="list-style-type: none"> check push button control panel conductors

PUTTING THE MACHINE OUT OF OPERATION



The machine must be immediately put out of operation in face of the following negative events:

- Cracks in the plates or weldings, due to stress and fatigue.
- Permanent deformations of the main structure or of structural elements, due to overloading or external factors
- Deformations caused by collisions due to the action of the wind.
- Break in the chain guard of hoisting or traveling reducers.
- Destruction of the braking linings of the hoisting brakes
- Stretching of the wire rope or breaking of the pulleys caused by overloading, anchoring of the hook to fixed structures, collision of the block against the machine body.
- Breaking of the reducer/drum shaft or of the motor coupling or shaft.
- Heavy wear and tear of hoisting gears.
- Hoisting brake inefficiency due to faulty relevant servo brake.

DISMANTLING, DISPOSAL AND SCRAPPING



- The demolition of the machines and of all the accessories thereof must be performed using suitable tools and equipment chosen taking into consideration the nature of the material involved (oxy-hydrogen flame, hacksaws, etc.)
- All components or parts must be reduced to pieces of dimensions which are such as to make their future use impossible.
- All materials, following their dismantling and scrapping, must be disposed of separately taking into careful consideration their different nature (metals, plastics, lubricating oils, etc.) entrusting their disposal, where possible, to qualified companies and always in full compliance with the relevant provisions of the law in force.

SPARE PARTS TABLE

POS.	NAME	REPLACEMENT EVERY MONTHS				QUANTITY		NOTES
		24	36	48	60	Per machine	Recommended stock	
1	Hoisting brake friction linings	x		x		1 set	1 set	Disks or shoes
2	Hoisting servo brake			x		1	1	Electromagnetic or Electro-hydraulic
3	Chain guide		x			1	1	For hoists only
4	Lifting chain			x		1	1	
7	Friction linings of the trolley brake		x			1 set	1 set	Disks or shoes
8	Monorail trolley wheels			x		1 set	1 set	
9	Monorail wheel bearings			x		1 set		
10	Pinions for monorail trolley	x		x		2	2	
11	Traveling unit dampers			x		1 set	1 set	
12	Hoist limit switch		x			1	1	
12	Trolley limit switch				x	1	1	
13	Fuses					1 set	3 sets	
14	Transformer				x	1		
15	Push button control panel	x		x		1	1	
16	Trolleys for push button control panel line					1 sets	3	
17	Trolleys for trolley line					1 set	2	
18	Trolleys for general line					1 set	2	

The chain must be replaced according to its degree of wear and tear or broken threads. The mandatory periodical check is governed by the rules and regulations prescribed by the law.

Always use Italkrane original spare parts!

ELECTROMAGNETIC "BABY" DISK BRAKE IN STANDARD OR EXPLOSION-PROOF EXECUTION – DIRECT CURRENT FEEDING

BRAKE

When power is supplied to the brake, the electromagnet (3) is energised overcoming the pressure exerted by the springs (4) by means of the floating keeper (2), in so doing freeing the friction disc (6) and allowing the motor shaft to rotate freely. When the electric power to the brake is interrupted, the electromagnet (3) being de-energised enables the springs (4) to re-exert pressure on the brake disk via the floating keeper (2), thus stopping rotation of the motor shaft.

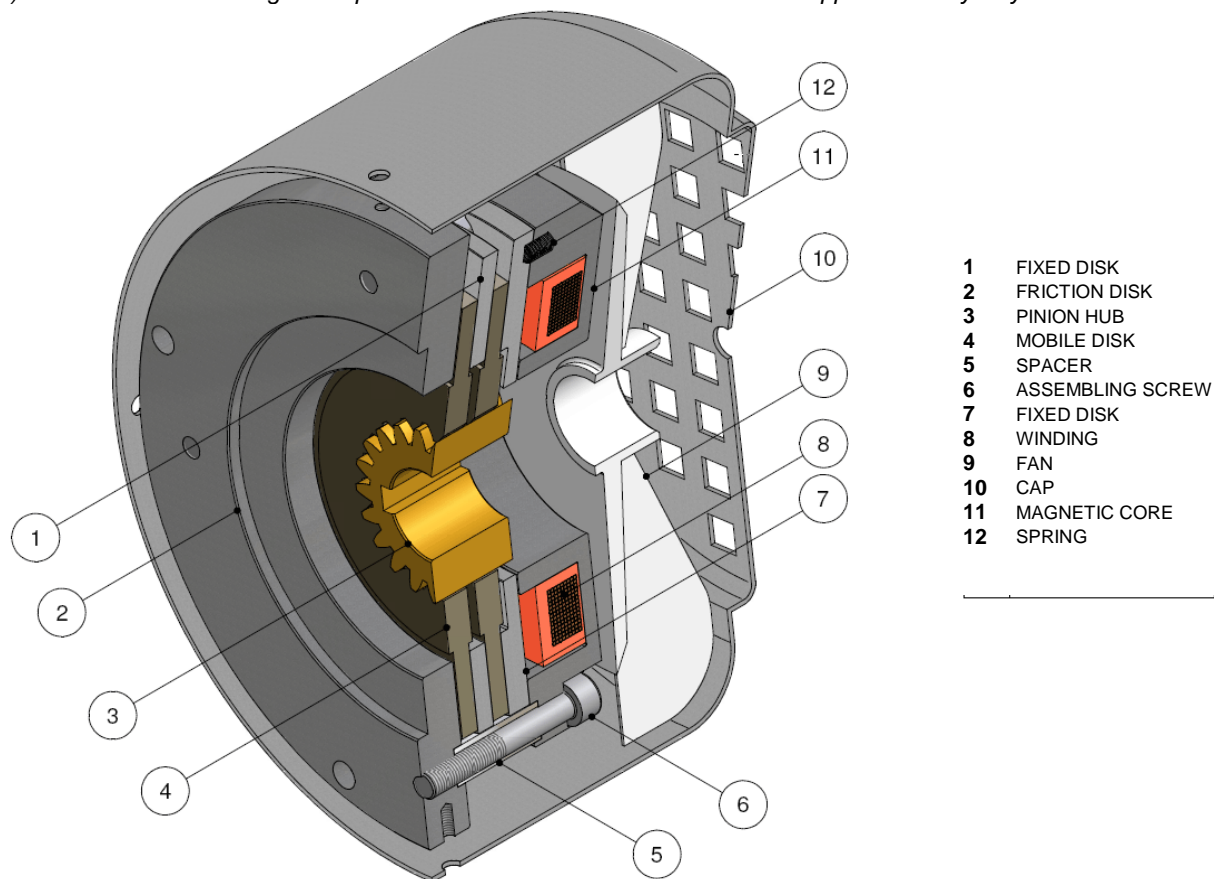
This arrangement referred to as "Fail Safe" means that with the power on, the brake is released, and with the power off, the brake is automatically applied.

MAINTENANCE

After the unit has been in service for a maximum of 12 months, or should a reduction in braking efficiency be detected, the brake disc (6) must be checked for damage or excessive wear.

The following sequences should be applied:

- A) Disconnect brake feeder cable at motor terminal box.
- B) Remove brake cover (7).
- C) Carefully remove electromagnet (3) and keeper plate (2) from the location pins, leaving spacers (9) in position.
- D) Remove the mobile disc (6) and with a Micrometer check the thickness, if less the 5 mm, it should be replaced.
- E) Whilst the electromagnet is removed, examine all brake springs (4), if there is any sign of spring fatigue, all springs should be replaced.
- F) When re-assembling it is important that the brake feeder cable is not trapped or in any way the insulation damaged.



IMPORTANT

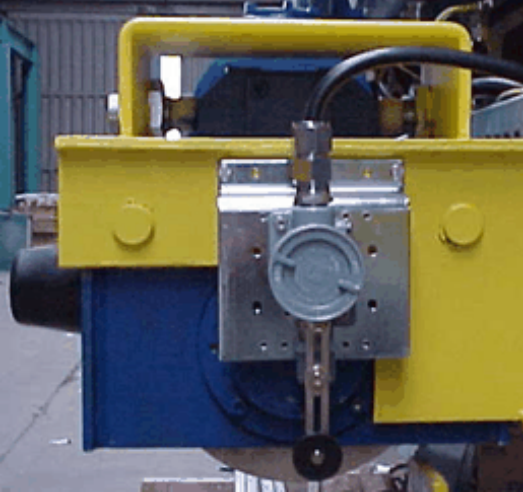


From the aforementioned it will be apparent that by reducing the quantity, or the rating of the springs, the torque and the subsequent efficiency of the brake can be affected.

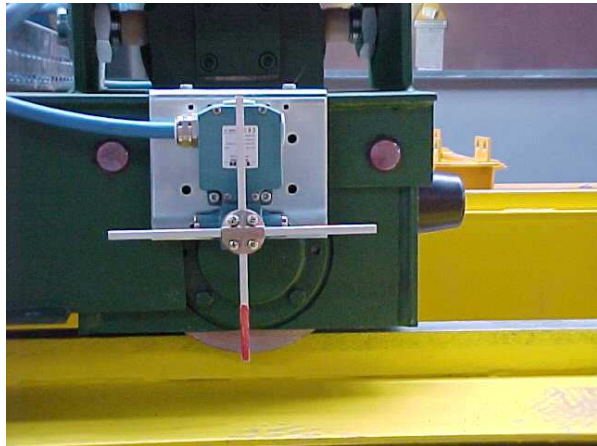


NEITHER THE QUANTITY NOR THE RATING OF THE SPRINGS SHALL BE ALTERED WITHOUT THE MANUFACTURERS APPROVAL; THE SAME APPLIES TO ANY OTHER COMPONENTS.

INSTALLATION AND SETTING OF TRAVEL LIMIT SWITCHES



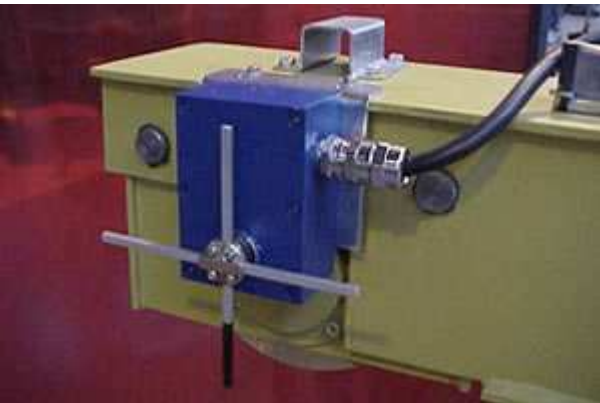
Roller limit switch



Cross limit switch



Examples of adjustable (single or double peg) actuators for limit switches, to be used with cross limit switches.



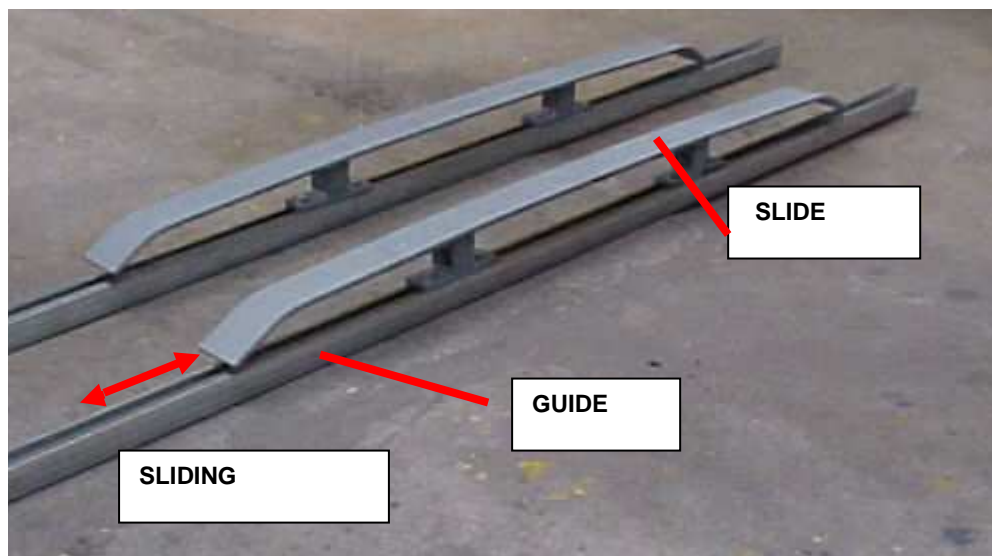
Cross limit switch in "EX IIB" execution



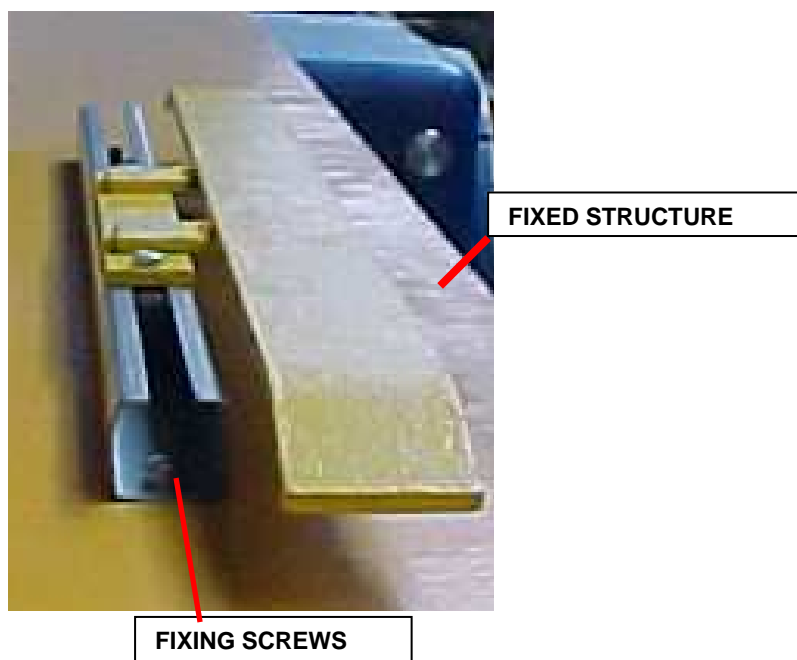
Lever limit switches in "EX IIC" execution"

POSITIONING SLIDE ACTUATORS FOR LEVER LIMIT SWITCHES

(Optional) Slide actuators are of the adjustable kind. They are adjusted by making them slide along the guide



First of all, secure the guide to the fixed structure (e.g. raceway) where the machine is installed.

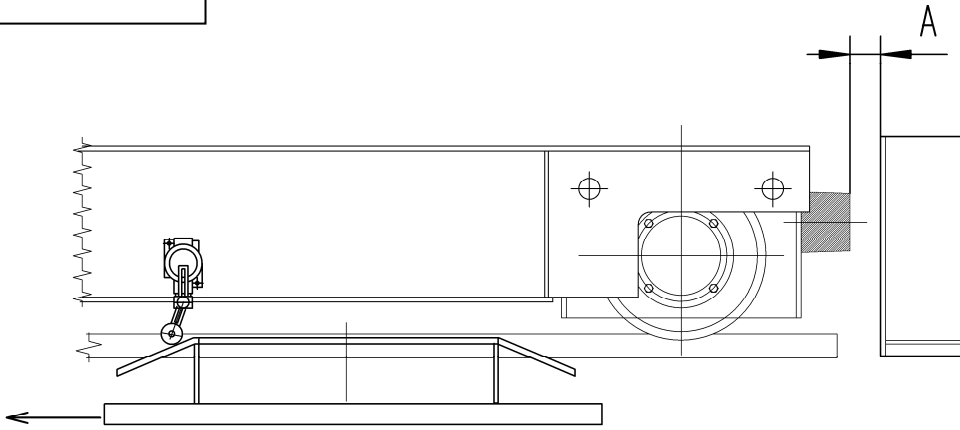


Position the actuator so that the crane moves slowly toward the end stop.

When the buffer is approx. 50 mm from the mechanical stop, the hoist must stop as a result of the action of the limit switch.

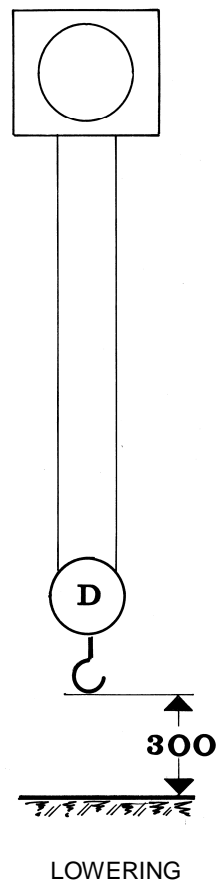
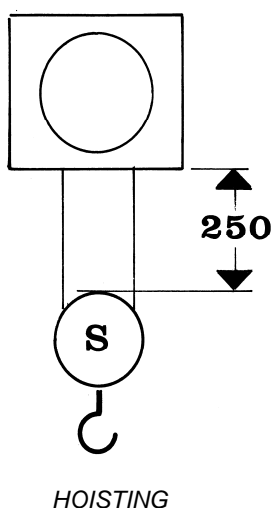
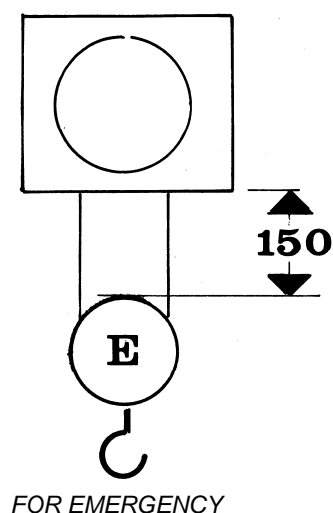


ROLLER



A=50 mm APPROX

⚠ RECOMMENDED MINIMUM SAFETY DISTANCES TO BE OBSERVED DURING THE ADJUSTMENT OF THE HOIST-LOWER LIMIT SWITCHES



⚠ PLEASE NOTE

When the emergency limit switch is open, it is no longer possible to operate the crane using the normal controls.

Therefore it is necessary to continue in one of two ways:

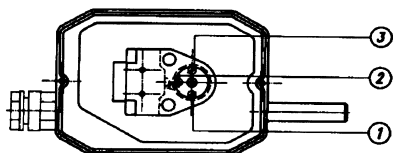
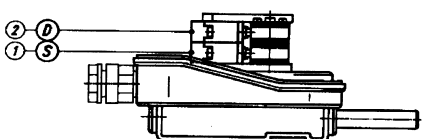
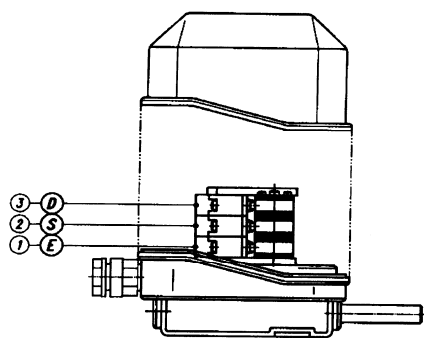
- act on the line contactor manually and at the same time lower the hook a few centimetres;
- by-pass the emergency limit switch contacts temporarily and lower the hook.
- find out why the "hoisting" contact did not work, repair the fault and re-set the limit switch.

⚠ All limit switch setting operations and re-setting safety-gaps must be carried out by specialised electricians authorised by respective section heads. 

SETTING OF THE "TER" TYPE WORM SCREW HOIST LIMIT SWITCHES



(To be carried out by a qualified operator) 



This series of limit switches is made up of a case containing a worm screw unit and micro-switches. It is directly driven by the rope drum axle to which it is connected by means of a plastic coupling or an hexagonal shaft.

Removing the cover the cams of the micro-switches can be seen.

The cam can be released by loosening the central screw; with lateral screws 1 - 2 - 3 place the cams in the exact position for opening the contact relative to the two working directions.

Re-tighten the central screw and carry out a few lifting manoeuvres as a final test. If there is a cam for the emergency contact, which acts on the line contactor switch, there should be a slight delay compared to the "hoist" contact.

The contacts must be set in the following order; emergency, "hoist" and then "lower".

Make sure the central screws are tight and then carefully shut the case.


E Emergency micro switch

S "Hoisting" micro switch

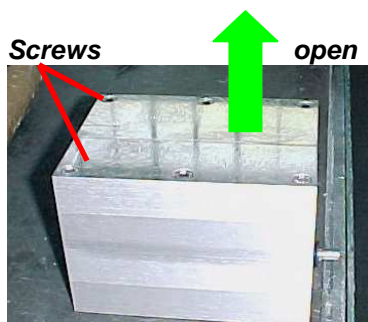
D "Lowering" micro switch

SETTING OF THE "BOX 0A" TYPE WORM SCREW HOIST LIMIT SWITCH

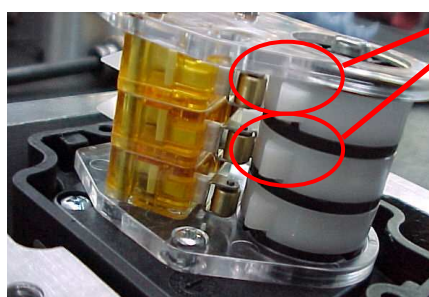


(to be carried out by a qualified operator) 

For setting operations, please refer to the instructions for TER type limit switch

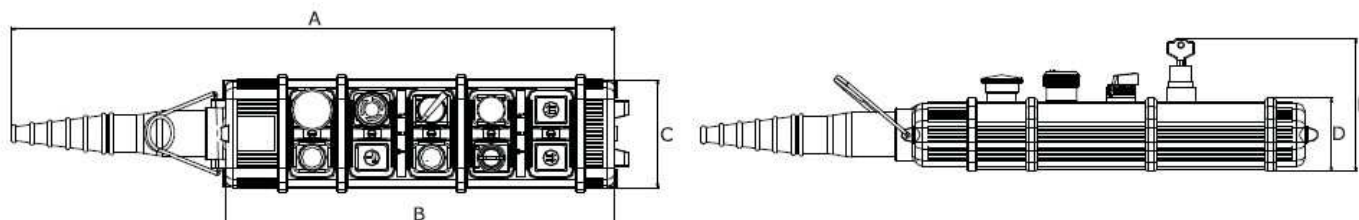


Central screw



CAMS



STANDARD VERSION SPA SERIES PUSH BUTTON CONTROL PANEL

No. of buttons	Weight (kg)	Overall dimensions (mm)				
		A	B	C	D	E
2	0.520	318	132	94	64	116
4	0.700	370	184	94	64	116
6	0.880	422	236	94	64	116
8	1.040	474	288	94	64	116
10	1.300	526	340	94	64	116
12	1.380	578	392	94	64	116
14	1.550	630	444	94	64	116
16	1.710	682	496	94	64	116
18	1.890	734	548	94	64	116
20	2.050	786	600	94	64	116

TECHNICAL SPECIFICATIONS

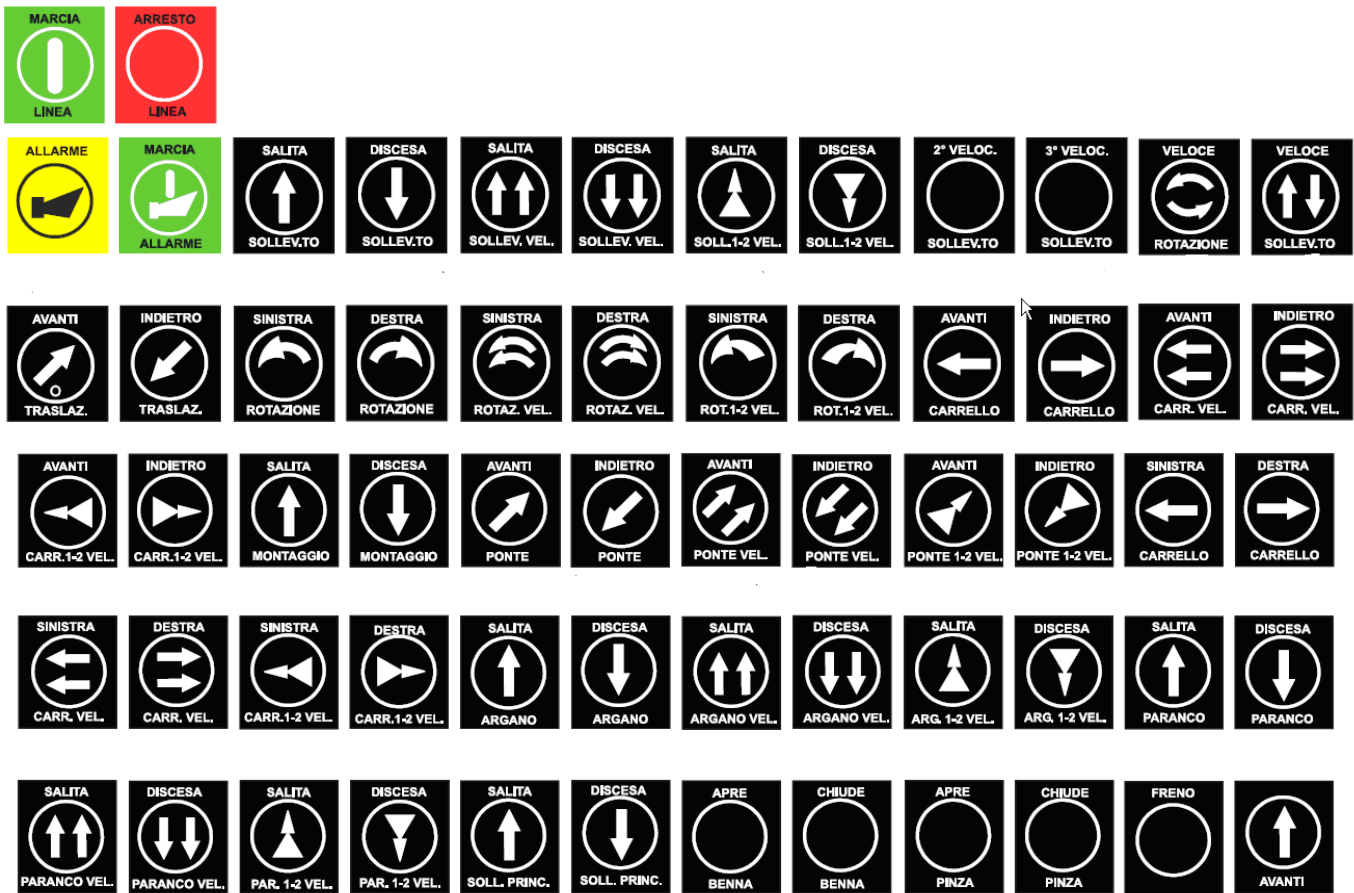
Conformity to Community Directives	2006/95/CE
Conformity to Standards	EN 60204-1 EN 60947-1 EN60947-5-1 EN 60529 EN 418
Ambient temperature	Storage -40°C/+70°C Operational -25°C/+70°C
Protection degree	IP 65
Insulation category	Class II
Cable entry	Rubber cable sleeve Ø 14÷26 mm
Operating positions	Any position
Markings	CE

TECHNICAL SPECIFICATIONS OF THE SWITCHES

Utilisation category	AC 15
Rated operational current	1.9 A
Rated operational voltage	380 V
Rated thermal current	10 A
Rated insulation voltage	500 V~
Mechanical life	1x10 ⁶ operations
Terminal referencing	According to EN 50013
Connections	Screw-type terminals
Markings	CE

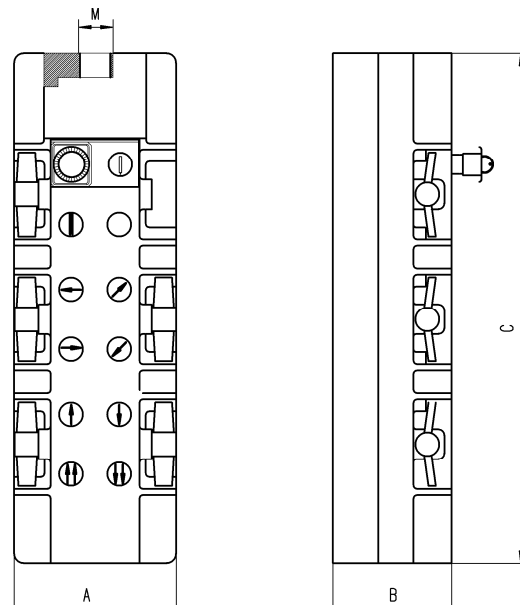
CHIEF SYMBOLS

(in compliance with FEM 9.941/95 "Control Symbols")



"Ex" EXECUTION "FLY" SERIES PUSH BUTTON CONTROL PANEL

IP66 MECHANICAL PROTECTION GRADE
 II 2GD EExd IIB T6 EXPLOSION-PROOF EXECUTION
 ENVIRONMENTAL TEMPERATURE -20°C/+55°C **





- Only qualified crane operators shall use the crane.
- Before beginning work make sure that runways are clear. Check limit switches and inform the Section Head immediately if there are any problems.
- Never lift loads exceeding maximum capacity or not properly slinged. Consult data given on the crane.
- Never start operating until starting signal is given, by the operators assistant or rigger.
- Do not swing the load. Always unload in line with by the operators assistant or rigger the vertical path.
- Do not lift or transport over working and transit areas. When this is absolutely unavoidable operations must be signalled.
- Before leaving its position the crane-operator must ensure that no loads are left suspended, switch off the power supply and set the controls to zero.
- Never leave anything on the gangway. The driver's cab must be kept clean and clear of inflammable material. When the crane is out of service for repair or maintenance, switch off the main power supply, and display notice to this effect.
- After work and during breaks out-door service gantry or similar cranes must be clamped with tongs or other devices.
- When the crane power supply flexible cable runs along the ground make sure no damage occurs to it.

SLING CAPACITY																				
STEEL SLINGS WITH FIBRE CORE – res. 180 Kg/mm²					ALLOYED STEEL CHAIN SLINGS GRADE 80					POLYESTER RING SLINGS					FLAT SLINGS					
Ø D I A M E T E R					Ø D I A M E T E R					T Y P E					W I D T H					M A T E R I A L
	650	800	1.300	920		7	1.200	960	1.680		2.500	SF1	1.000	800		2.000	1.400	50	1.350	
10	1.000	800	2.000	1.410	10	2.500	2.000	3.500	5.250	SF2	2.000	1.600	4.000	2.800	62	1.600	1.280	3.200	3.200	P O L Y A M I D E O R N Y L O N
12	1.400	1.000	2.800	2.000	13	4.000	3.200	5.600	8.400	SF3	3.000	2.400	6.000	4.200	75	1.800	1.440	3.600	3.600	
14	2.000	1.600	4.000	2.800	16	6.400	5.120	9.000	13.500	SF4	4.000	3.200	8.000	5.600	100	2.500	2.000	5.000	5.000	
16	2.500	2.000	5.000	3.500	20	10.000	8.000	14.000	21.000	SF5	5.000	4.000	10.000	7.000	150	3.250	2.600	6.500	6.500	
18	3.200	2.560	6.400	4.500	22	12.000	9.600	16.800	25.200	SF6	6.000	4.800	12.000	8.400	225	4.500	3.600	9.000	9.000	
20	4.000	3.000	8.000	5.650	26	16.000	12.800	22.400	32.000	SF8	8.000	6.400	16.000	11.200	300	6.000	4.800	12.000	12.000	
22	4.800	3.840	9.600	6.750	32	25.000	20.800	32.000	50.000	SF10	10.000	8.000	20.000	14.000	S A F E T Y C O E F F I C I E N T = 6					
24	6.000	4.800	12.000	8.500		■	■	■	■	SF12	12.000	9.600	24.000	16.900	50	900	720	1.800	1.800	
26	6.600	5.000	13.200	9.330		■	■	■	■	SF15	15.000	12.000	30.000	21.200	62	1.100	880	2.200	2.200	
28	8.000	■	16.000	11.300		■	■	■	■	SF20	20.000	16.000	40.000	28.200	75	1.350	1.080	2.700	2.700	
30	9.000	■	18.000	12.700		■	■	■	■	SF25	25.000	20.000	50.000	35.300	100	1.800	1.440	3.600	3.600	
32	10.100	■	20.200	14.280		■	■	■	■	SF34	34.000	27.200	68.000	47.900	150	2.250	1.800	4.500	4.500	
36	12.600	■	25.200	17.800		■	■	■	■		■	■	■	■	200	2.700	2.160	5.400	5.400	
40	15.500	■	31.000	22.000		■	■	■	■		■	■	■	■		■	■	■	■	
S A F E T Y C O E F F I C I E N T = 6					S A F E T Y C O E F F I C I E N T = 6					S A F E T Y C O E F F I C I E N T = 6					S A F E T Y C O E F F I C I E N T = 6					

CAPACITIES REFER TO NEW SLINGS WHEN MULTIPLE FALL SLINGS ARE USED THE MAXIMUM ANGLE AT THE APEX WHERE THE FALLS ARE OPENED WIDEST MUST BE TAKEN INTO ACCOUNT IT IS NOT ADVISABLE TO USE SLINGS WITH THE APEX ANGLE OVER 120°

SAFETY RULES FOR LOAD SLINGING

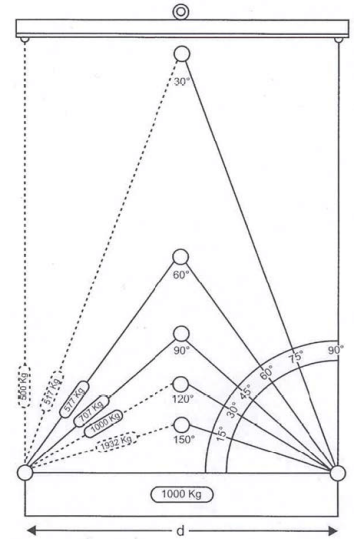
Given the ever increasing use of hoisting equipment for handling materials, the issue of load slinging is becoming more and more important.

The personnel members employed in such operations must be informed of the specific hazards to which they are exposed or to which they may expose other workers.

Loads which can be connected directly to the hook of a hoisting machine are rare. Flexible means such as chains, wire or textile ropes, are used in most cases. Particular attention must be paid to their capacity, as ropes and chains used for slinging and hoisting loads are subject to neglect and to service conditions which are a lot harder than those which hoisting machines are subject to.

Depending on the inclination of the sections the sling consists of, the force acting on each of them, with a 1,000 Kg load, ranges from 500 Kg (vertical slings) to 1,932 Kg (150° inclination), as shown in Picture 1.

Picture 1 – inclination of sling sections and acting forces.



Operation: LOAD HANDLING

LOAD HOISTING EQUIPMENT

If the weight of the load can not be equally divided among several slings, and it is necessary that a single sling is fit to support the entire load, while the other slings shall grant stability to the load (picture 2).

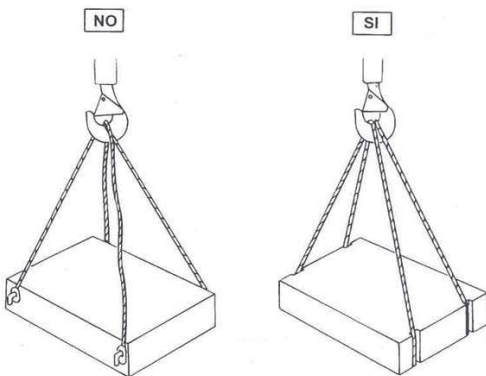
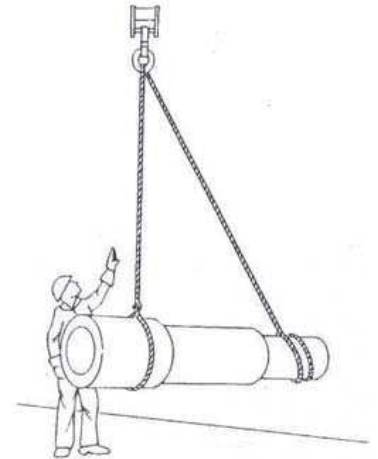
Picture 2 – Sling supporting the load and sling giving it stability

The slinging means (ropes, chains and straps) must be positioned at the bottom of the hook saddle, never resting them on the tip, and no knots must be made to shorten them. Making hooks work on the end tip is forbidden.

Please be reminded that if two ties cross on the same hook, one of them does is idle and they will both wear in the point where they overlap (picture 3).

Picture 3 – Crossed ties

If the load is uneven or has corners and sharp edges which may damage ropes or chains, wood or rubber distance blocks shall be interposed to avoid damages.

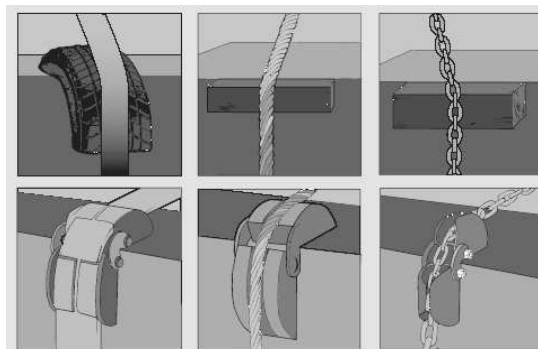


(Picture 4).

Picture 4 – Distance blocks to avoid damages to the rope or chain



Examples of protection of sharp corners and edges



Wire rod ties, which hold bundles of bars or pipes, must not be used to hoist those same bundles.

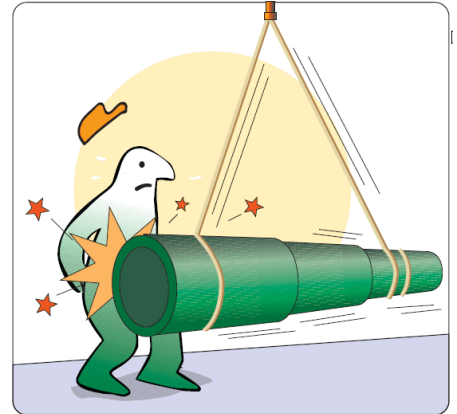
Once the load is slinged, check its balancing by slowly hoisting the load by a few centimeters. The suspended load must never be guided by hand, but only with ropes or hooks. The non-intervention of protections and of safety equipment or wrong maneuvers or the incorrect use of PPEs may result in the following hazards

CRUSHING

SPECIFIC SAFETY REQUIREMENTS

The appropriate specific safety requirements for load hoisting machinery are listed hereunder:

- Maximum admissible capacity must be displayed on all hoisting equipment (not including hand operated ones) and hooks.
- Hooks must be fitted with safety catches or be shaped so as to prevent ropes, chains or other slinging apparatus from coming unhooked.
- Ropes and chains of hoisting machines must be checked every quarter by qualified staff, and be registered on the appropriate page of the matriculation-book.
- Load hoisting and hoisting-moving maneuvers must be designed so as to prevent suspended loads from traveling above workers and places where the load fall might be dangerous. If such transit is unavoidable, load hoisting and/or handling maneuvers must be timely announced by appropriate and dedicated signals in order to allow, where possible, people to move away from the area where they might be exposed to danger if a load fell down.
- Hoisting and handling machines must be fitted with braking devices which can guarantee a prompt stopping and a stand still position of load and machine and, when required for safety purposes, guarantee a smooth stopping.
- When a black-out might endanger people, hoisting machines must be fitted with devices which will cause both the load and the machine to stop automatically. However, the stopping must always be smooth in order to avoid excessive stress as well as to prevent the stability of the load from being compromised by dangerous swinging.



Further and/or different safety requirements may be prescribed for a machine and the above information are therefore to be considered neither exhaustive nor mandatory.

- Motor operated elevators must be built so as to work with the motor engaged even while lowering
- While using hoisting and handling machines, the necessary measures in order to guarantee the stability of the machine and of its load, depending on the type of machine, on its speed, on accelerations at starting and stopping and on the characteristics of the route.

CHIEF BEHAVIOR RULES FOR WORKERS AND PROCEDURES

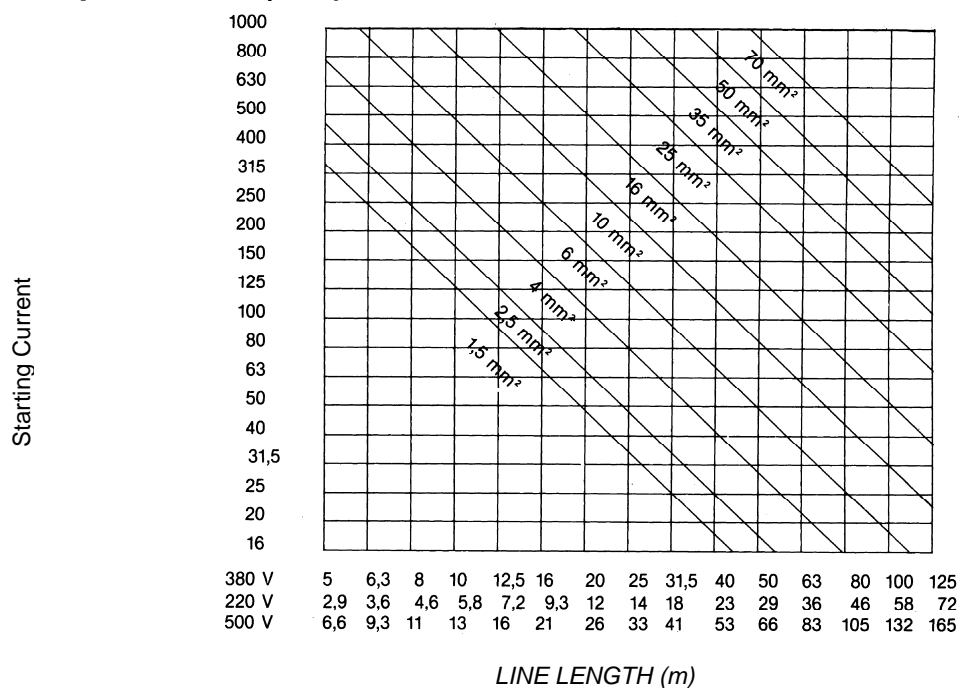
Each worker shall pay the greatest attention during operations, following the instructions supplied by the employer, by managers and by the persons in charge as well as the information contained in the user's manual of the machine.

CHIEF ACCIDENTS

The notes hereunder do not ensue from statistical data, which at the moment are not available, but from experiences collected in factories and among people working in this field.

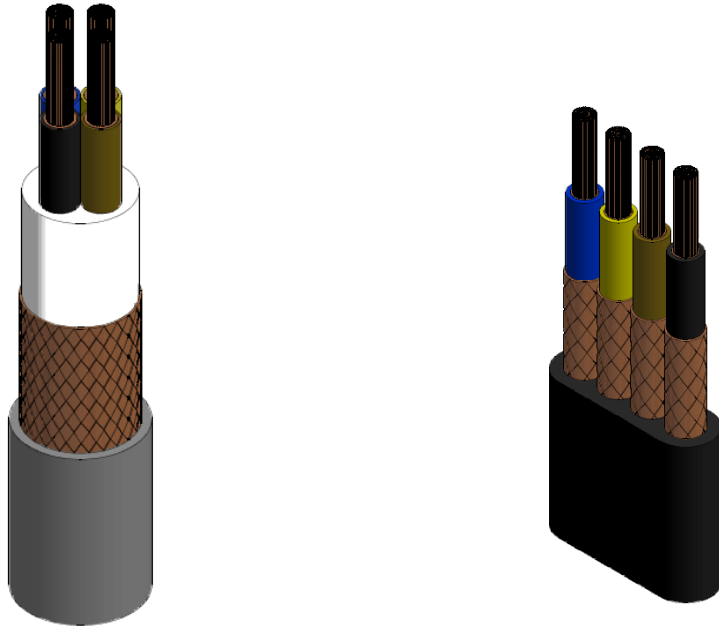


DIAGRAM FOR THE SELECTION OF CROSS SECTIONAL AREA OF THE FEEDING CONDUCTOR (voltage drop 5% - COS φ 0.8)



THERMAL CAPACITY OF CONDUCTORS ACCORDING TO FEM 1.001 RULES AND REGULATIONS

Cross section of each conductor	Accepted intensity for insulated conductors at a temperature of 40°C for a service factor of:		
	100%	60%	40%
mm^2	A	A	A
1,5	18	18	20
2,5	26	26	30
4	34	34	40
6	44	44	50
10	61	61	75
16	82	87	105
25	108	120	145
35	135	145	175
50	168	180	210
70	207	240	270
95	250	270	330
120	292	310	380
150	335	350	430



Round and flat armored cables

NAMEPLATES

HOIST-WINCH

italkrane s.r.l. MILANO - BUSSERO 		SERIE SERIAL <input type="text"/> TIPO TYPE <input type="text"/>	
COMMESSA JOB <input type="text"/> ITEM <input type="text"/>			PORTATA CAPACITY t <input type="text"/>
ISO - FEM CLASSE CLASS <input type="text"/> ANNO YEAR <input type="text"/>			ALZATA VERTICAL PATH m <input type="text"/> TIRI FALLS N <input type="text"/>
		VELOCITÀ SOLL. LIFTING SPEED m/min <input type="text"/> VELOCITÀ TRASL. TRAVELLING SPEED m/min <input type="text"/>	

INSTRUCTIONS FOR MAINTAINING MACHINES IN GOOD RUNNING ORDER WHEN INOPERATIVE



When, due to particular applications, service is irregular or perhaps the machine remain inoperative and stationary in an especially aggressive area the follow measures should be taken:

- Put the machine through all its movements every day, completing at least 3 working cycles, even with no load.
- Check the condition of the limit switches every 15 days. For limit switches made up of micro-switches arranged along the drum and for the travelling, pins, saddles and moving joints must be lubricated using water-repellent silicone-based Vaseline. Also check that the mechanical parts are moving easily. After this carry out a practice no-load test with the proper care.
- The push-button control panel should be kept covered, protected from humidity and dust in a vertical upside - down position. (Otherwise, not with standing the cable glands, water will get in through the hanging cable).

EVERY MONTH

- Check the condition of the disk or shoe brakes; clean and lubricate the moving joints of the latter.
- Check and lubricate any monorail trolley unprotected gears.
- Clean all mono rail lower flanges and gantry rails.
- Remove all dirt, grease, oil sand or oxidation dust, from all rotating parts with particular regard to auxiliary units (levers, small pistons, pin axles).
- After having opened the containers spray all electric component with appropriate specific lubricants and water-repellents.
- Check that anti-condensation heaters are working properly and the relative thermostat is not worn or inefficient. For this purpose it is essential that the main isolating switch, placed at the beginning of the feeding point, always stays "on".

ANTI-OXIDIZING PREVENTION PROCEDURE

All unvarnished machined surfaces, both internal and external, must be cleaned, dried and coated with rust preventer, which will guarantee a protective coat for at least 12 months, on condition that it is not burned, dissolved or mechanically removed

- For external surfaces, the anti-rust treatment is made with a compact coating of high-quality anti-corrosive agent
- For machined surfaces inside an assembled unit, the anti-rust treatment will be of a type which does not require to be removed before using the machine
- Admissible methods for applying anti-rust treatment are: spray, brush, by filling, etc., through all available openings or disassembling, if necessary, the parts to coat completely and protect all internal machined surfaces. Particular care must be used with all the open surfaces of rolling and sliding bearings, so that they are completely coated

Paints and Protective Substances

Finished surfaces subject to oxidizing or corrosion must be coated, by spraying, brushing or dipping, with an easily removable protective substance against water and hydrocarbons, which is fully compatible with materials and surfaces to be protected.

No anti-rust protective substance can be used on electric parts such as switches, rotors, distributors, brushes, terminals, connectors or other non-metal parts such as friction disks, brakes, rubber, plastic, fabric or leather. When the anti-rust substance precludes the use of such components, make sure it is completely dry before assembling the latter.

All protected surfaces must be isolated from touching wood or other hygroscopic materials by means of wax or polyethylene sheets or other similar products. In special cases, impregnating paper may also be used for coating surfaces and materials subject to corrosion.

Such products have the advantage of being easily and quickly removed.

If the protective coat breaks it must be restored to allow storage of goods to continue. Rust preventer must be of a type which can be removed using mineral turpentine.

- Machined surfaces must be cleaned using petroleum based solvents and dried before applying the rust preventer.

Usually, the rust preventer is not applied on metals which are intrinsically resistant to corrosion, such as:

- Copper, nickel, brass, or other corrosion-resistant metals or alloys
- Surface-treated metals or zinc, nickel or tin coated metals.
- If there is the possibility that the anti-rust products gets in contact with non-steel materials, it is necessary to accurately select the most suitable rust preventer based on the effects it may have on those same materials.
However, the direct contact between a steaming rust preventer and non-ferrous metals (with the exception of aluminum and its alloys) must be avoided.



Hoists

- (1) Clean shafts, joints and other exposed machined surfaces using solvent and coat them with an anti-rust product.
- (2) Keep bearings greased if they are not of the "life lubricated" kind.
- (3) Clean loading chains and steel wire ropes and coat them with a suitable lubricant.
- (4) Lubricate pulleys, pinions and sprockets applying grease on their teeth and grooves.

PRODUCTS AND MANUFACTURERS				
SHELL	MOBIL	VALVOLINE	AGIP	APPLICAZIONE SU
ENSIS FLUID-S	METAL GARD 360	TECTYL 502 C	RUSTIA 81	MACHINED MECHANIC COMPONENTS
-	-	TECTYL 846	-	SHIPMENTS BY SEA

DRYING SUBSTANCES: drying substances for absorbing humidity must be recyclable, non-corrosive and with a colored indicator to indicate its exhaustion

OPERATIONS TO BE CARRIED OUT BEFORE SETTING MACHINES TO WORK WHICH HAVE UNDERGONE A LONG PERIOD OF STORAGE ON THE SITE OR INACTIVITY

(to be carried out by a qualified operator)  

STRUCTURES:

- Remove protection which is applied to rails, and any traces of paint or lubricant.
- Remove protection from threaded holes, e.g. end carriages to crane beam fixings, if necessary by tapping.
- Remove protection, lubricant, paint or any corrosion from bright mating surfaces, e.g. end carriage to crane beam.
- Repair any damage to crane beam flanges (single girder cranes) or mating surfaces that may have been caused by mishandling or through storage.
- Using the correct paint, touch up parts that have been effected by handling and through storage.


MECHANISMS:

- Check there are no leaks of lubricant from the reducers and replace any damaged seals.
- Top up the lubricating oil.
- Check that all the elements which hold the mechanisms to the structures are tight.
- Remove any traces of corrosion from rotating or sliding pins such as limit switches, control pins, saddles for activating micro-switches, control chains for various components.
- Check any corrosion of the wires which make up the rope. Clean the metal ropes, the pulley grooves and the lifting drums. Lubricate with grease.
- Lubricate the axle ball bearing of the hooks, if not sealed for life type.
- Remove any water which has gathered in the concave parts of covers, ball bearings, fins.
- Lubricate the surface of the mechanical parts which are not painted (transmission shafts, couplings, control rods).

ELECTRIC PART:


- Check the overall condition.
- **Motors:** Remove all condensation from the inside sucking air through the open terminal box or after having taken off the end cover. Dry with blasts or air.
- **Disk brakes:** open the brake cover and remove all disks.
- Dry using air, check the condition and efficiency of the springs. Put the disks back after having carefully cleaned the braking surface and restored the air gap.
- **Brakes and shoes:** clean the braking surfaces carefully and remove all traces of humidity, paint or lubricant.
- Apply some lubricant to the articulations.
- **Limit switches:** limit switches must be checked carefully to establish their good running order both from the mechanical and electrical points of view. Particularly lubricate the moving joints and pins.
- **Control switch-gear:** open all casings, remove condensation, dry the contacts of the remote control switches. Check the condition of any electronic cards. Spray all components with a suitable substance. Apply Vaseline to the closing sections and to the threaded covers off all the explosion-proof containers after having cleaned the surface carefully.
- Carry out insulation test at 2000 V after having first insulated any bridge rectifiers electronic cards, or DC brakes.
- Check that all electric lines and loops slide easily and if necessary lubricate trolley-wheels after having carefully cleaned railways.
- A very thorough check should be carried out on the push-button control pendant: remove condensation, check that contacts are working properly, and that terminals are well-secured. For explosions-proof version check that pins turn perfectly and the small control pistons slide properly, then lubricate.

VERIFICATION OF THE EFFICIENCY OF BUFFERS


- Check that end stops are not deformed and that they are  firmly secured to the structures and that the buffer is intact and well secured to its support.
- Replace buffers when they show: signs of breaking or of permanent deformation, cuts, abrasions, incisions.



VERIFICATION OF THE EFFICIENCY OF THE CONTROL ELECTRIC SYSTEM

 **WARNING!** Some of the operations described hereunder are performed with the power supply on, be extremely careful)

- Check the inside of the control equipment by opening the cases' door(s).
- Operating on the push button panel, verify that the mobile parts of the contactors move properly and smoothly; otherwise, it may happen that the electromagnet is not strong enough to guarantee the correct closing of contacts.
- To avoid false contacts, heating or noisiness, verify that the voltage fed to coils is correct.
- Verify the efficiency of conductors and grounding connections and, and tighten if necessary, all the screws of the grounding terminals.
- Verify that terminals are firmly tightened; check that the ID number is clearly visible and integral with the terminal; verify the thermo insulating material is not damaged and promptly replace it in the event of cracks or rips.
- Keep an adequate stock for each fuse and/or temperature relays installed (see the wiring diagram), so that, if necessary, they can be replaced quickly with one of the same kind.
- Check all the gaskets of covers and cable glands
- Check all ID plates on the cover or on the side of cases are at their proper place and readable
- Replace electric components immediately if they are no longer capable of guaranteeing functional reliability

 Never perform improvised repairs.

VERIFICATION OF THE PUSH BUTTON CONTROL PANEL AND OF THE CABLE THEREOF

- Verify the conditions of the push button panel
- Check the functionality and efficiency of every push button,
- Clean push buttons removing all deposits and dirt from their seats
- Verify that nameplates are readable
- Check gaskets.
- Verify the conditions of the multi-core cable of the push-button panel as well as of all flexible cables, making sure there are no cuts, abrasions, bare patches or bare conductors.
- Make sure the push-button panel's suspension strings are efficient and correctly attached to the body of the machine.


VERIFICATION OF THE EFFICIENCY OF THE LOAD LIMITER


The machine is equipped with a load limiting device.

The limiter consists of a wattmetric electronic system which, on perceiving an excessive power is required of the hoisting motor due to overloading, acts on the supply circuit of the coils of control contactors of the electric appliance.

The intervention of the load limiter indicates the maximum admissible loading limit has been reached, stops all functions (hoisting and traveling) with the exception of lowering.

- Verify its correct intervention by making sure that it's activated with a load ranging from 115% and 120% of the nominal load.
- Repeat the operation several times verifying the repetitiveness of the release values.

 Load limiters are devices which perform safety functions and their breakdown or malfunctioning may seriously jeopardize the safety of the persons exposed!

 The verification of the setting value of the release limit of the intervention threshold of the load limiter must be performed, as prescribed by the FEM 9.761 rule, at least once a year by using suitably prepared masses whose value is known and/or with the aid of a loading cell with visualization of stress values.

Logging the values resulting from the yearly verifications of the setting of the load limiters into the check register is strongly recommended.

 Do not tamper with nor disconnect the load limiter, nor change the pre-established setting values

in the event a new setting of the load limiter is needed, such operation must be performed by **Italkrane s.r.l.** technical assistance or by personnel authorized by **Italkrane s.r.l.**

VERIFICATION OF THE EFFICIENCY OF PARTS AND COMPONENTS



For the single parts of the machines, scrupulously follow the instructions hereunder:

- Annual verification of the efficiency of structural elements, pins and hinges:
- Metallic structures, in addition to the usual alterations due to environmental factors or to wear and tear of mobile members (hinges), may be subject, sometimes accidentally or during handling operations, to blows, contacts or sliding with other machines and equipments or even to anomalous stress which may damage carpentry frames, weldings and pins. Structures, after being perfectly cleaned, must therefore undergo periodical scrupulous checks to ascertain their suitability and, if necessary, repair any damages.
- Brackets consisting of plates and pin, forming hinge elements, are subject to wear and tear as mobile and oscillating elements undergoing sliding friction in the contact area. Replace them if, during checks, excessive wear and tear is discovered.
- All screw-pins, high-grade plugs and pins must be disassembled and carefully checked, together with their seats, once a year.
- Repair structures and hinged elements, or replace them if they show: deformations, elongations, crushing, dents, buckling, wear and tear: worn out parts, reduced sections, incisions, abrasions, corrosions, oxidations, scratches, chipped paint, rips: cracked weldings, cracks, cuts or incisions, broken parts, variations of sections of > 10%, or of diameter or of thickness of >5% compared to the original values

VERIFICATION OF THE EFFICIENCY OF REDUCERS



Check that the noise level of reducers does not vary in intensity. Vibrations or excessive noise levels indicate either worn out toothing or a faulty bearing.

Check there is no leakage of lubricant.

IN CASE OF ANOMALIES

- Performing corrective maintenance operations on hoisting and traveling reducers is strictly forbidden.
- All extraordinary maintenance operations on hoisting, traveling or sliding reducers must be performed by **Italkrane s.r.l.** technical assistance or by personnel authorized by **Italkrane s.r.l.**

VERIFICATIONS OF THE EFFICIENCY OF ELECTRIC MOTORS



Clean the motor(s) removing the dust from the cases as it may hinder regular cooling; check that ventilation openings are not obstructed. Check, with the nominal load, that there are no anomalous noises (buzzes, frictions)

Make sure that the temperature of the case does not exceed 110°C. Otherwise, find the cause and check the service the hoist is meant for. Verify absorption and voltage, comparing them to the nominal values indicated on the nameplate of each motor.

IN CASE OF ANOMALIES:

- Performing corrective maintenance operations inside the motors is strictly forbidden
- All extraordinary maintenance operations on hoisting, traveling or sliding motors must be performed by **Italkrane s.r.l.** technical assistance or by personnel authorized by **Italkrane s.r.l.**

VERIFICATION OF THE EFFICIENCY OF BRAKES



- Check the brakes are released correctly, verifying that the rotor is not held and/or there are no frictions.
- Check that, with the nominal load, the brake, once the push button is released, holds the load suspended for at least 10 minutes without the load sagging or skidding.
- In case of skidding, lower the load to the ground, disconnect power supply and check the wear and tear degree of the brake shoe lining to discover any anomalies.
- If necessary, adjust the brake and/or replace the brake shoe with brake lining.
- Replace the brake shoe with the new brake lining when the load is unstable even after adjusting the brake.

IN CASE OF ANOMALIES:

- Performing corrective maintenance operations motor brakes is strictly forbidden
- All extraordinary maintenance operations on brakes must be performed by **Italkrane s.r.l.** technical assistance or by personnel authorized by **Italkrane s.r.l.**



CE Declaration of Conformity

In compliance with the Annex IIA of the Machinery Directive (2006/42/CE)

We hereby declare that the following products

- YoYo electric chain hoists with capacity ranging from 0.5 to 2.5 T
- GO UP electric or pneumatic wire rope hoists with capacity ranging from 1.25 to 32 T, with or without monorail or bi-rail trolley.
- Electric bridge cranes or single-girder or double-girder gantry cranes with hoist or winch with a capacity ranging from 1 to 200 T
- Pillar cranes, wall cranes and jib cranes with capacity ranging from 0.25 to 16 T.
- Manual chain or wire rope hoists with capacity ranging from 0.25 to 30 T.

Comply with the following EC directives:

- 2006/42/CE Machinery Directive and later modifications
- 2006/95/CE Low Voltage Directive
- 2004/108/CE Electromagnetic Compatibility Directive and later modifications
- ATEX 94/9/EC Directive on products for use in potentially explosive atmospheres

Are designed and manufactured in conformity with the following equalized Rules and Regulations:

- EN ISO 12100/1 /2 2003 Machine Safety
- EN 55014-1 /A1 /A2 Electromagnetic Compatibility
- IP Protection EN 60034-5
- EN 60204-32 Hoist Electric Equipment

In conformity with Annex V of the Machinery Directive:

- The CE symbol has been put on the machine
- The Technical file is stored in the manufacturer's premises.



Italkrane s.r.l



General Manager

QA/QC Manager

The CE declaration of conformity is valid together with the confirmation of the putting into operation, according to the indications in the User's Manual

CHECK REGISTER

In order to be able to prove the correct management of the machine check and maintenance activities, as well as to keep track of any responsibilities with regard to the activities carried out, it is strongly recommended that the machine's check register is scrupulously filled in and updated during the machine's entire life (10 years), as provided by the RES 4.4.2.b Directive ex 89/392/EEC.

In addition to all activities relating to the life and use of the machine (parts replacement, revisions, significant anomalies, etc.), all operations prescribed by the maintenance plan according to the terms indicated in the relevant paragraph of this manual must mandatorily be recorded in the check register.

The service man in charge will be responsible for filling in the check register in all its parts and recording all notes which are deemed to be useful. The service man's name must be clearly identifiable, so as the date on which the service was performed.

CHECK REGISTER

Lifting equipment type

Year of construction

Serial number

Operation Date	Operation Description	Service man's signature	Notes

TABLE OF CONTENTS

FOREWORD	1
GENERAL DEFINITIONS AND IMPORTANT INFORMATION	2
RELATION WITH THE USER	2
MANUFACTURER LIABILITY AND GUARANTEE	3
PERIODIC CHECKS	3
NOISE LEVELS	3
PACKING	3
FORWARDING	4
HANDLING	4
UNPACKING	4
CHECK FOR MISSING PARTS	4
STORAGE	4
FUNCTIONING AND INTENDED USE	4
CONTROL MODES	5
GENERAL SAFETY RULES	5
RISKS DURING USE	6
WORKING LIMITS	7
RULES AND REGULATIONS	10
SAFETY SIGNS	11
ADMISSIBLE AND INADMISSIBLE LOADS	11
HOISTING GEAR	12
MACHINE USE AND SAFETY MEASURES	12
IMPROPER USE	13
INSTALLATION	14
RUNNING CHECKS	14
SAFETY DEVICES	14
TESTS	15
DYNAMIC TEST	15
STATIC TEST	15
DOCUMENTATION	15
IMPORTANT WARNINGS	15
SPECIAL EXECUTION	16
EXPLOSION-PROOF EXECUTION EQUIPMENT FOR HAZARDOUS AREAS	17
CLASSIFICATION OF ELECTRICAL APPARATUS FOR USE IN THE PRESENCE OF COMBUSTIBLE DUST.	18
- TEMPERATURE CLASSES FOR COMBUSTIBLE DUST	18
CABLE ENTRANCE IN EX CASES	21
HOW TO SEAL C TYPE JOINTS	22
“A” TYPE CABLE GLAND (SCREENED OR ARMORED ROUND CABLE)	22
PREPARATION OF RESIN MIXTURE FOR “A” TYPE CABLE GLANDS	23
ELECTRIC COMPONENTS	24
MOTORS	24

AUTOMATIC LIMIT SWITCHES _____	24
TROLLEY TRAVELING AND BRIDGE SLIDING AUTOMATIC SWITCHES _____	24
ANTI-COLLISION _____	24
TROLLEY FEEDING LINE _____	24
CONTROL GEAR _____	25
PUSH-BUTTON CONTROL PENDANT _____	25
PRE ERECTION VERIFICATION _____	26
ASSEMBLY OF HOIST _____	26
SERPES LINE WITH “ZECCA” SYSTEM SUSPENSION _____	27
ELECTROMECHANICAL ANTI-COLLISION SYSTEMS _____	28
FESTOONED LINES (MAIN ELEMENTS) _____	28
“YOYO” ELECTRIC CHAIN HOISTS _____	30
PROTECTION AND INSULATION OF ELECTRICAL PARTS: _____	30
ELECTRIC SUPPLY: _____	30
NOMINAL CONDITIONS OF USE IN STANDARD EXECUTIONS: _____	30
NOISE LEVEL _____	30
STANDARD EXECUTIONS _____	31
EXECUTION WITH ELECTRIC TROLLEY: _____	31
FIXED EXECUTION _____	31
EXECUTION WITH MECHANICAL CHAIN TROLLEY _____	31
EXECUTION WITH PUSH TROLLEY _____	31
DESCRIPTION OF MAIN COMPONENTS _____	32
HOISTING AND TRAVELING ELECTRIC MOTOR _____	32
CLUTCH LOAD LIMITER _____	32
BRAKE _____	32
HOISTING REDUCER _____	32
SPROCKET – CHAIN GUIDE _____	32
CHAIN _____	32
LOADING HOOK _____	33
HOOK TACKLE _____	33
BLOCK _____	33
MOTOR REDUCER WITH SELF-BRAKING MOTOR: _____	33
TRAVELING TROLLEYS _____	33
CHAIN CONTAINER _____	33
ELECTRIC CONTROLS _____	33
AC 48 V – 50HZ LOW VOLTAGE ELECTRIC EQUIPMENT, _____	33
TRAVEL LIMIT SWITCHES _____	33
HOIST ELECTRIC LIMIT SWITCH _____	33
STOPS _____	33
SUSPENSION _____	33
TOW ARM: _____	33
YOYO HOIST – ELECTRICAL FEATURES OF MOTORS AND FUSES _____	34
BACO BRAKE-CLUTCH UNIT _____	34
DESCRIPTION OF BRAKE FUNCTIONING: _____	35
DESCRIPTION OF CLUTCH FUNCTIONING: _____	35
PERIODIC CHECKS OF THE BACO UNIT _____	35
CLUTCH SETTING _____	35
LUBRICANTS _____	36
TYPES OF LUBRICANT _____	36
SPARE PARTS CARD _____	37
SPECIAL USAGE MODES FOR YOYO HOISTS _____	38
CHAIN _____	38
REPLACING THE CHAIN _____	39
YOYO HOIST HOISTING CHAIN’S CERTIFICATE _____	40

WORKING CHECKS	41
CLEANING AND LUBRICATION	41
HOIST AND CRANE WITH HOIST	41
MAINTENANCE	42
TABLE OF LUBRICATING OILS OF THE MOST IMPORTANT BRANDS	42
SCHEDULED MAINTENANCE (up to 60 months)	43
QUALIFICATION OF SERVICEMEN	43
THE OPERATOR EMPLOYED IN THE USE OF THE MACHINE	44
MECHANICAL MAINTENANCE MAN	44
ELECTRICAL MAINTENANCE MAN	44
ELECTRO-MECHANICAL MAINTENANCE MAN:	45
MECHANICAL ENGINEER	45
ELECTRICAL ENGINEER	45
ELECTROMECHANICAL ENGINEER:	46
MAINTENANCE SCHEDULE	46
DAILY AND PERIODICAL MAINTENANCE	47
DAILY OPERATIONS, FOR THE CARE OF THE HOIST OPERATOR:	47
MONTHLY OPERATIONS, PERFORMED BY QUALIFIED PERSONNEL:	47
QUARTERLY OPERATIONS, PERFORMED BY QUALIFIED PERSONNEL:	47
RECURRENCE AND DEADLINES OF MAINTENANCE OPERATIONS	47
TABLE OF PERIODIC CHECK AND MAINTENANCE OPERATIONS	48
OPERATIONS TO BE PERFORMED	49
AUTHORIZED PERSONNEL FOR OPERATIONS IN THE EVENT OF BREAKDOWN	54
BREAKDOWN	54
WHAT TO DO IF	55
BREAKDOWN OF COMPONENTS AND POSSIBLE REMEDIES	56
PUTTING THE MACHINE OUT OF OPERATION	57
DISMANTLING, DISPOSAL AND SCRAPPING	57
SPARE PARTS TABLE	57
ELECTROMAGNETIC "BABY" DISK BRAKE IN STANDARD OR EXPLOSION-PROOF EXECUTION – DIRECT CURRENT FEEDING	58
BRAKE	58
MAINTENANCE	58
INSTALLATION AND SETTING OF TRAVEL LIMIT SWITCHES	59
POSITIONING SLIDE ACTUATORS FOR LEVER LIMIT SWITCHES	60
RECOMMENDED MINIMUM SAFETY DISTANCES TO BE OBSERVED DURING THE ADJUSTMENT OF THE HOIST-LOWER LIMIT SWITCHES	62
SETTING OF THE "TER" TYPE WORM SCREW HOIST LIMIT SWITCHES	63
SETTING OF THE "BOX 0A" TYPE WORM SCREW HOIST LIMIT SWITCH	63
STANDARD VERSION SPA SERIES PUSH BUTTON CONTROL PANEL	64
CHIEF SYMBOLS	65
"Ex" EXECUTION "FLY" SERIES PUSH BUTTON CONTROL PANEL	65
SAFETY RULES FOR CRANE OPERATORS	66

SLING CAPACITY	66
SAFETY RULES FOR LOAD SLINGING	67
LOAD HOISTING EQUIPMENT	67
CRUSHING	68
SPECIFIC SAFETY REQUIREMENTS	68
CHIEF BEHAVIOR RULES FOR WORKERS AND PROCEDURES	68
CHIEF ACCIDENTS	68
DIAGRAM FOR THE SELECTION OF CROSS SECTIONAL AREA OF THE FEEDING CONDUCTOR	69
THERMAL CAPACITY OF CONDUCTORS ACCORDING TO FEM 1.001 RULES AND REGULATIONS	69
NAMEPLATES	70
HOIST-WINCH	70
INSTRUCTIONS FOR MAINTAINING MACHINES IN GOOD RUNNING ORDER WHEN INOPERATIVE	71
ANTI-OXIDIZING PREVENTION PROCEDURE	71
OPERATIONS TO BE CARRIED OUT BEFORE SETTING MACHINES TO WORK WHICH HAVE UNDERGONE A LONG PERIOD OF STORAGE ON THE SITE OR INACTIVITY	72
STRUCTURES:	72
MECHANISMS:	72
ELECTRIC PART:	72
VERIFICATION OF THE EFFICIENCY OF BUFFERS	73
VERIFICATION OF THE EFFICIENCY OF THE CONTROL ELECTRIC SYSTEM	73
VERIFICATION OF THE PUSH BUTTON CONTROL PANEL AND OF THE CABLE THEREOF	73
VERIFICATION OF THE EFFICIENCY OF THE LOAD LIMITER	73
VERIFICATION OF THE EFFICIENCY OF PARTS AND COMPONENTS	74
VERIFICATION OF THE EFFICIENCY OF REDUCERS	74
VERIFICATIONS OF THE EFFICIENCY OF ELECTRIC MOTORS	74
VERIFICATION OF THE EFFICIENCY OF BRAKES	74
CHECK REGISTER	76