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JIB CRANES WITH AN ARTICULATED ARM *MANUALLY ROTATED*

- **“COLUMN”** – SERIES CBB
- **“WALL”** – SERIES MBB



- INSTRUCTIONS FOR USE -
installation - use - maintenance



KMAN14MG02

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1. - PRELIMINARY INFORMATION

1.1 Contents and use of the manual

§ This technical publication, identified by the code **KMAN14MG02**, refers to “**Jib cranes, manually rotated with an articulated arm, in CBB series column-mounted model or MBB series wall-mounted**”, built and put on the market by the company:

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§ It refers to their “intended use”, to their technical functional and performance characteristics and to the relevant


Installation , use and maintenance instructions. It is intended for:

- the supervisor of the factory, workshop, building site
- the staff in charge of transporting, handling and installation of the equipment
- the operators of the jib crane
- the maintenance staff

This manual must be kept by the person in charge of the above mentioned duties in a suitable place, so that it is

always available for consultation and kept in the best possible state.





If the manual is lost or becomes unusable, replacement documentation should be requested directly from the manufacturer by quoting the code of this manual.

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1.2 Symbols: meaning and use

§ In this manual certain symbols are used to focus the reader’s attention and underline some particularly important aspects of the subject.

The following table shows the list and meaning of the symbols used in the manual.

SYMBOL	MEANING	EXPLANATION, ADVICE, NOTES
	Danger	<ul style="list-style-type: none"> • Indicates a danger with risk of accident, possibly fatal. • Failure to follow the attached instructions can cause a situation of serious danger for the safety of the operator and for people in the vicinity! • Follow the instructions scrupulously!
	Warning	<ul style="list-style-type: none"> • Represents a warning note of attention of possible deterioration of the jib or of a personal object of the operator. • Important warning which requires one’s utmost care.
	Warning / Note	<ul style="list-style-type: none"> • Indicates a warning or a note about key functions or useful information.
	<ul style="list-style-type: none"> • Visual observation • Action to be taken 	<ul style="list-style-type: none"> • A printed eye can indicate to the reader that : <ol style="list-style-type: none"> a) He should proceed to a visual observation. b) He should proceed to the operating sequence. c) It is necessary to take a reading, to check a signal, etc.

1.3 Co-operation with the user



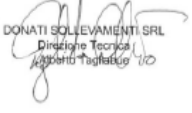
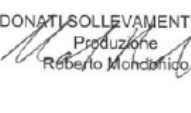
This manual reflects the configuration of the machine at the time the machine was put on the market. Any change to the manual, a copy of which will be sent to the customer by the manufacturer, shall be kept together with the manual.

The manufacturer is willing to supply its customers with any additional information they may require, and welcomes any suggestions aimed at improving the manual so that it corresponds better to the customer's needs.

If the jib crane is no longer to be used the main user is invited to deliver, with the hoist, this manual and the relevant documentation enclosed with it (declarations, schemes, control register etc.)

1.4 Conformity with safety regulations

The jib crane are designed and produced in consideration of the **“Essential Safety Requirements” of Enclosures 1 of the Community Machines Directive 2006/42/CE**, the jib cranes are put on the market with the **EC mark and the EC Conformity Declaration - Enclosures II A.**

 EC DECLARATION OF CONFORMITY <small>as defined by machinery directive 2006/42/EC – Annexe IIA</small>			
The legal representative of the company:			
 DONATI SOLLEVAMENTI S.r.l. <small>Via Quasimodo, 17 - 20025 Legnano (MI) - Tel. 0331.1481.1 - Fax. 0331.1481.880</small>			
Declares under on own responsibility that the named machine:			
Bridge crane with hoist and trolley type: <input type="checkbox"/> Suspended <input type="checkbox"/> Rested			
Crane structure : <input type="checkbox"/> Single girder <input type="checkbox"/> Double girder	Type :	Serial Nr :	Year :
Jib crane: <input type="checkbox"/> Bracket <input type="checkbox"/> Arm <input type="checkbox"/> Column	Type :	Serial Nr :	Year :
Electric hoist : <input type="checkbox"/> Wire rope <input type="checkbox"/> Chain	Type :	Serial Nr :	Year :
Trolley : <input type="checkbox"/> Electric <input type="checkbox"/> Mechanical <input type="checkbox"/> Push	Type :	Serial Nr :	Year :
Capacity (kg) :			
Is in according to the Comunitary Directives			
<ul style="list-style-type: none"> • Machine Directive 2006/42/CE • Low voltage Directive 2014/35/EU • Electromagnetic Compatibility Directive, 2014/30/EU 			
Main technical regulations considered:			
<small>EN ISO 12100 /2010– Safety of the machinery EN ISO13849-1/2015 General principles for design EN 12077-2/2008 Limiting and indication device EN 60204 – 32/2009 – Safety of machinery electrical equipment of machines EN 60529/2018 – Degrees of protection provided by enclosures (IP code) ISO 4301-1/2016 – Lifting equipment classification EN14492-2 – Power driven winches and hoists ISO 4308 – 1/2003 – Selection of wire ropes (for wire rope hoists DRH series) UNI 9466/94 – Lifting appliances shell drum. Design requirements (for wire rope hoists DRH series) DIN 15401 – Lifting hooks for lifting appliances: Single hooks FEM 1.001/98 - Rules for the design of hoisting appliances FEM 9.511/86 - Classification of mechanisms FEM 9.661/86 – Dimensions and design of rope reeving components FEM 9.671/88 – Chain qualities, selection criteria and requirements (for chain hoists DMK series) FEM 9.761/93 – Lifting force limiters for controlling the loading of motorized series hoists mechanisms FEM 9.683/95 – Selection of lifting and travel motors FEM 9.755/93 – Measures for achieving safe working periods for serial hoists units (S.W.P.) FEM 9.941/95 – Graphical symbols for control devices</small>			
Person authorized to compile the technical file			
Name and surname: Alberto Tagliabue			
Address: Via Quasimodo, 17 - 20025 Legnano (MI) - Italy			
 <small>DONATI SOLLEVAMENTI SRL Direzione Tecnica Alberto Tagliabue 1/0</small>		 <small>DONATI SOLLEVAMENTI SRL Produzione Roberto Mondinico</small>	
Legnano		Date: 22.06.2023	

*example CE Declaration CE of Conformity
Enclosure II A*

Furthermore the jib crane CBB-MBB series in accordante with:

- **Low Voltage Directive 2014/35UE**
- **Electromagnetic Compatibility Directive 2014/30/UE**

1.5 The manufacturer's responsibility and the warranty

§ With reference to the contents of this manual **DONATI SOLLEVAMENTI S.r.l.** declines any **responsibility** in case of:

- use of the jib crane contrary to the national safety and accident prevention laws
- erroneous choice of the building site or buildings in which the jib crane is to be operated
- voltage and power supply faults
- lack of or erroneous observation of the instructions supplied in this manual
- non-authorized modifications to the machine
- use (of the machine) by untrained or unsuitable staff

§ To be able to use the **warranty**, the certification of which is shown below, the Customer must scrupulously follow the instructions indicated in this manual, and in particular:

- always work within the use limits of the jib crane
- always carry out constant, diligent maintenance
- appoint operators of proven capability, who have been adequately trained for the job to use the machine
- use solely original spare parts indicated by the manufacturer



•The intended use and configurations of the hoist are the only ones allowed.

Do not try to use the hoist disregarding the supplied instructions.

•The instructions in this manual do not replace but add to the obligations regarding the current legislation for accident prevention standards.

2. - DESCRIPTION OF THE MACHINE AND TECHNICAL INFORMATION

2.1 Manual rotation jib cranes with articulated arm

2.1.1 Intended use - Foreseen use - Designated use

§ The **jib cranes with articulated arm**, manual rotation, “Column” version CBB series and “Wall” version MBB series, are produced to move goods within the plant.

§ The **jib cranes** have two functions:

- **Lifting** a load vertically, by means of the hook of the lifting block, generally made of a manual or electric chain hoist and using the appropriate accessories for such an operation;
- **Rotating** a load around the constraint axis of the jibs, by manually pushing the load, in the circular area below, delineated by the rotation radius of the jibs.

2.1.2 Constraints when installing

§ The **CBB column-mounted jib cranes** are intended to be fixed to the ground, the column is self-supporting and can be fixed to the ground using log bolts, on a foundation plinth or in special cases having checked suitability, also with screw anchors or dowelling.

§ The **MBB wall-mounted jib cranes** are intended to be fixed to an existing structure (columns, walls, machine casing, etc), using a system of brackets and staybolts, either with fixing screws or, subject to a check, with screw anchors or dowelling.



In both cases (column-mounted and wall-mounted cranes) the user MUST check, directly or using specialised staff, the suitability of the surfaces to be fixed on. These surfaces must guarantee the stability and safety of the crane in all its working conditions, supporting the lifting operations and the dynamic effects of the tilting momentum and of the type and speed of lifting.

2.1.3 The composition of the jib cranes

§ The composition of the jib crane is relatively simple, both in the column-mounted version and the wall-mounted one. Both have a steel structure, the lifting block made up of a chain hoist (electric or manual), the translation unit formed by a hoist-carrying trolley (electric or push-trolley), a series of accessories (support brackets, staybolts, foundation plinth, electric unit, etc.).

§ The **CBB column-mounted** jib crane consists of a tubular column with polygonal section fixed using log bolts or bolts at the base of appropriate size and an articulated arm which rotates round the axis of the column itself.

§ The **MBB wall-mounted** jib crane consists of a bracket support structure which is bolted on the support structure (fixed to the wall or anchored to a column) and an articulated arm which rotates around an axis on the support bracket.

§ Both versions are equipped, in most cases, with a chain hoist.

§ Column (CBB column-mounted version):

Made of pressed steel bent in a tubular structure with a polygonal shape it allows a high rigidity and stability for the crane; it is fixed to the base using a base plate and a system of bolts or log bolts. In the upper part a couple of plates support the arm of the crane and allow it to rotate (fig.1).

§ Support bracket (MBB wall-mounted version):

It is formed of a couple of plates made of pressed steel; fixed to the wall or anchored to a column using staybolts or screws, it acts as a support to the arm and allows it to rotate.(fig. 2).

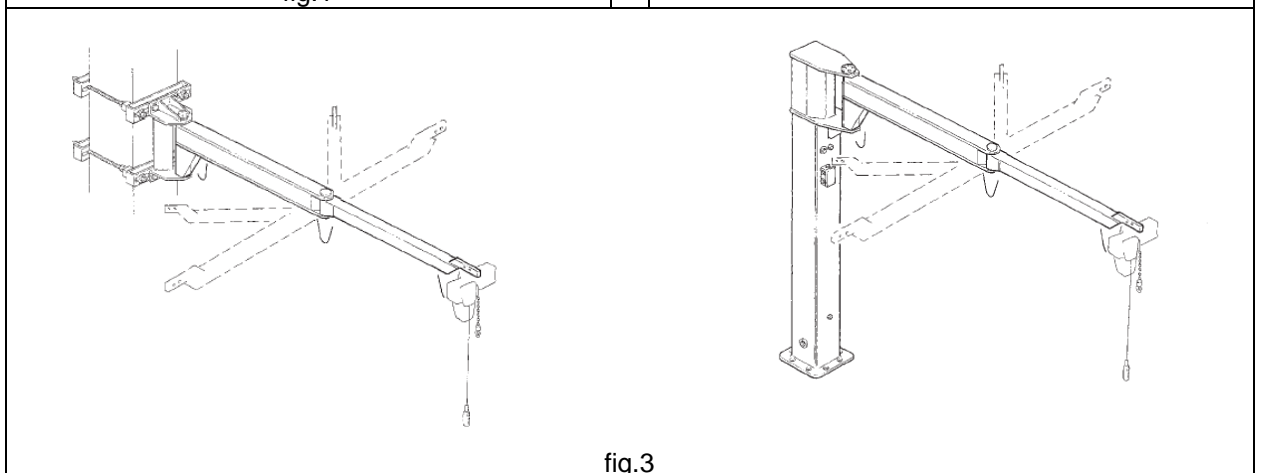
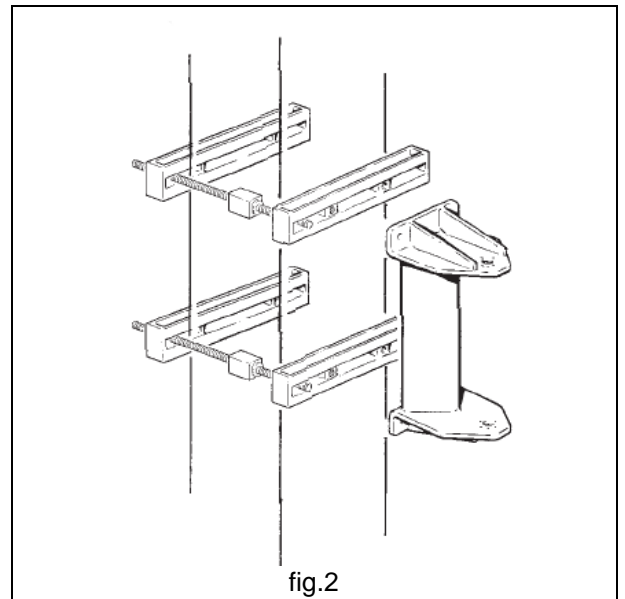
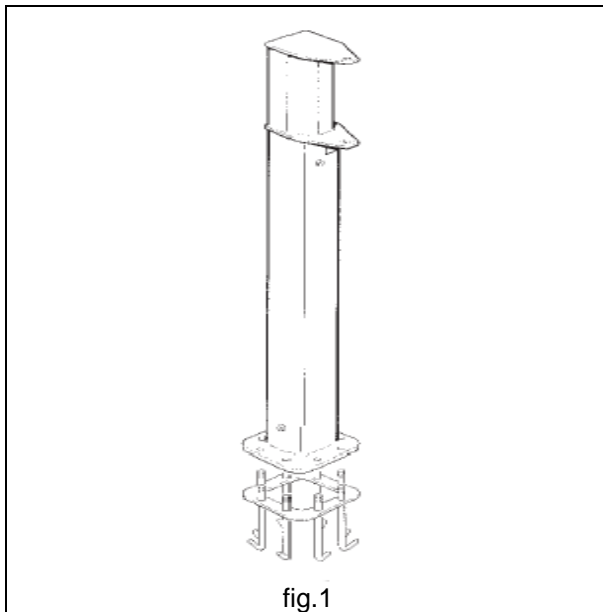
§ articulated jib:

The jib cranes, both in the wall and column versions, are fitted with an “articulated arm” composed by two segments (semi-arms) fastened.

The articulated arm is made using two cantilevered girders. The semi-arm on the “tie” side is generally made in boxes casing, while the “cantilever” side can be made using a T-beam or a tubular profile in which end is fixed the hoist.(fig. 3)

The first segment, semi-arm on the tie side, rotates around the axis situated on the column or on the bracket where it is fastened. The second segment, semi-arm on the cantilever side, rotates on the ends of the first segment and is fitted with a planarity regulation system. The two semi-arms can be of different lengths and are able to rotate independently of each other. Reciprocal mobility, thanks to the “pantograph” effect, allows the lifting equipment to reach any point in the area to be served, avoiding any obstacles to the rotation as well as increasing the surface area served behind the column or fixing pillar of the bracket.

The entire articulated arm is directly integral with, via suitable reinforcements, the rotation tube. The two semi-arms, rotating on their own rotation axes via bearings, allow the optimal use of the available space at a height due to the absence of staybolts.



§ The braking device of the arm:

It is made up of a clutch system with asbestos-free material, which allows the regulating of the rotating strain of the arm and ensures its positioning stability.

§ Electric power supply:

This powers the hoist and for the connection between the line and the power cable has terminal box near the support bracket in the MBB wall version.

The distribution of energy takes place via round multipolar flexible cable inserted in a channel welded under the flange of the jib.

A main on/off line switch which is padlocked is positioned on the column in the CBB version.

§ Foundation frame with log bolts:

This is supplied on request in the column-mounted version, for the fixing of the column itself to the base (foundation plinth). (fig.5).

§ Brackets and staybolts unit:

Used for fixing to a pillar in the wall-mounted version, it is available on request. It is fitted with a system of pressure screws to guarantee the best adherence of the staybolts to the pillar (fig.6).

§ Finish:

The protection of the steel structures from atmospheric and environmental agents (powders, gas, etc.) is guaranteed by the treatments which use yellow enamel paint, subject to preparation of the surfaces with metallic sanding of SA grade.

§ Lifting and translation unit:

The manually-rotated jib cranes with articulated arm in the column-mounted or wall-mounted version can be equipped with a chain hoist in electric or manual version.

For the measurements, weights and maximum admissible reactions on the wheels of the trolleys see the related table in paragraph "Technical data" to paragraph 2.2.

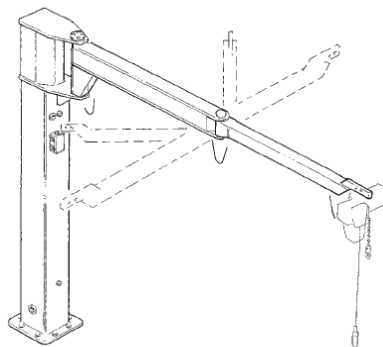


fig.4

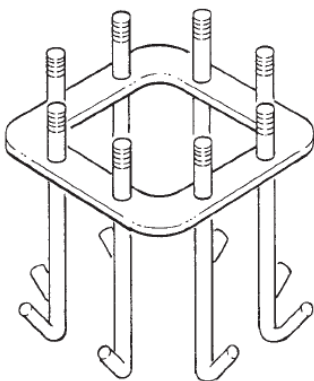


fig.5

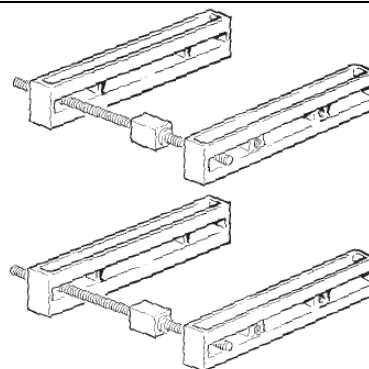


fig.6

§ The conception and construction:

The manually rotated jib cranes with articulated arm in the CBB column-mounted version and the MBB wall-mounted version are designed according to the conception of the modular components which put together in relation to commercial needs, as well as the standard models always available from the warehouse, allow the rapid economical realisation of numerous normalised and special executions.

The base, column, bracket and arms components, thanks to their extreme compactness are assemblable together, so as to guarantee the maximum use of the hook run and, thanks to the minimal side clearance allow an optimal use of the area in which the jib crane operates.

The construction uses the most advanced technology which is based on production processes of high industrialization and allows the realization, using economies of scale, of totally reliable and technically innovative machines. The high level of quality is guaranteed and controlled by the company quality system according to the UNI EN ISO 9001:2008 standard.

2.2 Technical information and service conditions

2.2.1 Safety reference list

§ In the planning and construction of the manually rotated jib cranes with articulated arm, column-mounted series CBB and wall-mounted series MBB the following standards and principal technical regulations have been taken into account :

- EN ISO 12100: 2010 – Safety of the machinery
- EN ISO 13849-1/2008 General principles for design
- EN 60204 – 32/2009 – Safety of machinery electrical equipment of machines
- EN 60529/97 – Degrees of protection provided by enclosures (IP code).
- ISO 4301-1/88 – Lifting equipment classification.
- FEM 1.001/98 - Rules for the design of hoisting appliances
- FEM 9.511/86 - Classification of mechanisms
- FEM 9.755/93 – Measures for achieving safe working periods for serial hoists units (S.W.P.)
- FEM 9.941/95 – Graphical symbols for control devices

2.2.2 Protection and insulation of electrical parts

- Cables: CEI 20/22 II - Maximum insulation voltage 450/750 V

2.2.3 Electrical power supply

- The jib cranes are designed to be powered with alternating electric current with maximum three-phase voltage of 600 V

2.2.4 Environment conditions of use

- Temperature of use: minimum –10° C; maximum +40° C
- Maximum relative humidity: 80%
- The machine must be placed in a well-ventilated place, free from corrosive vapours (acid vapours, salina cloud, etc.).



- It is forbidden to use the machine in an explosive environment or one which is potentially so, or where the use of flameproof equipment is prescribed.
- It is necessary to allocate sufficient working space to ensure the safety of the operator and of the maintenance staff.

2.2.5 Noise - Vibrations

- The jib cranes with articulated arm, being manually rotated, do not create noise during the movement of the flexing of the arm.
- The vibrations produced by the jib crane, during the manual rotation of the arm, are practically nil and in any case not dangerous for the health of the staff who operate them.
- Excessive noise or vibration can be caused by a fault which must be immediately notified and eliminated so as not to compromise the reliability of the jib crane.

2.2.6 Criteria of use and conditions of use

§ The necessary indispensable conditions to obtain the full functional responsiveness of the jib crane for the service it is intended, as well as its optimal and lasting functioning, are in the correct choice of the model of machine. This choice must be made in relation to the real service performance required as well as the environmental conditions in which the jib crane will have to operate.

§ The parameters which must be carefully considered in the choice of jib crane are:

The lifting capacity: this must be determined by the weight of the maximum load to be lifted and must never be.

The functional dimensions: the height of the arm which determines the hook run of the hoist and the range must be selected so as to guarantee the functional coverage of the space to be used considering the surrounding clearance.

The nature of the load: the nature of the load determines for its positioning the choice of the speeds of movement (lifting) suited to the task. In some cases it is indispensable to use two-speed hoists with a slow positioning speed.

The area to be used in: the jib crane with articulated arm features in its conception intrinsic high elasticity which becomes even more evident when it is used for moving loads close to the maximum load and/or with prevalent localisation in the ends of the arm.

The environment to be used in: the jib cranes with articulated arm are intended for service indoors and/or in a covered area, sheltered from bad weather and away from wind. In the case of use outdoors adequate steps must be taken in relation to the surface treatment (sanding, varnishing) as well as a system of stopping brake.

The frequency of use : if the use is very intense (frequent manoeuvres and/or repeated ones) with loads close to the maximum lifting capacity, the consequent fatigue of the operator due to the manual movements must be taken into account.



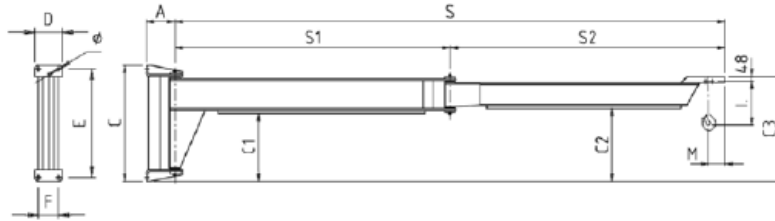
- The correct evaluation of the parameters indicated above, in the case of the parameters being close to the upper limits, can lead to the need to use a crane with higher performance features which, once gone beyond, can guarantee more rigidity and fewer translating and rotating strains.

2.2.7 Characteristics and technical data - Weights - Reactions on constraints

WALL-MOUNTED JIB CRANES WITH ARTICULATED ARM, WITH FIXED HOIST – MBB SERIES



Wall-mounted jib crane
Rotation 360°

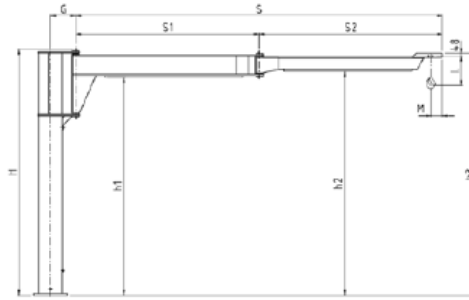


LIFTING CAPACITY (kg)	ARM S m	SIZE OF JIB CRANE	TYPE	WALL-MOUNTED JIB CRANES WITH ARTICULATED ARM, WITH FIXED HOIST - MBB SERIES														WEIGHT JIB CRANE kg
				OVERALL DIMENSIONS (mm)												ADDED HOIST		
				S1	S2	A	C	C1	C2	C3	D	E	F	Ø	M			
125	3	A	A01A3A	1000	2000	225	644	200	373	591	200	594	150	15	180	1	275	114
			A01A3B	1500	1500	225	644	200	373	591	200	594	150	15	180	1	275	138
			A01A3C	2000	1000	225	644	200	373	591	200	594	150	15	180	1	275	160
	4	B	A01B4A	1000	3000	225	644	200	333	591	200	594	150	15	180	1	275	141
			A01B4B	1500	2500	225	644	200	333	591	200	594	150	15	180	1	275	163
			A01B4C	2000	2000	225	644	200	373	591	200	594	150	15	180	1	275	171
	5	B	A01B5A	2000	3000	225	644	200	333	591	200	594	150	15	180	1	275	198
			A01B5B	2500	2500	225	644	200	333	591	200	594	150	15	180	1	275	220
			A01B5C	3000	2000	225	644	200	373	591	200	594	150	15	180	1	275	230
	6	C	A02C6B	2500	3500	280	930	455	592	850	250	870	190	22	180	1	275	326
			A02C6C	3000	3000	280	930	455	592	850	250	870	190	22	180	1	275	361
7	C	A02C7A	3000	4000	280	930	455	572	850	250	870	190	22	180	1	275	389	
		A02C7B	3500	3500	280	930	455	592	850	250	870	190	22	180	1	275	410	
250	3	B	A01B3A	1000	2000	225	644	200	333	591	200	594	150	15	180	1-2	275-310	124
			A01B3B	1500	1500	225	644	200	333	591	200	594	150	15	180	1-2	275-310	145
	4	C	A02C4A	1000	3000	280	930	455	552	850	250	870	190	22	180	1-2	275-310	218
			A02C4C	2000	2000	280	930	455	592	850	250	870	190	22	180	1-2	275-310	258
	5	C	A02C5A	2000	3000	280	930	455	552	850	250	870	190	22	180	1-2	275-310	295
			A02C5B	2500	2500	280	930	455	552	850	250	870	190	22	180	1-2	275-310	324
	6	D	A02D6B	2500	3500	280	930	455	552	850	250	870	190	22	180	1-2	275-310	348
			A02D6C	3000	3000	280	930	455	552	850	250	870	190	22	180	1-2	275-310	380
	7	D	A02D7A	3000	4000	280	930	455	552	850	250	870	190	22	180	1-2	275-310	405
			A02D7B	3500	3500	280	930	455	552	850	250	870	190	22	180	1-2	275-310	432
500	3	C	A02C3A	1000	2000	280	930	455	592	850	250	870	190	22	180	2	310	182
			A02C3F	1000	2000	280	930	455	592	850	250	870	190	22	190	3	378	182
			A02C3B	1500	1500	280	930	455	592	850	250	870	190	22	180	2	310	215
			A02C3G	1500	1500	280	930	455	592	850	250	870	190	22	190	3	378	215
	4	D	A02D4A	1000	3000	280	930	455	552	850	250	870	190	22	180	2	310	218
			A02D4F	1000	3000	280	930	455	552	850	250	870	190	22	190	3	378	218
			A02D4C	2000	2000	280	930	455	592	850	250	870	190	22	180	2	310	258
			A02D4H	2000	2000	280	930	455	592	850	250	870	190	22	190	3	378	258
	5	D	A02D5A	2000	3000	280	930	455	552	850	250	870	190	22	180	2	310	295
			A02D5F	2000	3000	280	930	455	552	850	250	870	190	22	190	3	378	295
			A02D5B	2500	2500	280	930	455	552	850	250	870	190	22	180	2	310	324
			A02D5G	2500	2500	280	930	455	552	850	250	870	190	22	190	3	378	324
	6	E	A03E6A	2000	4000	315	1240	725	780	1118	300	1160	220	34	180	2	310	518
			A03E6F	2000	4000	315	1240	725	780	1118	300	1160	220	34	190	3	378	518
			A03E6C	3000	3000	315	1240	725	820	1118	300	1160	220	34	180	2	310	575
			A03E6H	3000	3000	315	1240	725	820	1118	300	1160	220	34	190	3	378	575
	7	E	A03E7A	3000	4000	315	1240	725	780	1118	300	1160	220	34	180	2	310	633
			A03E7F	3000	4000	315	1240	725	780	1118	300	1160	220	34	190	3	378	633
A03E7B			3500	3500	315	1240	725	780	1118	300	1160	220	34	180	2	310	683	
A03E7G			3500	3500	315	1240	725	780	1118	300	1160	220	34	190	3	378	683	

COLUMN-MOUNTED JIB CRANES WITH ARTICULATED ARM, WITH FIXED HOIST – CBB SERIES



Column-mounted jib crane
Rotation 360°



LIFTING CAPACITY (kg)	ARM S m	SIZE OF JIB CRANE	HEIGHT H mm		TYPE	COLUMN-MOUNTED JIB CRANE WITH ARTICULATED ARM, WITH FIXED HOIST - CBB SERIES OVERALL DIMENSIONS (mm)												WEIGHT	
			BASE	MAX.		UNDER BEAM									ADDED HOIST		JIB CRANE kg	COLUMN BY m kg	
						h1	h2	h3	S1	S2	G	M	Δ	DMK	HEIGHT I				
125	3	R	3020	5020	A30R3A	2603	2777	2995	1000	2000	228	180	32	1	275	166	18.2		
			3020	5020	A30R3B	2603	2777	2995	1500	1500	228	180	32	1	275	190	18.2		
			3020	5020	A30R3C	2603	2777	2995	2000	1000	228	180	32	1	275	212	18.2		
	4	S	3020	5020	A30S4A	2603	2737	2995	1000	3000	274	180	32	1	275	215	22.8		
			3020	5020	A30S4B	2603	2737	2995	1500	2500	274	180	32	1	275	237	22.8		
			3020	5020	A30S4C	2603	2777	2995	2000	2000	274	180	32	1	275	245	22.8		
			3020	5020	A30S5A	2603	2737	2995	2000	3000	274	180	32	1	275	272	22.8		
	5	S	3020	5020	A30S5B	2603	2737	2995	2500	2500	274	180	32	1	275	294	22.8		
			3020	5020	A30S5C	2603	2777	2995	3000	2000	274	180	32	1	275	304	22.8		
	6	T	3525	5525	A35T6B	3083	3220	3478	2500	3500	323	180	42	1	275	450	35		
			3525	5525	A35T6C	3083	3220	3478	3000	3000	323	180	42	1	275	485	35		
	7	T	3525	5525	A35T7A	3083	3200	3478	3000	4000	323	180	42	1	275	513	35		
			3525	5525	A35T7B	3083	3220	3478	3500	3500	323	180	42	1	275	534	35		
250	3	S	3020	5020	A30S3A	2603	2737	2995	1000	2000	274	180	32	1-2	275-310	198	22.8		
			3020	5020	A30S3B	2603	2737	2995	1500	1500	274	180	32	1-2	275-310	220	22.8		
	4	T	3525	5525	A35T4A	3083	3180	3478	1000	3000	323	180	42	1-2	275-310	342	35		
			3525	5525	A35T4C	3083	3220	3478	2000	2000	323	180	42	1-2	275-310	382	35		
	5	T	3525	5525	A35T5A	3083	3180	3478	2000	3000	323	180	42	1-2	275-310	419	35		
			3525	5525	A35T5B	3083	3180	3478	2500	2500	323	180	42	1-2	275-310	448	35		
	6	U	3525	5525	A35U6B	3083	3180	3478	2500	3500	386	180	42	1-2	275-310	520	43.5		
			3525	5525	A35U6C	3083	3180	3478	3000	3000	386	180	42	1-2	275-310	552	43.5		
	7	U	3525	5525	A35U7A	3083	3180	3478	3000	4000	386	180	42	1-2	275-310	577	43.5		
			3525	5525	A35U7B	3083	3180	3478	3500	3500	386	180	42	1-2	275-310	604	43.5		
500	3	T	3525	5525	A35T3A	3083	3220	3478	1000	2000	323	180	42	2	310	306	35		
			3525	5525	A35T3F	3083	3220	3478	1000	2000	323	190	42	3	378	306	35		
			3525	5525	A35T3B	3083	3220	3478	1500	1500	323	180	42	2	310	339	35		
			3525	5525	A35T3G	3083	3220	3478	1500	1500	323	190	42	3	378	339	35		
			3525	5525	A35U4A	3083	3180	3478	1000	3000	386	180	42	2	310	390	43.5		
	4	U	3525	5525	A35U4F	3083	3180	3478	1000	3000	386	190	42	3	378	390	43.5		
			3525	5525	A35U4C	3083	3220	3478	2000	2000	386	180	42	2	310	430	43.5		
			3525	5525	A35U4H	3083	3220	3478	2000	2000	386	190	42	3	378	430	43.5		
			3525	5525	A35U5A	3083	3180	3478	2000	3000	386	180	42	2	310	467	43.5		
	5	U	3525	5525	A35U5F	3083	3180	3478	2000	3000	386	190	42	3	378	467	43.5		
			3525	5525	A35U5B	3083	3180	3478	2500	2500	386	180	42	2	310	496	43.5		
			3525	5525	A35U5G	3083	3180	3478	2500	2500	386	190	42	3	378	496	43.5		
			4025	6025	A40V6A	3565	3620	3958	2000	4000	443	180	45	2	310	796	64		
	6	V	4025	6025	A40V6F	3565	3620	3958	2000	4000	443	190	45	3	378	796	64		
			4025	6025	A40V6C	3565	3660	3958	3000	3000	443	180	45	2	310	853	64		
			4025	6025	A40V6H	3565	3660	3958	3000	3000	443	190	45	3	378	853	64		
			4025	6025	A40V7A	3565	3620	3958	3000	4000	443	180	45	2	310	911	64		
	7	V	4025	6025	A40V7F	3565	3620	3958	3000	4000	443	190	45	3	378	911	64		
			4025	6025	A40V7B	3565	3620	3958	3500	3500	443	180	45	2	310	961	64		

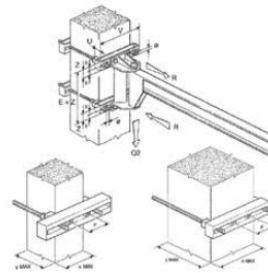
FIXING SYSTEMS FOR JIB CRANES

BRACKET AND STAYBOLTS UNIT FOR GBP/MBB/MBE SERIES WALL-MOUNTED CRANES

SIZE		A	B	C	D	E	F
Reactions (kN)	Q2	2.95	5	9.2	16.85	26.10	28.2
	R	11.9	21.75	27.05	49	66.8	120

TYPE OF BRACKET			01	02	03
Ø Staybolts/screws			M16	M20	M30
Clamping torques (Nm)	Staybolts		128	250	857
	Screws		205	400	1370
Code			GBK010110	GBP020110	GBP030110
Bracket Type: Short (mm)	U		50	60	80
	V		420	490	532
	Z		75	90	135
	Weight (kg)		21	36	75
Pillar dimensions (mm)	x	min	200	250	300
		max	330	400	400
	y	max	850	810	750
Code			GBK010120	GBP020120	GBP030120
Bracket Type: Medium (mm)	U		50	80	100
	V		550	640	682
	Z		75	120	145
	Weight (kg)		26	60	96

TYPE OF BRACKET			01	02	03
Ø Staybolts/screws			M16	M20	M30
Pillar dimensions (mm)	x	min	200	250	400
		max	460	550	550
	y	max	850	770	710
Code			GBK010130	GBP020130	GBP030130
Bracket Type: Long (mm)	U		60	80	120
	V		740	840	882
	Z		85	120	155
Weight (kg)			40	74	132
Pillar dimensions (mm)	x	min	460	550	550
		max	650	750	750
	y	max	830	770	670



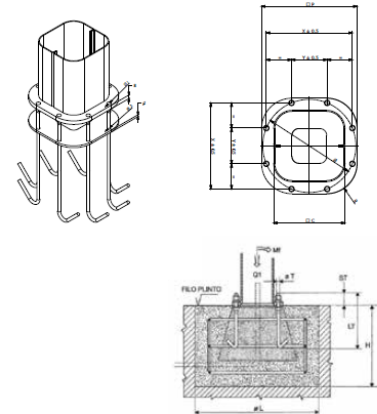
N.B.: The bracket and staybolts unit, used in the wall-mounted version for fixing the bracket to a pillar, is available on request.

BASE PLATES, FOUNDATION FRAMES AND PLINTHS FOR GBA/CBB/CBE SERIES COLUMN-MOUNTED CRANES

SIZE		R	S	T	U	V	Z
Code foundation set		GBK1R0260	GBK1S0260	GBK1T0260	GBK1U0260	GBK1V0260	GBK1Z0260
Base plate and foundation frame (mm)	☐C	205	258	296	372	435	515
	☐P	275	340	380	475	555	660
	S1	15	15	15	20	20	25
	S2	8	8	8	8	8	8
	x	247	305	345	432	506	599
	y	103	126	143	179	210	248
	Ø	268	330	373	468	548	648
	r	88	104	116	145	165	197
	Ø1	16	20	20	25	29	35
	Ø2	13	17	17	21	25	31
Lug bolts (mm)	Ø T	M12	M16	M16	M20	M24	M30
	LT	400	450	450	550	600	700
	ST	40	45	45	55	60	75
Clamping torques (Nm)		45	105	105	200	350	680
Frame/bolt weight (kg)		8	13	14	23	35	61
Foundation plinth (mm)	☐L	1200	1300	1400	1700	2000	2400
	H	800	800	900	900	1100	1100
Reaction (kN)	Q1	3.3	5.7	10.15	18.4	28.7	29.35
Momentum (kNm)	MF	12	21	31	57	107	164

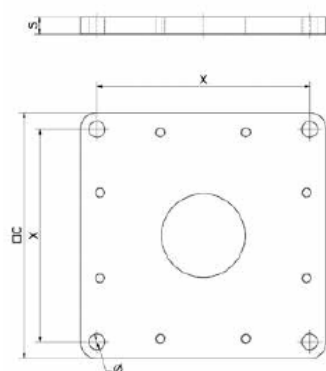
The dimensions of the plinths are purely indicative!

The plinth must be dimensioned by expert, qualified technicians considering the real consistency of the ground and the maximum pressure it can withstand.



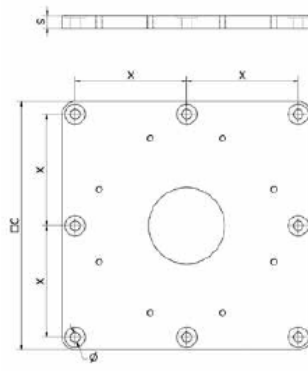
N.B.: The foundation frames with lug bolts, used in the column-mounted version for fixing the column itself to the foundation plinth is supplied on request.
* M= 1,11; ψ= 1,15

COUNTERPLATES FOR FIXING TO THE FLOOR WITH CHEMICAL BOLTS OF THE GBA/CBB/CBE COLUMN-MOUNTED CRANES



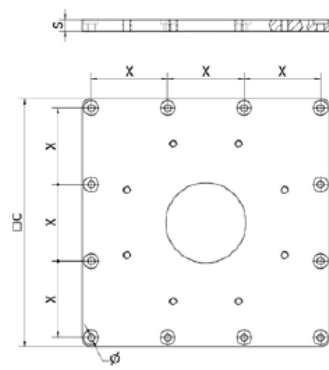
Nr. 4 Chemical bolts

COUNTERPLATES R - S



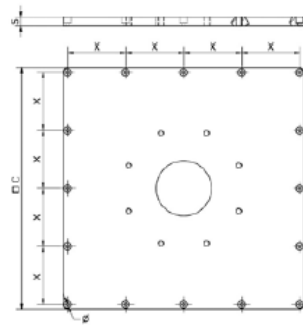
Nr. 8 Chemical bolts

COUNTERPLATES T



Nr. 12 Chemical bolts

COUNTERPLATES U - V - Z1



Nr. 16 Chemical bolts

COUNTERPLATES Z2

The fixing of the column using chemical bolts, needs a scrupulous check of suitability in relation to the type of support flooring. The suitability checks are the responsibility of the user and must be carried out by expert, qualified technicians who will evaluate the feasibility and formally undertake the relative responsibilities.

SIZE		R	S	T	U	V	Z1	Z2
Counter plate and chemical bolts code		GBA2R0KPS	GBA2S0KPS	GBA2T0KPS	GBA2U0KPS	GBA2V0KPS	GBA2Z1KPS	GBA2Z2KPS
Counterplate dimensions (mm)	□ C	295	445	490	680	995	1130	1310
	S	20	20	25	30	40	40	50
	x	255	395	220	210	315	360	315
	Nr x Ø	4x19	4x19	8x19	12x19	12x19	12x19	16x19
Counterplate weight (kg)		15	30	45	100	285	375	640
Maximum tilting movement allowed (kNm)		Mf*	11,8	20,7	31,2	56,7	107,3	135,6
Fixing characteristics	Type of concrete of the floor: Class Fck/Rck minimum (N/mm ²)	C20/25	C20/25	C20/25	C20/25	C20/25	C20/25	C20/25
	Minimum floor thickness (mm)	170	170	170	170	170	170	170
	Diameter of hole in the floor (mm)	18	18	18	18	18	18	18
	Depth of the hole in floor's concrete (mm)	135	135	135	135	135	135	135
	Clamping torque of the bolts (Nm)	60	60	60	60	60	60	60
	Dowel height from top plate surface (mm)	45	45	40	35	25	25	15

3. - SAFETY AND ACCIDENT PREVENTION

§ The manually rotated jib cranes with articulated arm, series CBB column-mounted and wall-mounted series MBB and accessories have been designed and manufactured using the most modern technical knowledge and can be used safely.

§ The dangers for persons working with them can be totally eliminated and/or notably reduced only if the jib crane is used by authorised staff who are appropriately trained and sufficiently prepared in accordance with the instructions in this documentation.



THE STAFF ARE RESPONSIBLE FOR THE FOLLOWING OPERATIONS:

§ Completing the jib crane with any missing parts and installing it (e.g. hoist, electric controls, fixing accessories, etc.)

§ Setting up the crane and, in any case, the managing of its functioning.

§ Inspections and checks of the crane and its components, before starting up the machine, during its functioning or also after it stops.






§ Maintenance of the crane, the checking and the repair and/or replacement of its components.

§ Staff must be completely informed about the potential dangers in the execution of their duties, both regarding the functioning and the correct use of safety measures available on the machine.

§ These staff must, moreover follow the safety regulations carefully, as described in this chapter, to prevent dangerous situations occurring.

3.1 Qualifications of qualified operators

§ The following table is designed to define more clearly the field of intervention and the consequent assumption of responsibility of every single OPERATOR, given their specific training and qualification obtained. It shows with a pictogram the professional figures necessary for every kind of intervention.

PICTOGRAM	OPERATOR PROFILE
 OPERATOR	Jib crane operator: Persons qualified to perform simple tasks, that is the driving of the crane by use of the controls and the loading and unloading of the materials to OPERATOR be moved.
 MECHANICAL MAINTENANCE OFFICER	Mechanical maintenance officer: Qualified persons able to intervene on the crane in normal conditions, to carry out normal adjustments to the mechanisms, ordinary maintenance checks and mechanical repairs.
 ELECTRICAL MAINTENANCE OFFICER	Electrical maintenance officer: Qualified persons able to intervene on the crane in normal conditions and for normal interventions of an electrical nature, adjustments, maintenance and repairs. This person can operate with the presence of current in the control boards.
 MECHANICAL TECHNICIAN	Mechanical technician: Qualified technician authorised to carry out operations of a complex and exceptional mechanical nature.
 ELECTRICAL TECHNICIAN	Electrical technician: Qualified technician authorised to carry out operations of a complex and exceptional electrical nature.

3.2 General safety regulations

§ Before putting the jib crane into service it is necessary:






- to read the technical documentation carefully;
- to find out about the functioning and the positioning of the emergency stopping devices;
- to know which safety devices are installed on the jib crane and where they are positioned;



§ Some activities to be carried out on functioning components (e.g. replacing a hoist chain) expose the operators to situations of grave danger, so it is necessary to adhere strictly to the following rules:







- Staff must be authorised and properly trained regarding the operating procedures to follow, the dangerous situations that could occur and the correct methods for preventing them.
- If ,exceptionally, staff have to deactivate completely or partially, open or remove the protective covers to allow a particular specialised technical intervention of maintenance, inspection or repair to be carried out, it will be their precise duty to put back immediately the relevant protective covers at the end of the intervention. The staff in charge must make sure that at the end of the intervention mechanical parts, tools or other devices used are not forgotten on the crane, since this may provoke damages or malfunctions.
- Staff in charge of maintenance, inspection and repair operations must use all the necessary and possible preventive safety measures before beginning work for their own safety, and in particular, they must check that:
- The jib crane is deactivated and the appropriate preventive measures have been taken (signs, blocking controls etc.) to avoid the accidental starting. To allow the execution of a technical intervention on an electric device, in the presence of voltage current, pay the maximum attention and operate with extreme caution.


3.3 Safety symbols

§ In the manual and in danger zones, signs and pictograms are used to underline or bring attention to potentially dangerous situations due to residual risks, or to actions which must be performed obligatorily according to the safety procedures shown in this manual.

SIGNS USED TO INDICATE DANGERS	
SIGN	MEANING
 DANGER PARTS WITH LIVE TENSION	Signals the presence of live voltage and is fixed to electrical equipment and on any structure which has live electrical voltage inside.
 GENERAL DANGER	Warning: general danger (accompanied by diagram which indicates what kind of danger)
 DANGER OF CRUSHING	Warning danger of crushing due to mechanical machine-parts in movement.
 DANGER OF ENTANGLEMENT	Warning danger of entanglement or dragging from machine-parts in motion (chains, wheels, etc.)
 DANGER FROM SUSPENDED LOADS	Warning danger from suspended loads being moved by the crane.



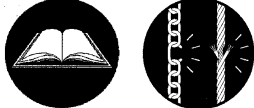



SIGNS USED TO INDICATE BANS	
SIGN	MEANING
 IT IS FORBIDDEN TO REMOVE THE PROTECTION	It is forbidden to remove the safety devices on a machine in motion.
 IT IS FORBIDDEN TO MANOEUVRE	It is forbidden to carry out manoeuvres during maintenance phases of moving machine-parts.







SIGNS USED TO INDICATE OBLIGATIONS	
SIGN	MEANING
 CONSULT THE MANUAL	Consult the manual when you see, preceding or positioned inside an indication (instructions, settings, maintenance, etc.)
 GLOVES MUST BE WORN	It is compulsory to wear protection gloves.
 HELMETS MUST BE WORN	It is compulsory to wear safety helmets.
 PROTECTIVE FOOTWEAR MUST BE WORN	It is compulsory to wear non-slip protective footwear.
 SAFETY HARNESSES MUST BE WORN	It is compulsory to wear safety harnesses in operations at a height with the risk of falling down.
 CHECK LIFTING OF THE MACHINE-PARTS	The preventive checking of wire ropes, hooks, safety harnesses and accessories used for lifting and manoeuvring is compulsory.

SIGNS USED FOR SAFETY INDICATIONS	
SIGN	MEANING
 AUXILIARY ILLUMINATION	For the interventions indicated the use of auxiliary illumination is recommended.

3.4 Warning about remaining risks

§ Having carefully considered the possible dangers in all the operating phases of the jib crane, necessary measures have been taken to eliminate, as far as possible, risks to the operators and/or limit or reduce the risks derived from dangers not totally eliminable at source. Nevertheless, despite all the precautions taken, the following **remaining risks** which are eliminable or reducible with the relevant prevention activities, still exist:

RISKS DURING USE		
DANGER / RISK	BAN / WARNING	OBLIGATION / PREVENTION
 <p>Risk from danger of crushing during the manoeuvring of loads suspended when the operator or other staff are in relevant zones/areas in the path of the load</p>	 <ul style="list-style-type: none"> • It is forbidden to lift loads while people are passing through the related manoeuvre area. • It is forbidden to transit, remain or manoeuvre under the suspended load. 	 <ul style="list-style-type: none"> • The operator must follow the indications to obtain maximum safety by observing the indications in this manual. • Obligation to do periodical checks of the wire rope and the hook.
 <p>Risk from dangers of entanglement and/or crushing after contact with the rotating arm and/or moveable parts of the hoist.</p>	 <ul style="list-style-type: none"> • Warning! Exposure to the parts in motion can create dangerous situations. • It is forbidden to touch the crane arm and the hoist in motion or to stand in their path. 	 <ul style="list-style-type: none"> • Obligation to use protective gloves during the phases of positioning of the harness and when moving the load by pushing it.

RISKS DURING MAINTENANCE		
DANGER / RISK	BAN / WARNING	OBLIGATION / PREVENTION
 <p>Risk from danger of electrocution electric shock during maintenance of electrical equipment without having deactivated the electric power supply.</p>	 <ul style="list-style-type: none"> • It is forbidden to intervene on electrical equipment before having switched off the jib crane from the electric power line 	 <ul style="list-style-type: none"> • Entrust electrical maintenance operations to qualified staff. • Carry out checks on electrical equipment prescribed in the manual
 <p>Risk from crushing in case of contact with the rotating arm during braking.</p>	 <ul style="list-style-type: none"> • Warning! Exposure to the parts in motion can create dangerous situations. 	 <ul style="list-style-type: none"> • Entrust electrical maintenance operations to qualified staff. • Carry out checks on electrical equipment prescribed in the manual

3.5 Safety measures and instructions

3.5.1 Control devices

§ **The manually rotated jib cranes with articulated arm**, in the CBB column-mounted version and the MBB wall-mounted version can be controlled in the following ways:

1 If fitted with an **electric hoist** the movements are activated:

***by a push-button panel** with ascent and descent buttons to control the lifting movement.

2 If fitted with a **manual hoist** the movements are activated:

***by mechanical working of the chain** of the hoist for the lifting movement.

3 In all cases the **rotation movement of the jib crane arm**, both in a clockwise and anti-clockwise direction, is activated manually, with a **pushing flexing of the load**.


3.5.2 Safety and emergency devices

§ **The manually rotated jib cranes with articulated arm** in the CBB column-mounted version and the MBB wall-mounted version, are fitted with the following safety and emergency devices:

1. **Rotating brake**, by friction, which allows the regulation of the arm's rotating force and ensures the stability of positioning.
2. **Anti-collision device, available on request**, to avoid the telescoping of two or more arms which, operating in the same area, can interfere with each other; or to avoid the collision of the arm with surrounding structures.

3.5.3 Warning and signalling devices - List of labels

§ The manually rotated jib cranes with articulated arm, column-mounted series CBB and wall-mounted series MBB, are fitted with the following devices:

- **Labels** on the machine:
 - logotype of the manufacturer: 
 - label of jib crane data with the CE marque
 - label indicating the maximum lifting capacity of the jib crane
 - warning labels about remaining risks
 - labels of the hoist

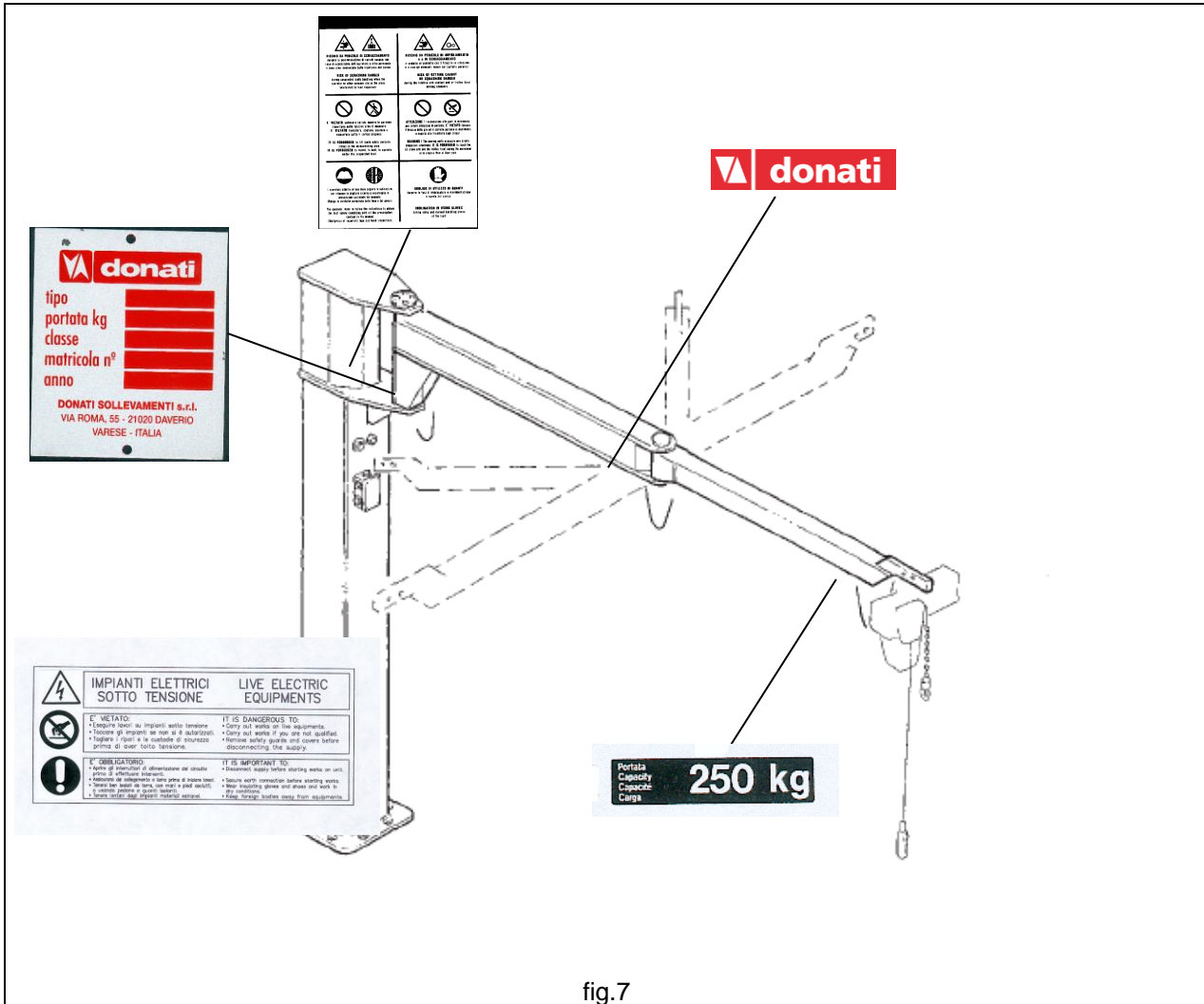


fig.7

§ Legibility and conservation of the labels

The labels and the data written on them must always be kept legible and must be periodically cleaned. If a label deteriorates and/or is no longer legible, even only in one of the shown elements, then we recommend requesting another from the manufacturer, quoting the data contained in this manual or on the original label, and providing for its replacement.



The labels must not be removed and it is absolutely forbidden to put other labels on the crane without previous authorization by DONATI SOLLEVAMENTI S.r.l.

4. - HANDLING - INSTALLATION - PUTTING INTO OPERATION

4.1 - General notes at delivery



- The manually rotated jib cranes of the CBB column-mounted version and the MBB wall-mounted version, are delivered not assembled, in their main parts which are the column or bracket, the arm, the electric system and, when part of the supply, the lifting unit.
- The user must therefore proceed to the phases of installation of the jib crane following the instructions contained in this chapter and assigning if possible the assembly to specialised installers.



- The operations described in this chapter, because of their delicacy and importance, can cause, if badly performed, grave safety risks in particular for persons exposed during the installation and use phases of the jib crane.
- In any case, the operations must be carried out by professionally qualified staff who specialise in industrial construction installing, with knowledge in electromechanics, equipped with work equipment and personal protection conforming to the current safety and accident prevention legislation in the workplace, and who have first read carefully this publication.



On receiving the supplied goods check and ensure that:



- The despatch data (receiver's address n° of items, n° of order, etc.) correspond to the accompanying documentation (transport documents and/or related packing-list).
- Technical/legal documentation which comes with the jib crane includes (fig 8):
- The instruction manual for the use of the crane to be installed.
- The CE declaration of Conformity or, alternatively, the Manufacturer's Declaration.
- The control register, when provided.
- The instructions for the use of the hoist/trolley to be installed on the crane, if included in the supply.
- The packing, if it is part of the supply, is in good condition, in one piece and free from damage.



In case of damage or missing parts tell the courier, note it on the accompanying document and notify DONATI SOLLEVAMENTI S.r.l. within eight days of receiving the goods.

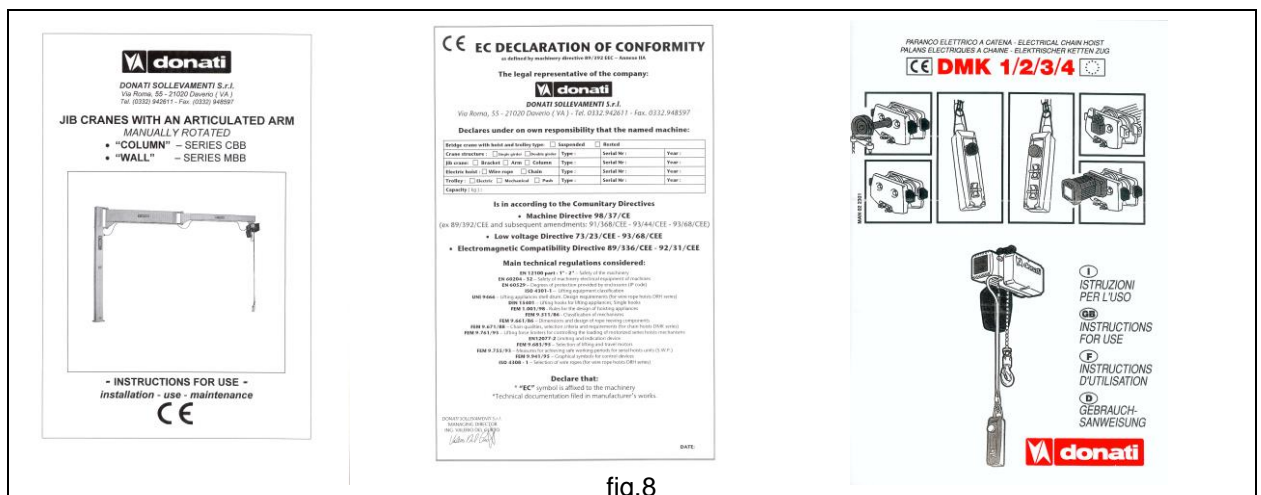


fig.8

4.2 Packing, transportation and handling



Before handling the jib crane and accessories it is useful to know that:

4.2.1 Standard packing

- The steel structures of the jib crane (column or bracket or arm) are, generally, supplied without packing; on the columns and brackets there are hooking points to make moving easier during the operations of installation (fig.9).
- To facilitate the handling and assembling operations of the lifting unit, if this is part of the supply, the unit can be delivered in a cardboard box (fitted with or without a pallet) or, when necessary in a chest or wooden cage or also simply attached to a pallet.
- When the lifting unit is delivered on a pallet, this is usually covered by a polyethylene film to protect it from dust.
- Related accessories, being part of the supply (e.g. components of the electric system), can be delivered inside cardboard boxes which, in relation to the mass to be handled, can be fitted with or without a pallet.
- The standard packing is not rainproof and is intended for overland destinations, not overseas, and for covered and not damp areas. Therefore packing and special protection are not included in the supply, unless these have been specified in the contract.
- The packing, when necessary, can show signs and pictograms which give important information regarding the handling and transport (mass, handling points, storage information, etc.) – (fig.10).
- The items, stored in the right way, can be kept in a warehouse for a period of two years in covered areas in which the temperature is between -20°C and $+60^{\circ}\text{C}$ with relative humidity of 80%. For different environmental conditions it is necessary to provide special packing.

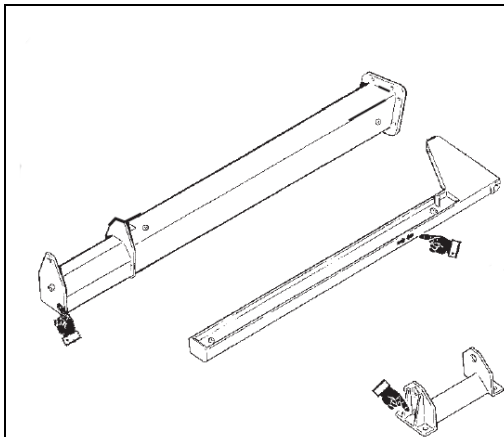


fig.9

Hook points consist in welded nuts, matching UNI 2947/DIN 580, eyebolts having the following dimensions:

M 16 for:

- Jib cranes R – S – T – U
- Wall mounted

M 20 for:

- Jib cranes V

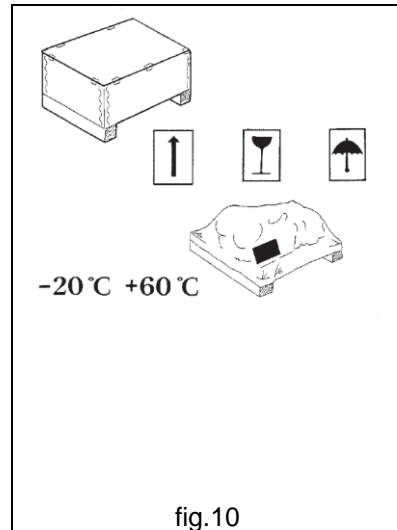


fig.10

4.2.2 Transportation

- Transportation should be carried out by qualified haulage contractors able to ensure the correct handling of the transported material.
- During transportation, avoid putting weights on top of the jib crane (mainly on arm tension bars or on channelled section bars) or on other packed items, because they could cause them damage.
- During the transportation phases we recommend that the pallet, or chests / cages are not tilted or overturned to avoid dangerous variations in their centre of gravity and, therefore, to ensure the best stability.



DONATI SOLLEVAMENTI S.r.l. takes no responsibility in the case of transportation by the client or haulage contractors chosen by the client.

4.2.3 Handling



For the handling of jib cranes proceed as follows:



- Allocate a limited, suitable area, with a level floor or surface, for the unloading operations and setting down on the ground of the separate parts of the steel structure and the components contained in the packing.
- Considering the typology of the part/component or the intended packing, allocate the necessary equipment for the unloading and handling of the parts of the crane and its accessories taking into account their weight, headroom dimensions and handling and/or suspension elements.
- The unloading and handling can be done using a crane (e.g. travelling cranes, overhead travelling cranes, etc.) or lift trucks with an adequate lifting capacity and characteristics and the use of special equipment is not required.
- Items of any accessories with a weight lower than 30 kg (as opposed to those over 30 kg), do not carry any indication of weight and can be handled by hand.
- Sling the parts of the crane with suitable equipment so as not to damage the painted surfaces: (fig.11)
 - For the columns use wire- or chain-staybolts with end hooks positioned in the points shown or a sling with strips made of textile fibres and sling in a baricentric position.
 - For the brackets and the arms the sling must be used, using strips made of textile fibres, arranged in loops corresponding to the handling points shown in the relative labelling.
- Carry out handling and move the parts of the crane and its accessories very carefully, to the zone allocated for unloading and avoiding oscillations, swinging and dangerous unbalancing.
- After handling, check that the parts and the loads are intact and that there has been no damage.



- **The handling of the parts of the jib crane and related accessories, must be carried out with great care and with adequate lifting and transport means so as not to create dangers due to the risk of losing stability.**
- **All parts or components must be set down or fixed in a stable way in all phases of handling, transport and storage and they must not be tilted or laid down in a vertical position or on one side (fig 12)..**

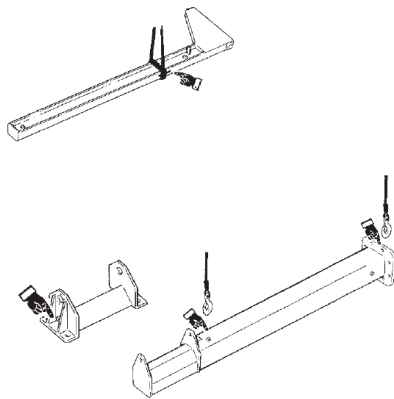


fig.11

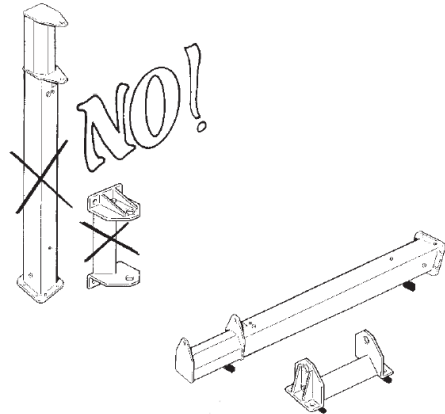


fig.12

4.2.4 Removing the packing and/or check of the crane parts








- In the case of packed loads open the packing and take out the various parts by using suitable equipment according to their weight and handling points.
- Check that all materials making up the supply are intact and that no parts or accessories are missing. Inform the manufacturer as soon as possible of any damage or things missing.
- If storage of the material is required follow the instructions in paragraph 4.5.1 "Storage and conservation of parts".





- **Check that all parts of the crane are intact and in particular check that:**
- **there is no crushing, deformations, cracks or broken parts in the columns, the brackets and the arms.**
- **there is no damage to the components of any related electrical system.**
- **Dispose of any packing in accordance with regional laws regarding wood, plastic, cardboard by differentiated recycling.**

4.3 - Installation of the jib crane

4.3.1 Duties and responsibilities of the installer

 	<ul style="list-style-type: none"> The installation of the jib crane, for the size of its operations, can pose, if not carried out correctly, serious risks to the safety of people exposed both at the assembly stage and at the successive stage of use of the crane. Therefore, the installation must be assigned to installers specialising in the assembly of industrial equipment. The lifting operations and positioning at a height of the parts of the crane must be carried out by installers equipped with: adequate individual safety measures (e.g. helmet, gloves, safety harness, etc.). work equipment (e.g. forklift truck, scaffolding etc.) suitable for the purpose. And following a careful evaluation of the following parameters: typology of the workplace, its environmental characteristics, (type of floor surface, etc.). height of the working space in relation to the loading surface. dimensions and weight of the components to be installed. available spaces for the handling of the parts to be installed. 	    
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	<p>Before assembling the parts and using the jib crane, the installer must check that the crane characteristics are suitable to what requested and for the foreseen use, in particular:</p>	
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- The lifting capacity of the crane is greater than/equal to the loads to be lifted.
- The characteristics of the fixing structures (plinth, floor, wall, column, etc.) have been “**declared suitable**” by the user or expert technicians employed by the user.
 - The characteristics of the lifting unit (hoist), if not part of the supply, are compatible with those of the jib crane (see point 2.2.7) in relation to: (fig.13)
 - Lifting capacity of the hoist:** must be less than/equal to the lifting capacity of the jib crane.
 - Weight of the hoist:** must be less than or equal to the maximum foreseen weight.
 - Speed of lifting:** must be less than or equal to the maximum allowed ones.
 - Headroom of the size of the hoist:** must be less than or equal to the maximum allowed ones.

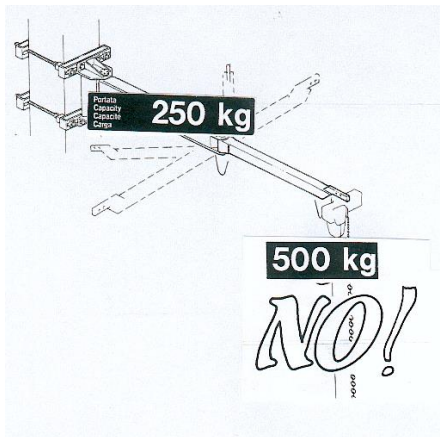



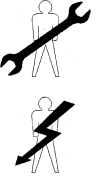


fig.13

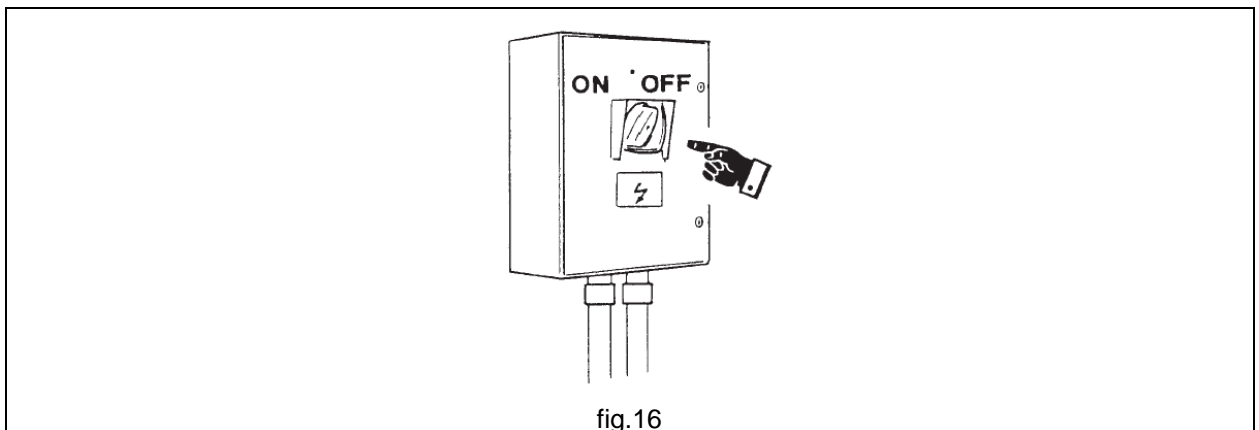
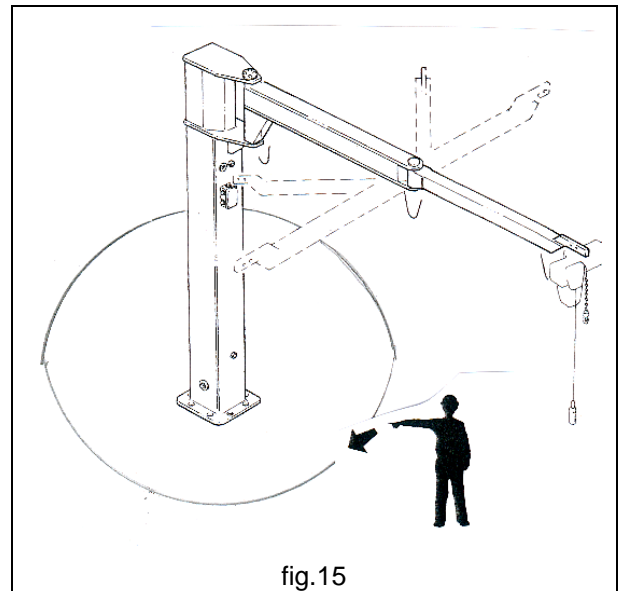
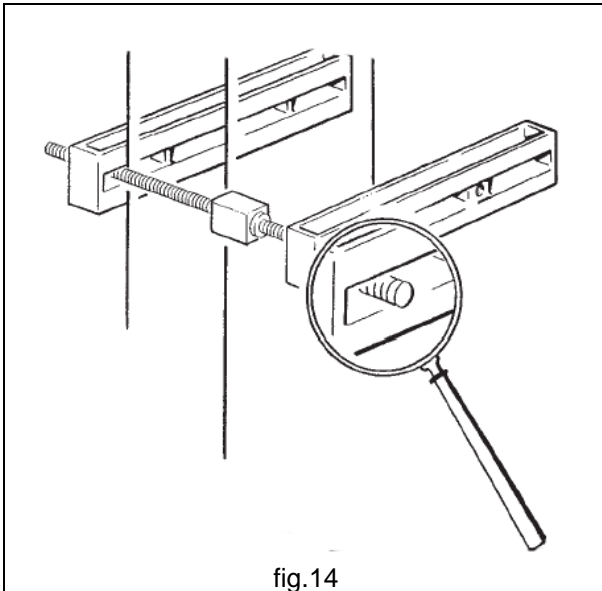
	<p>Following the installation of the jib crane, it is the precise duty of the installer to:</p>	
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- Carry out the activities of “**Putting into operation**”, as described in paragraph 4.4;
- Update the “**Inspection**” report and decide on the “**Suitability for use**” of the jib crane;

4.3.2 Preparing the place of installation

	<p>To allow the installation of the jib crane, the following operations must be carried out:</p>	
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- Check that the declaration of suitability/adequacy of the support/fixing structures is present;
- Check that obvious defects of the support/fixing structures are absent (fig.14);
- Check the suitability of the manoeuvre spaces (rotation) available for the jib crane, especially if it operates in areas where there are other cranes or other manufacturing machines (fig.15);
- Check the suitability and correct functioning of the electric system (fig.16)
 - 1) correspondence of the power line voltage with the voltage for the motors
 - 2) that there is a suitable switch/disconnecting switch for the power line;
 - 3) adequacy of the section of the cable of the electrical power supply;
 - 4) that there is a suitable earthing system;
- Prepare the masses for the **test runs** equal to: **nominal lifting capacity x 1,1**
- Prepare the masses for the **static test runs** equal to: **nominal lifting capacity x 1,25**
- Prepare the equipment for the slinging and lifting of the masses for the load test runs
- Check that there are the relevant signs to warn of the risks posed by the manoeuvring of the crane.



4.3.3 Assembly of the column – For CBB column-mounted cranes



- The fixing of the column to the ground can be done in the following ways:
 - using a foundation frame with log bolts sunk into a plinth made of reinforced concrete.
 - using bolts and screw anchors or dowelling.



- The fixing of the column using bolts and screw anchors or dowelling requires a scrupulous check of suitability in relation to the type of support flooring.
- The technical data, so that the user can choose the right size for the the foundation plinth, are shown in the table in paragraph 2.2.7 (“Fixing systems”p.12).The plinth size must be in relation to the real consistency of the ground and the specific maximum pressure that it can bear.
- The suitability checks of the foundation are the responsibility of the user and must be carried out by technical experts who judge the feasibility and take responsibility for this.



Positioning of the foundation frame in the plinth:



1. Screw tight the low nuts **2** on the log bolts **1**, leaving a threaded part showing which corresponds to the level **ST** (fig.17) (for the protusion **ST**, see “Fixing systems” on page 12). Do the same operation on all 8 (eight) log bolts.
2. Insert all the logbolts **1** in the holes on the foundation frame **4**, so that the plate of the frame is resting on the nuts and then tighten with the tall nuts **5**, interposing the washers **3**.
3. Sink the frame prepared in this way in the plinth casting, taking care that the upper plate remains on the same level as the floor (fig.18) Protect the threadings of the logbolts to avoid damage.
4. When needed, insert a tube into the plinth through which the electrical cable which powers the crane can be passed (fig.19).
5. Level the foundation frame using if necessary a bubble and proceed to the filling and flint-glazing of the plinth (fig.20).
6. Wait the necessary time before assembling the column so that the plinth can stiffen.

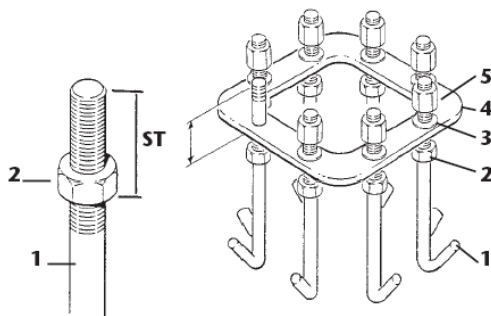


fig.17

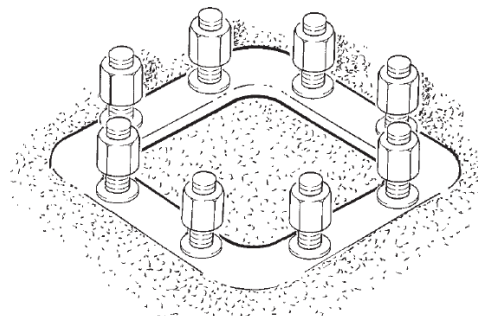


fig.18

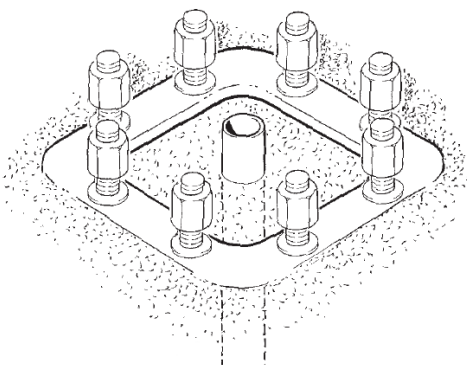


fig.19

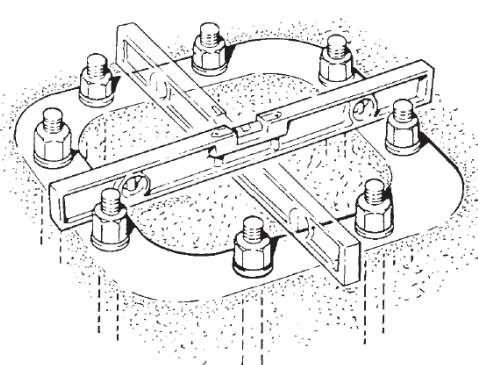
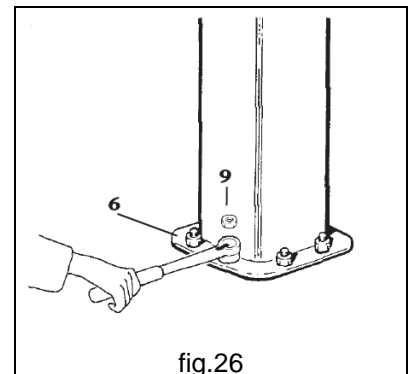
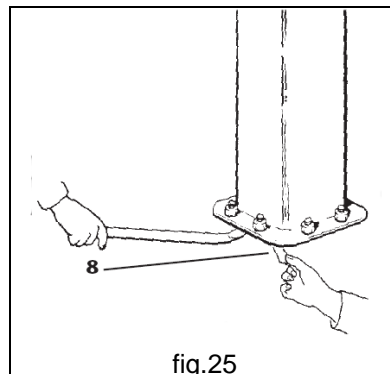
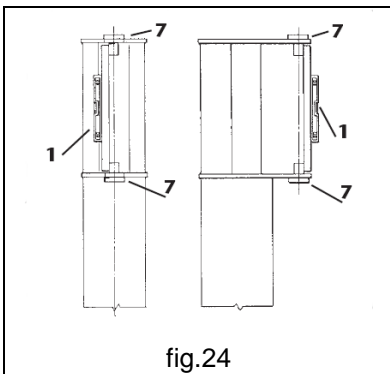
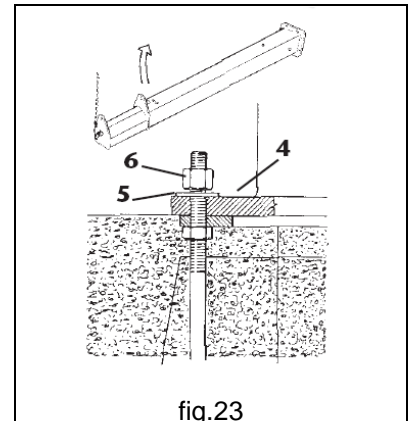
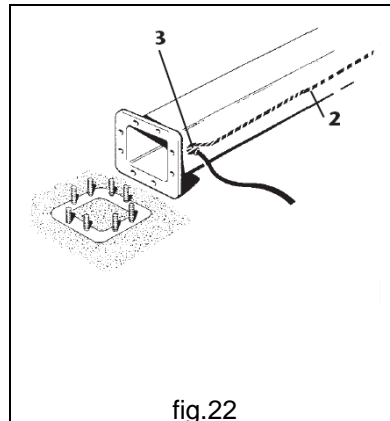
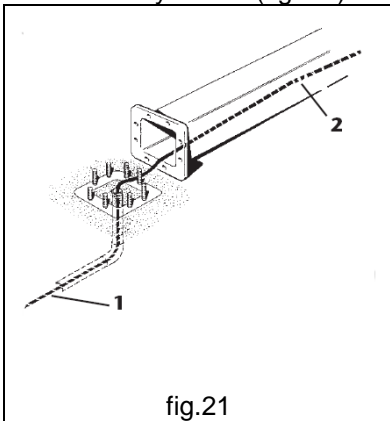


fig.20

**Column assembling:**

1. Once the solidification of the plinth has taken place, remove the protection from the threadings of the log bolts and check that the tall nuts can be unscrewed without being forced, remove them and the related washers.
2. Insert, when needed, the electric cable **1** in the column resting on the floor and push it through the hole at the end of the column, using this layout as follows:
 - a. In the case of cable **1** which comes out of the allocated tub (pipe) in the plinth, insert the cable directly inside the column until it reaches hole **2** at the end of the column (fig.21)
 - b. In the case of cable **1** coming from the outside, push it into the column using a suitable fairlead **3** placed at the bottom of the column, until it reaches hole **2** at the top (fig.22)
3. Set up the column without the arm, lifting it by the upper part with appropriate equipment having put it in the sling as shown, assemble it on the foundation frame positioning the base plate **4** correctly and lining up the nuts **6**, subject to the interposition of the related flat washers **5** (fig. 23).
4. Check the verticality of the rotation axis as follows:
 - a. Remove the protective plastic plugs from the housing of the pivots.
 - b. Insert the pivots **7** provisionally in their respective housing (see 4.3.5 Assembly of the arm).
 - c. Check the verticality of the rotation axis, by using a level **L** and a bar which must be resting directly on the rotation pivots **7** (fig.24).
 - d. The perfect plumbing can be obtained, if necessary, inserting suitable shims **8** (not included in the supply), corresponding to the log bolts, under the base plate (fig. 25).
5. Screw tight the nuts **6** using a dynamometric spanner, applying the clamping couples (see table on page 12) based on the diameter of the logbolts, checking the nuts afterwards for unscrewing with the relative safety nuts **9** (fig. 26).



It is recommended that, after the first lifting operations the clamping of the nuts is checked again, to take up any slack due to the bedding of the plinth.

4.3.4 Assembly of the bracket – For MBB wall-mounted cranes



- The fixing of the bracket to the support structure can take place as follows:
 - using brackets with the related staybolts
 - using bolts and screw anchors or dowelling.



- The fixing of the bracket using bolts and screw anchors or dowelling, requires a scrupulous check of suitability in relation to the type of support.
- Technical data, so that the user can scale the fixings to the right size are shown in the table at paragraph 2.2.7 ("Fixing systems"-page 12).
- The suitability checks of the support structure are the responsibility of the user and must be carried out by expert technicians who evaluate the feasibility and take on the related responsibilities.



Assembly of the brackets to the pillar or load-bearing wall:



1. Screw up the nuts **1** on the four staybolts **T** and insert the contrast panels **2** (fig. 27).
2. Assemble the two brackets, the front one **3** and the back one **4**, for the fixing of the upper part of the bracket, in such a position to obtain the required height under the arm of the crane, inserting the safety washers **5** and the cramping nuts **6** on the staybolts **T** (fig.28).
3. Pretighten the nuts **6** to ensure good adherence to the pillar brackets (fig.29).

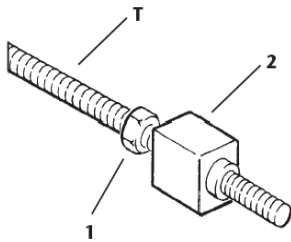


fig.27

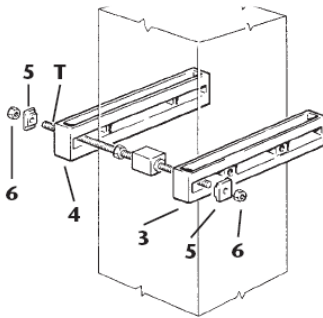


fig.28

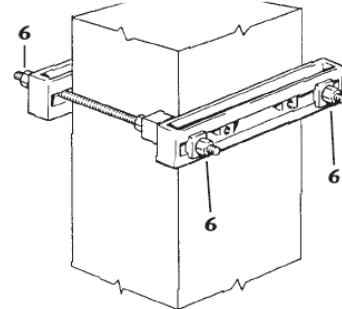


fig.29



Assembly of the bracket:



Assemble on bracket **1** the other front bracket **2** (fig.30).

1. Lift the bracket to a height with suitable equipment, by putting it in the sling as shown and fix it to the front bracket previously positioned on the pillar (fig.31).
2. Assemble on the front bracket fixed on the bracket, the other back bracket (fig. 36). (Refer to the preceding point "Assembly of the brackets" at positions 1 and 2)

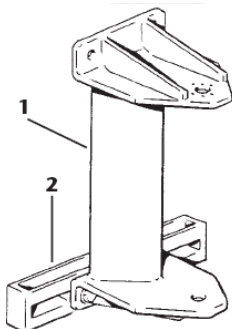


fig.30

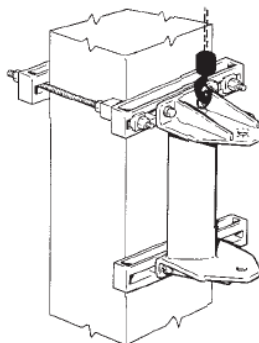


fig.31

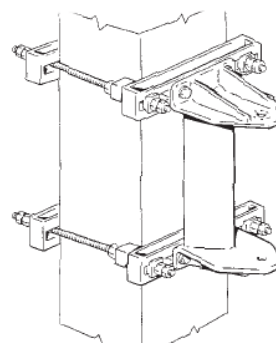
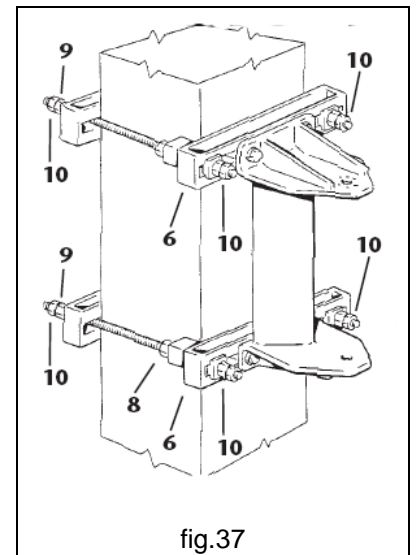
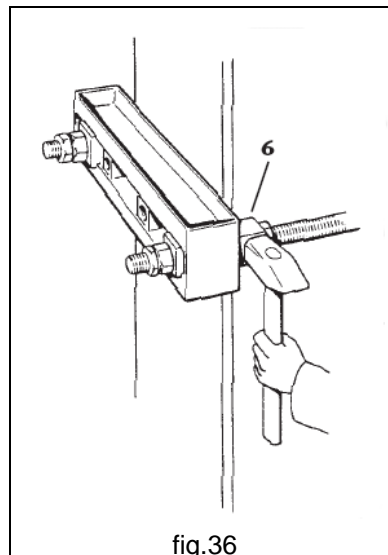
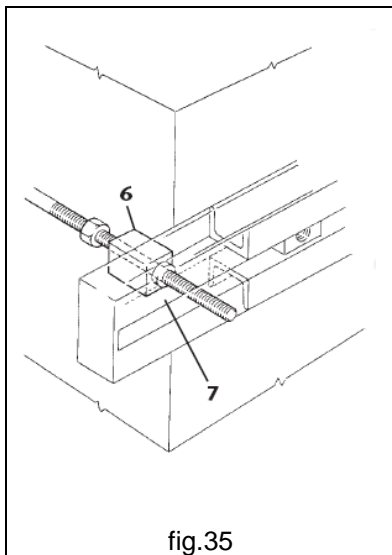
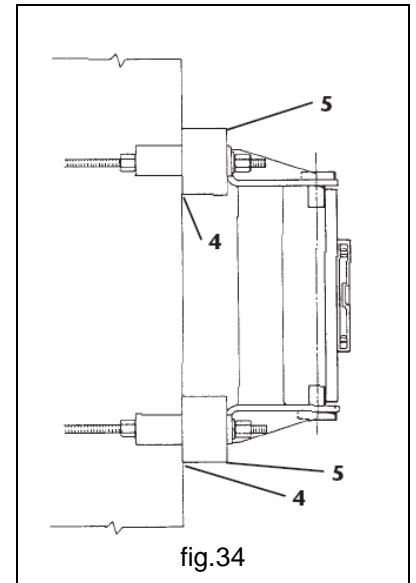
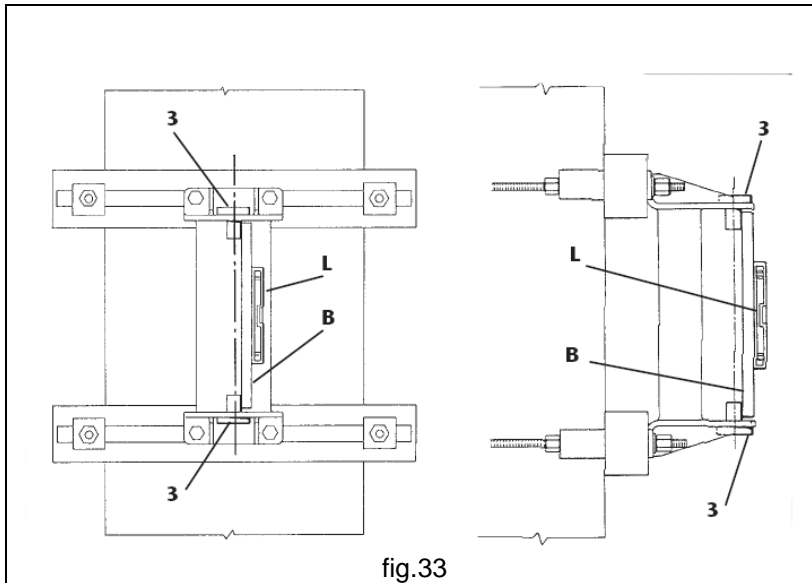


fig.32

3. Check the verticality of the rotation axis as follows:
 - a. Remove the protective plastic plugs from the housing of the pivots.
 - b. Insert provisionally the pivots **3** in their respective housing (see 4.3.5 Assembly of the arm)
 - c. Check the verticality of the rotation axis, using a level **L** and a bar **B** which must rest directly on the rotation pivots **3** (fig.33).
 - d. The perfect plumbing can be obtained, if necessary, inserting suitable shims **4** (not part of the supply), under the front brackets **5** (fig.34).
4. Check the correct positioning of the four contrast boards **6**, checking that the centring crowns **7** are well settled in their respective housing of the front brackets (fig.35).
5. Using a mallet, stick the level of the contrast boards **6** to the surface of the pillar (fig.36).
6. Tighten thoroughly the blocking nuts **8** of the contrast boards **6**.
7. Screw up the back blocking nuts **9** of the staybolts and block them using a dynamometric spanner, applying the clamping couples (see table on page 12), based on the diameter of the staybolts, checking the nuts afterwards for unscrewing with the related safety nuts **10** (fig.37).
8. Check again the perpendicularity of the rotation axis as described in point 4



It is recommended that, after the first lifting operations the clamping of the nuts is checked, to take up any slack due to the settling of the brackets

4.3.5 Assembly of the arms –For CBB column-mounted cranes and MBB wall-mounted cranes



For the assembly of the arms proceed as follows:



1. Sling the arm, using strips made of textile fibre arranged in a "loop", corresponding to the handling points shown on the labelling and lift with suitable means (overhead travelling crane, travelling crane, etc.). Keep the girder horizontal to the round and constantly check the stability of the slinging which must not move from the handling point. Avoid oscillations and swinging and, if necessary, to maintain the equilibrium use a rope tied to the ends of the arm.
2. Line the arm up with the plates (of the bracket or column) and position in the upper part of the tube the bearing **1** the upper bearing pressure plate **8** and the clutch plate **9** with the clutch disc **12** (glued on the disc) against the tube, making sure at the same time that the bearing and the lower bearing support **14** fit into the lower part (fig.38).

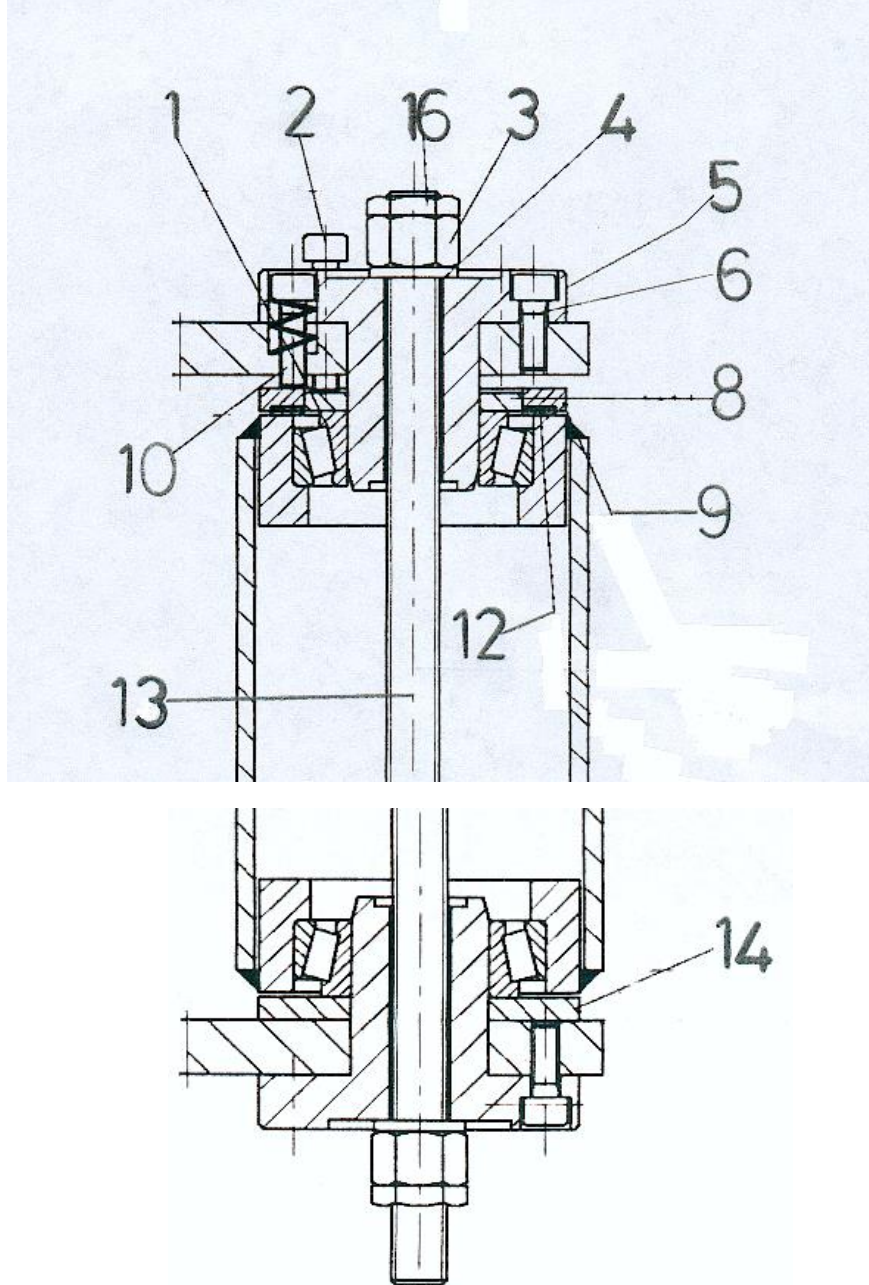
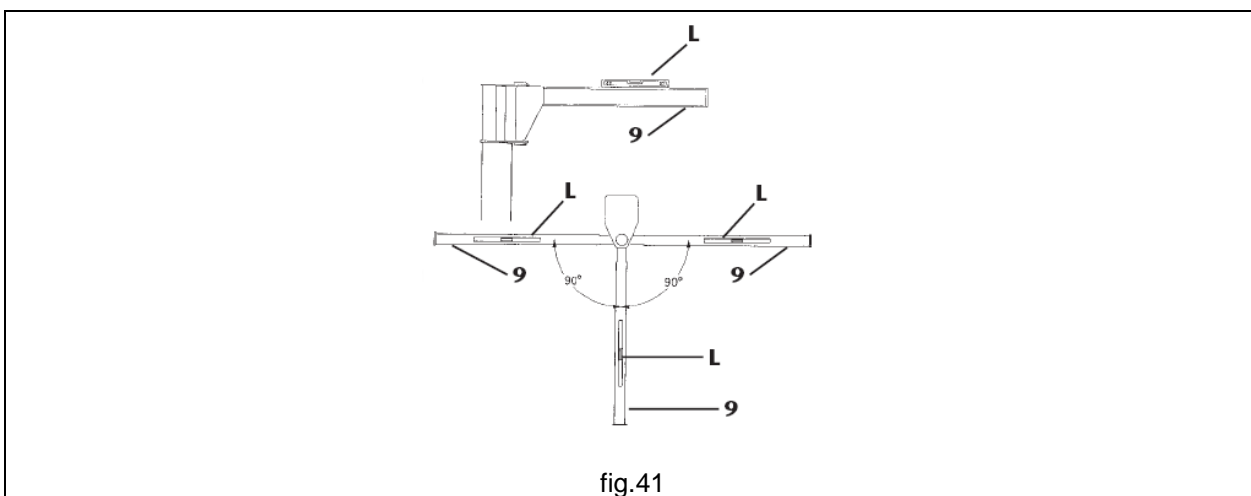
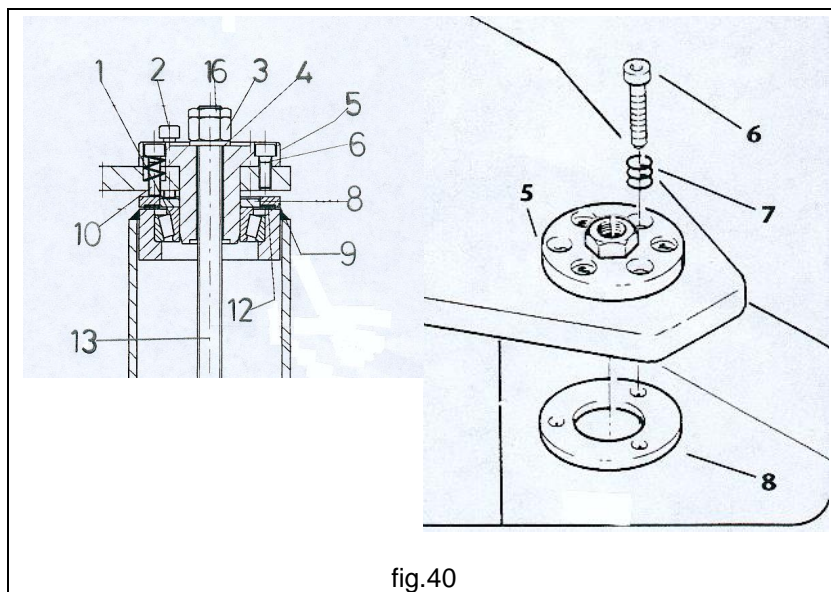
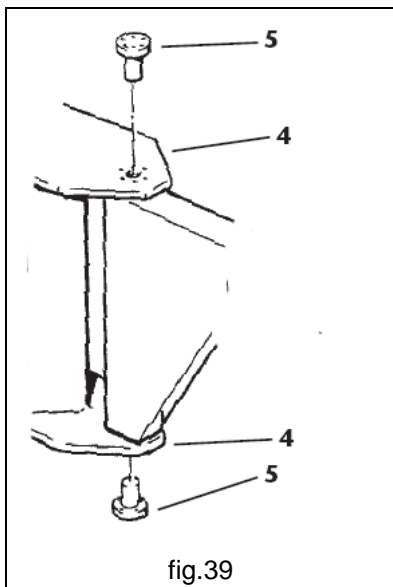


Fig.38

3. Insert the tube between the plates **4** until the rotation axis of the tube coincides with that of of the plates and insert the rotation pivots **5**, after lubricating them with grease (fig.39).
4. Block, with the campling couplet shown in the table, the pivots **5** with their related screws **6** in the three holes at 120 on the pivot's flange .

5. Insert threaded bar **13** in the pins **5**, lock it with relevant washers **4** and self-locking nuts **3-16** taking care of plates parallelism **4**(fig.40).
6. Insert in the remaining holes of pins caps keep **5**, the springs **7** and the screws **6** verifying with attention that screws shank buck with special seats obtained on pressure disks **8** (fig.40).
7. Regulate the slid ability of the rotation of the arm, by acting on the braking system using register/adjuster screws **6**, until the traverse sensitivity required is obtained.
8. Carry out the check of the planarity of the arm **9** with the help of a level **L**. Do this check by rotating the arm by 90° to the left and to the right (fig.41).



The user or installer assigned by the user must:

- install, in the immediate vicinity of the crane, a line switch, protected against short circuits, showing its function with the appropriate label.
- have earthing connected, to the structure of the crane, corresponding to the handling points for this purpose

N.B.

The sequence of installation of the second arm is the same as per above mentioned instruction.

4.3.6 Assembly of the electric system with the connector block



For the assembly of the electric system proceed as follows:

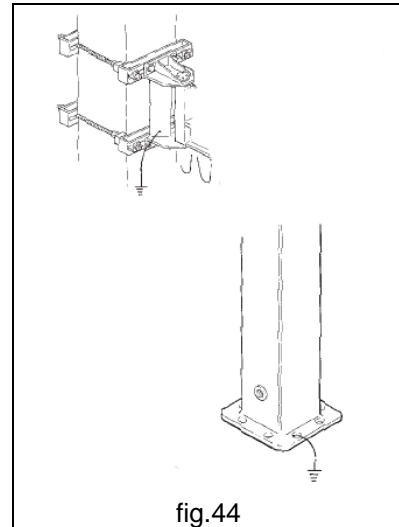
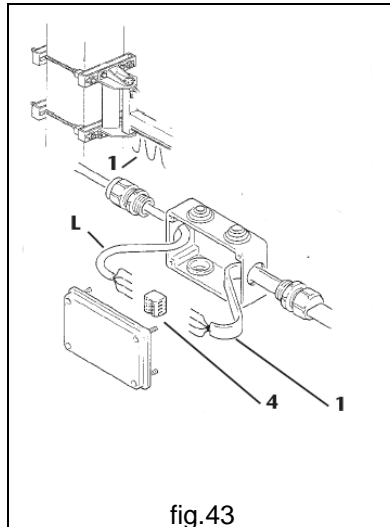
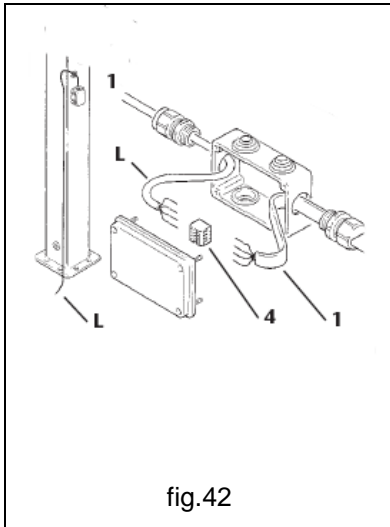


§ “Column” version – CBB series:

4. Connect to the terminals **4** contained in the connector block the electric cable **1** and the cable of line **L** (inserted previously in the column- see 4.3.3 – Assembly column) - (fig.42).

§ “Wall” version – MBB series:

1. Connect the electric cable **1** to the terminals **4** contained in the connector block, to be applied to the column or load-bearing wall and to which the cable of line **L** coming from the power supply will be connected (fig.43).



The user or installer assigned by the user must:

- install, in the immediate vicinity of the crane, a line switch, protected against short circuits, showing its function with the appropriate label.
- Have earthing connected, to the structure of the crane, corresponding to the handling points for this purpose.

4.3.6.1 Assembly of the electric system with isolatine switch for CBB column-mounted cranes



For the assembly of the electric system proceed as follows:



1. Assemble the isolator switch as in figure 45, assembling the components.
2. Position the isolator switch in the hole in the column, connecting the relative electric cables, finishing the assembly with the application of the yellow frame and of the red knob as in figure 46.

fig.45

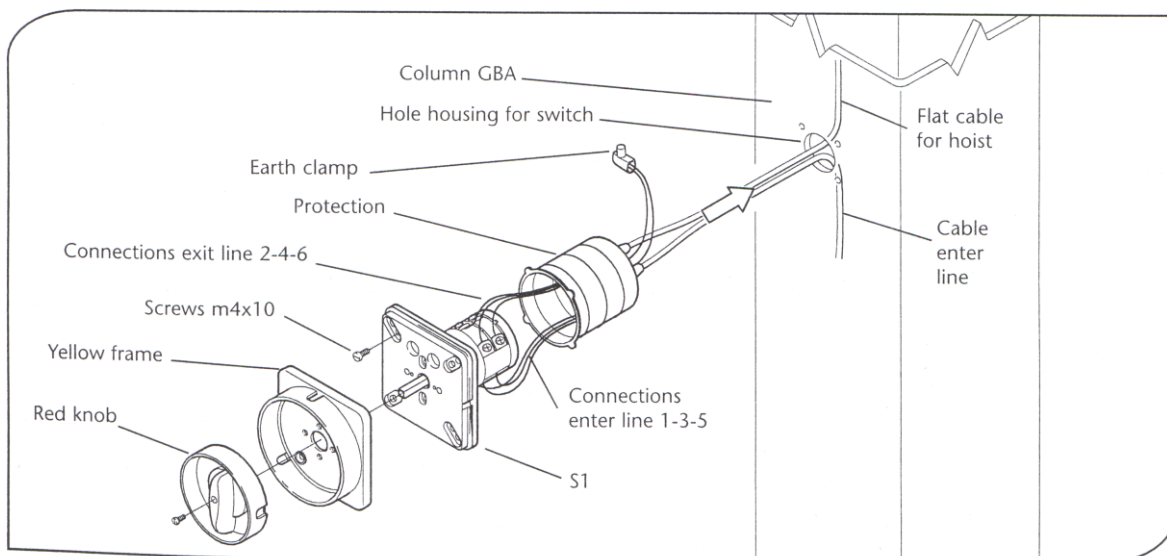
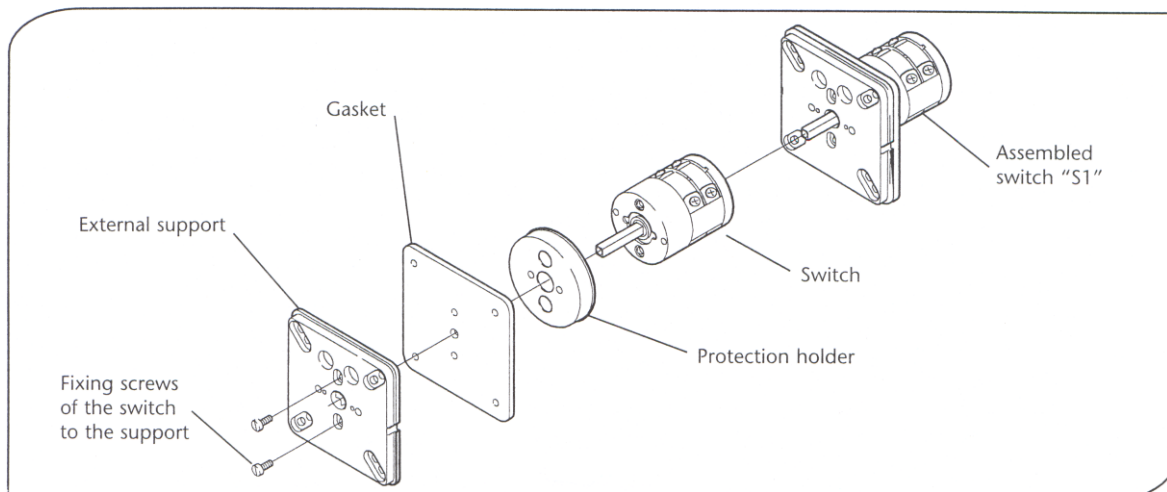


fig.46



The user or installer assigned by the user must:

- Install, in the immediate vicinity of the crane, a line switch, protected against short circuits, showing its function with the appropriate label.
- Have earthing connected, to the structure of the crane, corresponding to the handling points for this purpose (fig.44).

4.3.7 Assembly of the hoist



Assembly of the hoist on the crane CBB-MBB:



See “Instruction for use” of the hoist (if supplied) included in this publication



Electrical connection of the hoist:





To connect the festooned cable of the power line to the terminals of the electrical apparatus of the lifting unit, see “Instruction for use” of the hoist (if supplied) included in this publication



- Never carry out electrical connections with live power
- Never make precarious connections or flying connections
- Clamp down completely the cable presses
- Procure the electrical circuit diagrams for the hoist/trolley on which you are working

4.4 - Putting the machine into operation


4.4.1 Preliminary operations - Adjustments and test runs

	Before putting the jib crane into use, carry out the following operations:	
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- **Check the electrical system is in a suitable condition:**
 - Check that the voltage and line frequency, shown on the respective motor plates, correspond to those designed for the functioning.
 - Check that the voltage value to the motors is within the limits of +/-10% of the nominal value.
 - Check there are ground clamps and that they are connected correctly.

- **Checking the correct installation of the crane:**
 - Check there are no obvious faults following the installation of the crane.
 - Check that all the bolted joints are correctly tightened.
 - Check the uniform sensitivity of the flexing of the arm, in all its amplitude.
 - Check that the arm can freely rotate, related to the absence of obstacles in the whole area of operation of the crane and any interference.
 - Adjust the ascent limit switches of the electric hoist (see information in the related "Instructions for use"), to allow the maximum possible run. The ascent limit switch must be adjusted so that the hook at its lowest point is about 10 cm from the ground.
 - Check there are no leaks of lubricant.
 - Check during the trial runs that there are no strange noises and/or vibrations and/or incorrect movements (skidding of the wheels or, spontaneous movements of the trolley and/or the arm,etc).

- **Checking the functioning of the correct rotation direction of the motors:**
 - **If the crane is fitted with electric hoist:**
 - Operate, for brief distances, the "ascent/descent" buttons, taking care to operate first in one direction (descent), and then in the other (ascent) with two brief impulses necessary only to ascertain the correct direction of rotation, without using any electric limit switches.



	<ul style="list-style-type: none"> • Avoid intervening using the lifting limit switch. • If the rotation direction of the motors does not correspond to the controls of the push-button control panel the limit switches do not halt the movement, and malfunctioning can occur. • If the direction of the movement does not correspond to the function shown on the push button control panel, halt the manoeuvre.
---	---

4.4.2 Inspection of the jib crane – Suitability for use

	<ul style="list-style-type: none"> • The jib crane is marketed considering inspections carried out by the manufacturer on similar prototypes, subjected to checks for their suitability for use on the structural parts (columns, brackets, arms, etc.). • The inspection procedure, described below, refers to ascertaining the functional and performance responsiveness of the jib crane installed in its place of use, complete in all its parts (fixings, structure, lifting unit, lifting accessories, etc.). • The inspection of the crane installed is the responsibility and task of the user and must be carried out by specialized staff (installer) who will assemble it, by scrupulously following the instructions in this manual. • The installer must carry out the inspection and complete all the “Inspection Report” and complete the “Suitability for use” certificate, contained in the “Checks Register” included, when required, with this publication.
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§ After carrying out the “empty” test runs, carry out the dynamic test runs; these test runs are carried out with masses of value corresponding to the lifting capacity shown on the crane label uprated by the coefficient of overload 1.1 (load equals 110% of the nominal load). The static test runs are carried out with an overload coefficient of 1.25 (load equals 125% of the nominal load.).

	<p>All tests must be carried out in no windy conditions.</p>
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	<p>Proceed to the testing of the jib crane, in the following way:</p>	
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§ Empty test runs:

- activate the switch/disconnecting switch.
- put the emergency stop switch in the position which allows movement.
- press the “gear/alarm” button (if available).
- check the lifting function by pressing the ascent/descent buttons.
- in the case of movements at two speeds check the functionality.
- check of the flexing of the arm by manual rotation.
- check the functioning of the electrical limit switches of all the movements and/or the clutch device, when available.

§ Dynamic test runs:

- prepare adequate weights for the test runs with load equal to **nominal lifting capacity x 1.1** and suitable equipment for the harnessing and lifting of the load.
- harness the load, taking care to position the hook vertically to avoid skew rope falls.
- slowly tension the sling so as not to cause tearing, if available do the test runs with load using the "slow" speed.
- slowly lift the load and check that this happens with no difficulty and that there are no anomalous noises, clear deformations or sagging in the structure of the crane, in the support structures and/or the anchorings.
- repeat the test run at maximum speed, if available, doing the preceding checks.
- check the functionality of the "ascent and descent" limit switches, when installed, and/or any clutch device fitted.
- check the functionality of the lifting brake, checking that the weight is braked in adequate time and that there is no skidding of the load, after releasing the button.
- carry out the same checks also for the trolley travelling movements and rotation of the arm, checking the functionality of the limit switches, without bringing the load to the maximum height (lift it to a height of one metre from the ground).
- operate first at slow speed, if available, and then at maximum speed.
- check the correct sliding of the trolley on the girder, and ascertain that there are no anomalous noises, evident permanent deformations or anomalous sagging of the structure of the crane, of the support structure and/or the anchorings.
- check the functioning of the "emergency stop" button which must stop and inhibit all the movements. Any function of the hoist and/or trolley must stop, in the shortest possible time and space, without showing anomalies, side skids, dangerous oscillations, etc. which threaten the stability.
- check the braking spaces and stopping spaces during lifting travelling and rotation, checking the stability of the mass manoeuvred.



The dynamic test run must be carried out in the most unfavourable load conditions, that is combining lifting and rotation.

§ Static test runs:



- use suitable masses for the test runs equal to: **nominal lifting capacity x 1.25** and suitable equipment for slinging and lifting the load.
- put in the sling the load **used for the dynamic test runs** (nominal capacity x 1.1) taking care to position the hook on the vertical to avoid skew runs.
- tension the sling slowly to avoid tearing, if available carry out the test runs using the "slow" speed.
- lift the load and stop it in a suspended position at a height of 10 cm.
- gradually apply weight on it until reaching an overload value equal to 25% of the nominal lifting capacity.
- leave the weight suspended for no less than 10 minutes.
- check that the weight suspended (load + overload) does not yield (the lifting brake and the clutch device/load limiting switch, if installed, must not skid).
- release the load and check that there are no evident deformations and/or sagging of the structures of the crane, the support structures and/or the anchorings.



- **During the static test run NO movement of the crane must be activated.**
- **The testing of the jib crane must be repeated at the annual checks** (see paragraph 6.3.2)
- **The results of the annual testing must be noted in the checks register** (see chapter 8) **included with this publication, when required.**

4.5 Out of service

4.5.1 Storage and conservation of parts

	If the jib crane and its component parts should be put in the warehouse and kept (storage), to avoid damage or deterioration proceed in the following way:	
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- Protect the machine surfaces of the plates and the mechanisms with antioxidant products, do not scratch the surfaces intended for assembling with other parts or the inside of holes.
- The materials are foreseen for indoor or outdoor installation and can be stored for a maximum period of two years in an environment with the following characteristics:
 - protected from atmospheric agents.
 - relative humidity no more than 80%.
 - temperatures: minimum -20°C ; maximum $+60^{\circ}\text{C}$.
- For a storage period longer than two years ask for conservation procedures from the manufacturer.
- If these values should change during the storage, it will be necessary to carry out preliminary checks before putting the crane into use (see 4.5.2 "Reuse after storage").
- If in the storage place the temperature exceeds or goes below the values indicated and the relative humidity is more than 80% prepare protection for the packed packages with barrier bags and hygroscopic salts.
- For storage in open areas provide:
 - raised bases for all items without pallets.
 - protect all items with barrier bags and hygroscopic salts.
 - If the crane has been built to operate outside, the parts of the steel structure do not require special protection; on the contrary, the parts machined on a machine tool (machined surfaces, wheels, pivots, etc.) must be protected with antioxidant products (transparent varnishes, grease, etc.).

4.5.2 Reuse after storage

	Before putting the jib crane back into use after a long storage period, the following operations must be carried out:	
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- **Structure:**
 - eliminate traces of lubricant from the structure.
 - clean any grease residue from the holes and skim the threads of the holes.
 - clean the mating surfaces at the joints.
 - repair any structural damage (scratched surfaces, peeling paint, etc.).
- **Mechanisms:**
 - check for any leakage and if necessary, refill the levels of lubricant.
 - verify that the mechanisms are correctly tightened to the related structure.
 - eliminate traces of rust from sliding parts which are accessory to the commands.
 - lubricate the thrust bearing of the hook and the unpainted mechanisms (shafts, etc.).
 - eliminate any residual water from concave parts.
- **Electrical equipment:**
 - eliminate any condense from the motors and terminal boards; dry with jets of air.
 - check the integrity and functioning of the brakes.
 - clean the surfaces of the brake gaskets thoroughly, eliminating all traces of humidity, lubricants and varnishes.
 - check the integrity and functioning of the limit switches.
 - check the parts and the electrical components are intact.
 - dry contactor contacts.
 - clean closure surfaces thoroughly, clean threaded holes of all containers.
 - carefully check the functioning and efficiency of the push-button control panel.

5. - FUNCTIONING AND USE OF THE JIB CRANE

5.1 - Functions of the jib crane

5.1.1 Intended use - Foreseen use - Designated use

§ **The manually rotated jib cranes with articulated arm**, in the CBB column-mounted version and the MBB wall-mounted version are produced for the manoeuvring of goods inside a building, in a yard or to serve operative positions.

§ **The jib cranes with articulated arm** have two functions:

- **they lift** a load vertically, using the hook of the lifting block, generally made up of a manual or electric chain hoist and using suitable accessories for such an operation.
- **they rotate** the load, around the constraint axis of the arm, by pushing by hand the load, using the surrounding circular area, delineated by the rotation range of the arms.

§ If the crane is fitted with an **electric hoist** the movements can be activated by:

- using the **push-button control panel** with the push-buttons of “ascent” and “descent” for control of the lifting movement.

§ If the crane is fitted with **manual hoist** the movements are activated by:

- **mechanical action** of the manoeuvre chain of the hoist for lifting.

§ In all cases the **rotation movement of the arms** is activated manually with **push-training**.

§ **When it is controlled by the push-button control panel**, the push-buttons activate the function when they are held down and control of the auxiliary slow lifting, it can be activated as follows:

- **with separate push-buttons which** keep the “high” and “low” speed controls separate.
- **with a single push-button** with two positions, the first position is the “low” speed and the second position is the “high” speed.

The emergency stop button is red and mushroom-shaped, and activates the stop function when pressed right down.

- To allow the jib crane to work it is necessary to bring the **emergency stop button** to its most “raised” gear speed position and then push the **start buttons** one after the other.
- The push-button control panel is pendant from the hoist and can be used by the operator on the ground while following the travelling movement the rotation of the arms.
- The electric movements of the jib crane can also be controlled through a radio-control system, the functions of the buttons are the same as the ones on the pendant push-button panel.



- **When the jib crane is controlled using the radio-control the push-button panel is not attached to the crane itself, therefore the operator must always take the utmost care during manoeuvres and never lose sight of the work area or of the load being moved so as not to threaten his own safety and/or that of other people present.**
- **It is forbidden to control the jib crane movements while sitting or standing on it.**

5.1.2 Permitted loads, loads not permitted.

§ The loads must:

- Be of a form, dimensions, mass, balancing and temperature suitable to the characteristics of the place in which they will be handled, and they must be compatible with the performance of the hoist.
- Have suitable handling points and/or fitted with accessories which prevent accidental falls.
- Be stable and not subject to changing their static or physical configuration during handling.

	<p>§ Handling of the following loads is not permitted:</p> <ul style="list-style-type: none"> • one with a weight (including accessory) greater than the nominal capacity of the crane (fig. 47). • with an uneven mass with respect to the centre of gravity. • with surfaces which are not resistant enough to withstand the pressure of the hold. • those which are classified as dangerous (e.g. flammable, explosive, radioactive material), because of their chemico-physical characteristics. • harmful toxic materials or products, unless handled in suitable safety containers (e.g.: corrosive chemical products, products having biological risks, etc.). • loose foodstuffs, which may come into direct contact with parts of the hoist or with its lubricants. • those which may change their static and/or chemico-physical configuration or their centre of gravity during handling. • those without the accessories outlined in the following point.
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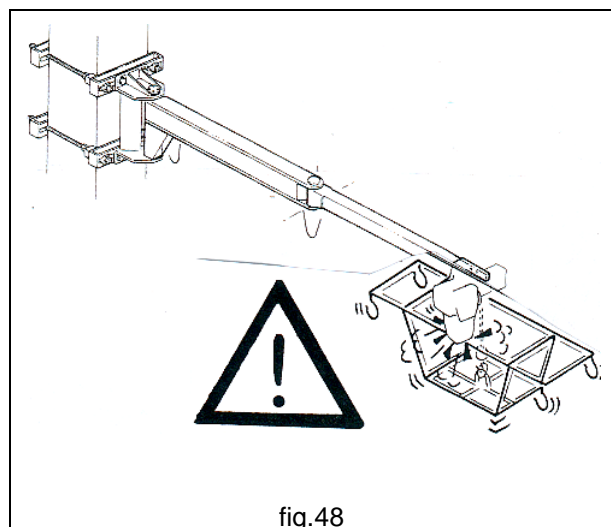
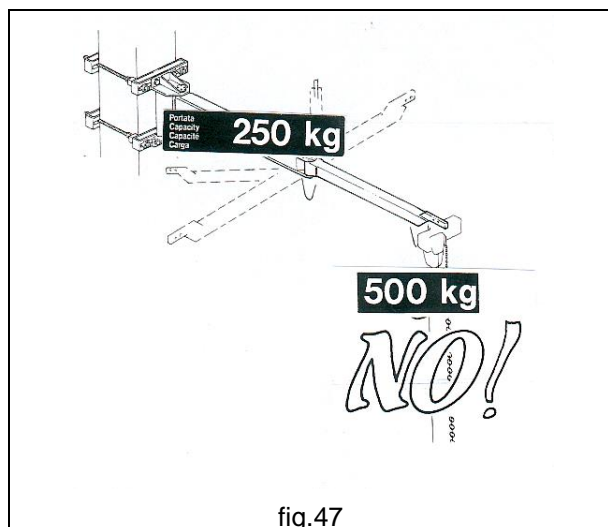
5.1.3 Lifting accessories

§ The following are usually allowed:

- Slings consisting of ropes and/or chains and/or strips made of textile fibres.
- Lifting accessories which are located between the load and the lifting hook including: balances, plies, holdfasts, magnets and electromagnets, etc.
- The use of such accessories must strictly comply with the specifications supplied by the manufacturers.

	<p>§ The following accessories are not usually allowed:</p> <ul style="list-style-type: none"> • those with functional characteristics which may provoke a level of dynamic stress superior to that admissible for the hoist or accidental overloading. • those which may collide with parts of the jib crane (fig. 48). • those which compromise free handling of the load. • those which are connected to independent electrical lines.
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	<p>The weight of the lifting accessories must be subtracted from the nominal capacity of the jib crane.</p>
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5.2 - Operating conditions

5.2.1 Operating environment

- **The operating environment must have the following characteristics:**
- **temperature:** min. -10°C ; max. $+40^{\circ}\text{C}$, max. relative humidity 80.
- **indoor use:** as the jib crane is not exposed to atmospheric conditions no particular precautions need be taken.

outdoor use: the jib crane may be exposed to atmospheric conditions during and after use. The electric parts of the hoist and trolley have IP55 protection, however, protecting the hoist and trolley with a shelter of some kind is recommended (fig.49).

To avoid oxidation protect the structure by using a suitable treatment and lubricating the rotating mechanisms. Outdoor use of the jib crane is possible when there are no exceptional atmospheric conditions, which can modify the values of the foreseen loads, for example: heavy rain, heavy snow, stormy winds, etc.



In the standard version the crane must not be used in environments or areas:

- With highly corrosive and/or abrasive vapours, smoke or dust (when this cannot be avoided intensify the maintenance cycles).
- Where there are flames and/or heat above the temperature permitted.
- With risks of fire or explosion and where flameproof and spark-proof components are required.
- Where strong electromagnetic fields are present which can generate an accumulation of electrostatic charge.
- In direct contact with loose foodstuffs.

5.2.2 Danger zones and people exposed to risk

§ Danger zones are all areas, in any operative phase, where the people present can be subjected to a risk which constitutes a danger for their safety, health or psychophysical integrity. It is necessary to inform the **people potentially exposed**, that the jib crane operator does not always work with sufficient visibility to prevent all potential risks of crushing, hitting and dragging. These people must, therefore, take care to avoid exposing themselves to such risks during manoeuvres in these areas (fig. 50).



The purchaser must adequately signal danger zones to forbid or limit access by outside people or unauthorised staff in the areas where the hoist operates, as outlined by the current regulations in force.

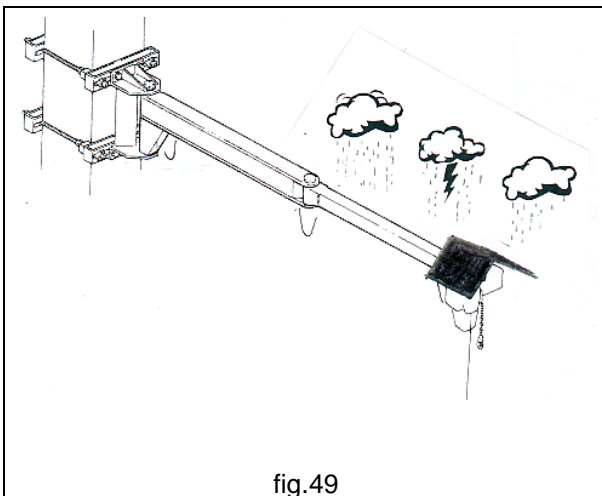


fig.49

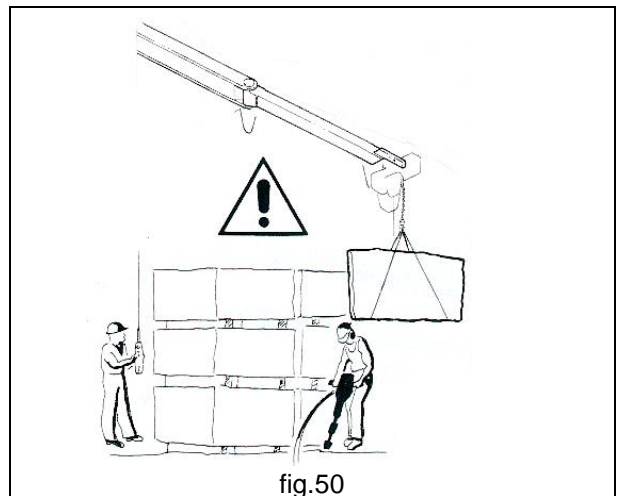




fig.50

5.2.3 Illumination of the work area

§ The column-mounted – series CBB and wall-mounted – series MBB jib cranes do not have their own lighting system. Therefore, the work place of the crane operator must be adequately illuminated in order to guarantee maximum visibility.




	<ul style="list-style-type: none"> • The level of illumination must guarantee the maximum level of safety possible for the operation of the crane (fig.51). • The installation of a supplementary lighting system is obligatory in zones with insufficient illumination, avoiding shadows which impede or reduce visibility in the operative and/or neighbouring areas. 	
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5.2.4 The operator

§ **The operators** are all those who, from time to time, perform the following activities on the jib crane:


- transportation, handling, assembling, installation, regulation and testing.
- starting, use, cleaning, maintenance and repair.
- disassembly, dismantling, and demolition.

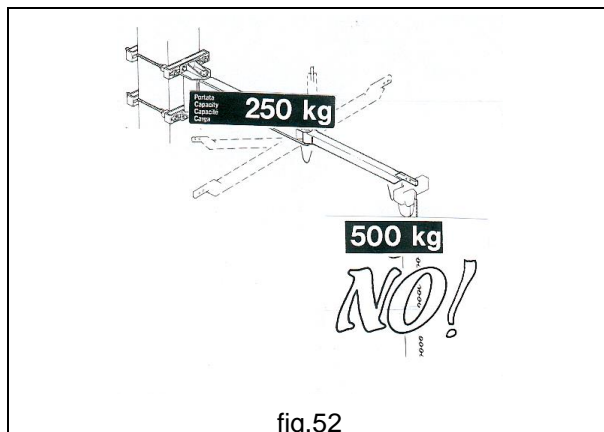
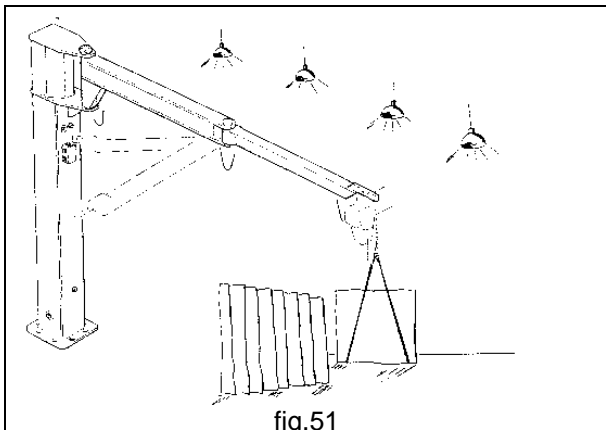
- **The operators** must be people suited to the work and psychophysically able to cope with the demands connected to the activities related to the jib crane during all operative phases and in particular during the slinging and handling phases.
- **The crane operator** must position himself so as not to compromise his own safety, foreseeing and/or preventing and, therefore, avoiding possible dropping of the load being transported, and dangerous movements. He must follow the specifications supplied to ensure maximum safety for himself and for others during use of the machine, in particular he must strictly adhere to the specifications contained in this manual.

	<ul style="list-style-type: none"> • The operator must not let anybody come near during the handling of the jib crane and forbid the use to external people, in particular to people under 16 years of age. • The use of the crane is forbidden to non-authorized or untrained people. • The operator must use suitable personal protection devices (PPD = gloves, protective footwear) 	 
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5.2.5 The lifting capacity of the jib crane

§ **The lifting capacity** of the jib crane, in its original operative configuration, is clearly indicated on a plate attached to it and also to the hook block and is visible from the command post.


	<ul style="list-style-type: none"> • The loading capacity of the crane and its accessories must never be overcome by applying overloads (fig.52). <ul style="list-style-type: none"> • The crane must never be equipped with a lifting device (hoist) with a nominal lifting capacity superior to that of the crane. • The speed limit for lifting of 24m/min must never be exceeded if not reducing the lifting capacity of the crane accordingly.
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5.2.6 Manoeuvres: lifting and arm rotation

§ It is a good rule to perform one movement at a time, because only in this way can a manoeuvre be started, stopped and constantly followed by the operator, who also has to avoid continuously switching the machine on and off even for little movements.

- Engagement of the load by the hook of the hoist and by the lifting accessories must be carried out with great care, delicately and without jolting.
- Begin a lifting operation by slowly stretching the chain until the load has been lifted by a few centimetres, stop the manoeuvre and check the hold and stability of the load.
- At the end of the manoeuvre, place the load on the ground carefully and remove the hook of the hoist.
- **During lifting manoeuvres** the operator must avoid resting the hook on the ground or on loads to be lifted, to avoid free oscillation of the chain. The operator must absolutely avoid making skew falls with the chain, which are always dangerous and difficult to control (fig.53).
- **During manual rotation manoeuvres of the arm** the operator must handle the load by pushing it and never by pulling it towards himself, to avoid the risk of crushing (fig.54).

	<ul style="list-style-type: none"> • Operate with care and diligence, follow the manoeuvre constantly and visually check the balance of the mass being moved. • Avoid sharp or jolting movements which are very damaging to the stability of the load because of the dynamic effects which are generated. • Never lift loads with an unbalanced and non barycentric engagement. Never neglect to hook the load and secure all original sling accessories. Do not secure the load with improvised slinging. • Never leave the load suspended, once the handling operation has begun it must be completed in the shortest time possible and the load must be positioned without crushing the lifting accessories.
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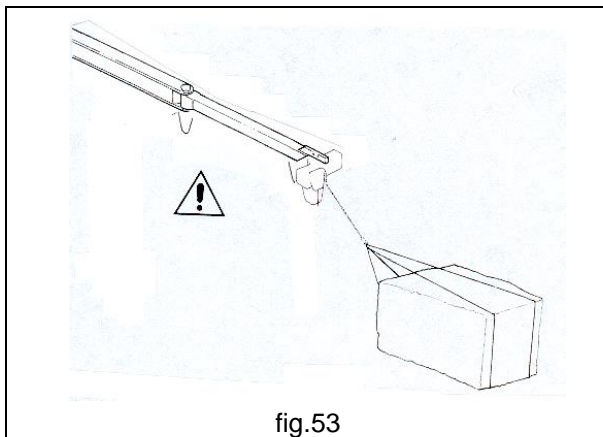


fig.53

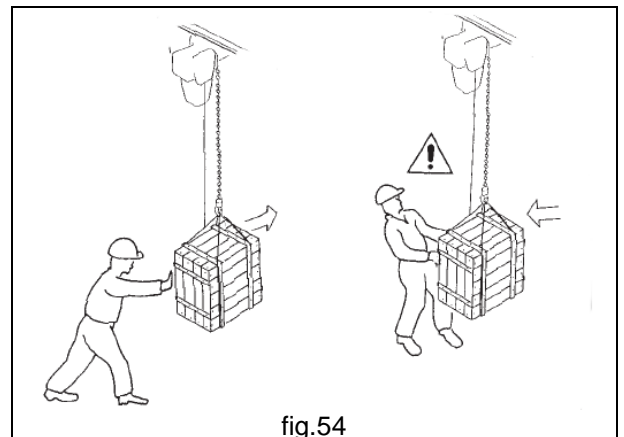


fig.54

5.2.7 Safety devices


§ Cutting out the power supply of the crane must be done by switching off the line switch-selector (not included in the supply) and/or by pushing the “emergency stop” button on the push-button panel.

§ An electric and/or mechanical lock prevents simultaneous use of commands for the two directions of the motors for both high and low speeds.



§ A lack of voltage causes all movements of the hoist to be stopped immediately, as the motors are equipped with an automatic braking device.

§ A safety latch is installed on the lifting hook to prevent accidental unhooking of the slinging and/or load.

§ The lifting, and rotation limit switches bound the maximum vertical and horizontal travel of the load. They are emergency devices and are not suitable for turning off the machine or to begin new operations.



	<p>• When the safety devices are not supplied by DONATI SOLLEVAMENTI S.r.l., they must be installed by the purchaser.</p>
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5.3 - Setting up – Starting the jib crane

	To begin operational activities with the crane carry out the following operations:	
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1. Visually check the integrity of the crane and the structures on which it is installed. Pay particular attention to the rope, hook and related safety latch.
2. Carry out all preliminary checks as described in paragraph 5.5 "Criteria and precautions of use".
3. Turn on the power supply by putting the main switch in the "ON" or "1" position.
4. Ensure that no people are exposed in danger zones.
5. Place the red mushroom-shaped "**emergency stop**" button in the position which allows movement.
6. Activate all functions by pushing, if available, the "**forward**" button.
7. Verify proper functioning of the safety devices by checking the movements as described in paragraph 5.1 "Functions of the jib crane".

5.4 Switching off at the end of use

	To shut down the crane at the end of work it is necessary to:	
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1. Position the arm in recovery position ensuring it is stable and taking care that it does not create a risk of collision or interference with the surrounding structures and/or machines.
2. Free the lifting hook of any slinging used to move the load.
3. Lift the hook, when possible, to a height of no less than 2.5 m so that it does not obstruct or create danger for people or things below the crane.



When a manual hoist is used:

4. Check that the manoeuvre chain does not create risks caused by entangling.

When an electric hoist is used:

5. Halt all the crane movements by pushing the "stop" button on the push-button control panel.
6. Put the push button control panel in the "obstruction" position.
7. Cut off the power supply by turning the general switch to "OFF" or "0" (zero).



5.5 - Criteria and precautions of use

	<ul style="list-style-type: none"> • The correct use of the jib crane guarantees the safe and full performance of the machine. • These potentialities are only guaranteed if the following instructions are strictly adhered to: 	
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- **ALWAYS** follow the directions and instructions in the use and maintenance manuals and check the integrity of the components and parts of the crane.
- **ALWAYS** heed the instructions and warnings displayed on the machine; the warning label plates located on the crane and in the manoeuvre zone are accident-prevention signs and must always be perfectly legible.
- **ALWAYS** ensure that the crane operates in an environment protected from atmospheric agents (rain, wind, snow, etc.), or, if in the open, that it has adequate shelter or protection.
- **ALWAYS** check that the capabilities of the crane correspond with the job which needs to be done (work cycles – intermittence – duration of use – load to be moved).
- **ALWAYS** check the suitability of the structures (walls, columns, foundations) which support the jib crane
- **ALWAYS** ascertain the adequacy of the state of maintenance of the crane (cleaning, lubrication) and its main components (hook, chains, push-button control panel, limit switches, motoreducers, wheels, brakes, etc.)
- **ALWAYS** verify the correct response of the movements of the hoist.
- **ALWAYS** test the functioning of the emergency stop button.
- **ALWAYS** check the efficiency of the brakes and of the limit switches and of the electric system.
- **ALWAYS** check the efficiency of the chain, hook block, hook and push-button panel and that they are intact.
- **ALWAYS** ensure that the hook is not worn, damaged or without a spring catch.
- **ALWAYS** check the suitability and efficiency of the slinging (ropes, chains, bands,...).

- **ALWAYS** when moving manually push the load and avoid pulling it towards it self.
- **ALWAYS** ensure the lifting unit (hoist and hook) is centered on the perpendicular of the load before slinging and moving it.
- **ALWAYS** appropriately secure the load slings to the lifting hook and stretch the slings with slow, safe movements.
- **ALWAYS** operate in the best conditions as far as lighting and load visibility are concerned.
- **ALWAYS** ensure, before maneuvering, that the rotation of the arm is free from obstacles and that during lifting, travelling and rotation, the load does not meet obstacles.
- **ALWAYS** operate outside the maneuvering area of the lifted load.
- **ALWAYS** carry out the handling avoiding jogging.
- **ALWAYS avoid to cause hunting of the load.**
- **ALWAYS** use "slow" speeds for approaching and positioning operations.
- **ALWAYS** at the end of work, position the crane arm, the load hook and the push-button panel, so they are not a collision risk .
- **ALWAYS** push the red emergency stop button on the push-button panel before leaving the command post and switch off the cutout switch of the crane.
- **ALWAYS** switch off power to the machine during checks, repairs, ordinary maintenance.
- **ALWAYS** for all operations, use adequate safety protection devices (DPI, gloves, etc.).
- **ALWAYS** point out any functioning anomalies (faulty working, possible breakings, incorrect movements and unusual noise) to the person in charge of the specific department and put the machine out of service.
- **ALWAYS** follow the maintenance programme and record, for each check, any specific observations, especially regarding the hook, chains, brakes, and limit switches.

5.6 - Contraindications of use

	<ul style="list-style-type: none"> • The use of the jib crane for manoeuvres which are not permitted, improper use and a lack of maintenance can carry risks of grave danger for the health and safety of the operator and of the people in the area, as well as risks of damage for the work environment and can compromise the functionality and intrinsic safety of the machine. • The actions described below, which obviously cannot cover the entire range of possible "bad uses" of the crane, are the most predictable ones, and are absolutely forbidden: 	
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5.6.1 Use not intended and not allowed - Foreseeable and unforeseeable inappropriate use

- **NEVER** use the crane to lift and transport people.
- **NEVER** lift loads heavier than the nominal lifting capacity nor equip the crane with hoists with a nominal lifting capacity greater than that of the crane itself.
- **NEVER** lift loads while people are walking under the suspended load.
- **NEVER** walk, stop, operate and maneuver under the suspended load.
- **NEVER** permit unqualified staff or under 16 years of age to use the crane.
- **NEVER** use the crane unless psychophysically suited to the work.
- **NEVER** use the crane unless provided with suitable personal protection (PPD, gloves, etc.)
- **NEVER** operate without taking the necessary care during lifting and travelling and rotation of the arm maneuvers.
- **NEVER** rotate the arms of the crane using the cable of the push button panel.
- **NEVER** touch the slings during tensioning in contact with the load and between the hook and the slinging.
- **NEVER** leave the suspended load unattended.
- **NEVER** use the crane for jobs other than those for which it was designed, do not use it for other operations such as painting ceilings, changing light bulbs, a place to rest scaffolding on, etc.
- **NEVER** lift unbalanced loads.
- **NEVER** allow the load or the hook to swing during translation or rotation.
- **NEVER** place the chain in a diagonal position for pulling.
- **NEVER** use the crane or its lifting apparatus for pulling or dragging.
- **NEVER** use slings without having previously checked their suitability.
- **NEVER** use the chain of the hoist for grounding a welder.
- **NEVER** lift loads with the hoist.

- **NEVER** use the crane to keep tension or to extract elements tied to the ground.
- **NEVER** perform a hook run, after having positioned a load, in a way which causes the chain to wobble.
- **NEVER** hit the supporting structures of the building, of machines and systems with the load or the arm.
- **NEVER** use two cranes at the same time to lift the same load .
- **NEVER** employ two simultaneous movements when using the crane, wait until the movement has come to a complete stop before beginning another.
- **NEVER** use the crane in unforeseen atmospheric conditions or, if installed outside, in hostile, unfavourable and /or dangerous atmospheric conditions (strong wind, heavy rain, etc.).
- **NEVER** use or act on the hoist in conditions where illumination and/or visibility are insufficient.
- **NEVER** use the crane where the use of flameproof componentry is required.
- **NEVER** use the limit switch devices and the overload device continuously.
- **NEVER** approach at maximum speed the areas of “end of the runs” when rotating.
- **NEVER** use the crane when there is a large drop in the voltage or when one of the phases is lacking.
- **NEVER** perform sudden changes of direction during lifting and rotation operations.
- **NEVER** press the control buttons on the push-button panel repeatedly.
- **NEVER** modify the function characteristics of the crane and/or its components.
- **NEVER** tamper with the settings of the safety-devices (limit switches, clutch device).
- **NEVER** carry out temporary repairs or procedures for putting the machine back into operation which do not comply with the instructions.
- **NEVER** use non-original spare parts or spare parts which have not been recommended by the manufacturer.
- **NEVER** leave the crane at the end of a job without having implemented the safety procedures.
- **NEVER** carry out maintenance, inspections or repairs without having put the crane out of service.
- **NEVER** during maintenance work:
 - use unsuitable equipment.
 - lean ladders on the column, on the hoist, on the trolley, or on the arm of the crane.
 - work without personal protection devices.
 - carry out work without having removed the load.
- **NEVER** use the crane if it is not totally responsive in all its operating functions.

6. - MAINTENANCE OF THE JIB CRANE

6.1 Safety precautions

§ The precautions to prevent accidents contained in this paragraph must always be strictly adhered to during maintenance work, with the aim of avoiding damage to staff and to the hoist.

	<ul style="list-style-type: none"> • Maintenance staff of the jib crane must: • be well trained. • have read this publication. • have an excellent knowledge of the accident prevention regulations. • Unauthorised staff must be outside the work area during operations. 	
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§ Such precautions are covered in greater detail in this chapter, whenever a procedure which may carry a risk of damage or accident is required, through **WARNING** and **DANGER** notes:

	WARNING notes precede an operation which, if not correctly carried out, may cause damage to the crane and its components.
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	DANGER notes precede an operation which, if not correctly carried out, may cause injury to the operator.
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	Pay attention to the following WARNING NOTES during maintenance work:
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	Before putting the jib crane back into operation after a breakdown, it must be inspected thoroughly and checked for evidence of any damage which may have occurred and the procedure in paragraph 5.3 must be repeated.	
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	Never alter the settings or positionings of the safety devices, unless expressly required in order to deal with a breakdown. Tampering with them can cause serious damage to the crane and its components.	
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Pay attention to the following DANGER NOTES during maintenance work:



When not required cut out the electricity supply of the crane before carrying out any maintenance work on it. Affix a sign reading: MACHINE UNDER MAINTENANCE – DO NOT INSERT ELECTRICITY SUPPLY.



NEVER exclude the safety and protection devices installed on the jib crane. If this became necessary, mark with suitable warning signs and operate with maximum care.



Always check the presence and suitability of earthing connections and that they correspond to regulations. If earthing is not installed with electric equipment serious harm could be done to people.



Avoid use of flammable or toxic solvents (petrol, ether, alcohol, etc.). Avoid long periods of contact with solvents and inhalation of their vapours. Avoid, in particular, use near open flames.



Before turning on the crane always ensure that the maintenance staff are at a safe distance (not at a height) and that tools or other materials have not been left on the crane.



Always use protective gloves during maintenance work.



All accessible moving parts, excluding only the chain and block, must be protected against accidental contact. Put back the protection devices before putting the hoist into operation.



Never use water in case of fire; disconnect all electrical currents and use suitable fire extinguishers.



Ensure that all tools to be used are in perfect condition and have insulating handles where required.



Pay utmost attention to all the REMAINING RISKS highlighted on the hoist and in this publication.



6.2 The qualifications of maintenance staff

§ To be capable to adequately carry out maintenance work of jib cranes maintenance staff must:

- know the laws in force related to accident prevention during work carried out on machines with motor transmissions and be able to apply them.
- have read and understood chapter 3 "Safety and Accident Prevention".
- be able to use and consult this document.
- know the functioning of the machine.
- recognise irregularities regarding functioning and when necessary take necessary measures to rectify them.

§ Professional figures appointed and authorised to carry out maintenance on the crane are:

	Operator of the jib crane.	
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- **Typical maintenance activities:**
 - Verification of proper functioning of the jib crane. Cooperation with staff appointed to periodical and/or extra maintenance work, after having informed them of any anomalies found in the functioning.
 - Cleaning and lubrication of the parts of the crane (hoist) which the operator is normally in contact with (push-button panel, hook) and simple maintenance work which does not require intervention at a height (e.g. lubrication of the thrust bearing of the hook).
- **Technical knowledge required:**
 - knowledge of the functions and use of the jib crane
 - knowledge of the lubricants utilised in the crane and in the hoist and of the dangers associated with their use.
- **Qualification required:**
 - suitability to the work in relation to the specific operative and environmental characteristics.

	Mechanical maintenance officer.	
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- **Typical maintenance activities:**
 - mechanical regulation of the clearance of brakes and mechanisms.
 - test movements and mechanical regulation of the safety devices.
 - check mechanical clearance and wear of the components (chain, hook, etc.).
 - replacement of components which can wear out (chain, hook, chain guide, pulleys) according to this publication.
 - ordinary maintenance of mechanical units after substitution of parts with original spare parts.
- **Technical knowledge required:**
 - good knowledge of mechanical lifting systems and handling with a manual and motor driven system.
 - good knowledge of safety devices used on the hoist (limit switches, brakes, overload switch, etc.).
 - basic knowledge of the moderately difficult techniques for electric checking and adjustment (limit switch adjustment, replacement of fuses, motor connection, etc.).
 - knowledge of the methods of measurement and testing to determine the actual state of the conditions of the crane and of the hoist (tests of: brakes, chain and hook wear, anomalous noise, etc.).
 - logical trouble-shooting methods of non complex breakdowns and evaluation of the results.
 - ability to arrange the necessary measures to put the hoist back into working order.
 - ability to write a maintenance intervention report.
- **Qualification required:**
 - Complete training of an industrial mechanic having a specialisation in and experience of lifting-system maintenance or of industrial handling.

	Electrical maintenance officer	
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- **Typical maintenance activities:**
 - intervention on the electrical equipment beginning from the electrical circuit diagrams.
 - test of the execution of movements and electric adjustment of the safety devices.
 - check of the wear of electrical components (contacts of the electrical equipment).
 - repairs of the electric units after replacement of parts with original spare parts.
- **Technical knowledge required:**
 - good knowledge of electrical plants and installations.
 - good knowledge of the electrical componentry and of the safety devices used in the hoist (limit switches, brakes, etc.).
 - knowledge of moderately difficult electrical checks and adjustments (replacement according to the original diagrams: motors, limit switches, push-button panel, control console, cables, etc.).
 - basic knowledge of moderately difficult techniques for mechanical checks and adjustments (wear testing, adjustment of mechanical stops, etc.).
 - knowledge of the methods of measurement and testing to determine the actual state of the conditions of the hoist (tests of the efficiency and reliability of the electrical equipment).
 - knowledge of trouble-shooting methods in case of power failure or breakdown and experience of electric command and control systems of lifting and handling equipment.
 - ability to arrange the necessary measures to put the hoist back into working order.
 - ability to write a maintenance intervention report.
- **Qualification required:**
 - Complete training of an industrial electrician having a specialisation in and experience of lifting-system maintenance or of industrial handling.

	Electromechanical maintenance officer: He is an operator whose professional profile, as well as including the typical characteristics of the electrical maintenance officer, also combines and synthesizes the competence and abilities required of the mechanical maintenance officer	 
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	Mechanical technician	
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- **Typical maintenance activities:**
 - mechanical adjustments of the safety devices, calibrations and tests (annual load test).
 - normal maintenance work after substitution of complex and/or critical mechanical componentry in order to maintain safety levels (fixing components, arm, reducers, motors, etc.).
 - repair of mechanical units after extra maintenance work has been carried out (structural repairs requiring soldering, mechanical work on board of the crane, etc.).
- **Technical knowledge required:**
 - knowledge of industrial mechanical lifting and handling systems with proof of specific training.
 - specific knowledge of safety devices used on the hoist (limit switches, brakes, overload switch, etc.).
 - basic knowledge of techniques for electric checking and adjustment (motor test).
 - specific competence about the methods of measurement and testing to determine the actual state of the conditions of the crane and the hoist (test of: brakes, push-button panel, control console, limit switch etc.).
 - specific competence of logical trouble-shooting methods in case of breakdown and evaluation of the results.
 - ability to direct the necessary measures to put the jib crane back into working order.
 - ability to write a maintenance intervention report.
- **Qualification required:**
 - Complete training as industrial mechanical technician and specific competence in lifting and handling systems.

**Electrical technicians.**

- **Typical maintenance activities:**
- electrical adjustment of safety devices, calibrations, and tests (annual load test).
- normal maintenance work after substitution of complex and/or critical electrical componentry in order to maintain safety levels (lifting limit switch, motors, B.T. switchboard).
- repair of electrical units after extra maintenance work has been carried out (repair of the electric motors with partial replacement, replacement of limit switches with variation in position, etc.).
- **Technical knowledge required:**
- very good knowledge of electrical systems and installations on industrial lifting and handling equipment • specific knowledge of the electrical componentry and of the safety devices used in the hoist (limit switches, brakes, overload switch, etc.).
- experience of the techniques used in electrical checks and adjustments (ability to alter the original diagrams to make improvements on: limit switches, push-button panel, control consoles, cables, etc.).
- knowledge of the techniques for mechanical checks and adjustments (wear testing, test performance of mechanical components, adjustment of mechanical stops, test noise level, etc.).
- specific competence in the methods of measurement and testing to determine the actual state of the conditions of the hoist (tests of the efficiency and reliability of the electrical equipment) • specific competence in trouble-shooting methods in all types of breakdown and evaluation of the results on the command and control electrical equipment of lifting machines.
- capacity to manage the measures necessary to put the jib crane and the hoist back into action and performance.
- ability to write a maintenance intervention report.
- **Qualification required:**
- Complete training of an industrial electrical technician having a specialisation in and specific experience of electrical apparatus of lifting and handling systems.

**Electromechanical technician:**

He is a highly specialised and specifically trained operator, whose professional profile combines and synthesizes not only the abilities and knowledge typical of the electrical technician, but also those of the mechanical technician.

**Special recommendations regarding maintenance:**

- 1.If performed correctly maintenance work guarantees the safety of jib crane operators and reduces downtime to a minimum after a breakdown.
- 2.Repairs carried out opportunely prevent further deterioration of the crane and its components.
- 3.Use original spare parts and products.
- 4.To prepare the crane for maintenance work the following rules must be followed:
 - The staff appointed to do the ordinary or extraordinary maintenance work must have read and understood well all the instructions contained in this chapter and in chapter 3.
 - Extraordinary maintenance work must only be carried out by authorised, qualified staff, trained for the job.





Maintenance work must be carried out, when possible, while the crane is not connected to the power supply and in safe conditions, using suitable tools and adequate personal protection devices, in accordance with the regulations in force, and affixing a sign with the warning: “MAINTENANCE WORK IN PROGRESS”.



For problems which may come about or to order spare parts contact the DONATI SOLLEVAMENTI S.r.l. Technical Assistance Service.

6.3 Maintenance plan




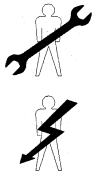


§ The maintenance plan includes ordinary types of work, such as inspections, checks and tests conducted by the operator and/or by qualified staff appointed for normal company maintenance and periodical maintenance, which includes replacement, adjustments and lubrication, carried out by technical staff trained for the job through specific courses and publications.

	<ul style="list-style-type: none"> • As maintenance work can be carried out at a dangerous height, staff must have appropriate means of support (scaffolding, platform, ladders etc.) which allows the work to be performed in safe conditions. • Staff must also have suitable personal protection devices (PPD) as set out by legislation in force. 	
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6.3.1 Daily and periodical maintenance

§ It includes maintenance work which can be performed directly by the crane operator or by qualified staff, as instructed in this publication and/or in attached documentation, which do not require the use of special instruments or equipment.






































§ Maintenance operations are divided into:

	<p>Daily intervention to be performed by the crane operator:</p> <ul style="list-style-type: none"> • general visual check. • functional checks: motors, limit switches, clutch device, empty test runs, push-button tests of “stopping” and of the other functions of the push-button panel. • check of the state of the chain and hook. • check the correct rotation of the crane arm. 	
	<p>Monthly intervention to be performed by qualified staff:</p> <ul style="list-style-type: none"> • Visual check of every gear and for possible lubricant leakage. • Function check of the break at full load. • Check that anomalous noise and/or vibration are not present. • See to the lubrication of the gears and limit switches to guarantee normal functioning and to limit wear. • Check the functionality and integrity of the push-button panel and relative cable. 	
	<p>Quarterly checks to be performed by qualified staff:</p> <ul style="list-style-type: none"> • Check efficiency and wear on: hook, chain and chain guide bar. • Check wear on and hook block/underblock. • Verify efficiency and functionality of overload switch. • Visual check inside switchboard for the presence of dust. • Check and cleaning of oxidised contacts and of any connectors outlets/plugs. • cable check. • Check efficiency and integrity of electricity supply line and its components. • Loaded check of motors and brakes and verify level of wear. • Check of efficiency and conservation of the structure (paintwork, corrosion, etc.). 	

6.3.2 Frequency and deadlines for maintenance work

§The periodicity of the following operations is for jib cranes used in normal working conditions and is valid up to the M5 group (ISO norm 4301/88) or 2 m (FEM rule 9.511).

§If the jib crane is used normally and correctly for a daily 8 hour shift, overhaul can take place after a period of about 10 years (FEM rule 9.755 – S.W.P.). If used during a number of shifts then the maintenance periods must be reduced proportionately.

Table of periodic checks and maintenance					
Object of the check ↓	Periodic checks				Page
	Daily	Monthly	Quarterly 	Annually 	
Checks Inspections - Testing	 General visual checks. Verify good functioning	 General visual inspections	  Wear check	  Annual test	34
Signs pictograms warning signs and plates	 Legibility of signs and pictograms, warning signs and plates	 Visual inspections of wholeness and cleaning of plates and signs	  Check suitability		19
Structural elements Welding Pivots Bolted couplings				 Wear and efficiency check Check bolted and soldered joints	53
Chain Securing elements	 Visual inspection		 Wear and efficiency check		Hoist manual
Lifting hook	 Visual inspection and check safety latch		 Wear and efficiency check		Hoist manual
Load whorl Chain guide Transmission of the hook block			 check Wear and efficiency		Hoist manual
Lifting reducer		 Noise check			Hoist manual
Lifting motor	 Check correct functioning		 Loaded testing		Hoist manual
Lifting brake Rotation brake	 Check correct functioning	 Loaded testing of braking distances	 Loaded testing Wear check		Hoist manual
Rotation bearings			 Wear check		Hoist manual
anti-collision lug	 Visual check			 Wear and efficiency check	Hoist manual
Electrical system Push-button panel and cable	 Check correct functioning	 Visual inspection for external breakage push-button panel/cable	 Wear and efficiency check		Hoist manual
Overload switch Clutch device			 Loaded testing	 Calibration check	Hoist manual
Lifting limit switch	 Check correct functioning		 Loaded testing Wear and efficiency check		Hoist manual
Cleaning and lubrication	 Check correct state of cleanliness and lubrication	 Inspection of general lubrication	 Leakage check Rubricate chain, hook and mechanisms		Hoist manual

6.3.3 Check of efficiency of parts and components



For the individual parts of the jib crane the following instructions must be strictly adhered to:



Annual check of the efficiency of structural elements, welding, pivots and bolted couplings (fig.54):



- The metal structures of the jib crane, as well as normal alterations due to environmental factors and wear of mobile parts (hinges), can be subject, even inadvertently or during handling operations, to bumps, contact or grazing with other equipment or to anomalous strain which can cause damage to the frames, welding and pivots. Therefore, after careful cleaning, the structures must periodically undergo scrupulous checks to ensure their suitability and if necessary, any damage be remedied.
- The brackets, composed of plates and pivot, which form hinged elements, are subject to wear as they are mobile, swinging elements exposed to sliding friction in the areas of contact. If excessive wear is found, substitute them during the check.
- All screw bolts, high resistance plugs and pins must be disassembled and carefully checked annually, and so must the relative seatings.
- Check the clamping couple of the fixing bolts of the column and the bracket, according to the given couples.



Repair or substitute hinged parts where one finds:

- **deformation:** lengthening, crushing, staining, bending.
- **wear:** worn parts, scarcement, incisions, abrasions, corrosion, oxidation, scratching, peeling point.
- **breakage:** cracks in the welding, cracking, cuts or incisions, broken parts.
- **variation of a section $\geq 10\%$, or of the diameter or thickness $\geq 5\%$ compared to initial values.**

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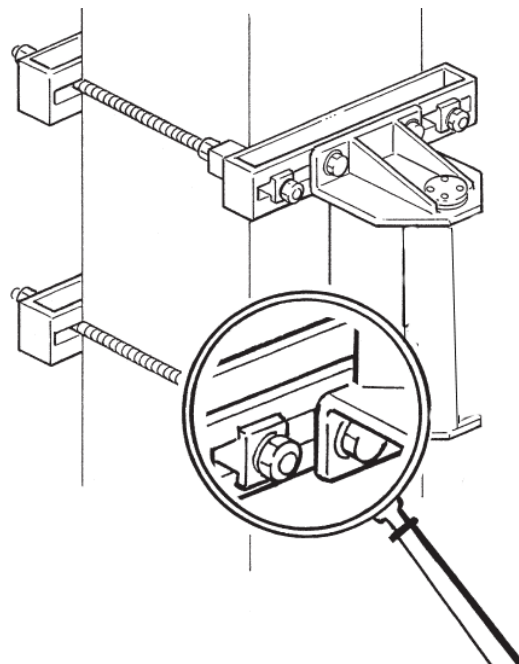













fig.54




	Quarterly check of the efficiency of the brake of the rotation arm of the crane:	
<ul style="list-style-type: none"> Check the stability of the arms when empty and when fully loaded, at the end points and intermediate points of rotation; then checking that the arms, in any point of the rotation, keeps its position with moving spontaneously. When necessary have the brake of the crane adjusted, as described in paragraph 6.4.1 "Adjustment of the rotation brake of the crane arm". 		
	<ul style="list-style-type: none"> Replace the clutch plates of the brake when there is instability of the arm after adjusting the brake. IN CASE OF ANOMALIES: <ul style="list-style-type: none"> It is forbidden to carry out corrective maintenance work on the brake of the rotation arm of the jib crane. Any operation, outside normal maintenance, on the brake of the rotation arm of the crane can be done by the assistance service of DONATI SOLLEVAMENTI S.r.l. or by staff authorized by them. 	TECNICO DONATI   DONATI SERVICE

	Quarterly check of the efficiency of the electric power supply:	
<ul style="list-style-type: none"> Check the efficiency of the power cable, check there is no peeling, cuts, lacerations or other changes in the protection sheath. Check the seal of the protectors, the power cable, their clamps (in the connector block) and, if necessary, tighten them correctly. Check the efficiency of the conductors and the grounding connections, carrying out a check, and, if necessary, fixing all the grounding screws. Carry out a check of all the weather strips of the covers and the cable clamps. Check there are warning plates and that they are visible. 		
	<ul style="list-style-type: none"> Do not hesitate to replace the electrical component, if it is no longer giving sufficient guarantee of functional reliability. Never carry out improvised repairs. Use original spare parts. 	



	For information about checks of all the structural, mechanical and electromechanical components of the lifting units of the jib crane, see the relevant documentation included in this technical publication.
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	<ul style="list-style-type: none"> Don't hesitate to replace the part and /or the component in question, when it no longer gives sufficient guarantee of safety and/or functional reliability. Never carry out improvised repairs!
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6.3.4 Cleaning and lubrication of the jib crane

	<ul style="list-style-type: none"> • Cleaning can be carried out by staff who are not highly specialised. • It is necessary to keep clean the following elements at regular intervals: • structure of the jib crane (column, bracket, arm, etc.). • mechanisms of the jib crane (pivots, braking device). • electric parts of the jib crane (festooned cable, sleds, etc.). • components of the lifting unit (wheels, chain, hook, hook block, push-button panel, etc.). • Cleaning at a height must be carried out by qualified staff equipped with suitable means and personal protection measures. • These operations are necessary every three months to allow the performing of the periodical checks. 	 
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- Cleaning can be simply done using means, equipment, and detergents and solvents commonly used in general cleaning operations of industrial equipment as there are no particular contraindications regarding the use of products or materials.
- Clean away any foreign fouling substances with aspirators, absorbent cloths, etc.
- Dry the grease and/or oil in excess on the parts.







	<p>The careful lubrication of the mechanism of the jib crane is necessary to guarantee the efficient service the hoist is intended for, as well as its duration.</p>	
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- Over time the lubricating power is diminished due to the load stress, therefore proceed to the adjustment or renewal of the lubricants.
- The lubrication of the jib crane is very easy: apply a light amount of oil or grease, between the bearings and pivots, in the rotation points of the arm.
- It is very important to lubricate the lifting and translation mechanisms and the lubrication cycles for them are contained in the relevant technical publications included with this one.

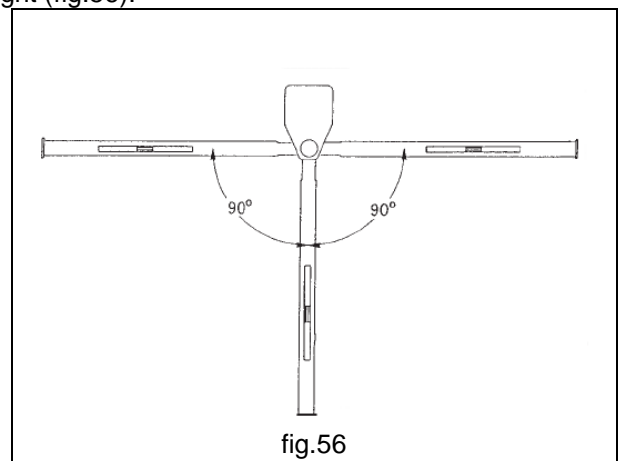
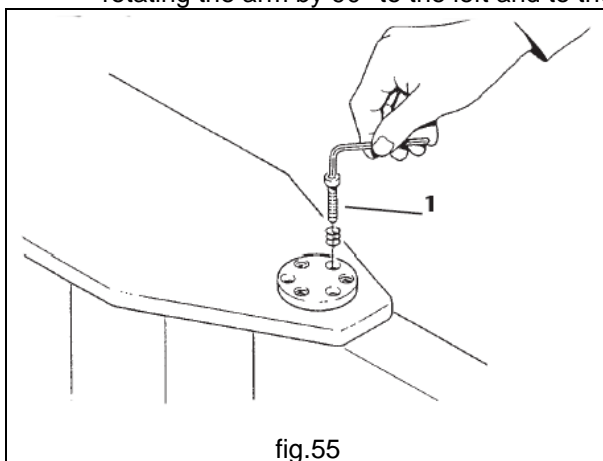
	<ul style="list-style-type: none"> • Lubricants, solvents and detergents are products which are toxic or damaging to health. • If they come into direct contact with the skin they can cause irritation. • If inhaled they can cause serious poisoning. • If swallowed they can cause death. • Use them with care using adequate personal protection measures (DPI) Do not dump them, dispose of them in conformity with the legislative measures currently in force for toxic/harmful waste.
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6.4 Adjusting and regulating

6.4.1 Adjusting the rotation brake of the crane arm

REMAINING RISKS IF ON THE CRANE DURING THE ADJUSTMENT OF THE BRAKE		
DANGER / RISK	BAN / WARNING	OBLIGATION / PREVENTION
		
Risk of crushing in case of contact with the rotation arm when adjustments of the brake are being made.	Warning! Exposure to moving parts can cause danger.	<ul style="list-style-type: none"> Adjustments of the brake must be carried out by qualified maintenance staff. Use of protective gloves and, if necessary, safety harnesses.
	<ul style="list-style-type: none"> The brake of the jib crane must be adjusted so as to guarantee the stability of the arm in any of its positions with a maximum load. The braking is mechanical and is ensured by two pushed clutch plates which with adjusting screws work on a pressure plate, in contact with the rotation tube of the arm. The clutch plates, which are asbestos-free, are subject to wear in relation to the intensity of service and when, after a period of use, there is a tendency of the arm to take up preferred positions putting itself in different positions to those required when the rotation action has not happened, adjustment must be made. 	
 	<p>To adjust the brake of the arm of the jib crane proceed as follows:</p> <p>WARNING! When this operation is carried out at a height, on a scaffolding or other mobile equipment, the use of safety harnesses is obligatory.</p>	

1. Regulate the slidability of the rotation of the arm, using the braking system by means of the adjuster screws 1 (fig.55).
2. Carry out the check of planarity of the arm with the help of a level. Carry out such a check rotating the arm by 90° to the left and to the right (fig.56).



	If the adjustment of the brake has been made several times and after the last adjustment the stability of the arm is not guaranteed, replace the clutch plates.
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6.5 Breakdowns and solutions

6.5.1 Main types of failure or breakdowns and possible solutions

§ In the columns of the table that follows the main conditions of bad functioning are shown, which can be reasonably foreseen and the type of problem, the potential cause of the breakdown and possible solutions.

Type of failure	Possible causes of breakdown	Possible solution
Rotation is blocked	<ul style="list-style-type: none"> a foreign body has entered the rotation. seizure of the bearings. 	<ul style="list-style-type: none"> remove the foreign body. replace the bearings.
Difficult rotation	<ul style="list-style-type: none"> scant lubrication of the bearings. 	<ul style="list-style-type: none"> Lubricate.
Instability of the positioning of the arm	<ul style="list-style-type: none"> excessive leaning of the rotation axis 	<ul style="list-style-type: none"> check the verticality of the crane and the clamping of the fixing system.



6.5.2 Authorised staff for intervention in case of breakdown

The staff authorised to intervene in most cases of breakdown, or where not indicated differently, are expert maintenance people or trained with a specific preparation on mechanical and electrical parts. Where shown, however, the intervention of specialised suitably-trained staff or the technical staff of the manufacturer is necessary.

6.5.3 Putting out of service

§ If the jib crane cannot be repaired, proceed to the putting out of service operations, signalling the breakdown with a sign; request the intervention of the assistance service.

6.6 Dismantling, disposal and scrapping

	If the jib crane or its components, whether broken, worn out or at the end of their designated life, should no longer be usable nor repairable their demolition must be carried out.	
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- The demolition of the jib crane must be carried out using suitable equipment chosen according to the nature of the material on which to intervene (e.g.: shears, oxyhydrogen flame, saw, etc...)
- All the components must be dismantled and scrapped having been reduced to small pieces so that none of them can reasonably be used again.
- When the jib crane is scrapped their parts must be disposed of taking into account the different nature of them (metals, oils and lubricants, plastic, rubber, etc.) using possibly specialised companies and in any case according to what the relevant law requires regarding solid industrial waste.

	Do not try to use again parts or components of the jib crane which look intact but, after checks and/or replacements carried out by specialised staff, or by the manufacturer itself, have been declared no longer fit for use.
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7. - SPARE PARTS



- The jib cranes are designed and manufactured, so as not to normally require spare parts **DUE TO BREAKDOWNS or BREAKAGES**, if used correctly and according to adequate maintenance as described in this manual.
- If necessary, consult the “jib crane components and spare parts”.
- The parts and components subjected to normal wear and tear, or deterioration are to be obtained from the manufacturer for a minimum period of 10 years.



- Do not hesitate to replace the part and/or component under examination, if it does not give sufficient safety guarantees and/or functional reliability.
- Never carry out improvised repairs!

If it is necessary to replace broken parts it is compulsory to use only original spare parts, requesting them directly from:



DONATI SOLLEVAMENTI S.r.l.
Via Quasimodo, 13 - 20025 Legnano (MI)
Tel. +39 0331.14811 - Fax. +39 0331.1481880



The use of non-original spare parts, as well as cancelling the warranty, can threaten the good functionings of the jib crane.