

# MISIA

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**ELECTRIC WIRE ROPE HOIST**

## **XM SERIES**

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**MANUAL FOR INSTALLATION  
OPERATION AND MAINTENANCE**



M 26/09/18



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## 1. PRELIMINARY INFORMATION

### Contents of the manual

This manual contains the description of the trolley/hoist and its "intended purpose", the operation and performance technical data and the installation, operation and maintenance instructions for all supported or suspended versions, with mono or double rail trolley.

The manual also contains the following documents:

- CE conformity declaration or manufacturer declaration;
- Test report of the machine, where applicable;
- Wiring diagrams, where applicable.

### Recipients of this manual

This manual has been prepared for:

- The plant manager, workshop manager or site manager;
- The installation technicians;
- The operator;
- The maintenance technicians.

The manual must be left in the safekeeping of a duly authorised person, in an appropriate place where it is always available in best conditions for reference.

In the event of loss or damage, ask for a copy directly to **MISIA PARANCHI srl** indicating the code of this manual.

### How to use this manual

The instructions are accompanied by symbols facilitating reading and specifying the various type of information supplied.

## 1.1 COMPULSORY WARNINGS



**Pay utmost attention to the instructions accompanied by this symbol and strictly observe the indications.**

**Important information:**



**Indicates useful information and hints for handling, mounting and installation operations.**



**Indicates to proceed with the operational sequence.**

Where necessary, references and numbers corresponding to the illustrations appear throughout the manual. In the illustrations any part of the trolley/hoist described in the text is indicated with a number.

**For example: Pos. 1 (fig. 1) means:**

part or component 1 in figure 1.

## 1.2 IMPORTANT INFORMATION


Before starting any procedure, the relevant section(s) of this instructions manual for the activity to perform must be read.

The guarantee of problem-free and of full correspondence of the performances with the planned use strictly depends on the proper application of all instructions contained in this manual.

### Reference legislative framework

The electric wire hoists XM Series and the relevant movement trolleys comply with the **Essential Safety Requirements** pursuant to **Annex I of Machinery Directive 2006/42/EC** and are therefore provided with a **CE Declaration of Conformity** pursuant to **Annex IIA** and the **CE Mark** pursuant to **Annex III** of the same Directive.

Furthermore, the electric wire hoists XM Series and the relevant electric trolleys comply with the **Low Voltage Directive 2006/95/EC** and the **Electromagnetic Compatibility Directive 2004/108/EC**.



**CE**  
**Dichiarazione di conformità**  
ai sensi della Direttiva Macchine 2006/42/CE. Allegato II, parte 1, sez. A

La sottoscritta:  
**MISIA PARANCHI SRL**  
Via Dei Lavoratori, 911 - 20092 Cinisello Balsamo (MI)  
Certificato n. 01 UNI-EN ISO 9001

Dichiara sotto la propria responsabilità che la macchina NUOVA

DENOMINATA:  
PORTATA KG:      MATRICOLA N°:      ASSI:     

E' conforme alle seguenti Direttive comunitarie:  
Direttiva Macchine 2006/42/CE  
Direttiva Bassa Tensione (CEN) 2006/95/CE  
Direttiva Compatibilità Elettromagnetica (CEN) 2004/108/CE

**Norme armonizzate applicate:**  
UNI - EN - ISO 12100/1 e 12100/2 (sicurezza macchine)  
CEI - EN - 60204 - 1 (sicurezza macchine - apparecchi elettrici)

**Norme nazionali applicate e regole tecniche:**  
VBOH - VBOH - VBOH (sicurezza macchine)  
DIN 15400 (sicurezza macchine)  
DIN 40500 (sicurezza macchine)  
FEM 1001 (sicurezza macchine)  
FEM 9.511 (sicurezza macchine)  
FEM 9.755 (sicurezza macchine)  
FEM 9.761 (sicurezza macchine)  
FEM 9.941 (sicurezza macchine)

Si dichiara, come previsto dall'allegato VII della Direttiva Macchine 2006/42/CE, che:  
- La marcatura del simbolo "CE" è apposta sulla macchina  
- Il fascicolo tecnico è a disposizione presso la sede del fabbricante  
- Persona autorizzata a costituire il fascicolo tecnico: Sig. Aldo Luigi Carozzi, Via Dei Lavoratori, 911 - 20092 Cinisello Balsamo (MI)

Cinisello Balsamo, 17-12-2014  
MISIA PARANCHI SRL  
Responsabile di Prodotto  
Carozzi Dott. Aldo

441101

Reproduction  
of the Declaration  
of Conformity

MISIA manufactures and distributes electric wire hoists under the company quality system in compliance with the standards: UNI EN ISO 9001, with the following international certificates released by the BV test company: ACCREDIA - Italy.



### 1.3 LIABILITY

The instructions in this manual do not substitute, but only summarise the obligations stated by the actual safety and injury prevention laws and regulations.

With reference to the content of this instructions manual, MISIA declines any liability in the following cases:

- Use non-compliant with national safety and injury prevention laws and regulations;
- Defective layout of the structures on which the hoist is intended to operate;
- Failure to read or comply with the instructions in this manual;
- Faults in the main power supply;
- Unauthorised changes to the hoist;
- Use by untrained staff.

### Readability and preservation of plates

Plates must always be maintained in a readable condition for all their details and periodically cleaned. If only some of the information on the plate deteriorates or is no longer legible, we recommend ordering a new plate from the manufacturer quoting the data in this manual or on the original plate, especially the serial number and proceed to replace it.

### Plate types:

- Identification plate for the hoist/trolley
- Hoist and travel motors plate
- Blocks plate

 <b>MISIA</b> PARANCHI S.r.l. VIA DEI LAVORATORI, 9/11 20092 CINISELLO B.MO MILANO ITALY			
<b>PARANCO ELETTRICO</b> A FUNE ELECTRIC ROPE HOIST		<b>TIPO</b> TYPE	
PORTATA CAPACITY	kg.	<b>GRUPPO</b> GROUP  <b>FEM</b>	ANNO DI FABBRICAZIONE MANUFACTURING YEAR
CORSA GANCIO HEIGHT OF LIFT	m.		POTENZA POWER
VELOCITA' SOLLEV. HOISTING SPEED	m/min.		ALIMENTAZIONE SUPPLY
			V- Hz

### 1.4 MANUAL UPGRADING

This manual illustrates the state-of-the-art machine at the time it was introduced on the market. This manual is part of the machine and complies with all laws, directives and regulations in force at this time, therefore, this manual cannot be considered inadequate solely because it was subsequently updated due to new information becoming available.

Any changes, adaptations, etc. to the machine sold in the future do not oblige the manufacturer to intervene on the previously supplied equipment, nor should the manual or the equipment be considered lacking or inadequate.

**Any integrations to the manual sent by the manufacturer to users must be saved with the relevant manual.**

## 2. DESCRIPTION OF THE HOIST/TROLLEY

### 2.1 HOIST CONFIGURATION

The electric hoists were designed and tested according to the FEM calculation rules for lifting equipment. According to the intended operation, the electric hoists can be:

**a) standard feet mounted;**



**b) with standard, monorail trolley.**

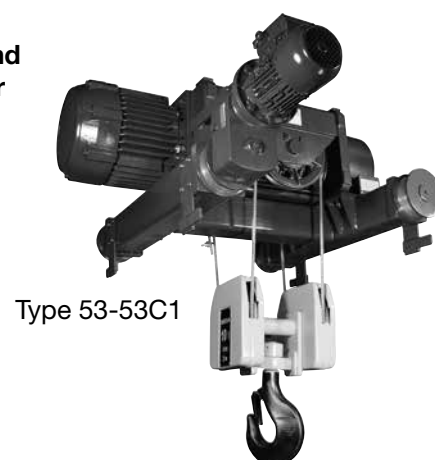


**c) with low headroom, monorail trolley.**

This reduces the distance between the suspension point of the load on the hook and the travel surface;



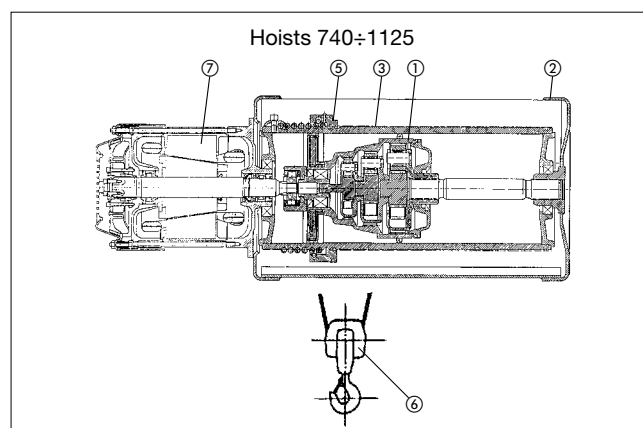
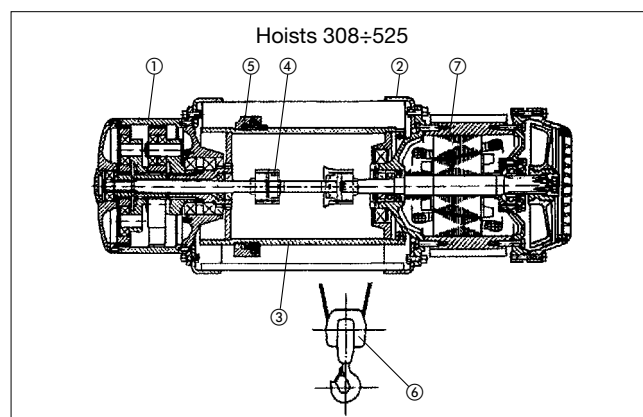
**d) with double rail trolley and supported or suspended hoist.**



### Lifting mechanism

The lifting mechanism is composed of the following assemblies:

1. planetary gear;
2. hoist body;
3. rope drum;
4. coupling;
5. rope guide;
6. block;
7. self-braking electric motor.



### Hoisting motor, self-braking and conical

Three-phase asynchronous 1 or 2 speed electric motor with cone rotor and integrated cone brake driven by a coil spring. The brake is released due to axial sliding of the rotor after power is switched on.

### Hoisting and travel motor, self-braking and cylindrical

Three-phase asynchronous, 1 or 2 speed electric motor with cylindrical rotor, with a DC brake. The single polarity motor can be inverter driven to obtain the slow speed required as well as the acceleration or deceleration ramps.

### Coupling

The torque of the motor is transmitted to the shaft of the gearbox by a toothed coupling connected to the gearbox shaft.

### Planetary gear

The two or three stage planetary gear reduces the rotation speed of the electric motor to the number of rotations necessary for the drum.

All gears on the gearbox are in heat treated high quality steel.

### Drum

The drum is driven centrally by the hollow output shaft on the gearbox. The shaft on the gearbox and the guide plate on the second stage are supported on roller bearings on which the drum is installed. For hoists Type 740-750-950-963-980-1100-1125 the gearbox is located inside the drum.

The profile of the rope grooves on the drum are manufactured in compliance with DIN standards.

### Rope guide

The rope guide is essentially composed of two parts: a guide ring and a pressure ring that properly guide the rope on the drum grooves. The guide ring maintains the rope in position during uncoiling, preventing it coming off the groove and, when the load swings, is guided by a fixed bar and runs on a roller bearing.

### Hoist body

The supporting framework is composed of a compact welded structure made of two steel flanges joined by profiled plates.

### Block with hook

The structure of the block with the 2 or 4 rope falls allows distribution of the tensile force generated from the ropes load. The side covers of the block covering the pulleys are strong and shock resistant.

### Load limiter

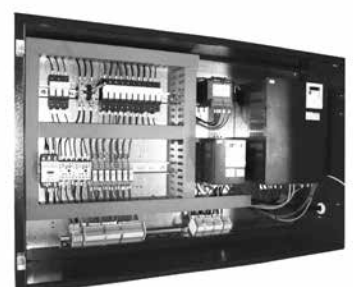
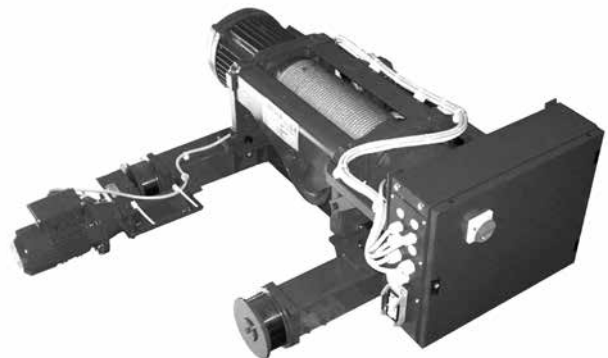
All the hoists in the "XM" Series with 2 and 4 rope falls are systematically equipped with a load limiter.

The load limiters intervene on the auxiliary circuit by signalling the maximum nominal load and, in the event of overcharging, stops the ascent operation and movement.

- A Electronic device with dynamometric pin with relevant pre-calibrated board, with two intervention thresholds;
- B Electromechanical device with pre-calibrated spring, with two intervention thresholds.

### Electrical system

The hoist trolley, where required, can be provided with its own electrical system which includes: electromagnetic switches to control all hoist movement, as well the protection fuses against short circuit. The control circuits are low voltage (48/110 volts). A terminal box with numbered terminals ensures simplicity and safety in the wiring for all external functions.



## 2.2 PERFORMANCE AND TECHNICAL FEATURES

### Cylindrical motors

Capacity kg	Group FEM	Hoist XM	Rope falls No.	Hook stroke				Lifting speed/Motor power							
				H m	H m	H m	H m	N		V		NA		VA	
								m/min	kW *	m/min	kW *	m/min	kW	m/min	kW
1000	3m	308	2/1	10	14	20	26	8	2,5	12	2,5	8/2,6	2,5/0,83	12/4	2,5/0,83
1250	3m	308	2/1	10	14	20	26	8	2,5	12	4	8/2,6	2,5/0,83	12/4	4/1,3
1600	2m	308	2/1	10	14	20	26	8	2,5	12	4	8/2,6	2,5/0,83	12/4	4/1,3
2000	3m	308	4/1	/	7	10	13	4	2,5	6	2,5	4/1,3	2,5/0,83	6/2	2,5/0,83
	3m	312	2/1	10	14	20	26	8	4	12	5	8/2,6	4/1,3	12/4	5/1,6
2500	3m	308	4/1	/	7	10	13	4	2,5	6	4	4/1,3	2,5/0,83	6/2	4/1,3
	2m	312	2/1	10	14	20	26	8	4	12	5,8	8/2,6	4/1,3	12/4	5,8/1,9
3200	2m	308	4/1	/	7	10	13	4	2,5	6	4	4/1,3	2,5/0,83	6/2	4/1,3
	2m	316	2/1	10	14	20	26	8	5	12	7	8/2,6	5/1,6	12/4	7/2,3
4000	3m	312	4/1	/	7	10	13	4	4	6	5	4/1,3	4/1,3	6/2	5/1,6
	3m	525	2/1	10	14	20	26	8	8	12	12	8/2,6	8/2,6	12/4	12/4
5000	2m	312	4/1	/	7	10	13	4	4	6	5,8	4/1,3	4/1,3	6/2	5,8/1,9
	3m	316	4/1	/	7	10	13	4	4	6	5,8	4/1,3	4/1,3	6/2	5,8/1,9
	2m	525	2/1	10	14	20	26	8	8	12	12	8/2,6	8/2,6	12/4	12/4
6300	2m	316	4/1	/	7	10	13	4	5	6	7	4/1,3	5/1,6	6/2	7/2,3
	2m	740	2/1	13	18	25	32	8	12	/	/	8/2,6	12/4	/	/
8000	3m	525	4/1	/	7	10	13	4	8	6	12	4/1,3	8/2,6	6/2	12/4
	2m	740	2/1	13	18	25	32	8	12	/	/	8/2,6	12/4	/	/
	3m	750	2/1	13	18	25	32	/	/	8	12	/	/	8/2,6	12/4
10000	2m	525	4/1	/	7	10	13	4	8	6	12	4/1,3	8/2,6	6/2	12/4
	2m	750	2/1	13	18	25	32	/	/	8	15	/	/	8/2,6	15/5
	3m	963	2/1	20	32	48	/	/	/	8	16	8/2,6	16/5,3	9/3	18/6
12500	3m	740	4/1	6,5	9	12,5	16	4	12	/	/	4/1,3	12/4	/	/
	2m	963	2/1	20	32	48	/	/	/	8	20	8/2,6	20/6,5	/	/
16000	2m	740	4/1	6,5	9	12,5	16	4	12	/	/	4/1,3	12/4	/	/
	3m	750	4/1	6,5	9	12,5	16	/	/	4	12	/	/	4/1,3	12/4
	1Am	980	2/1	20	32	48	/	5	16	7,5	24	/	/	/	/
20000	2m	750	4/1	6,5	9	12,5	16	/	/	4	15	/	/	4/1,3	15/5
	3m	963	4/1	10	16	24	/	5	20	6	24	5/1,6	20/6,5	/	/
	2m	1100	2/1	20	24	30	44	4	16	5	20	4/1,3	16/5,3	5/1,6	20/6,5
25000	2m	963	4/1	10	16	24	/	/	/	4	20	4/1,3	20/6,5	/	/
	1Am	1125	2/1	20	24	30	44	4	20	5	24	4/1,3	20/6,5	/	/
32000	1Am	980	4/1	10	16	24	/	/	/	4	24	/	/	/	/
40000	2m	1100	4/1	10	12	15	22	2	16	2,5	20	2/0,6	16/5,3	2,5/0,8	20/6,5
50000	1Am	1125	4/1	10	12	15	22	2	20	2,5	24	2/0,6	20/6,5	/	/

\* Motors used with inverter

### Motor features

#### Normal voltages:

- 400 V - 230 V at 50 Hz three phase
- Motors with special voltage and frequency are made available (to be defined upon order or offer).
- Only for tapered single polarity motors it is always possible the  $\Delta/\Delta$  voltage switching (400V star / 230V triangle). For all other motors the voltage must be specified.
- The motor consumption values are indicated in table 2 on page 40.



The STD motor are manufactured for use relating to group FEM 2m, precisely: 240 no. of start I.R. 40% fast and 15% slow, non cumulative.

#### Special voltages:

On request, voltages other than those indicated can be supplied

**NOTE - Auxiliary speeds can only be used for a limited time, based on the intermittent duty rates (for example: spotting) and not as the normal operating speed.**



## Conical motors

Capacity kg	Group	Hoist XM	Rope falls No.	Hook stroke				Lifting speed/Motor power							
				H m	H m	H m	H m	N		V		NA		VA	
								m/min	kW	m/min	kW	m/min	kW	m/min	kW
1000	3m	308	2/1	10	14	20	26	8	2,5	12	2,5	8/2,6	3/1	12/4	3/1
1250	3m	308	2/1	10	14	20	26	8	2,5	12	4,5	8/2,6	3/1	12/4	3/1
1600	2m	308	2/1	10	14	20	26	8	2,5	12	4,5	8/2,6	3/1	12/4	4,5/1,5
2000	3m	308	4/1	/	7	10	13	4	2,5	6	2,5	4/1,3	3/1	6/2	3/1
	3m	312	2/1	10	14	20	26	8	4,5	12	4,5	8/2,6	3/1	12/4	4,5/1,5
2500	3m	308	4/1	/	7	10	13	4	2,5	6	4,5	4/1,3	3/1	6/2	4,5/1,5
	2m	312	2/1	10	14	20	26	8	4,5	12	5,5	8/2,6	4,5/1,5	12/2	6/1
3200	2m	308	4/1	/	7	10	13	4	2,5	6	4,5	4/1,3	3/1	6/2	4,5/1,5
	2m	316	2/1	10	14	20	26	8	4,5	/	/	8/2,6	4,5/1,5	/	/
4000	3m	312	4/1	/	7	10	13	4	4,5	6	4,5	4/1,3	3/1	6/2	4,5/1,5
	3m	525	2/1	10	14	20	26	8	7,5	12	12	8/1,3	8/1,3	12/2	12,5/1,7
5000	2m	312	4/1	/	7	10	13	4	4,5	6	5,5	4/1,3	4,5/1,5	6/1	6/1
	3m	316	4/1	/	7	10	13	4	4,5	6	5,5	4/1,3	4,5/1,5	6/1	6/1
	2m	525	2/1	10	14	20	26	8	7,5	6	12	8/1,3	8/1,3	12/2	12,5/1,7
6300	2m	316	4/1	/	7	10	13	4	4,5	/	/	4/1,3	4,5/1,5	/	/
	2m	740	2/1	13	18	25	32	/	/	/	/	8/1,3	13/2,2	/	/
8000	3m	525	4/1	/	7	10	13	4	7,5	6	12	4/0,7	8/1,3	6/1	12,5/1,7
	2m	740	2/1	13	18	25	32	/	/	/	/	8/1,3	13/2,2	/	/
	3m	750	2/1	13	18	25	32	5	12,5	/	/	5/1,2	13/3	8/1,3	13/2,2
10000	2m	525	4/1	/	7	10	13	4	7,5	6	12	4/0,7	8/1,3	6/1	12,5/1,7
	2m	750	2/1	13	18	25	32	5	12,5	/	/	5/1,2	13/3	8/1,3	15/2,5
	3m	963	2/1	20	32	48	/	6	12,5	/	/	6/1,5	13/3	/	/
12500	3m	740	4/1	6,5	9	12,5	16	/	/	/	/	4/1	13/3	/	/
	3m	963	2/1	20	32	48	/	5	12,5	/	/	5/1,2	13/3	/	/
16000	2m	740	4/1	6,5	9	12,5	16	/	/	/	/	4/0,7	13/2,2	/	/
	3m	750	4/1	6,5	9	12,5	16	2,5	12,5	/	/	2,5/0,6	13/3	4/0,7	13/2,2
	1Am	980	2/1	20	32	48	/	/	/	/	/	5/1,2	16/4	/	/
20000	2m	750	4/1	6,5	9	12,5	16	2,5	12,5	/	/	2,5/0,6	13/3	4/0,7	15/2,5
	3m	963	4/1	10	16	24	/	3	12,5	/	/	3/0,75	13/3	/	/
	2m	1100	2/1	20	24	30	44	3	12,5	/	/	3/0,75	13/3	5/0,8	20/3,3
25000	2m	963	4/1	10	16	24	/	2,5	12,5	/	/	2,5/0,6	13/3	4/0,7	20/3,3
	1Am	1125	2/1	20	24	30	44	/	/	/	/	3/0,75	16/4	4/0,7	20/3,3
32000	1Am	980	4/1	10	16	24	/	/	/	/	/	2,5/0,6	16/4	/	/
40000	2m	1100	4/1	10	12	15	22	/	/	/	/	1,5/0,37	13/3	2,5/0,4	20/3,3
50000	1Am	1125	4/1	10	12	15	22	/	/	/	/	1,5/0,37	16/4	2/0,35	20/3,3

## Motor features

### Normal voltages:

- 400 V - 230 V at 50 Hz three phase
- Only for single speed motors it is always possible to change tension Y "star" to "delta" Δ connection.
- For bipolar motors, specify the exact mains voltage
- The motor consumption values are indicated in table 2A on page 40



The STD motor are manufactured for use relating to group FEM 2m, precisely: 240 no. of start I.R. 40% fast and 15% slow, non cumulative.

### Special voltages:

On request, voltages other than those indicated can be supplied

**NOTE - Auxiliary speeds can only be used for a limited time, based on the intermittent duty rates (for example: spotting) and not as the normal operating speed.**

**2.3 MOVEMENT TROLLEY FEATURES****Trolleys**

Capacity	Group	Hoist	Rope falls	Trolley speed and motor power															
				Monorail								Double rail							
				Type: 3-43				Type: 83				Type: 53-53C1							
kg	FEM	XM	No.	m/min	kW *	m/min	kW	m/min	kW *	m/min	kW	m/min	kW *	m/min	kW	m/min	kW	m/min	kW
1000	3m	308	2/1	18	0,37	18/6	0,37/0,12	20	2x0,25	20/5	2x0,24/0,06	16	0,37	16/5,3	0,37/0,12	0,37	20	0,37/0,12	0,37/0,12
1250	3m	308	2/1																
1600	2m	308	2/1																
2000	3m	308	4/1																
	3m	312	2/1																
2500	3m	308	4/1																
	2m	312	2/1																
3200	2m	308	4/1																
	2m	316	2/1																
4000	3m	312	4/1																
	3m	525	2/1																
5000	2m	312	4/1																
	3m	316	4/1																
6300	2m	525	2/1																
	2m	740	2/1																
8000	3m	316	4/1																
	3m	525	4/1																
	2m	740	2/1																
10000	3m	750	2/1																
	2m	525	4/1																
	2m	750	2/1																
12500	3m	963	2/1																
	3m	740	4/1																
	1Am	963	2/1																
16000	2m	740	4/1																
	2m	750	4/1																
	3m	963	4/1																
	1Am	980	2/1																
20000	2m	750	4/1																
	3m	963	4/1																
	2m	1100	2/1																
25000	2m	963	4/1																
	1Am	1125	2/1																
32000	1Am	980	4/1																
40000	2m	1100	4/1																
50000	1Am	1125	4/1																

\* Motors used with inverter

**Motor features**

- The motor consumption values are indicated in table 3-4-5 on page 40

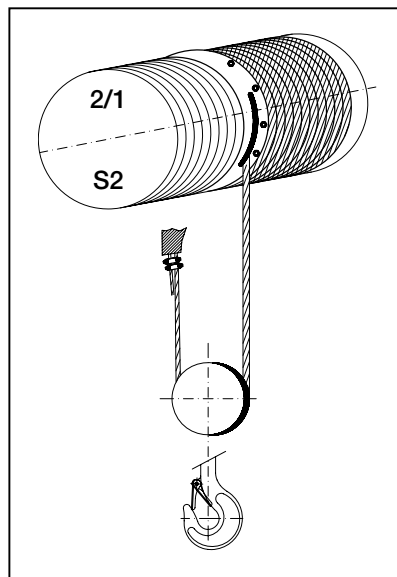


The STD motor are manufactured for use relating to group FEM 2m, precisely: 240 no. of start I.R. 40% fast and 15% slow, non cumulative.

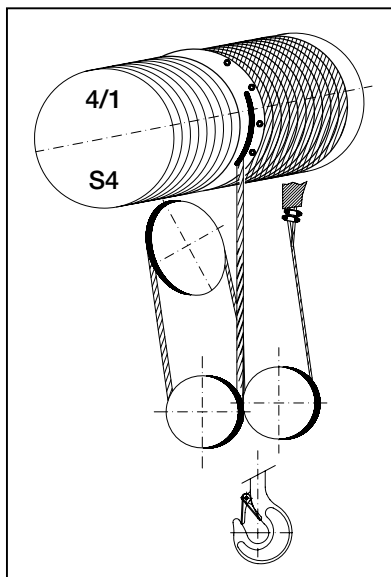
**NOTE - Auxiliary speeds can only be used for a limited time, based on the intermittent duty rates (for example: spotting) and not as the normal operating speed.**

## 2.4 STANDARD VERSIONS AND USE

### Rope fall arrangement

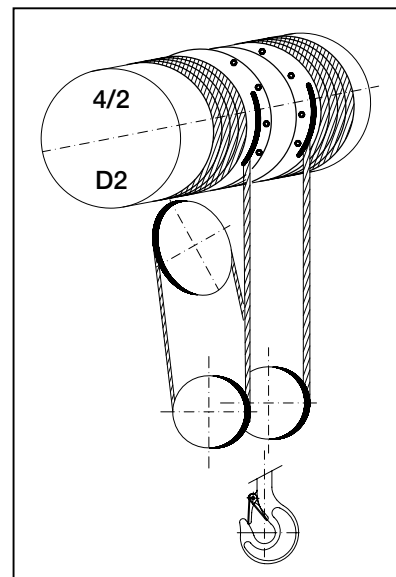


S2 - 2 ROPE FALLS (2/1)



S2 - 4 ROPE FALLS (4/1)

### Standard use

D2 - 4 ROPE FALLS (4/2)  
CENTRAL FALL

### Example of hoist code composition

XM	312	N	S4	H7	A	/5	a
Series	Hoist size		Version: S2 - 2 rope falls 2/1 S4 - 4 rope falls 4/1 D2 - 4 rope falls 4/2	Hook stroke			2 <sup>nd</sup> travel speed (where requested)
		N 1 speed normal lifting V 1 speed fast lifting				Type: 5 supported 5C1 suspended 3 standard monorail trolley 83 low headroom monorail trolley 53 double rail trolley with rested hoist 53C1 double rail trolley with suspended hoist	
					2 <sup>nd</sup> lifting speed (where requested)		

## 2.5 TECHNICAL INFORMATION

### Reference legislative framework

The design and construction of the electric rope hoists "XM" Series and the relevant movement trolleys took into consideration the following main standards and technical regulation:

- **EN ISO 12100:2010** Main fundamental general design concepts.
- **EN ISO 13849-1:2008** Parts of the command system relating to safety.
- **EN 12385-4:2008** Steel ropes - Safety  
Part 4 - Stranded ropes for general lifting use.
- **EN 13135-1:2010** Lifting devices  
Part 1 - Electrical and technical equipment.
- **EN 13135-2:2010** Lifting devices  
Part 2 - Non-electrical and technical equipment.
- **EN 12077-2:2008** Limiting and indication devices.
- **EN 13001-1:2009** Lifting equipment -  
General criteria for the project  
Part 1 - Principles and main requirements.
- **EN 13001-2:201.1** Lifting equipment -  
General criteria for the project  
Part 2 - Load actions.
- **EN 13001-3-1:2012** Lifting equipment -  
General criteria for the project  
Part 3-1 - Limit statuses.
- **EN 14492-2:2009** Lifting equipment -  
Part 2 - Motorised hoists.
- **EN 60204-32:2008** Safety of electrical equipment on lifting machinery.
- **EN 60529:1997** Level of casing protection (IP Codes).
- **ISO 4301-1:1988** Lifting equipment -  
Classification - Part 1 - General information.
- **ISO 4308-1:2003** Lifting equipment -  
Rope selection - Part 1 - General information.
- **DIN 15400** Selection of lifting hooks -  
Mechanical and support properties.
- **DIN 15401** Selection of lifting single hooks.
- **FEM 1.001/98** Calculation of lifting equipment.
- **FEM 9.511/86** Classification of mechanisms.
- **FEM 9.661/86** Selection of drums, ropes and pulleys.
- **FEM 9.683/95** Choice of lifting  
and travel motors.
- **FEM 9.755/93** Safe work periods.
- **FEM 9.761/93** Load limiters.
- **FEM 9.941/95** Command symbols.

### Operating conditions

The MISIA standard hoists are manufactured to work in environmental conditions characterised by:

- min. temperature.  $-10^{\circ}\text{C} \div \text{max } +40^{\circ}\text{C}$
- relative humidity  $< 80\%$
- altitude  $\text{max } 1000 \text{ a.s.l.}$

When operation of the hoist is planned in other environmental conditions to those standard conditions, special versions are available on request.

### Standard guards and insulation

MISIA hoists are designed for use in an environment protected from atmospheric agents. Electrical parts are supplied with the guards and insulation as indicated in Tables 1, 2 and 3.

#### Conical motors

Table 1

Function	Guard		Class of insulation
	Motor	Brake	
Lifting	IP54	IP23	F
Movement	IP54	IP23	F

#### Cylindrical motors

Table 2

Function	Guard		Class of insulation
	Motor	Brake	
Lifting	IP55	IP55	F
Movement	IP55	IP55	F

#### Electrical systems

Table 3

Part	Guard	Max insulation voltage
Electric box	IP55	1,500 V
Cables	CE 120/22	450/750 V
Connectors	IP55	600 V
Keypad	IP55	500 V
Limit switch	IP54	500 V

**Hoists for outdoor use, guards and insulation other than standard ones are available on request.**

### Noise

The sound pressure level emitted when all the parts of the hoist are working is clearly under 85 dB(A) measured 1 m distance and 1.60 metres off the ground.

### Electrical power supply

Serial MISIA hoists are designed for three-phase AC power 400V / 50Hz  $\pm 10\%$ .

Motors with special voltage and frequency are made available (to be defined upon order or offer).

Only for tapered single polarity motors it is always possible the  $\Delta$  /  $\Delta$  voltage switching (400V star / 230V triangle). For all other motors the voltage must be specified.

The design of the power supply line must be adequate for the power and absorption of the motor relevant to configuration of the machine planned in the sales quote (see table 6 on page 41).

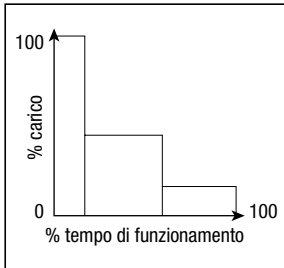
Motors for special voltages and frequencies other than standard supplies are available on request.

## 2.6 CHOICE OF HOIST BASED ON FEM GROUPS

The duty class of hoist use is determined by two parameters:

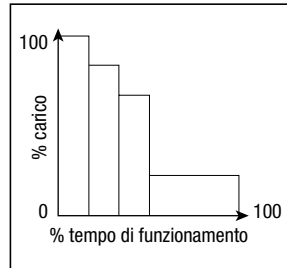
- a) running time;
- b) duty class.

### L1 Light



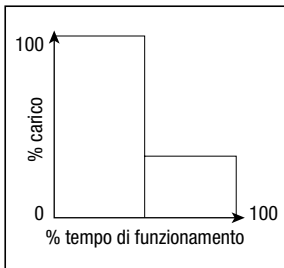
For hoists that rarely lift the maximum load and mainly reduced loads.

### L2 Medium



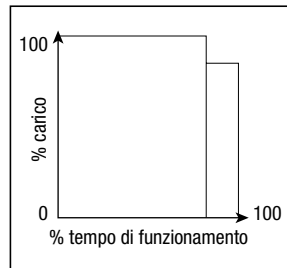
For hoists lifting approximately the same ratio maximum, medium and reduced loads.

### L3 Heavy



For hoists that frequently lift the maximum load and normally medium loads.

### L4 Very Heavy



For hoists that regularly lift loads near the maximum value.

Duty class	Running time "T"	
L1 - Light	6300	12500
L2 - Medium	3200	6300
L3 - Heavy	1600	3200
L4 - Very heavy	800	1600
<b>FEM Group</b>	<b>1A m</b>	<b>2 m</b>

## Temporary service

As foreseen in the **FEM 9.681 e 9.682** rules, electric self-braking motors for movement and lifting are designed and manufactured for use in intermittent service in relation to the selected duty class. However, for example for long movement or high hook strokes, these intermittent duty rates may not be respected. In these cases, the hoist may be operated in **temporary service** with the possibility of establishing the running time while taking into consideration the permissible temperature limits of the motors. In these cases, make sure the motors are not started more than ten times and for the corresponding maximum running time, in compliance with the aforementioned FEM standards, of the chosen duty class (see table).

### Comparison between duty classes

**FEM section IX (standard hoists) E**

**FEM section I and ISO (special hoists)**

FEM 9.511	FEM Sect. I-ISO
1C m	M2
1B m	M3
1A m	M4
2 m	M5
3 m	M6
4 m	M7

### Temporary service (high hook strokes and long movements)

Group		Continuous running time min.	Max. no. of consecutive start-ups during the running time
FEM	ISO		
1B m	M3	15	10
1A m	M4		
2 m	M5	30	10
3 m	M6		

## 3. INSTALLATION INSTRUCTIONS

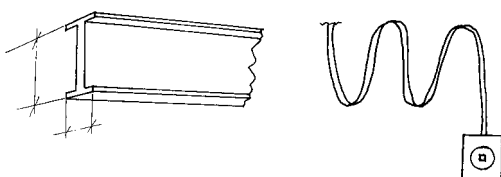
### 3.1 PREPARATION FOR INSTALLATION



Before starting installation, make sure the technical data of the hoist and the parts to be prepared by the user comply with the content of the order confirmation, in order to ensure a proper installation, especially:



Verify the suitability of the rail or the fixed support to hold the hoist, as well as the feeding line.

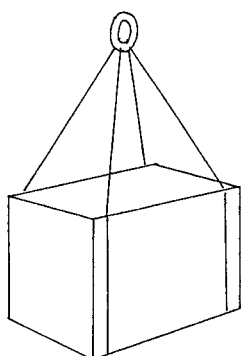


Inspect the working area where the hoist will be operating:

- Check that there are no obstacles in the way of the hook during lifting.
- For a hoist with trolley, make sure that travel and lifting movements are free from obstacles and are not dangerous to people, things and the workplace.
- Make sure that no permanent working activities are performed under the operating area of the trolley.



Provide suitable test weights for dynamic and static load tests, with suitable sling and lifting equipment, as follows:



**DYNAMIC TEST**  
mass=  
 $\text{rated capacity} \times 1.1$

**STATIC TEST**  
mass=

- **rated capacity x 1.25**  
besides the rated capacity of 1000 kg.
- **rated capacity x 1.5**  
up to rated capacity of 1000 kg.
- **the static test must be carried out without starting the motor, but only by applying the load to verify the hold of the brake (see page 45).**



Check the suitability of the power supply line and the current / voltage values accordingly to the content of the order confirmation.

**Verify that this documentation corresponds to the hoist to be installed.**

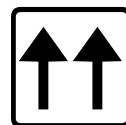
### 3.2 PACKAGE



Check in the packaging-list, or the delivery note, the list of documents supplied with the equipment (including the instruction, operation and maintenance manual, the various certificates and the conformity declaration). The hoist can be delivered on: pallets, crate, closed case, according to the requirements of the customer when making the order. For "closed cases" respect the handling instructions as well as the indications and symbols marked thereon.



Handle  
with care



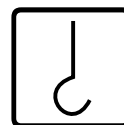
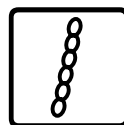
Do not  
overturn



Protect  
from rain



Do not  
stack



Instructions on lifting means and holding points



Before handling the packaging, take note of the weight of the load unit signed on the package and use proper tools.



If the hoist should not be installed immediately, note the following points:



The standard packaging is not rainproof" and is intended for transport by land, and not by sea, inside covered rooms, without humidity.



The packed and suitable preserved equipment can be stored indoors for a period of about 5 years, at a temperature between -20° and +70°C and 80% humidity. Different environmental conditions require a special package.



Identify the hold points, if any, marked on each package unit with the corresponding symbol. Before handling the load unit, visually check the package, and consequently the goods, for breaks or damages.



**NEVER USE SLING CHAINS TO LIFT OR MOVE THE PACKAGE UNIT**



**LIFT THE PACKAGED HOIST WITH THE FORKS OF A LIFT TRUCK OR BY MEANS OF A TRANSPALLET**



Dispose of the package according to legal specifications.

### 3.3 TRANSPORT AND MOVEMENT



In order to ensure careful and proper handling of the equipment, we recommend you entrust qualified carriers with the transport. No other goods can be laid on the equipment or its package. During transport the goods must be properly covered to provide waterproof protection against rain.

In case of shipping, the package units must be kept in the hold protected against sprinkling water or humid winds.



Handle with suitable means, lifting the equipment without dragging it.

#### 3.3.1 STORAGE



The goods, whether designed for indoor or outdoor installation, can be stored up to a maximum period of 5 years in an environment with the following characteristics:

- protected against atmospheric agents;
- humidity not higher than 80%;
- minimum temperature -20°C;
- maximum temperature +70°C.



For storage periods over 5 years, ask the manufacturer for special protection procedures.



Should these values change during storage, preliminary checks must be performed before putting the hoist into service.

(refer to section 4.13 "Restoration after storage" on page 69).



If in storage the temperature rises above or falls below the given values and the humidity exceeds 80%, provide protection for the packages with barrier bags and hygroscopic salts.



In case of storage outdoors:

- provide for supports to keep all packages without pallets clear of the floor;
- protect all packages with barrier bags and hygroscopic salts.

#### 3.3.2 PACKAGE REMOVAL



To extract the hoist from the package no special slings are required.



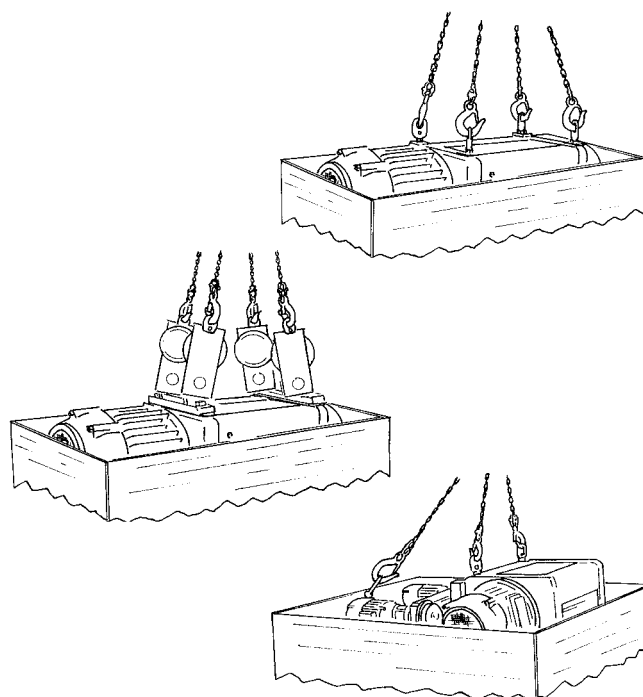
Use adequate slings for the mass of the hoist to be lifted.



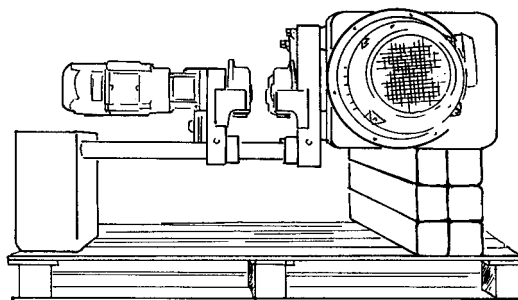
After package removal, visually check the hoist for integrity before starting installation.



To extract the hoist, hook the slings to the points provided, as shown in the illustrations. Using the ring bolts ØM shown in table A on page 16.



Once the hoist is removed from the packaging, put it on a pallet and ensure its stability.



#### 3.4 PARTS SSEMBLY



Verify the technical data of the hoist comply with the foreseen kind of operation, especially the hook travel is not shorter than required and that the operation capacity is equal or greater than the loads to be lifted.



To assemble hoists Type 5C1 (suspended type) always use the lock tab under the head of the bolt and bend as shown. For the bolt diameter see table A.

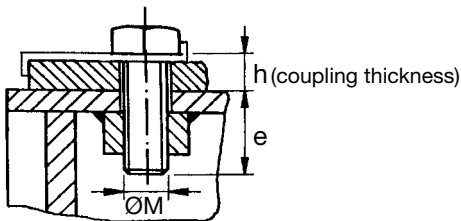


Table A

XM	ØM	e min
308	14	30+h
312-316	20	35+h
525	24	50+h
740-750	27	50+h
950-980	36	70+h
1100-1125	30	60*

\* Not valid for suspended Type hoist (5C1)



In case of hoists with monorail trolley Type 3 and Type 83, the trolleys are delivered with a pre-set beam width. This value is indicated in the order confirmation Check for compliance and verify the space required on the catalogue.

LT = Rail flange + 3÷4 mm

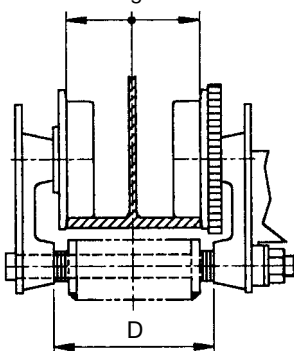
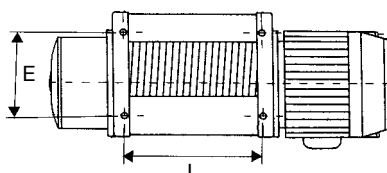


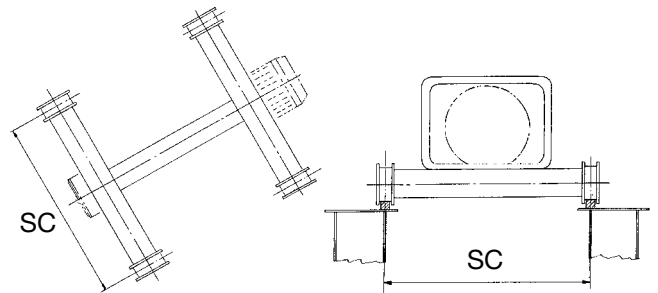
Fig. 1



Verify the feet base for hoist Type 5 as per the catalogue drawing.



Verify the gauge of double rail trolleys Type 53 as per the catalogue drawing.



For any changes please contact the Technical Department of MISIA.

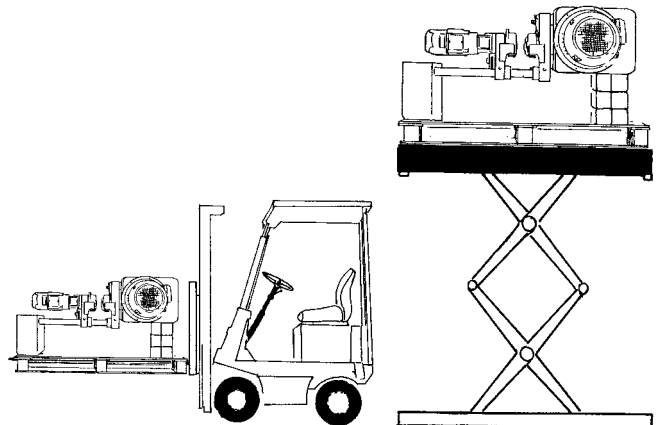
#### 3.5 MOUNTING TROLLEY TYPE 3 AND 83



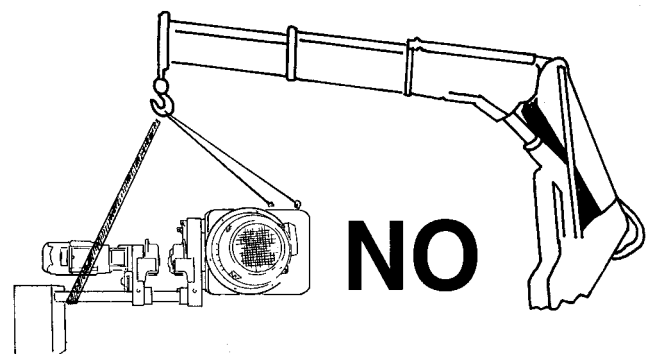
With the hoist on the pallet, lift it vertically with a lift truck or platform.



The step to be performed is to elevate, not to lift the hoist.

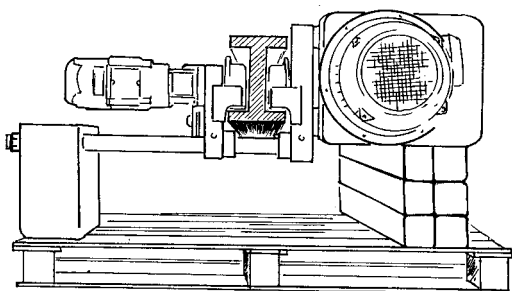


Do not use derricks for this step, otherwise the slings during lifting would hinder mounting on the rail.





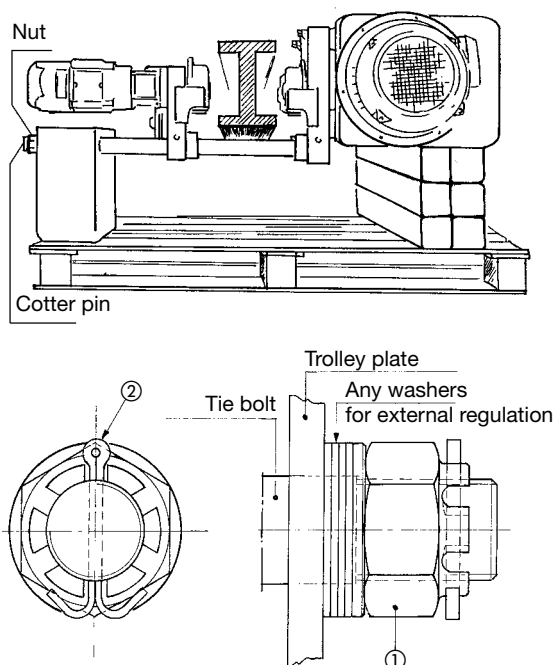
- If the rail has one open end, fit the trolley on the open end of the rail and lock the rail end with a fixed stopper.



**TROLLEY FIG. 83**

- ⚠ Before installing the hoist on the beam, you need to check correct correspondence between the width of the beam and the dimension **LT (width of the beam taken by the manufacturer on the trolley  $LT = \text{Beam wing} + 3 \div 4 \text{ mm}$ )**.

- To mount the hoist in a closed end rail, widen the plate on the nut side proceeding as follow:



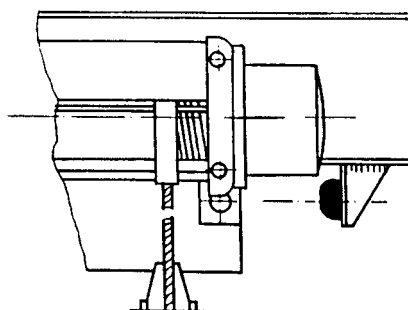
- Remove the cotter pin pos. 2, loosen the nut pos. 1 until the plates spread enough to allow the wheels to pass on the external edge of the beam flange.

- Place the trolley in position and restore the proper wheel base, paying attention to leave  $3 \div 4 \text{ mm}$  between the beam flange shown in Fig. 1 on page 16.

- ⚠ Press the plate against the inner spacers, tighten the nuts again paying attention that the slot of the slotted nut pos. 1 is aligned with the hole of the tie bolt, insert the cotter pin pos. 2 and bend the ends of the cotter pin so that it cannot come out.

- ⚠ In case of low headroom trolleys, before opening remove the counterweight, paying attention to put it again in position before tightening the nuts.

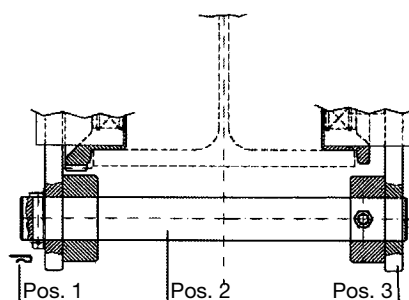
- ⚠ After mounting, verify the trolley travels smoothly and that there are no obstacles, such as projection on beam flanges, junctions plates, bolt heads, etc. Provide rubber stoppers at the ends of the trolley stroke as shown below.



- Low headroom trolleys are available with counterweights made of steel sheets with a pre-set weight located at the end of the tie bolts on the side of the travel gearmotor. Verify the proper balance and grip of the driving wheels with no trolley load, in order to prevent slipping.

**TROLLEY FIG. 3**

- ⚠ Before installing the hoist on the beam, you need to check correct correspondence between the width of the beam and the dimension **LT (width of the beam taken by the manufacturer on the trolley  $LT = \text{Beam wing} + 3 \div 4 \text{ mm}$ )**.



- Remove the cotter pin pos. 1, remove the pin pos. 2, and open the plate pos. 3 to allow the wheels to pass on the external edge of the beam flange.

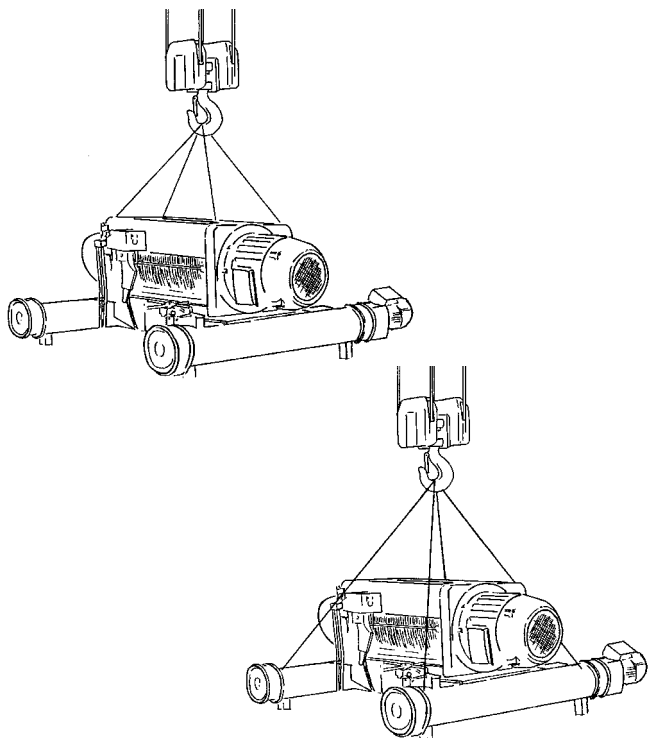
**→** Position the trolley and tighten the plates. The space between the wheels and the beam flange must be  $3 \div 4$  mm. see Fig. 1 on page 16.

**→** Reassemble the pin pos. 2 and the cotter pin pos. 1.

**→** After mounting, verify the trolley travels smoothly and that there are no obstacles, such as projection on beam flanges, junctions plates, bolt heads, etc. Provide rubber stoppers at the ends of the trolley stroke as shown below.

### 3.6 MOUNTING DOUBLE RAIL TROLLEY

**!** Lift the trolley hoist with a mobile crane using the hold points provided and lay it on the pre-arranged travel rails, after checking the exact gauge of the strokes.



**!** Check the anti-fall brackets for proper mounting.

### 3.7 BLOCK MOUNTING

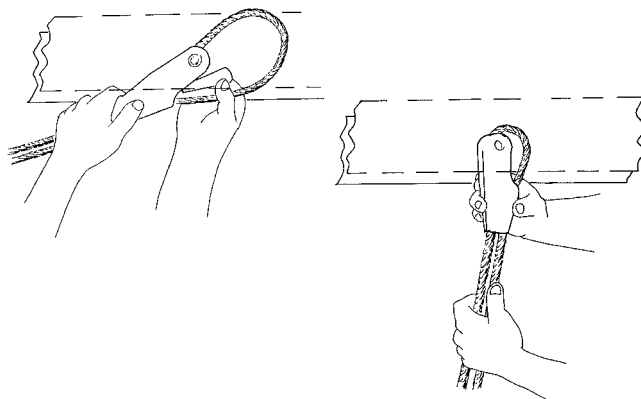
To ensure the safe and reliable operation of the hoist, special care must be given to the fixing of the two rope ends, observing the following instructions.

For transport reasons, the block is delivered loose, detached from the ropes. In this case, perform the block mounting paying attention to the following points:

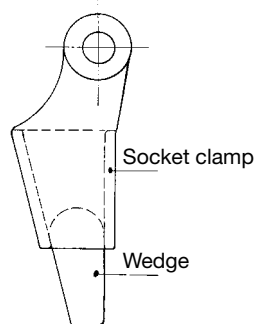
• **the rope should not be twisted, but tight.**

**!** To mount the block for rope hoists with 2 or 4 falls, follow the correct sequence of rope rotations, between the drum output and the pulley, up to the socket as in figures S2 (2/1), S4 (4/1) and D2 (4/2) on page 11.

**!** Pass the rope through the pulleys and fix it to the relevant transverse beam by inserting the wedge into the compartment of the socket without twisting the rope.



**i** Before inserting the rope in the socket, make sure the wedge supplied cannot come out from the lower hole of the socket without the rope wrapped around it, as shown below.

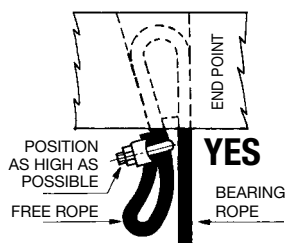




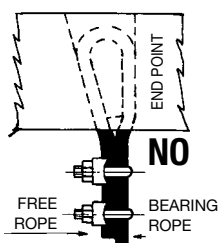
After that, fasten the supplied clamps to the free rope end.

#### FOR ROPES Ø 7-10 mm

Correct fastening of clamps

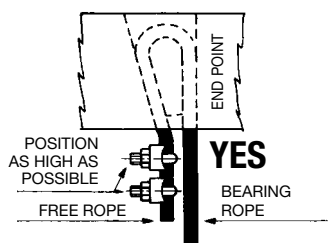


Correct fastening of clamps

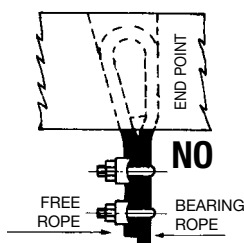


#### FOR ROPES OVER 10 mm

Correct fastening of clamps



Correct fastening of clamps



### 3.8 ELECTRICAL EQUIPMENT

**Caution:** before starting assembly and start-up of the electric hoist, visually check there are no mechanical or other damages caused by transport.

#### Connection to the power supply line for hoists with electric equipment



First of all, check if the rated voltage and frequency on the identification plate of the hoist comply with the power supply line values. After that, perform the connection and start-up of the electrical hoist observing the wiring diagram located inside the electric equipment. If the feeding cable of the hoist does not form part of the delivery, determine its sections in mm<sup>2</sup> taking into account the necessary length and the current consumption of the motors, refer to section 3.10 "Start-up" on page 41.

### 3.9 CONNECTING THE HOISTS WITHOUT EQUIPMENT TO ELECTRICITY



Before switching on the hoist motor, check if the voltage and the frequency of the network power supply line comply with the data on the identification plate of the hoist. Considering that bipolar motors generally have only one feeding voltage, it is impossible to change the voltage inverting the connection in the terminal box.



Verify that, under worst operating conditions (i.e. with the greatest number of users operating), and with the hoist at full load, The voltage at the motor terminals remains within a tolerance of  $\pm 10\%$  of the rated voltage.



Forcefully tighten the terminals in order to avoid loose contacts.



Make sure that the wiring diagram of the electric system of the terminal box refer to the installed hoist.



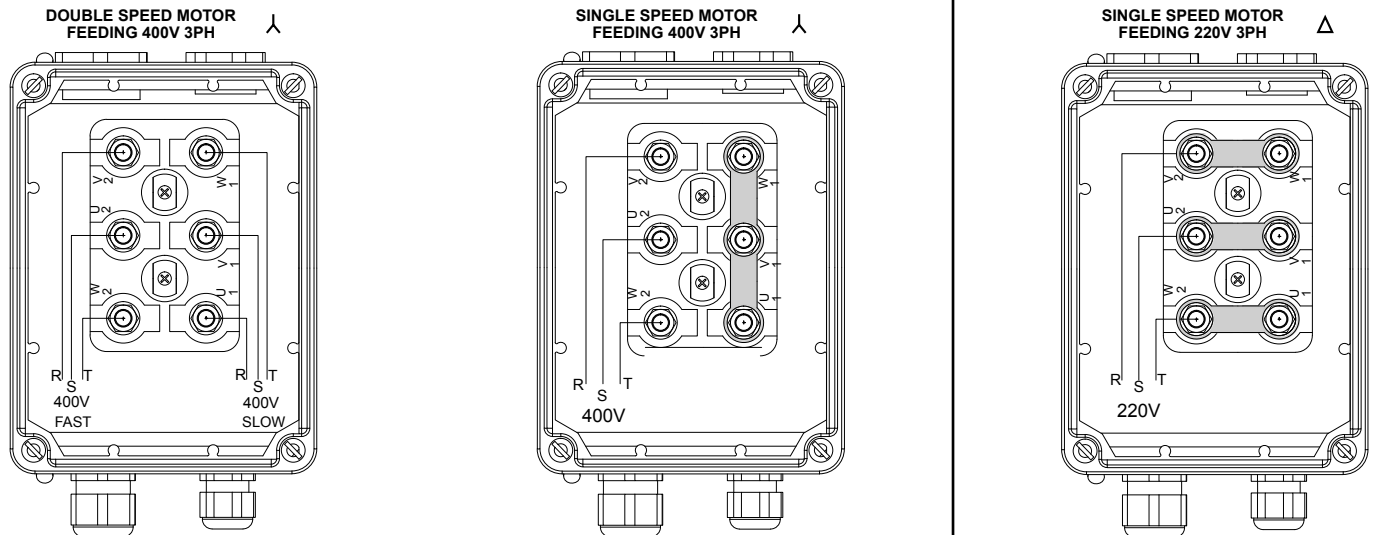
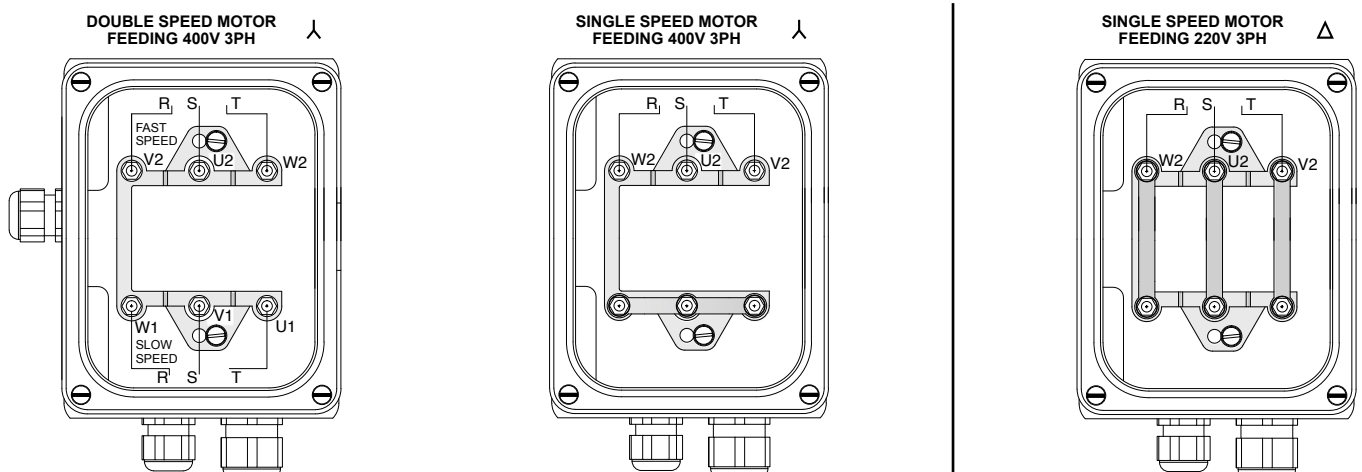
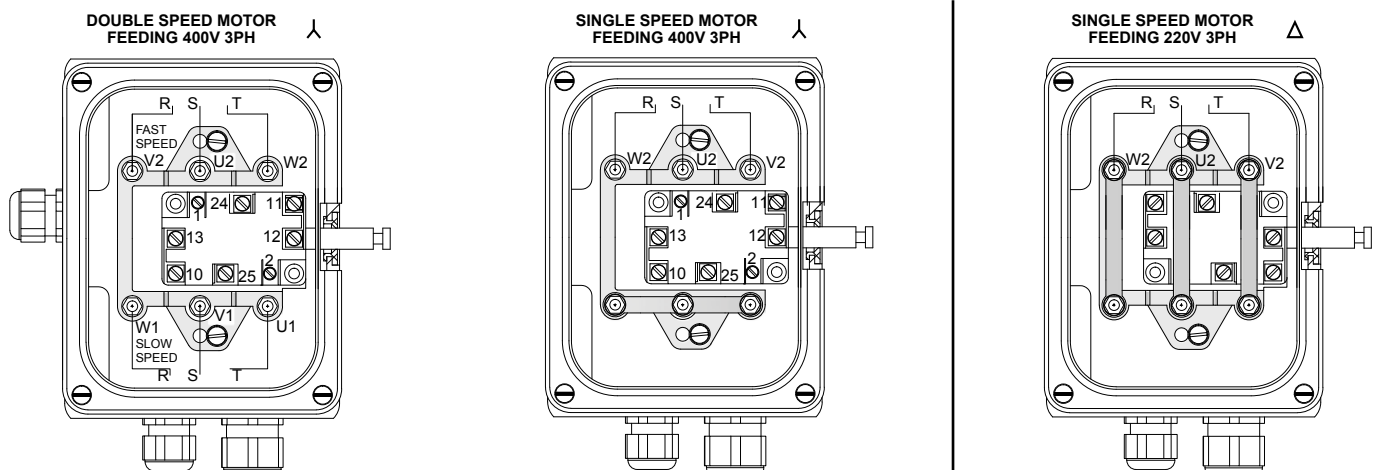
Define the capacity of the fuses according to the amperage of the electric motors on the hoist and trolley (Tab. 2-2A-3-4-5 on page 40).



Determine the section in mm<sup>2</sup> of the feeding cable, taking into account the necessary length and the current consumption of the motors (Tab. 6 on page 41).



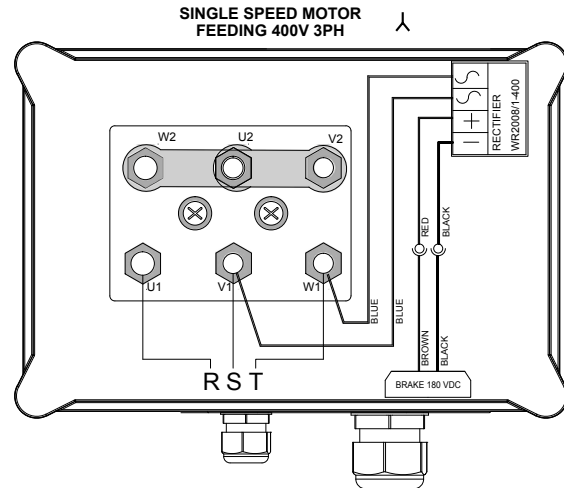
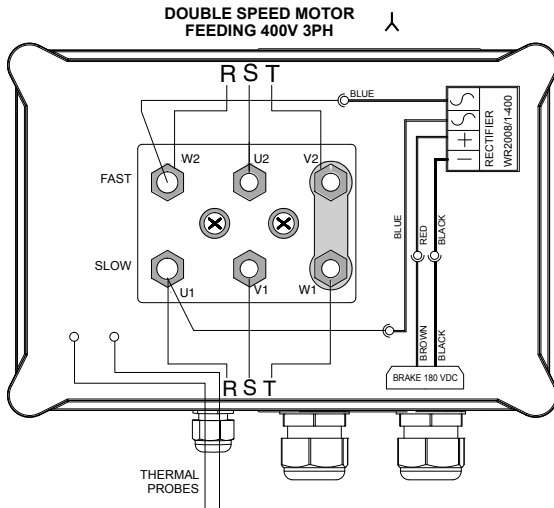
For rapid closing of the brake for cylindrical lifting motors with power over 8 KW, 2 auxiliary contacts must be installed on the up/down switches in the electric control panel, in order to cut off the CC on the brake, as in the enclosed diagrams.

**3.9.1 WIRING CONNECTIONS CONICAL MOTORS 1 OR 2 SPEEDS****XM SERIES XM308/312/316/525****XM SERIES 740/750/950/963/980/1100/1125 WITH END LIMIT SWITCH EXTERNAL TO THE MOTOR TERMINAL BOARD****XM SERIES WITH END LIMIT SWITCH INTERNAL TO THE MOTOR TERMINAL BOARD**

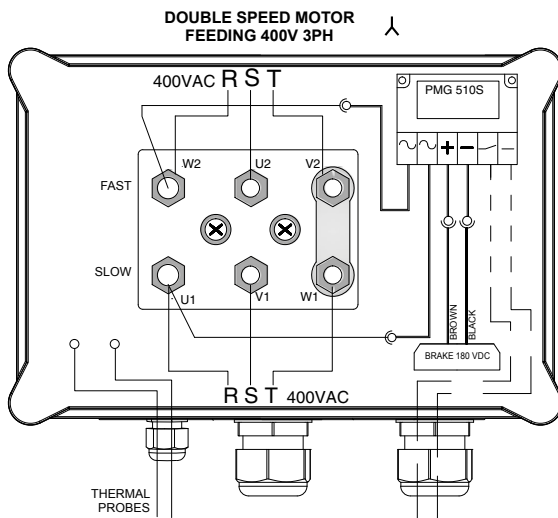
\*Only for single speed motors it is always possible to change tension Y “star” to “delta”  $\Delta$  connection.

### 3.9.2 WIRING CONNECTIONS CYLINDRICAL MOTORS 1 OR 2 SPEEDS

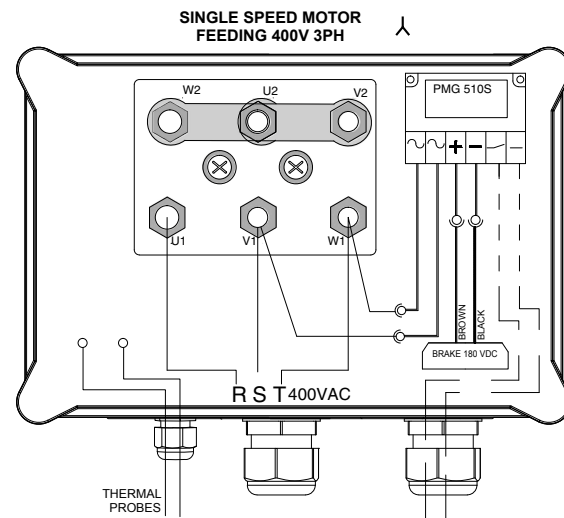
#### XM SERIES 308/312/316/525 (WITH FAST BRAKE RECTIFIER)



#### XM SERIES 525V/740/750/950/963/980/1100/1125 (WITH RECTIFIER PMG 510S)



S/D --- AUXILIAR CONTACTORS  
ON THE UP/DOWN RELAYS FOR THE  
FAST BRAKE

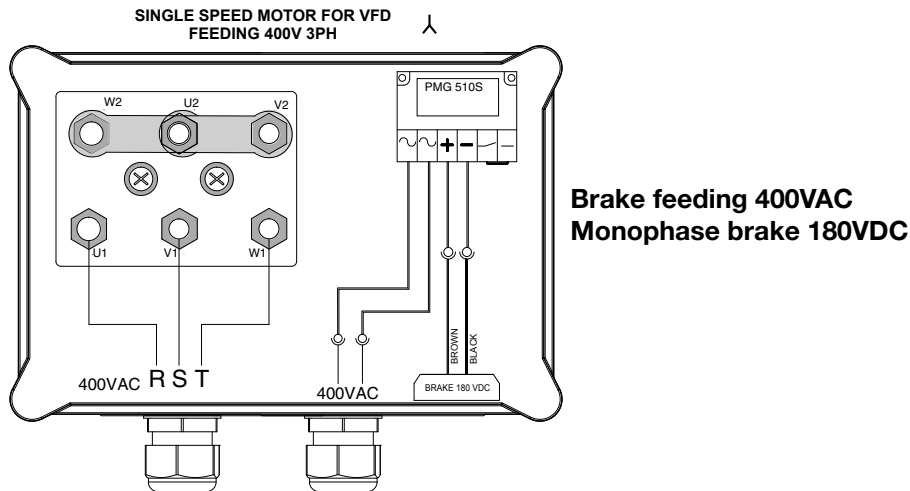


S/D --- AUXILIAR CONTACTORS  
ON THE UP/DOWN RELAYS FOR THE  
FAST BRAKE

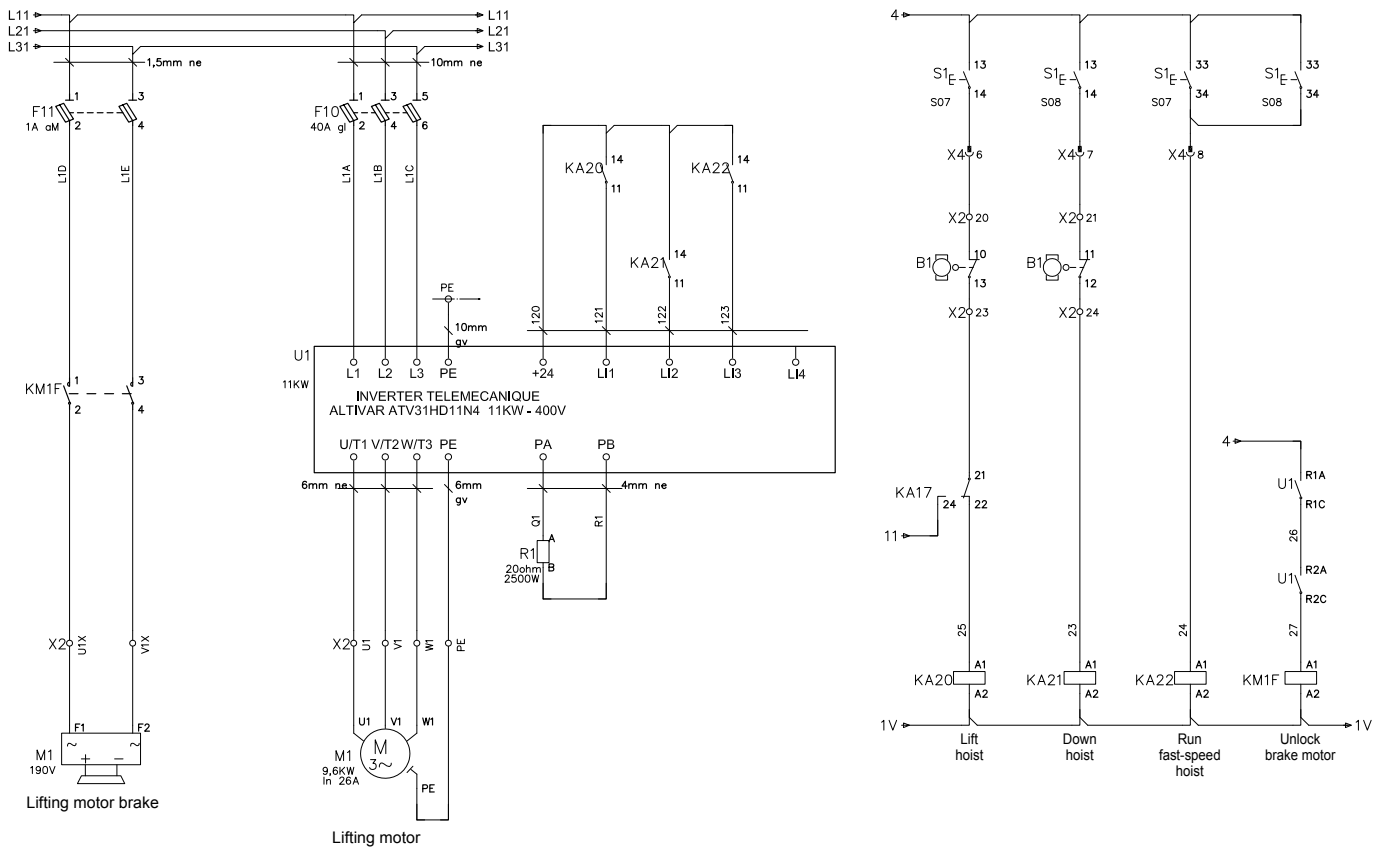


For a quick and fast brake closure on the cylindrical motors with powers higher than 8 kW, it is necessary to foresee to put in the electrical panel two auxiliary contacts on the up/down relays to interrupt the feeding in CC of the brake as per attached schemas (see page 35).

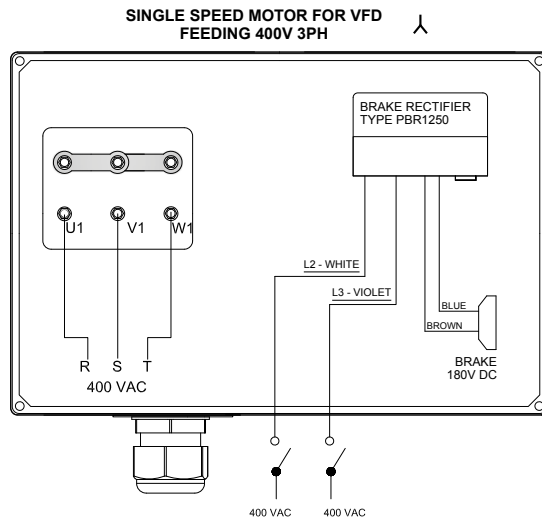
#### 3.9.3 WIRING CONNECTIONS CYLINDRICAL MOTORS SINGLE SPEED SUITABLE FOR VFD



#### EXAMPLE OF VFD WIRING CONNECTION FOR LIFTING MOTOR

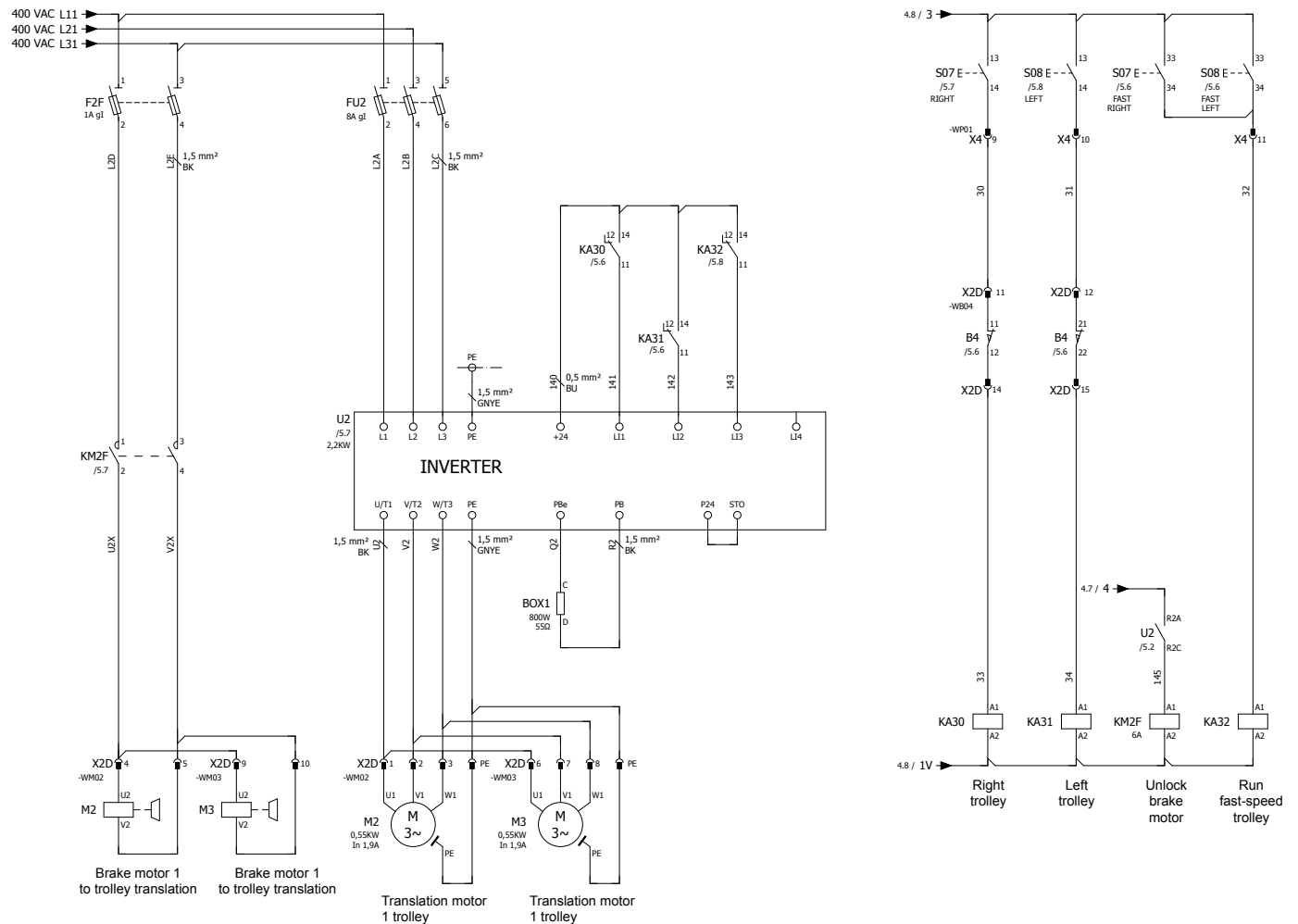


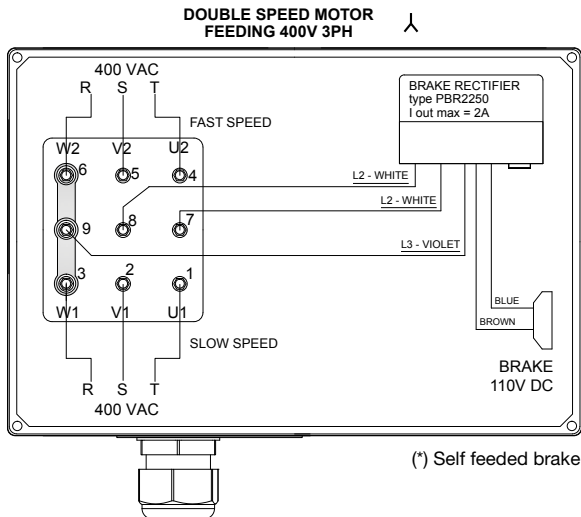
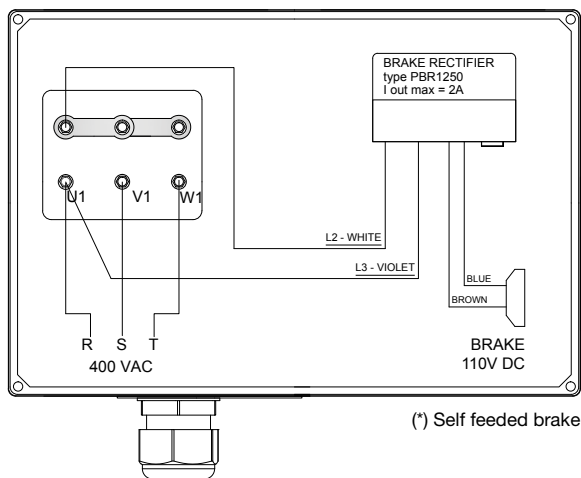
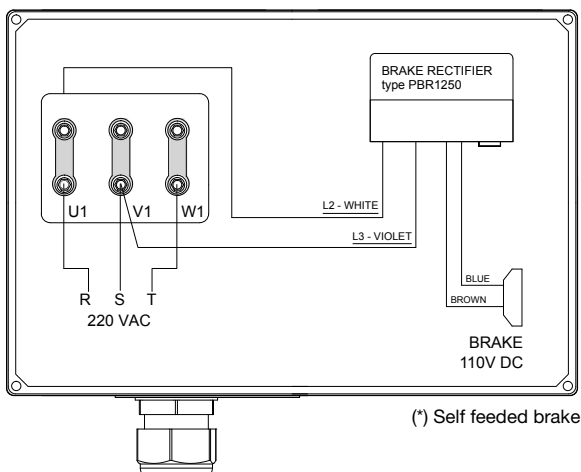
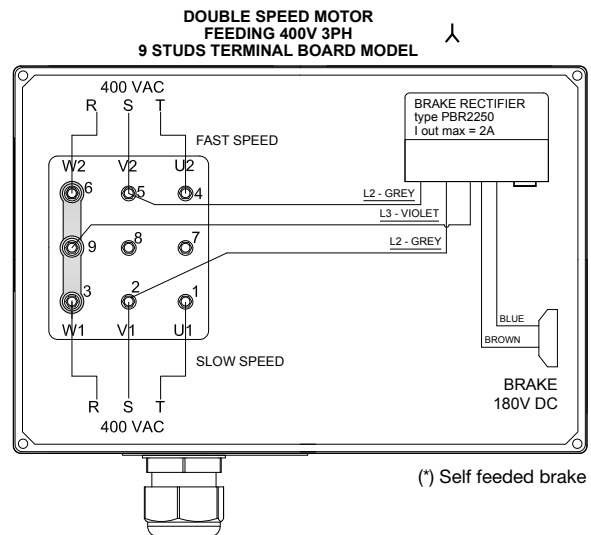
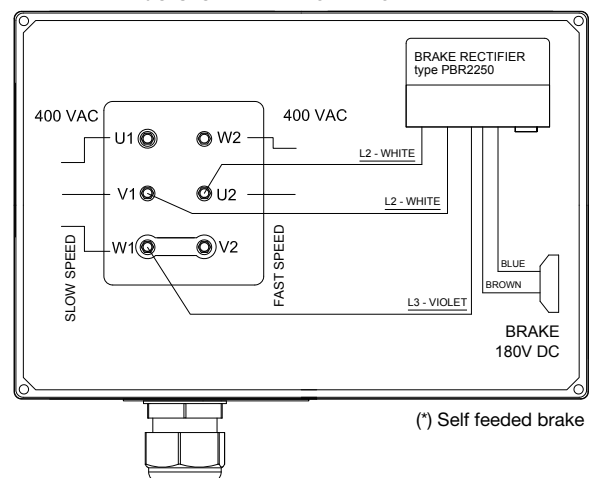
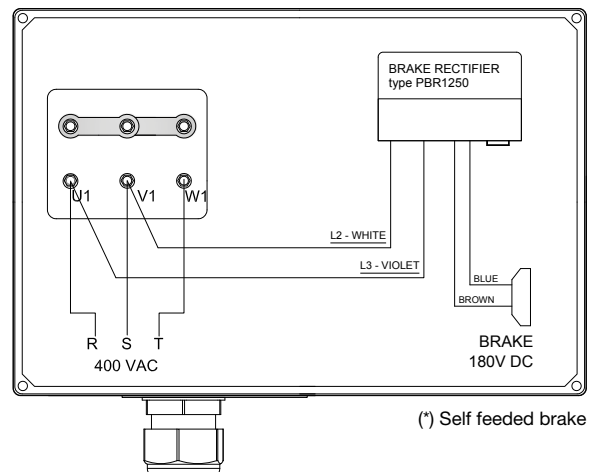
#### 3.9.3.1 C/T MOTOR FOR VFD WIRING CONNECTIONS



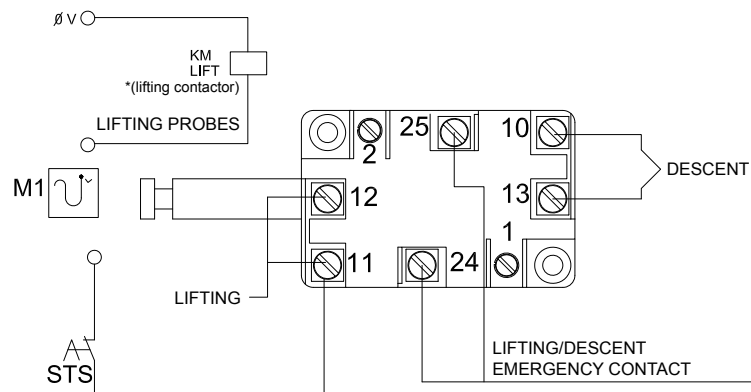
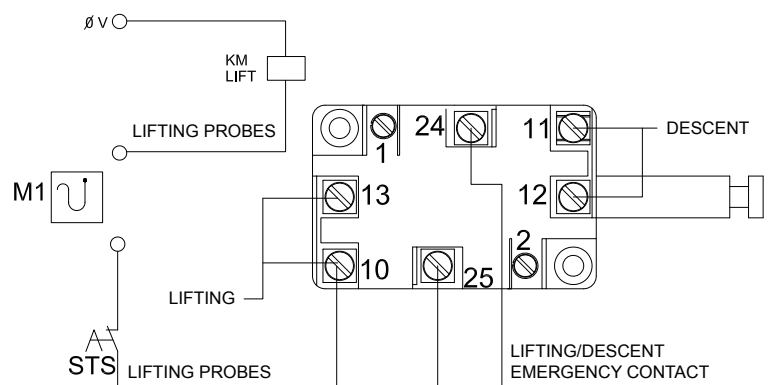
**Separate brake feeding 400VAC monophase  
Brake 180V DC**

#### EXAMPLE OF VFD ELECTRICAL CIRCUIT

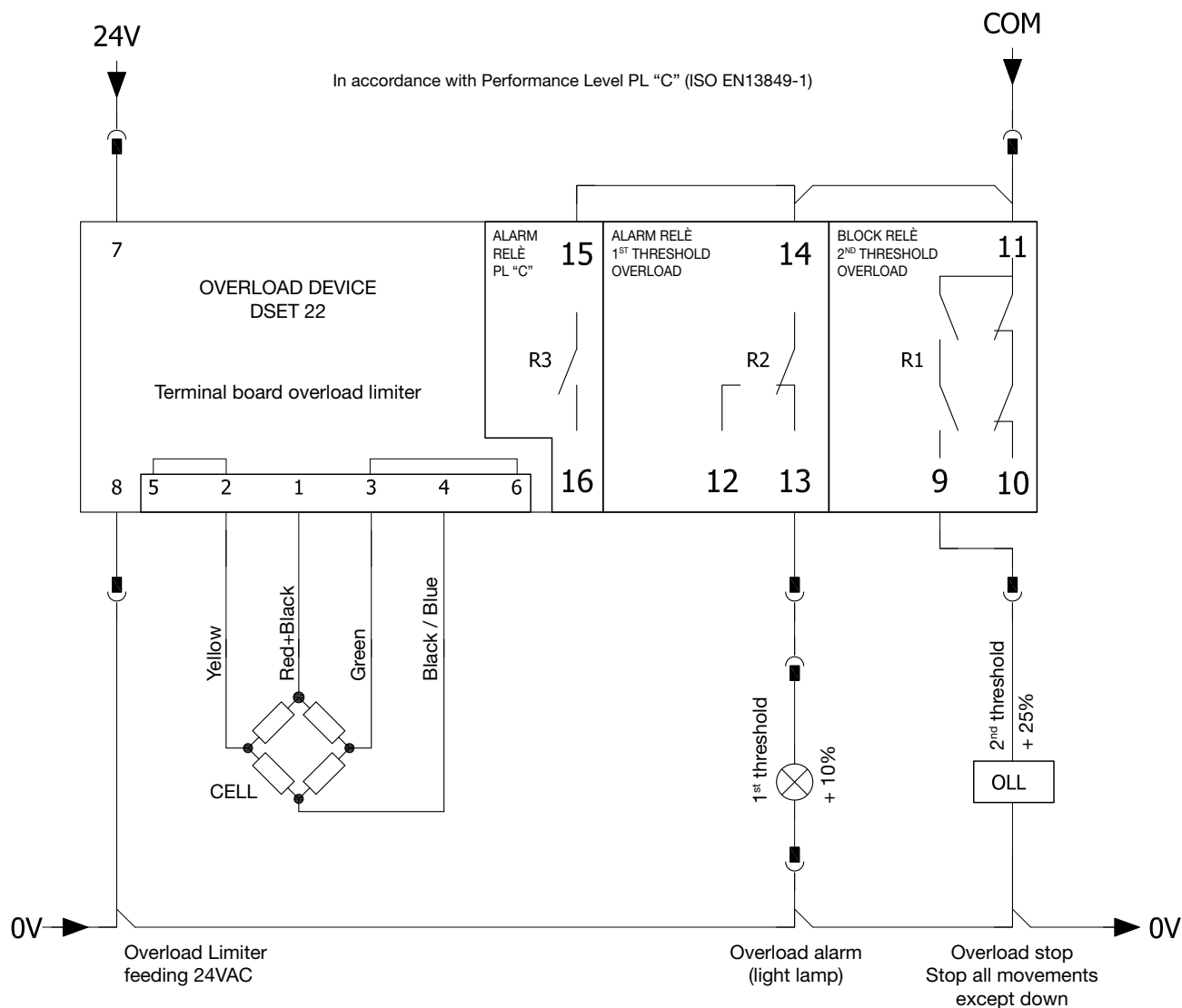


**3.9.4 WIRING CONNECTIONS CROSS TRAVEL MOTORS 1 OR 2 SPEEDS MODEL T AND KT****BRAKE 110V DC****Wiring connection star  $\star$  400 VAC****SINGLE SPEED MOTOR FEEDING 400V 3PH**  $\star$ **Delta connection  $\Delta$  220 VAC****SINGLE SPEED MOTOR FEEDING 220V 3PH**  $\Delta$ **BRAKE 180V DC****Wiring connection star  $\star$  400 VAC****DOUBLE SPEED MOTOR FEEDING 400V 3PH**  $\star$   
6 STUDS TERMINAL BOARD MODEL**SINGLE SPEED MOTOR FEEDING 400V 3PH**  $\star$ 

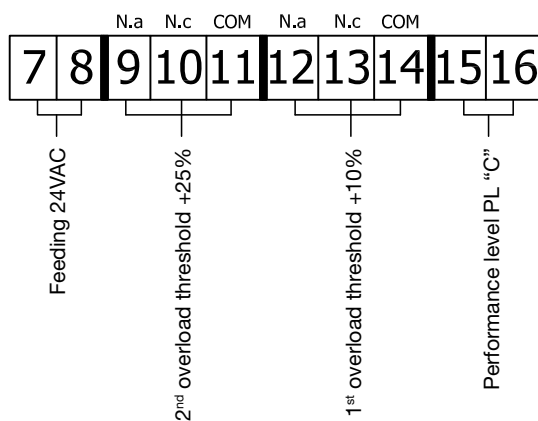


**3.9.5 END LIMIT SWITCH WIRING CONNECTIONS****EXTERNAL END LIMIT SWITCH****END LIMIT SWITCH INSIDE THE MOTOR TERMINAL BOARD**

### 3.9.6 ELECTROMECHANICAL OVERLOAD LIMITER DSET22



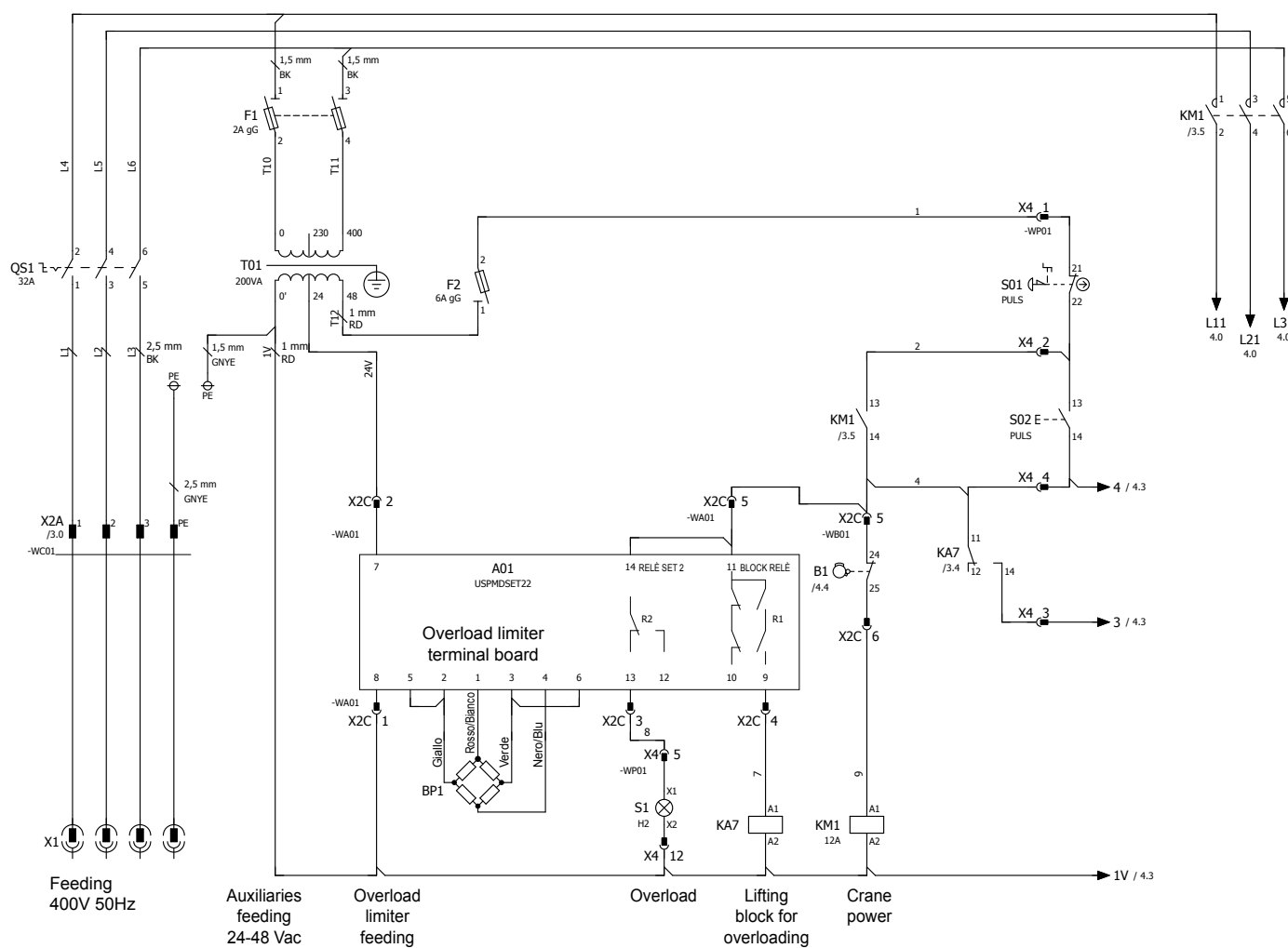
## TERMINAL BOARD



Num.	Feeding relè terminal board
7	+ FEED 10-30 Vdc
8	GND / Vac
9	Block relè (NA)
10	Block relè (NC)
11	Block relè (COM)
12	Pre alarm relè (NA)
13	Pre alarm relè (NC)
14	Pre alarm relè (COM)
15	Alarm relè (COM)
16	Alarm relè (NA)

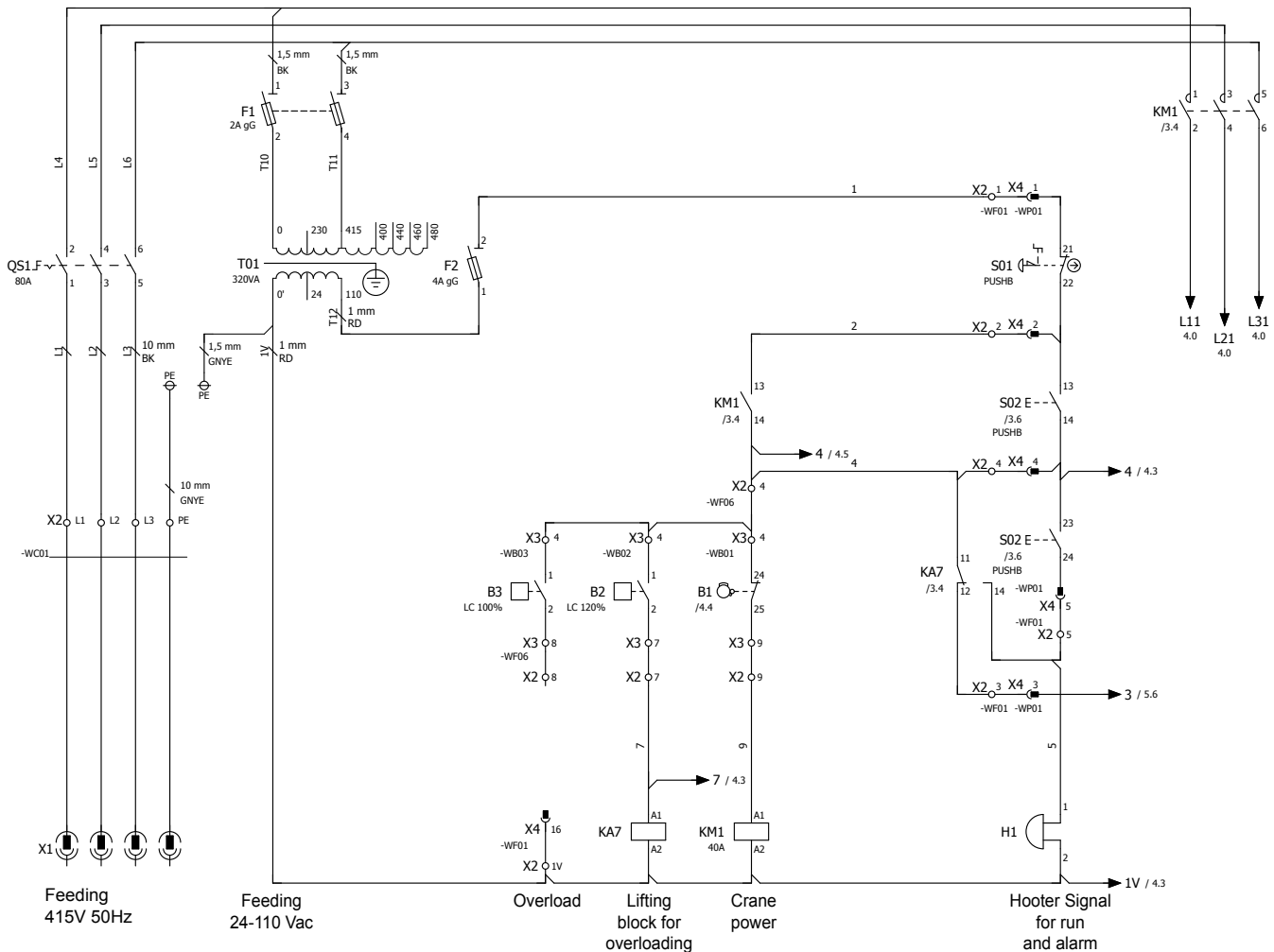
## ELECTROMECHANICAL OVERLOAD LIMITER DSET22

## OVERLOAD LIMITER WIRING CONNECTION EXAMPLE

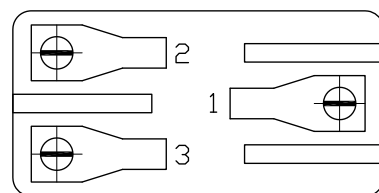


## ELECTROMECHANICAL OVERLOAD LIMITER dSET22

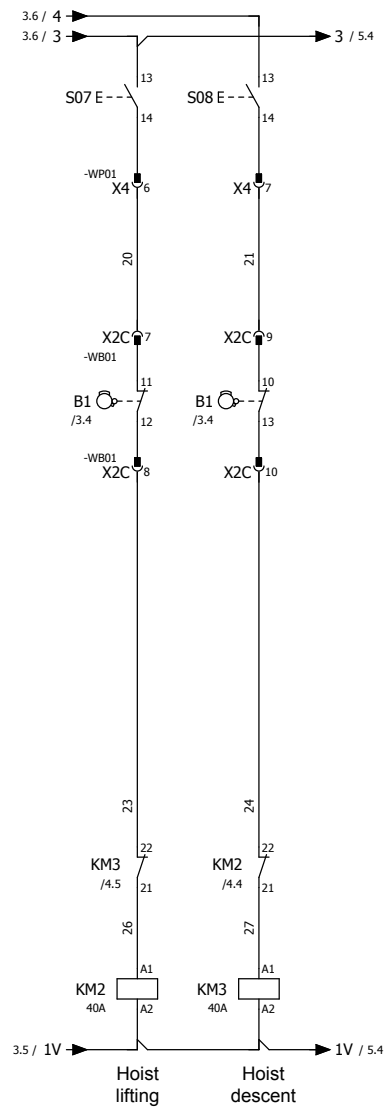
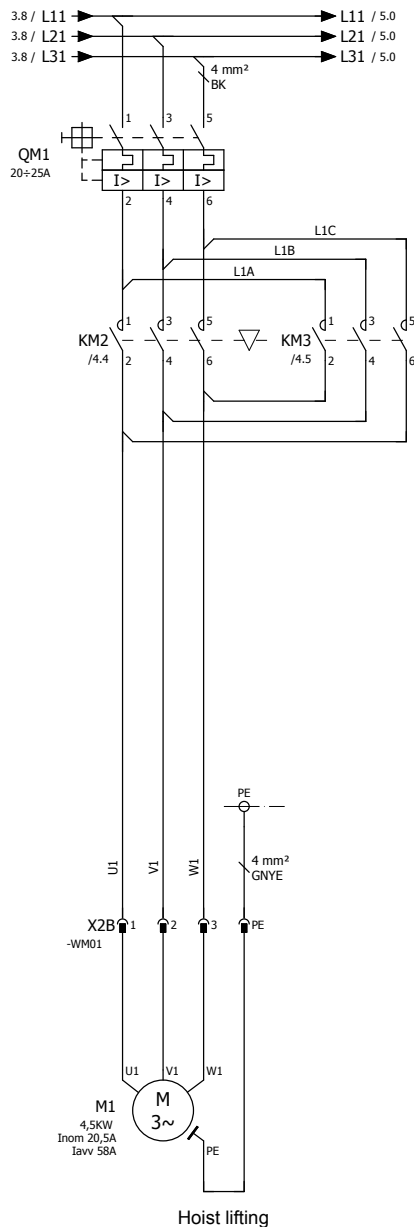
### MECHANICAL OVERLOAD LIMITER WIRING CONNECTION EXAMPLE



#### MICROSWITCH CONTACTORS

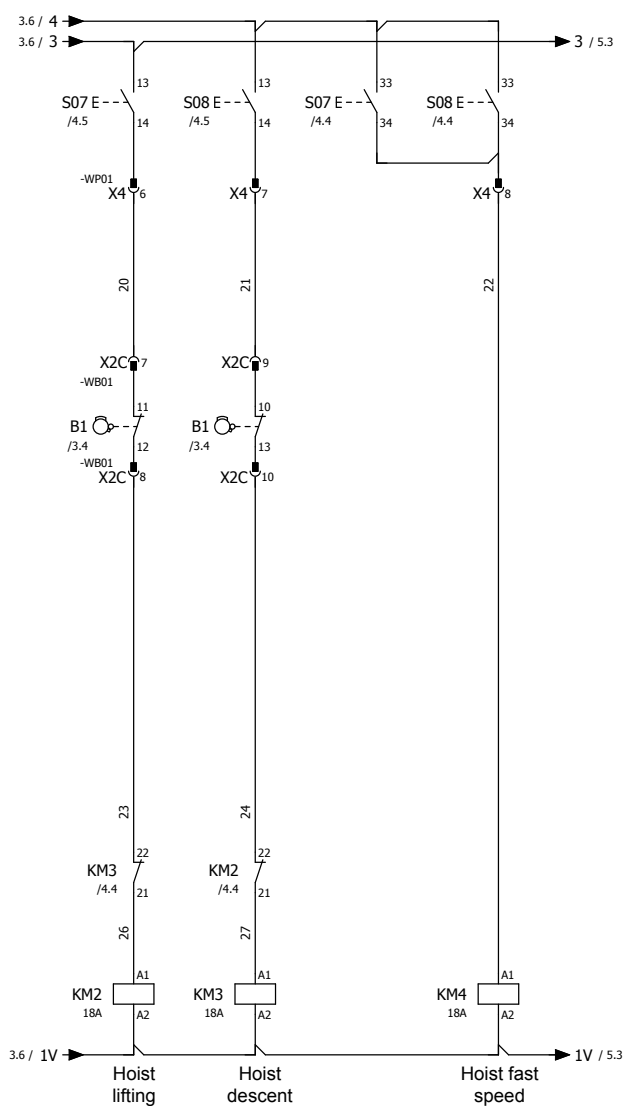
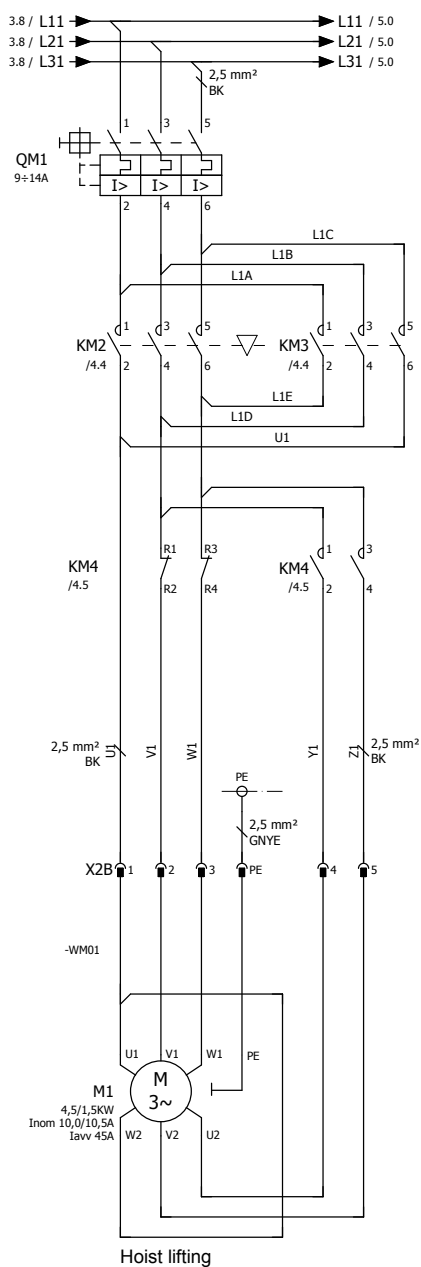


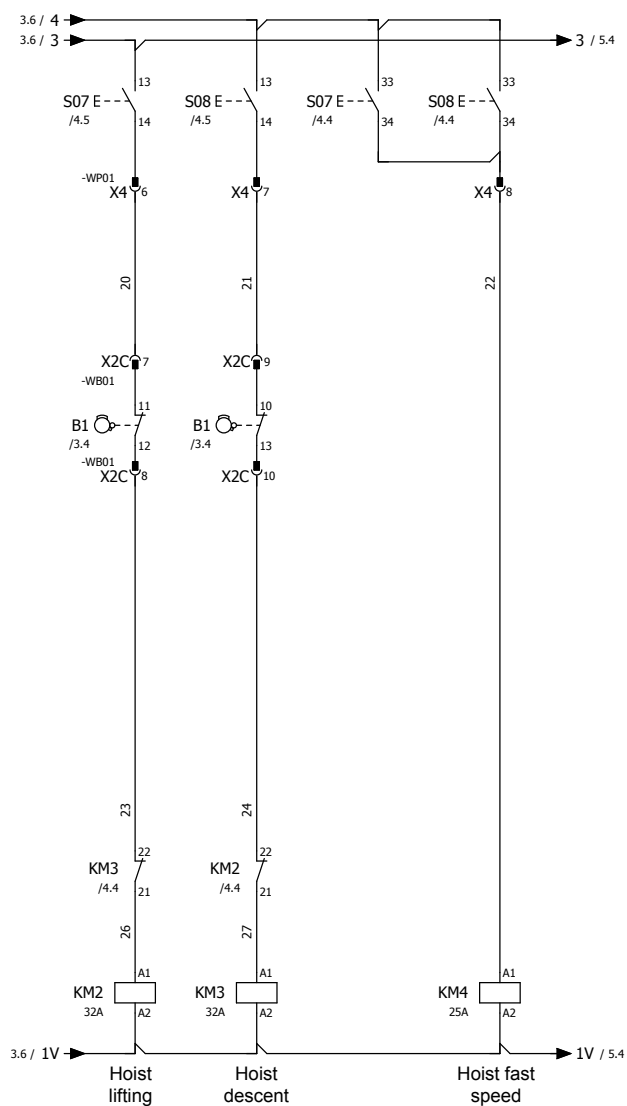
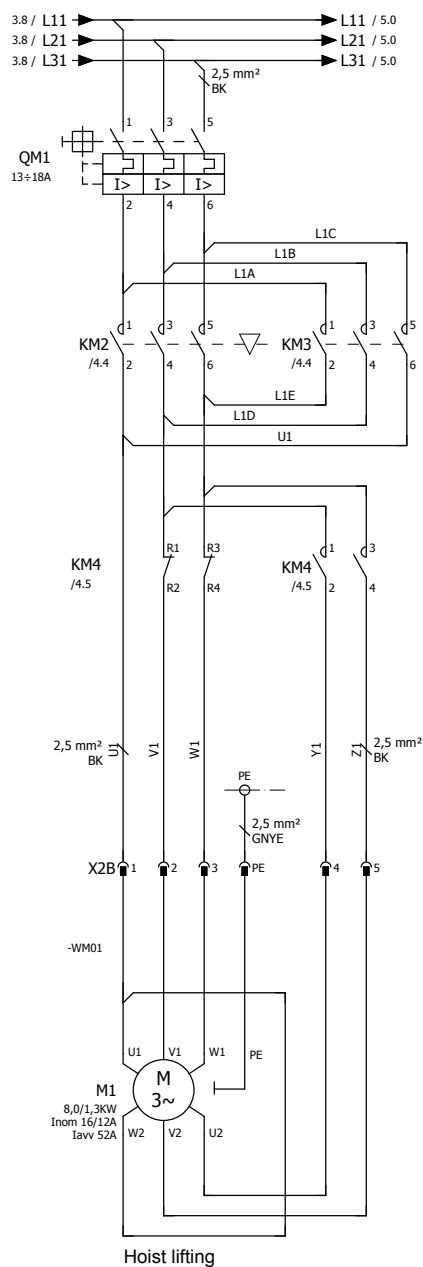
- 1 COMMON (BLACK)
- 2 NORMALLY OPEN CONTACT (BROWN)
- 3 NORMALLY CLOSED CONTACT (GREY)

**3.9.7 CONICAL MOTOR WIRING CONNECTIONS EXAMPLES****CONICAL MOTOR 4,5 KW SINGLE SPEED WIRING CONNECTIONS EXAMPLES**

## CONICAL MOTOR WIRING CONNECTIONS EXAMPLES

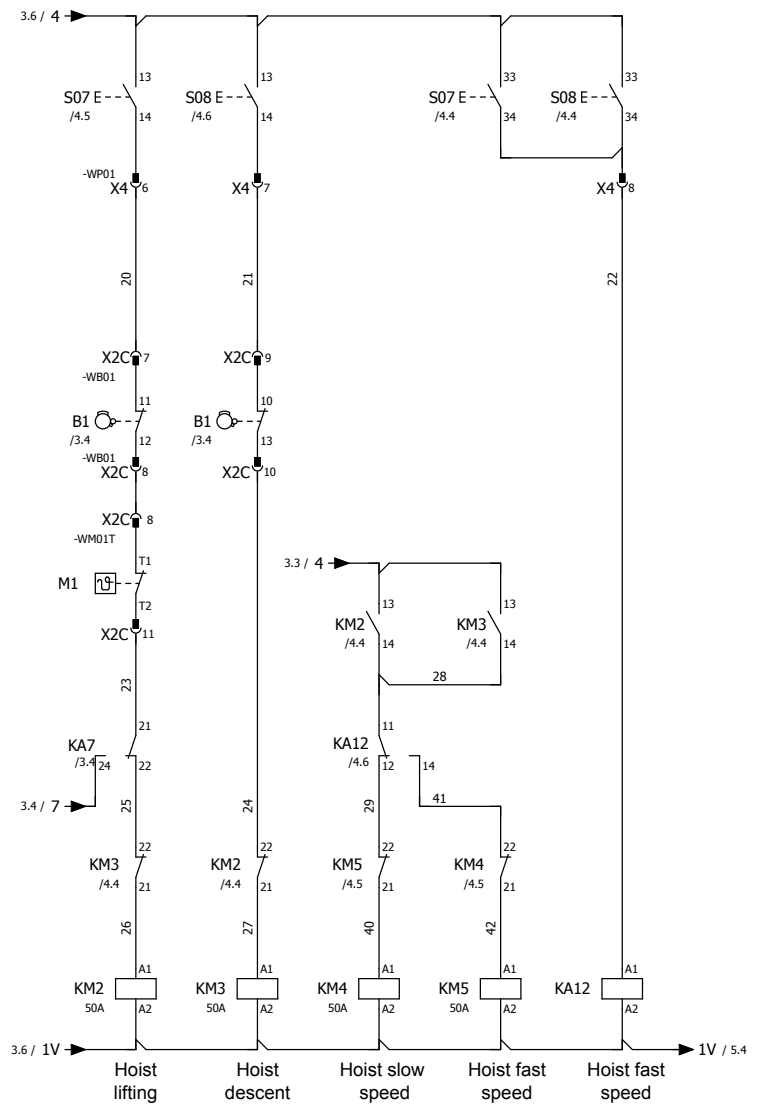
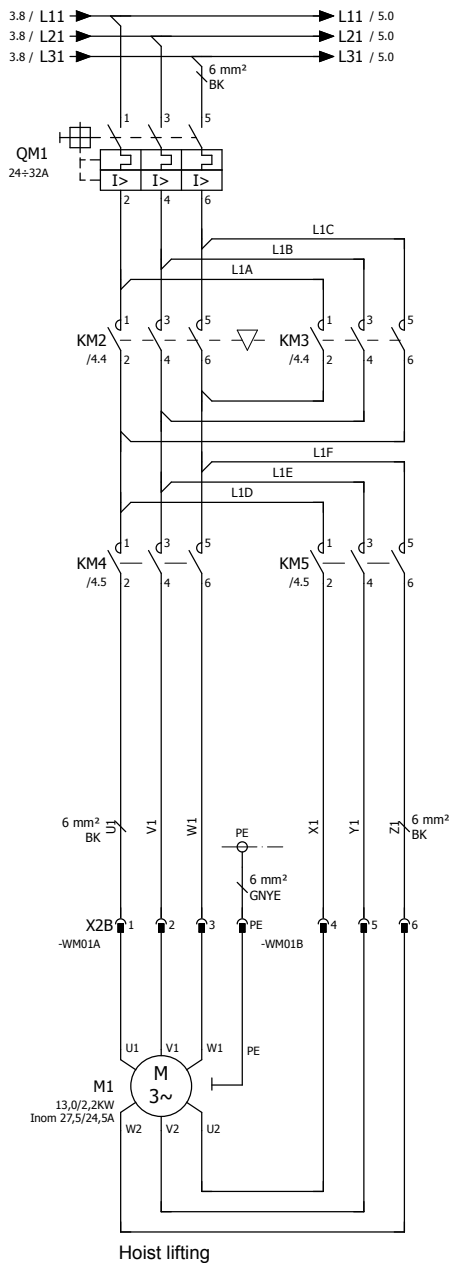
## CONICAL MOTOR DOUBLE SPEED WIRING CONNECTIONS EXAMPLES

**POWERS 3/1 - 4,5/1,5 - 6/1 KW**

**CONICAL MOTOR WIRING CONNECTIONS EXAMPLES****CONICAL MOTOR DOUBLE SPEED WIRING CONNECTIONS EXAMPLES****POWER 8/1,3 KW**

## CONICAL MOTOR WIRING CONNECTIONS EXAMPLES

### CONICAL MOTOR DOUBLE SPEED WIRING CONNECTIONS EXAMPLES    POWERS 13/2,2 - 15/2,5 - 16/4 - 24/4 KW

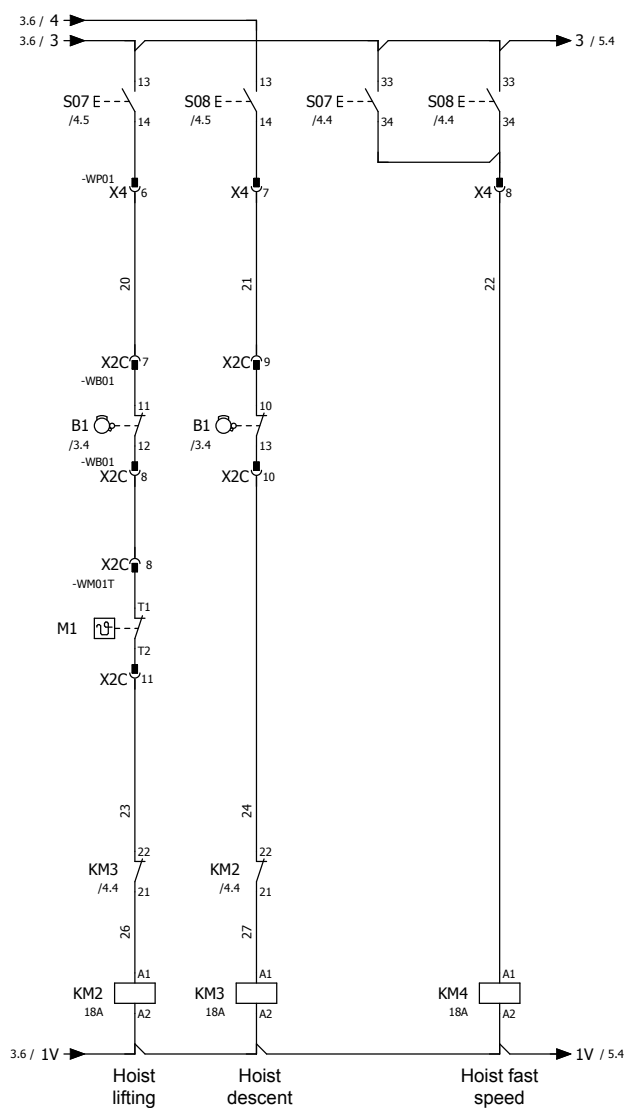
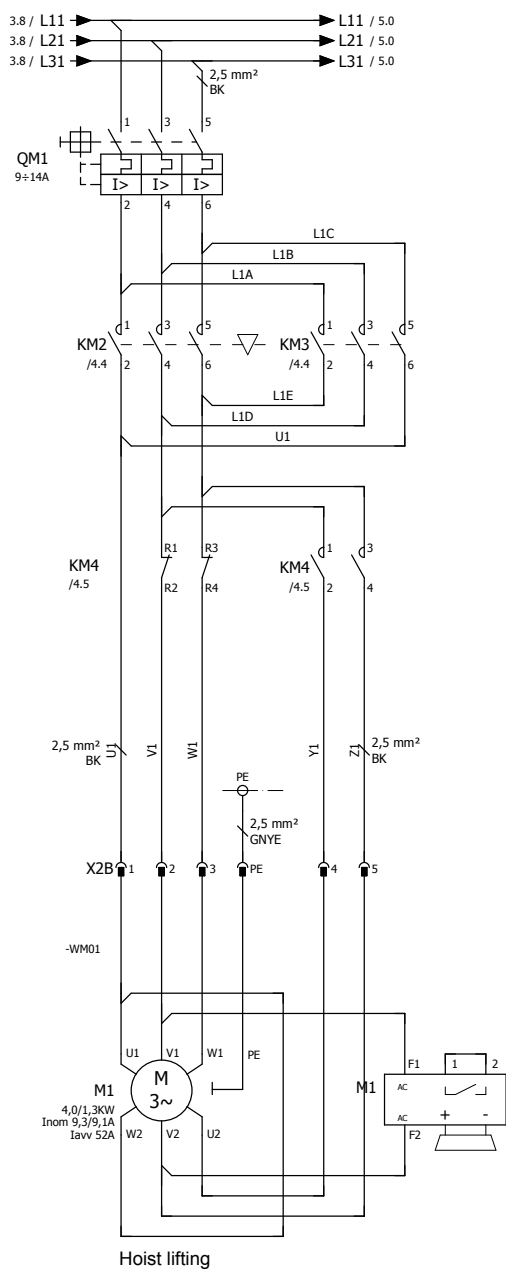


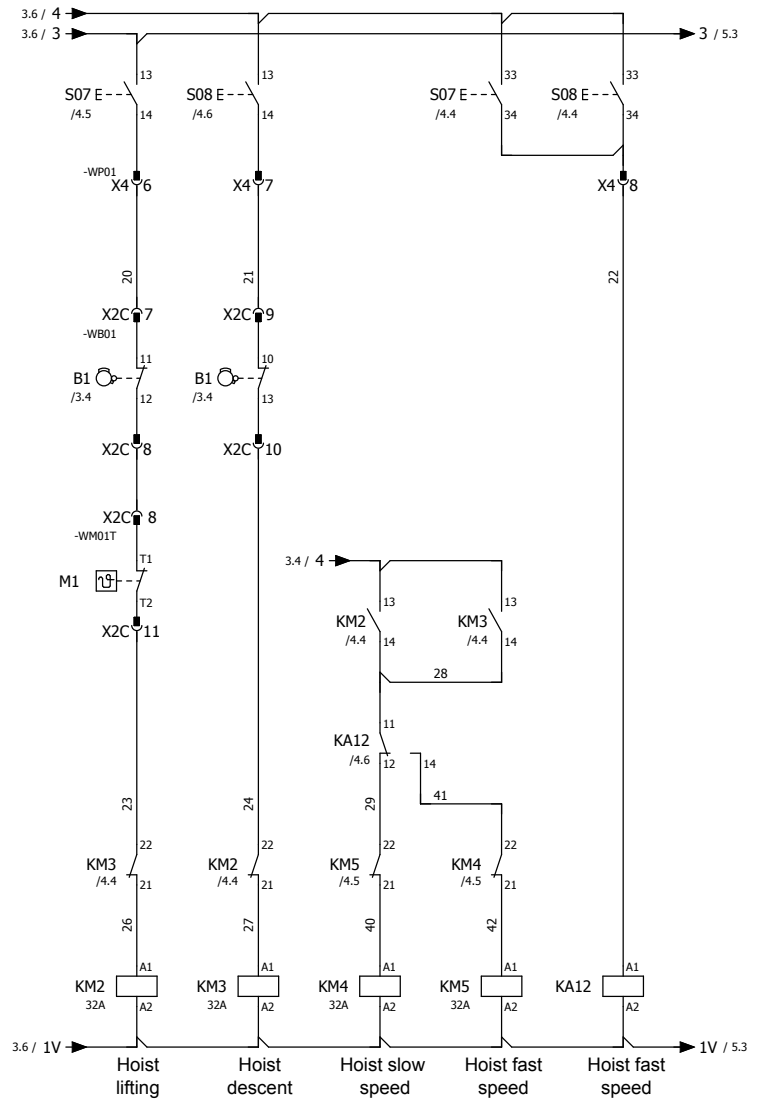
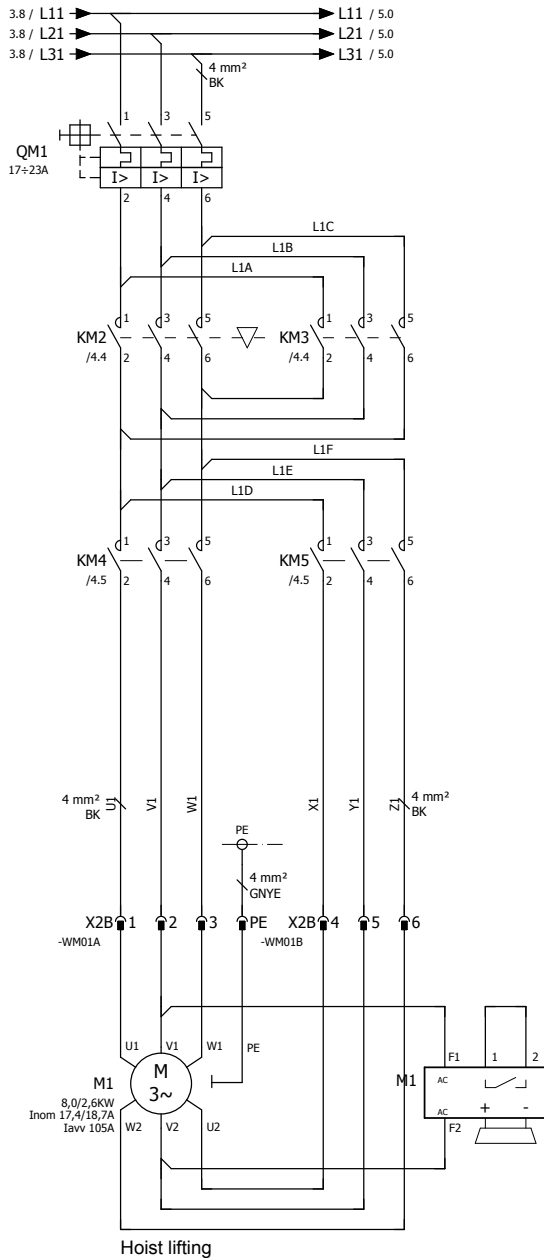


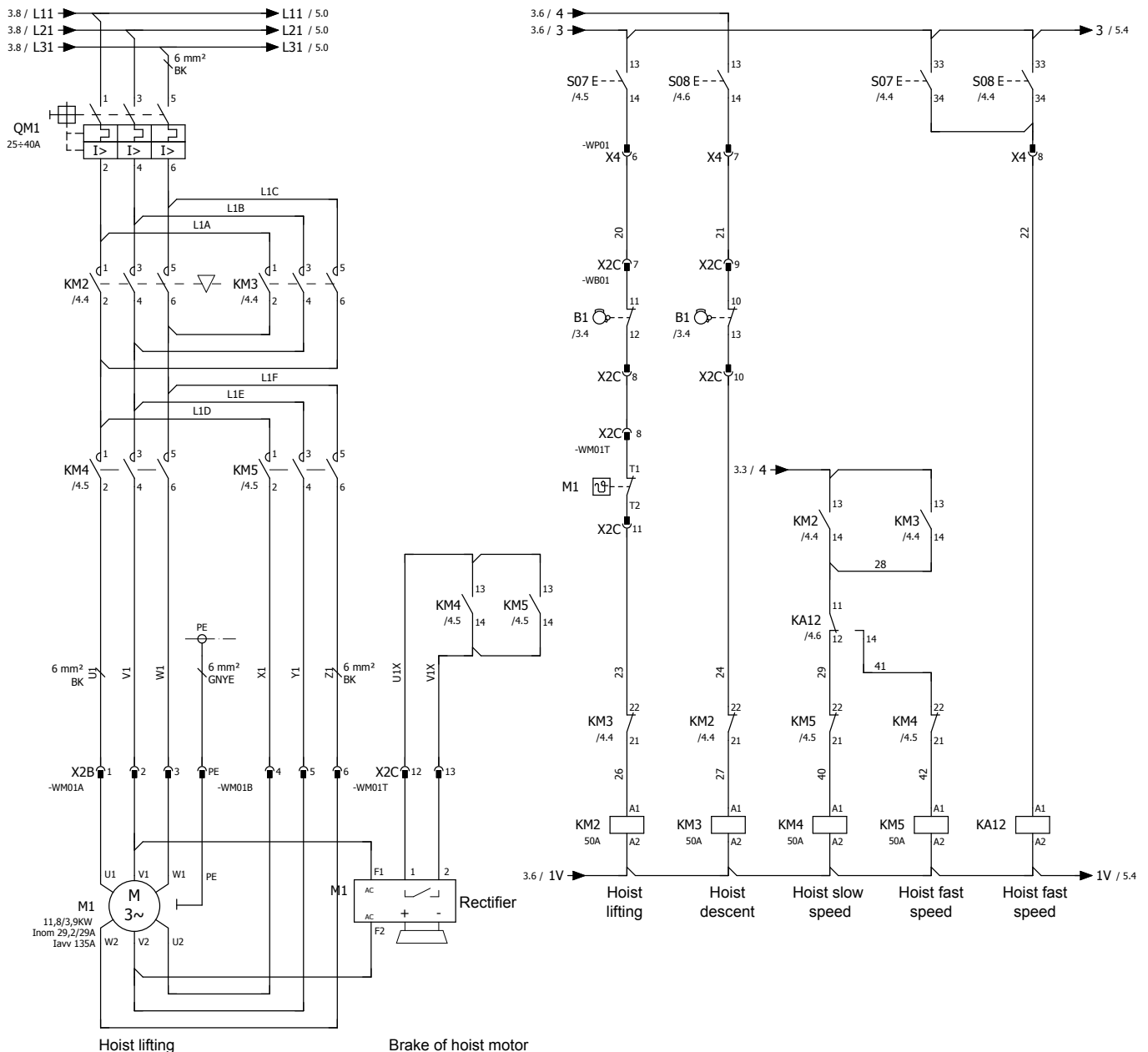
### 3.9.8 CYLINDRICAL MOTOR WIRING CONNECTION EXAMPLES

## CYLINDRICAL MOTOR DOUBLE SPEED WIRING CONNECTIONS EXAMPLES

**POWER UP TO 7/2,3 KW**



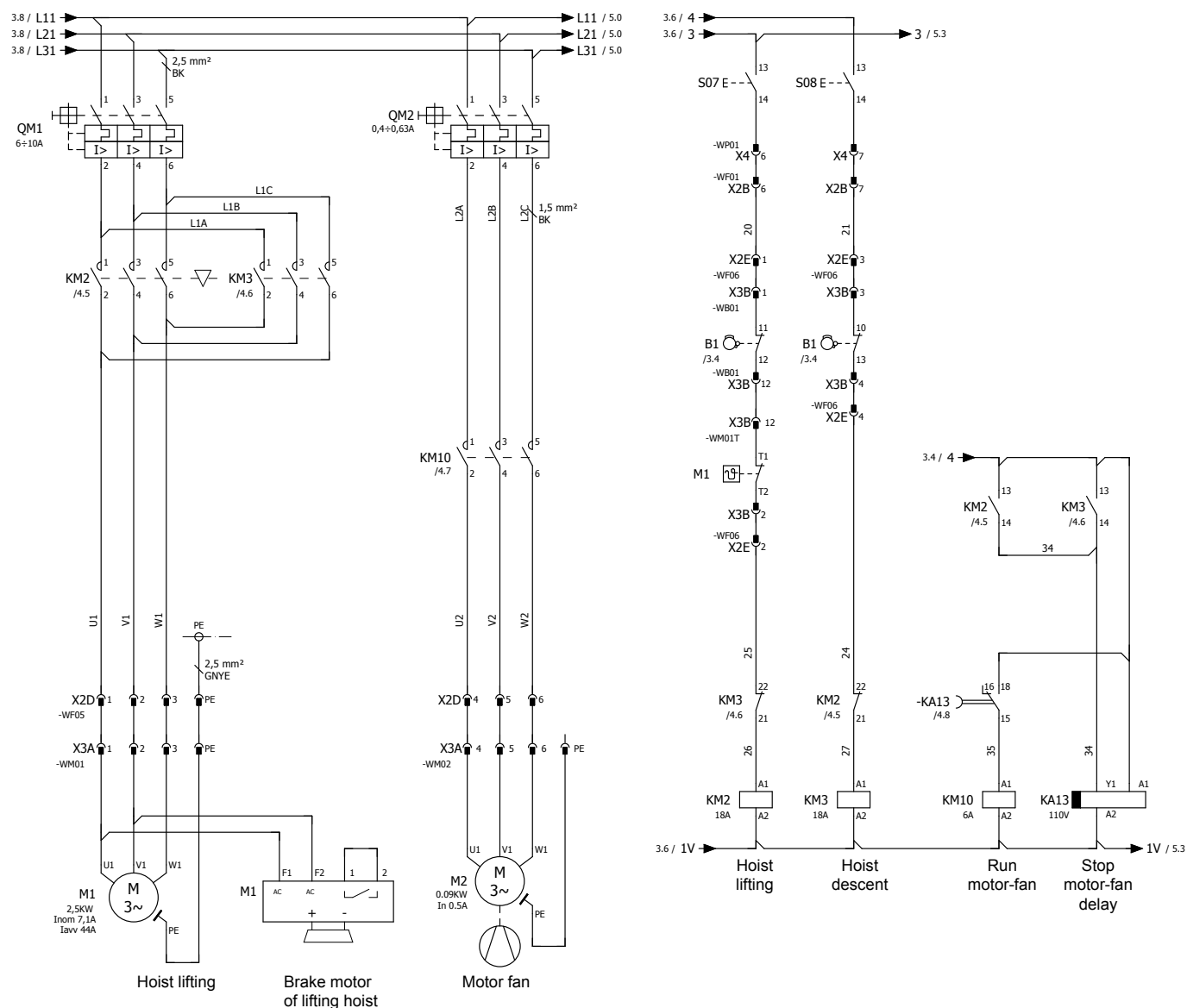
**CYLINDRICAL MOTOR WIRING CONNECTION EXAMPLES****CYLINDRICAL MOTOR WITH DOUBLE SPEED WIRING CONNECTIONS EXAMPLES****POWER 8/2.6 KW**

**CYLINDRICAL MOTOR WIRING CONNECTION EXAMPLES****CYLINDRICAL MOTOR DOUBLE SPEED WIRING CONNECTIONS EXAMPLES    POWERS 12/4 - 15/5 - 18/6 KW**

For a quick and fast brake closure on the cylindrical motors with powers higher than 8 kW, it is necessary to foresee to put in the electrical panel two auxiliary contacts on the up/down relays to interrupt the feeding in CC of the brake as per attached schemas.

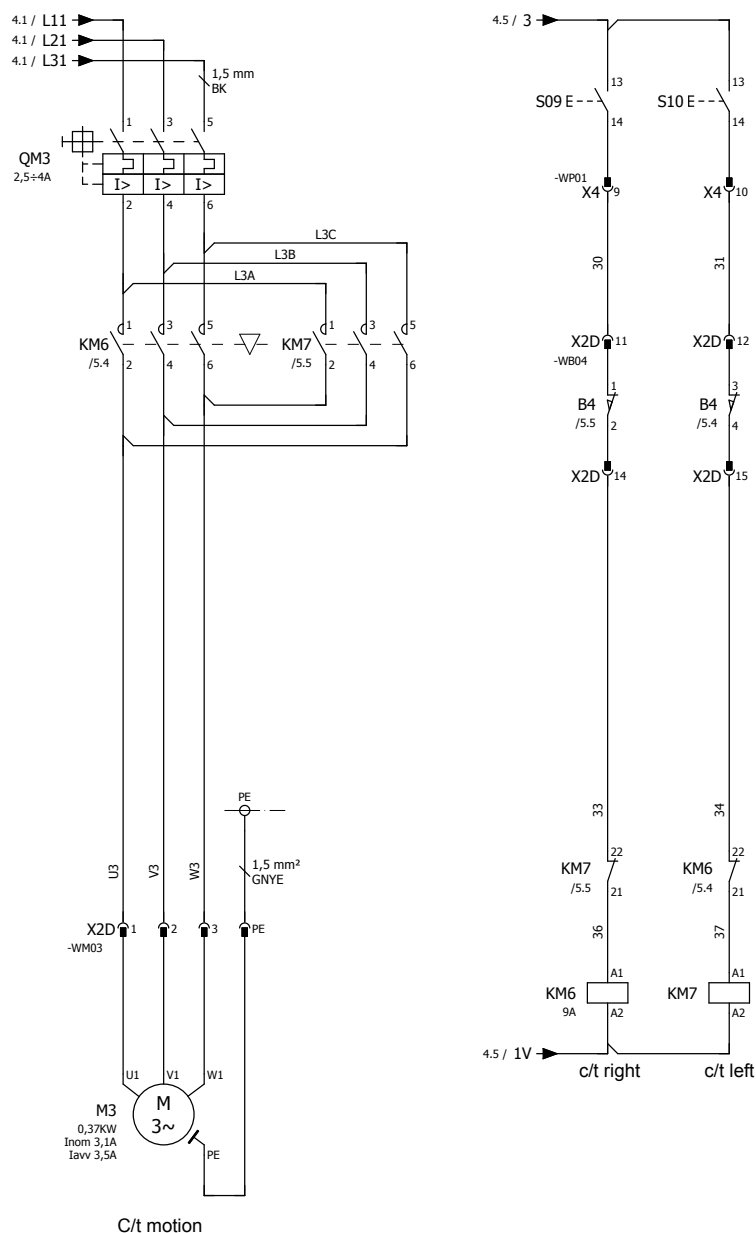
## CYLINDRICAL MOTOR WIRING CONNECTION EXAMPLES

## MOTOR WIRING CONNECTION CYLINDRICAL MOTOR WITH FORCED VENTILATION



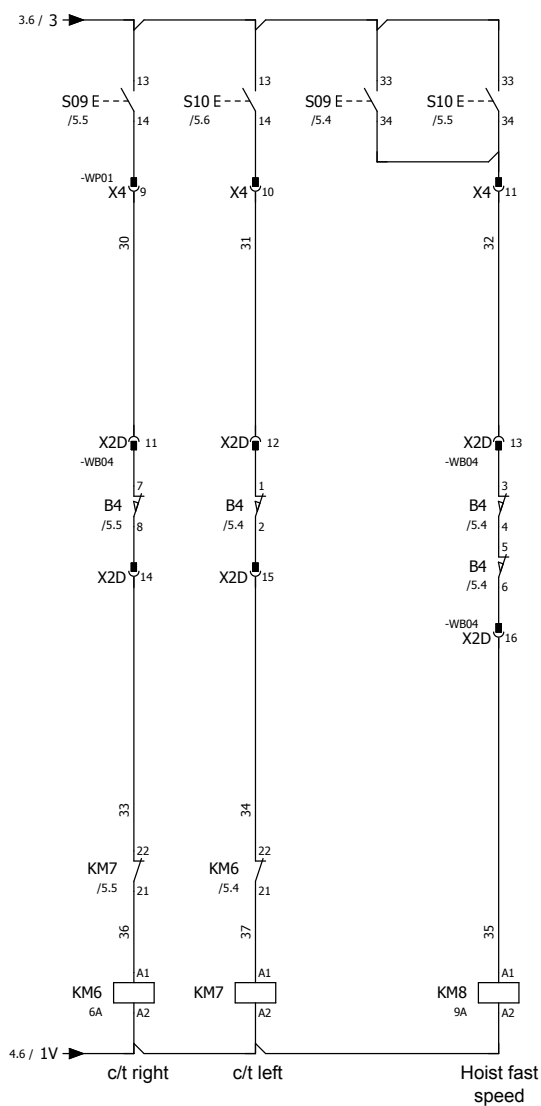
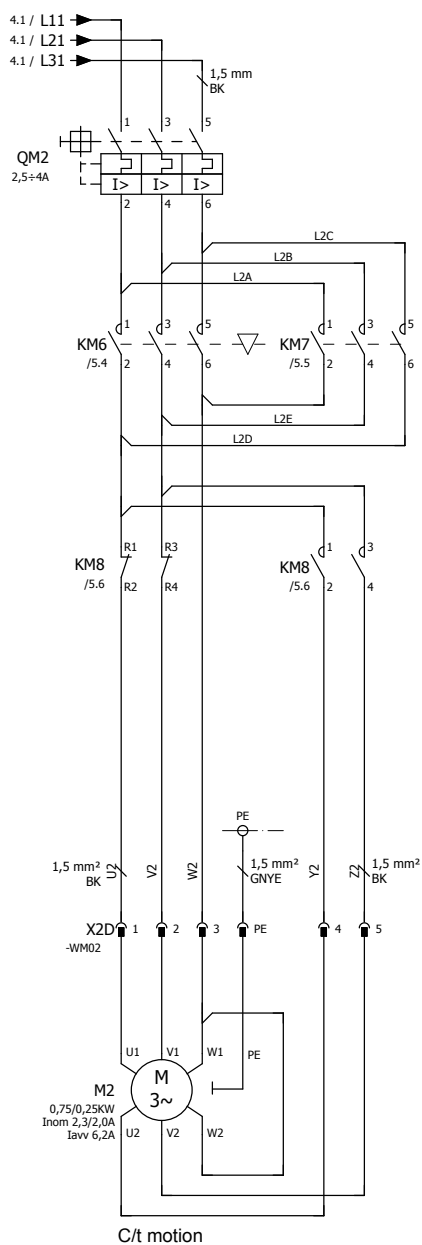
## 3.9.9 WIRING CONNECTIONS C/T MOTORS EXAMPLES

## CROSS TRAVEL MOTOR WIRING CONNECTIONS EXAMPLES



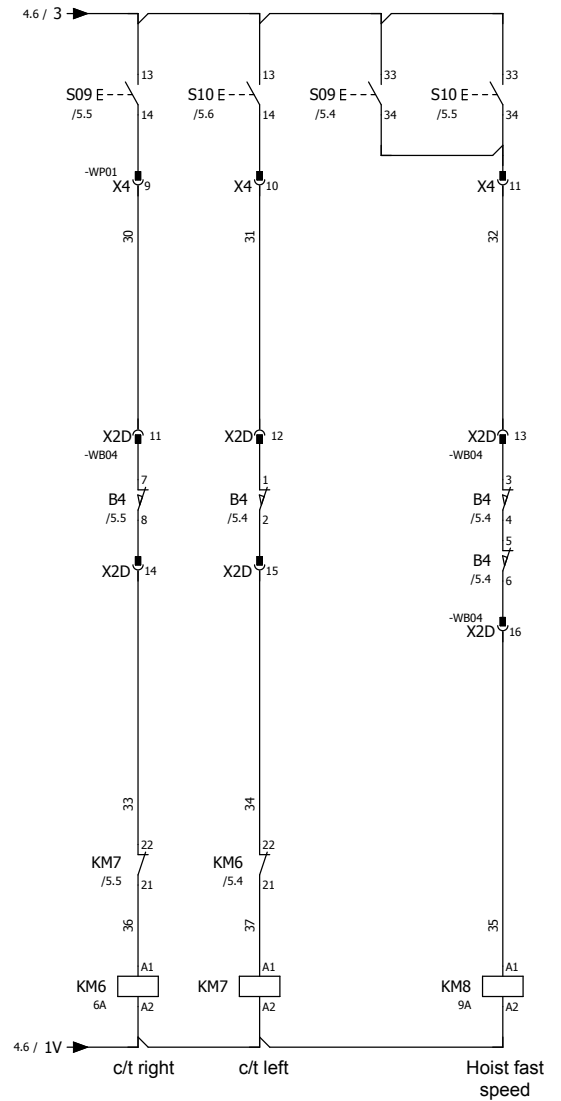
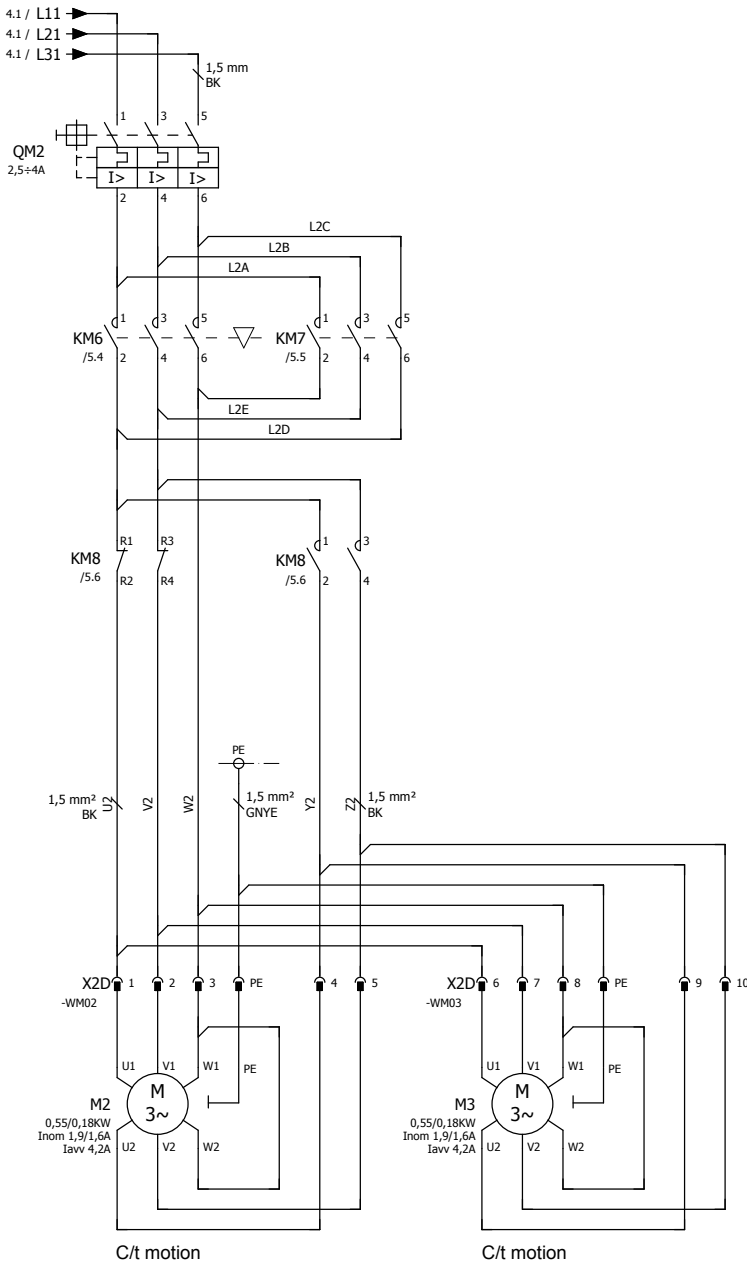
## WIRING CONNECTIONS C/T MOTORS EXAMPLES

## DOUBLE SPEED CROSS TRAVEL MOTOR CONNECTIONS EXAMPLES



## WIRING CONNECTIONS C/T MOTORS EXAMPLES

### DOUBLE SPEED AND DOUBLE CROSS TRAVEL MOTOR CONNECTIONS EXAMPLES



**3.9.10 MOTORS ABSORPTION****Conical hoist motors**

Table 2

Motor		Rated current (in A)		"aM" type protection fuse for the motor	
Poles	Power kW	230 V	400 V	230 V min	400 V min
4	2,3	10,0	6,0	12	8
4	4,5	20,5	12,0	25	16
4	5,5	21,0	11,2	25	16
4	7,5	31,0	17,0	40	20
4	12,0	49,5	28,0	63	32
6	12,5	61,5	36,0	80	40
4/12	3/1	15/14,5	8,5/8,0	20	10
4/12	4,5/1,5	19,3/18,5	10,5/10	25	12
4/24	6/1	24,8/12,0	13,5/7,0	32	16
4/24	8/1,3	21,5/19	16/12	25	16
4/24	12,5/1,7	34,5/26	23/15	40	25
4/24	13/2,2	49/53	28/30		
6/24	13/3	48/70	30/40	80	50
4/24	15/2,5	56/57	32/33	80	40
6/24	16/4	63/126	36/70	160	80
4/24	24/4	80/126	48/70	160	80

**Cylindrical hoist motors**

Table 2A

Motor		Rated current (in A)		"aM" type protection fuse for the motor	
Poles	Power kW	230 V	400 V	230 V	400 V
4	2,5	12,3	7,1	16	10
4	4	15,8	9,1	20	16
4	5	19,9	11,5	25	16
4	5,8	21,8	12,6	25	16
4	7	23,0	13,3	32	20
4	8	29,1	16,8	40	25
4	12	41,5	24	50	32
4	15	56,2	32,5	63	63
4	16	60,4	34,9	80	63
4	18	65,9	38,1	80	63
4	20	72,7	42	100	63
4	24	86,7	50,1	100	63
4/12	2,5/0,83	10,2/8,7	5,9/5	12	10
4/12	4/1,3	15,8/16	9,2/9,3	20	12
4/12	5/1,6	21,3/17	12,3/9,8	25	16
4/12	5,8/1,9	21,7/17,5	12,5/10,1	25	16
4/12	7/2,3	30,3/24,4	17,5/14,1	40	20
4/12	8/2,6	30,7/25,2	17,7/14,7	40	20
4/12	12/4	51,4/50,3	29,7/29	63	40
4/12	15/5	52,2/41,7	30,2/24,1	63	40
4/12	16/5,3	63,2/51,4	36,5/29,7	80	63
4/12	18/6	67,9/56,6	39,2/32,7	100	63
4/12	20/6,5	70/57	41/33	100	63
4/12	22/7,3	74,8/62,3	43,2/36,1	100	63

**Travel motors  
monorail trolley Type 83**

Table 3

Motor		Rated current (in A)		"aM" type protection fuse for the motor	
Poles	Power kW	230 V A	400 V A	230 V A	400 V A
2	0,25	1,2	0,7	2	1
2	0,37	1,7	1,0	4	2
2	0,55	2,4	1,3	4	2
4	0,18	1,05	0,58	2	1
4	0,25	1,65	0,83	4	2
2/8	0,24/0,06	1,4/1,3	0,8/0,8	2	1
2/8	0,30/0,075	2,2/2,2	1,2/1,2	4	2
2/8	0,55/0,13	2,4/3,3	1,3/1,8	4	2

**Travel motors  
monorail trolley Type 3**

Table 4

Motor		Rated current (in A)		"aM" type protection fuse for the motor	
Poles	Power kW	230 V A	400 V A	230 V A	400 V A
4	0,37	2,1	1,4	4	2
4	0,55	2,9	1,6	4	2
4	0,75	4,0	2,2	6	4
4	1,10	5,1	2,8	6	4
4/12	0,37/0,12	2,6/3,1	1,4/1,7	4	2
4/12	0,55/0,18	2,9/3,5	1,6/1,9	4	2
4/12	0,75/0,25	3,9/4,4	2,1/2,4	6	4
4/12	1,1/0,37	6,4/6,4	3,5/3,5	8	4

**Travel motors  
double rail trolley Type 53**

Table 5

Motor		Rated current (in A)		"aM" type protection fuse for the motor	
Poles	Power kW	230 V A	400 V A	230 V A	400 V A
4	0,37	2,1	1,12	4	2
4	0,55	2,9	1,6	4	2
4	0,75	4,0	2,2	6	4
4	1,1	5,1	2,8	6	4
4	1,5	6,6	3,6	10	6
4	2,2	9,3	5,1	10	6
4/12	0,37/0,12	2,6/3,1	1,4/1,7	4	2
4/12	0,55/0,18	2,9/3,5	1,6/1,9	4	4
4/12	0,75/0,25	3,9/4,4	2,1/2,4	6	4
4/12	1,1/0,37	6,4/6,4	3,5/3,5	8	6
4/12	1,5/0,55	7,1/7,1	3,9/3,9	10	6
4/12	2,2/0,75	13,8/9,8	7,6/5,4	16	10





Tolerance on  
absorbing values is  $\pm 5\%$



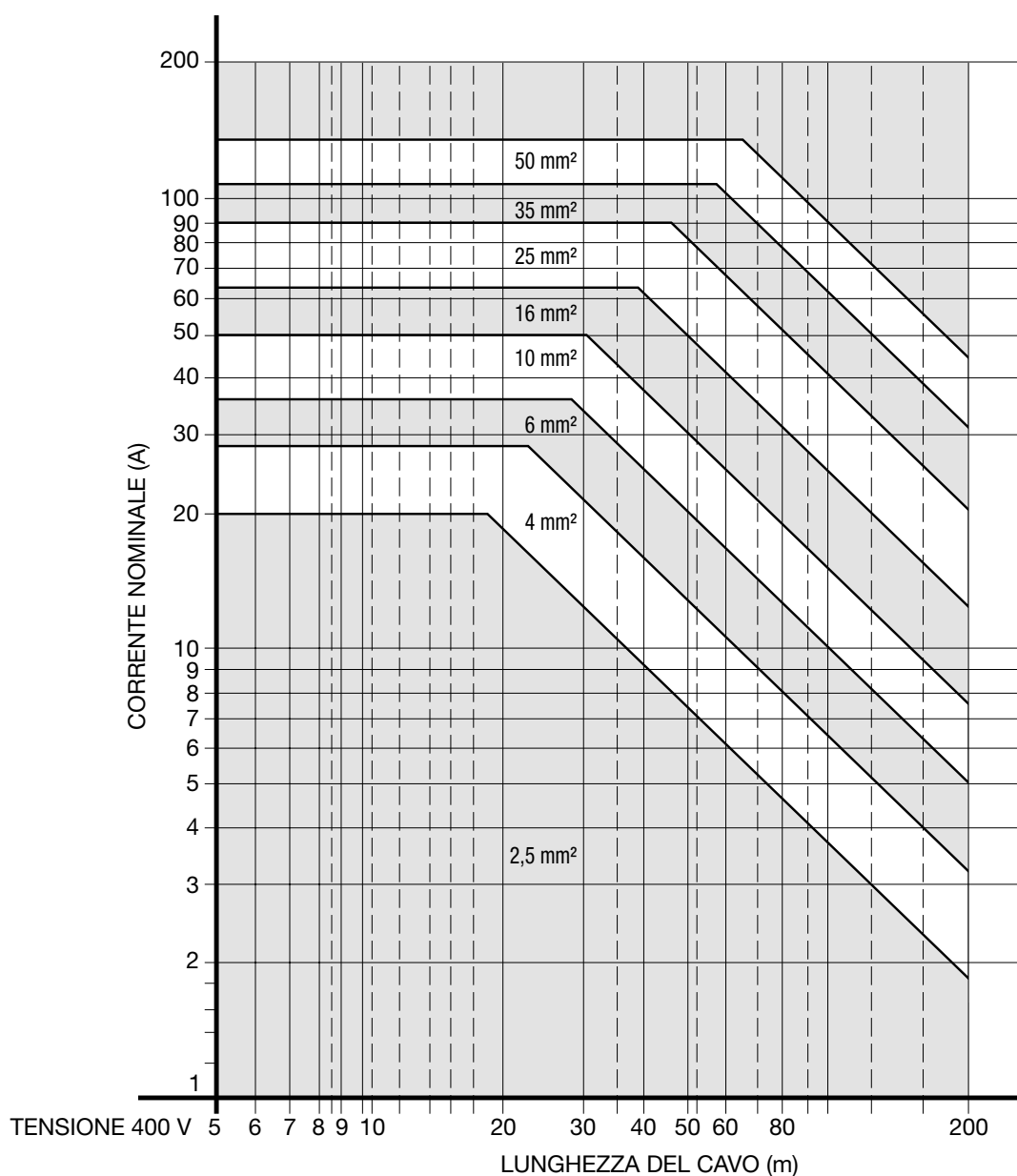
**3.10 START-UP**

- i** Verify the function of the power supply line and the capacity of the main line circuit breaker in relation to the motor powers and the relevant current consumption.
- i** Make sure the gearboxes are lubricated and there are no oil leaks.
- i** Verify that rope, drum, pulleys and rope guide are lubricated with grease grade SAE 30.

- i** Verify the proper installation of the rope into the socket and that the rope is not tight.
- i** Check the stop limit switches for proper position and fastening.
-  Verify the cable section of the power supply line, in compliance with the current consumption of the motors (as shown in Table 2-3-4-5 on page 40).
-  Verify tightening of all fastening screws on the components.

**Cable section for power supply trailing cable**

Table 6



### 3.11 FUNCTION TESTS AND ADJUSTMENTS

#### 3.11.1 UP-DOWN LIMIT SWITCH



The installed limit switch has the function to stop lifting in EMERGENCY cases only. In case of necessity to use it as a normal operational stop, a further limit switch should be installed



After connection with the main power line, check that the hook is lifted when the "Up" button is pressed. If this is not the case, reverse two phases of the power supply.

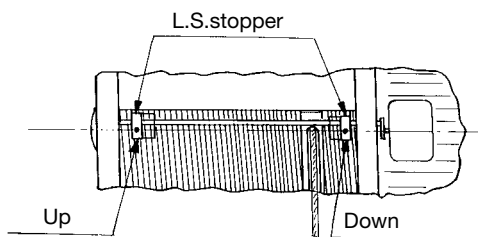


**This step is extremely important because the proper operation of the up and down limit switches depends on it.**

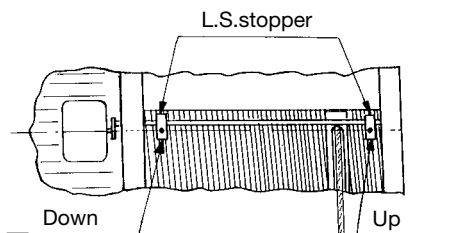


Take care to position the up and down limit switch stoppers at the correct locations on the limit switch control rod, so that the switch operates when the hook is at the desired height.

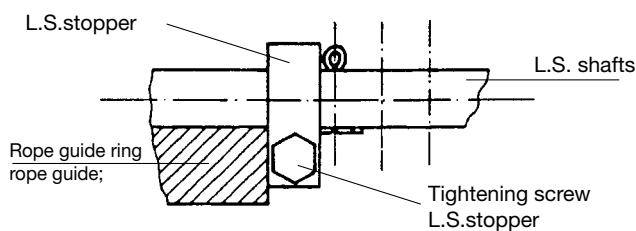
Type XM  
308  
312  
316  
525



Type XM  
740-750  
950  
963  
980  
1100  
1125



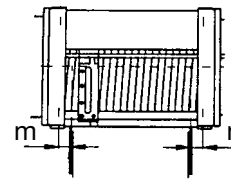
#### Detail L.S. stopper mounting



The max rope approach at the feet base should never exceed the values of Table 7.

#### Gearbox side

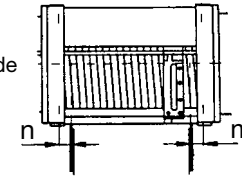
Wound rope side  
for hoists  
XM 308÷525



Unwound rope side  
for hoists

#### Motor side

Unwound rope side  
for hoists  
XM 740÷1125



Wound rope side  
for hoists

#### Rope outlet position

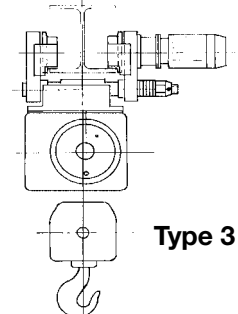
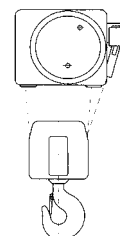
Table 7

Type	XM hoist											
	308		312 316		525		740 750		950 963 - 980		1100 1125	
	m	n	m	n	m	n	m	n	m	n	m	n
5 - 3 - 53	45	48	48	56	60	61	65	85	55	90	75	120
83 - S2	45	48	48	56	60	61	-	-	-	-	-	-
83 - S4	45	48	48	56	60	61	-	-	-	-	-	-



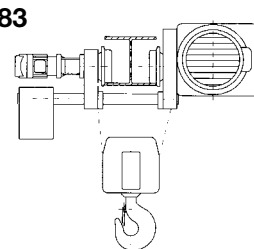
Positioned at the "up" limit switch, the block should show the measurements indicated in Table 7, and should be at the distance indicated in Table 8. For lifting speeds over 8 m/min. this distance must be increased at least 50mm.

#### Type 5-5C1

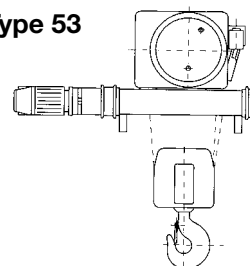


Type 3

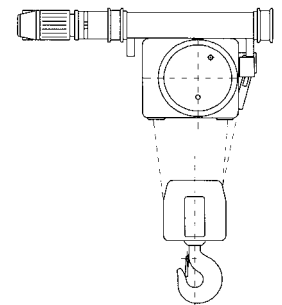
#### Type 83



#### Type 53



#### Type 53C1



## Block size (minimum measurement c).

### Version S2 (2 rope falls)

Table 8

XM	Type					
	5	5C1	3	83*	53	53C1
	C1	C2	C3	C4	C5	C6
308	570	895	1080	70	570	900
312	640	965	1140	680	640	965
316	640	965	1140	680	640	965
525	730	1110	1180	730	730	1110
740	840	1370	1630	-	840	1370
750	840	1370	1650	-	860	1370
950	1100	1725	1990	-	1100	1700
963	1100	1725	2150	-	1100	1700
980	1100	1725	-	-	1100	1750
1100 Δ	1330	-	-	-	1330	-
1125 Δ	1330	-	-	-	1330	-

### Version S4 (4 rope falls)

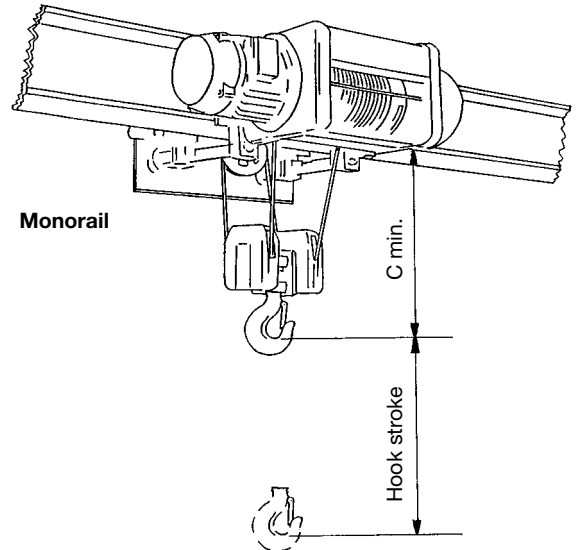
XM	Type					
	5	5C1	3	83*	53	53C1
	C1	C2	C3	C4	C5	C6
308	520	845	1020	680	520	845
312	590	925	1120	620	590	920
316	640	965	1140	640	640	965
525	730	1130	1290	700	650	1030
740	825	1355	1600	-	830	1360
750	880	1410	1740	-	850	1380
950	1000	1625	1960	-	1000	1630
963	1000	1625	1960	-	1000	1630
980	1080	1705	2040	-	1180	1810
1100 Δ	1170	-	-	-	1270	-
1125 Δ	1170	-	-	-	1270	-

\* NB: The measures indicated for the type 83 are for beam flange up to max 300 mm.  
For bigger rail flange, the measures increases 12 mm every 10 mm rail width.

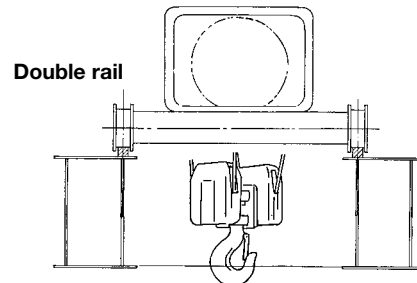
Δ NB: Not available for Type 5C1 and 53C1.



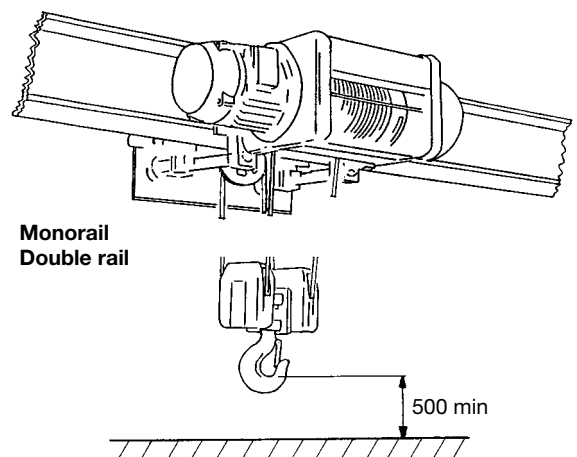
Run the lower block along the whole pre-set hook stroke and check that it stops correctly when it reaches the stopper on its way up and down.



For a hoist with a double rail trolley Type 53, the internal edge of the hook jaw should be not be deeper than the lower edge of the beam.



The setting of the down limit switches must stop lowering when the lower edge of the hook has reached a distance of 500 mm from the floor.



#### 3.11.2 TROLLEY TRAVEL LIMIT SWITCH



Perform the connection to the main power line.



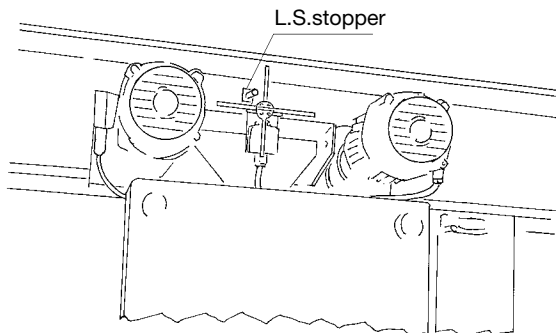
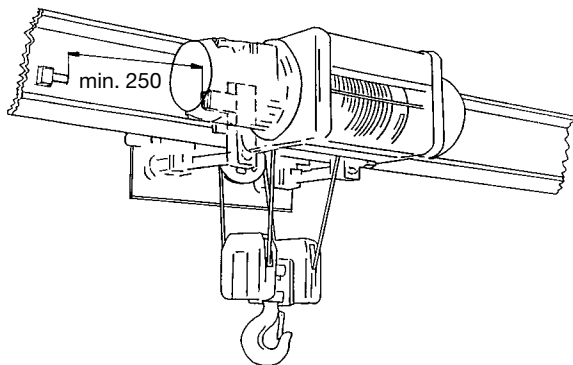
Do not interfere with the internal connections of the trolley/hoist or the keypad.



Pressing the push buttons "right-left", run the trolley along the whole length of the rail and check that it stops correctly.



Check the proper position of the limit switch stopper on the trolley, in order to ensure adequate overrun room and avoid collisions between the trolley and the fixed stopper.



#### 3.11.3 BRAKE RELEASE



In "jog" mode, check the brake disk detaches from the brake pad, thus freely rotating without rubbing.

#### 3.11.4 NOISE LEVEL



Verify the absence of abnormal noise during lifting and travel, such as: squeaks, cyclic noises, abnormal vibrations, etc.

The noise level of the hoist, even at full load, must always be less than 85 dbA and constant.

#### 3.12 LOAD TESTS

##### 3.12.1 DYNAMIC TEST



Provide adequate weights for load testing as follows: rated capacity x 1.1 and proper slinging and lifting equipment.



Sling the load taking care to position the hook vertically above the load itself, to avoid oblique pulls.



Tension the slings slowly, avoiding jerks.



Tension the slings using the "slow" speed, if available



Slowly lift the load and make sure it happens smoothly, without abnormal noise levels bends or structural settlements.



Repeat the test at maximum speed, carrying out the previous check.



Check the "up and down" emergency limit switches are properly working.



Check the brake is working properly, making sure the mass is stopped within an adequate time and that there is no abnormal slipping of the load when the button is released.



Perform the same checks on horizontal travel operation, without lifting the load at the maximum height (lift it 1 metre from the floor).



Operate first at slow speed, if available, and then at maximum speed.



Check the trolley for smooth running on the beam and make sure there are no abnormal noise or structural settlements.

### 3.12.2 LOAD LIMITER FUNCTION CHECK

#### 1<sup>st</sup> threshold warning

Apply the rated load, switch-on the hoist motor and check proper intervention, with the signal on the button panel or the siren if available.

#### 2<sup>nd</sup> threshold warning

The 2<sup>nd</sup> threshold must stop all movements (except going down).

Apply a load 15% higher than rated load, switch-on the hoist motor and check the proper intervention.

**Note - The dynamometric or electromechanical load limiter is statically pre-set by the manufacturer. Should it not work properly, perform its settings as explained in the chapter settings - paragraph 4 on page 55.**

### 3.12.3 STATIC TEST



Perform the static tests without switching-on the hoist and travel motor.



Lift the rated load, hold it suspended and gradually apply on it masses up to an overload of 25% of the rated capacity, for hoists over 1000 kg, respectively 50% for hoists up to 1000 kg.



During this step the load should not be moved.



Verify that with the mass suspended (rated load plus overload) no slipping, abnormal noise level, permanent deflections and structural settlements occur.



Verify that pressing the "UP" push button lifting is not activated, as a consequence of the intervention of the load limiter.

## 4. OPERATION AND MAINTENANCE INSTRUCTIONS

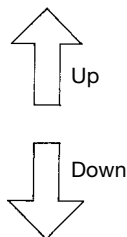
### 4.1 HOIST FUNCTIONS - "Intended purpose"

**i** The electric rope hoist is intended to handle goods or materials (by vertically lifting in the space) with the load hook and appropriate accessories, in industrial, craftsman or commercial installations and is not suitable for civil use, unless suitably adapted for this purpose. The hoist can be used in stationary or travelling operation on a trolley on a bridge, jib, portal cranes, etc. or monorails. Basically, the hoist/trolley assembly performs its duty by means of two main movements:

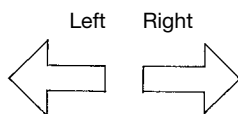
- vertical lifting of the load with the hoist;
- horizontal travelling of the load with the trolley.

These movements are controlled by push buttons on the keypad as follows:

- UP and DOWN push buttons for the LIFTING function



- LEFT and RIGHT push buttons for HOIST TRAVEL functions



The push buttons activate the function when they are kept pressed and of a "graduated" type with two positions, the first for "slow" speed and the second for "fast" speed.

The red mushroom EMERGENCY STOP button on the keypad activates the STOP function if completely pressed.

To enable the operation of the hoist, turn the EMERGENCY STOP button clockwise and lift it in its original position.

The hoist can also be operated by a radio control system; the push buttons have the same functions as specified above, and the keypad is free, and not connected to the hoist

### 4.2 BEFORE STARTING

Before starting the hoist, perform the following:



Visually check the equipment for integrity;



Switch-on the power turning the main switch to "ON" or "1";



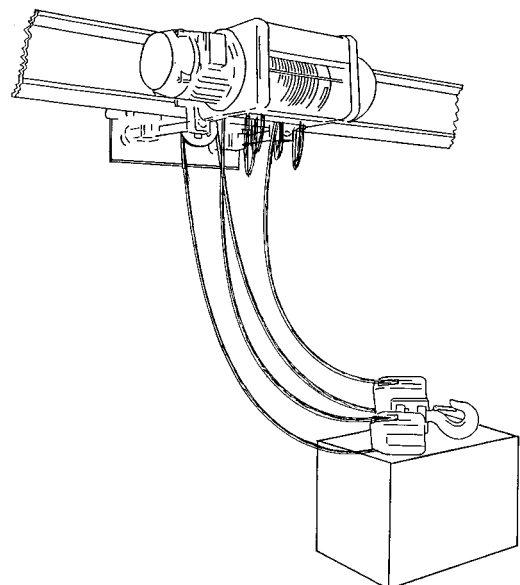
Verify the function of the hoist checking the movements described in the previous section (HOIST FUNCTION - "Intended purpose") and performing the preliminary checks described in the Chapter "WHAT MUST ALWAYS BE DONE!" on page 48.

#### 4.2.1 LIFTING

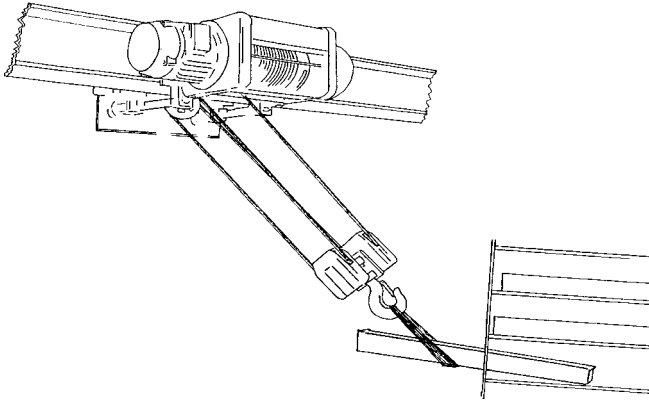


The operator must pay attention to always hold the lifting ropes taut, never laying the hook on the floor or on the load to be lifted.

Slack ropes may twist, spring out from the drum windings or from lower block pulleys, from knots, suffer even serious damage and cause unexpected dangerous situations.



The operator must strictly avoid oblique pulling of the load, which is always dangerous and hard to control, and especially oblique pulling as shown in the figure, which could in addition cause damage to the rope guide and the grooves, which could even cause coiling.



### 4.2.2 TROLLEY TRAVEL

**i** It is essential to avoid forceful impacts between the trolley and the end stoppers, in order not to seriously damage the mechanical component and the structure. It must be kept in mind that the limit switches are placed in a position that allows full travel of the trolley when it is approaching them at low speed, and that the required braking distance increases with the speed. Consequently, the operator must always slow down the travel speed when the trolley approaches the rail ends.

### 4.2.3 EMERGENCY AND INTERLOCK DEVICES

**i** To disconnect the power supply of the machine, switch-off the line circuit breaker or press the "EMERGENCY STOP" button on the keypad. An electrical and mechanical interlock on the hoist and travel motors prevents the simultaneous rotation in two directions; the electric interlock on the hoist motors for slow and fast speed prevents simultaneous power feeding. No voltage causes the immediate stoppage of all movements of the hoist, since the electric motors are equipped with automatic negative brakes.

### 4.2.4 SAFETY DEVICES

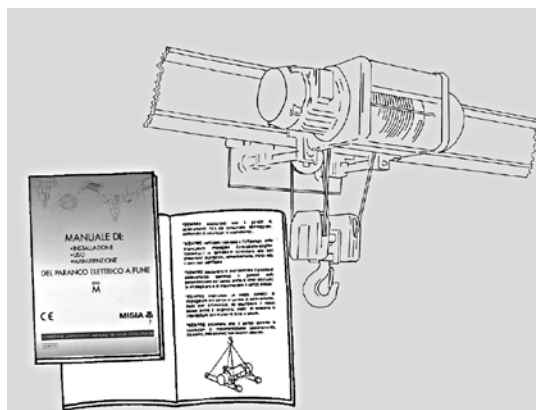


The lifting limit switch, which limits the max hook travel, and the trolley travel, **limit switch are safety devices, not meant to be systematically used as normal stop or enabling devices for further operations.** The load limiter with two reaction thresholds (first: WARNING, second: STOP) prevents the operation of the hoist with an overload. The lifting hook is equipped with a safety catch preventing the accidental release of the slings.

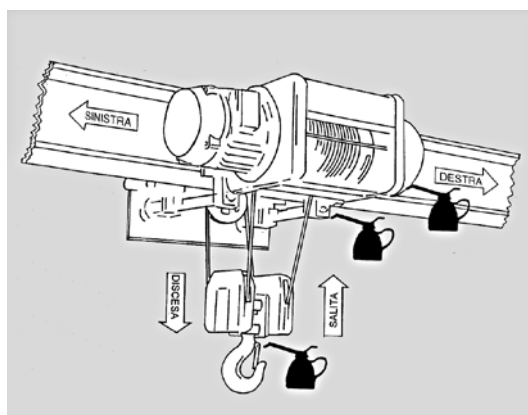
### 4.3 WHAT MUST ALWAYS BE DONE!

#### Precautions and operation criteria

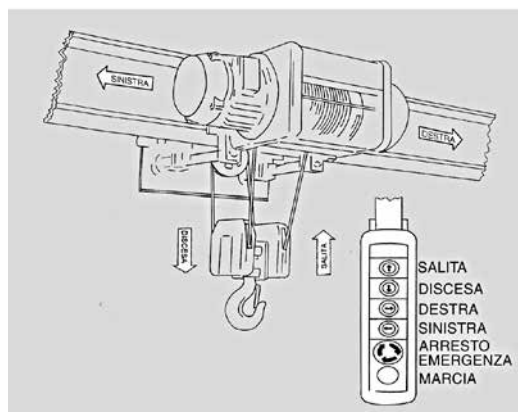
The proper use of the hoist allows to fully exploit its capabilities in complete safety. These potentialities are granted only strictly observing under mentioned instructions; therefore:



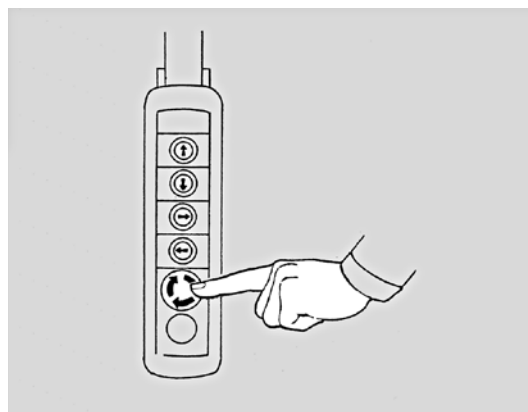
**ALWAYS** observe the indications and instructions of the installation and operation manuals and check the components and the parts of the hoist for integrity.



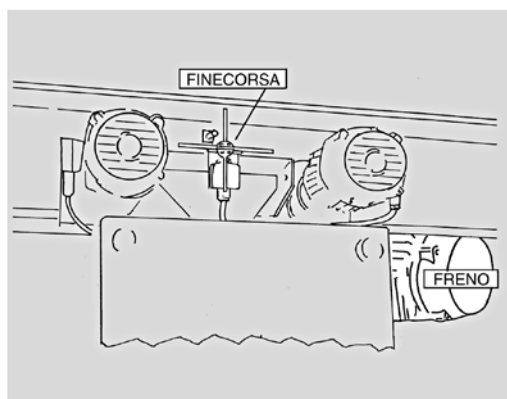
**ALWAYS** verify that the hoist is suitable for the work to be done (duty cycles - intermittent duty - running time - load to be handles etc.).



**ALWAYS** verify the correspondence of the movements of trolley and hoist.

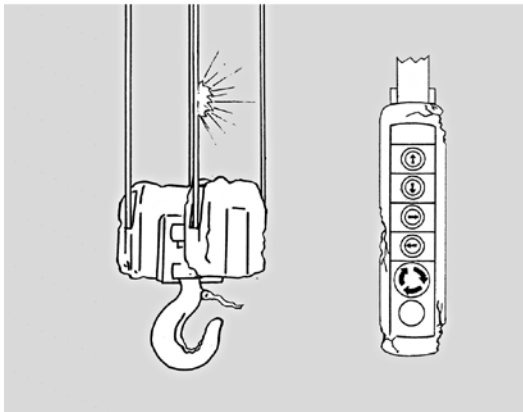


**ALWAYS** test the operation of the emergency stop button.

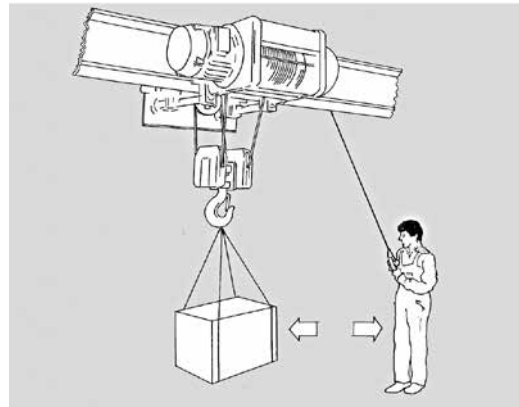


**ALWAYS** check with regularity the efficiency of brakes and limit switches, testing their functions.

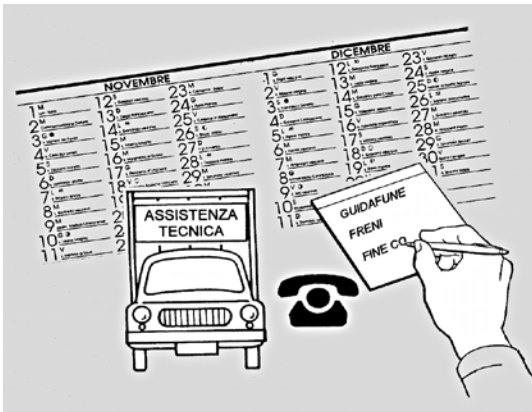




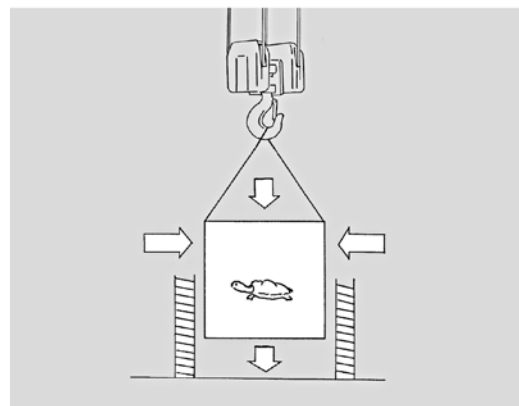
**ALWAYS** check the ropes, block hook, load limiter and keypad for integrity and efficiency.



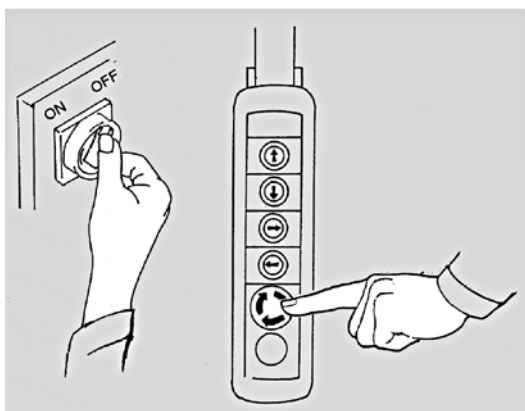
**ALWAYS** stand clear of the lifted load.



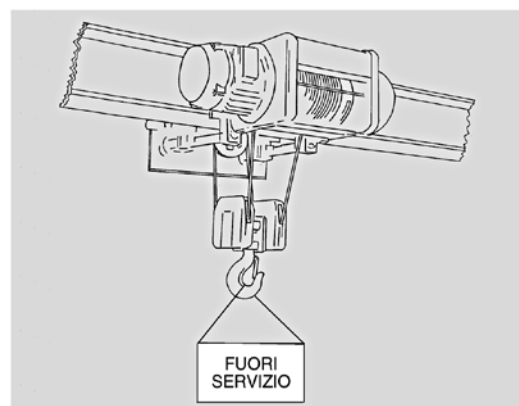
**ALWAYS** observe the maintenance schedules and record, after each inspection, any observations, especially concerning hook, rope, brakes and limit switches, must be noted.



**ALWAYS** use "low" speeds for approaching and spotting manoeuvres, **for short distances**.



**ALWAYS** before leaving the workplace, press the switch-off button on the keypad and the main switch supplying power to the hoist.



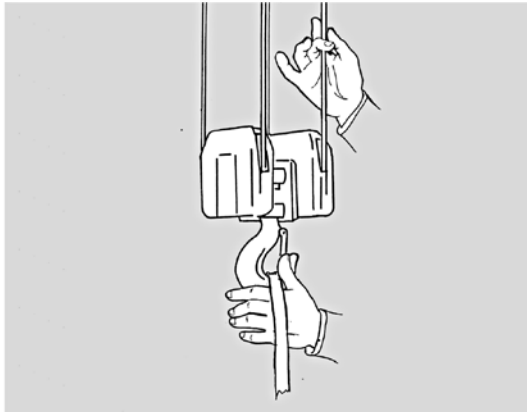
**ALWAYS** inform the safety manager of any operation defects (faulty operations, suspected breaks or abnormal noises) and put the hoist out of service.

#### 4.4 WHAT MUST NEVER BE DONE!

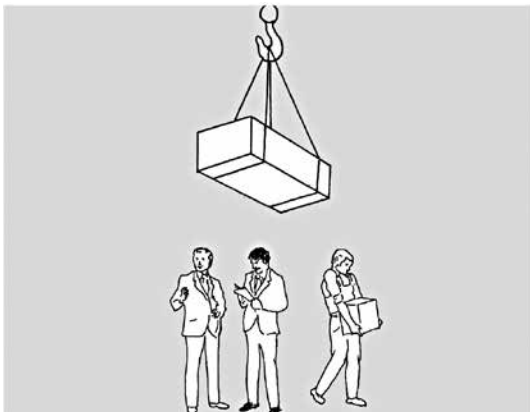
##### Contraindications and improper use



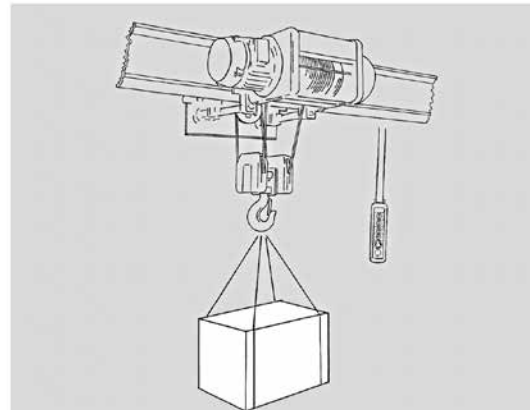
Use of the rope hoist for forbidden manoeuvres, its improper use and poor maintenance, not only generate seriously dangerous situations for the safety of the workers and damage to the workplace, but also prejudice the functioning and intrinsic safety of the equipment. The actions described below, obviously cannot cover all possible "improper uses" of the hoist, nevertheless they represent the most "reasonably" foreseeable and must be considered as severely forbidden; therefore:



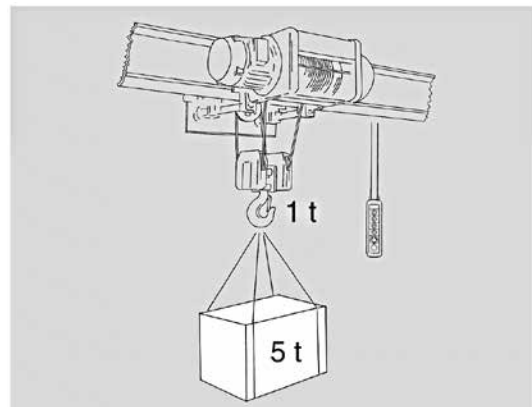
**NEVER** place hands in rotating pulleys, moving ropes, sling being tensioned in contact area, or between hook and sling.



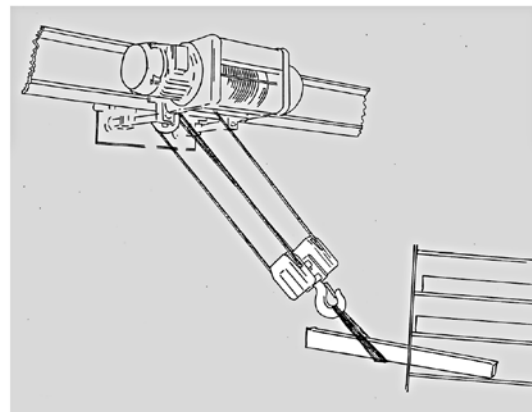
**NEVER** lift a load with people walking underneath. **NEVER** walk, stand, work and operate under a suspended load.



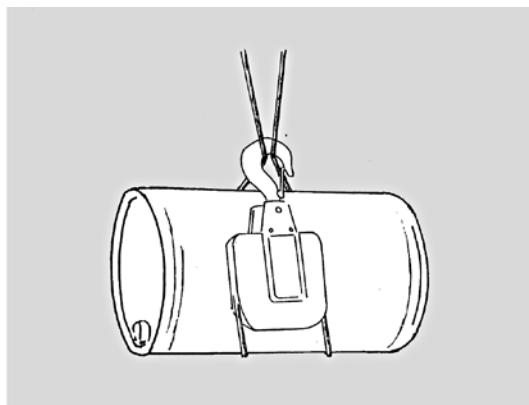
**NEVER** leave the suspended load unattended.



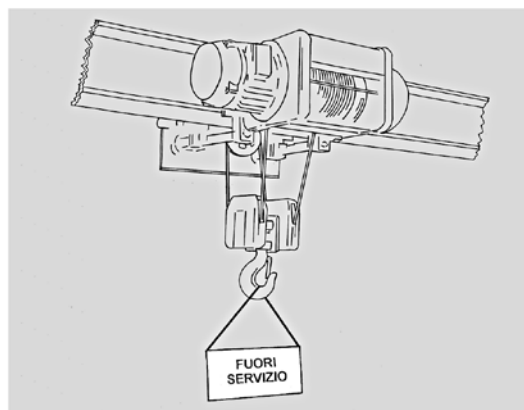
**NEVER** lift, nor attach heavier loads than the rated capacity on the hook.



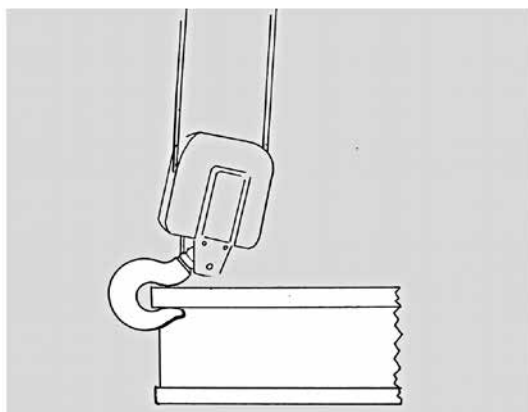
**NEVER** diagonally stretch the rope.



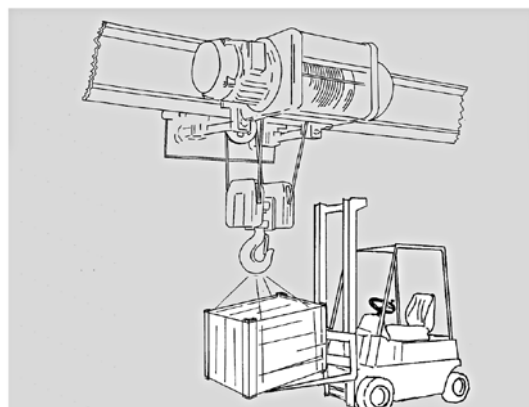
**NEVER** use the rope of the hoist to sling the load.



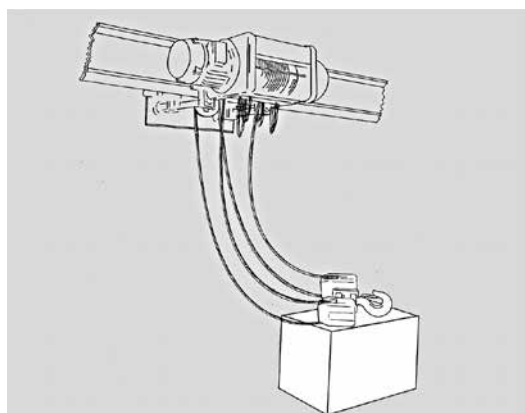
**NEVER** perform maintenance, inspection or repair steps without having previously put the hoist out of service, or with a suspended load and without having performed relevant safety procedures.



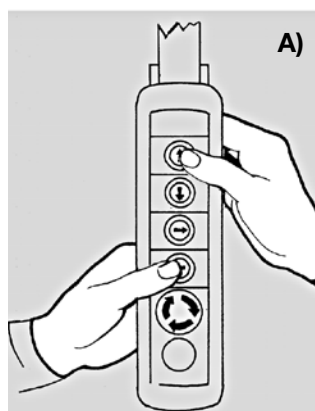
**NEVER** rig a load to the point of the hook.



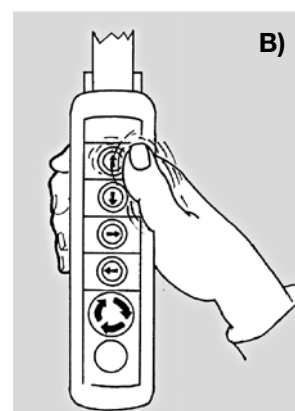
**NEVER** tamper with the brake, if a load remains suspended due to a fault, use suitable means to release the load.



**NEVER** continue to lower the hook after positioning the load causing the rope slack.



**A) NEVER** use the hoist with two simultaneous movements. Before starting a new movement, wait for the first one to stop completely.



**B) NEVER** repeatedly push the push-buttons of the hoist.

## 4.5 OPERATION

### 4.5.1 WORKING AREA



The working area must have the following features:

- min. temperature: -10°C  
max temperature: +40°C  
max humidity: 80%;
- The standard trolley/hoist set cannot be used in the presence of corrosive and/or abrasive fumes, smoke or dust, with risk of fire or explosion, and in any case it cannot work where the use of explosion proof components is prescribed;
- Furthermore it must not be used in areas with strong electromagnetic fields which may generate electrostatic discharge.

Further features of the working area:

**Indoors** - In this case the hoist does not require any particular precautions, since it is not exposed to atmospheric agents.

**Outdoors** - The hoist can be exposed to atmospheric agents during and after use. Whenever possible, it will be necessary to protect the trolley/hoist and its electronic components with roofing or shelters. To avoid oxidation, protect the structure with suitable treatments and lubricate the mechanism.

### 4.5.2 OPERATOR



The operator must be fit for the work and, from a mental-physical point of view, and able to meet the requirements concerning the operation of the trolley/hoist in its intended purpose.

The operator must not allow anyone to approach the trolley/hoist during its use and must prevent its use by unauthorised personnel (especially by people under 16).

The operator must follow the directions received to maximum efficiency, minimum consumption and to the highest safety for himself and for others when using the trolley/hoist. In particular, he must strictly observe the instructions of this manual.

### 4.5.3 PERMISSIBLE LOADS



Shape and dimensions of the loads must comply with the features of the handling location and with the machine used. Loose or bulky materials must be put in suitable containers (to prevent them from accidentally falling), and equipped with suitable hooking means: Changes to static configuration of the loads during lifting must not be possible.

### 4.5.4 NON-PERMISSIBLE LOADS



Load whose mass and accessories - if any - included, exceed the capacity of the machine. Dangerous classified loads for their chemical-physical features (e.g. flammable materials, explosives, etc.).

### 4.5.5 LIFTING ACCESSORIES

#### Generally admitted accessories:



Slings made of ropes, chains and/or textile slings, if necessary equipped with suspensions rings and end hooks.

Lifting accessories between the load and the hook, such as: hangers, pliers, suckers, magnets and electromagnets, etc.

These accessories must be used in compliance with the instructions of their manufacturers.

Their mass must be deducted from the rated capacity of the trolley/hoist to determine the useful lifting load.

#### Generally not admitted accessories:



All those accessories, whose functional and performance features can generate higher dynamic stresses in the trolley/hoist than permissible.

Non-permissible are, for instance, accessories that allow immediate release of the load (if not foreseen in the project), which can therefore cause dynamic over stresses and/or accidental overloads. Accessories limiting the free handling of the load, or connected with separate power lines, etc.

When using a MISIA electric rope hoist the operator must observe the directions given in order to obtain best efficiency and maximum safety for himself and for other people. In particular, it is very important to strictly obey the following prescriptions:



**Capacity** - The capacity limit must never be exceeded (handling heavier loads, than the rated capacity, or overloads, or changing the setting of the load limiter), although determined with wide safety margins.



**Manoeuvres** - It is good practice to carry out one movement at a time, since only this way a manoeuvre can be started, stopped and constantly followed by the operator, who must avoid repeated switching on/off in case of short movements. In fact, it is not true that manoeuvres activated with "short bursts of current" are advantageous. Only a precise definition of the manoeuvre's starting and ending time allow real saving of time and energy.



**Lighting** - The hoist and trolley are not equipped with their own standard lighting system. The ambient lighting must allow the full safety operation of the hoist for the intended purpose. When carrying out maintenance steps in badly lit areas and/or parts of the hoist, a portable lighting system must be prepared, taking care to avoid patches of shadow which may obstruct or reduce the visibility at the point where the work is being carried out or in the surrounding areas.

### 4.6 SWITCHING OFF AT END OF WORK

To switch off the hoist at end of work, observe the following:



remove the load handling slings from the lifting hook



for a hoist with trolley, move the machine to the area chosen for its storage when still.



Lift the hook in order to avoid dangerous interference with persons and objects under the machine.



Stop all movements of the hoist pressing the "STOP" button.



Position the keypad where it cannot be "disturbed".



Disconnect the power supply to the hoist turning the main switch to "OFF" or "0";

## 4.7 MAINTENANCE



The maintenance schedule includes ordinary procedures such as inspection checks and tests directly performed by the operator and/or qualified staff, responsible for normal company maintenance and periodic procedures, including adjustments and lubrication, performed by staff trained by the manufacturer by means of specific courses or publications.

### 4.7.1 ORDINARY MAINTENANCE



Ordinary maintenance covers procedures that may be carried out directly by the operator or by specialised technicians according to the prescriptions of this manual and which do not require the use of special instruments or tools. The procedures consist of:



**Daily steps performed by the operator and including:**

- general visual checks;
- functional tests (of motors, limit switches, brakes without load, "START/STOP" push button);
- condition check of ropes and hooks.



**Weekly steps performed by specialised technicians, including:**

- visual check of each mechanism and of lubricant leaks;
- functional check of the brakes with load;
- check of the limit switches and, if necessary, lubrication of the mechanisms, levers or control cams of the limit switches, to ensure the proper function and limit the wear;
- check of function and integrity of the keypad and of the relevant cable.



**Monthly steps performed by specialised technicians, including:**

- check of ropes and rope guide for efficiency;
- check of pulley for wear;
- check of wheels for wear;
- check and cleaning of plug and socket connectors;
- check of oxidised contacts: after cleaning, cover them with a thin layer of Vaseline;
- lubrication check of the cable trailers and the cables;
- check the efficiency and integrity of the power supply line and of its components;
- visual checks of the equipment inside the control boxes, to ascertain the presence of dust, if any.



The recommended steps are indicative; they may be increased or decreased according to the operation time of the hoist.

#### 4.7.2 PERIODIC MAINTENANCE

Periodic maintenance includes steps performed by trained staff and concerning adjustments and lubrications. During the maintenance of mechanical and electric components, switch-off the main isolating switch and place an "out of service" notice on the hoist.

**For the single components of the equipment, observe the following instructions:**

**i Ropes and fasteners** - Check the condition of the rope to judge the possible deterioration. The rope and rope guide are wearing parts, regular lubrication makes their life longer. It is often possible to improve the performance of the ropes finding out the causes of their deterioration. This can be done analysing the old rope. During the inspections it is advisable to carefully observe the parts of the rope coiled on the pulley and the fixing point at the end. Note the date and the results of the checks as prescribed in the relevant table, in order to be able to plan when the rope is to be replaced. The decision to replace the rope according to the UNI ISO 4309/84 must be taken first of all considering the number and the location of broken strand wires, by the degree of wear and corrosion, by other important damages or tears. The ropes must be replaced when visible broken wires reach the maximum deterioration values given for one of the two reference lengths (Table 9), corresponding to 6 or 30 times the rope diameter. Keep in mind that breaks often are hard to identify, since the ends of the broken wire remains in the original location, without protruding from the surface of the rope. To see these breaks, it is necessary to remove the grease covering the rope, to slide a piece of solid wood along the rope and, if possible, to bend the rope manually, in order to force the wires ends to raise making themselves visible. The rope check must be performed "without load", to ease the visualisation of possible breaks and to foresee a bending radius roughly corresponding to the pulley radius.

#### Checks during the inspection:

**! Number of broken wires** - Based on the features of the rope, it is possible to find out in Table 9, "Limit number of visible broken wires", the maximum permissible number of visible wire breaks on any rope section. In case of higher values, than those shown, the rope must be replaced.

**! Rope diameter decrease** - if a wire core rope shows a decrease of 15% or more of its rated diameter (due to stretching in the bending area), it must be replaced.



**Rope corrosion and wear** - In the event of a decrease of 10% or more of the rated rope diameter due to corrosion or wear, the rope must be replaced even in the absence of broken wires.



**Rope deformation** - Helical deformations with diameter decreases concentrated in a short section of the rope and local flattening or angular deformations due to severe external causes. In the first case, the deformation causes irregular movements of the rope while it is running, which are the primary cause of greater wear and wire breaks; in the second case, the defect often occurs at the rope sockets.



**Heat influence** - Ropes exposed to exceptionally high temperatures (externally shown by the annealed iron colour assumed by the rope) must be replaced.



The above causes are described in detail in the ISO standards 4309.

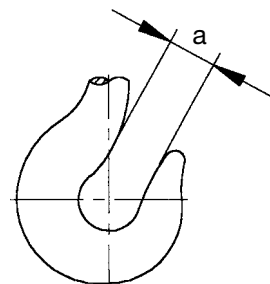


**Hook** - Verify the function of the safety catch and of the rotation lock.

Check the deflection pulleys of the rope for smooth rotation.

The pulleys of the hook can be easily visually checked observing the inclination without load during lifting and subsequent lowering. If the hook during these travels shows a considerable inclination, first on one side and then on the other, from the vertical, this means that the pulley friction is excessive and the pulley must therefore be disassembled to check their running surfaces. With released rotation lock check the wheel for smooth running, without too much friction and jolts. Otherwise remove it and check the bearing. Check the area in contact with the slings for wear.

Check the hooks for cracks or bends. To measure bending, measure the distance between the stem and the point of the hook as shown in the figure. If the measured value is 5% higher than the value originally measured on the new hook (a) according to table DIN 15401, we recommend replacing the hook.



Limit number of visible broken wires

Table 9

Number of load bearing wires in outer strands <sup>1)</sup>	Typical example of rope construction <sup>2)</sup>	Number of visible broken wires <sup>3)</sup> , due to rope fatigue in a lifting device causing the obligatory replacement for:							
		Mechanism type group M1, M2, M3, M4				Mechanism type group M5, M6, M7, M8			
		equal lay incrociato		equal lay parallel		equal lay incrociato		equal lay parallel	
		over a length of				over a length of			
<i>n</i>		6 <i>d</i>	30 <i>d</i>	6 <i>d</i>	30 <i>d</i>	6 <i>d</i>	30 <i>d</i>	6 <i>d</i>	30 <i>d</i>
51 < <i>n</i> < 75	6x19 (19/9/1)*	3	6	2	3	6	12	3	6
76 < <i>n</i> < 100		4	8	2	4	8	16	4	8
101 < <i>n</i> < 120	8x19 (9/9/1)*	5	10	2	5	10	19	5	10
	6x19 (12/6/1)								
	6x19 (12/6+6F/1)								
	6x25FS (12/12/1)*								
121 < <i>n</i> < 140		6	11	3	6	11	22	6	11
141 < <i>n</i> < 160	8x19 (12/6+6F/1)	6	13	3	6	13	26	6	11
161 < <i>n</i> < 180	6x36 (14/4+7/7/1)*	7	14	4	7	14	29	7	14

<sup>1)</sup> Filler wires are not considered as load-bearing wires and are therefore excluded from the inspection. In multilayer ropes, only the visible external layer is to be inspected. In ropes with a steel core, this is considered as an internal strand and therefore not considered.

<sup>2)</sup> To calculate the number of broken wires round the value to an integer. For ropes with external wires with a larger section than normal, the special construction is downgraded in the table and indicated by an asterisk \*.

<sup>3)</sup> A broken wire may have two visible ends..

*d* = rated rope diameter.



**Pulley** - Check each rotating pulley for smooth running; in case of irregularities, disassemble it and check the relevant bearing. Check the wear of the groove (the permitted groove wear of the pulley is 25% of the original dimension of the pulley). Pulleys with cracks and breaks on the edges must not be used.



**Drum** - Check tightening of the rope fastening screws and the wear.  
Check the integrity of the thread.



**Gearbox** - Check for abnormal vibrations which may be caused by damage of a bearing; in this case, disassemble the gearbox to replace the bearings.

**NB: For the hoists 308÷525 the gearbox is outside the hoist while for the hoist type 740÷1125 it is inside the rope drum.**



**Wheels** - Check the wheels flanges and the rolling surfaces for wear; if the thickness of the flange and/or of the rolling surface shows higher wear than shown in table 59 and 60) the wheels must be replaced. Verify the running noise of the bearings; an abnormal noise means that the bearing must be replaced. Check the wheel/axle and axle/gearbox clearances; the presence of clearances means that the axle and/or the wheels must be replaced.



**Stoppers**- Check that the end stoppers are not bent and firmly fastened to the structures. Furthermore, check that the stopper does not show signs of breaks or permanent distortion and is properly fixed to its support.



**Electric equipment** - If the electric equipment is included in the supply, check the moving parts of the contractors for smooth movements; otherwise the electromagnet might not have strong enough pressure between the contacts. It is also necessary to check the cleanness of the contact surfaces between the stator and rotor, in order to prevent the film formed by rust inhibitors collecting dust and causing the contractor to stick.

Never lubricate the contacts with oil, which can carbonise and offer resistance to the passage of current, causing local overheating which shortens the life of the electromagnetic switch. Remove oxidation with a very fine file, and never with sandpaper or similar. In addition, check the contacts for wear, replacing them if (particularly in case of irregular wear) as this prejudices the alignment of the assembly, or weakens the pressure spring so that the two contact surfaces are not always in contact. Check auxiliary contacts with the same procedure. In case of disassembly, handle the coil very carefully to avoid damaging the winding, especially its ends. To avoid loose connections, overheating or noise, check the correctness of the supply voltage of the coils.



**Limit switches** - Check their conditions and proper operation (operate the limit switches manually several times). In particular, for the limit switches of the movements. check their operations during an ordinary manoeuvre, testing first at low speed. Make a statistical check on their resistance to atmospheric agents. Check the mechanical integrity of the moving parts (lever and springs) and check the tightness of the fastening screws.



**Fuses** - Keep a regular stock of each type of fuse fitted, so that they can be quickly replaced with the same type of fuse if necessary, see Table 40).



**Terminals** - Periodically check that the terminals are properly tightened; check that the identification number is clearly visible and fastened to the terminal; check the integrity of the heat insulating material and replace promptly if cracked or broken.

#### 4.7.1 MAINTENANCE SCHEDULES AND INTERVALS



The intervals between the maintenance procedures shown in Table 10 below refer to a hoist working under normal duty conditions as stated by the FEM standard 9.511 for the group 1Am; for heavy duty conditions, the frequency of the maintenance operations must be increased.



**Timers** - Check and clean the contacts with the same procedures as the contactors; check intervention simulating an external operation and, in case of damage, replace the damaged part.



**Motors** - Clean the motor removing any dust settled on the case that could hinder regular cooling; check that the ventilation openings are not obstructed; with the motor running at normal operation range, check the noise level, the temperature and the presence of any clearance in the rotor mountings. In case of even minimal clearance, temperatures close to the mounting higher than those of the case and/or high noise level, replace the bearings with the motor running at normal operation range, check the temperature of the case using a temperature probe. Temperatures above 110°C reveal, in fact, that the motor is overloaded; in this case, look for the causes inside the equipment and check the duty for which the hoist is intended; check the current consumption and the voltage, comparing them with the rated values shown in the rating plate of each motor (see table 2-2A-3-4-5 on page 40).

This consideration is also valid if the hoist is used in a higher duty class, than the one specified. In case of normal and proper use of the hoist, its overhaul may be performed after running time of approximately 10 years accordingly to the FEM standard 9.755 (S.W.P.).



The recommended intervals are indicative and may be changed in compliance with the duty class for which the equipment is used.

#### Recommended periodic maintenance and inspections

Table 10

Machine components	Intervals					
	1st maintenance		Periodical inspections			Maintenance
	after 3 months	after 12 months	daily	weekly	monthly	every
INSPECTION OF ROPES AND FASTENERS	X				X	6 months
LIMIT SWITCH FUNCTION	X		X			6 months
LOAD LIMITER	X			X		6 months
HOOK CONDITIONS		X		X		6 months
GEARBOX FUNCTION		X			X	12 months
BRAKES FUNCTION	X		X			4 months
BRAKE AIR GAP ADJUSTMENT	X				X	6 months
INSPECTION OF WHEELS/ ROLLER BEARINGS		X				6 months
STOPPER CONDITIONS		X				6 months
INSPECTION OF THE ELECTRIC EQUIPMENT	X				X	6 months
KEYPAD	X		X			3 months
FASTENING BOLTS	X					12 months



## 4.8 LUBRICATION

- The lifting gearboxes are "long life" lubricated: do not need any maintenance since the used lubricant has high EP features, wear and oxidation protection capacity and a very high viscosity. Being "long life" lubricated, the gearboxes do not need any oil change or topping up.

### 4.8.1 POSSIBLE LUBRICANT TOP UP

- If you need to repair gearboxes XM 308÷525, to top up lubricant do the following:

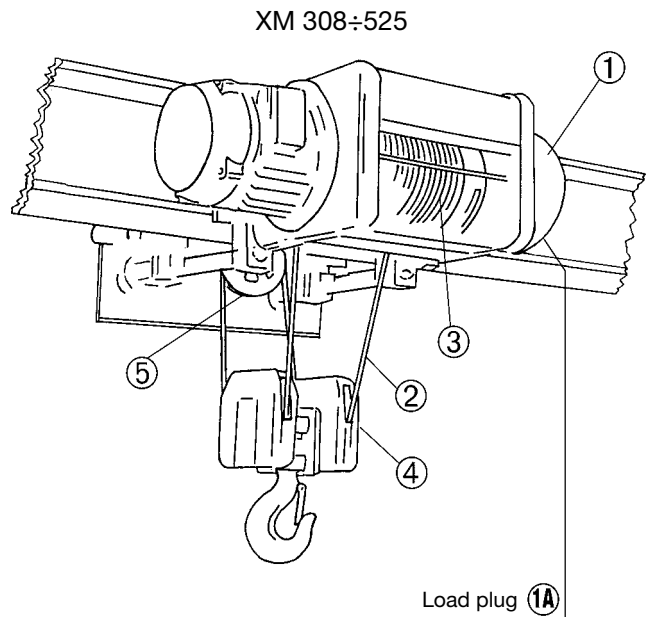
After correct assembly of the components and checking all the gaskets, unscrew the conical plug position "1A" on the bottom of the lid, reducer, add the grease using a syringe, as indicated in table 11A.



If the hoist gearboxes are XM 740÷1125, since the operation is complex, send the hoist to the manufacturer for any repairs.



The monorail gearboxes Type 3 and 83 do not require maintenance since the lubricant used has EP features, is anti-wear, anti-oxidant and has the highest viscosity. No change or top up of oil is necessary as it has "Long Life" lubrication.



### Lubrication schedule

Table 11

Lubrication point	Item	Lubricant	Lubricant	Interval
1	Hoist gearbox	TOTAL/FINA CERAN CA	/	Long Life
2	Rope	/	MULTIS MS2	2 months
3	Rope drum			4 months
4	block pulleys			12 months
5	Rope deflection pulley			12 months

### Lubricant quantity

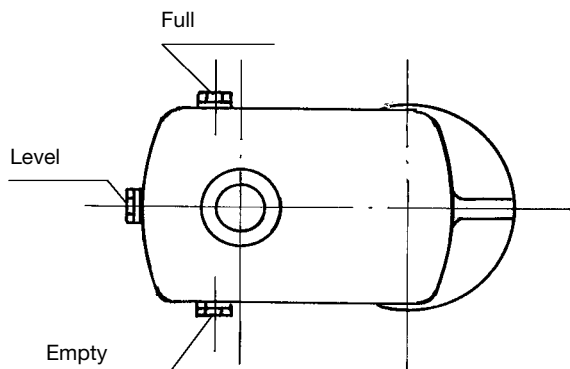
Table 11A

Gearbox size	XM Series				
	308	312	316	525	740÷1125
Possible filling up	Quantity kg.				
	1	1,5	1,5	2	3

The use of different lubricant for the lifting gearbox can prejudice correct functioning and duration of the MISIA gearboxes and therefore the warranty conditions expire.

#### 4.8.2 PROCEDURE TO DRAIN AND CHANGE GEARBOX OIL ON DOUBLE RAIL TROLLEY TYPE 53

- Oil is drained at a temperature no lower than +20°C (in the event of an ambient temperature <20°C the gearboxes must rotate with no load, for a few minutes to heat the oil before removing it);
- Remove the drainage plug and leave the oil to flow. Wash the gearbox with petrol. Conduct some manoeuvres and then completely drain;
- Pour oil very slowly in to ensure the necessary time to reach the level; pay attention not to exceed the indicator level;
- The type of lubricant must never be more fluid than that specified to avoid leaks.
- The amount is shown in Tab . 12 .



Lubrication schedule

Table 12

Gearbox type	Oil	Quantity	Interval
160	AGIP EXIDIA 320	0.5 dm <sup>3</sup>	3 years
200		0.8 dm <sup>3</sup>	
250		1.0 dm <sup>3</sup>	
315		1,2 dm <sup>3</sup>	
Alternative: ESSO - FEBIS K 20 FUCHS - RENEP 5 220 K IP - BANTIA OIL 220			

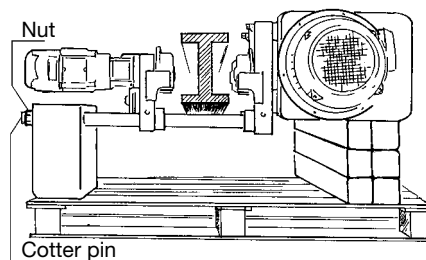
#### 4.9 REPLACEMENTS

##### Removal and installation procedures

##### 4.9.1 MONORAIL TROLLEY



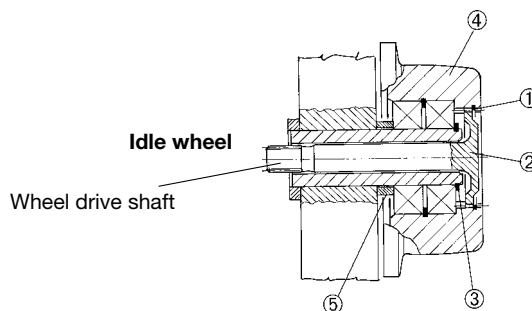
Replacements of components of the hoist or of the trolley must be performed by skilled and trained technicians with specific knowledge of lifting equipment.



##### MONORAIL TROLLEY TYPE 83 - DRIVING WHEEL

**Removal:** remove the ring pos. 1 on the grooved hole. Pull out the pin pos. 2, remove the ring on the wheel axle pos. 3 and pull out the wheel with a puller.

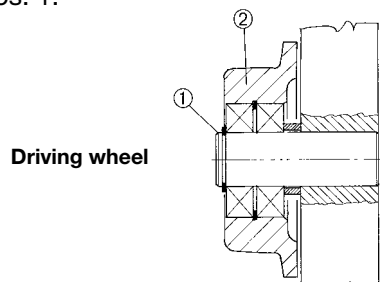
**Installation:** verify the position of the spacer pos. 5, install the wheel, pos. 4, fit the ring pos. 3, insert the pin pos. 2 turning it until the groove gets perfectly into the gearbox, fit the ring pos. 1 in its seat, check the wheel for smooth running switching on the motor.



##### MONORAIL TROLLEY TYPE 3 AND 83 - IDLE WHEEL

**Removal:** remove the ring pos. 1, pull out the wheel, pos. 2 with a puller.

**Installation:** verify the position of the spacer pos. 3, is properly positioned install the wheel pos. 2, fit the stop ring pos. 1.

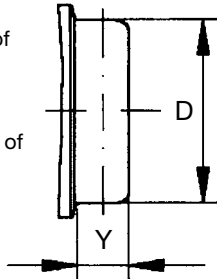




Wheels must be replaced when the original dimensions change as shown.

Max. tolerance on dimension D: -5% of the original value.

Max. tolerance on dimension Y: +10% of the original value.



Original dimensions of the (standard) wheels

Table 13

Type 83	D	100	125	155
	Y	40	40	45
Type 3	D	120	140	
	Y	35	40	



If during the periodical inspections the measured internal dimensions of the wheels exceeds the dimensions "rail flange + 3 ÷ 4 mm", it is necessary to restore the old dimensions varying the closure of the side plates of the trolley as shown in section 3.4 "Assembly of components" on page 16 (deduct the measured difference from the D dimension).

### HOIST TRAVEL MOTOR TYPE 83

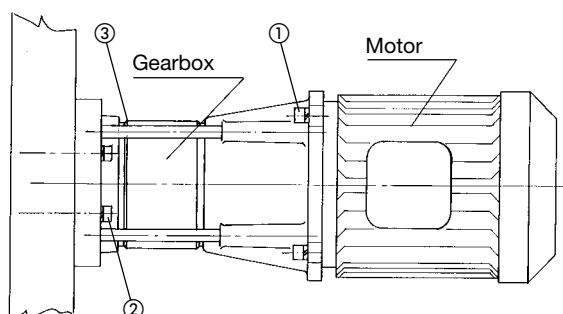
**Removal:** Trolley hoist with wheels  $\varnothing$  125 and type 1 gearbox, loosen the stud bolts pos. 3 and pull out the motor. Trolley hoist with wheels  $\varnothing$  125-155 and type 2 gearbox, loosen the screw pos. 1 and pull out the motor.

**Installation:** Trolley hoist with wheels  $\varnothing$  125 and type 1 gearbox, install the motor and tighten the stud bolts pos. 3. Trolley hoist with wheels  $\varnothing$  125-155 and type 2 gearbox, install the motor and tighten the screws pos. 1.

### GEARMOTOR TYPE 83

**Removal:** Loosen the 4 screws pos. 2 and pull out the gearmotor unit.  $\varnothing$  125 and 155.

**Installation:** install the gearmotor oscillating it, so that the compartment of the gearbox perfectly fits into the projection of the wheel drive shaft (indicated on page 58), and then definitively tighten the 4 screws pos. 2.



### HOIST TRAVEL MOTOR TYPE 3

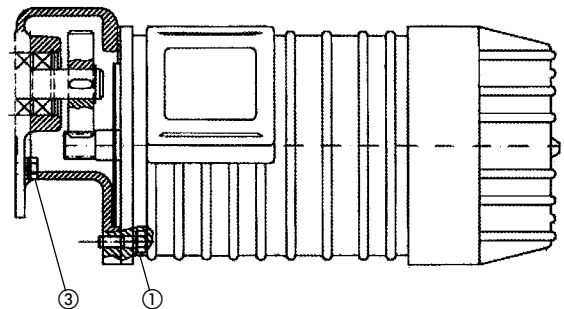
**Removal:** loosen the 4 lock nut pos. 1 and pull out the motor.

**Installation:** Install the motor turning it so that the drive shaft perfectly fits in its compartment, paying attention to align the driving gear with the gear of the gearbox of the trolley (or pre-gearbox), then definitively tighten the 3 screws pos. 1.

### GEARBOX TYPE 3

**Removal:** remove the motor as previously described, then loosen the screws pos. 3 and pull out the gearbox.

**Installation:** install the gearbox turning it so that its compartment perfectly fits into that of the plate of the trolley. Place the gearbox in its original position, tighten the screws pos. 3, install the motor as previously described.

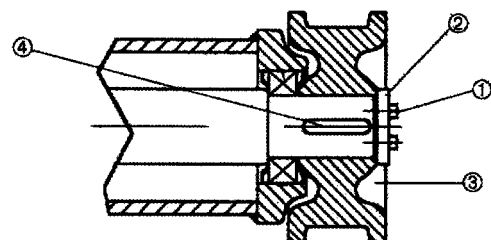


### 4.9.2 DOUBLE RAIL TROLLEY TYPE 53

**Wheel removal:** loosen the screws pos. 1, remove the wheel stopper pos. 2 and pull out the wheel pos. 3 with a puller. **NB:** to remove the wheel from the gearmotor side, first remove the gearmotor (see page 60).

**Wheel installation:** check that the key pos. 4, is properly positioned install the wheel pos. 3, place the wheel stopper pos. 2 and tighten whole with the screws pos. 1.

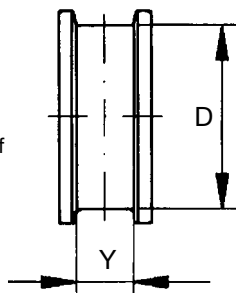
**NB:** to install the wheel from the gearmotor side, first install the wheel and then the gearmotor (see page 60).



Wheels must be replaced when the original dimensions change as shown in Table 14 on page 60.

Max. tolerance on dimension D: -5% of the original value.

Max. tolerance on dimension Y: +10% of the original value.



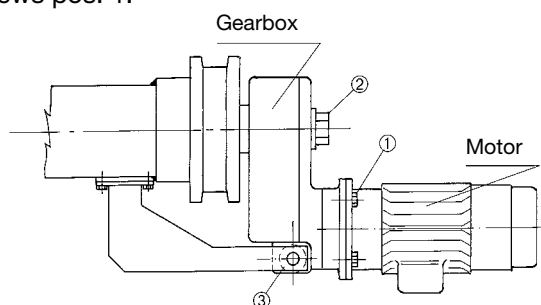
Original dimensions of the (standard) wheels Table 14

Type 53	D	160	200	250	320	320
	Y	50	60	60	70	90

## TRAVEL MOTOR

**Removal:** Loosen the 4 screws pos. 1 and pull out the motor, remove the half-coupling from the drive shaft using a puller.

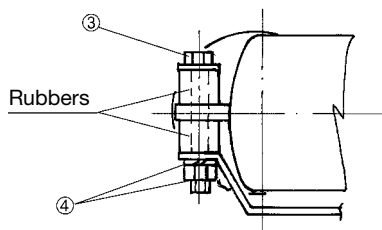
**Installation:** Install the half-coupling on the drive shaft, verify that the rubber of the flexible coupling is placed into the compartment of the half-coupling fitted to the gearbox, and install the motor carefully tightening the screws pos. 1.



## GEARMOTOR

**Removal:** remove the screw pos. 2 and the relevant washer, remove the screw pos. 3 on the torque rod, and pull out the planetary gear from the shaft of the trolley.

**Installation:** verify the presence of the key into the shaft seat, fit the gearbox on the shaft. Fit the damper rubbers on the torque rod as shown, and tighten the screw pos. 3. Fit the nut and the washer pos. 4.



### 4.9.3 HOIST MOTOR



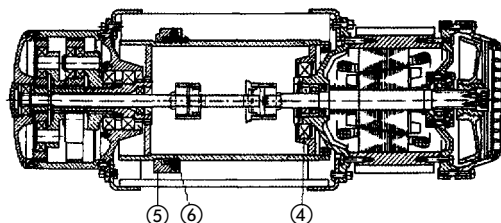
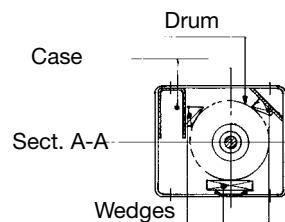
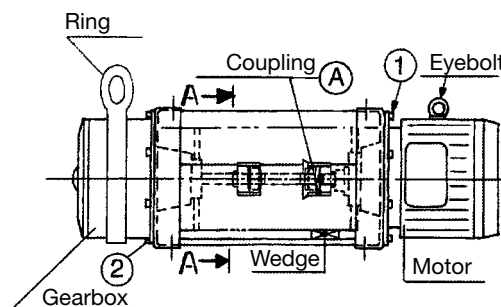
To replace the entire pull motor on the **standard series hoists**, you are advised to monitor it in the vertical position with the hoist on the ground.



For hoists with long coupling strokes, **XML series**, changing the pull motor must **only** be carried out in the vertical position with the hoist on the ground.

**Removal:** insert wooden wedges between the drum and the case to prevent the drum from falling, loosen the screws pos. 1, pull out the motor slinging it to the lifting eye fitted before.

**Installation:** Check the two half-coupling (the inside the grooved seats and the external teeth) for wear. Insert the intermediate shaft into the half-coupling on the gearbox side (pos. 3) and verify the proper lift of the half-coupling on the motor side (pos. 4) and the proper position of the drum (in order to avoid shifting during the removal). Hold the motor with slings or bands fastened to the lifting eye provided and oscillate it in order to match the male and female hub and the compartment of the drum bearing until the proper position is reached. Finally tighten the screws position 1 and connect the limit switch rod with the relevant fork to the outer pin of the base.



Never use the fastening screws to approach the motor to the case, since this could damage the couplings and the relevant stop rings. Install and tighten the fastening screw (pos. 1) only after proper positioning of the motor into the compartment of the case.

**i** This step, if performed as above described, requires special experience and therefore only skilled technicians can be entrusted with it.

Whenever possible we recommend to install the motor with the hoist on the floor in vertical position.

#### 4.9.4 LIFTING HOIST GEARBOX TYPE XM 308÷525

(see figure on page 60 "motor removal")

**Removal:** fit wooden wedges like for motor removal, on the gearbox side, loosen the screws pos. 2, pull out the gearbox balancing it with sling bands.

**Installation:** proceed as described in section 4.9.3. (hoist motor installation), first pacing the motor side half-coupling (pos. 4), then the relevant intermediate shaft and inserting the gearbox until reaching of the proper position, then tighten all the screws (pos. 2).



Never use the fastening screws to approach the gearbox to the case, since this could damage the couplings and the relevant stop rings. Install and tighten the fastening screw (pos. 2) only after proper positioning of the gearbox into the seat of the case.

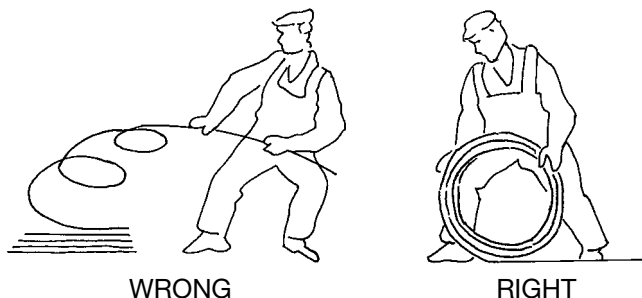


Whenever possible we recommend to remove and install the gearbox with the hoist on the floor in a vertical position to facilitate the procedure.

To remove the gearbox of hoist 740÷1125 that is inside the drum, we recommend you send the hoist to the manufacturer.

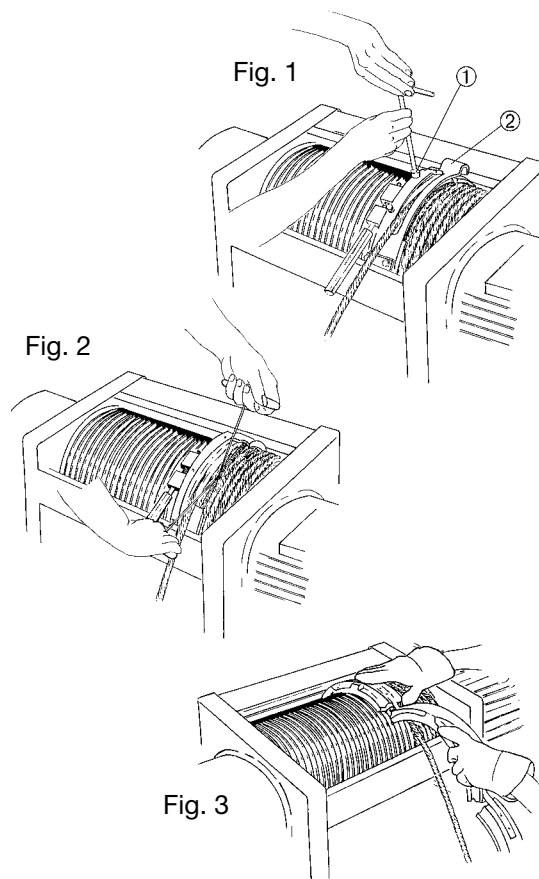
#### 4.9.5 ROPE

Before fitting a new rope, it is necessary to check the pulley grooves and the drum thread for wear or bends due to winding of the old rope. If necessary, replace the damaged parts. Wind-off the new rope coil, without twisting it, so as not to cause bends.



**To remove the rope guide proceed as follow:**

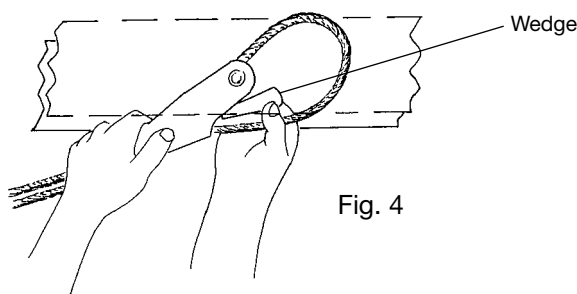
Loosen the screws pos. 1 (Fig. 1), detach the rope guide slide pos. 2 (Fig. 1), remove the rope clamp spring (Fig. 2), pull out the rope guide ring from the drum (Fig. 3).



The removal of the rope guide of the hoist type 308÷525 with SX thread is shown in figure, whereas for hoist type 740÷1125 it is mirror-inverted in respect to the illustration with DX thread.



**Rope removal:** pull out the wedge (Fig. 4), then extract the rope end from the socket and pull out the rope from the lower block pulleys and the deflection pulley, if any. Fully unwind the rope from the drum by pressing the "down" button on the keypad, until the end of the drum. Loosen the fastening screws of the rope clamps (Fig. 5).



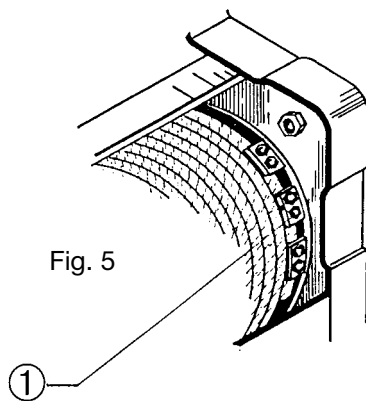


Fig. 5

**Mounting new rope:** push the cable last clamp letting out of about 40 mm the end of the rope ; tighten the clamp screws ( Fig . 5 - pos .1) tightening the rope up to the crushing of the same and fix the other terminals .

Press the "up" button on the keypad and holding the rope tight, wind it up to half drum, to allow installation of the relevant rope ring guide.



For hoists type 308÷525, the start of rope winding is from the drum motor side to the left groove, for hoist type 740÷963 it is with the drum and right groove with start opposite the motor.

**Rope guide ring assembly:** insert rope guide ring (Fig. 6) placing it in the drum grooves position.

Bring the ring with the tongs 2 beaks , using the two holes at the ends of the ring ( Fig . 7 ) .i .

Assemble the spring stringifune in the special slot on the inside of the ring ( Fig . 8 ) and close the same hooking it ( Fig . 9 ). Apply shoe rope guide ( Fig . 10 ) and tighten the screws pos .

Having assembled the rope guide ring, pass the free end of the rope through the block pulley and then fasten the free end to the clamp, as described in the "Block assembly" operations in paragraph 3.7. on page 18 of the installation manual.

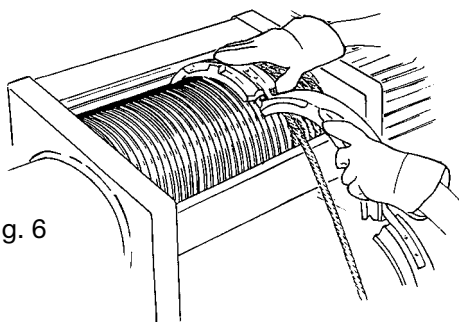


Fig. 6

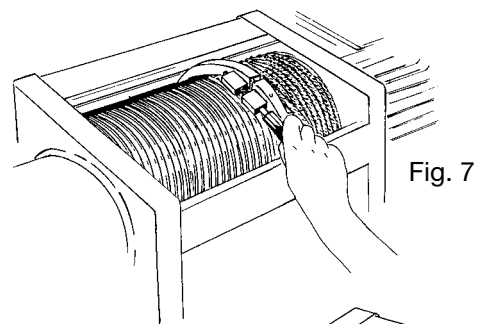


Fig. 7

Fig. 8

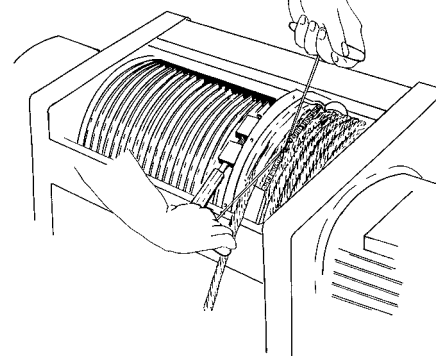
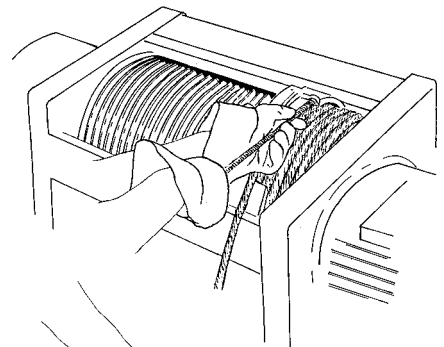


Fig. 9

Fig. 10

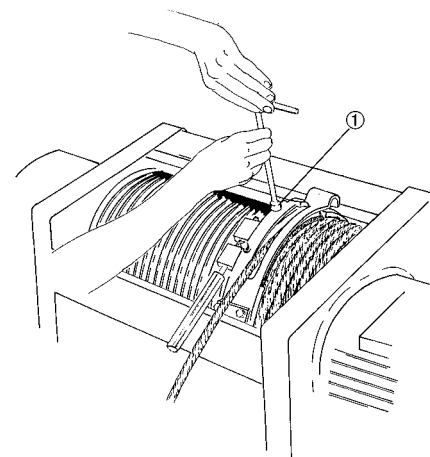
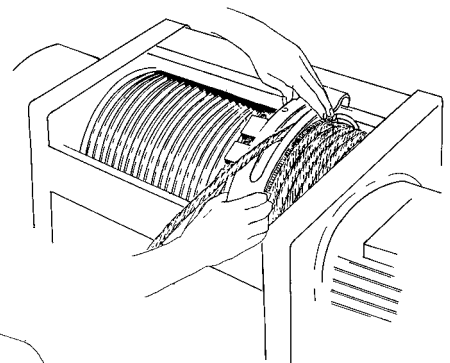
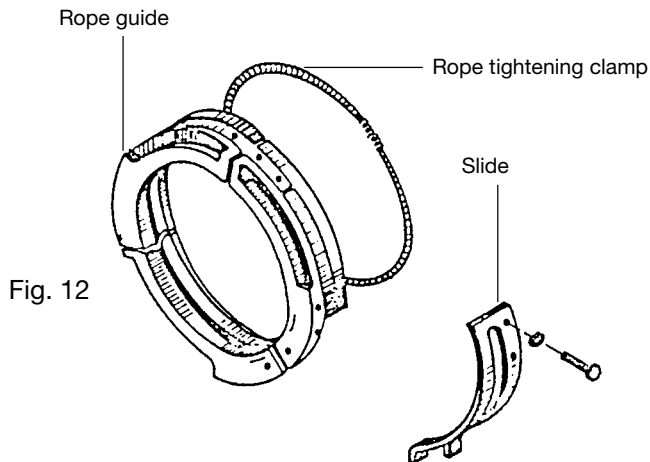


Fig. 11

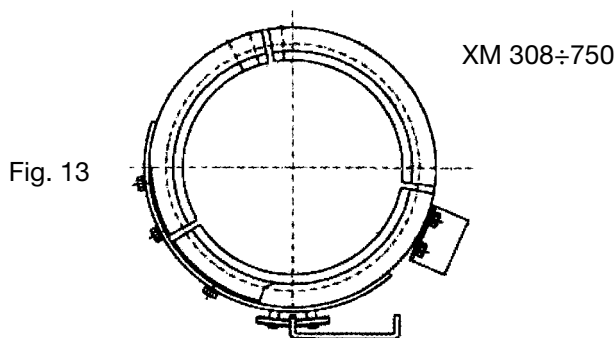


Rope guide ring assembly for hoists type XM 308÷525 is indicated in figures 12 and 13). For hoist dimensions 740÷1125 see the figures indicated.

Rope guide diagram  
hoists XM 740-950-963-980-1100-1125



Rolling rope guide for hoists diagram



#### 4.9.6 LIFTING BRAKE FAN OF CONICAL MOTOR

**Removing and installing:** first make sure that there is no load applied, loosen the screws pos. 1 (Fig. 16), and remove the brake housing pos. 2 (Fig. 16) and remove the brake adjusting the ring nut pos. 3 (Fig. 16) with the special wrench (Fig. 17). Remove the brake fan pos. 4 (Fig. 18). Install the new fan pushing it forward with a lead mallet, install the brake housing pos. 2 (Fig. 16) and the screws pos. 1 (Fig. 16), and then perform the adjustment as shown in the section "brake fan adjustment" on page 65.

Fig. 16

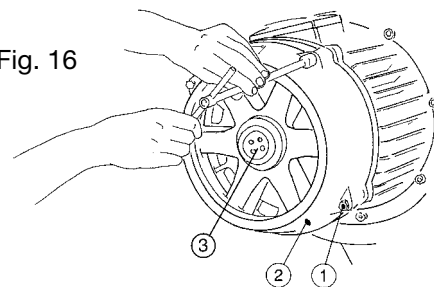
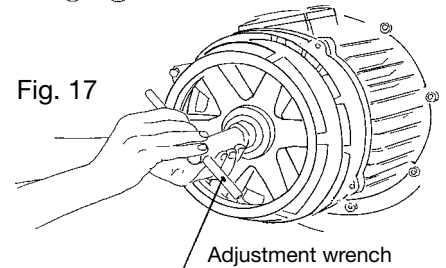


Fig. 17



Extraction wrench

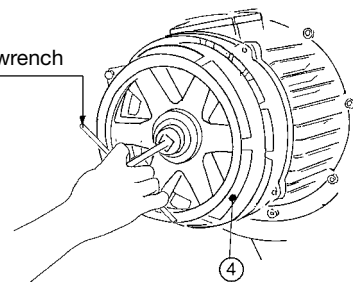


Fig. 18

#### 4.9.7 BRAKE TYPE "M" FOR CYLINDRICAL LIFTING MOTOR

##### REMOVING AND INSTALLING THE ELECTROMAGNET

###### Removing and installing:

- loosen the screws pos. 1, remove the cap pos. 2.
- Loosen the screw pos. 3, remove the fan pos. 4.
- loosen the screws pos. 5, remove the electromagnet pos. 6, paying attention to springs pos. 7.
- Position the electromagnet pos. 6) tighten the screws pos. 5 verify the tightening torque " $M_A$ " as for Table 15 and verify the air gap (a) as for table 16 in chapter "brake adjustment", install the fan pos. 4, tighten the nut pos. 3, install the cap pos. 2) with the screws pos. 1.

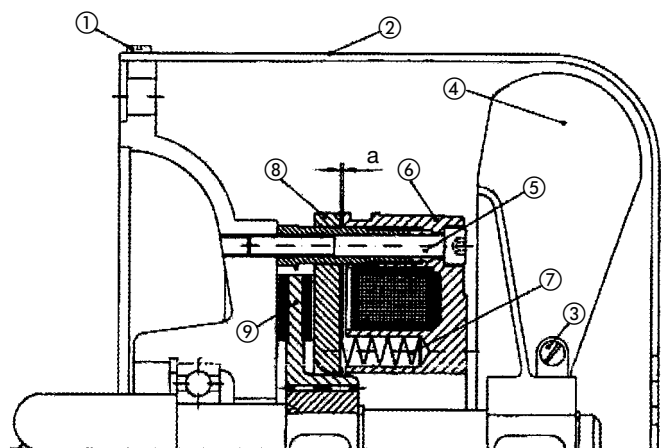
Table 15

Spring brake	tightening torque	Air gap	measure
FDB	$M_A$ (Nm)	"a" (mm) <sup>+0,1</sup> min.	"y" (mm) max
15	10	0,3	1,0
17	25	0,3	1,0
20	25	0,4	1,2
23	25	0,4	1,2
26	50	0,5	1,5

##### REMOVING AND INSTALLING THE BRAKE DISK

###### Removing and installing:

- Remove the electromagnet as described above, remove the mobile anchor pos. 8 and the brake disc pos. 9.
  - Install the disk pos. 9 on the broached hub pos. 10, install the mobile anchor pos. 8 and install the electromagnet as described above.
- Adjust the air gap as showed in chapter 4.10.2 - tab 16.



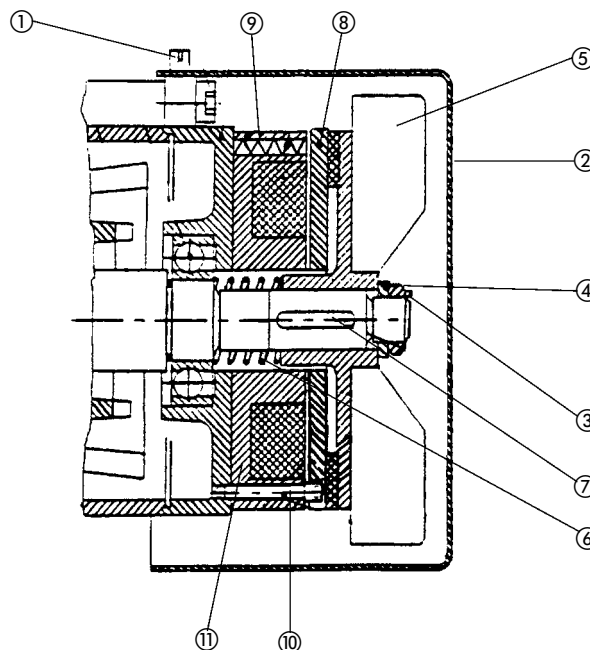
#### 4.9.8 TROLLEY TRAVEL BRAKE TYPE E (MOTORS WITH CYLINDRICAL ROTOR)

**Brake fan removal:** Loosen the screws pos. 1, remove the cover, pos. 2, loosen the screw pos. 3, and the nut pos. 4, pull out the brake fan pos. 5.

**Brake fan removal:** check the right locating of the spring pos. 6 and the key pos. 7, put the brake fan pos. 5, tighten the nut pos. 4 and the screws pos. 3, put the cover pos. 2 tighten the screws pos. 1.

**NB:** check that the brake stops correctly, in this case adjust it as described in section "adjustment of trolley brake motors". Electromagnet removal follow the same rules as in the above section "Brake fan removal", then pull out the movable keeper pos. 8 and the spring pos. 9 and loosen the screws pos. 10. Disconnect the feeding cables of the electromagnet pos. 11 from the motor terminal block and pull whole.

**Electromagnet removal:** Disconnect the feeding cables of the electromagnet pos. 11 following the rules on page 21 "Electrical diagram for the motor brake feeding connection". Position the electromagnet pos. 11 tighten the screws pos. 10, put the spring pos. 9, put the removable keeper pos. 8 and check the right locating of the spring pos. 6 and of the key pos. 7. Put the brake fan pos. 5, tighten the nut pos. 4 and the screws pos. 3, put the cover pos. 2 and tighten whole with the screws pos. 1.





## 4.10 ADJUSTMENTS

### 4.10.1 ADJUSTMENT OF THE CONICAL HOIST MOTOR BRAKE

This step must be performed with a still hoist and without load.

Loosen the screws pos. 1, remove the grid pos. 2, (Fig. 19); with the brake applied, measure at any point between the brake fan (Fig. 20) and the surface of the bell. After this measurement, axially push the fan inside the motor with the aid of a lever and make another measurement, recording the difference (Fig. 20). If the difference is greater than the rated values (0,8/1,2 mm) proceed as follows:

- loosen the screw (Fig. 21) and then turn the adjusting ring nut clockwise to take up any axial shifting greater than the rated value, bearing in mind that one complete turn of the ring nut corresponds to 2 mm (Fig. 22). After this take up operation, repeat the measurement with the brake released (Fig. 20), checking that the axial shifting is within the rated value, then put back the screws and the grid in their positions (Fig. 19).



If the measurement indicated is not reached with the above operation, it is necessary to replace the fan.

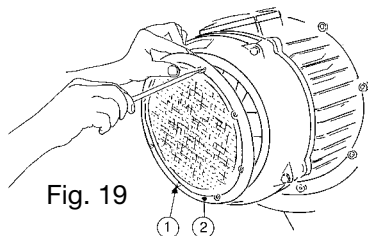


Fig. 19

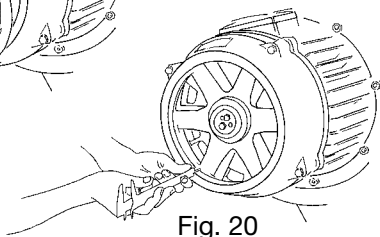


Fig. 20

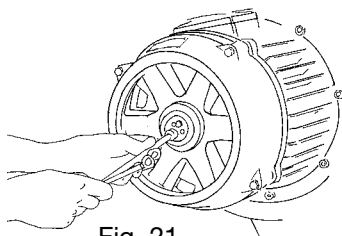


Fig. 21

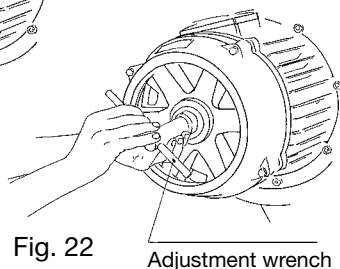


Fig. 22

Adjustment wrench



**ATTENTION!** The brakes does not function properly with an axial shifting over 2.5 mm. The maximum permissible axial shifting of the rotor during operation is of 2.5 mm.

### 4.10.2 ADJUSTMENT OF BRAKE TYPE "M" FOR CYLINDRICAL LIFTING MOTOR

- Check the magnetic gap (air gap) "a" and wear of the brake as for table 16.

The air gap must be restored acting on the screws of the body brake (position 5), screwing them clockwise



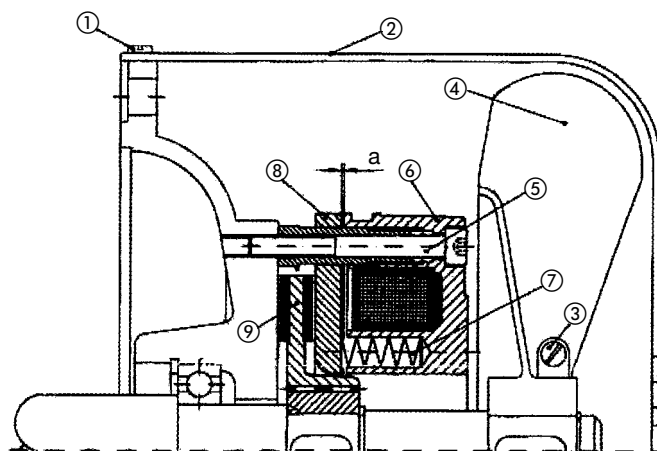
If the thickness of the disk brake is lower than as shown in table 16, it is necessary to replace it by operating as described in section 4.9.7.



NB: following the regulation of the magnetic gap, the braking torque is restored.

Table 16

Power kW		Type brake	Air gap		Disk thickness mm min.
4 poles	4/12 poles		mm min.	mm max	
2,5	2,5/0,83	15	0,3	0,9	9,5
4	4/1,3	17	0,3	1,0	11,5
5	5/1,6	17	0,3	1,0	11,5
5,8	5,8/1,9	17	0,3	1,0	11,5
7	7/2,3	20	0,4	1,1	12,5
8	8/2,6	20	0,4	1,1	12,5
12	12/4	23	0,4	1,1	14,5
15	15/5	23	0,4	1,1	14,5
16	16/5,3	26	0,5	1,2	16,5
18	18/6	26	0,5	1,2	16,5
20	20/6,5	26	0,5	1,2	16,5
24	-	26	0,50	1,2	16,5

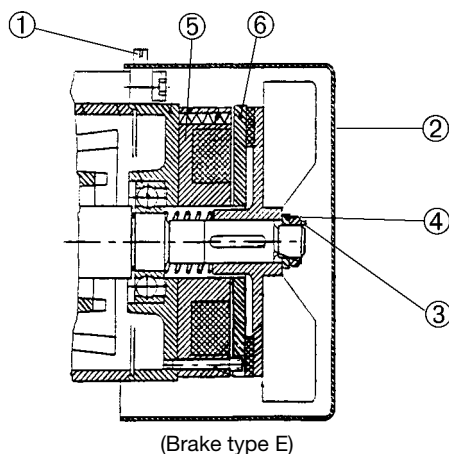


#### 4.10.3 ADJUSTMENT OF TROLLEY MOTORS BRAKE - MOTORS WITH CYLINDRICAL ROTOR

This step must be performed with a still trolley and without load.

If the braking distance is longer than necessary, increase the brake torque as follow: loosen the screw pos. 1, remove the cover, pos. 2, loosen the screw pos. 3 and loosen or tighten the nut pos. 4 in order to adjust the brake opening.

NB: turning the nut clockwise the brake distance decreases and vice versa. The brake opening shall have a range between a minimum of 0.5 mm up to a maximum of 0.8 mm. This value can be checked by putting a thickness meter between pos. 5 and 6.



#### 4.10.4 ELECTROMECHANICAL LOAD LIMITER SETTING

##### 1st threshold warning

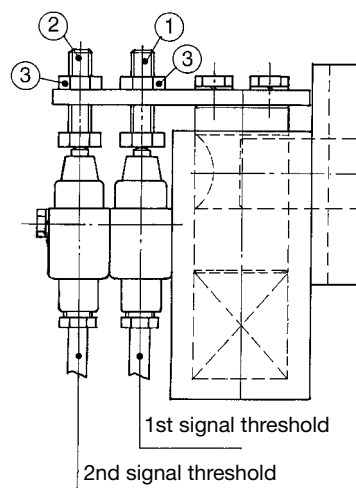
Apply the rated load, switch-on the hoist motor and check proper intervention, with the signal on the button panel or the siren if available.

##### 2nd threshold warning

The 2nd threshold must stop all movements (except going down).

Apply a load 15% higher than rated load, switch-on the hoist motor and check the proper intervention.

**Note - The dynamometric or electromechanical load limiter is statically pre-set by the manufacturer. Should it not work properly, perform its settings as explained in the chapter settings - paragraph 4 on page 55.**



#### 4.10.5 DYNAMOMETRIC LOAD LIMITER SETTING

Any calibration of the limiter with rated load for the 1st threshold with dynamic load +10% and the 2nd threshold with static load +25% of the rated load must be carried out by a specialist technician following the procedure described with a sample weight.



If the system is not working properly, refer to the "Installation and Use Manual" of the limiter with relevant electronic board attached to this documentation.

**QUICK GUIDE TO LIMITER ADJUSTMENT (FIG. G / DETAIL 2)**

The MISIA load limiter is pre-calibrated with two levels:

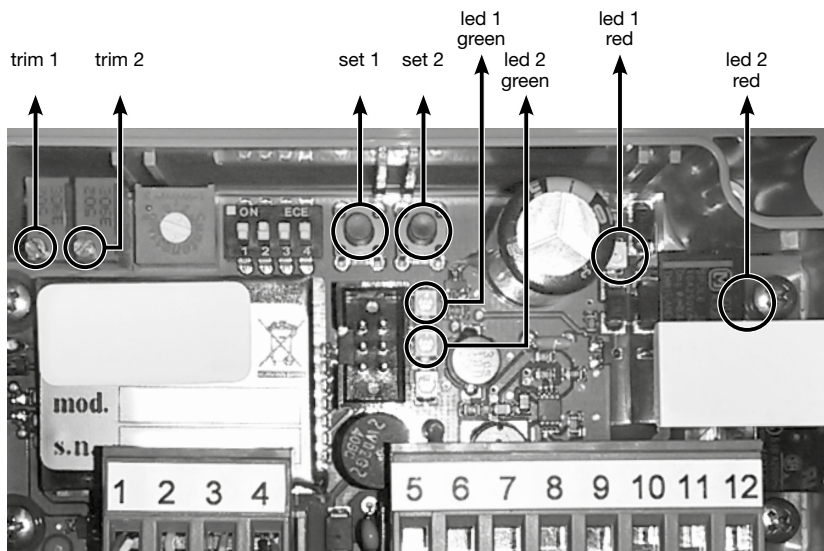
Threshold 1 = 110% (rated load +10%)

Threshold 2 = 125% (rated load +25%)

During the hoist installation phase, precision calibration may be necessary before testing.

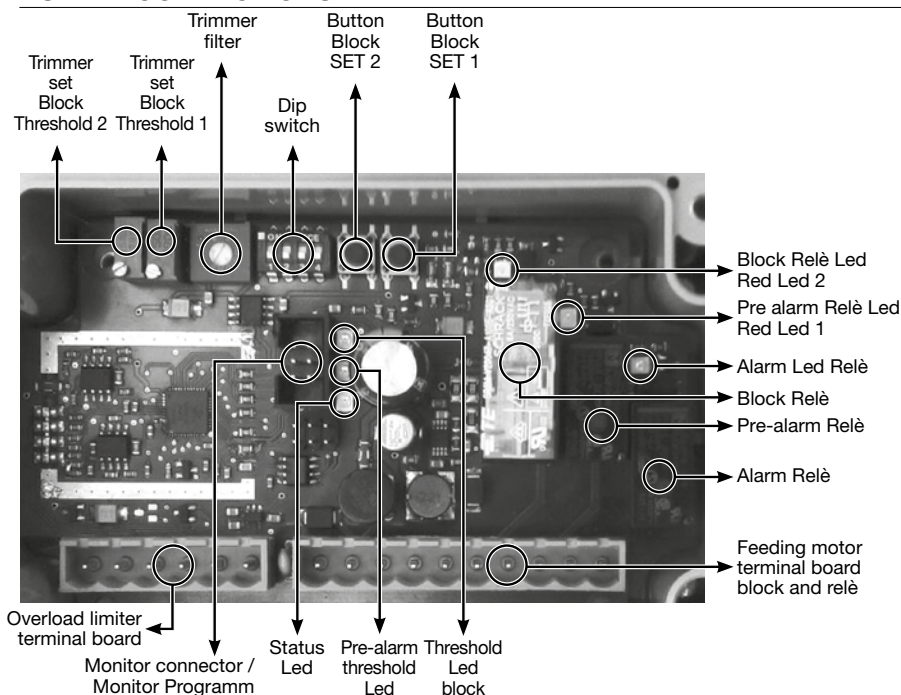
Apply the sample weight (rated load) and proceed as follows:

- 1) List the load and check the intervention levels are correct.
- 2) If the intervention level is not exact:
  - 2a) turn the trimmer (1 or 2 according to the thresholds) in an anti-clockwise direction if the limiter does not activate
  - 2b) turn the trimmer (1 or 2 according to the thresholds) in a clockwise direction if the limiter activates before one of the two thresholds is reached.
- 3) In both cases, ignore the green led (green led 1 or green led 2 according to the thresholds) which flash to indicate the modification in progress.
- 4) Continue to turn in the pre-selected direction until the red led switches off (red led 1 or red led 2 according to the thresholds) and wait for the green led (green led 1 or green led 2 according to the thresholds) stops flashing.
- 5) With the red led off, press the "set" key for approximately 5" (set 1 or set 2 according to the thresholds) and wait for the green led (green led 1 or green led 2 according to the thresholds) to stop flashing.
- 6) Let the load off and start from point 1) to test the new settings.

**DSET 01 CONNECTIONS**

Num.	Terminal box load cell
1	+ Cell power supply (pos.)
2	+ Signal (pos.)
3	- Signal (neg.)
4	- Cell power supply (neg.)

Num.	Terminal box relay power supply
5	+POWER 10-30 Vdc / 24 Vac
6	GND / 24 Vac
7	Relay 1 NO
8	Relay 1 NC
9	Relay 1 COM
10	Relay 2 NO
11	Relay 2 NC
12	Relay 2 COM

**DSET 22 CONNECTIONS**

Num.	Overload limiter terminal board
1	+ Feeding chip (pos.)
2	+ Signal (pos.)
3	- Signal (neg.)
4	- Chips feeding (neg.)
5	+ Signal 2 (pos.)
6	- Signal 2 (neg.)

Num.	Relè terminal board feeding
7	+ Feeding 10-30 Vdc/Vac
8	GND / Vac
9	Block relè (NA)
10	Block relè (NC)
11	Block relè (COM)
12	Pre-alarm relè (NA)
13	Pre-alarm relè (NC)
14	Pre-alarm relè (COM)
15	Alarm relè (COM)
16	Alarm relè (NA)

### 4.11 TROUBLESHOOTING


The following tables show the possible malfunctions of the individual functions of the trolley/hoist.


The column of the "component fault table" lists the fault, the relevant function and the possible causes.


**Component fault table**

Component/fault type	Cause	Solution
<b>Brake slipping</b>	<ul style="list-style-type: none"> <li>- Worn brake lining</li> <li>- Presence of oil and grease</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust the clearance or replace the brake lining</li> <li>- Clean the brake lining</li> </ul>
<b>Disk brake vibration</b>	<ul style="list-style-type: none"> <li>- Improper supply voltage (too low)</li> <li>- Supply with only one phase</li> <li>- Excessive air gap between magnetic components</li> </ul>	<ul style="list-style-type: none"> <li>- Restore the original, proper conditions</li> <li>- Adjust the air gap</li> </ul>
<b>Brake overheating excessively</b>	<ul style="list-style-type: none"> <li>- Improper duty cycle</li> <li>- Improper adjustment</li> <li>- Operation under unsuitable conditions or out of normal duty</li> </ul>	<ul style="list-style-type: none"> <li>- Restore the foreseen working conditions</li> <li>- Restore proper conditions</li> </ul>
<b>The limit switch stuck open</b>	<ul style="list-style-type: none"> <li>- Clogging</li> <li>- Connections broken</li> </ul>	<ul style="list-style-type: none"> <li>- Clean and restore the original conditions</li> </ul>
<b>Keypad push buttons stuck closed</b>	<ul style="list-style-type: none"> <li>- Clogging</li> </ul>	<ul style="list-style-type: none"> <li>- Clean</li> <li>- Check the keypad conductor</li> </ul>
<b>Stuck contacts on the electromagnetic switches</b>	<ul style="list-style-type: none"> <li>- Lack of maintenance</li> <li>- Operation under unsuitable conditions or out of normal duty</li> </ul>	<ul style="list-style-type: none"> <li>- Restore proper working conditions</li> </ul>
<b>Motor overheating</b>	<ul style="list-style-type: none"> <li>- Higher voltage fluctuations as the permitted <math>\pm 10\%</math></li> <li>- Lack of cooling air, possible clogging of air passages</li> <li>- Higher environment temperatures as planned for the operation</li> <li>- Operation of equipment not within the foreseen duty cycle</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure the proper power voltage supply</li> <li>- Restore the proper air circulation</li> <li>- Restore suitable environmental conditions or adapt the function features of the motor to the new conditions</li> <li>- Adapt the operation conditions to those planned</li> </ul>
<b>The motor does not start</b>	<ul style="list-style-type: none"> <li>- Blown fuse</li> <li>- The contactor interrupted the power supply</li> <li>- Overload, blockage, high start frequencies, inadequate protections</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the fuse</li> <li>- Verify the contactor of the function</li> <li>- Repair the motor winding and ensure a better protection</li> <li>- Check the keypad</li> </ul>
<b>The motor starts with difficulty</b>	<ul style="list-style-type: none"> <li>- At start-up, voltage or frequency are well below their rated values</li> </ul>	<ul style="list-style-type: none"> <li>- Improve the conditions of the line or of the main power supply</li> </ul>
<b>The motor hums and draws much current</b>	<ul style="list-style-type: none"> <li>- Faulty windings</li> <li>- The rotor contacts the stator</li> <li>- Lack of one phase of the power supply</li> <li>- Gearbox seized</li> <li>- Brake seized</li> <li>- Power cables short circuit</li> <li>- Motor short circuit</li> </ul>	<ul style="list-style-type: none"> <li>- Have repaired by a specialist</li> <li>- Check the main power supply and/or the contactor</li> <li>- Call for a specialised technician</li> <li>- Check and, if necessary, adjust</li> <li>- Repair the short circuit</li> <li>- Call for a specialised technician</li> </ul>
<b>Short circuiting in the motor winding</b>	<ul style="list-style-type: none"> <li>- Faulty winding</li> </ul>	<ul style="list-style-type: none"> <li>- Repair the motor winding</li> </ul>
<b>False contact</b>	<ul style="list-style-type: none"> <li>- Accidental activation of the function</li> </ul>	<ul style="list-style-type: none"> <li>- Check the keypad conductor</li> </ul>

### 4.12 REMOVAL - NEW DESTINATION

 Should it become necessary to remove the trolley/hoist from its working position for extraordinary maintenance operations (repairs/replacements), or to install it in a new location, reverse the procedures described under "Mounting", section 3.5 on page 16 and sections 3.6-3.7 on page 18.

 This operation must be carried out by specialists and specially trained staff, with adequate tools and personal safety devices, as required by the standards.

 Should the user sell the trolley/hoist to another user (resale of used machine to third person) it is advisable to inform the manufacturer of the new destination and address of the new user, so MISIA srl can send updated information, if any, in connection to the hoist and/ or this manual.

### 4.13 RESTORATION AFTER STORAGE

Before putting in service a trolley/hoist which has been stored for a long time, the following steps must be carried out:

#### Mechanism

- check for any lubricant leaks and replace any faulty seal;
- top up the lubricants;
- check that the mechanisms are properly fastened to the structure;
- remove any trace of rust from the sliding parts of the control devices;
- check the rope for integrity and clean and lubricate it, the pulley grooves and the drums;
- lubricate the thrust bearing of the hooks, and the unpainted mechanical components (shafts, couplings, control rods);
- eliminate water deposits in hollow components of the structure and of the mechanism.

#### Electric system

- eliminate any condensation inside the motors sucking it from the open terminal boxes; dry blow with air;
- check the brakes for the integrity and function. Restore the proper air gap;
- check the limit switches for integrity and function;
- verify the integrity of the parts and of the electric and electronic components. Eliminate any condensation, wipe dry the contacts of the electromagnetic switches and protect all components with a suitable spray for electrical equipment. Carefully clean and apply a film of Vaseline on the closure surfaces and threaded covers of all containers;
- perform an electric strength test at 2000 V, taking care to isolate any rectifier bridge or electronic circuit;
- check the trailing cables for smooth running;
- carefully check the function of the keypad.

### 4.14 DISPOSAL/SCRAPPING

If the hoist/trolley have to be scrapped, their parts must be disposed of in different ways according to the different characteristics thereof (e.g. metal, oils and lubricants, plastic and rubber, etc.), possibly entrusting specialised authorised disposal companies, and in any case observing the law requirements for the disposal of solid industrial waste.

## 5. MAINTENANCE REPORT

### 5.1 PERIODIC MAINTENANCE REPORTS

In these maintenance reports the user must record all performed maintenance steps at monthly, six-monthly and yearly intervals. It must be filled in by the user, noting the results and possible comments. The report must clearly state the name of the maintenance worker and date of the maintenance step.

#### 5.1.1 FILLING IN THE REPORT

The report consist of a number of pages equal to the number of components listed alongside.

#### List A

(recommended monthly, six-monthly maintenance)

- Ropes
- Hook
- Brakes
- Fastening bolts
- Electrical system
- Limit switch

#### List B

(recommended six-monthly maintenance)

- Rope guide
- Gearbox
- Wheels
- Stoppers
- Block
- Deflection pulleys
- Load limiter

MONTHLY/SIX MONTHLY MAINTENANCE OPERATION				
Component: _____				
Date	Operation	Result	Signature	Remarks

## 6. SPARE PARTS

When ordering spare parts, always indicate the serial number of the hoist, year of manufacture and code number of the manual.

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[illegible]



[illegible]

[illegible]





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