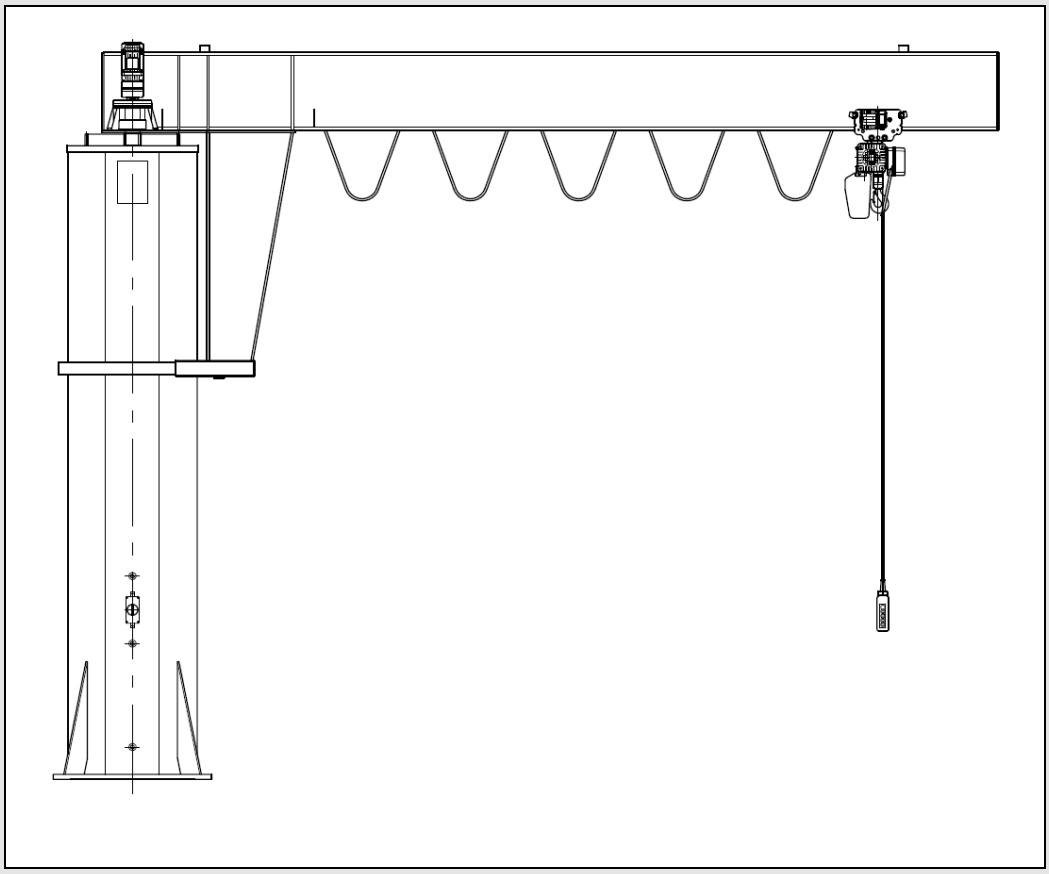
COLUMN-MOUNTED JIB CRANE

ELECTRICALLY/MANUALLY ROTATED - SERIES GBL



- INSTRUCTIONS

INSTALLATION - USE - MAINTENANCE

CE

KMAN10MG00

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1. - PRELIMINARY INFORMATION

1.1 Manual contents and recipients

§ This technical publication, marked with the code **KMAN10MG00**, refers to the **"Electrically or manually rotated, column-mounted jib crane - GBL series"**, manufactured and sold by the company:

DONATI SOLLEVAMENTI S.r.l.
Via Quasimodo, 17 - 20025 Legnano (MI)
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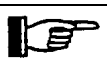
§ It is related to their "intended use", their functional technical specifications and performance and the relative installation, use and maintenance instructions. It is addressed to:

- the manager of the plant, garage or worksite
- operators assigned to transport, handling and installation
- operators assigned to use of the jib crane
- personnel assigned to maintenance

§ The manual must be kept by a person in charge of doing so, in a suitable place, so that it is always available for consultation in the best possible conditions.
§ If it is lost or deteriorates, replacement documentation must be requested directly from the manufacturer, quoting the code of this manual.

1.2 Symbols: meaning and use

§ Certain symbols are used in this manual to call the reader's attention and underline some particularly important aspects.
The following table shows the list and meaning of the symbols used in the manual

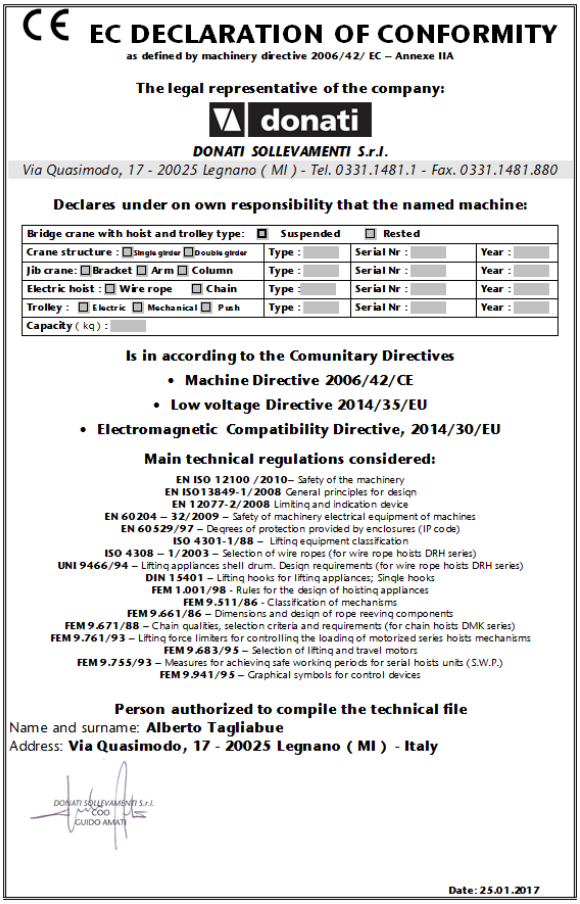
SYMBOL	MEANING	EXPLANATION, RECOMMENDATIONS AND NOTES
	**Hazard**	• Indicates a hazard with the risk of an accident, including fatal. • The failure to comply with the instructions marked with this symbol may result in a seriously hazardous situation for the operator's and/or exposed persons' safety! • **Carefully follow the instructions!**
	Warning	• Represents a warning note of a possible deterioration of the jib or a personal belonging of the operator. • **Important warning to pay attention to.**
	**Warning Note**	• Indicates a warning or a note on key functions or useful information.
	• **Visual observation** • **Actions to perform**	• A stylized eye may indicate to the operator that: **a)** He needs to make a visual inspection. **b)** He must proceed with the operating sequence. **c)** A measurement value needs to be read, a warning needs to be checked, etc.

1.3 Collaboration with the user

§ The manual reflects the state of the art at the time the machine was placed on the market, and is an integral part of the machine.
§ Any supplements to the manual that the manufacturer considers appropriate to send to the users must be kept together with the manual.
§ The manufacturer is available to its customers to provide additional information and to consider proposals for improvement in order to make the manual closer to the needs for which it was prepared.
§ If the jib crane is sold, the main user is asked to deliver, along with the hoist, this manual and the relative attached documentation (declarations, diagrams, test logbook, etc.).

1.4 Compliance with standards

The GBL series jib cranes are designed and produced in consideration of the **"Essential Safety Requirements" of Annex 1 of Machinery Directive 2006/42/EC** and are put on the market **with the CE mark** and **CE Declaration of Conformity - Annex II A**



CE **EC DECLARATION OF CONFORMITY**

as defined by machinery directive 2006/42/ EC – Annexe IIA

The legal representative of the company:

donati

DONATI SOLLEVAMENTI S.r.l.

Via Quasimodo, 17 - 20025 Legnano (MI) - Tel. 0331.1481.1 - Fax. 0331.1481.880

Declares under on own responsibility that the named machine:

Bridge crane with hoist and trolley type: ☒ Suspended ☐ Rested			
Crane structure : ☐ Single girder ☐ Double girder	**Type :**	**Serial Nr :**	**Year :**
Jib crane: ☐ Bracket ☐ Arm ☐ Column	**Type :**	**Serial Nr :**	**Year :**
Electric hoist : ☐ Wire rope ☐ Chain	**Type :**	**Serial Nr :**	**Year :**
Trolley : ☐ Electric ☐ Mechanical ☐ Push	**Type :**	**Serial Nr :**	**Year :**
Capacity (kg) :			

Is in according to the Comunitary Directives

- **Machine Directive 2006/42/CE**
- **Low voltage Directive 2014/35/EU**
- **Electromagnetic Compatibility Directive, 2014/30/EU**

Main technical regulations considered:

EN ISO 12100 /2010– Safety of the machinery
EN ISO13849-1/2008 General principles for design
EN 12077-2/2008 Limiting and indication device
EN 60204 – 32/2009 – Safety of machinery electrical equipment of machines
EN 60529/97 – Degrees of protection provided by enclosures (IP code)
ISO 4301-1/88 – Lifting equipment classification
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

Person authorized to compile the technical file

Name and surname: **Alberto Tagliabue**
Address: **Via Quasimodo, 17 - 20025 Legnano (MI) - Italy**

DONATI SOLLEVAMENTI S.r.l. CUIDO AMATI

Date: 25.01.2017

facsimile of the CE Declaration of Conformity
Annex II A

§ In addition the GBL series jib cranes are in compliance with the following directives:

- **Low Voltage Directive 2014/35/EU**
- **Electromagnetic compatibility directive 2014/30/EU**

1.5 Manufacturer's liability and warranty

§ In terms of the contents of this manual the company ***DONATI SOLLEVAMENTI S.r.l.*** shall not be held **liable** for cases of:

- use of the jib crane in conflict with national laws on safety and accident prevention
- incorrect selection or set-up of structures on which the crane will be installed
- defects in voltage and the mains supply
- no or incorrect compliance with the instructions provided in this manual
- unauthorised modifications to the machine
- use by personnel who are not trained or not suitable

§ To be able to use the **guarantee** as per the certificate below the customer must scrupulously comply with the instructions indicated in this manual and in particular:

- always operate within the use limits of the jib crane
- always perform a constant and diligent maintenance
- assign use of the machine to operators with a proven capacity, adequately instructed for the purpose
- only use the original spare parts indicated by the manufacturer

- **The intended use and the configurations of the jib are the only ones allowed. Do not try to use it ignoring the provided instructions.**
- **The instructions contained in this manual do not replace but summarise the obligations to comply with current accident prevention laws.**

2. - DESCRIPTION OF THE MACHINE AND TECHNICAL INFORMATION

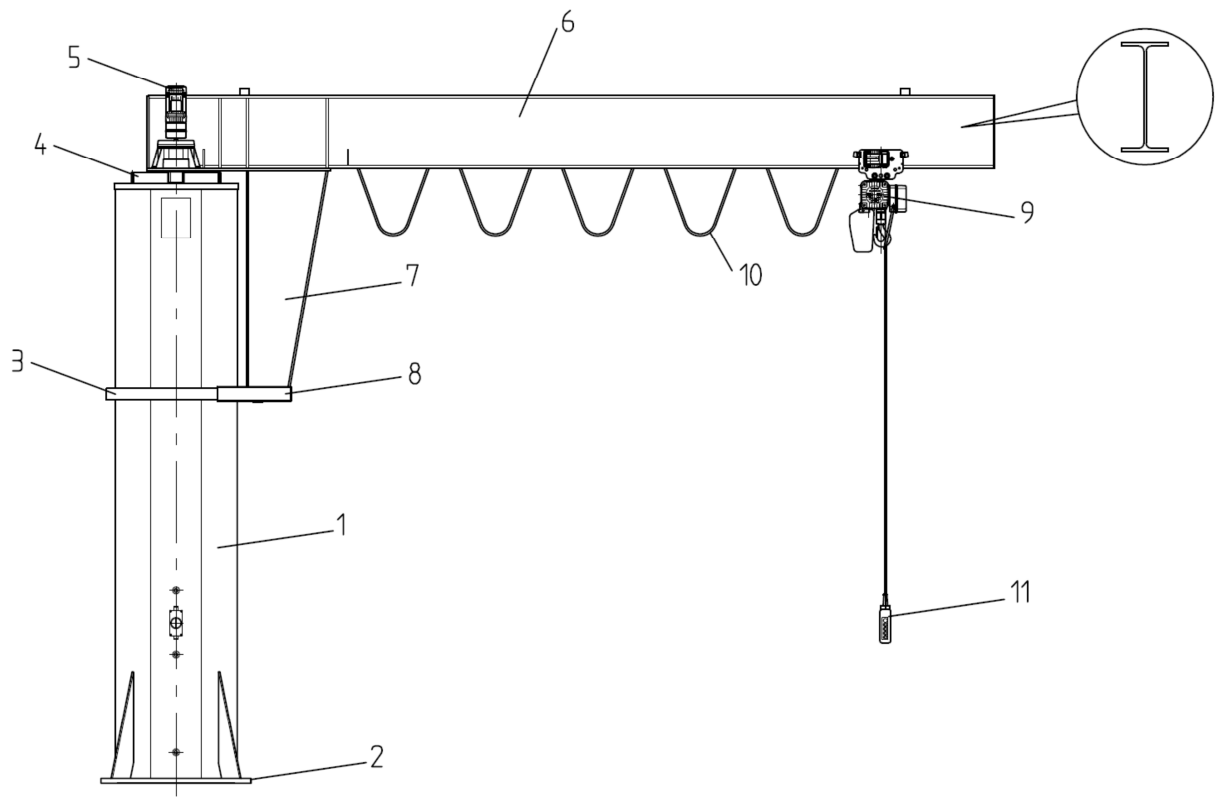
2.1 Jib cranes, with manual and/or electrical rotation

2.1.1 Intended use - Expected use – Intended purpose

§ The GBL series column-mounted **jib cranes** are designed to be attached to the floor and are created for local handling of goods within a plant and to be used by the operating stations..
§ The cranes vertically lift the load in space by the hook of the lifting unit with suitable accessories for this operation, they traverse the load in space along the radial axis of the arm by the traverse unit and by electric rotation are used in a work area within the radius of the arm. .
§ The electrical rotation of the crane arm is ensured by a motoreducer which is connected to the arm.
§ The circular area served by the arm can, according to necessity, be limited by electrical limit switch, or allow continual rotation, without stopping, of the arm in both directions through the use of a rotating collector ring.
§ The GBL series electrically and/or manually rotating jib cranes thus handle three functions:

- **lifting** of the load, normally by a electrical chain hoist or rope
- **traverse** of the load with the use of an electrical trolley which slides along the crane arm
- **rotation** around the axis attaching the arm to the column by means of a motoreducer (electric)

§ All of the controls can be activated by a pendant pushbutton panel.



Legend:

1. column
2. base plate
3. rolling track
4. sprocket (for electrical rotation)
5. motoreducer (for electrical rotation)
6. rotating arm
7. arm support
8. roller box
9. lift/traverse unit
10. electrical system with cables
11. pendant pushbutton panel

fig.1

2.1.2 The composition of the jib crane

§ Column:

- Made of press-forged steel sheet welded to the tubular structure with octagonal section it allows a high rigidity and stability; it is fixed with a base plate and a system of bolts and lug bolts. The upper part is equipped with a flange for anchoring the sprocket (for electrical rotation of the arm) and adjustable radial bearing with rollers for centring and rotation of the arm on the column and a rolling track.

§ Rotating arm:

- This is formed by a supporting girder made in double T beam form, a centring pin on the vertical axis of the column and an arm support with box containing rollers which slide on the rolling track of the column. The electrical rotation version is fitted with a motoreducer that meshes with the sprocket on the column.

§ Electrical rotation mechanisms:

- **Sprocket**, attached to the column.
- **Motoreducer** fitted on the arm, fitted with a self-braking motor with progressive start-up and braking and a sprocket, keyed on the slow shaft, fits together with the external teeth of the crown.

§ Electrical system:

- This is installed to power the hoist and trolley, which run along the jib of the crane as well as the rotation motoreducer.
  The electrical system includes:
  - **two electric control panels**, one to control the lift and traverse unit is on the hoist/trolley, the second to control the rotation motoreducer is attached to the arm. Inside the panels there are the contactors for the control of all of the movements, as well as protection fuses against short circuits. The control circuits are low voltage obtained via a transformer protected by fuses. A connection terminal board, with numbered terminals, ensures simplicity and safety of the wiring of the cables related to all the external functions making any inspections easy to perform.
  - **the electrical line** to power the trolley-hoist is formed by flexible flat fire-retardant multipolar cables festooned on the trolleys which slide inside a channel section.
  - **the pushbutton control panel** hangs from the hoist/trolley control equipment. It is supported by a round multipolar cable and suspended by specific cables.
  - **the acoustic alarm** is controlled by an “alarm” button serves the function of acoustic warning to indicate any dangerous situations during handling.
  - the electric safety **limit switches** on electrical rotation movements, acting on low voltage auxiliary circuits, are installed (upon request) when it is necessary to limit the rotation range of the jib crane.
  - the rotating **collector ring** is installed (upon request) as an alternative to the rotation limit switches, when the arm of the crane is free from obstacles in every point of its rotation and gives the arm itself the ability to rotate continuously and without stopping in both directions.

§ Foundation frame with lug bolts:

- Supplied (upon request) to anchor the column to the ground, with the fixed foundation plinth.

§ Finishing:

- The protection of the metalwork structure from atmospheric agents (dust, etc.) is guaranteed by a painting treatment that includes the application of a coat of yellow two component acrylic polyurethane enamel with a 50 micron thickness, after preparation of the surfaces with metallic sandblasting with SA2 grade.
  Drying in an oven for 15 minutes at a temperature of 45/50°C concludes the cycle.
  Jib cranes can be supplied (upon request, see the order confirmation) with SA 2 1/2 sandblasting and a painting cycle with special colours and paints.

§ Lift and traverse unit:

- The GBL series jib cranes can be equipped with a chain or rope hoist, with relative electrical trolley.

§ The concept and construction of GBL jib cranes:

- The "Column-mounted" version of the GBL series **jib cranes** are built based on the concept of modular components which, assembled to each other based on commercial needs, as well as the standard versions, allow fast and economic creation of many standardised and special configurations.
- The base components, columns and arms, thanks to their extreme compactness are assembled together so as to guarantee the maximum use of the hook run and, thanks to their minimum lateral encumbrance, allow the optimal use of the area in which the jib crane operates.
- The construction uses the most evolved technology based on high industrialisation production processes and allows the creation of completely reliable and technically innovative machines through economies of scale. The high quality level is guaranteed and controlled by the company quality system certified based on the EN ISO 9001 standard.

2.1.3 Installation restrictions

§ The "Column-mounted" GBL series jib cranes are generally designed to be attached to the ground, the column is self-bearing and can be anchored to the ground with bolts, on a specific foundation plinth or, in special cases, for limited loads and/or jibs and after having verified the feasibility, including with expansion bolts or chemical anchoring.

- **The user must verify, either directly or through personnel specialised in the matter, the suitability of the anchoring surfaces which must ensure the stability and safety of the crane in all operating conditions, withstanding the stress and dynamic effects induced by the tilting movement and the type of lifting speed.**

2.1.4 Selection and use criteria

§ One of the necessary and indispensible conditions to obtain the complete operating compliance of the jib crane, for the use it is intended for, as well as excellent and long-lasting operation of the same, consists of the correct selection of the machine model. This selection must be made based on the real duty performance required as well as the ambient conditions where the crane will operate.

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

- **The capacity**: the maximum load weight to lift must be calculated and must not ever be less than the same.
- **The functional dimensions**: the height of the trolley beam which determines the hook run of the hoist, and its jump (jib) must be selected so as to guarantee the functional coverage of the area to be served in consideration of the surrounding encumbrances.
- **Nature of the load**: delicate or not determines by its positioning the choice of the most suitable speeds of handling (lifting and travel).. In some cases it is indispensible to use hoists with two speeds with a slow speed of positioning.
- **Area of use**: the jib crane is characterised, by its conception, by intrinsic high elasticity which becomes even more evident when it is used for handling with loads close to the maximum lifting capacity and/or with prevalent localisation at the ends of the arm.
- **Area of use**: the jib cranes are intended to be used inside and/or in a covered area, sheltered from bad weather and the wind. In the event of outdoor use, adequate measures must be included, in relation to the environmental characteristics, in terms of surface treatment (sandblasting - painting) as well as adequate protective covers for the rotation motoreducer, electric panel and hoist-trolley.

2.2 Technical information and duty conditions

2.2.1 Regulatory reference framework

§ In the designing and construction of the GBL series jib cranes, the following standards and main technical rules have been taken into consideration:

- EN ISO 12100:2010 “General principles for design”
- EN ISO 13849-1:2008 “Safety-related parts of control systems”
- EN 60204-32:2009 “Safety of machinery. Electrical equipment of machines. Requirements for hoisting machines”
- EN 60529:1997 “Degrees of protection provided by enclosures (IP Code)”
- ISO 4301-1:1988 “Cranes and lifting appliances --. Classification”
- FEM 1.001/98 “Rules for the design of hoisting appliances”
- FEM 9.683/95 “Selection of lifting and travel motors”
- FEM 9.755/93 “Measure for achieving safe working periods for motorised serial hoist units (S.W.P.)””
- FEM 9.941/95 “Graphical symbols for control devices”

2.2.2 Protection and insulation of electrical parts

- Rotation motor: Protection IP54 (motors) IP23 (brakes); insulation class “F”
- Electric panel: Protection IP55 - Maximum voltage insulation 1500 V
- Push-button panel: Protection IP65 - Maximum voltage insulation 600 V
- Collector: Protection IP51 - Maximum voltage insulation 500 V
- Limit switch: Protection IP65 - Maximum voltage insulation 300 V
- Cables: CEI 20/22 - Maximum power insulation 450/750 V.

2.2.3 Electrical supply

- The jib cranes have been designed to be powered with alternating electric current with three phase voltage of: 400 V +/- 10% (Euro voltage min. 360 V; max. 440V) - 50Hz. according to IEC 38-1.

2.2.4 Ambient use conditions

- Operating temperature: minimum - 10°C; maximum + 40°C
- Maximum relative humidity: 80%
- Maximum altitude 1000 m above sea level
- The machine must be installed in a well ventilated area, free from corrosive fumes (acid fumes, salt mist, etc.).

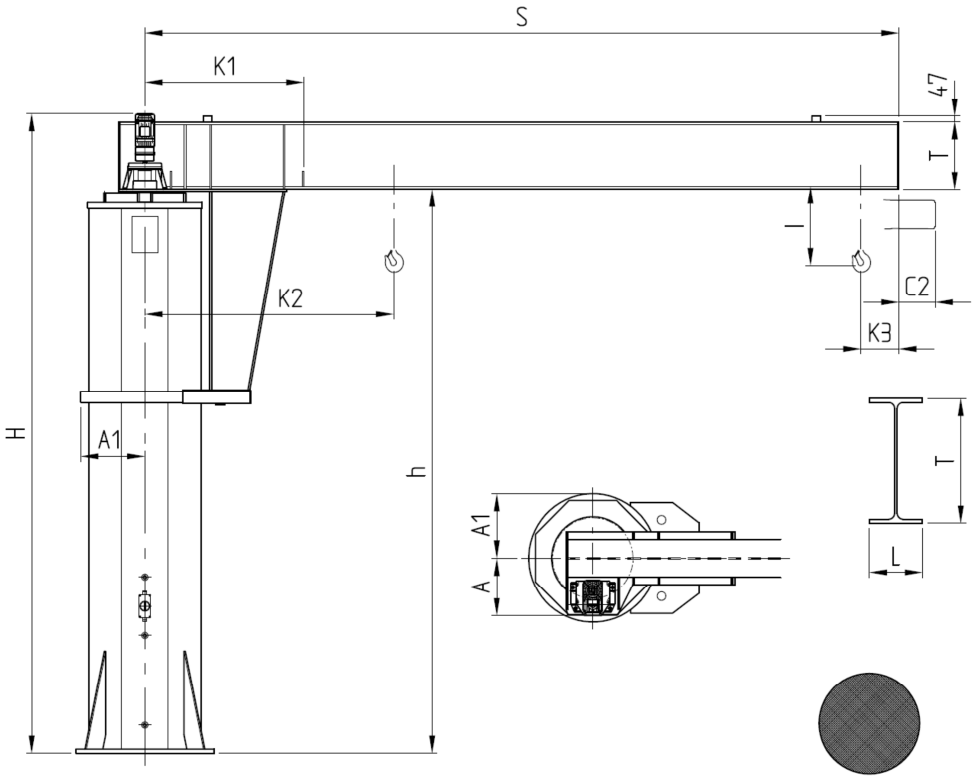
- **It is forbidden to use the machine in an explosive atmosphere or potentially explosive one or where the use of non-explosive components is required.**
- **Sufficient work spaces must be provided in order to ensure the safety of the operator and personnel assigned to maintenance.**

2.2.5 Noise - Vibrations

- The noise level emitted during the rotation of the GBL jib crane arm in full load operation, is always less than the value of: **85 dB (A),** measured at 1 m and 1.6 meters in distance from the ground.
- The vibrations produced by the jib crane, during arm rotation, are very limited and are not hazardous for the health of the personnel who operates it.

- Excessive noise or vibration may be caused by a fault which must be immediately reported and eliminated in order not to compromise the reliability of the job crane.

2.2.6 Technical specifications and data - Dimensions - Weights - Reactions on restrictions



Column-mounted jib crane - Rotation 360°

GBR jib cranes with DRH electric wire hoist:
K2 = K1+(C+I1-S3)* referring to the fixed mechanical limit switch
K3 = (C+S3)* referring to the fixed mechanical limit switch
I* and **C2*** = (*) See DRH hoist commercial catalogue

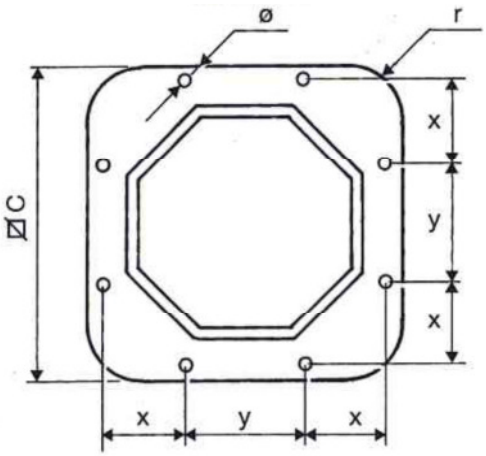
GBR jib cranes with DMK electrical chain hoist:
K2 = K1+(M/2)* referring to fixed mechanical limit switch
K3 = (M/2)* referring to fixed mechanical limit switch
I* = (*) See DMK hoist commercial catalogue

GBL series column-mounted jib crane - Electrically rotated at 360° continuously

Lifting capacity	Arm	Size of jib crane	Code type	Total dimensions (mm)									Arm speed		Power motor	Tilting momentum	Maximum pull of the lug bolt	Weight	
				Under beam	Total height H													Jib crane	Column by m
kg	S m			h	Electrically	Manually	K1	A	A1	T	L	no. of revolutions r.p.m.	Peripheric m/min	kW	kNm	kN	kg	kg
1000	4	2	2E3540	3500	4100	3847	820	550	350	300	150	0.585	14.7	0.4/0.1	63	21	1350	92.7
	5	2	2E3550	3500	4100	3907	820	550	350	360	170	0.585	18.4	0.4/0.1	83	28	1475	92.7
	6	2	2E3560	3500	4100	3907	820	550	350	360	170	0.585	22	0.4/0.1	103	34	1535	92.7
	7	2	2E3570	3500	4100	3947	820	550	350	400	180	0.585	25.7	0.4/0.1	125	42	1660	92.7
	8	2	2E3580	3500	4100	3997	820	550	350	450	190	0.585	29.4	0.4/0.1	150	50	1825	92.7
2000	4	2	2H3540	3500	4100	3907	820	550	350	360	170	0.585	14.7	0.4/0.1	107	36	1420	92.7
	5	2	2H3550	3500	4100	3947	820	550	350	400	180	0.585	18.4	0.4/0.1	139	46	1530	92.7
	6	3	3H3560	3500	4100	3997	950	550	400	450	190	0.585	22	0.4/0.1	173	50	1935	141.6
	7	3	3H3570	3500	4100	4047	950	550	400	500	200	0.585	25.7	0.4/0.1	210	61	2113	141.6
	8	3	3H3580	3500	4100	4097	950	550	400	550	210	0.585	29.4	0.4/0.1	250	73	2335	141.6
3200	4	2	2J3540	3500	4100	-	870	550	350	450	190	0.585	14.7	0.4/0.1	160	53	1515	92.7
	5	3	3J3550	3500	4100	-	950	550	400	500	200	0.585	18.4	0.4/0.1	208	60	1930	141.6
	6	3	3J3560	3500	4100	-	950	550	400	550	210	0.585	22	0.4/0.1	258	75	2123	141.6
	7	5	5J4070	4000	4647	-	1265	550	510	600	220	0.585	25.7	0.63/0.15	320	48	3247	183.6
4000	4	3	3K3540	3500	4100	-	950	550	400	450	190	0.585	14.7	0.4/0.1	198	58	1780	141.6
	5	3	3K3550	3500	4100	-	950	550	400	550	210	0.585	18.4	0.4/0.1	258	75	2017	141.6
	6	5	5K4060	4000	4647	-	1265	550	510	600	220	0.585	22	0.63/0.15	327	50	3125	183.6
	7	5	5K4070	4000	4647	-	1265	550	510	600	220	0.585	25.7	0.63/0.15	389	59	3247	183.6
5000	4	3	3L3540	3500	4100	-	950	550	400	550	210	0.585	14.7	0.4/0.1	243	71	1910	141.6
	5	5	5L4050	4000	4647	-	1265	550	510	600	220	0.585	18.4	0.63/0.15	320	49	3005	183.6
	6	5	5L4060	4000	4647	-	1265	550	510	600	220	0.585	22	0.63/0.15	393	60	3125	183.6
	7	5	5L4070	4000	4615	-	1265	550	510	490	300	0.585	25.7	0.63/0.15	474	72	3475	183.6

BASE PLATES AND FOUNDATION FRAMES FOR GBL SERIES COLUMN-MOUNTED CRANES

Gr 2-3



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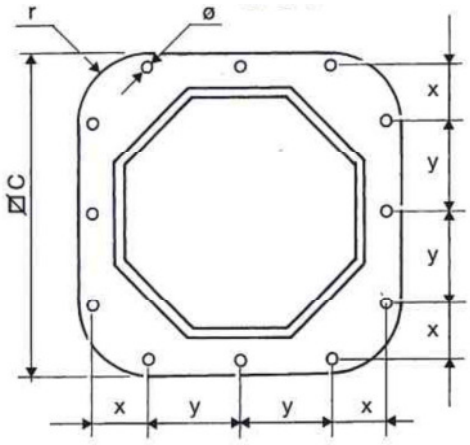
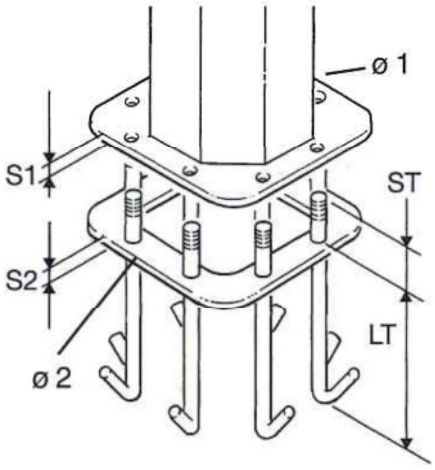
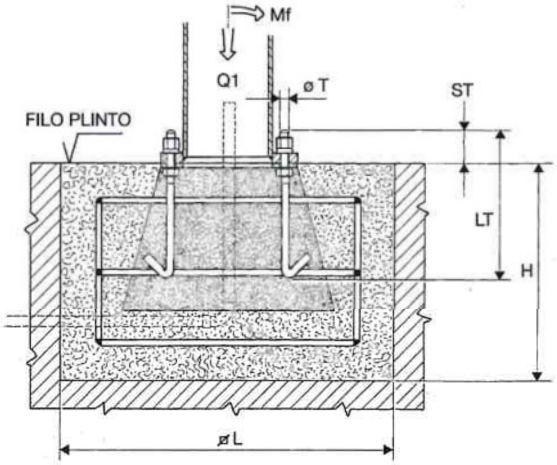






Size of jib crane		2	3	5
Base plate and foundation frame (mm)	**□ C**	750	860	1100
	S1	20	25	35
	S2	10	10	10
	X	199	230	185
	Y	281	325	320
	Ø 1	27	33	39
	Ø 2	25	31	37
	r	150	170	220
	Ø T	M 24 x 3	M 30 x 3.5	M 36 x 4
Anchorage bolts (mm)	**LT**	600	700	800
	ST	90	105	130
Clamping torque (Nm)		350	680	1200
Weight of the frame with bolts (kg)		34.5	52.5	113
Foundation plinth (mm)	**□ L**	2500	3000	4000
	H	1150	1300	1300
Max. crane weight (kg) (excluding hoist and trolley)	**Q 1**	1825	2335	3475
Maximum tilting movement (kNm)	**Mf**	160	258	474

The dimensions of the plinths are purely indicative!
The plinth must be dimensioned by considering the real consistency of the ground and the maximum pressure it can withstand.

3. SAFETY AND ACCIDENT PREVENTION

§ The electrically and/or manually rotated, column-mounted jib cranes - GBL series and relative accessories, were designed and built based on the most modern technical knowledge and can be used safely.
§ The hazards for assigned personnel can be completely eliminated and/or significantly reduced only if the crane is used in accordance with the instructions contained in this documentation by authorised and specifically instructed personnel, in possession of sufficient preparation.

!	**PERSONNEL IS RESPONSIBLE FOR THE FOLLOWING OPERATIONS:**

§ Any installation and completion of the jib crane parts which may be missing (e.g. hoist, electrical controls, anchoring accessories, etc.);
§ Commissioning of the crane and management of its operation;
§ Inspections and tests of the crane and its components, before start-up, during operation and even after it stops.
§ Maintenance of the crane and repair and/or replacement of its components.
§ The personnel must be absolutely informed on potential hazards they may encounter in performing their jobs, both in terms of operation and the correct use of safety devices available on the machine.
§ This personnel must also carefully comply with the safety rules contained in this chapter in order to prevent the occurrence of hazardous situations.

3.1 Authorised operator qualifications

§ To better define the field of operation and the consequent undertaking of responsibility by each OPERATOR, given the specific training and achieved qualification, the following table has been prepared of the professional profiles with relative pictogram, necessary for all types of operation

PICTOGRAM	OPERATOR PROFILE
 ASSIGNED TO USE	**Operators assigned to use of the jib crane:** Personnel assigned to perform only simple jobs, i.e. drive the crane through the use of controls and the loading and unloading operations of materials to handle.
 MECHANICAL MAINTENANCE PERSONNEL	**Mechanical maintenance personnel** Qualified personnel able to intervene on the crane in normal conditions, make normal adjustments of the mechanisms, perform routine maintenance and mechanical repairs.
 ELECTRICAL MAINTENANCE PERSONNEL	**Electrical maintenance personnel:** Qualified personnel able to intervene on the crane in normal conditions and assigned to normal interventions of an electrical nature, adjustments, maintenance and repair. Able to work in the presence of voltage inside the panels.
 MECHANICAL TECHNICIAN	**Mechanical technician:** Qualified and authorised technician for performing complex and extraordinary operations of a mechanical nature.
 ELECTRICAL TECHNICIAN	**Electrical technician:** Qualified and authorised technician for performing complex and extraordinary operations of an electrical nature.

3.2 General safety regulations

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

- Carefully read the technical documentation;
- Become informed on the operation and positioning of the emergency stop devices;
- Know what safety devices are installed on the crane and their location;

§ Some of the activities to perform on operating components (e.g. replacement of the rope or chain on the hoist installed on the crane) expose the operators to serious hazard situations, thus it is necessary to scrupulously follow the rules below:

- Personnel must be authorised and specifically instructed on the operating procedures to follow, hazardous situations that may occur and the correct methods for avoiding them.
- If the assigned personnel must exceptional completely deactivate or partly open or remove guards to perform a particular specialist technical maintenance operation, it is their precise duty to immediately restore the involved guards at the end of the operations. The personnel must also make sure at the end of the operation not to forget foreign objects on the crane, in particular mechanical parts, tools or any devices used, that could cause damage or malfunctioning.
- The personnel assigned with maintenance, inspection and repair operations shall put into place all the necessary safety preventive measures before starting their work and within the possible limits in order to protect their health and shall also check that:
- The crane is disabled and specific preventive measures have been undertaken (warning signs, locking devices, etc.) to prevent accidental starting. Maximum attention must be paid and work must be done with extreme caution for technical operations on an electrical device with the voltage on.

3.3 Safety warning signs

§ Signs and pictograms have been used in the manual and in danger zones to highlight or warn of any hazardous situations due to residual risks or actions which must be performed according to the safety procedures indicated in this manual.

SIGNS USED TO INDICATE HAZARDS	
SIGN	MEANING
 WARNING LIVE PARTS	**Live parts warning** and it is found affixed to electrical equipment and on any structure where voltage is present inside.
 GENERAL HAZARD	**Attention general hazard** (accompanied by a caption that indicates the type).
 RISK OF BEING CRUSHED	**Risk of being crushed** by moving mechanical parts.
 RISK OF BEING DRAWN IN	**Attention risk of being drawn in and dragged** by moving parts (chains, ropes, wheels, etc.).
 RISK OF HANGING LOADS	**Attention risk of hanging loads** that are handled by the crane.

SIGNS USED TO INDICATE PROHIBITED ACTIONS	
SIGN	MEANING
 DO NOT REMOVE THE PROTECTIONS	**It is prohibited to remove the safety devices while the machine is on.**
 DO NOT MAKE MANOEUVRES	**It is prohibited to perform manoeuvres during maintenance phases of moving parts.**

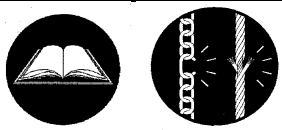
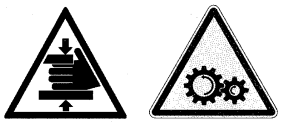
SIGNS USED TO INDICATE OBLIGATIONS	
SIGN	MEANING
 CONSULT THE MANUAL	**Consult the manual when this sign appears**, preceding or positioned inside an indication (instructions, adjustments, maintenance, etc.).
 GLOVES MUST BE WORN	**It is mandatory to use protective gloves.**
 HELMET MUST BE WORN	**It is mandatory to use a protective helmet.**
 PROTECTIVE SHOES MUST BE WORN	**It is mandatory to use protective, non-slip shoes.**
 SAFETY HARNESS MUST BE WORN	**It is mandatory to use a safety harness in overhead operations with a risk of falling.**
 CHECK LIFTING PARTS	**It is mandatory to perform a preventive check of chains, ropes, hooks, slings and accessories used for lifting and handling.**

SIGNS USED FOR SAFETY INDICATIONS	
SIGN	MEANING
 AUXILIARY LIGHTING	**The use of auxiliary lighting is recommended for the indicated interventions.**

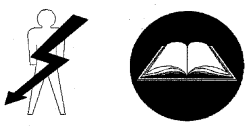
3.4 Warnings on residual risks

§ After having carefully considered the hazards present in all of the jib crane operating phases, measures have been adopted that are necessary to eliminate, as much as possible, the risks for operators and/or to limit or reduce the risks resulting from hazards that cannot be completely eliminated at the source. However, despite all of the adopted precautions, the following **residual risks** are on the machine that can be eliminated or reduced through the relative prevention activities:

RISKS DURING USE

HAZARD / RISK	PROHIBITION / WARNING	OBLIGATION / PREVENTION
 **Risk of being crushed** during handling of suspended loads in the case of exposure of the operator or other personnel in the zones/areas involved in the trajectory of the load.	 • **It is prohibited** to lift loads while people are going through the relative manoeuvre area. • **It is prohibited to** move through, stand, work or manoeuvre under the suspended load.	 • The operator assigned to use must follow the indications to obtain the best safety by complying with the instructions contained in this manual. • Obligation to periodically check the chains, ropes and hooks.
 **Risk of being drawn in and/or crushed** following contact with the arm in rotation and/or with the moving parts of the trolley/hoist.	 • **Attention!** Exposure to moving parts may create hazardous situations. • **It is forbidden** to touch the crane arm and the trolley/hoist when moving or expose yourself to their trajectories.	 • It is mandatory to use gloves during the slinging and pushing phase of the load.

RISKS DURING MAINTENANCE

HAZARD / RISK	PROHIBITION / WARNING	OBLIGATION / PREVENTION
 **Risk of electrocution - being shocked** in the case of maintenance on the electrical equipment without disabling the electrical supply.	 • **It is prohibited** to work on the electrical equipment before having disconnected the jib crane from the electrical line.	 • Assign the electrical maintenance operations to a qualified person. • Perform the tests on the electrical equipment contained in the manual.
 **Risk of being hit or crushed** in the event of contact with the rotation arm during the brake adjustment phase.	 • **Attention!** Exposure to moving parts may create hazardous situations.	 • Assign the brake adjustment operations to qualified maintenance personnel. • Use protective gloves and, if necessary, safety harnesses.

3.5 Safety devices and instructions

3.5.1 Control devices

§ The electrically and/or manually rotated **jib cranes**, GBL series, are controlled by a **pushbutton panel** (which may or may not be part of the supply) which sends low voltage electric signals to the **control panels** generally located on the crane and the hoist, to activate the relative movements.
§ These movements are activated by the following buttons of the pushbutton panel (fig. 2):

- **lift** and **lower** buttons to control **hoist lifting** (fast and/or slow)
- **right** and **left** buttons to control **trolley travel** (fast and/or slow)
- **clockwise** and **counterclockwise** buttons to control the **electrical rotation of the crane arm** (fast and/or slow).

§ The **lift**, **right** and **clockwise rotation** function keys have a **black symbol on a white background**, while the **lower**, **left** and **counterclockwise rotation** ones have a **white symbol on a black background**. They start the function when they are pressed and the slow/fast speed, lift, traverse and rotation controls are activated with two click buttons, the first click for the “slow” speed control, the second click for the “fast” one.
§ To allow the operation of all crane movements the **emergency stop**/**start** button located on the pushbutton panel needs to be in the “lifted” position for start consensus and then the function button needs to be pressed.
§ The crane can also be controlled by a remote control system, the functions of the buttons are unchanged compared to that related to the pushbutton panel.

⚠	**When the crane is controlled by remote control the pushbutton panel is free and not restricted by the crane, the operator thus must always pay utmost attention during manoeuvres without ever losing sight of the work area and the load in order not to compromise his safety and/or that of exposed persons.**

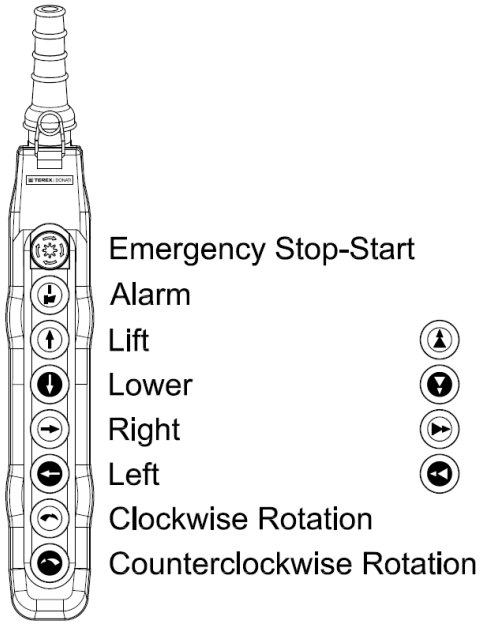


fig.2

§ The GBL series electrically rotated jib crane based on contractual agreements, may be supplied **complete or without the control devices** (control panel and pushbutton panel).

☞	**When the crane is supplied without control devices, it is prohibited to put it into service before it has been completed in compliance with the provisions of the Machinery Directive 2006/42/EC.**	

3.5.2 Safety and emergency devices

§ The GBL electrically rotated **jib cranes** are equipped with the following safety and emergency devices:

1. **Rotation brake**, negative type on the rotation motor for forward/backward manoeuvres, that intervenes automatically if there is no electricity and ensures the arm positioning stability.

2. **Arm rotation limit switch**, (available upon request), composed of electric microswitches, with relative adjustable mechanical actuators, that limit the rotation field of the crane arm.

3. **Trolley end limit switch**, mechanical stops that limit the maximum stroke of the trolley along the arm beam.

4. **Mechanical drives**, limit switch counters of the traverse trolley electric microswitches.

5. **Anti-collision device**, (available upon request), to prevent the collision between two or more arms that, working in the same area, may interfere with each other; or to prevent the collision of the arm with surrounding structures.

6. **Emergency stop**, located on the pushbutton panel, it has a red mushroom shape, and activates the **stop** function when in is pressed all the way down stopping any movement (fig.2).

⚠	**ATTENTION!** **When the crane is not supplied with control devices:** • **Electric limit switches are not connected!** Before putting the crane into service it is mandatory to connect the devices checking that they intervene correctly, as described in the paragraph 4.5 “Commissioning”. • **It is supplied without a pushbutton panel and thus does not have an emergency stop button which must be set up by the customer in compliance with current regulations.**

3.5.3 Warning and notice devices - Signage summary

§ The GBL series electrically and/or manually rotated **jib cranes** are equipped with the following warning and signalling devices (fig. 3):

- **Acoustic alarm**, located on the rotation control panel and activated from the pushbutton panel, it is composed of an acoustic alarm that warns of any hazardous situations during handling.
- **Plates** present on the machine:
  - manufacturer's logo (fig, 3a)
  - jib crane data plate with CE mark - (fig. 3b)
  - plate indicating the maximum capacity of the jib crane (fig. 3c)
  - electrical equipment plate (fig. 3d)
  - direction plate (fig. 3e)
  - hoist and trolley plates
  - arm rotation motor plate (on the motoreducer)
  - warning plates for residual risks (fig. 3f)

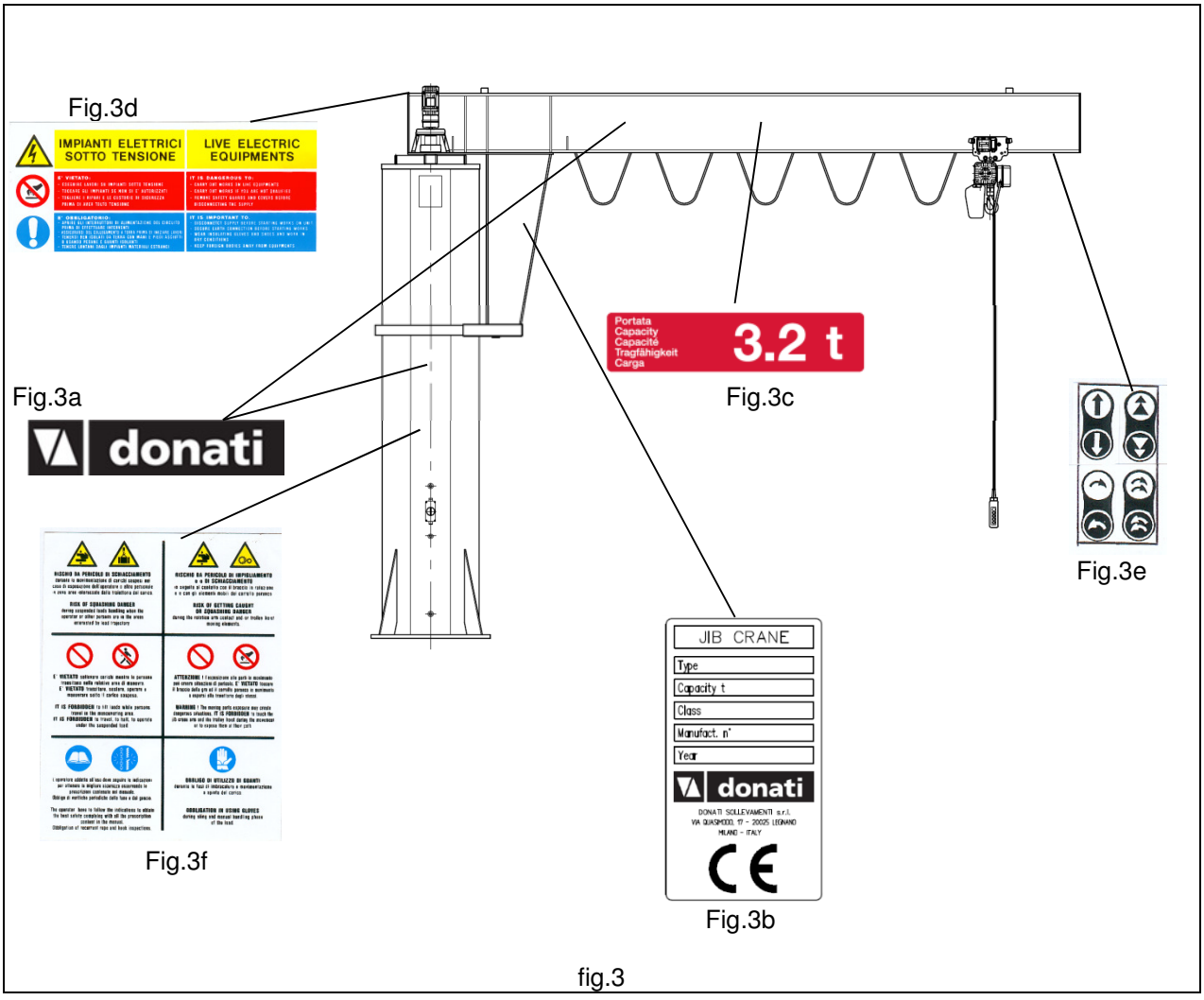


fig.3

§ Legibility and preservation of the plates

The plates must always be kept legible in terms of all the data contained in them by periodically cleaning them.

If a plate deteriorates and/or is no longer legible, including just one of the informational items shown, it advisable to request another one from the manufacturer, quoting the data contained in this manual or on the original plate and then replace it.

!	**The plates must never be removed and it is absolutely prohibited to affix other plates on the crane without prior authorisation from *DONATI SOLLEVAMENTI S.r.l.***

4. - HANDLING - INSTALLATION - COMMISSIONING

4.1 - General notes for delivery

- **The GBL series electrically and/or manually rotated jib cranes are delivered unassembled, in their main parts including the column, arm, electrical system and, if it is part of the supply, the lifting unit.**
- **The customer must handle the installation phases of the jib crane, following the instructions contained in this chapter and possibly using specialised installers for the assembly.**

- **Due to their delicacy and importance, the operations described in this chapter if not performed correctly may result in serious risks for the safety and health of exposed persons during the installation and use phases of the jib crane.**
- **Therefore they must be performed by professionally qualified personnel with a specialisation in assembling industrial plants, with an electromechanical background, equipped with work equipment and personal protection equipment in compliance with current laws on occupational safety and after having carefully read this publication.**

After receiving the supply check and make sure that:

- The shipping data (address of the recipient, no. of parcels, etc.) match what is contained in the accompanying documentation (transport document and/or any packing list).
- The technical/legal documentation supplied with the jib crane includes (fig. 4):
  - the “User instructions” manual of the crane to install.
  - CE Declaration of Conformity.
  - Test logbook, **when included.**
  - instructions for using the hoist / trolley to install on the crane, if they are part of the supply.
- The packaging, if part of the supply, is in good condition, intact, and free from damage.

In the event of damage or missing parts report the problem to the shipper, putting a written reservation on the accompanying document and notifying *DONATI SOLLEVAMENTI S.r.l.* within eight days from receiving the goods.

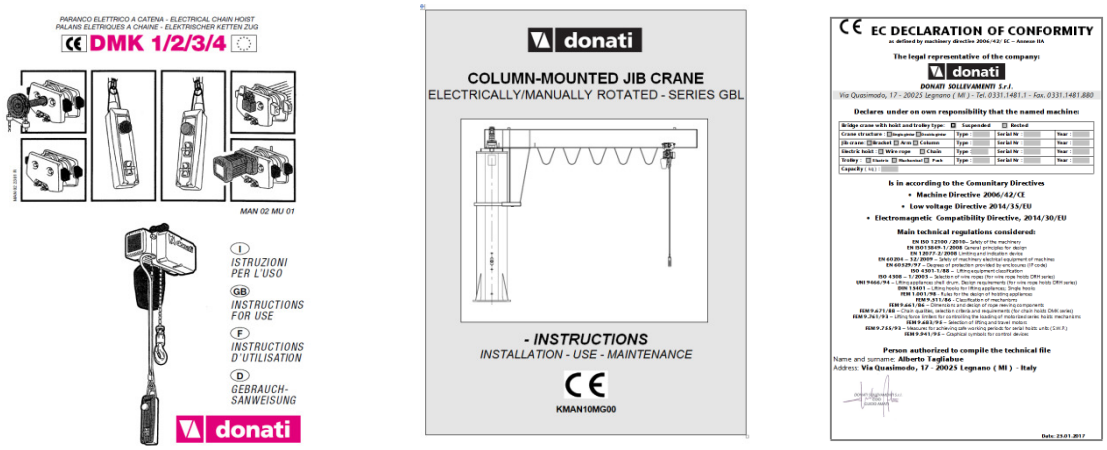


fig.4

4.2 Packaging, transport and handling

☞	**Before handling the jib crane and its accessories you should know that:**

4.2.1 Standard packaging

- The metalwork parts of the jib crane (column and arm) are generally supplied without packaging, hooking points are present on the columns and arms to make it easier to move them during transport and installation operations.
- To make handling and assembly operations easier for the lifting unit, if it is part of the supply, it can be delivered in a cardboard box (with or without pallet) or, where included, in a crate or wooden cage or even simply on a pallet.
- When the lifting unit is delivered on a pallet, it is generally covered with a protection against dust composed of a polyethylene film.
- Any other accessories which are part of the supply (e.g. electrical system components) can be delivered inside cardboard boxes that, based on the weight to move, can be with or without a pallet.
- The standard packaging are not waterproof against rain and are designed for delivery via land and not via sea, for covered and non-damp environments. Therefore special packaging or protections are excluded from the supply unless that are contained in the contract.
- If necessary the packaging can include signs and pictograms that provide important information regarding handling and transport (weight, grip points, storage information, etc.) - (fig. 5).
- Appropriately preserved parcels can be stored for a period of around two years in covered environments where the temperature ranges from -20°C to +60°C with relative humidity of 80%. Specific packaging needs to be prepared for different environmental conditions.

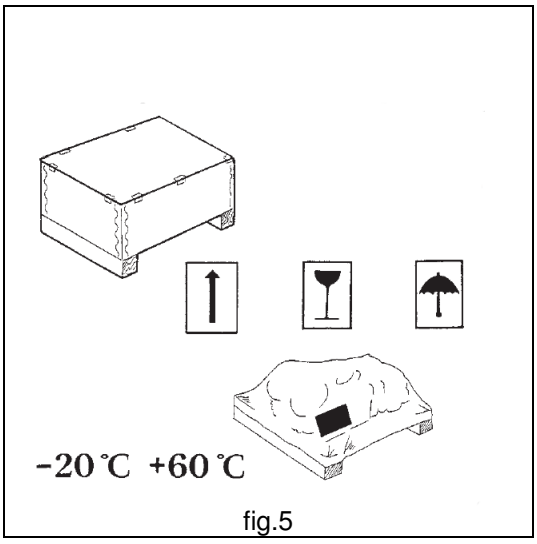


fig.5

4.2.2 Transport

- The transport must be performed by qualified shippers able to guarantee correct handling of the transported material.
- Avoid placing parcels on the structural parts of the jib crane or other packaged parts that could cause damage during the transport.
- During transport phases it is advisable that the pallets or crates/cages not be turned over or upside down, to avoid dangerous changes in their barycentre and to thus constantly guarantee the best stability for them.

☞	***DONATI SOLLEVAMENTI S.r.l.*** **shall not be held liable for transports made by the customer or shippers chosen by the customer.**

4.2 3 Handling

	To move the jib crane proceed as follows:	

- Prepare a limited and adequate area, with flat flooring or ground, for the unloading and placing the bulk metalwork parts and components contained in the packaging on the ground.
- Based on the type of part/component or the packaging, prepare the equipment necessary for unloading and handling of the crane parts and its accessories taking into account their weight, overall dimensions and gripping and/or suspension elements.
- Unloading and handling may be performed by crane (e.g. mobile cranes, bridge cranes, etc.) or forklifts, with adequate capacity and characteristics and the use of special equipment is not required.
- The parcels of any accessories with a weight less than 30 kg (unlike those with a weight greater than 30 kg) do not show any indication of their weight and can be handled by hand.
- Slinging of the columns and arms must be performed at the specific grip points, using adequate equipment to prevent damaging the painted surfaces.
- Grip the crane parts and its accessories with suitable slings in the established points (fig. 6) and move them very carefully to the area set up for unloading and avoid swinging, tilting and any dangerous unbalancing.
- When they have been moved check that the parts and parcels are intact and free from damage.

	• **Moving of the jib crane parts and relative accessories must be done very carefully and with adequate lifting and transport means, in order not to generate hazards due to the risk of a loss of stability.** • **All of the parts or components must be placed or anchored stably in all phases of the movement, transport and storage phases and must not be flipped over or placed vertically or on their sides** (fig. 7).

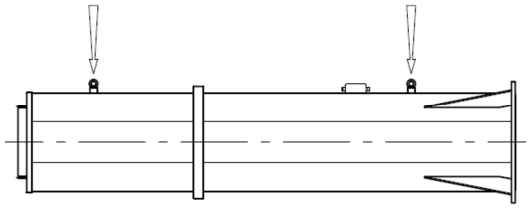


fig.6

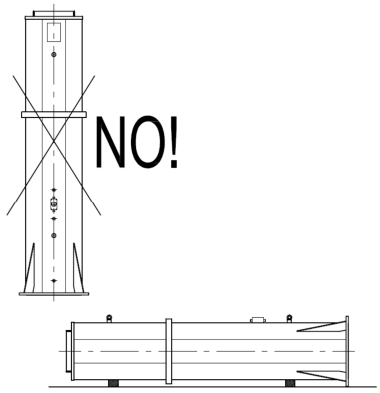


fig.7

4.2.4 Removal of the packaging and/or checking of the crane parts

- In the cased of packaged parcels, open the packaging and extract the various parts using suitable equipment chosen in relation to their weight and grip points.
- Check the conditions of all of the material of the supply and make sure no parts and/or accessories are missing. Notify the manufacturer immediately if anything is damaged or missing.
- If the material is going to be stored follow the instructions in paragraph 4.5.1 “Storage and preservation of parts”.

	• **Check the conditions of all the crane parts and in particular check that:**
	  • **the columns and arms have not been crushed, deformed, bent or have any broken parts.**
	  • **there is no damage to the components of the electrical system (if included).**
	• **Dispose of the packaging as required by regional waste disposal laws based on the nature of the waste (wood, plastic, cardboard), after sorting it.**

4.3 - Installation of the jib crane

4.3.1 Installer duties and responsibilities

- **Installation of the jib crane, due to the importance of the operations, may cause, if not correctly performed, serious risks for the safety of exposed persons both in the assembly phase and subsequent crane use phase. Therefore, if not performed by the manufacturer it must be entrusted to installers specialised in the assembly of industrial plants.**
- **Lifting and overhead placement of crane parts must be performed by installers equipped with:**
  - **personal protection equipment** (e.g.: helmet, gloves, safety harness, etc.) **that is adequate and suitable**
  - **equipment** (e.g.: crane, forklifts, scaffolding, etc.) **adequate for the purpose.**
- **And after a careful evaluation of the following parameters:**
  - **environmental characteristics of the work site** (e.g.: walk on surfaces, etc.)
  - **height of the work surface compared to the loading surface**
  - **dimensions and weight of the parts to install**
  - **spaces available for handling the parts to install.**

Before carrying out the assembly of the parts and installation of the jib crane, the installer must make sure that the crane specifications are in compliance with what was requested and the intended use and in particular:

1. The crane capacity is ≥ compared to the load to lift
2. The specifications of the anchoring structures (plinth, floor, etc.) have been "**Declared suitable**" by the customer or expert technician appointed by the customer.
3. The specifications of the lifting unit (trolley/hoist), if not part of the supply, are compatible with those of the jib crane (see point 2.2,6) in relation to: (fig.8)
   - **Hoist capacity:** must be ≤ compared to the jib crane capacity.
   - **Trolley/hoist weight:** must be ≤ compared to the maximum ones.
   - **Lifting/travel speed:** must be ≤ compared to the maximum ones allowed.
   - **Trolley/hoist form overall dimensions:** must be ≤ compared to the maximum ones allowed.
   - **Reactions on the trolley wheels:** must be ≤ compared to the maximum ones allowed.

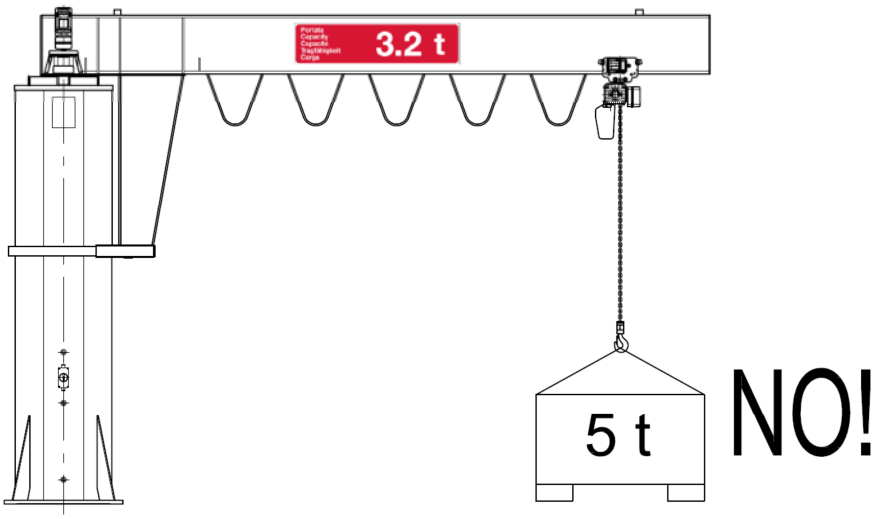
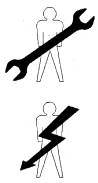


fig.8

Following the jib crane installation activities, the installer must:

1. Conduct the "**Commissioning**" as described in paragraph 4.4.
2. Draft the "**Acceptance test**" report and approve the jib crane "**Suitable for use**";

4.3.2 Preparation of the installation site

	**To allow the jib crane installation, first perform the following operations:**	

- Verify the presence of the suitable/adequate declaration of the support/anchoring structures;
- Verify the absence of clear defects of the support/anchoring structures (fig. 9);
- Verify the suitability of the manoeuvre (rotation) spaces for the jib crane, especially if operating in areas where other cranes or operating machines are present (fig. 10);
- Verify the suitability and correct operation of the mains: (fig.11)
  1) correspondence of the line voltage with the voltage required for the motors;
  2) presence and suitability of the electrical line switch/circuit breaker;
  3) adequacy of the cable cross section of the electrical line;
  4) presence and suitability of the earthing system;
- Verify the width of the beam flange which must correspond to that required for the trolley wheels (fig. 12).
- Prepare the masses for the **dynamic tests** equal to: **rated capacity x 1.1**
- Prepare the masses for the **static tests** equal to: **rated capacity x 1.25**
- Prepare the equipment for slinging and lifting of the masses for the load tests
- Verify the presence of signs warning of the risks due to handling with the crane.

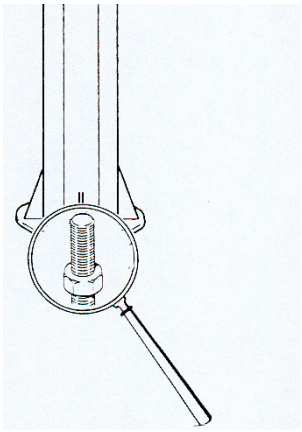


fig.9

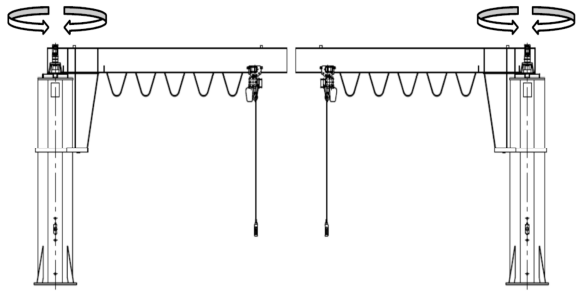


fig.10

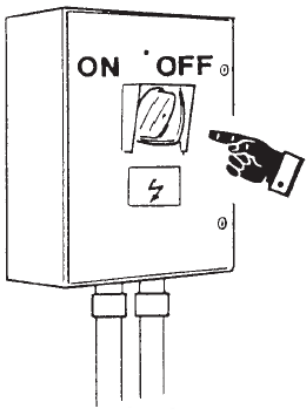


fig.11

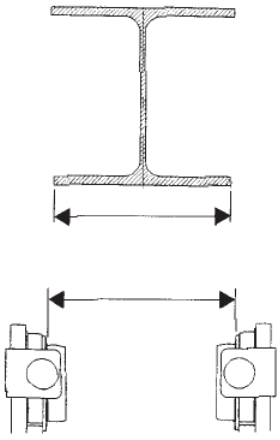


fig.12

4.3.3 Column assembly

- **The column can be anchored to the ground in the following manners:**
  - **using the foundation frame with bolts embedded in a plinth formed in reinforced concrete.**
  - **using bolts and expansion bolts or with chemical anchoring.**

- **The anchoring of the column using bolt, expansion bolts or with chemical anchoring, needs a scrupulous check of suitability in relation to the type of support flooring.**
- **The technical data so that the customer can dimension the foundation plinth, are indicated in the table shown in paragraph 2.2.6** ("Anchoring systems" - page 13). **The plinth must be dimensioned in relation to the real consistency of the ground and the specific maximum pressure that it can allow.**
- **The suitability checks of the foundation are the responsibility of the user and must be carried out by expert, qualified technicians who will evaluate the feasibility and assume the relative responsibilities.**

Positioning of the foundation frame in the plinth:

1. Screw all of the bolts **1**, low nuts **2** leaving the threaded part protruding at the measurement **ST** (fig. 13) - for the protrusion **ST** see "Anchoring systems" on page 13).
2. Insert all of the bolts **1** in the holds of the foundation frame **4** so that the plate of the frame sits on the nuts and tighten with the high nuts **5** inserting the washers **3**.
3. Embed the frame prepared this way in the plinth casting making sure that the upper plate remains flush with the floor (fig. 14). Protect the threading of the bolts to prevent damage.
4. If required, prepare insertion of a pipe in the plinth adequate for passage of the electrical cable to supply the jib crane in the
5. Level the foundation frame, possibly using a level and fill and scrape the plinth (fig. 16).
6. Wait for the plinth to solidify before assembling the column.

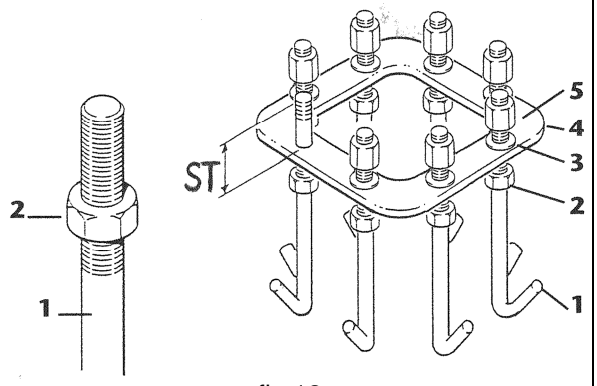


fig.13

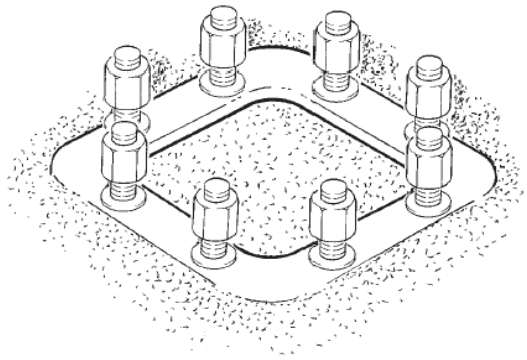


fig.14

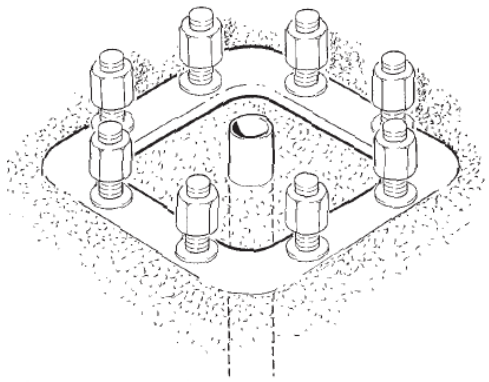


fig.15

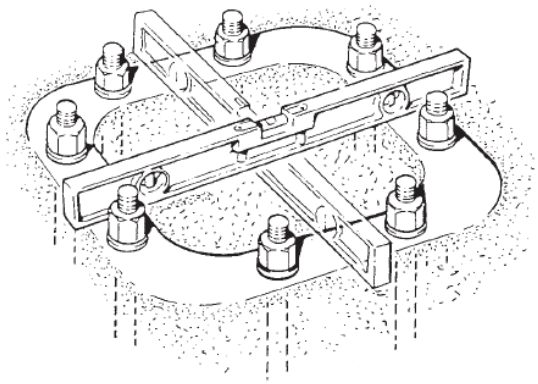


fig.16

Column assembly:

1. When the plinth has solidified, remove the protection of the bolt threading and check that the high nuts unscrew without forcing, then remove them and the washers.
2. Insert the electrical cable inside the column and have it exit from the access and inspection door to the collector ring. Perform the operation with the column on the ground. (fig.17).

This operation is to be performed only if the supply is from the pipe previously placed in the plinth and if the crane is equipped with a rotating collector ring.

3. Erect the column by lifting it using lifting devices suitable for the purpose, i.e. bridge crane or mobile crane and the relative slings with capacity and specifications adequate for the weight to move. (fig.18)
4. Mount the column on the foundation frame lining up and inserting the holes of the base plinth **4** on the threaded portion of the bolts protruding from the plinth, then anchoring them with the nuts **6** after placing the relative flat washers **5** (fig. 18)
5. Check the verticality of the axis of rotation using a levels for this operation **1** that should be resting on the mounting plate **2** of the column. The perfect plumb of the column is obtained by putting spacers under the column base plate **8** (fig. 19)
6. Stably screw the nuts **6** using a torque wrench and applying the locking torque shown in the table in relation to the diameter of the bolts (see page 13).
7. Then secure the nuts against unscrewing with the relative counternuts **9** (fig.19).
8. For the powered version, place the Crown gear **1** on the top of the column by fixing it through screws and spring washers **2** with a torque tightening of 220 Nm (fig.20)

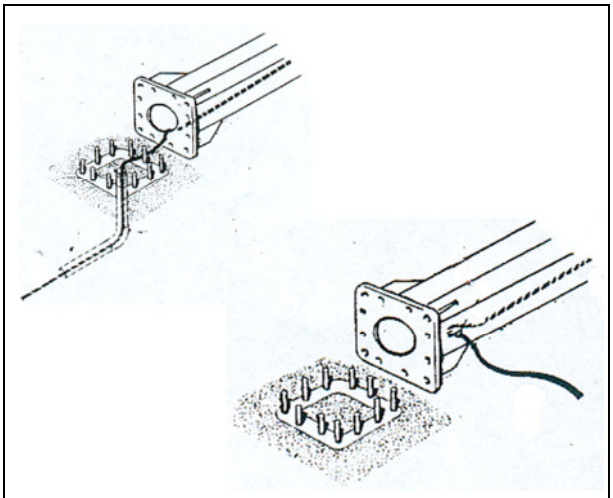


fig.17

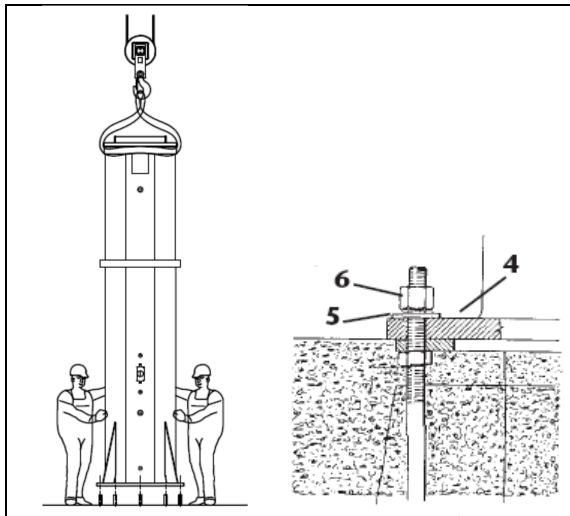


fig.18

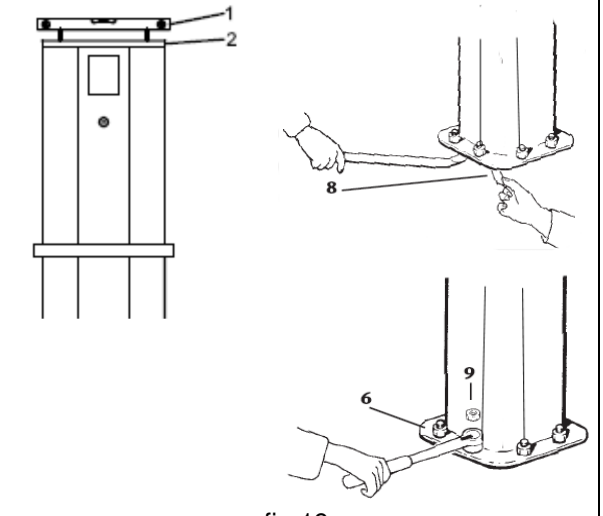


fig.19

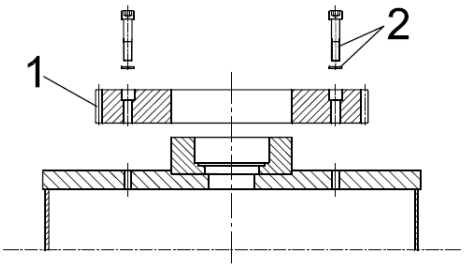
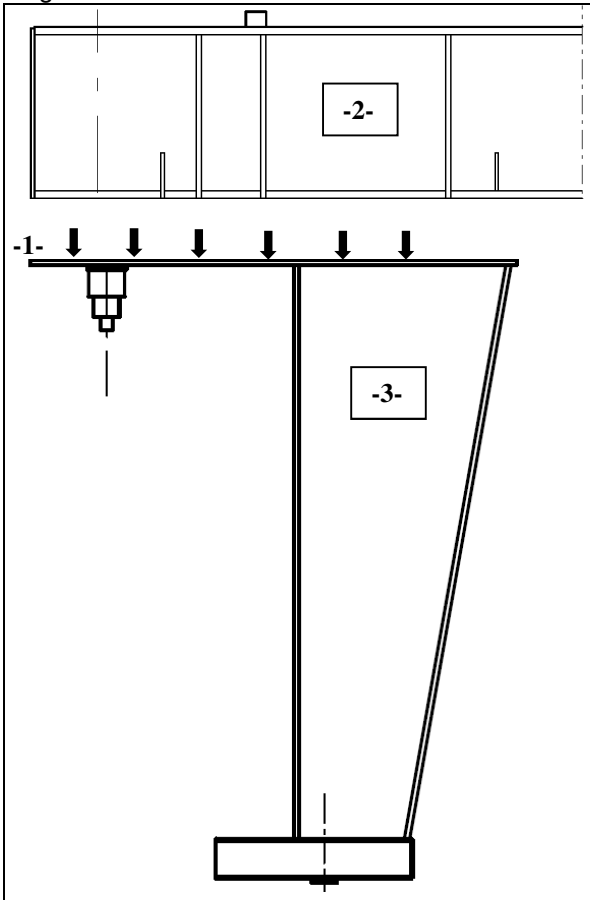


fig.20

4.3.4 Arm assembly

To assemble the arm proceed as follows:

A- Using the supplied screws/washers/nut **-1-** (M16 cl.10.9) connect the crane arm **-2-** to relative reaction arm **-3-.** The number of screws and relative positions will vary based on the crane size according to the diagram below.



GBL	2	3	5
No. screws	8	10	12
*Screw pitch (mm)	100/200x3	100/200x4	100/200x5
No. screws per pitch	2	2	2

* From plate edge opposite arm

M16 cl.10.9
Clamping torques = 288 Nm

B - Mount the contrast rollers in the roller box as follows:

1. Position the spacers above and below the contrast rollers (fig.MR1)
2. Insert the contrast rollers in the roller box positioning the slot so it corresponds to the threaded holes (fig.MR2)
3. Insert the stop in the specific slot with relative screw and grower M6x12) tightening it all the way down (fig.MR3)

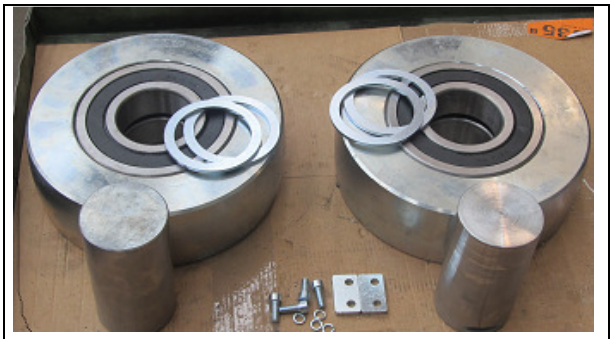


fig.MR1

fig.MR2

fig.MR3

Arm mounting:

1. Check (if the electrically rotated version) that the teeth of the sprocket mounted on the column are greased with care.
2. In sequence mount the metallic ring type AV **2**, the adjustable radial bearing with rollers **3** (after greasing) and the seeger **4** in the arm rotation pin. (fig.21)
3. Sling the arm in the points as indicated in (fig.22), and lift it with means suitable for the purpose, i.e. bridge crane or mobile crane and relative slings with adequate capacity and specifications in relation to the weight to move, being careful to maintain the beam horizontal to the ground and avoiding swinging and tilting.
4. Insert the metallic ring type JV **2** in seat **3** and grease, then insert the rotation pin **1** of the arm in the column. (fig.23)
5. Check that the contrast rollers **2** sit on the column rolling track **1**. (fig.24)
6. From the inspection window located at the end of the column, introduce the collector ring support **1** and position it against the arm rotation pin shank.
   Lock the support with the nut and counternut **2**. (fig. 25)

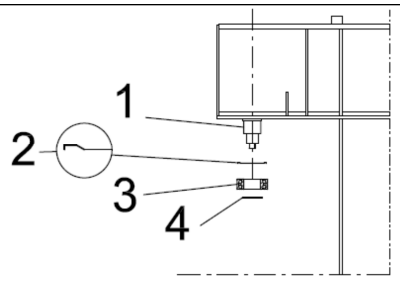


fig.21


fig.22

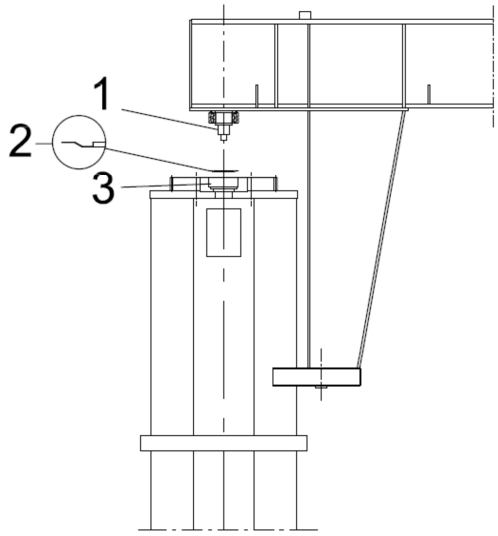


fig.23

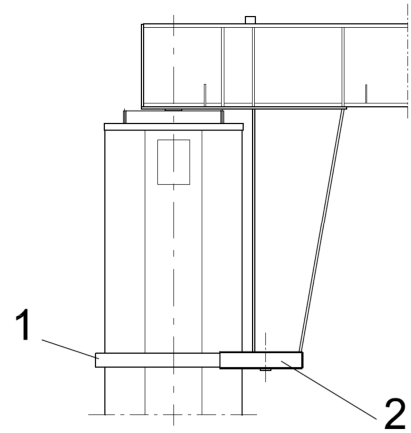


fig.24

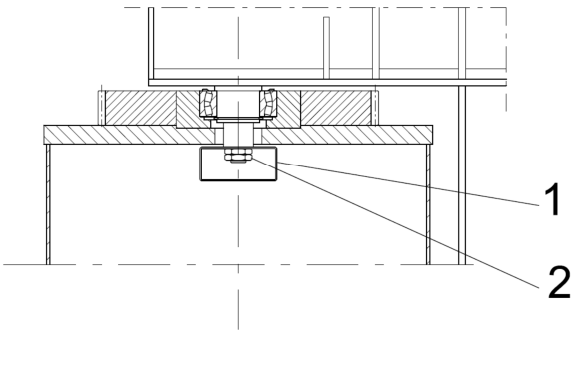


fig.25

4.3.5 Assembly of the motoreducer in the version with electric rotation

To assemble the motoreducer on the jib crane arm proceed as follows:

1. Sling the reducer **1** in the preset point **2** as indicated, position it in seat **3** located on the side of the arm. (fig. 26)
2. Make sure the pinion **1** meshes with the crown **2** fixed on the column and anchor the reducer using the screws and snap washers **3** (in the threaded holes) and the screws and flat washers **4** (in the side drilled hole) locking them with the self-locking nuts **5**. (fig. 27)
3. Mount the shaft-mounted motoreducer **2** inserting in the grooved shaft **3** (after cleaning and lubrication) of reducer **1** and anchor it with the screw and snap washer **4**. (fig. 28)
4. Anchor the shaft-mounted motoreducer **1** to the reaction arm **2** using the screw **3** and the relative nut **4** and inserting, based on the correct sequence shown in the diagram (fig. 29), the washer **5** and the rubber buffers **6**, compressing them around 1 mm.

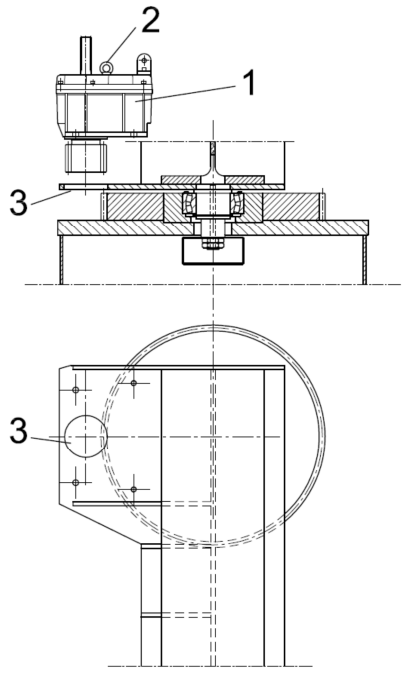
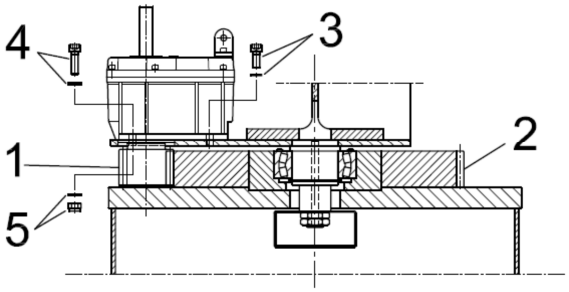


fig.26



Clamping torque:
Screw M16 (3) 128Nm
Nut M16 (5) 205Nm

fig.27

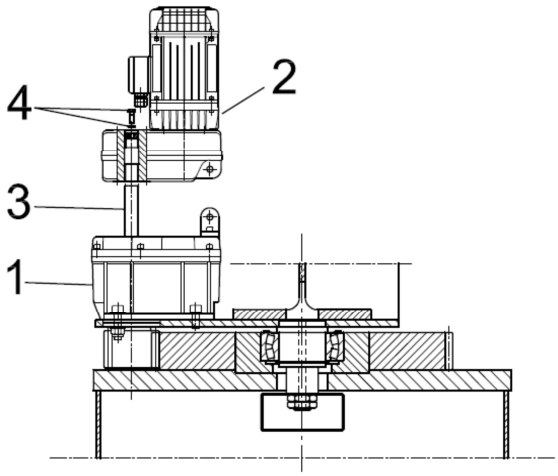


fig.28

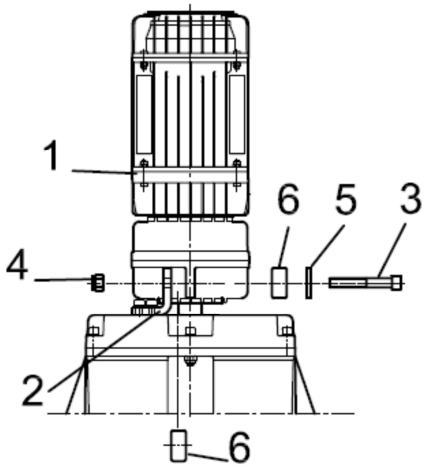


fig.29

4.3.6 Assembly of the trolley/hoist

	To assemble the trolley/hoist on the jib crane arm proceed as follows:	

5. Mount the trolley-hoist on the beam flange as described in the hoist manual.

	See the "User instructions" of the trolley/hoist.

	The suspended DRH version trolley motoreducer needs to be positioned from the crane side where installation of the rotation control electric panel is planned. **The DRH lowered and DMK version trolley motoreducer needs to be positioned from the crane side where installation of the rotation control electric panel is planned.**

4.3.7 Assembly of the electrical system

	To assemble the electrical system proceed as follows:	

1. Remove any packaging that contains the cables, trunking, the electric panel, collector ring (if installed), pushbutton panel as well as all of the accessories necessary for the purpose.
2. Attach the brackets to the beam using the clamps **1** (fig.30).
3. Follow the diagram (fig.31) for the distances between brackets (1100/1300 mm max.). Particular setups or special electrical equipment may reduce the distance between supports.
4. Hang the line trunking to the brackets using the suspensions **1**. The distance between the beam and the power line caries based on the type of hoist mounted. Generally the cable needs to run at around 150 mm from the maximum overall machine dimensions (fig. 32).
5. Complete the line with all of the trunking sections using the joints **1** (the trunking have a length ranging between 2000 and 3000 mm) (fig. 33).
6. Unwind the cables to prevent any twisting.
7. Insert the cables in the trunking, anchor the stops and the cable ends. Check that the trolleys slide correctly in the profiles and, if necessary, check the alignment of the trunking at the joints. Anchor the rotation equipment **1** at the beginning of the trunking (fig. 34).
8. Mount the draw arm with snap ring **1** on the hoist holder trolley positioned again from the side of the cable trunking. (fig.35).

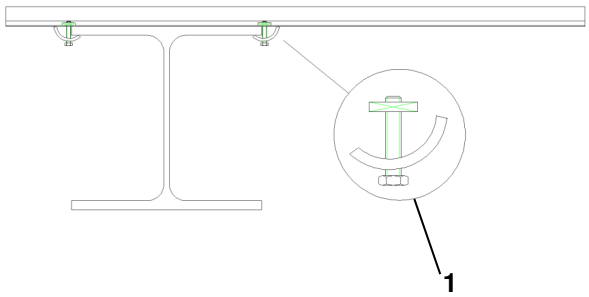


fig.30

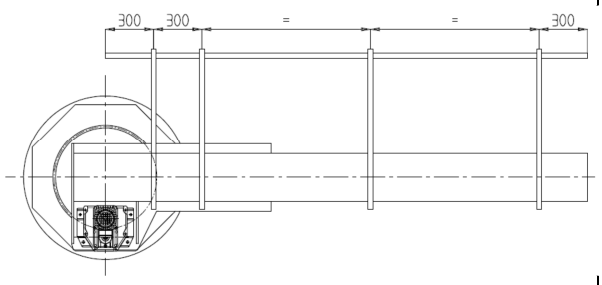


fig.31

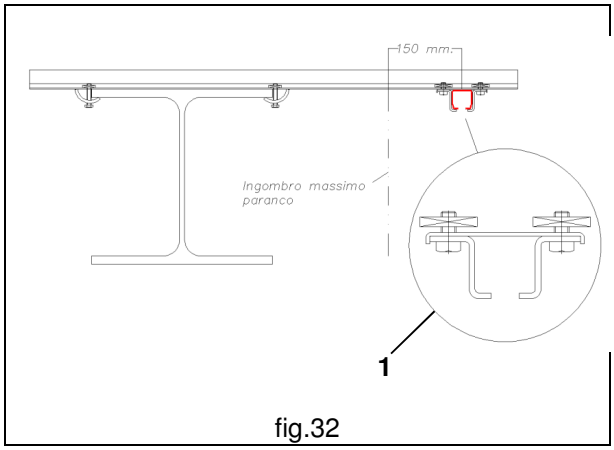


fig.32

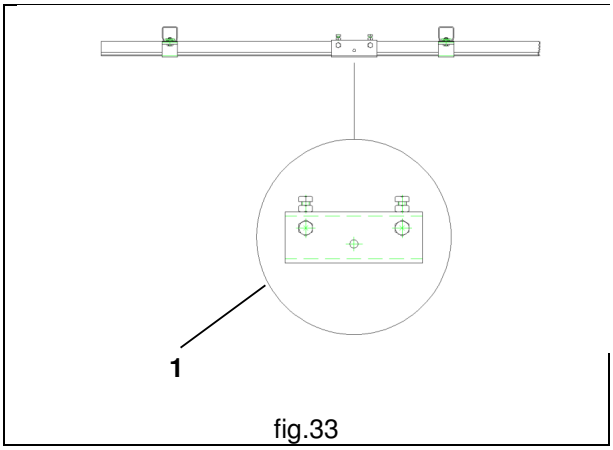


fig.33

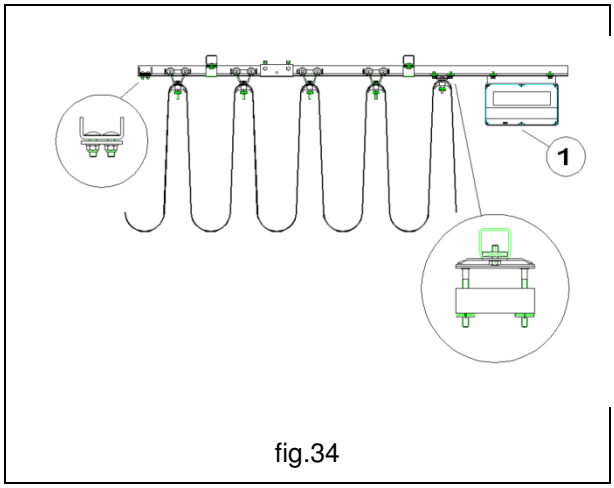


fig.34

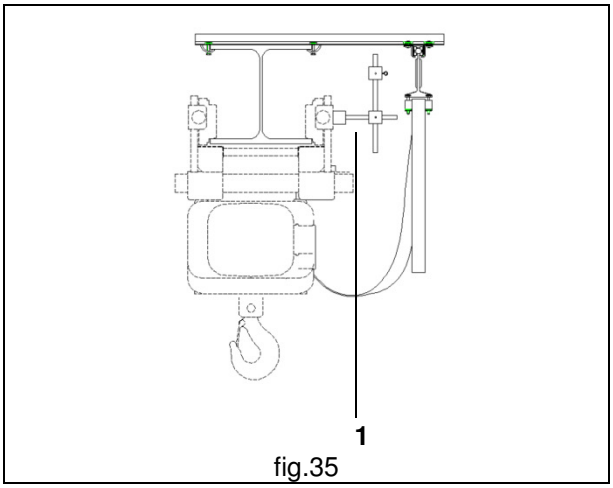


fig.35

§ Assembly of the rotating collector ring (if installed):

- From the inspection window **1** located at the end of the column, insert the collector ring **2** and insert it in the collector ring support **3**. Lock the collector ring with the nut and counternut **4**. (fig. 36)

§ Assembly of the rotation limit switch (if installed):

- Position the limit switch with worm screw **1** so that the pinion **2** meshes on the crown positioned on the column and anchor it to the arm with the screws **3** and relative snap washers. (fig.37).

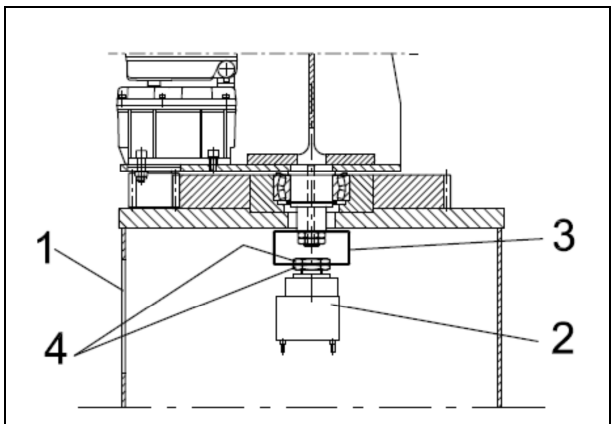


fig.36

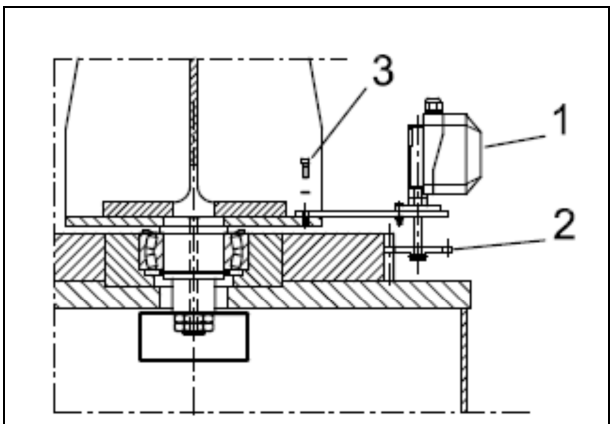
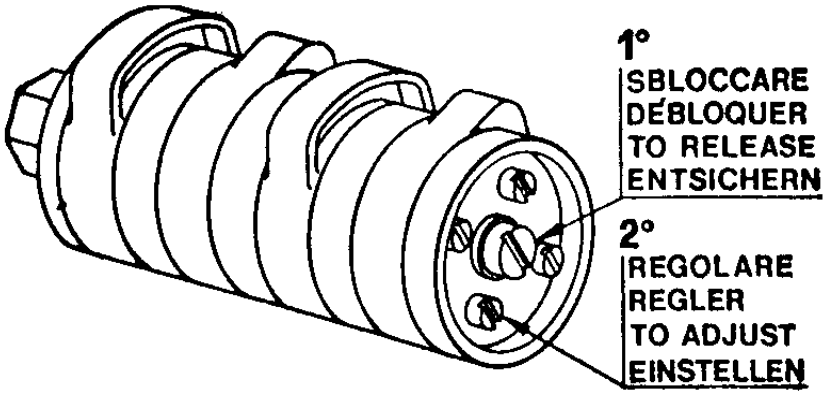


fig.37

4.3.7.1 Commissioning of the rotations limit switch

Perform the following:



Contact function:

SQ5A = duty limit switch RIGHT rotation
SQ6A = duty limit switch LEFT rotation
SQ5B = emergency limit switch RIGHT rotation
SQ6B = emergency limit switch LEFT rotation

Contact settings:

1) Set the cam for contact SQ5A to limit the RIGHT rotation as needed.
Set the cam related to the emergency contact SQ5B immediately after the intervention of contact SQ5A.

2) Set the cam for contact SQ6A to limit the LEFT rotation as needed.
Set the cam related to the emergency contact SQ6B immediately after the intervention of contact SQ6A.

N.B.:
Intervention of the emergency limit switch contacts, blocks operation of the entire machine.
To reset after an emergency intervention, once the cause is identified, act on the limit switch, by momentarily releasing the involved contact cam.
Exit from the anomalous position with an opposite control with that of the intervention.
Reset the original position of contacts.

4.3.8 Electrical connections - Version with two electric panels

To create the electrical connections on the jib crane arm proceed as follows:

- Connect all of the electrical connections between the equipment for hoist/trolley control, the power cable and the equipment for rotation control as indicated in the topographical and functional wiring diagrams.

§ Wiring diagrams

- The wiring diagrams are supplied inside the rotation control equipment.
- The wiring diagrams include:
  - topographical diagrams
  - functional, control and power diagrams
  - terminal board diagrams

- The following diagram (fig. 38) indicates the criterion with which the electrical utilities are path of the cables/conductors are identified. All the utilities and cables are indicated and numbered on the relative components.

Utility legend:

1. Line general switch
2. Hoist/trolley control equipment
3. Rotation control equipment
4. Hoist motor
5. Trolley motor
6. Rotation motor
7. Hoist limit switch
8. Trolley limit switch
9. Arm rotation limit switch (when installed)
10. Pushbutton panel
11. Load limiter (only for rope hoist)
12. Power supply rotating collector ring (when installed)

Cable legend:

A Line supply
B Hoist/trolley supply cable
C Arm rotation limit switch (when installed)
D Motor
E Pushbutton panel

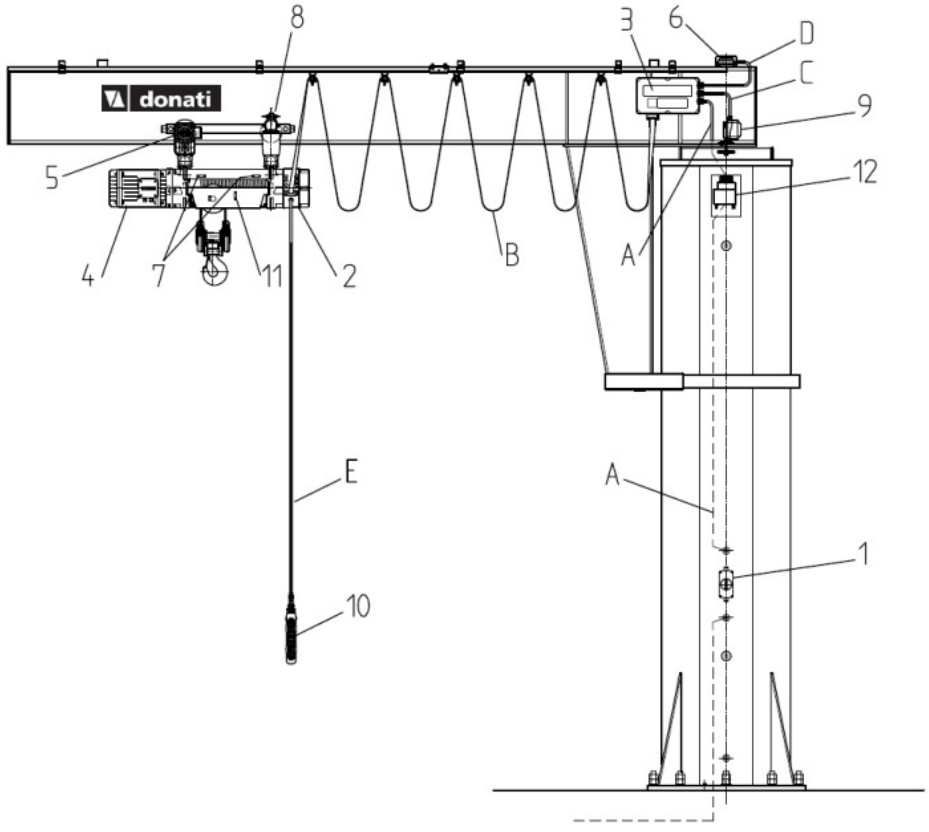


fig.38

Mains connection:

§ Crane equipped with rotating collector ring:

1. Connect the shortest cable **A** of the rotating collector ring to the rotation control electric panel passing it through the rotation pin hole attached to the arm. (fig.39)
2. Connect the longer cable **B** of the rotating collector ring **1** to the switch of line **2**. (fig.40)
3. Close the inspection window with the collector ring cover **1** making sure that the fork **2** welded on the cover inserts in the collector ring stop plug **3**. (fig.41)

§ Crane equipped with limit switch (with worm screw) for field limitation (not supplied with collector ring):

1. Directly connect line cable **B** to the terminal block of the rotation control electric panel passing it through the rotation pin hole attached to the arm. (fig.42)
2. Connect the arm rotation limit switch with worm screw in the specific terminals of the control panel.

- **Never make the electrical connections with the voltage on.**
- **Never make temporary connections or jump or makeshift connections.**
- **Tighten the cable glands all the way down.**
- **Use the wiring diagrams corresponding to the trolley/hoist being worked on.**

The customer or installer appointed by the customer must:

- **Install a line switch in the immediate vicinity of the crane to protect against short circuits, indicating its function with a specific plate (**fig.43).
- **Make the connection of the crane structure to the earthing system, at the grip points provided for this purpose** (fig.44).

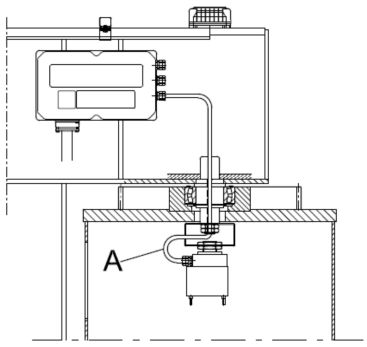


fig.39

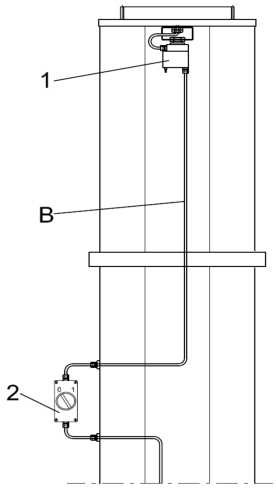


fig.40

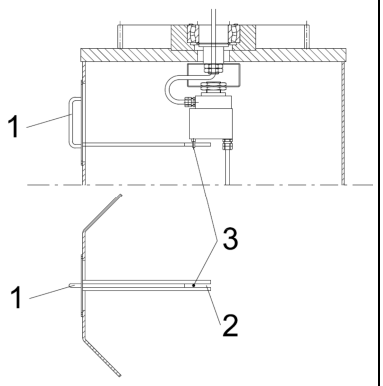


fig.41

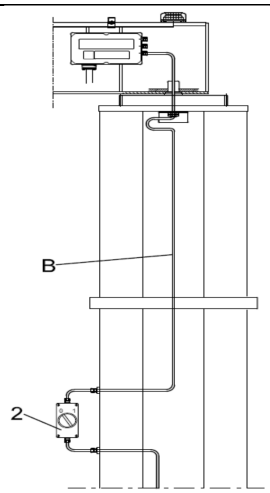


fig.42

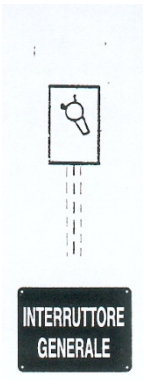


fig.43

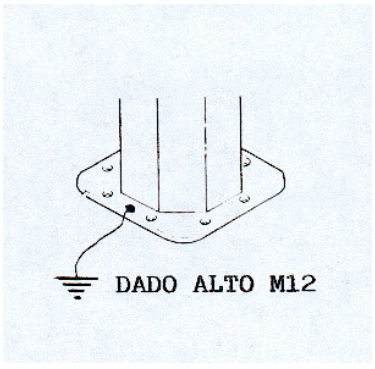
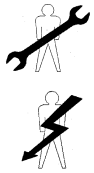


fig.44

4.4 - Commissioning

4.4.1 Preliminary tests - Adjustments and operating tests

	Perform the following tests before commissioning the crane:	

- **Check the suitability of the electrical system:**
  - Check that the line voltage and frequency, shown on the respective motor plates, correspond to those required for operation.
  - Check that the voltage value to the motors is within the limits of +/- 10% of the rated value.
  - Check for the presence and correct connection of the earth socket.

- **Check the correct crane installation:**
  - Make sure that there are no clear defects after installation of the crane.
  - Check that all of the bolted joints are correctly tightened.
  - Check the conditions of the trolley wheel track, which must be free from obstacles, roughness, dips and foreign bodies.
  - Make sure the end stops and/or arm and trolley limit switches are present.
  - Make sure there is no lubricant leakage.

- **Checking the operation of the correct rotation direction of the motors:**
  - Activate the “right/left” direction buttons and check that the trolley movements occur as indicated by the direction arrows located in the crane beam;

	• **First check the traverse movements, then check lifting and rotation; in any case prevent the respective limit switches from intervening. If the motor rotation direction does not coincide with the pushbutton controls the limit switches will not stop there movement, and may cause hazardous situations.** • **If the movement direction does not correspond with the pushbutton panel indications, stop the movement and invert the connection of the two phases in the line terminal board of the crane control electric panel.**

- **Settings and operating tests:**
  - Make sure that all of the electronically controlled functions, performed the requested movement via the relative pushbutton panel control.
  - Adjust the electric hoist lift limit switch (see the information in the related “User instructions”) in order to allow the maximum stroke possible.
  - Adjust the lower limit switch so that the hook, in its lowest point, is 10 cm from the ground.
  - Adjust the traverse movement limit switch in order to avoid contact with the buffers.
  - Adjust the rotation limit switch, making sure to avoid hitting, contacts and/or collisions with the fixed parts or obstacles.
  - Check the entire breadth of the arm rotation; check the freedom of the arm rotation in relation to the absence of obstacles in the entire area covered by crane operation.
  - Make sure that no noises, and/or anomalous vibrations and/or incorrect movements are detected during the tests (sliding of the wheels or spontaneous movements of the trolley and/or arm, etc.).

	The automatic switches of the limit switches are emergency devices and must not be subjected to normal operation. If this need exists then other supplementary limit switches need to be installed for continuous operation in order that they act before the emergency ones.

	See the hoist operating manual to adjust the limit switch.

4.4.2 Acceptance test of the jib crane - Suitability for use

- **The jib crane is put on the market considering the acceptance tests conducted at the manufacturer on similar prototypes subjected to testing of their suitability on the structural parts** (columns, arms, etc.).
- ***DONATI SOLLEVAMENTI S.r.l.*** **controls manufacturing within the framework of a company "Quality system", certified by DNV according to the standard UNI EN ISO 9001. The guarantees the constant quality and the compliance to the tested prototypes of all the parts of the jib crane.**
- **The acceptance test procedure, described below, refers to verification of the functional and performance compliance of the jib crane installed in its place of use, complete with all its parts** (anchors, structure, lifting unit, lifting accessories, etc.).
- **The acceptance test of the installed crane is the responsibility of the user and must be conducted by the same specialised personnel (Installer) who performed the assembly, scrupulously following the instructions of this manual.**
- **The installer must perform the acceptance test and fill out all parts of the "Acceptance test report" and draft the "Suitable for use" certificate contained in the "Test logbook" attached , when included, to this publication.**

§ After having performed the "no load" operating tests, perform the dynamic tests; these tests are performed with weights corresponding to the capacity of the crane plate plus an overload factor of 1.1 (load equal to 110% of rated load). The static tests are performed with an overload factor of 1.25 (load equal to 125% of the rated load).

All the tests must be performed when there is no wind.

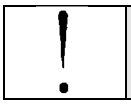
To perform the acceptance test of the jib crane proceed as follows:

§ No load test:

- activate the line switch/circuit breaker
- put the emergency stop button in the "start consensus" position
- press the "alarm" button
- check the operation of the hoist lift function by pressing the "Lift/lower" buttons
- check the operation of the trolley travel function by pressing the "right/left" buttons
- check the operation of the jib arm rotation by pressing the "rotation" buttons
- if there is two speed movements check its operation
- check the operation of the limit switches on all movements and/or the clutch device, when available

§ Dynamic test:

- prepare adequate weights for the load tests equal to: **rated capacity x 1.1** and suitable equipment for slinging and lifting the load
- sling the load being careful to position the hook vertically to avoid oblique pulling
- slowly tension the slinging to not generate tugs, perform the load tests using the “slow” speed if available
- slowly lift the load and check that this occurs without problems and that no anomalous noise is heard, or clear deformation or giving way of the crane structure, support structures and/or anchorages
- repeat the test at maximum speed, if available, performing the previous tests
- check the operation of the lift/lower electric limit switches, when installed, and/or any clutch device
- check the operation of the lifting brake, checking that the weight is stopped in adequate time and that there is not shifting of the load, after releasing the button
- perform the same tests also for the trolley traverse movements and arm rotation, checking the operation of the limit switches without bringing the load to the maximum height (left to a metre from the ground).
- work first at slow speed, if available, and then at maximum speed
- check the correct movement of the trolley and arm rotation and make sure that no anomalous noise is heard, or clear permanent deformations or giving way of the crane structure, support structure and/or anchorages
- check the operation of the “emergency stop” button which must stop and inhibit all movements. Any operation of the crane must stop, in the shortest time and space possible, without any shifting, hazardous swinging, etc. nor compromise its stability.
- check the operation of the load limiter, and or the clutch device, if included.
- check the braking and stop spaces during lifting, traverse and rotation, checking the stability of the handled weight. The breadth of these spaces is calculated as follows:
  - in the lower movement, with maximum load, it is between 6 and 8 cm for hoists with maximum lifting speed of 8 m/min.
  - during arm rotation it is between 50 and 100 cm estimated compared to the tip of the arm with a rotation speed of around 1 rpm.
  - In both cases significant swinging of the load should not be generated.
  - in the trolley traverse movement, which moves at a normal speed of 15 or 20 m/min, it is between 15 and 30 cm.

	**The dynamic test must be performed in the most unfavourable load conditions, i.e. combining lifting, traverse and rotation movements.**

§ Static test:

- prepare adequate weights for the load tests equal to: **rated capacity x 1.25** and suitable equipment for slinging and lifting the load
- sling the load **used for the dynamic tests** (rated capacity x 1.1) being careful to position the hook vertically to avoid oblique pulling
- slowly tension the slinging to not generate tugs, perform the load tests using the “slow” speed if available
- slowly tension the sling to avoid tugging, if available perform the load tests using the “slow” speed
- gradually apply on it weights for an overload equal to 25% of the rated capacity
- leave the weight suspended for a time not less than 10 minutes.
- check that the suspended weight (load + overload) does not give way (the lifting brake and clutch device/load limiter, if installed, must not slide).
- release the load and make sure that no deformations and/or giving way of the crane and support structures and/or anchorages are not detected.

	• **No movement of the crane should be activated during the static test.** • **The jib crane acceptance test must be repeated for the annual controls** (see paragraph 6.3.2). • **The annual acceptance test results must be noted in the test logbook** (see chapter 8) **attached to this publication, when included.**

4.5 Decommissioning

4.5.1 Storage and preservation of parts

	**If the jib crane and its components need to be stored, to prevent damage or deterioration, proceed as follows:**	

- Protect the machined surfaces of the plates, thrust bearing and mechanism with antioxidant products, do not scratch the surfaces used for assembly with other parts or inside of the holes.
- The materials, whether for indoor or outdoor installation, can be stored for a maximum period of two years in an environment with the following characteristics:
  - protected from inclement weather
  - relative humidity not greater than 80%
  - minimum temperature - 20°C - maximum temperature + 60°C
- For a storage period over two years ask the manufacturer for the storage procedures
- If these values should change during the storage it will be necessary to perform preliminary tests before operating the crane (see paragraph 4.5.2 “Resetting after storage”
- If the temperature goes above or drops below the indicated values and the relative humidity is greater than 80% prepare protection packaging for the parcels with sacks and hygroscopic salts.
- Storage in outdoor areas requires:
  - wedges to lift off the floor for all parcels without pallet
  - protect all parcels with sacks and hygroscopic salts
  - if the crane has been built to operate outdoors the metal work parts do not require particular protections; on the contrary the parts machined on machine tool (machined surfaces, thrust bearing, wheels, pins, etc.) must be protected with antioxidant products (transparent paints, grease, etc.).

4.5.2 Resetting after storage

	**Before putting a jib crane back into operation after a long period of storage, it is necessary to perform the following operations:**	

- **Structure:**
  - eliminate traces of lubrication from the structure and the trolley beam
  - go over the hole threading and eliminate any grease residue
  - cleaning the matching surfaces used for assembly
  - repair any structural damage (scratched surfaces, crumbling pint, etc.)

- **Mechanisms:**
  - check for any lubricant leakage and replace defective seals
  - fill up the lubricant level where necessary
  - check the correct anchoring of the bolts of mechanisms and structures
  - eliminate traces of oxidation from the accessory sliding parts of the control parts
  - lubricate the bearings and unpainted mechanical parts (shafts, pins, etc.)
  - eliminate an water residue in the concave parts of structures and mechanisms.

- **Electrical equipment:**
  - eliminate any condensation from the motors and terminal boards; dry with jets of air
  - check the conditions and operation of the brakes
  - accurately clean the surfaces of the brakes eliminating any traces of moisture, lubricants and paints
  - check the conditions and operation of the limit switches
  - check the conditions of the electrical parts and components
  - dry the contactor contacts
  - accurately clean the closing surfaces and the threaded holes of all containers
  - check the movement of the electric lines with cables
  - carefully check the operation of the control pushbutton panel

5. - OPERATION AND USE OF THE JIB CRANE

5.1 - Functions of the jib crane

5.1.1 Intended use - Expected use – Intended purpose

§ The GBL series column-mounted jib cranes are designed to be attached to the floor and are created for local handling of goods within a plant and to be used by the operating stations..
The cranes vertically lift the load in space by the hook of the lifting unit with suitable accessories for this operation, they traverse the load in space along the radial axis of the arm by the traverse unit and by electric and/or manual rotation are used in a work area within the radius of the arm. .

§ The GBL series electrically and/or manually rotating jib cranes thus handle three functions:

- **lifting** of the load, normally by a electrical chain hoist or rope
- **traverse** of the load with the use of an electrical trolley which slides along the crane arm
- **rotation** around the axis attaching the arm to the column (by means of a motoreducer if electric)

These movements are activated by the following buttons of the pushbutton panel:

- **lift** and **lower** buttons to control **hoist lifting** (fast and/or slow)
- **right** and **left** buttons to control **trolley travel** (fast and/or slow)
- **rotation** buttons to control the **electrical rotation of the crane arm** (fast and/or slow).

§ These buttons start the relative functions when they are pressed and the slow/fast speed, lift, traverse and rotation controls are activated with two click buttons, the first click for the “slow” speed control, the second click for the “fast” one.

§ The **emergency stop/start** button, present on the pushbutton panel is mushroom shaped, red, and activates the **stop** function when pushed all the way down. To allow the operation of all crane movements the **emergency stop** button just generally needs to be in the “lifted” position for **start** consensus and then the function button needs to be pressed.

!	**The ALARM button when pressed, activates the acoustic alarm located on the control panel. It is a good idea to activate the ALARM at the beginning of each sliding manoeuvre, in any case it must be activated every time the operator detects a potentially hazardous situation for the exposed persons and must signal the passage of the crane in areas where visibility is not complete.**

§ The crane can also be controlled by a remote control system, the functionality of the buttons is unchanged compared to that related to the pushbutton panel.

	• **When the crane is controlled by remote control the pushbutton panel is not restricted by the crane, the operator thus must always pay utmost attention during manoeuvres without ever losing sight of the work area and the handled load in order not to compromise his safety and/or that of any exposed persons.** • **It is prohibited to control the jib crane movements while on board it.**

5.1.2 Permitted loads, unpermitted loads

§ The loads must be:

- Of a shape, dimensions, weight, equilibration and temperature suitable for the characteristics where they need to be handled and must be compatible with the performance of the jib crane.
- Equipped with grip points and/or slung with specific accessories which prevent accidental dropping
- Stable and not subject to changed their static or physical configuration during handling.

§ Handling the following loads is not allowed:

- **whose weight, including any accessories, exceeds the crane capacity-**
- **with weights that are unbalanced compared to their centre of gravity.**
- **with surfaces that are not sufficiently resistant to the pressure exercised by the grip**
- **that, due to their chemical and physical characteristics, have been classified as hazardous, for example: flammable, explosive, radioactive, etc. materials**
- **toxic or handful materials or products, if not handled in specific safe containers, for example; corrosive chemical products, with biological risks, etc.**
- **bulk food products or substances, that can come into direct contact with the hoist parts or with its lubricants.**
- **that can change their static and/or chemical and physical configuration or their barycentre during handling.**
- **not equipped with accessories as per the following point.**

5.1.3 Lifting equipment

§ The following are generally allowed:

- Slings consisting of ropes and/or chains and/or textile fibre bands
- Lifting accessories that are placed between the load and the lifting hook, such as: balances, pliers, suction cups, magnets and electromagnets, etc.
- The use of such accessories must be in compliance with the instructions supplied by their manufacturers.

§ The following accessories are generally not allowed:

- **with functional specifications that can cause dynamic overstress to the crane over those allowed or accidental overloading.**
- **that can collide with the parts of the jib crane.**
- **that limit the free movement of the load.**
- **that are connected with independent electrical lines.**

The weight of the lifting accessories must be subtracted from the rated capacity of the jib crane.

5.2 - Operating conditions

5.2.1 Operating environment

- **The operating environment must have the following specifications:**
- **temperature:** min. - 10°C; max.: + 40°C : relative humidity max. 80%.
- **use in indoor environment**: in this case the jib crane is not exposed to inclement weather and does not require any special precautions.

The crane in the standard model, must not be used in environments and areas:

- **With vapours, fumes or dusts which are highly corrosive and/or abrasive** (when this cannot be avoided intensify the maintenance cycles).
- **In the presence of flames and/or heat greater than the allowed temperatures.**
- **With the risk of fire or explosion where the use of anti-explosion and/or fireproof components is required.**
- **In areas where strong electromagnetic fields are present which can generate electrostatic load accumulations.**
- **In direct contact with bulk food substances.**

5.2.2 Danger zones and exposed persons

§ The hazardous areas are all of those where, in any operating phase, the exposed persons can be subject to the risk that a hazardous event may occur for their safety, health of psychological/physical well-being. Specifically, it is necessary to inform **potentially exposed person**, that the operator assigned with use of the jib crane does not always work, in the movement trajectories of the **danger zones**, with sufficient visibility conditions to be able to completely and immediately prevent all potential risks of being crushed, collisions and being dragged in in terms of any people who thus must avoid to expose themselves to risk during the manoeuvres in these areas.

It is mandatory for the customer to place adequate signs in the danger zones to prohibit or limit access to unauthorised and/or not assigned personnel in the areas where the jib crane works, as required by current laws.

5.2.3 Work area lighting

§ The GBL series electrically rotated jib cranes are not equipped with their own lighting system. Consequently, the workplace of the operator assigned to use the crane and its work areas must be adequately lighted to ensure maximum visibility.

- **The level of ambient light must always be such as to ensure the maximum possible safety for crane operations.**
- **It is mandatory to install supplementary lighting systems in areas that are not sufficiently lit, thus preventing shadow areas that inhibit or reduce the visibility in the operating and/or surrounding areas.**

5.2.4 Operator

§ The operators are all of those who carry out the following activities on the jib crane on a time to time basis:

- transport, handling, assembly, installation, adjustments and the acceptance test
- commissioning, use, cleaning, maintenance and repair
- disassembly, dismantling and demolition
  - **The operators** need to be persons suitable for the work and mentally and physically able to meet the needs connected with the activities correlated with the jib crane during all the operating phases and in particular during the slinging and handling phases.
  - **The operator assigned to use** of the cranes must position himself in a manner that is not dangerous for his safety, predicting and thus preventing possible falls or dangerous movements of the transported load. Instructions are provided below to obtain greater safety for himself and others in using the machine, specifically the instructions in the manual must be scrupulously respected.

- **The operator must not allow anyone to come close during the use of the jib crane and prevent it from being used by unauthorised personnel, especially minors under age 18.**
- **The use of the crane by unauthorised and uninformed persons is prohibited.**
- **The operator must always use adequate personal protection equipment (P.P.E. = gloves, protective shoes).**

5.2.5 Capacity of the jib crane

§ The capacity of the jib crane, in the planned operating configuration, is clearly indicated by the plate affixed on it and is visible from the manoeuvring position.

- **The crane capacity limit must never be exceeded, by applying overloads or changing the calibration of the hoist load limiter.**
- **The crane must never be equipped with lifting equipment (hoist) with a rated capacity over the same.**
- **The lifting speed of 24 m/min must never be exceeded, unless the crane capacity is adequately reduced.**

5.2.6 Manoeuvres: lifting, trolley traverse and arm rotation

§ It is a good idea to perform one movement at a time, since it is only in this way that a manoeuvre can be started, stopped and constantly followed by the operator, who should also avoid continuously enabling and disabling including in the case of small movements.

- Gripping of the load with the hoist hook and the lifting accessories needs to be carried out carefully, gently and without abrupt movements.
- Start the lifting operation by slowly tensioning the chain until lifting the load a few centimetres, stop the manoeuvre and check the hold and the stability of the load.
- At the end of handling, carefully place the load and release the hoist hook,

- **During lifting manoeuvres:**
  The operator must pay attention to always keeping the lifting ropes and chains tensioned, never placing the hook on the ground or on the loads to lift. The ropes or chains can twist, come off the drum coils or the block pulleys, form knots, become seriously damaged and create unexpected hazardous situations. The operator must absolutely avoid making oblique pulls which are always dangerous and hard to control, and above all oblique pulls parallel to the axis of the drums that can also cause damage to the rope guide and the grooves with consequent irregular winding.

- **During trolley traverse and arm rotation manoeuvres**
  It is mandatory to avoid violent collisions between the trolley or arm and the end bumpers, in order not to cause serious repercussions on the mechanical parts and metalwork. It should be noted that the limit switches are placed in a position to allow the complete stroke when they are reached at reduced speed and that the braking space required is much greater the higher the speed. Consequently, the operator must always slow down the speed of the trolley or arm when they near the ends.

- **Work carefully and diligently constantly following the manoeuvres and visually checking the equilibrium of the handled weight.**
- **Avoid sudden manoeuvres and "small abrupt movements" that are very damaging for the stability of the load due to the dynamic effects which are generated.**
- **Never lift loads with grips which are not barycentre and not balanced or omit to hang and secure all of the required slinging accessories or anchor the load with temporary or makeshift slings.**
- **Never leave the load suspended, once a handling operation has been started, it must be completed as quickly as possible and the load needs to be placed without crushing the lifting accessories.**

5.2.7 Safety devices

§ Disabling of the crane power must be performing by disabling the line switch/circuit breaker (not included in the supply) and/or by pressing the “emergency stop/start” button on the pushbutton panel.
§ An electric or mechanical interlocking device prevents simultaneous control in both motor rotation directions, both at slow and fast speed.
§ The lack of voltage causes an immediate block of all hoist, trolley and crane arm movements, since the electric motors are equipped with automatic braking devices.
§ A safety catch is installed on the lifting hook to prevent accidental unhooking of the slings and/or load.
§ The lifting, traverse and rotation (if installed) limit switches limit the maximum vertical and horizontal travel of the load.

	**The automatic switches of the limit switches are emergency devices and must not be subjected to normal operation. If this need exists then other supplementary limit switches need to be installed for continuous operation in order that they act before the emergency ones.**

	• **The safety devices, when excluded from the *DONATI SOLLEVAMENTI S.r.l.* supply must be installed by the customer.**	

5.3 - Activating the jib crane

	**To start the operating activity of the jib crane follow the instructions below:**	

1. Visually inspect the conditions of the crane and the structures where it is installed.
2. Perform all of the tests as described in paragraph 5.5 “Use criteria and precautionary measures”
3. Activate the power line by putting the general switch in the “ON” or “1” position
4. Check that there are no exposed persons in the hazardous operating areas
5. Put the **“emergency stop/start”** red mushroom head button in start consensus
6. Check the operation of the safety devices by checking the movements as described in the paragraph 5.1 “Functions of the jib crane”

5.4 - Deactivating at the end of work

	**To deactivate the crane at the end of work follow the instructions below:**	

1. Position the arm in a recovery position making sure of its stability and taking care that it does not generate risks of collision or interferences with surrounding structures and/or machines.
2. Release the lifting hook from the slings used to handle the load.
3. Lift the hook, where possible, to a height not under 250 cm, i.e. so that it does not create disturbances and danger for the movement of people and things below the crane.
4. Stop all crane movements by pressing the “stop” button of the pushbutton panel.
5. Put the pushbutton panel in the “do not disturb” position.
6. Deactivate the power by putting the general switch in the “OFF” or “0” (zero) position.

5.5 - Use criteria and precautionary measures

!	• **The correct use of the jib crane makes it possible to fully use the performance that is able to provide in completely safe conditions.** • **This potential is only guaranteed by scrupulously following the instructions below:**	

- **ALWAYS** follow the indications and instructions contained in the installation and user manuals and check the conditions of the crane components and parts..
- **ALWAYS** comply with the instructions and warning shown on the machine; the warning plates on the crane and the manoeuvre areas are accident prevention warnings and they must always be perfectly legible.
- **ALWAYS** check that the crane performance matches the intended duty (work cycles - intermittence - use times - loads to handle).
- **ALWAYS** check the solidity and adequacy of the structures (ground; flooring; foundation; plinth) that support the jib crane, when first commissioning, or check that this has been done by professionally competent personnel.
- **ALWAYS** check that the track for movement of the electric trolley on the arm, is installed at a height which does not allow the operator to interfere with the shape of the trolley hoist and/or its moving parts. If this is not possible install appropriate guards or signs located in the risk area.
- **ALWAYS** check the correspondence of the crane rotation, trolley traverse and hoist lifting movements.
- **ALWAYS** test the operation of the emergency stop/stat button.
- **ALWAYS** ensure that the arm rotation area is free from obstacles before any manoeuvres.
- **ALWAYS** check the adequacy of the state of preservation (cleaning, lubrication) and maintenance of the crane and its main components (ropes or chains, drum or nut, pulleys, block-hook, pushbutton panel, limit switch, motoreducer, wheels, electrical system, etc.).
- **ALWAYS** check the suitability and operation of the electrical system; specifically check that there are no precarious or dangerous connections.
- **ALWAYS** check the correct operation of all of the crane motors.
- **ALWAYS** constantly check the efficiency of the brakes and limit switches checking their operation in all jib crane movements.
- **ALWAYS** perform tests on the block-hook ropes/chains, load limiter or clutch device and pushbutton panel checking their conditions and efficiency.
- **ALWAYS** check the suitability and efficiency of the slings (ropes; chains; bands; etc.); specifically, check that there are not tears, crushing, broken strands or parts that are not lubricated.
- **ALWAYS** make sure to have centred the lifting unit (hoist and hook), on the perpendicular axis of the load before performing the slinging and handling of the load.
- **ALWAYS** correctly secure the slings of the load to the lifting hook, after having balanced the load before lifting it, tension the slings with slow and safe manoeuvres.
- **ALWAYS** make sure that the load does not encounter obstacles during handling operations (lifting, rotation and traverse).
- **ALWAYS** give warning, using the acoustic alarm, to the personnel working near the jib crane manoeuvre area when starting the load handling operations.
- **ALWAYS** work in the best lighting conditions of the area and visibility of the load.
- **ALWAYS** work outside the manoeuvre range of the lifted load.
- **ALWAYS** activate the various movements avoiding to use control impulses in rapid succession as much as possible.
- **ALWAYS** use the “slow” speed for approach and positioning operations.
- **ALWAYS** position the crane arm, hook and pushbutton panel at the end of working in a manner that they are not in danger of colliding. Where possible, raise the hook to a height of ≥ 250 cm.
- **ALWAYS** activate the stop button on the pushbutton panel and disable the crane general switch before leaving the manoeuvre position.
- **ALWAYS** turn off the machine voltage for inspections, repairs and routine maintenance operations.
- **ALWAYS** report any operating anomalies (defective behaviour, suspects breakage, incorrect movements and noise that is not normal) to the department head and put the machine in non-working conditions.
- **ALWAYS** comply with the maintenance operation program and logbook, for each test, any observations related in particular to the hook, ropes/chain, brakes and limit switch.

5.6 - Use contradictions

	• **The use of the jib crane for non consented manoeuvres, its improper use and lack of maintenance may result in serious risks for the health and safety of the operator and exposed persons, as well as compromise the operation and safety of the machine.** • **The actions described below, which obviously cannot cover the entire range of possible "misuse" of the crane, do however constitute those which are "reasonably" more foreseeable, they are absolutely prohibited and therefore:**	

5.6.1 Unintended and unpermitted use – Foreseeable and unforeseeable misuse

- **NEVER** use the jib crane to lift and transport people.
- **NEVER** lift loads while people are transiting in the manoeuvring area below.
- **NEVER** move through, stand, work or manoeuvre under the suspended load.
- **NEVER** allow the crane to be used by unauthorised personnel or minors under 18 years of age.
- **NEVER** work without the due attention during lifting, rotation and traverse.
- **NEVER** put your hands in the pulley while rotating, on moving ropes or chains, on slings during the "tensioning" phase in the contact areas with the load and between the hook and slings.
- **NEVER** leave a suspended load unsupervised.
- **NEVER** lift loads greater than the rated capacity nor equip the crane with hoists with a rated capacity higher than the crane capacity.
- **NEVER** lift unbalanced loads.
- **NEVER** swing the load of the hook during the traverse.
- **NEVER** put the rope or change in a diagonal pull position.
- **NEVER** use the crane for towing or dragging.
- **NEVER** use the hoist rope or chain as a sling for the load.
- **NEVER** use slings without having checked their suitability.
- **NEVER** use the hook tip as a support base for the load.
- **NEVER** use the crane to keep items attached to the ground tensioned.
- **NEVER** lift "guided" loads.
- **NEVER** continue the hook stroke after having placed the load causing the ropes or chains to shift.
- **NEVER** use two cranes at the same time to lift the same load, without having put adequate safety procedures into place.
- **NEVER** use the crane with two simultaneous movement, wait until the first movement has completely stopped before starting another one.
- **NEVER** use the crane in incorrect ambient conditions (- 10°C + 40°C; 80%).
- **NEVER** use the crane in areas where the use of non-explosive components is required.
- **NEVER** cause the automatic limit switches to trip continuously.
- **NEVER** reach the "stroke end" at full speed in rotation and traverse movements.
- **NEVER** use the crane in the presence of a sharp mains voltage drop or an accidental lack of one of the three phases.
- **NEVER** perform abrupt changes in direction in the lifting, rotation and traverse phases.
- **NEVER** repeatedly activate the crane control buttons.
- **NEVER** change the functional and performance characteristics of the crane and/or its components.
- **NEVER** change, alter the settings of the safety devices (limit switch, load limiter, clutch device, etc.) and/or tamper with the crane and/or its components.
- **NEVER** perform temporary repairs or reset interventions not in compliance with the instructions.
- **NEVER** use non-original spare parts or those not recommended by the manufacturer.
- **NEVER** entrust maintenance and repair operations to personnel not instructed by the manufacturer.
- **NEVER** leave the crane at the end of work without having put the safety procedures into place.
- **NEVER** perform routine maintenance operations, inspections or repairs without having decommissioned the crane and activated the relative procedure.
- During maintenance phases, **NEVER**:
  - use unsuitable equipment
  - leans ladders on the hoist or jib crane
  - work without personal protection equipment
  - intervene without having removed the lifted load

  NEVER use the crane if it is not perfectly compliance in all its operating functions.

6. - JIB CRANE MAINTENANCE

6.1 Safety precautionary measures

§ The accident prevention measures contained in this paragraph must always be strictly complied with during maintenance, in order to avoid personal injury and damage to the jib crane.

⚠	**The personnel assigned to jib crane maintenance must:** • **be well trained** • **have read this publication** • **have an in-depth knowledge of accident prevention laws** • **Unauthorised personnel must remain outside of the work area during operations.**	

§ These measures are cited and further described in this chapter, each time a procedure is required that may entail a risk of injury, damage or accident, using the **WARNING** and **HAZARD** notes.

!	**The WARNING notes precede an operation that, if not correctly performed, may cause damage to the jib crane or its components.**

⚠	**The HAZARD notes precede any operation that, if not correctly performed, may cause an operator accident.**

☞	**Pay attention to the following WARNING NOTES during the maintenance phases:**

!	**Before restarting the jib crane, after a fault, it must be carefully inspected and controlled to discover any damage and the procedure described in paragraph 5.3 must be repeated.**	

!	**Never intervene on the setting and positioning of safety devices unless expressly required to eliminate a fault. Tampering with them may cause serious damage to the crane or its components.**	

Pay attention to the following HAZARD NOTES during the maintenance phases:

Disable the power to the crane electrical components before performing maintenance operations unless it is necessary. Affix a sign stating: MACHINE MAINTENANCE - DO NOT TURN ON THE POWER.

Never disable the safety and protection devices installed on the jib crane. Use specific warning signs and work with utmost caution if it becomes necessary.

Always make sure of the presence and suitability of the earth connections and their compliance with the law. Lack of an earth connection for the electrical equipment may cause serious injury to people.

Avoid the use of flammable or toxic solvents (petrol, ether, alcohol, etc.). Avoid prolonged contact with solvents and inhalation of their fumes. Specifically avoid the close by use of open flames.

Always ensure, before starting the crane, that the personnel assigned to maintenance is at a safe distance (no longer above ground) and that tools and materials have not been left on the crane.

Always use protective gloves during maintenance operations.

All of the accessible moving parts, with the sole exception of the chain and sub block/block, are protected against accidental contacts as much as possible. Replace the required guards before starting the crane again.

Never use sprayed water for fires, disconnect all the power and use adequate fire extinguishers.

Make sure that the tools to use are in perfect conditions and have insulated handles, where required.

Pay maximum attention to tall of the RESIDUAL RISKS shown on the jib crane and included in this publication.

6.2 Qualification of personnel assigned to maintenance

§ Toe be able to adequately perform maintenance of the jib crane, the personnel assigned to maintenance must:

- know the current laws related to accident prevention during the works performed on the machines with motor transmission and be able to apply them
- have read and understood chapter 3 “Safety and Accident Prevention”
- know how to use and consult this documentation
- be interested in the machine operation
- notice any operating irregularity and take the necessary measures if needed.

§ The professional figures in charge and authorised to perform crane maintenance are:

	**Operator assigned to use of the jib crane.**	

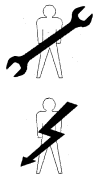
- **Typical maintenance activities:**
  - Testing of correct operation of the jib crane. Collaboration with the personnel assigned to routine and/or extraordinary maintenance, after prompt notification of the same if anomalies are discovered.
  - cleaning and lubrication of the crane parts (hoist) with which they are normally in contact (pushbutton panel and hook) and performance of simply performed maintenance activities which do not require overhead interventions (e.g. hook thrust bearing bearing lubrication).
- **Required technical knowledge:**
  - knowledge of the functions and use of the jib crane
  - knowledge of the lubricant used in the crane and hoist and the hazards connected with their use.
- **Required qualification:**
  - suitable for work in relation to the specific operating and environmental characteristics.

	**Mechanical maintenance personnel**	

- **Typical maintenance activities:**
  - mechanical adjustment of brake and mechanism clearances.
  - testing of movement executions and mechanical adjustment of safety devices
  - checking of mechanical clearances and component (rope or chain, hook, etc.) wear
  - replacement of worn components (rope or chain, hook, rope guide or chain guide, pulleys) through the use of this publication and/or attached publications
  - routine maintenance of the mechanical units after replacement of parts with original spares.
- **Required technical knowledge:**
  - good knowledge of the mechanical lifting and manual and motor handling systems
  - good knowledge of the safety devices used in the hoist (limit switch, brakes, load limiter, clutch, etc.)
  - elementary knowledge of moderately difficult electrical control and setting techniques (limit switch adjustment, fuse replacement, motor connections, etc.)
  - knowledge of the measurement and test methods to determine the actual state of the crane and hoist conditions (testing of: brakes, wear on ropes or chains, hook wear, wheel wear, anomalous noise, etc.)
  - non complex logical troubleshooting methods and risk assessment
  - ability to organise the measurements aimed at restoring the hoist to its operation and performance
  - ability to write a maintenance intervention report
- **Required qualification:**
  - Complete training as an industrial mechanic with specialisation and experience in maintenance of lifting or industrial handling systems

	Electrical maintenance personnel	

- **Typical maintenance activities:**
  - intervention on electrical equipment starting from functional diagrams
  - testing of movement executions and electrical adjustment of safety devices
  - testing of wear of electrical components (contacts of electrical equipment)
  - repair of electrical units after replacement of parts with original spares.
- **Required technical knowledge:**
  - good knowledge of electrical systems and installations
  - good knowledge of electrical components and safety devices used in the hoist (limit switch, brakes, etc.)
  - knowledge of average difficult electrical control and adjustment techniques (replacement based on the original diagram of; motors, limit switch, pushbutton panel, control panels, cables, etc.)
  - elementary knowledge of moderately difficult mechanical control and adjustment techniques (testing of wear, adjustment of mechanical stops, etc.)
  - knowledge of the measurement and test methods to determine the actual state of the hoist conditions (testing of the efficiency and reliability of the electrical equipment)
  - knowledge of electrical troubleshooting methods and experience on electrical command and control systems for lifting and handling equipment
  - ability to organise the measurements aimed at restoring the hoist to its operation and performance
  - ability to write a maintenance intervention report
- **Required qualification:**
  - Complete training as an electrical mechanic with specialisation and experience in maintenance of lifting or industrial handling systems

	Electromechanical maintenance personnel: **Operator whose professional profile, in addition to possessing the typical characteristics of electrical maintenance personnel, also possesses the skills and technical abilities required of mechanical maintenance personnel.**	

	Mechanical technician	

- **Typical technical activities:**
  - mechanical adjustments of safety devices, calibrations and acceptance tests (annual load tests)
  - routine maintenance operations after replacement of complex mechanical components and/or those which are critical for safety purposes (anchoring components, arm, reducers, motors, etc.)
  - repair of mechanical units including extraordinary maintenance operations (repair of structural parts with welding, mechanical machining on the crane, etc.).
- **Required technical knowledge:**
  - knowledge of lifting and industrial handling mechanical systems certified by specific training
  - specific knowledge of the safety devices used in the hoist (limit switch, brakes, load limiter, clutch, etc.)
  - basic knowledge of electrical control and adjustment techniques (testing of motors)
  - specific competence in measurement and test methods for determining the actual state of the crane and hoist conditions (testing of: brakes, pushbutton panel, control panel, limit switch, etc.)
  - specific competence on logical troubleshooting methods and risk assessment
  - ability to oversee the measurements aimed at restoring the jib crane to its operation and performance
  - ability to write a maintenance intervention report
- **Required qualification:**
  - Complete training as an industrial mechanic technician with specialisation and specific competence in lifting and handling systems.

☞	**Electrical technician.**	

- **Typical maintenance activities:**
  - electrical adjustments of safety devices, calibrations and acceptance tests (annual load tests)
  - routine maintenance operations including replacement of complex electrical components and/or those which are critical for safety purposes (lifting limit switch, motors, LV panel)
  - repair of electrical units including extraordinary maintenance operations (repair of electrical motors with partial replacements, replacement of limit switch with changes in layout, etc.).
- **Required technical knowledge:**
  - excellent knowledge of electrical systems and installations on lifting and industrial handling equipment
  - specific knowledge of electrical components and safety devices used in the hoist (limit switch, brakes, load limiter, etc.)
  - experience with electrical control and adjustment techniques (ability to intervene on the original diagram for improvements on; limit switch, pushbutton panel, control panels, cables, etc.)
  - knowledge of mechanical control and adjustment techniques (testing of wear, testing of mechanical component performance, adjustment of mechanical stops, noise testing, etc.)
  - specific competence on the measurement and test methods to determine the actual state of the hoist conditions (testing of the efficiency and reliability of the electrical equipment)
  - specific competence on the logical troubleshooting methods and risk assessment on the command and control electrical equipment of lifting equipment
  - ability to oversee the measurements aimed at restoring the jib crane and hoist to their operation and performance
  - ability to write a maintenance intervention report
- **Required qualification:**
  - Complete training as an industrial electrical technician with specialisation and specific competence in the electrical equipment of lifting and handling systems.

☞	**Electromechanical technician:** **Operator highly specialised and specifically trained, whose professional profile include, in addition to the typical competences and knowledge of an electrical technician, those of a mechanical technician.**	

☞	**Special recommendations regarding maintenance:**

1. If correctly performed, maintenance operations guarantee the safety of workers assigned to use of the jib crane and reduce downtime after a fault to a minimum.
2. A promptly executed repair avoids additional deterioration of the crane or its components.
3. Use original spare parts or products as much as possible.
4. The following instructions need to be complied with for maintenance work:
   - Personnel assigned to perform routine and extraordinary maintenance work must have read and clearly understood all of the indications contained in this chapter and chapter 3.
   - Extraordinary maintenance jobs must only be performed by authorised and qualified personnel who have been trained for this purpose.

⚠	**Maintenance operations must be performed, when possible, with the crane power off and in safe conditions, using suitable equipment and adequate personal protection equipment, based on the requirements of current laws, and affixing a sign with the warning: "MACHINE IN MAINTENANCE".**

☞	**For any problems which should arise or to order spare parts contact the *DONATI SOLLEVAMENTI S.r.l.* Technical Assistance Service.**

6.3 Maintenance plan

§ The maintenance plan includes all ordinary type operations, that entail inspections, tests and checks conducted by the operator assigned to use the crane and/or qualified personnel assigned to normal company and periodic type maintenance which include replacement, setting and lubrication operations performed by technical personnel instructed for the purpose through specific courses or publications.

	• **Since maintenance operations can be performed at a dangerous height above ground, the assigned personnel must have appropriate means (scaffolding, platform, ladders, etc.) that make it possible to perform the activity in safe conditions.** • **Personnel must also be in possession of adequate personal protection equipment (P.P.E.) required by current laws.**	

6.3.1 Daily and routine maintenance.

§ This involves maintenance operations that can be directly performed by the operator assigned to use the crane or qualified personnel, as prescribed in this publication and/or in any attached documents, which do not require the use of special instruments and equipment.

§ Maintenance operations are divided into:

	**Daily operations, handled by the operator assigned to crane use:** • general visual inspections • functional tests with testing of motors, limit switches, clutch device, brakes with no load, “stop” button, and other functions of the pushbutton panel • testing or the rope or chain and hook conditions • testing of correct crane arm rotation.	

	**Monthly operations, handled by qualified personnel:** • visual inspection of each mechanism and any lubricant leaking • functional testing of full load brakes • checking that no anomalous noises and/or vibrations exist • greasing of the mechanisms and limit switches to ensure regular operation and limit wear • testing of the operation and conditions of the pushbutton panel and relative cable.	

	**Quarterly operations, handled by qualified personnel:** • check the efficiency and wear of: hook rope or chain and rope guide or chain guide • check the nut, drum, pulley, block/sub block wear • check the wheel, pinion, guide roller of the traverse trolley wear • check the lubrication of the rotation motoreducer pinion and sprocket • check the efficiency and operation of the load limiter or clutch device. • inspect the interior of the panels to check for the presence of dust • check and clean oxidised contacts and any plug/socket connectors • check the greasing of the mobile trolleys of the cable line and check the cables • check the efficiency and conditions of the power line and its components • test the motors and brakes with load with check of wear • check the efficiency and preservation of the structure (paint, oxidation, etc.).	

6.3.2 Frequency and deadlines for maintenance interventions.

§ The frequency of the following operations refers to a jib crane used in normal operating conditions and are valid up to service group M4 (standard ISO 4301/88) or 1Am (FEM 9,511 rule).

§ If the use of the jib crane is normal and correct for a daily 8 hour shift, the following overhaul may be performed after a use period of approximately 10 years (FEM 9,755 - S.W.P. rule)

If use is over various shifts, the maintenance periods need to be reduced proportionately.

Table of periodic checking and maintenance operations

Subject of the check ⇓	Periodic checks				Useful notes
	Daily	Monthly	Quarterly ✍	Annual ✍	
Checks Inspections - Acceptance tests	General visual checks Correct operation operation	Visual inspections	Check for wear	Annual acceptance testing	pages 37-38-39
Signs and pictograms Signs and plates	Legibility of signs and pictograms, signs and plates	Visual inspections of conditions and cleaning of plates and signs	Check for suitability		pages 15-20
Structural parts Welding Bolted joints				Check wear and efficiency Check bolted/welded joints	page 55
Check the contrast rollers of the roller box	General visual checks Correct operation operation			Check wear and efficiency	page 59
Rope or Chain Anchoring parts	Visual inspection		Check wear and efficiency		Hoist manual
Lifting hook	Visual inspection and check of spring catch		Check wear and efficiency		Hoist manual
Loading drum Chain guide/rope guide Cleaning/block return			Check wear and efficiency		Hoist manual
Lifting reducer Traverse reducer Rotation reducer		Check of noise			Hoist manual and page 56
Lifting motor Traverse motor Rotation motor	Check of correct operation		Load test		Hoist manual and page 57
Lifting brake Traverse brake Rotation brake	Check of correct operation	Load test of braking paces	Load test Check wear		Hoist manual and page 56
Wheels Pinions Rotation sprocket and pinion			Check wear		Hoist manual and page 56
Trolley buffers	Visual inspection			Check wear and efficiency	Hoist manual
Electrical system Pushbutton panel and ring collector cable	Check of correct operation	Visual inspection external breakage pushbutton panel/cable	Check wear and efficiency		Hoist manual and page 58
Load limiter Clutch device			Load test	Check for calibration	Hoist manual
Lifting limit switch Traverse limit switch Rotation limit switch	Check of correct operation		Load test Check wear and efficiency		Hoist manual and page 57
Cleaning and lubrication	Check for correct cleaning and lubrication state	General lubrication inspection	Lubrication leak test Lubrication of chains, hook, mechanisms		Hoist manual and page 60

N.B.: ✍ The following operations must be noted in the specific test logbook (See chapter 8)

6.3.3 Test of part and component efficiency

The following instructions should be scrupulously complied with for the single parts of the jib crane:

Annual test of the efficiency of the structural elements, welding and bolted joints (fig. 45):

- The metallic structure of the jib crane, in addition to normal alternations due to environmental factors and wear of moving parts, may be subject, including unexpectedly or during handling operating phases, to collisions, contacts or scraping with other equipment or abnormal stress that can damage the metalwork frame and welding. Therefore the structures, after perfect cleaning, must periodically undergo scrupulous tests to check their suitability and repair any damage if necessary.
- Check the tightening of the column anchoring bolts, based on the required torque (see the table on page 13)

Repair the structure where the following occur:

- **deformations:** lengthening, crushing, dents, bends
- **wear**: worn parts, reduction in cross section, incisions, abrasions, corrosion, oxidation, scratches, peeling paint
- **breakages:** cracks in the welding, bending, cuts or incisions, broken parts
- **changes in cross sections ≥ of 10%, or thickness ≥ of 5 % compared to the initial values**

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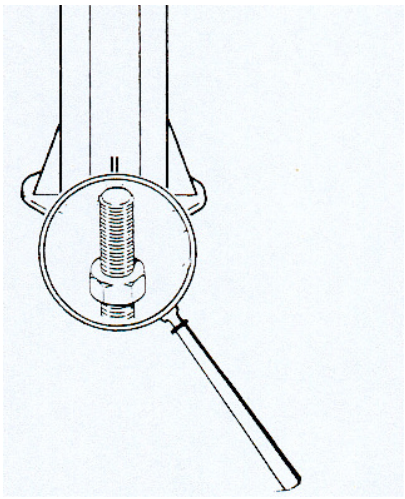


fig.45

	Quarterly test of the efficiency of the sprocket and relative pinion:	

- Using the pushbutton panel, activate the arm rotation “forward and backward” movements, check that the rotation pinion has a silent, gentle and regular movement.
- If necessary adjust the speed and/or duty plate (e.g. intense duty, in the presence of heat, etc.) at the time of annual inspections, check the wear and lubrication of the sprocket teeth and reducer pulley. Lubrication them with grease if necessary.

•	**Replace and motoreducer pinion and/or crown if the following are detected:** • **Major changes in the noise of the motoreducer, creaking of the pinion.** • **Excessive friction of the crown and/or strong vibration of the motoreducer.** • **“Knocking” and/or “jerking” and/or difficult and/or irregular arm rotation.**	DONATI TECHNICIAN DONATI SERVICE

	Quarterly test of the efficiency of the rotation motor brake:	

- Check the stability of the arm now load and the handled weight at full load, checking that the braking spaces and arm stop in rotation are between 50 and 100 cm estimated compared to the tip of the arm.
- If necessary adjust the crane brake, as described in paragraph 6.4.1. “Adjustment of the jib crane rotation motor brake” on page 59.

	• **Replace the brake shoe when arm instability is detected including after having adjusted the brake.** **IN THE EVENT OF A FAULT:** • **It is prohibited to act on the jib crane rotation are brake with corrective maintenance.** • **Any extraordinary maintenance operation on the crane rotation motor brake must be conducted by the *DONATI SOLLEVAMENTI S.r.l.* assistance service or personnel authorised by the same.**	DONATI TECHNICIAN DONATI SERVICE

	Monthly test of the efficiency of the crane rotation reducer:	

- Check that the reducer noise has not changed in intensity. Excessive vibrations or noise indicate wear of the teeth or malfunction of a bearing.
- Make sure no lubrication is leaking and check its level at least every four years.

•	**CAUTION:** • **The reducers are lubricated for life and do not need any maintenance or top ups of lubrication, unless there is leaking.** **IN THE EVENT OF A FAULT:** • **It is forbidden to perform corrective maintenance on the rotation reducer.** • **Any extraordinary maintenance operation on the rotation reducer must be conducted by the *DONATI SOLLEVAMENTI S.r.l.* assistance service or personnel authorised by the same.**	DONATI TECHNICIAN DONATI SERVICE

	**Quarterly test of the efficiency of the crane rotation motor:**	
• Clean the motor eliminating any dust from the casing which could hinder regular cooling; check that the ventilation openings are not blocked. • Make sure there is no anomalous noise with a rated load (buzzing, rubbing). • Make sure the temperature of the casing does not exceed 110°C. If it does search for the causes and check the duty the hoist is intended for (see point 6.5 "Troubleshooting"). • Check the absorption and voltage comparing them with the rated values indicated on the motor plate.		
	**IN THE EVENT OF A FAULT:** • **It is forbidden to perform corrective maintenance inside the rotation motor.** • **Any extraordinary maintenance operation on the rotation motor must be conducted by the *DONATI SOLLEVAMENTI S.r.l.* assistance service or personnel authorised by the same.**	DONATI TECHNICIAN  DONATI SERVICE

	**Quarterly test of the efficiency of the crane rotation limit switch** (when installed):	
• Check the preservation and the correct tripping (trip the limit switch various times) and in particular, check their operation during a normal full load manoeuvre first testing at slow speed. • Check the correct tightening of the grommets, covers and seals. • Check the mechanical conditions of the mobile parts (lever and spring) and check the tightening of the anchoring screws.		
	• **The limit switched are devices with safety functions and their fault or malfunction could compromise the safety of exposed persons!** • **Do not hesitate to replace the limit switch in question, if it is not able to offer sufficient guarantees on its functional reliability.** • **Do not ever make temporary or makeshift repairs on the limit switches!** • **Use original spare parts.**	

Quarterly test of the efficiency of the control electrical system:
ATTENTION! Some of the operations described below are performed live, operate with maximum caution.

- **Hoist and rotation control equipment**: check internally.
  Using the pushbutton panel,, check that the mobile parts of the contactors move with a minimum friction; if not it may be that the electromagnet force is insufficient for guaranteeing a good pressure between the contacts.
  To prevent uncertain contacts, heating or noise, check that the power voltage of the coils is the correct value.
- **Wires and earth connections**: check the efficiency by testing, and anchoring all of the screws of the earth terminal if necessary.
- **Terminals**: check that they are correctly tightened, check that the identification number is clearly visible and attached to the terminal; check the conditions of the heat insulation material and in the case of cracks or breakage replace it immediately.
- **Fuses**: maintain a regular supply of each type of installed fuse (see the wiring diagram)m in order to be able to quickly replace them with the same type of fuse if needed.
- **Seals**: check all of the seals of the covers and grommets.
- **Plates**: check for the presence and efficiency of the warning plates located on the cover
- **Rotating ring collector**: if installed check the efficiency checking for any wear on the ring tracks and current socket guides.

- **Do not hesitate to replace the electrical component in question, if it is no longer able to offer sufficient guarantees on its functional reliability.**
- **Do not ever make temporary or makeshift repairs.**
- **Use original spare parts.**

Monthly test of the pushbutton panel and relative cables

- Check the preservation of the pushbutton panel, check the operation and efficiency of all the buttons, cleaning it removing dirt or any greasy deposits in the seats. Check the legibility of the plates. Test the seals.
- Check the preservation of the multipolar cable of the pushbutton panel and all the flexible cables making sure there are no cuts, abrasions, worn patches and uncovered wires. Check the efficiency of the pushbutton suspension cables and their correct attachment to the hoist body.

If any breakage to the pushbutton panel is found, or abrasions, cuts and warn patches of the cable notify the electrical maintenance personnel for replacement.

For information on the tests of all the structural, mechanical and electromechanical tests of the living and traverse units incorporated in the jib crane, see the relative documentation attached to this technical publication.

- **Do not hesitate to replace the part and/or component in question, if it is not able to offer sufficient guarantees on its safety and/or functional reliability.**
- **Do not ever make temporary or makeshift repairs!**

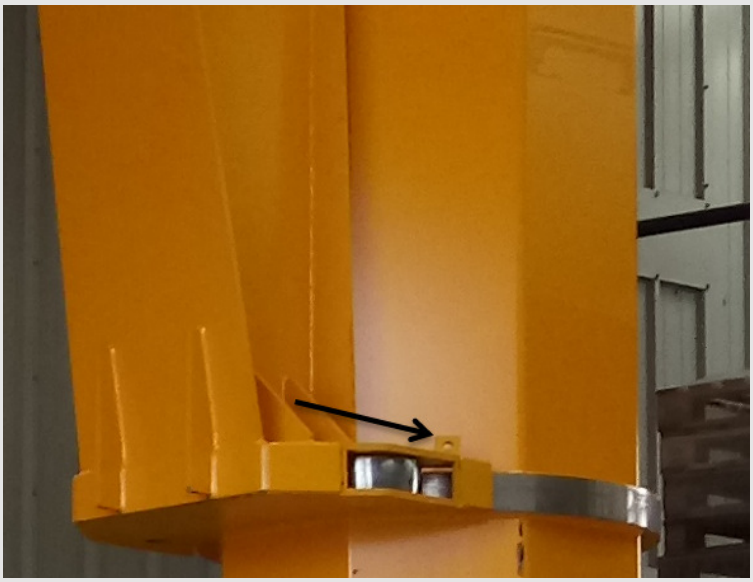
Annual test of contrast roller wear:

- Make sure that the contrast roller diameter is not less than 5% compared to the rated diameter (see the table below)

GBL dimension	Roller rated diameter	Roller minimum diameter for use
2	200 mm	190 mm
3	210 mm	200 mm
5	230 mm	219 mm

If the wear exceeds 5%, replace the contrast rollers as follows:

- **Remove** the crane arm from the column by inserting two M24x120 screws (not supplied) in the holes indicated by arrows in the figure, tightening until the rollers are removed from the track



- **Remove** the sides of the roller box by unscrewing the relative screws

- **Unscrew** the screws securing the stop plate to the upper part of the roller box.
- **Remove** the pin stop plates being careful not to drop the pins which will be taken off from the lower part of the roller box
- **Remove** the worn contrast rollers by taking them off from the roller box side
- **Mount** the new kit following the instructions on page 29 inserting all of the rollers from the roller box side
- **Unscrew** and **remove** the two M24x120 screws so that the contrast rollers lock on the track

6.3.4 Cleaning and lubricating the jib crane

- **Cleaning can be performed by personnel who is not highly specialised.**
- **It is periodically necessary to keep the following parts clean:**
  - **crane structure** (column, arm)
  - **jib crane mechanisms** (sprocket, rotation motoreducer)
  - **electrical parts** (control panel, pushbutton panel, cable and trolleys)
  - **components of the lifting and traverse unit** (wheels, chain or rope, hook, block, etc.)
- **Overhead <u>cleaning above ground</u> must be performed by qualified personnel equipped with suitable means and personal protection equipment.**
- **There operations are necessary on a quarterly basis to permit activation of periodic tests.**

- Cleaning can be implemented simply with the use of means, equipment and cleaners or solvents normally used in general cleaning operations for industrial equipment since no particular contraindications exist in relation to the use of products or materials.
- Clean by removing any foreign and dirty substances with vacuums, absorbent cloths, etc.
- Dry any excess grease and/or oil on the parts.

Accurate management of the jib crane mechanism lubrication is a necessary condition for guaranteeing the effective compliance to its intended duty as well as its duration.

- The lubricating power decreases over time due to stress, so it may be necessary to restore or renew the lubricants.
- The lubrication of the GBL electrically rotated jib crane is very simply and is limited to the application of a light layer of grease on the crown teeth and the relative pinion.
- The motoreducer is lubricated for life. However, it is a good idea to check the lubricant level at least every four years and top it up if necessary.
- Perform the tests and where necessary lubricate using the recommended lubricant types or corresponding ones as indicated in the following **"Table of periodic lubrication operations"**.
- Moreover, the lubrication of the lifting and traverse mechanisms is very important, their lubrication cycles are contained in the relative technical publications.

Table of periodic lubrication operations

Component	Type of lubricant		Frequency
	Oil	Grease	
Crown and relative pinion		Agip Blasia GR MU3	Check every 3 months
Rotation reducer	Agip Blasia S 220		Check every 4 years
Lifting mechanisms	See the user instructions of the electric hoist		
Traverse mechanisms	See the user instructions of the electric trolley		

- **Lubricants, solvents and detergents are toxic/harmful products for health:**
  - **they can cause irritation if they come into direct contact with the skin**
  - **they can cause serious intoxications if inhaled**
  - **they may be fatal if ingested.**
- **Handle with care using adequate personal protection equipment (PPE). Dispose of correctly in compliance with current laws on toxic/harmful waste.**

6.4 Settings and adjustments

6.4.1 Adjustment of the crane arm rotation brake

RESIDUAL RISKS ON THE CRANE DURING THE BRAKE ADJUSTMENT PHASE		
HAZARD / RISK	**PROHIBITION / WARNING**	**OBLIGATION / PREVENTION**
		
Risk of being crushed in the event of contact with the rotation arm during the brake adjustment phase.	**Attention!** Exposure to moving parts may create hazardous situations.	Assign the brake adjustment operations to qualified maintenance personnel. Use protective gloves and, if necessary, safety harnesses.

- **The GBL series jib crane rotation motor is self-braking with axial movement of the rotor.**
- **Braking is mechanical and ensured by a tapered brake shoe, equipped with a braking gasket, attached to the rotor which, if there is no power, is pushed by a spring in contact with the braking surface of the brake cover.**
- **The braking gaskets, made of asbestos, are subject to wear based on the intensity of duty.**
- **Consumption of the brake shoe braking gasket increases the axial movement of the motor shaft. This results in a progressive loss of braking torque with consequent shifting of the brake and lengthening of the braking space, to this reason the brake needs to be adjusted.**
- **The braking torque can be adjusted in the following manner:**
- **internal recovery of the brake clearance, due to heavy wear of the braking gasket with increase of the motor shaft axial stroke > 1 mm**

Adjustments of the GBL series jib crane brake by internal recovery of the brake clearance

ATTENTION! A safety harness is mandatory when performing this operations above ground

- To adjust the brake of the **GBL series jib crane** the following **PRELIMINARY OPERATIONS** need to be performed:
  1. Disconnect the power;
  2. Safely go to the overhead work area;
  3. Working overhead, remove the plastic grill (ventilation) by completely unscrewing the four screws (fig. 46).
  4. Completely unscrew the three screws from the ring nut locking the brake shoe (fig. 47);
  5. Remove the ring nut from the shoe unlocking it. If necessary put a screwdriver in the slot (fig. 48);
  6. Turn the ring nut 360° anticlockwise (1 complete turn) considering that a complete turn of the ring nut generates a 1 mm axial movement of the brake shoe.

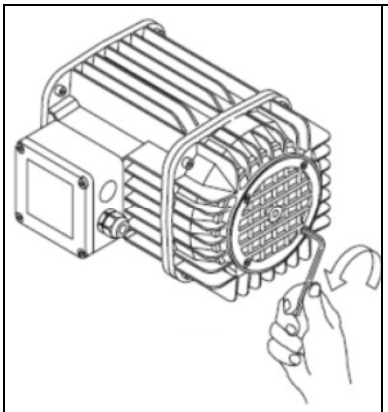


fig.46

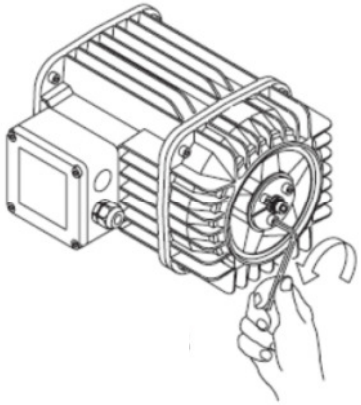


fig.47

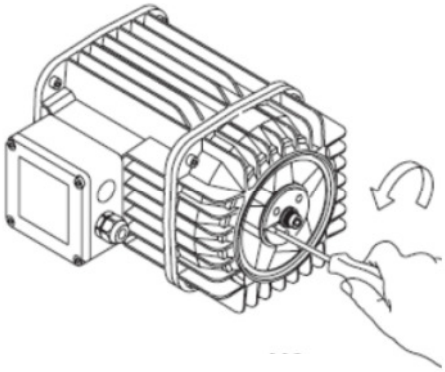


fig.48

7. Move the shoe back to the ring nut matching up the relative holes.
8. Replace the three screws in the original seat on the ring nut tightening them on the shoe (fig. 49)
9. Remote the grill (ventilation) completely screwing the four screws (fig. 50).

When the operation is completed check that the brake adjustment, with clearance recovery, has been performed correctly, by testing (first empty and then with rated load) that:

- The rotation of the motor is free, and with no anomalous noise, brake rubbing or overheating of the brake cover.
- The brake intervenes silently and the arm rotation occurs without clear shifting.

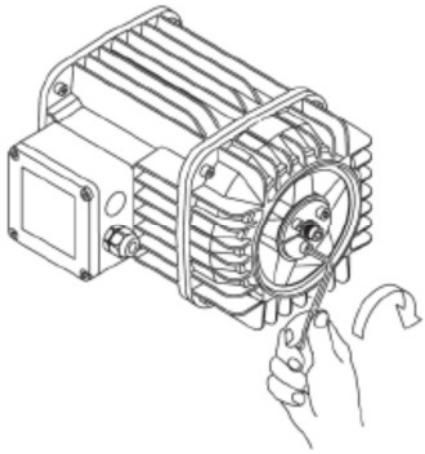


fig.49

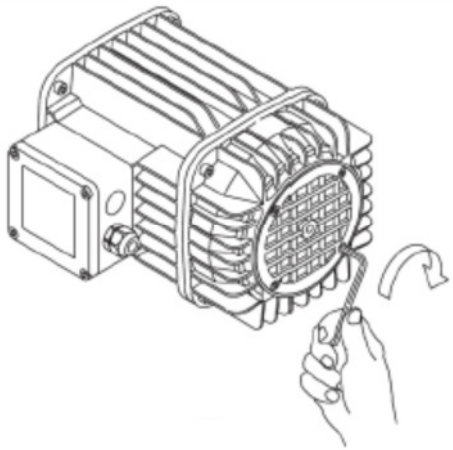


fig.50

If the adjustment has been performed various times and it is not longer possible to obtained the desired braking, it is necessary to replace the motor cover ONLY order the original spare part.

6.5 Troubleshooting

6.5.1 Main causes of malfunctions or faults

§ In relation to the single operating functions of the jib crane, the columns of the table below show the main causes for malfunctions or faults that can be reasonably predicted, as well as the type of problem and the possible cause of the fault.

FUNCTION FAULT	Hoist lifting	Trolley traverse	Jib rotation	POSSIBLE FAULT CAUSES
it does not start	■			- lift/lower contactors - lift/lower buttons - hoist motor - fuses - electric load limiter (if available)
it does not start		■		- right/left contactor - right/left button - trolley motor - fuses
it does not start			■	- forward/backward contactor - forward/backward button - jib arm rotation motor - fuses
it does not start	■	■		- check power supply cable of the hoist/trolley
it does not start	■	■	■	- power supply line - ring collector (if available) - low voltage transformer - line contactor - fuses
it starts partly (in only one direction)	■	■	■	- limit switch, contactor or function button disabled
The movement does not stop at the limit switch and does not stop in the due space	■	■	■	- function limit switch - brake of the function (in this case check the action of the “slide”)
the movement continues even after the button is released	■	■	■	- button of the function - contactor of the function - “false contact”
excessive reducer noise	■	■	■	- lack of lubrication - reducer fault of the function noisy
sharp noise in the braking phase	■	■	■	- presence of dust - excessive clearance - braking gasket wear
all of the crane functions move slowly and/or it is difficult for the hoist to lift the load	■	■	■	- drop in line voltage - incorrect cross section of the power cable - lack of a line phase (single phase operation)
current felt on the hook or the structure	■			- electrical system - earthing system

6.5.2 Troubleshooting

TYPE OF FAULT	CAUSE	SOLUTION
sliding of brake	- braking gasket wear	- adjust the clearance of replace the brake shoe - clean the braking gasket
vibration of the brakes	- voltage too low) - single phase supply	- restore the initial correct conditions
brake heats excessively	- incorrect duty - operation in unsuitable ambient conditions - incorrect adjustment	- restore the required work conditions - adjust the brake
The brake does not unlock	- no power - incorrect adjustment	- restore the required voltage conditions - adjust the brake
The brake tends to “seize”	- operation in unsuitable ambient conditions or not in the duty speed	- restore suitable conditions
the limit switch blocked while opening, it does not reset	- blockage of stop - interruption of connections	- cleaning - restore the initial conditions
The buttons of the pushbutton panel are blocked in “closed”	- blockage	- cleaning - check the wires
the contactors have “seized” contacts	- lack of maintenance - operation in unsuitable ambient conditions or for unintended duty	- restore the correct use conditions
the motor is too hot	- changes in voltage are > 10% - poor cooling, blockage of the air passages - ambient temperature > that required - use of the crane is not within duty speed	- ensure the correct mains voltage - restore the correct air circulation - adjust the motor characteristics - adapt the duty conditions to those required
the motor does not start	- burned fuse - the contactor has interrupted the power - overload, blockage for high start-up frequencies, insufficient protection	- replace the fuse - check the function contactor - rewind the motor and ensure a better protection - check the control device
the motor has difficulty in starting	- at start-up the voltage or the frequency lower compared to the rated value	- improve the conditions of the line or the mains
the motor buzzes and absorbs a lot of current	- defective winding, the rotor is in contact with the stator - a phase is missing in the power supply - the reducer is blocked - the brake is blocked - short circuit in the power supply cables - short circuit in the motor	- have a specialist make the repair - check the power supply of the network and/or contactor - ask for the intervention of a specialised technician - have it tested and if necessary adjust - eliminate the short circuit - ask for the intervention of a specialist
short circuit of the motor	- fault in the winding	- rewind the motor
false contact	- involuntary activation of the function	- check the wires of the pushbutton panel

6.5.3 Personnel authorised to intervene in the event of a failure

§ The personnel authorised to work in most of the cases of fault, or unless otherwise reported, is an expert maintenance person or one who is authorised based on specific preparation on the mechanical and electrical parts. When highlighted the intervention of specialised or specifically trained personnel or the manufacturer’s technical personnel is necessary.

6.5.4 Decommissioning

§ If it is not possible to repair the jib crane, decommission it, indicating the fault with a specific sign; ask for intervention from the assistance service.

6.6 Disassembly, disposal and scrapping

	If the jib crane and its components, because broken, worn or at tend end of their expected life cycle, can no longer be used or repaired, they need to be demolished.	

- Demolition of the jib crane must be performed using suitable equipment selected in relation to the material on which to intervene (e.g. shears, blow torch, hacksaw, etc.).
- All of the components must be dismantled and scrapped after having reduced them to small pieces in order that none of them can be reasonably reused.
- When the jib crane is scrapped, its parts must be recycled taking into account their various natures (metals, oil and lubricants, plastic, rubber, etc.) possible hiring specialised companies authorised for this purpose and complying with the laws regarding the disposal of solid industrial waste.

	Do not attempt to reuse the parts or components of the jib crane that apparently may seem still intact once that they, following check and tests and/or replacements conducted by specialised personnel or the manufacturer, have been declared no longer suitable.

7. - SPARE PARTS

	• **The jib cranes have been designed so they do not normally need spare parts due to FAULTS OR BREAKAGE, if they are used correctly and following adequate maintenance as described in this manual.** • **Parts or components subject to normal wear and tear following use can be obtained from the manufacturer for a minimum period of 10 years.**

	• **Do not hesitate to replace the part and/or component in question, if it is not able to offer sufficient guarantees on its safety and/or functional reliability.** • **Do not ever make temporary or makeshift repairs!**

§ When it is necessary to replace faulty parts it is mandatory to only use original spare parts, by directly contacting:

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	The use of non-original spare parts, in addition to cancelling the warranty, may compromise the correct operation of the jig crane and/or its components.

8. - TEST LOGBOOK

§ To demonstrate the correct performance of all of the test and maintenance activities of the jib crane, as well as to keep a record of all responsibilities in terms of the performed activities, as described in this publication, **it is advisable to diligently fill in and maintain for the expected life of the hoist** (10 years) the specific test logbook as prescribed by RES 4.4.2 of Annex 1 to the Machinery Directive 2006/42/EC supplied, **when required**, as an attachment to this publication.

§ In addition to the activities regarding the lift and the use of the jib crane (replacement of parts, overhauls, faults of a certain entity, etc.) all operations included in the maintenance plan with quarterly and annual occurrence indicated in the **"Table of periodic checking and maintenance operations"**, point 6.3.2 must be noted in the logbook.

§ The maintenance personnel in assigned by the customer are responsible for filling in all parts of this logbook reporting the results and any notes in the specific spaces.

§ The name of the maintenance personnel and the date of the intervention must be clearly identified.

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