KMAN
05MG05

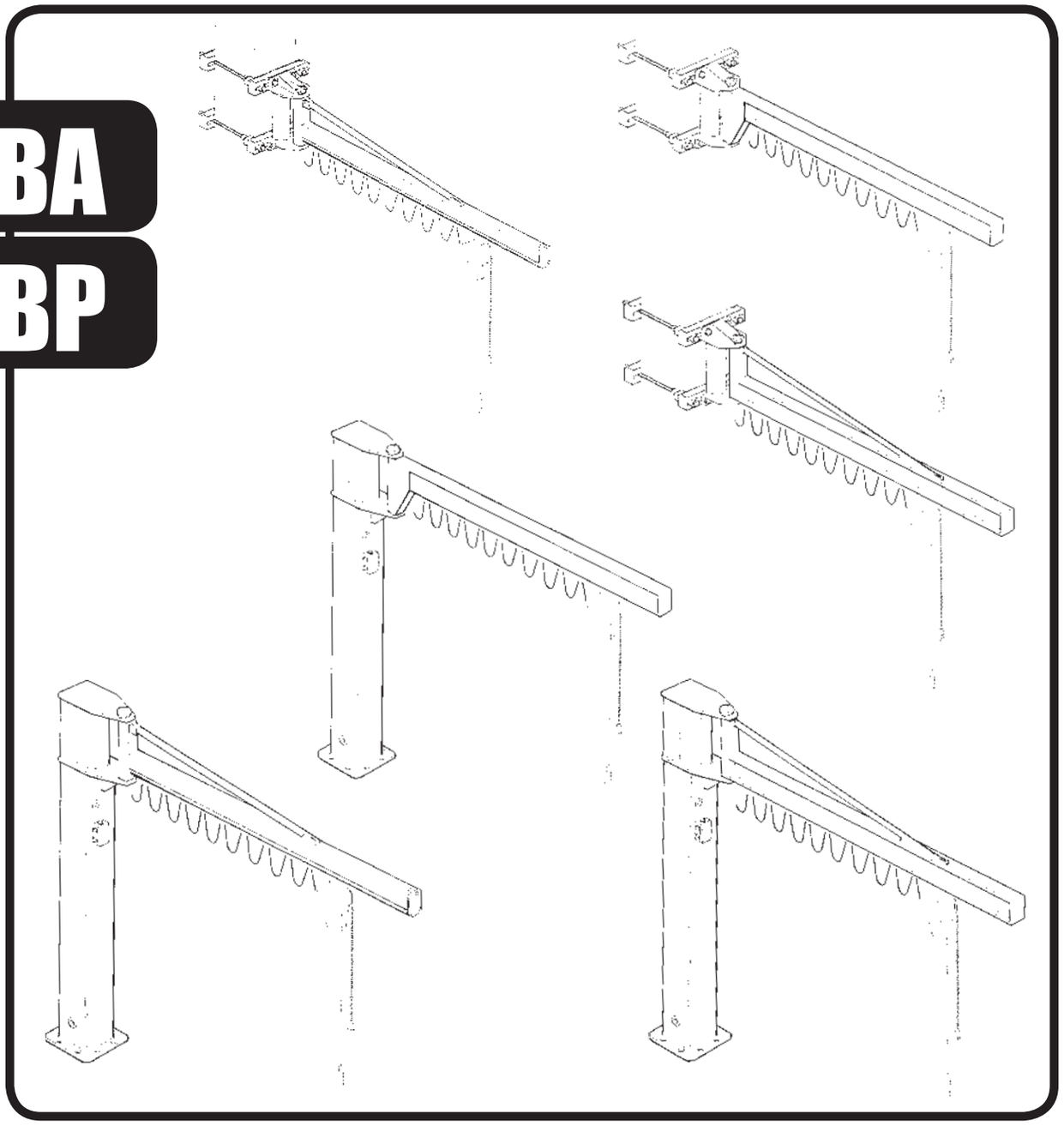
INSTRUCTIONS

JIB CRANE

***"Column"** • series GBA* ***"Wall"** • series GBP*

GBA

GBP



ISTRUCTIONS

installation, use, maintenance

donati

INSTRUCTIONS

JIB Crane "Column"

series GBA

JIB Crane "Wall"

series GBP

KMAN05MG05

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1. - PRELIMINARY INFORMATION

1.1 Contents and use of the manual

KMAN05MG05

This technical publication, identified by the code **KMAN05MG05**, refers to "**Jib cranes, manually rotated, in GBA series column-mounted model or GBP series wall-mounted model**", built and put on the market by the company:

DONATI SOLLEVAMENTI S.r.l.
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It refers to their "intended use", to their technical functional and performance characteristics and to the relevant installation, use and maintenance instructions. It is intended for:

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

This manual must be kept by the person in charge of the above mentioned duties in a suitable place, so that it is always available for consultation and kept in the best possible state.
If the manual is lost or becomes unusable, replacement documentation should be requested directly from the manufacturer by quoting the code of this manual.

1.2 Symbols: meaning and use

In this manual certain symbols are used to focus the reader's attention and underline some particularly important aspects of the subject.
The following table shows the list and meaning of the symbols used in the manual.

SYMBOL	MEANING	EXPLANATION, ADVICE, NOTES
	**Danger**	• Indicates a danger with risk of accident, possibly fatal. • Failure to follow the attached instructions can cause a situation of serious danger for the safety of the operator and for people in the vicinity! • **Follow the instructions scrupulously!**
	Warning	• Represents a warning note of attention of possible deterioration of the jib or of a personal object of the operator. • **Important warning which requires one's utmost care.**
	**Warning / Note**	• Indicates a warning or a note about key functions or useful information.
	**Visual observation** **Action to be taken**	• A printed eye can indicate to the reader that: a) He should proceed to a visual observation. b) He should proceed to the operating sequence. c) It is necessary to take a reading, to check a signal, etc.

1.3 Co-operation with the user

This manual reflects the configuration of the machine at the time the machine was put on the market.
Any change to the manual, a copy of which will be sent to the customer by the manufacturer, shall be kept together with the manual.
The manufacturer is willing to supply its customers with any additional information they may require, and welcomes any suggestions aimed at improving the manual so that it corresponds better to the customer's needs.
If the jib crane is no longer to be used the main user is invited to deliver, with the hoist, this manual and the relevant documentation enclosed with it (declarations, schemes, control register etc.).

1.4 Conformity with safety regulations

The jib crane was designed and produced following the **"Essential Safety Requirements"** of **Attachment I of the Community Directive 2006/42/CE** the crane can be put on the market with **CE Mark** and the EC **Declaration of Conformity - Attachment 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.
COO
GUIDO AMATI

Date: 02.10.2017

example EC Declaration of Conformity
Attachment II A

Furthermore the Jib Cranes GBA-GBP Series in accordance with:

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

1.5 The manufacturer's responsibility and the warranty

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

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

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

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

- ***The intended use and configurations of the hoist are the only ones allowed. Do not try to use the hoist disregarding the supplied instructions.***
- ***The instructions in this manual do not replace but add to the obligations regarding the current legislation for accident prevention standards.***

2. - DESCRIPTION OF THE MACHINE AND TECHNICAL INFORMATION

2.1 The manually rotated jib crane

2.1.1 Intended use - Foreseen use - Designated use

The jib cranes, manually rotated,in GBA series column-mounted model or GBP series wall-mounted model, are produced to move goods within the plant.

The jib cranes have three functions:
- **lifting** a load vertically, by means of the hook of the lifting block, generally made of a manual or electric chain hoist and using the appropriate accessories for such an operation;
- **moving** a load with the aid of an electric or manual trolley which runs along the radial axis of the crane jib;
- **rotating** a load, around the constraint axis of the jib, by manually pushing the load, in the circular area below, delineated by the rotation radius of the jib.

2.1.2 Constraints when installing

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

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

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

2.1.3 The composition of the jib cranes

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

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

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

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

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

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

The rotating arm:
The arm, rotating around its own axis on grazing ball bearings, is formed by a support girder for the sliding of the hoist-carrying trolley and comes **in three basic models for loads from 125 to 2000kg and ranges up to 8m.** (fig.3):

- **The arm in the channel model:** Made with the use of a special section bar made of formed steel inside which the hoist-carrying trolley slides. The arm is fitted with one or two staybolts which support the shape and link it to the rising rotating tube. This model features extreme lightness of movement due to the low inertia from its own reduced weight. This model of the crane is normally supplied with a push trolley.
- **The arm in the staybolted girder model:** Made using a double-T formed steel beam girder the lower flange of which the hoist-carrying trolley slides on. The arm is fitted with one or two staybolts for the support of the beam which connects it to the rising rotating tube. The crane can be used with push trolleys, electric trolleys or mechanical ones.
- **The arm in the cantilever model:** Made using a double-T formed steel beam girder the lower flange of which the hoist-carrying trolley slides on. The girder is a self-supporting cantilever, without support staybolts, and it is directly solid, using suitable reinforcement, to the rising rotating tube. It allows an optimal use of the available space at a height, due to the absence of staybolts. The crane can be used with push-trolleys, electric trolleys or mechanical ones.

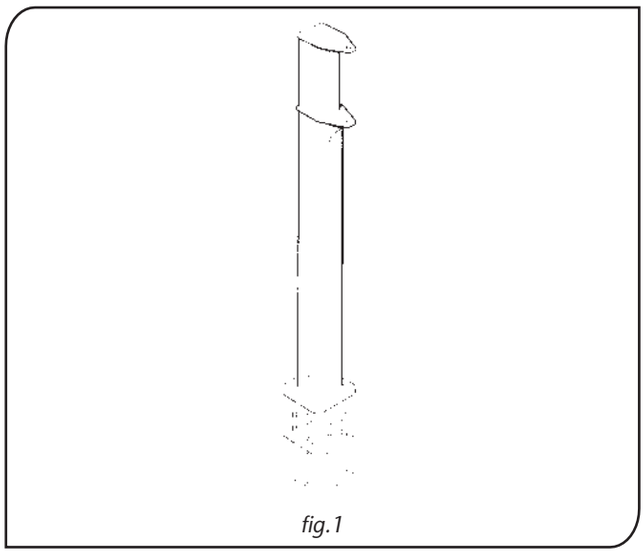


fig.1

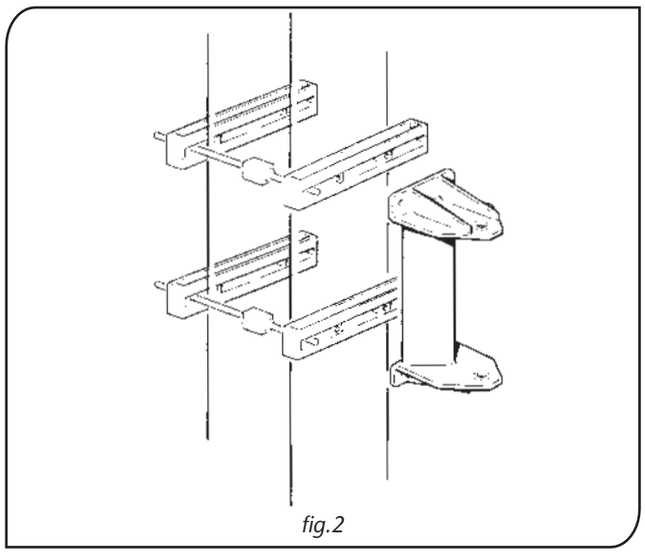


fig.2

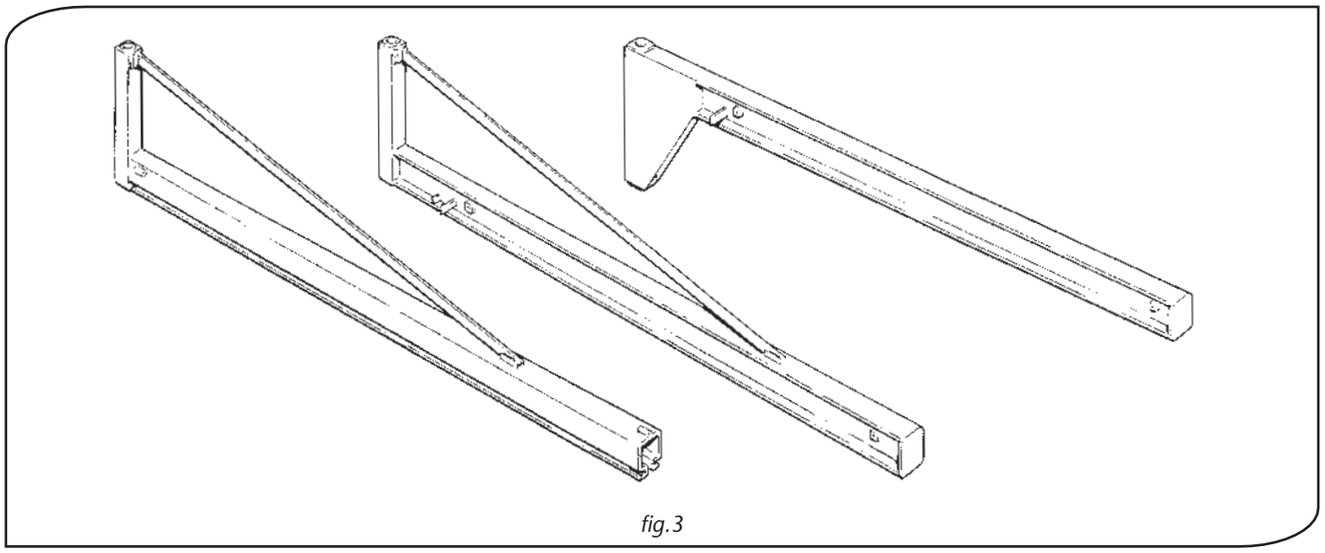


fig.3

The braking device of the arm:
It is made up of a clutch system with asbestos-free material, which allows the regulating of the rotating strain of the arm and ensures its positioning stability (fig. 4).

The electrical system:
It is intended for the electrical input of the hoist and/or trolley (if electric) which slides along the arm of the crane (fig. 5). It has a connector block, situated on the top of the column-mounted jib crane or on the arm support of the wall-mounted jib crane, for the connector between the line and the festooned cable.
The distribution of energy uses festoon-cable which does not spread flames, generally of the flat type, sliding on suitable coasters or sleds that slide the whole way along the arm, inserted in the arm or in a special channel.

Foundation frame with log bolts:
This is supplied on request in the column-mounted version, for the fixing of the column itself to the base (foundation plinth). (fig. 6).

Brackets and staybolts unit:
Used for fixing to a pillar in the wall-mounted version, it is available on request. It is fitted with a system of pressure screws to guarantee the best adherence of the staybolts to the pillar (fig. 7).

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

Lifting and translation unit:
The manually-rotated jib cranes in the column-mounted or wall-mounted version can be equipped with a chain hoist with the relevant trolley either in electric or manual version.
For the measurements, weights and maximum admissible reactions on the wheels of the trolleys see the related table in paragraph “Technical data” 2.2

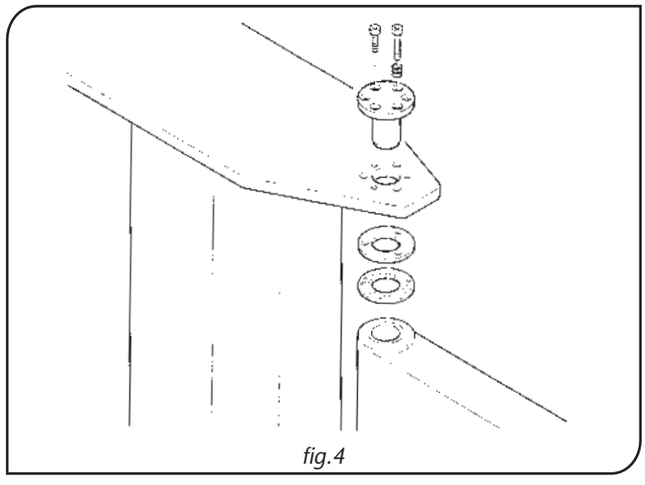


fig.4

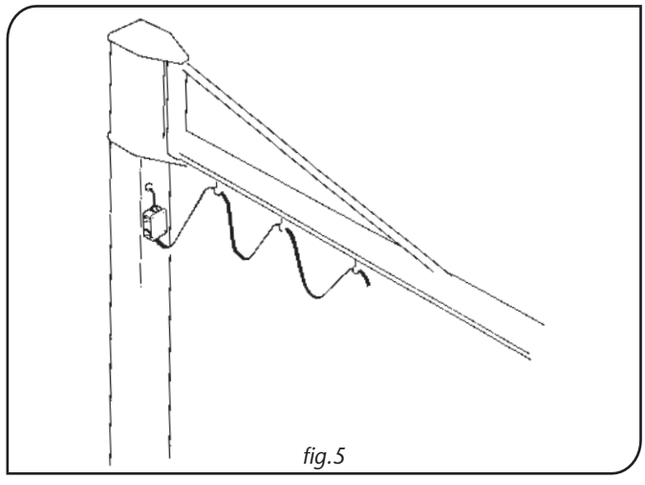


fig.5

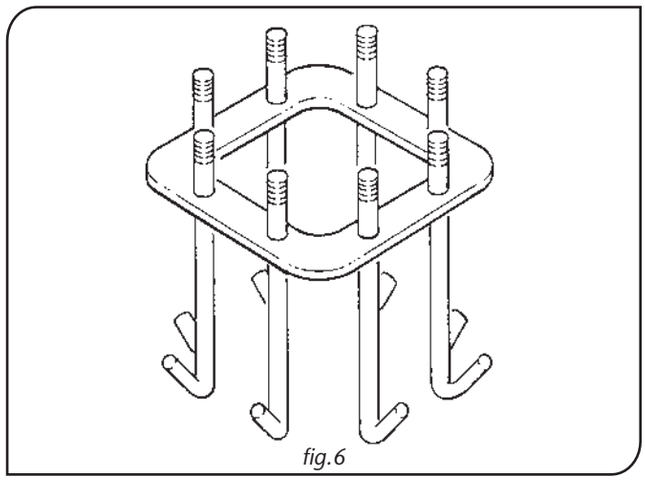


fig.6

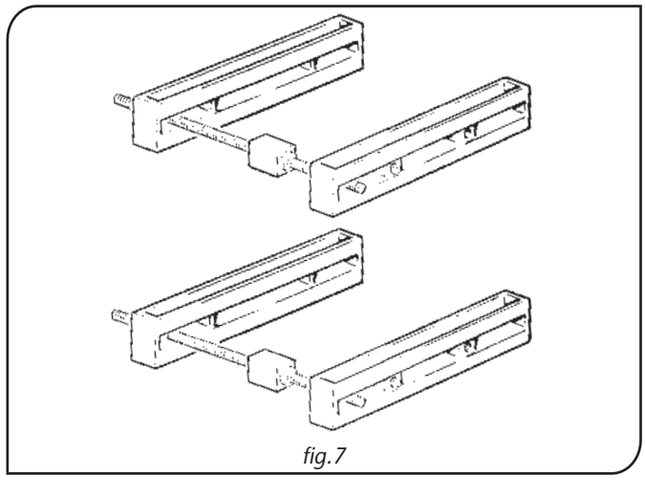


fig.7

The conception and construction:

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

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

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

2.2 Technical information and service conditions

2.2.1 Safety reference list

In the planning and construction of the manually rotated jib cranes, column-mounted series GBA and wall-mounted series GBP the following standards and principal technical regulations have been taken into account:

- EN ISO 12100/2010 “Safety of the machinery”
- EN ISO 13849-1/2008 “General principles for design”
- EN 60204 - 32/2009 “Safety of machinery electrical equipment of machines”
- EN 60529/97 “Degrees of protection provided by enclosures (IP code)”
- ISO 4301-1/88 “Lifting equipment classification”
- FEM 1.001/98 “Rules for the design of hoisting appliances”
- FEM 9.683/95 “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”

2.2.2 Protection and insulation of electrical parts

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

2.2.3 Electrical power supply

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

2.2.4 Environment conditions of use

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

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

2.2.5 Noise - Vibrations

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

2.2.6 Criteria of use and conditions of use

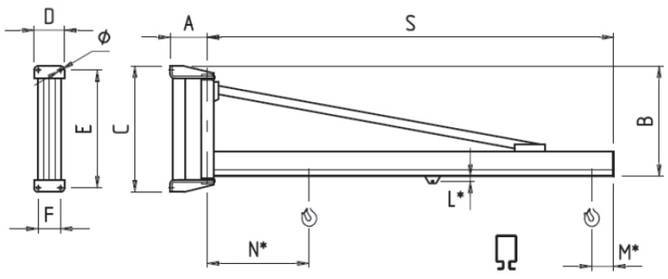
The necessary indispensable conditions to obtain the full functional responsiveness of the jib crane for the service it is intended, as well as its optimal and lasting functioning, are in the correct choice of the model of machine. This choice must be made in relation to the real service performance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

The parameters which must be carefully considered in the choice of jib crane are:
- **The lifting capacity:** this must be determined by the weight of the maximum load to be lifted and must never be less than this weight.
- **The functional dimensions:** the height of the sliding girder of the trolley which determines the hook run of the hoist and the range must be selected so as to guarantee the functional coverage of the space to be used considering the surrounding clearance.
- **The type of translation:** manual or electric in relation to the characteristics of the mass to be moved and the type of arm already selected (channel-cantilever- staybolted girder).
- **The nature of the load:** the nature of the load determines for its positioning the choice of the speeds of movement (lifting and translating) suited to the task. In some cases it is indispensable to use two-speed hoists with a slow positioning speed.
- **The area to be used in:** the jib crane features in its conception intrinsic high elasticity which becomes even more evident when it is used for moving loads close to the maximum load and/or with prevalent localisation in the ends of the arm.
- **The environment to be used in:** the jib cranes are intended for service indoors and/or in a covered area, sheltered from bad weather and away from wind. In the case of use outdoors adequate steps must be taken in relation to the surface treatment (sanding, varnishing) as well as a system of stopping brake.
- **The frequency of use:** if the use is very intense (frequent manoeuvres and/or repeated ones) with loads close to the maximum lifting capacity, the consequent fatigue of the operator due to the manual movements must be taken into account.

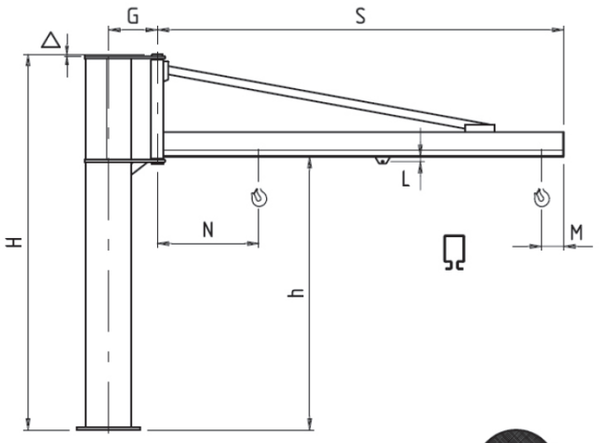
- ***The correct evaluation of the parameters indicated above, in the case of the parameters being close to the upper limits, can lead to the need to use a crane with higher performance features which, once gone beyond, can guarantee more rigidity and fewer translating and rotating strains.***
- ***Using an electric trolley instead of a push-trolley can reduce the fatigue of the operator considerably.***

2.2.7 Characteristics and technical data - Weights - Reactions on constraints

GBP/GBA SERIES JIB CRANES – C VERSION – CHANNEL PROFILE VERSION



Wall-mounted jib crane - Rotation 270°

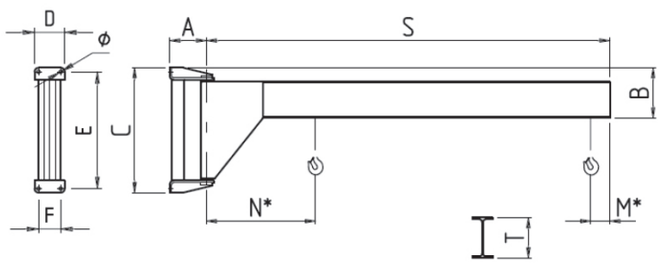


Column-mounted jib crane - Rotation 300°

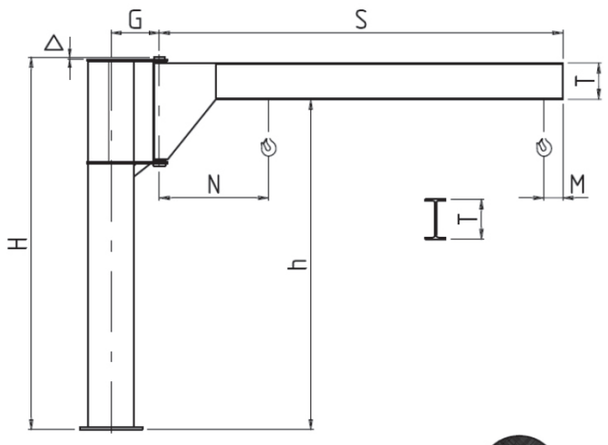
Heights L*, M* and N* for wall-mounted jib cranes. See corresponding heights relative to column-mounted jib cranes.

LIFTING CAPACITY	ARM S		SIZE OF JIB CRANE		TROLLEY TYPE	GBP SERIES WALL-MOUNTED JIB CRANES - C VERSION									GBA SERIES COLUMN-MOUNTED CRANE - VERSION C											
	ARM	ARM C/W COVER	BRACKET	COLUMN		TYPE	OVERALL DIMENSIONS (mm)							WEIGHT JIB CRANE	HEIGHT H m		TYPE	OVERALL DIMENSIONS (mm)						WEIGHT	
																		UNDER BEAM						JIB CRANE	COLUMN BY m
kg	m	mm					A	B	C	D	E	F	Ø	kg	BASE	MAX.		h	G	L	M	N	Δ	kg	kg
63	4	4056	A	R	CCP	C01A40	170	552	644	200	594	150	15	74	3	5	C30R40	2496	228	34	140	585	12	127	18.2
	5	5056	A	R	CCP	C01A50	170	552	644	200	594	150	15	87	3	5	C30R50	2496	228	34	140	645	12	140	18.2
	6	6056	B	S	CCP	C01B60	170	552	644	200	594	150	15	100	3	5	C30S60	2496	274	34	140	705	12	175	22.8
	7	7056	B	S	CCP	C01B70	170	552	644	200	594	150	15	113	3	5	C30S70	2496	274	34	140	765	12	188	22.8
125	2	2056	A	R	CCP	C01A20	170	552	644	200	594	150	15	48	3	5	C30R20	2496	228	34	140	525	12	101	18.2
	3	3056	A	R	CCP	C01A30	170	552	644	200	594	150	15	61	3	5	C30R30	2496	228	34	140	585	12	114	18.2
	4	4056	B	S	CCP	C01B40	170	552	644	200	594	150	15	74	3	5	C30S40	2496	274	34	140	585	12	149	22.8
	5	5056	B	S	CCP	C01B50	170	552	644	200	594	150	15	87	3	5	C30S50	2496	274	34	140	645	12	162	22.8
	6	6066	C	T	CCP	C02C60	210	820	930	250	870	190	22	135	3.5	5.5	C35T60	2738	323	34	140	785	17	260	35
	7	7066	C	T	CCP	C02C70	210	820	930	250	870	190	22	150	3.5	5.5	C35T70	2738	323	34	140	845	17	275	35
250	2	2056	B	S	CCP	C01B20	170	552	644	200	594	150	15	48	3	5	C30S20	2496	274	34	140	525	12	123	22.8
	3	3056	B	S	CCP	C01B30	170	552	644	200	594	150	15	61	3	5	C30S30	2496	274	34	140	585	12	136	22.8
	4	4066	C	T	CCP	C02C40	210	820	930	250	870	190	22	105	3.5	5.5	C35T40	2738	323	34	140	665	17	230	35
	5	5066	C	T	CCP	C02C50	210	820	930	250	870	190	22	120	3.5	5.5	C35T50	2738	323	34	140	725	17	245	35
	6	6066	D	U	CCG	C02D60	210	820	930	250	870	190	22	202	3.5	5.5	C35U60	2738	386	43	156	820	17	376	43.5
	7	7066	D	U	CCG	C02D70	210	820	930	250	870	190	22	228	3.5	5.5	C35U70	2738	386	43	156	880	17	402	43.5
500	2	2066	C	T	CCPD	C02C20	210	820	930	250	870	190	22	75	3.5	5.5	C35T20	2738	323	34	265	730	17	200	35
	3	3066	C	T	CCPD	C02C30	210	820	930	250	870	190	22	90	3.5	5.5	C35T30	2738	323	34	265	790	17	215	35
	4	4066	D	U	CCPD	C02D40	210	820	930	250	870	190	22	113	3.5	5.5	C35U40	2738	386	34	265	820	17	287	43.5
	5	5066	D	U	CCPD	C02D50	210	820	930	250	870	190	22	129	3.5	5.5	C35U50	2738	386	34	265	880	17	303	43.5
	6	6076	E	V	CCG	C03E60	255	1100	1240	300	1160	220	34	270	4	6	C40V60	2980	443	43	156	880	20	567	64
	7	7076	E	V	CCG	C03E70	255	1100	1240	300	1160	220	34	300	4	6	C40V70	2980	443	43	156	940	20	597	64
1000	2	2066	D	U	CCGD	C02D20	210	820	930	250	870	190	22	93	3.5	5.5	C35U20	2738	386	60	306	790	17	267	43.5
	3	3066	D	U	CCGD	C02D30	210	820	930	250	870	190	22	163	3.5	5.5	C35U30	2738	386	60	306	850	17	337	43.5
	4	4076	E	V	CCGD	C03E40	255	1100	1240	300	1160	220	34	212	4	6	C40V40	2980	443	60	306	910	20	509	64
	5	5076	E	V	CCGD	C03E50	255	1100	1240	300	1160	220	34	241	4	6	C40V50	2980	443	60	306	970	20	538	64
	6	6076	F	Z	CCGD	C03F60	255	1100	1240	300	1160	220	34	298	4	6	C40Z60	2980	513	60	306	1100	20	680	75.2
	7	7076	F	Z	CCGD	C03F70	255	1100	1240	300	1160	220	34	331	4	6	C40Z70	2980	513	60	306	1160	20	713	75.2

GBP/GBA SERIES JIB CRANES – T VERSION – CANTILEVER VERSION



Wall-mounted jib crane - Rotation 250°

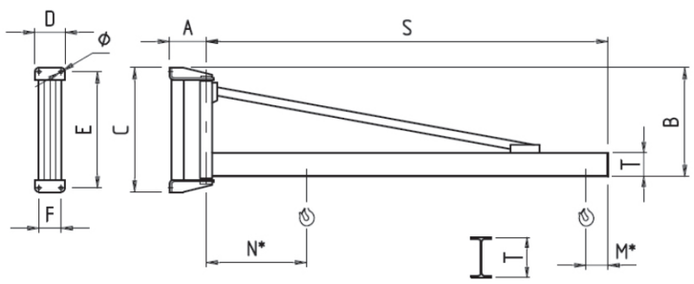


Column-mounted jib crane - Rotation 290°

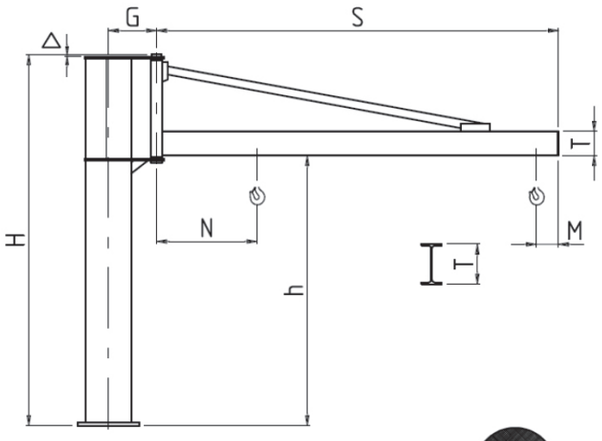
Heights M* and N* for wall-mounted jib cranes. See corresponding heights relative to column-mounted jib cranes.

LIFTING CAPACITY	ARM	SIZE OF JIB CRANE		GBP SERIES WALL-MOUNTED JIB CRANES - T VERSION									GBA SERIES COLUMN-MOUNTED CRANE - VERSION T										
				TYPE	OVERALL DIMENSIONS (mm)							WEIGHT JIB CRANE	HEIGHT H m		TYPE	OVERALL DIMENSIONS (mm)						WEIGHT	
	S	BRACKET	COLUMN													UNDER BEAM						JIB CRANE	COLUMN BY m
kg	m				A	B	C	D	E	F	Ø	kg	BASE	MAX.		h	G	M	N	T (IPE)	Δ	kg	kg
63	4	A	R	T01A40	170	248	644	200	594	150	15	95	3	5	T30R40	2800	228	190	655	160	12	148	18.2
	5	A	R	T01A50	170	248	644	200	594	150	15	111	3	5	T30R50	2800	228	190	715	160	12	164	18.2
125	2	A	R	T01A20	170	248	644	200	594	150	15	63	3	5	T30R20	2800	228	190	595	160	12	116	18.2
	3	A	R	T01A30	170	248	644	200	594	150	15	79	3	5	T30R30	2800	228	190	655	160	12	132	18.2
	4	B	S	T01B40	170	288	644	200	594	150	15	125	3	5	T30S40	2760	274	190	725	200	12	200	22.8
	5	B	S	T01B50	170	288	644	200	594	150	15	147	3	5	T30S50	2760	274	190	785	200	12	222	22.8
250	2	B	S	T01B20	170	288	644	200	594	150	15	81	3	5	T30S20	2760	274	190	665	200	12	156	22.8
	3	B	S	T01B30	170	288	644	200	594	150	15	103	3	5	T30S30	2760	274	190	725	200	12	178	22.8
	4	C	T	T02C40	210	346	930	250	870	190	22	195	3.5	5.5	T35T40	3212	323	190	800	240	17	320	35
	5	C	T	T02C50	210	346	930	250	870	190	22	226	3.5	5.5	T35T50	3212	323	190	860	240	17	351	35
	6	D	U	T02D62	210	406	930	250	870	190	22	340						190	1000	300			
	6	E	V	T03E62	255	500	1240	300	1160	220	34	410	4	6	T40V62	3640	443	190	1065	300	20	705	64
	7	E	V	T03E72	255	500	1240	300	1160	220	34	555	4	6	T40V72	3580	443	190	1135	360	20	852	64
500	2	C	T	T02C20	210	346	930	250	870	190	22	134	3.5	5.5	T35T20	3212	323	190	740	240	17	260	35
	3	C	T	T02C30	210	346	930	250	870	190	22	165	3.5	5.5	T35T30	3212	323	190	800	240	17	290	35
	4	D	U	T02D40	210	406	930	250	870	190	22	256	3.5	5.5	T35U40	3152	386	190	880	300	17	430	43.5
	5	D	U	T02D50	210	406	930	250	870	190	22	298	3.5	5.5	T35U50	3152	386	190	940	300	17	472	43.5
	6	E	V	T03E65	255	500	1240	300	1160	220	34	482	4	5	T40V65	3580	443	190	1140	360	20	779	64
	6	F	Z										4	6	T40Z62	3580	513	190	1140	360	20	864	75.2
	7	E	V	T03E75	255	540	1240	300	1160	220	34	596	4	4	T40V75	3540	443	190	1270	400	20	893	64
	7	F	Z										4	6	T40Z72	3540	513	190	1270	400	20	978	75.2
1000	2	D	U	T02D20	210	406	930	250	870	190	22	172	3.5	5.5	T35U20	3152	386	190	820	300	17	346	43.5
	3	D	U	T02D30	210	406	930	250	870	190	22	214	3.5	5.5	T35U30	3152	386	190	880	300	17	388	43.5
	4	E	V	T03E40	255	499	1240	300	1160	220	34	381	4	6	T40V40	3580	443	190	945	360	20	678	64
	5	E	V	T03E50	255	499	1240	300	1160	220	34	438	4	6	T40V50	3580	443	190	1005	360	20	735	64
	6	F	Z	T03F65	255	540	1240	300	1160	220	34	530	4	4	T40Z65	3540	513	190	1190	400	20	912	75.2
	7	F	Z	T03F75	255	590	1240	300	1160	220	34	688						190	1270	450			
1600	6	F	Z	T03F67	255	590	1240	300	1160	220	34	610						190	1270	450			
2000	2	E	V	T03E20	255	499	1240	300	1160	220	34	267	4	6	T40V20	3580	443	210	900	360	20	564	64
	3	E	V	T03E30	255	499	1240	300	1160	220	34	324	4	6	T40V30	3580	443	210	960	360	20	621	64
	4	F	Z	T03F40	255	540	1240	300	1160	220	34	400	4	6	T40Z40	3540	513	210	1070	400	20	780	75.2
	5	F	Z	T03F50	255	590	1240	300	1160	220	34	535						210	1220	450			

GBP/GBA SERIES JIB CRANES – H VERSION – OVERBRACED VERSION



Wall-mounted jib crane - Rotation 270°



Column-mounted jib crane - Rotation 300°

Heights M* and N* for wall-mounted jib cranes. See corresponding heights relative to column-mounted jib cranes.

LIFTING CAPACITY	ARM	SIZE OF JIB CRANE		GBP SERIES WALL-MOUNTED JIB CRANES - H VERSION										GBA SERIES COLUMN-MOUNTED CRANE - VERSION H									
				TYPE	OVERALL DIMENSIONS (mm)							WEIGHT JIB CRANE	HEIGHT H m		TYPE	OVERALL DIMENSIONS (mm)						WEIGHT	
kg	S m	BRACKET	COLUMN		A	B	C	D	E	F	Ø	kg	BASE	MAX.		UNDER BEAM h	G	M	N	T (IPE)	Δ	JIB CRANE kg	COLUMN BY m kg
125	6	C	T	H02C60	210	820	930	250	870	190	22	160	3.5	5.5	H35T60	2738	323	190	900	160	17	285	35
	7	C	T	H02C70	210	820	930	250	870	190	22	180	3.5	5.5	H35T70	2738	323	190	960	160	17	305	35
	8	D	U	H02D80	210	820	930	250	870	190	22	251	3.5	5.5	H35U80	2738	386	190	1070	200	17	425	43.5
250	4	C	T	H02C40	210	820	930	250	870	190	22	122	3.5	5.5	H35T40	2738	323	190	780	160	17	247	35
	5	C	T	H02C50	210	820	930	250	870	190	22	141	3.5	5.5	H35T50	2738	323	190	840	160	17	266	35
	6	D	U	H02D60	210	820	930	250	870	190	22	200	3.5	5.5	H35U60	2738	386	190	950	200	17	374	43.5
	7	D	U	H02D70	210	820	930	250	870	190	22	226	3.5	5.5	H35U70	2738	386	190	1010	200	17	400	43.5
	8	E	V	H03E80	255	1100	1240	300	1160	220	34	303	4	6	H40V80	2980	443	190	1140	200	20	620	64
500	4	D	U	H02D40	210	820	930	250	870	190	22	149	3.5	5.5	H35U40	2738	386	190	830	200	17	323	43.5
	5	D	U	H02D50	210	820	930	250	870	190	22	175	3.5	5.5	H35U50	2738	386	190	890	200	17	349	43.5
	6	E	V	H03E60	255	1100	1240	300	1160	220	34	262	4	6	H40V60	2980	443	190	1020	200	20	559	64
	7	E	V	H03E70	255	1100	1240	300	1160	220	34	293	4	6	H40V70	2980	443	190	1080	200	20	590	64
	8	F	Z	H03F80	255	1100	1240	300	1160	220	34	389	4	6	H40Z80	2980	513	190	1240	240	20	771	75.2
1000	4	E	V	H03E40	255	1100	1240	300	1160	220	34	200	4	6	H40V40	2980	443	190	900	200	20	497	64
	5	E	V	H03E50	255	1100	1240	300	1160	220	34	231	4	6	H40V50	2980	443	190	960	200	20	528	64
	6	F	Z	H03F60	255	1100	1240	300	1160	220	34	312	4	6	H40Z60	2980	513	190	1120	240	20	694	75.2
	7	F	Z	H03F70	255	1100	1240	300	1160	220	34	351	4	6	H40Z70	2980	513	190	1180	240	20	733	75.2
	8	F	Z	H03F85	255	1100	1240	300	1160	220	34	430	4	6	H40Z85	2980	513	190	1180	*152	20	812	75.2
1600	6	F	Z	H03F67	255	1100	1240	300	1160	220	34	312	4	6	H40Z67	2980	513	210	1140	240	20	694	75.2
2000	4	F	Z	H03F40	255	1100	1240	300	1160	220	34	233	4	6	H40Z40	2980	513	210	1020	240	20	615	75.2
	5	F	Z	H03F50	255	1100	1240	300	1160	220	34	272	4	6	H40Z50	2980	513	210	1080	240	20	654	75.2

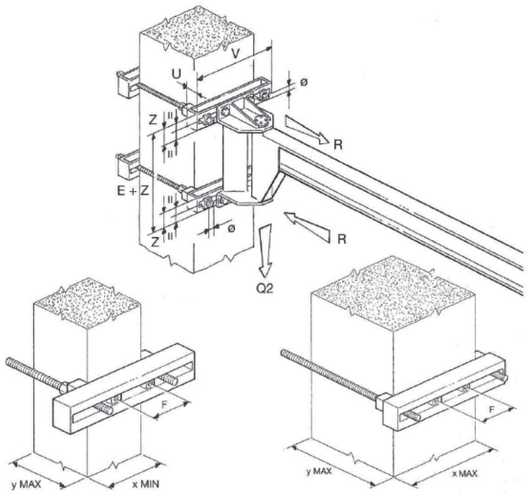
* Profiled girder type HEA160

FIXING SYSTEMS FOR JIB CRANES

Bracket and staybolts unit for GBP/MBB/MBE series wall-mounted cranes

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

TYPE OF BRACKET			01	02	03
Ø Staybolts/screws			M14	M20	M30
Clamping torques (Nm)	Staybolts		67	200	685
	Screws		135	400	1370
Bracket Type: Short (mm)		Code	GBP010110	GBP020110	GBP030110
		U	50	60	80
		V	400	490	532
		Z	75	90	135
		Weight (kg)	21	36	75
Pillar dimensions (mm)	x	min	200	250	300
		max	330	400	400
	y	max	850	810	750
Bracket Type: Medium (mm)		Code	GBP010120	GBP020120	GBP030120
		U	50	80	100
		V	530	640	682
		Z	75	120	145
		Weight (kg)	26	60	96
Pillar dimensions (mm)	x	min	200	250	400
		max	460	550	550
	y	max	850	770	710
Bracket Type: Long (mm)		Code	GBP010130	GBP020130	GBP030130
		U	60	80	120
		V	720	840	882
		Z	85	120	155
		Weight (kg)	40	74	132
Pillar dimensions (mm)	x	min	460	550	550
		max	650	750	750
	y	max	830	770	670

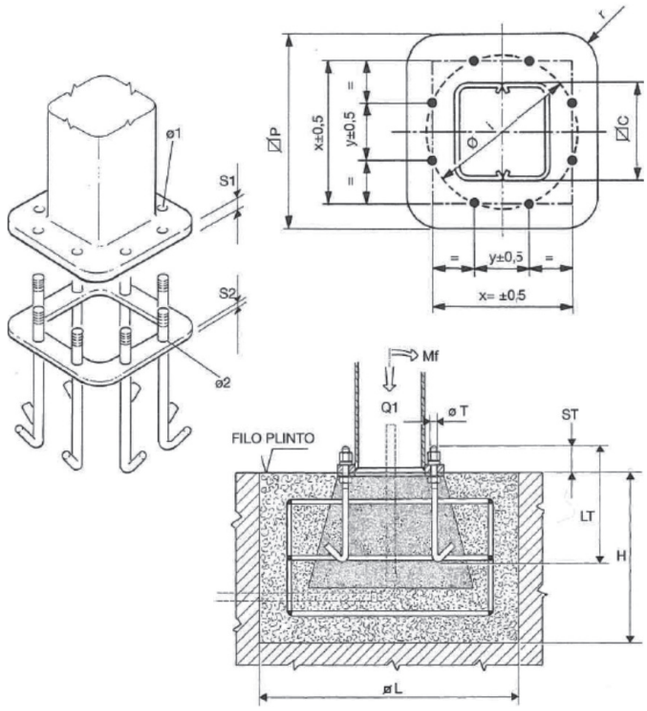


N.B.: The bracket and staybolts unit, used in the wall-mounted version for fixing the bracket to a pillar, is available on request.

Base plates, foundation frames and plinths for GBA/CBB/CBE series column-mounted cranes

SIZE		R	S	T	U	V	Z
Base plate and foundation (mm)	∅ C	205	258	296	372	435	515
	∅ P	275	340	380	475	555	660
	S1	15	15	15	20	20	25
	S2	8	8	8	8	8	8
	x	247	305	345	432	506	599
	y	103	126	143	179	210	248
	Ø	268	330	373	468	548	648
	r	88	104	116	145	165	197
	Ø 1	16	20	20	25	29	35
	Ø2	13	17	17	21	25	31
Lug bolts (mm)	Ø T	M12	M16	M16	M20	M24	M30
	LT	400	450	450	550	600	700
	ST	40	45	45	55	60	75
Clamping torques (Nm)		45	105	105	200	350	680
Frame/bolt weight (kg)		5	10	11	17	26	47
Foundation plinth (mm)	∅ L	1200	1300	1400	1700	2000	2400
	H	800	800	900	900	1100	1100
Reaction (kN)	Q1	3.3	5.7	10.15	18.4	28.7	29.35
Momentum (kNm)	MF	12	21	31	57	107	164

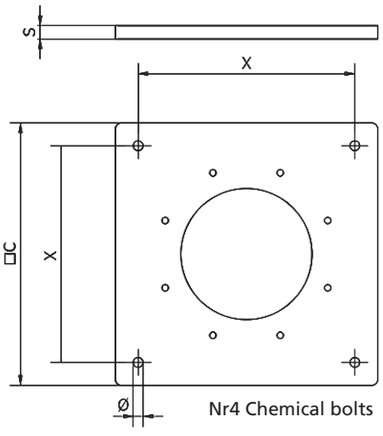
! The dimensions of the plinths are purely indicative! The plinth must be dimensioned by expert, qualified technicians considering the real consistency of the ground and the maximum pressure it can withstand.



N.B.: The foundation frames with lug bolts, used in the column-mounted version for fixing the column itself to the foundation plinth is supplied on request.

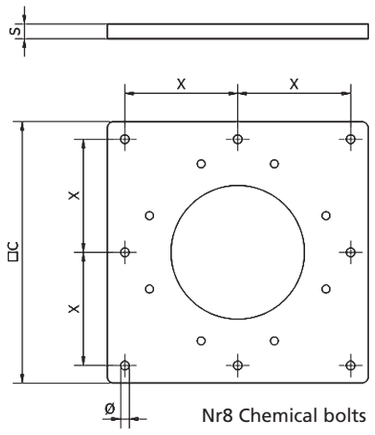
* M= 1,11; ψ= 1,15

Counterplates for fixing to the floor with chemical bolts of the GBA/CBB/CBE column-mounted cranes



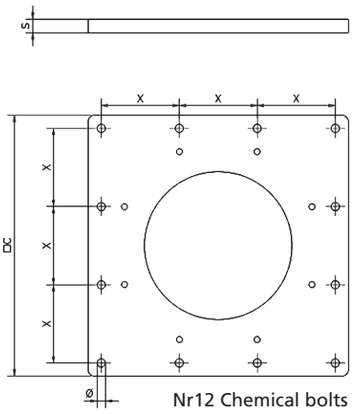
Nr4 Chemical bolts

COUNTERPLATES R



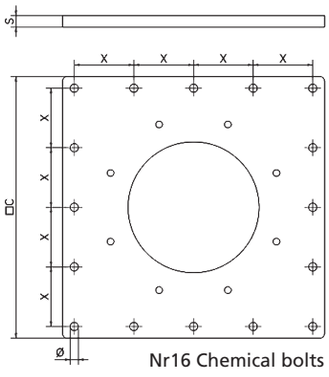
Nr8 Chemical bolts

COUNTERPLATES S T



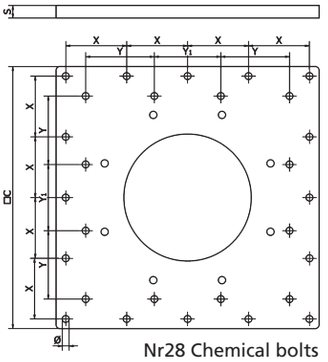
Nr12 Chemical bolts

COUNTERPLATES U



Nr16 Chemical bolts

COUNTERPLATES V



Nr28 Chemical bolts

COUNTERPLATES Z

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

SIZE			R	S	T	U	V	Z
	Counterplate code		GBA1R0PS5	GBA1S0PS5	GBA1T0PS5	GBA1U0PS5	GBA1V0PS5	GBA1Z0PS5
	Counterplate dimensions (mm)	☑C	400	450	500	600	800	950
		S	20	25	25	30	35	45
		x	330	195	220	180	182	220
		y / y1	-	-	-	-	-	240/248
		Nr x Ø	4x15	8x15	8x19	12x19	16x25	28x25
	Counterplate weight (kg)		20	31	39	63	139	254
	Maximum tilting movement allowed (kNm)	Mf	11,8	20,7	31,2	56,7	107,3	164
Fixing characteristics	Type of concrete of the floor: Class Rck minimum (kg/cm2)		C250	C250	C250	C250	C250	C250
	Type of chemical bolts (e.g.: HILTI HVU with threaded bars HILTI HAS)		M12	M12	M16	M16	M20	M20
	Minimum thickness of floor block (mm)		140	140	170	170	220	220
	Diameter of hole in the floor (mm)		14	14	18	18	24	24
	Depth of the hole of the concrete in the floor (mm)		110	110	125	125	170	170
	Clamping torques of the bolts (Nm)		40	40	80	80	150	150
	Project resistance of traction of one bolt (kN)		25,3	25,3	40	40	74,6	74,6

To ensure the tightness of the fixing with the resin HILTI HVU operate as follows:

a) Drill holes in the concrete surface by using coring drill or as a drilling template the same counter.

b) Thoroughly clean the hole with a jet of air and a brush.

c) Place the tube into the hole and insert a steel bar through a rotary percussive drill supplied with the entrance to bars and stem drag.

d) After laying, the workweek in which the bars must be placed and the time when we must not intervene in order to allow complete curing, are specified in the instruction booklet in each tin of resin.

3. - SAFETY AND ACCIDENT PREVENTION

The manually rotated jib cranes, series GBA column-mounted and wall-mounted series GBP and accessories have been designed and manufactured using the most modern technical knowledge and can be used safely.
The dangers for persons working with them can be totally eliminated and/or notably reduced only if the jib crane is used by authorised staff who are appropriately trained and sufficiently prepared in accordance with the instructions in this documentation.

THE STAFF ARE RESPONSIBLE FOR THE FOLLOWING OPERATIONS:

Completing the jib crane with any missing parts and installing it (e.g. hoist, electric controls, fixing accessories, etc.)
Setting up the crane and, in any case, the managing of its functioning;
Inspections and checks of the crane and its components, before starting up the machine, during its functioning or also after it stops.
Maintenance of the crane, the checking and the repair and/or replacement of its components.
Staff must be completely informed about the potential dangers in the execution of their duties, both regarding the functioning and the correct use of safety measures available on the machine.
These staff must, moreover follow the safety regulations carefully, as described in this chapter, to prevent dangerous situations occurring.

3.1 Qualifications of qualified operators

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

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

3.2 Norme generali di sicurezza

Before putting the jib crane into service it is necessary:

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

Some activities to be carried out on functioning components (e.g. replacing a hoist chain) expose the operators to situations of danger, so staff must be authorised and properly trained regarding the operating procedures to follow, the dangerous situations that could occur and the correct methods for preventing them.

3.3 Safety symbols

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

PICTOGRAMS USED TO INDICATE DANGERS

PICTOGRAM	MEANING
	**Warning danger from suspended loads being moved by the hoist.**
	**Warning danger of crushing due to mechanical machine-parts in movement.**
	**Warning danger of entanglement or dragging from machine-parts in motion (chains, wheels, etc.)**
	**Signals the presence of live voltage and is fixed to electrical equipment and on any structure which has live electrical voltage inside.**
	**It is forbidden to transit, remain or manoeuvre under the suspended load.**
	**It is forbidden to touch the crane arm and the trolley/hoist in motion or to stand in their path.**
	**It is forbidden to carry out manoeuvres during maintenance phases of moving machine-parts.**
	**It is forbidden restart the hoist if the protections were not removed relocated.**
	**It is compulsory to wear protection gloves.**
	**Comply with the instructions as stated within the manual.**
	**The preventive checking of chains, hooks, safety harnesses and accessories used for lifting and monoeuvring is compulsory.**

3.4 Warning about remaining risks

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

RISKS DURING USE

DANGER / RISK	BAN / WARNING	OBLIGATION / PREVENTION
  **Risk from danger of crushing** during the manoeuvring of loads suspended when the operator or other staff are in relevant zones/areas in the path of the load.	  • **It is forbidden** to lift loads while people are passing through the related manoeuvre area. • **It is forbidden** to transit, remain or manoeuvre under the suspended load.	  • The operator must follow the indications to obtain maximum safety by observing the indications in this manual. •Obligation to do periodical checks of the chain and the hook.
  **Risk from dangers of entanglement and/or crushing** after contact with the rotating arm and/or moveable parts of the trolley/hoist.	  • **Warning!** Exposure to the parts in motion can create dangerous situations. • **It is forbidden** to touch the crane arm and the trolley/hoist in motion or to stand in their path.	 • Obligation to use protective gloves during the phases of positioning of the harness and when moving the load by pushing it.

RISKS DURING MAINTENANCE

DANGER / RISK	BAN / WARNING	OBLIGATION / PREVENTION
 **Risk from danger of electrocution-electric shock** during maintenance of electrical equipment without having disactivated the electric power supply.	  **It is forbidden** to intervene on electrical equipment before having switched off the jib crane from the electric power line.	  • Entrust electrical maintenance operations to qualified staff. • Carry out checks on electrical equipment prescribed in the manual.
 **Risk from** crushing in case of contact with the rotating arm during braking.	 • **Warning!** Exposure to the parts in motion can create dangerous situations.	   • Adjustments of the brake must be carried out by qualified. • Obligation to use protective gloves and, if necessary, safety belts.

3.5 Safety measures and instructions

3.5.1 Control devices

The manually rotated **jib cranes,** in the GBA column-mounted version and the GBP wall-mounted version can be controlled in the following ways:

1. If fitted with an **electric hoist and push-trolley** the movements are activated:
   - by a **push-button panel** with ascent and descent buttons to control the **lifting** movement.
   - by **pushing the load** for the control of the **trolley.**
2. If fitted with an **electric hoist and electric trolley** the movements are activated:
   - by a **push-button panel** with ascent and descent buttons to control the **lifting** movement.
   - by a **push-button panel** with right and left buttons to control the **translation** of trolley.
3. If fitted with a **hoist and manual trolley** the movements are activated:
   - by **mechanical working** of the chain of the hoist for the **lifting** movement.
   - with a **push of the load** for the control of the **trolley.**
4. In all cases the **rotation movement of the jib crane arm,** both in a clockwise and anti-clockwise direction, is activated manually, with a **pushing flexing of the load** (fig. 8).

3.5.2 Safety and emergency devices

The manually rotated **jib cranes** in the GBA column-mounted version and the GBP wall-mounted version, are fitted with the following safety and emergency devices (fig. 9):

1. **Rotating brake,** by friction, which allows the regulation of the arm's rotating force and ensures the stability of positioning.
2. **Trolley-end limit switches,** mechanical catches which limit the maximum run of the trolley along the arm's girder.
3. **Mechanical limit switch actuators** (in the case of the crane with electric trolley), limit switch striker plates of the trolley's electrical microswitches.
4. **Limit switches for the arm's ends, supplied on request,** mechanical catches which limit the maximum rotation of the arm.
5. **Anti-collision device, available on request,** to avoid the telescoping of two or more arms which, operating in the same area, can interfere with each other; or to avoid the collision of the arm with surrounding structures.

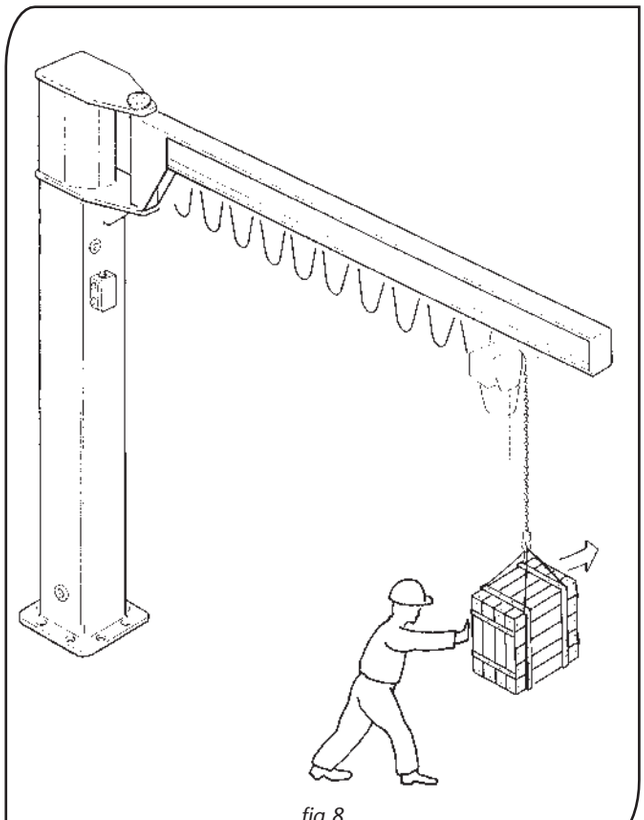


fig.8

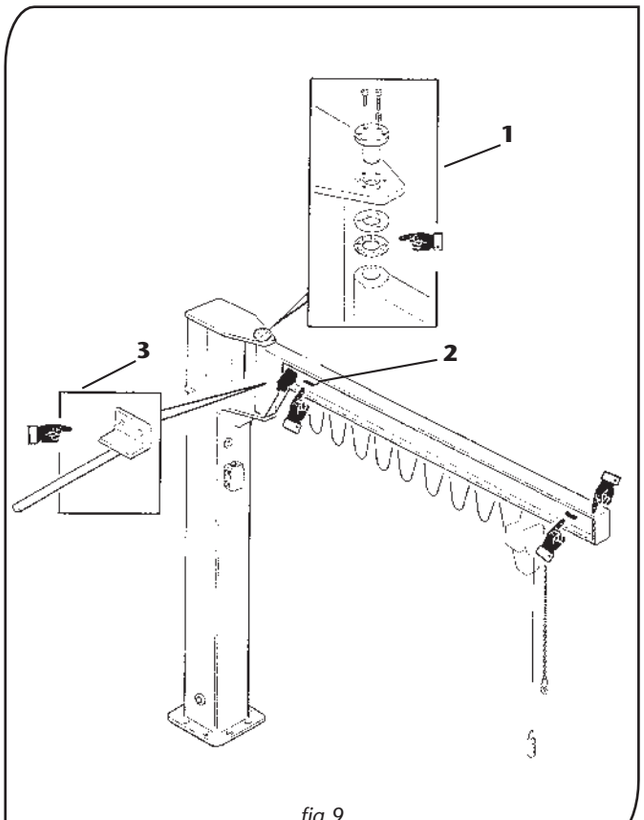


fig.9

3.5.3 Warning and signalling devices - List of labels

The manually rotated jib cranes, column-mounted series GBA and wall-mounted series GBP, are fitted with the following devices (fig. 10):

- **Labels** on the machine:
  - logotype of the manufacturer (fig. 10a): donati
  - label of jib crane data with the CE marque (fig. 10b)
  - label indicating the maximum lifting capacity of the jib crane (fig. 10c)
  - directional labels (only for T- and H-models) (fig.10d)
  - warning labels about remaining risks (fig. 10e)
  - labels of the hoist and the trolley, if present

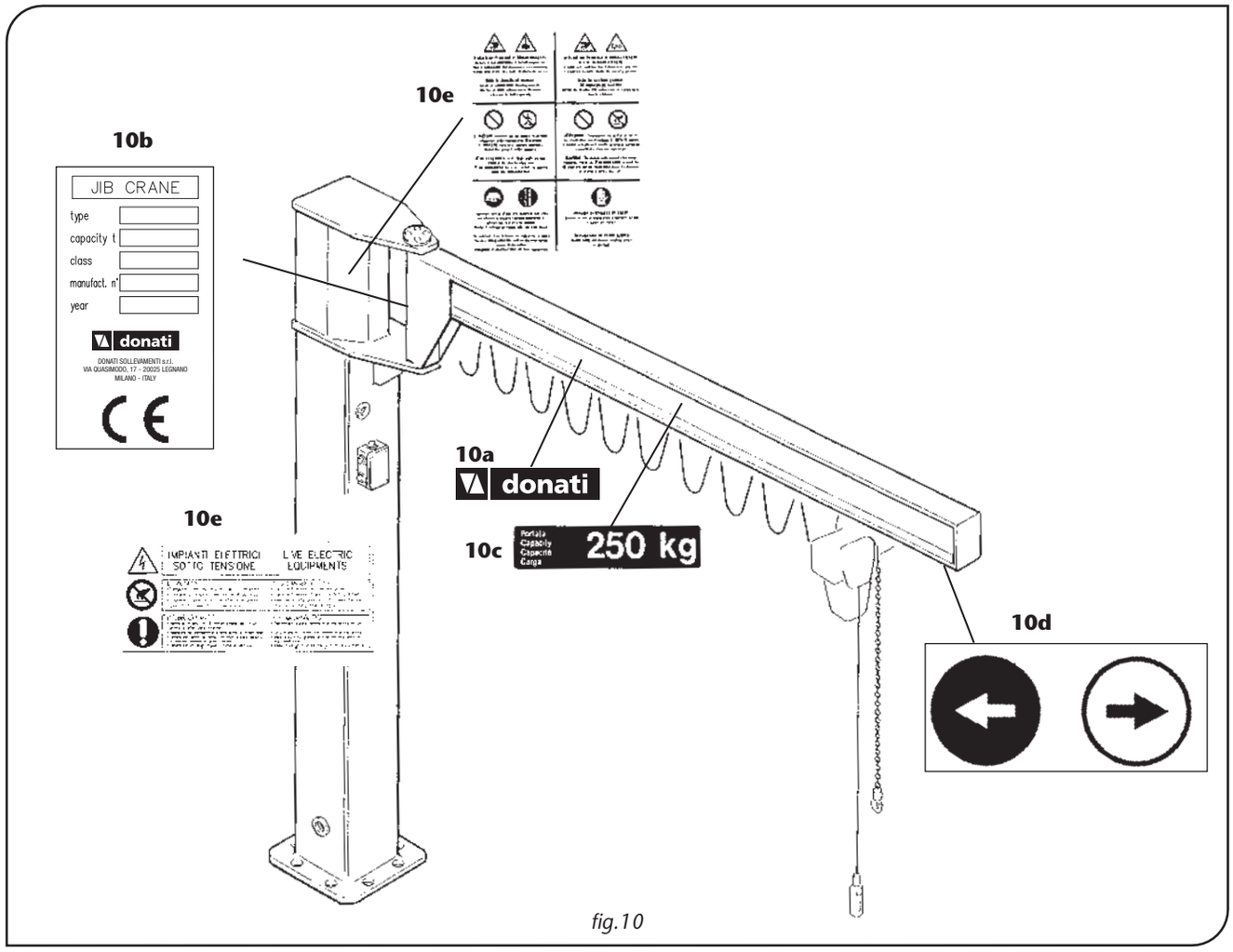


fig.10

Legibility and conservation of the labels

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

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

4. - HANDLING - INSTALLATION - PUTTING INTO OPERATION

4.1 General notes at delivery

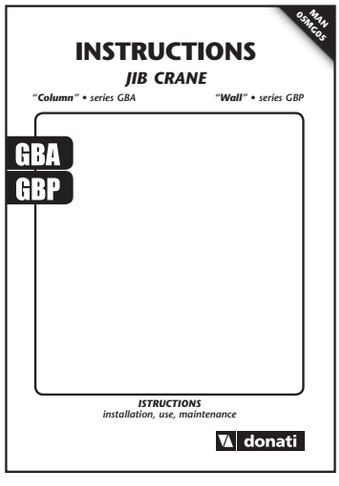
- *The manually rotated jib cranes of the GBA column-mounted version and the GBP wall-mounted version, are delivered not assembled, in their main parts which are the column or bracket, the arm, the electric system and, when part of the supply, the lifting unit.*
- *The user must therefore proceed to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

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

On receiving the supplied goods check and ensure that:

- The despatch data (receiver's address n° of items, n° of order, etc.) correspond to the accompanying documentation (transport documents and/or related packing-list).
- Technical/legal documentation which comes with the jib crane includes (fig. 11):
  - The instruction manual for the use of the crane to be installed.
  - The EC Declaration of Conformity.
  - The instructions for the use of the hoist/trolley to be installed on the crane, if included in the supply.
- The packing, if it is part of the supply, is in good condition, in one piece and free from damage.

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



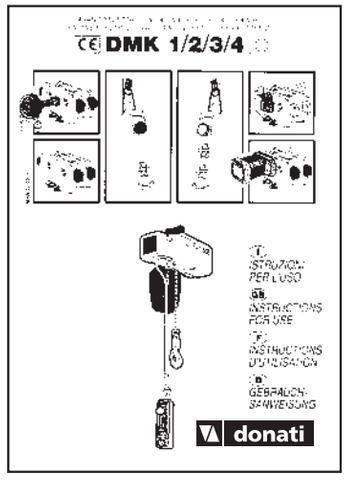


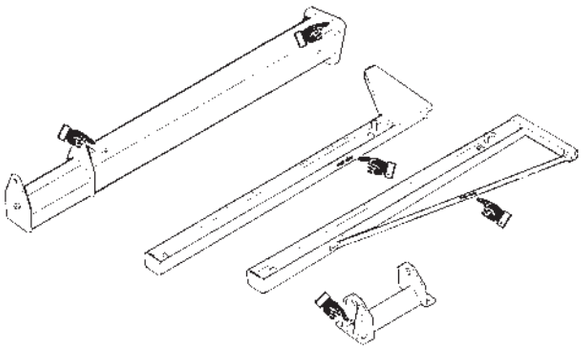
fig.11

4.2 Packing, transportation and handling

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

4.2.1 Standard packing

- The steel structures of the jib crane (column or bracket or arm) are, generally, supplied without packing; on the columns and brackets there are hooking points to make moving easier during the operations of installation (fig.12).
- To facilitate the handling and assembling operations of the lifting unit, if this is part of the supply, the unit can be delivered in a cardboard box (fitted with or without a pallet) or, when necessary in a chest or wooden cage or also simply attached to a pallet.
- When the lifting unit is delivered on a pallet, this is usually covered by a polyethylene film to protect it from dust.
- Related accessories, being part of the supply (e.g. components of the electric system), can be delivered inside cardboard boxes which, in relation to the mass to be handled, can be fitted with or without a pallet.
- The standard packing is not rainproof and is intended for overland destinations, not overseas, and for covered and not damp areas. Therefore packing and special protection are not included in the supply, unless these have been specified in the contract.
- The packing, when necessary, can show signs and pictograms which give important information regarding the handling and transport (mass, handling points, storage information, etc.) (fig.13).
- The items, stored in the right way, can be kept in a warehouse for a period of two years in covered areas in which the temperature is between –20°C and +60°C with relative humidity of 80%. For different environmental conditions it is necessary to provide special packing.



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

M 16 for:
• Jib cranes
R – S – T – U

M 20 for:
• Jib cranes
V – Z

fig.12

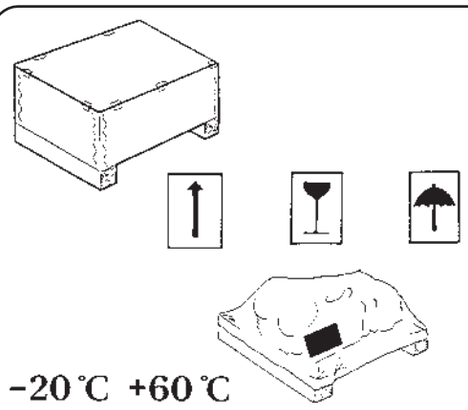


fig.13

4.2.2 Transportation

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

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

4.2.3 Handling

For the handling of jib cranes proceed as follows:

- Allocate a limited, suitable area, with a level floor or surface, for the unloading operations and setting down on the ground of the separate parts of the steel structure and the components contained in the packing.
- Considering the typology of the part/component or the intended packing, allocate the necessary equipment for the unloading and handling of the parts of the crane and its accessories taking into account their weight, headroom dimensions and handling and/or suspension elements.
- The unloading and handling can be done using a crane (e.g. travelling cranes, overhead travelling cranes, etc.) or lift trucks with an adequate lifting capacity and characteristics.
- Items of any accessories with a weight lower than 30 kg (as opposed to those over 30 kg), do not carry any indication of weight and can be handled by hand.
- Sling the parts of the crane with suitable equipment so as not to damage the painted surfaces: (fig.14)
  - For the columns use wire- or chain-staybolts with end hooks positioned in the points shown or a sling with strips made of textile fibres and sling in a baricentric position.
  - For the brackets and the arms the sling must be used, using strips made of textile fibres, arranged in loops corresponding to the handling points shown in the relative labelling.
- Carry out handling and move the parts of the crane and its accessories very carefully, to the zone allocated for unloading and avoid oscillations, swinging and dangerous unbalancing.
- After handling, check that the parts and the loads are intact and that there has been no damage.

- ***The handling of the parts of the jib crane and related accessories, must be carried out with great care and with adequate lifting and transport means so as not to create dangers due to the risk of losing stability.***
- ***All parts or components must be set down or fixed in a stable way in all phases of handling, transport and storage and they must not be tilted or laid down in a vertical position or on one side (fig 15).***

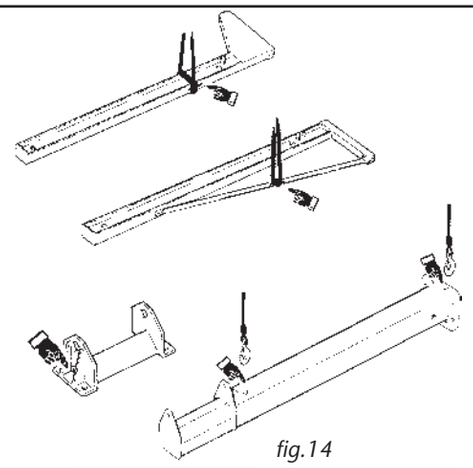


fig.14

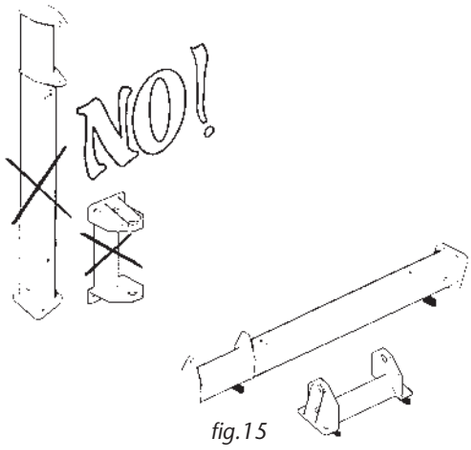


fig.15

4.2.4 Removing the packing and checking the crane parts

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

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

4.3 Installation of the jib crane

4.3.1 Duties and responsibilities of the installer

- ***The installation of the jib crane, for the size of its operations, can pose, if not carried out correctly, serious risks to the safety of people exposed both at the assembly stage and at the successive stage of use of the crane. Therefore, the installation must be assigned to installers specialising in the assembly of industrial equipment.***
- ***The lifting operations and positioning at a height of the parts of the crane must be carried out by installers equipped with:***
  - ***adequate individual safety measures*** *(e.g. helmet, gloves, safety harness, etc.)*
  - ***work equipment*** *(e.g. forklift truck, scaffolding etc.)* ***suitable for the purpose***
- ***And following a careful evaluation of the following parameters:***
  - ***typology of the workplace, its environmental characteristics,*** *(type of floor surface, etc.)*
  - ***height of the working space in relation to the loading surface***
  - ***dimensions and weight of the components to be installed***
  - ***available spaces for the handling of the parts to be installed.***

Before assembling the parts and using the jib crane, the installer must check that the crane characteristics are suitable to what requested and for the foreseen use, in particular:

1. The lifting capacity of the crane is greater than/equal to the loads to be lifted.
2. The characteristics of the fixing structures (plinth, floor, wall, column, etc.) have been **"declared suitable"** by the user or expert technicians employed by the user.
3. The characteristics of the lifting unit (trolley/hoist), if not part of the supply, are compatible with those of the jib crane (see point 2.2.7) in relation to: (fig.16)
   - **Lifting capacity of the hoist:** must be less than/equal to the lifting capacity of the jib crane.
   - **Weight of the trolley/hoist:** must be less than or equal to the maximum foreseen weight.
   - **Speed of lifting/moving:** must be less than or equal to the maximum allowed ones.
   - **Headroom of the size of the trolley/hoist:** must be less than or equal to the maximum allowed ones.
   - **Reactions on the trolley wheels:** must be less than or equal to the maximum allowed ones.

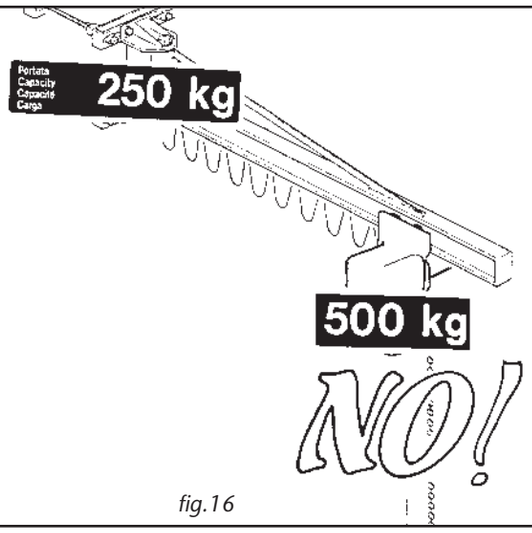


fig.16

Following the installation of the jib crane, it is the precise duty of the installer to:

1. Carry out the activities of **"Putting into operation"**, as described in paragraph 4.4;
2. Update the **"Inspection"** report and decide on the **"Suitability for use"** of the jib crane;

4.3.2 Preparing the place of installation

To allow the installation of the jib crane, the following operations must be carried out:

- Check that the declaration of suitability/adequacy of the support/fixing structures is present;
- Check that obvious defects of the support/fixing structures are absent (fig.17);
- Check the suitability of the manoeuvre spaces (rotation) available for the jib crane, especially if it operates in areas where there are other cranes or other manufacturing machines (fig.18);
- Check the suitability and correct functioning of the electric system (fig.19):
  1) correspondence of the power line voltage with the voltage for the motors;
  2) that there is a suitable switch/disconnecting switch for the power line;
  3) adequacy of the section of the cable of the electrical power supply;
  4) that there is a suitable earthing system;
- In the case of a jib crane with an arm with a section bar of laminated girder (H- or T-type), check the width of the flange of the girder which must correspond to that intended for the trolley wheels (fig. 20).
- Prepare the loads for the **test runs** equal to: **nominal lifting capacity x 1,1**
- Prepare the loads for the **static test runs** equal to: **nominal lifting capacity x 1,25**
- Prepare the equipment for the slinging and lifting of the loads for the load test runs
- Check that there are the relevant signs to warn of the risks posed by the manoeuvring of the crane.

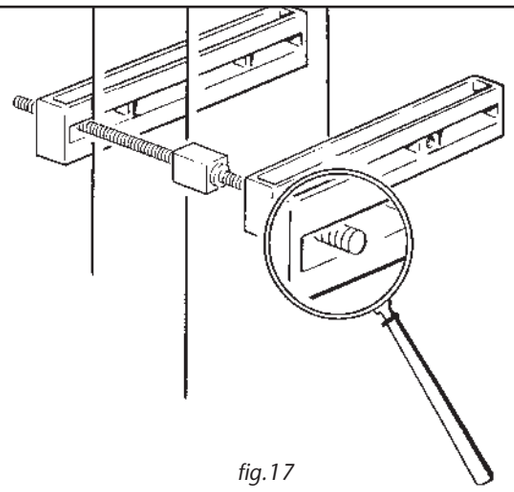


fig.17

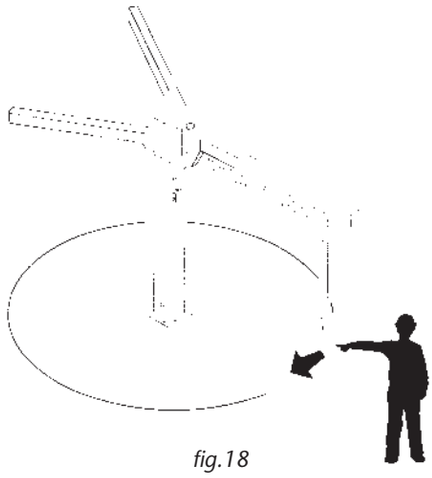


fig.18

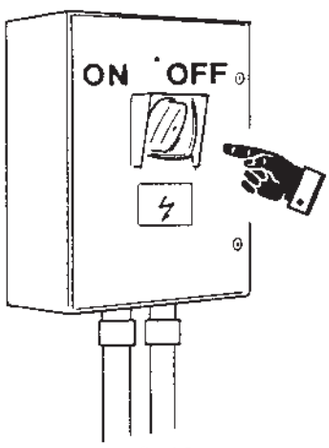


fig.19

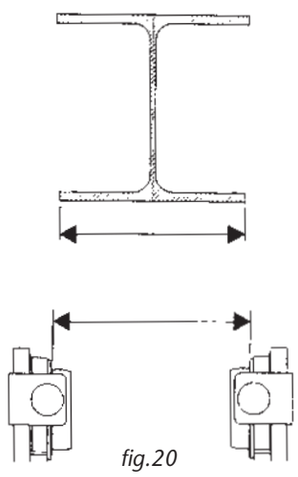


fig.20

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

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

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

Positioning of the foundation frame in the plinth:

1. Screw tight the low nuts **2** on the log bolts **1,** leaving a threaded part up to have the corresponds protusion **ST,** (see "Fixing systems" on page 12) (fig. 21). Do the same operation on all 8 (eight) log bolts.
2. Insert all the logbolts **1** in the holes on the foundation frame **4,** so that the plate of the frame is resting on the nuts and then tighten with the tall nuts **5,** interposing the washers **3.**
3. Sink the frame prepared in this way in the plinth casting, taking care that the upper plate remains on the same level as the floor (fig. 22) Protect the threadings of the logbolts to avoid damage.
4. When needed, insert a tube into the plinth through which the electrical cable which powers the crane can be passed (fig. 23).
5. Level the foundation frame using if necessary a bubble and proceed to the filling and flint-glazing of the plinth (fig. 24).
6. Wait the necessary time before assembling the column so that the plinth can stiffen.

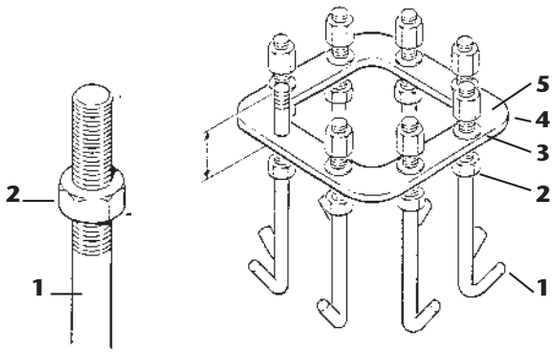


fig.21

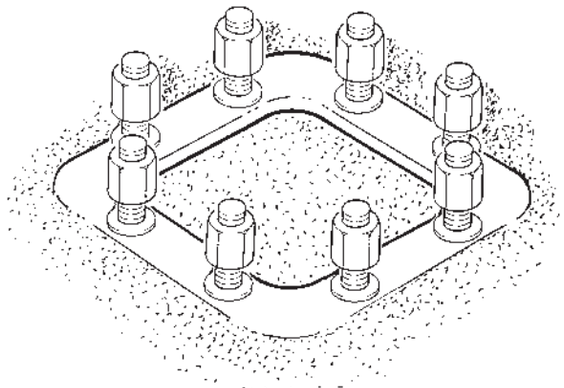


fig.22

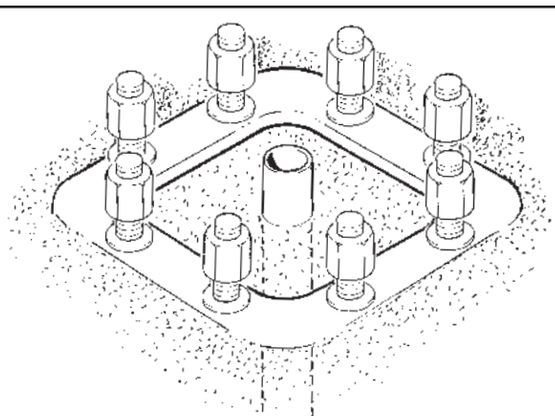


fig.23

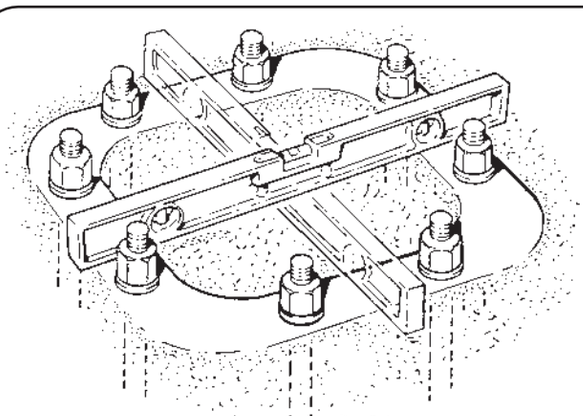


fig.24

Column assembling:

1. Once the solidification of the plinth has taken place, remove the protection from the threadings of the log bolts and check that the tall nuts can be unscrewed without being forced, remove them and the related washers.
2. Insert, when needed, the electric cable **1** in the column resting on the floor and push it through the hole at the end of the column, using this layout as follows:
   a. In the case of cable **1** which comes out of the allocated tube (pipe) in the plinth, insert the cable directly inside the column until it reaches the hole **2** at the end of the column (fig. 25)
   b. In the case of cable **1** coming from the outside, push it into the column using a suitable fairlead **3** placed at the bottom of the column, until it reaches the hole **2** at the top (fig. 26)
3. Set up the column without the arm, lifting it by the upper part with appropriate equipment having put it in the sling as shown, assemble it on the foundation frame positioning the base plate **4** correctly and lining up the nuts **6**, subject to the interposition of the related flat washers **5** (fig. 27).
4. Check the verticality of the rotation axis as follows:
   a. Remove the protective plastic plugs from the housing of the pivots.
   b. Insert the pivots **7** provisionally in their respective housing (see 4.3.5 Assembly of the arm).
   c. Check the verticality of the rotation axis, by using a level **L** and a bar which must be resting directly on the rotation pivots **7** (fig. 28).
   d. The perfect plumbing can be obtained, if necessary, inserting suitable shims **8** (not included in the supply), corresponding to the log bolts, under the base plate (fig. 29).
5. Screw tight the nuts **6** using a dynamometric spanner, applying the clamping couples (see table on page 12) based on the diameter of the logbolts, checking the nuts afterwards for unscrewing with the relative safety nuts **9** (fig. 30).

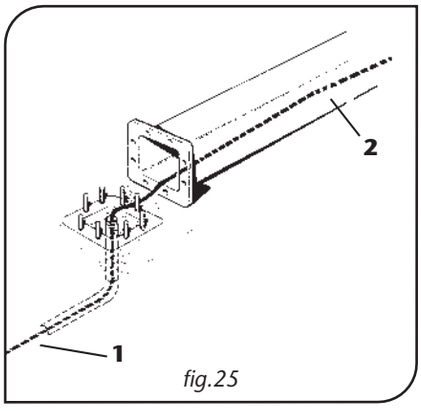


fig.25

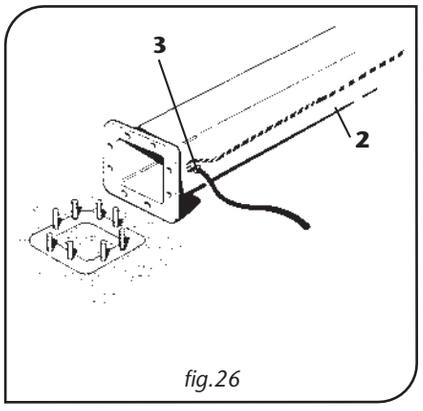


fig.26

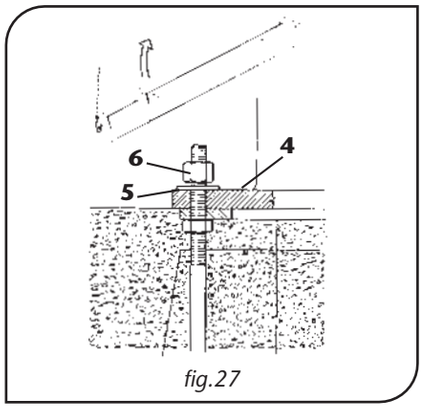


fig.27

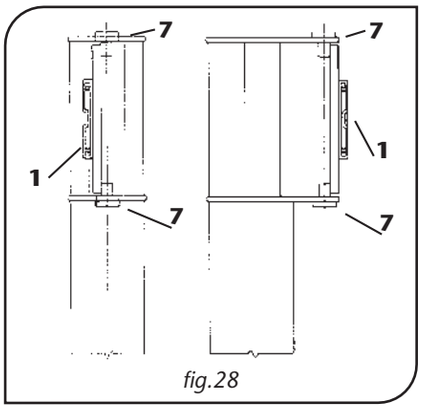


fig.28

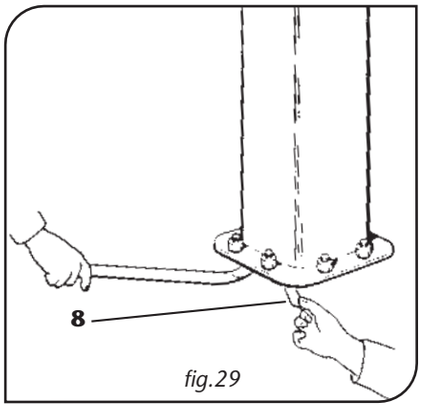


fig.29

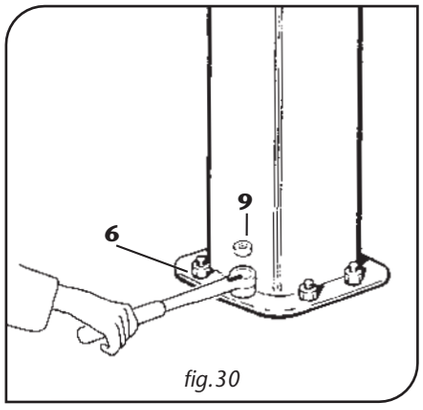


fig.30

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

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

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

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

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

1. Screw up the nuts **1** on the four staybolts **T** and insert the contrast panels **2** (fig. 31).
2. Assemble the two brackets, the front one **3** and the back one **4,** for the fixing of the upper part of the bracket, in such a position to obtain the required height under the arm of the crane, inserting the safety washers **5** and the cramping nuts **6** on the staybolts **T** (fig. 32).
3. Pretighten the nuts **6** to ensure good adherence to the pillar brackets (fig. 33).

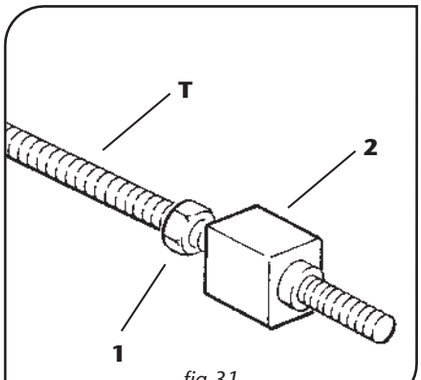


fig.31

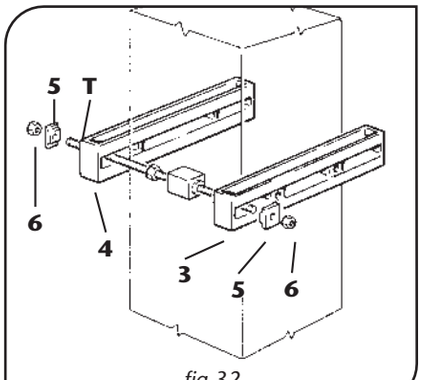


fig.32

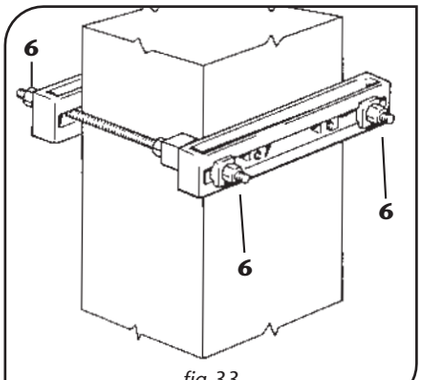


fig.33

Assembly of the bracket:

1. Assemble on bracket **1** the other front bracket **2** (fig. 34).
2. Lift the bracket to a height with suitable equipment, by putting it in the sling as shown and fix it to the front bracket previously positioned on the pillar (fig. 35).
3. Assemble on the front bracket fixed on the bracket, the other back bracket (fig. 36). (Refer to the preceding point "Assembly of the brackets" at positions 1 and 2)

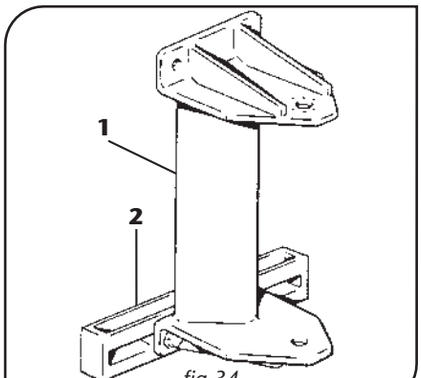


fig.34

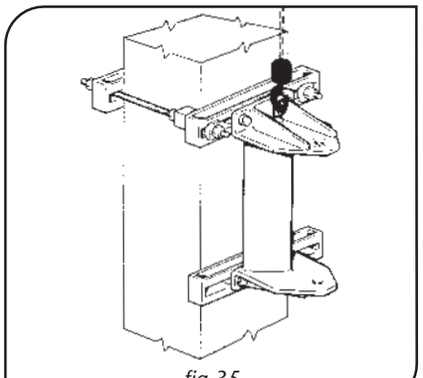


fig.35

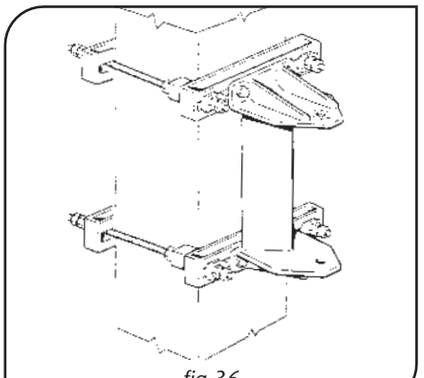


fig.36

4. Check the verticality of the rotation axis as follows:
   a. Remove the protective plastic plugs from the housing of the pivots.
   b. Insert provisionally the pivots **3** in their respective housing. (see 4.3.5 Assembly of the arm)
   c. Check the verticality of the rotation axis, using a level **L** and a bar **B** which must rest directly on the rotation pivots **3** (fig. 37).
   d. The perfect plumbing can be obtained, if necessary, inserting suitable shims **4** (not part of the supply), under the front brackets **5** (fig. 38).
5. Check the correct positioning of the four contrast boards **6,** checking that the centring crowns **7** are well settled in their respective housing of the front brackets (fig. 39).
6. Using a mallet, stick the level of the contrast boards **6** to the surface of the pillar (fig. 40).
7. Tighten thoroughly the blocking nuts **8** of the contrast boards **6.**
8. Screw up the back blocking nuts **9** of the staybolts and block them using a dynamometric spanner, applying the clamping couples (see table on page 12), based on the diameter of the staybolts, checking the nuts afterwards for unscrewing with the related safety nuts **10** (fig. 41).
9. Check again the perpendicularity of the rotation axis as described in point **4.**

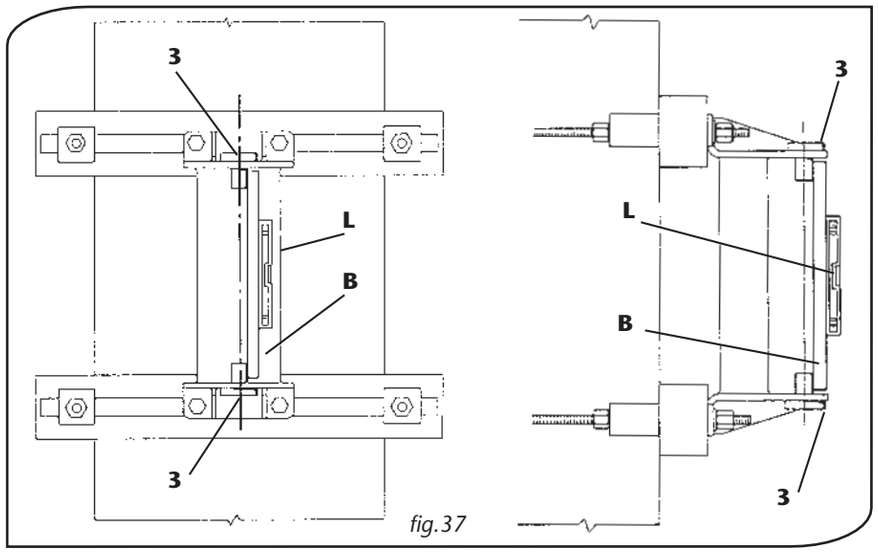


fig.37

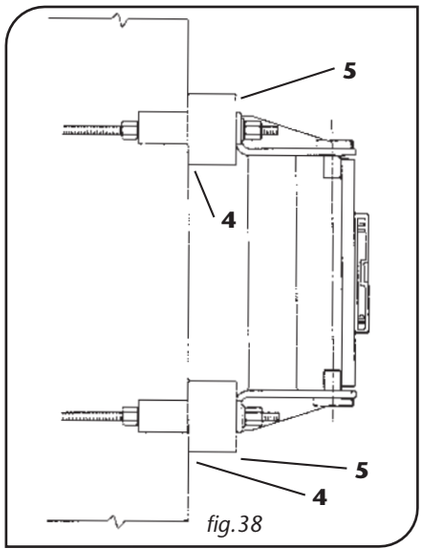


fig.38

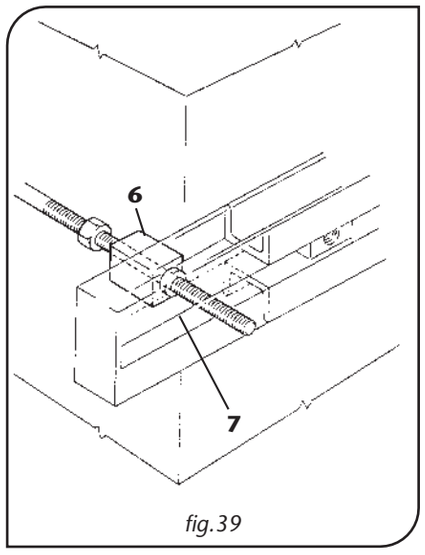


fig.39

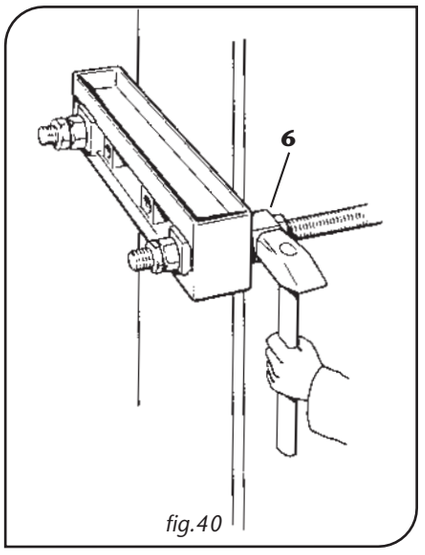


fig.40

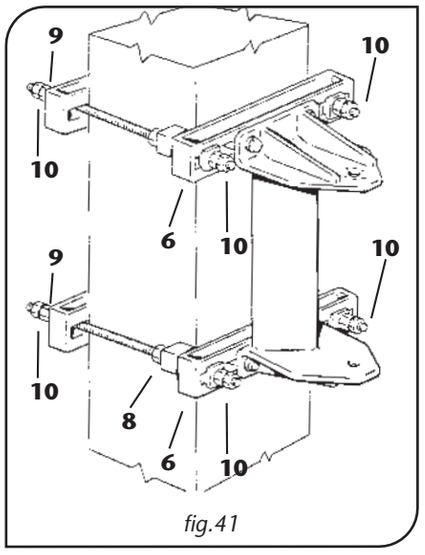


fig.41

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

4.3.5 Assembly of the arm –For GBA column-mounted cranes and GBP wall-mounted cranes

For the assembly of the arm proceed as follows:

1. Sling the arm, using strips made of textile fibre arranged in a "loop", corresponding to the handling points shown on the labelling and lift it with suitable means (overhead travelling crane, travelling crane, etc.). Keep the girder horizontal to the ground and constantly check the stability of the slinging which must not move from the handling point. Avoid oscillations and swinging and, if necessary, to maintain the equilibrium use a rope tied to the ends of the arm (fig. 42).
2. Line the arm up with the plates (of the bracket or column) and position the clutch plate **2** and the pressure plate **3** in the upper part of the tube, making sure at the same time that the clutch plate **2** and the pressure plate **3** fit into the lower part (fig. 43).
3. Insert the tube between the plates **4** until the rotation axis of the tube coincides with that of the plates and insert the rotation pivots **5** (upper side pivot with 6 holes, lower side pivot with 3 holes), after lubricating them with grease (fig. 44).
4. Block, with the clamping couples shown in the table, the pivots **5** with their related screws **6** in the three holes at 120 on the pivots' flange **5** (fig. 45).
5. Insert in the remaining holes of the upper side pivots' flange **5,** the springs **7** and the screws **6** checking carefully that the shank of the screws fits into the housing on the pressure plates **8** (fig. 46).
6. Regulate the slidability of the rotation of the arm, by acting on the braking system using register/adjuster screws **6,** until the traverse sensitivity required is obtained.
7. Carry out the check of the planarity of the arm **9** with the help of a level **L.** Do this check by rotating the arm by 90° to the left and to the right (fig. 47).

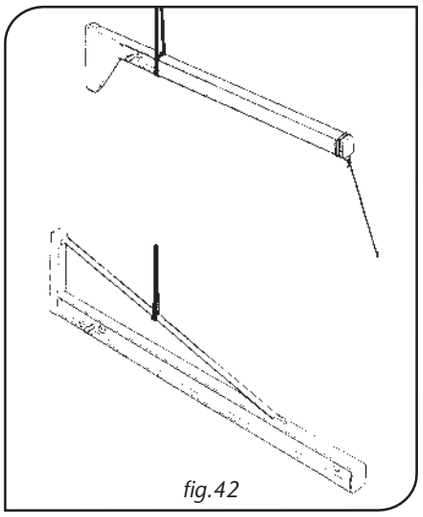


fig.42

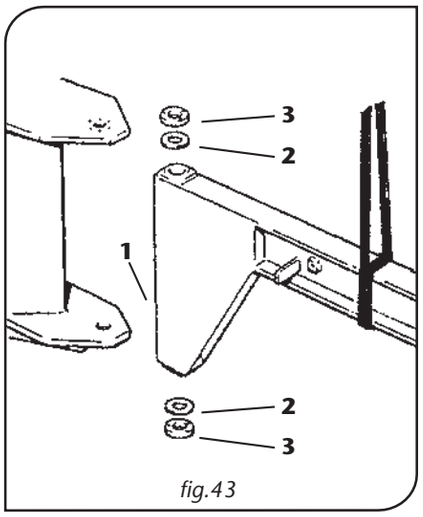


fig.43

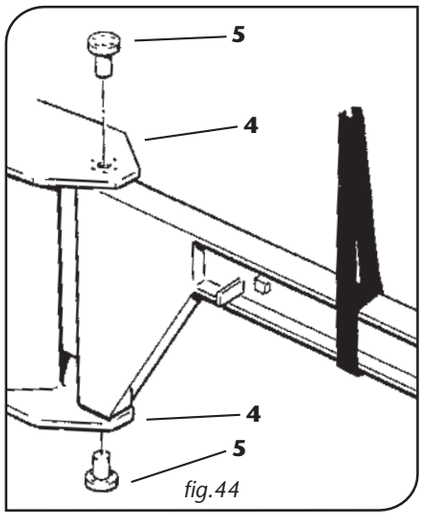


fig.44

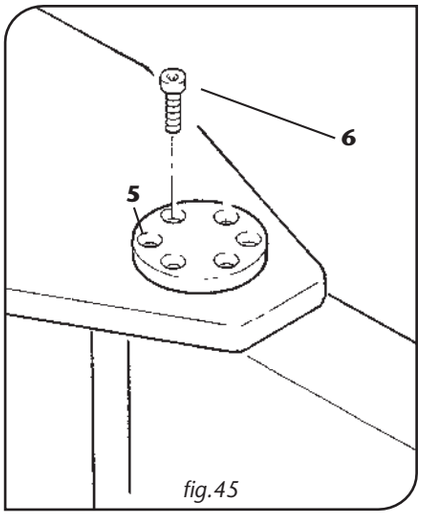


fig.45

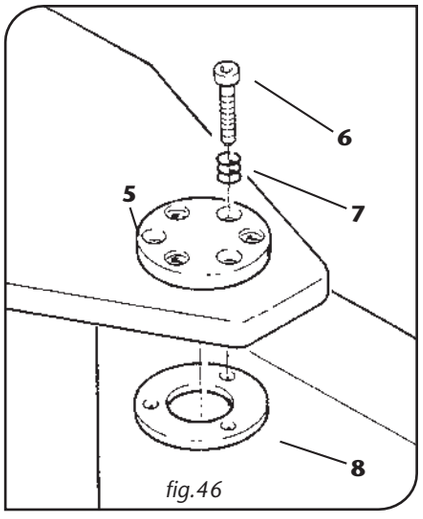


fig.46

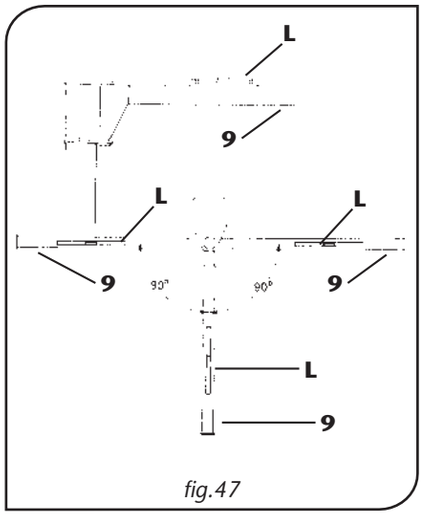


fig.47

- ***Keeping the arm clean is one of the indispensable conditions for its good sliding and to avoid a premature deterioration of the rotation elements .***
- ***Moderate lubrication with grease of the bearings is necessary.***

4.3.6 Assembly of the electric system with the connector block (For section 4.3.6.1 see page 59)

For the assembly of the electric system proceed as follows:

1. Extract the cable, the sleds or slides and the other electrical components from any packing.
2. Insert the power cable **1** in the cable-carrying sleds **2**, in the case of the channel - bar arm (fig. 48), or in the slides **3**, in the case of the "girder" arm (fig. 49), so as to form a series of festoons of equal width. Tighten the cable with the related screws or seatings.
3. Insert the sleds, or slides, in the relative sliding housings (channel-girder or double-T "girder") – (fig. 50).

• **In the case of the GBA column-mounted crane**

4. Connect the electric cable **1** and the cable of line **L** (inserted previously in the column – see 4.3.3-Assembly column – Pos.2) to the terminals **4** contained in the connector block (fig. 51).

• **In the case of the GBP wall-mounted crane:**

4. Connect the electric cable **1** to the terminals **4** contained in the connector block, to be applied to the column or load-bearing wall and to which the cable of line **L** coming from the power supply will be connected (fig. 52).

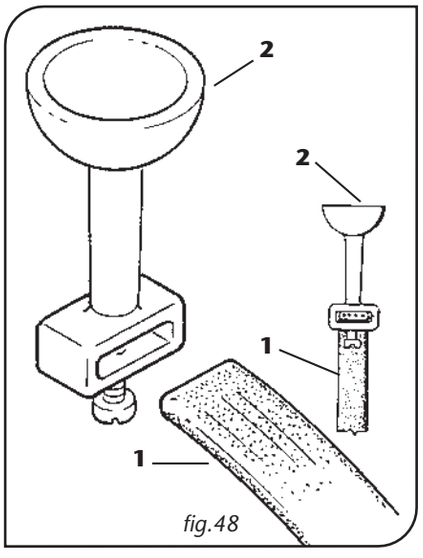


fig.48

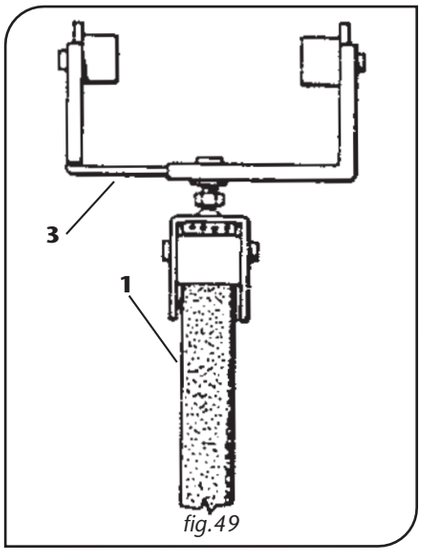


fig.49

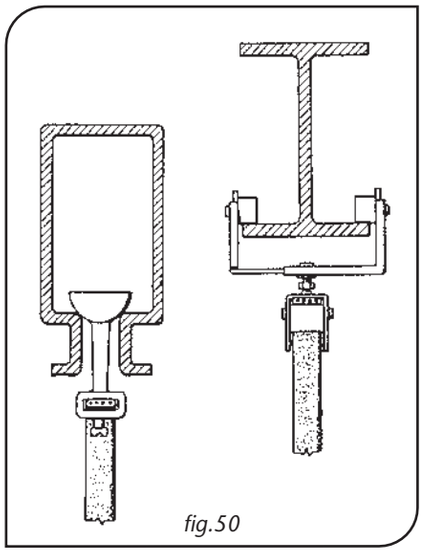


fig.50

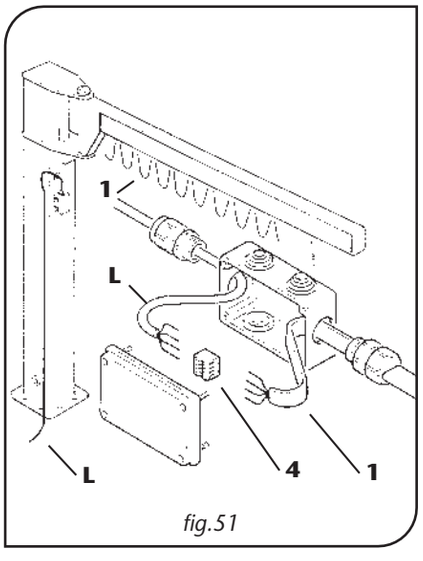


fig.51

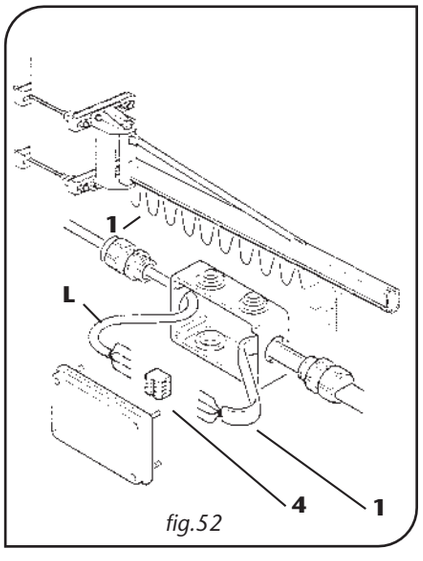


fig.52

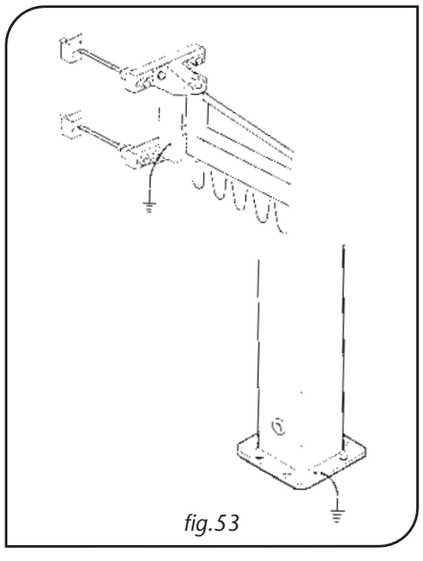


fig.53

The user or installer assigned by the user must:

- *install, in the immediate vicinity of the crane, a line switch, protected against short circuits, showing its function with the appropriate label.*
- *Have earthing connected, to the structure of the crane, corresponding to the handling points for this purpose (fig. 53).*

4.3.6.1 Assembly of the electric system with isolating switch for GBA column-mounted cranes

For the assembly of the electric system proceed as follows:

1. Extract the cable trolleys or cable sliders and the other components from any packing.
2. Insert the power cable **1** in the cable sliders **2**, in the case of the channel girger (fig.48), or in the cable trolleys **3** in the case of the girder arm (fig. 49), so as to form a series of festoons of equal width. Clamp the cables with the relative screws or seatings.
3. Insert the cable sliders or cable trolleys into or onto the relevant jib arm (fig.50).
4. Assemble the isolator switch as in figure **51b**, assembling the components 1-2-3-4-5.
5. Position the isolating switch in the hole in the column, connecting the relative electric cables, finishing the assembly with the application of the yellow frame and of the red knob as in figure **52b**.

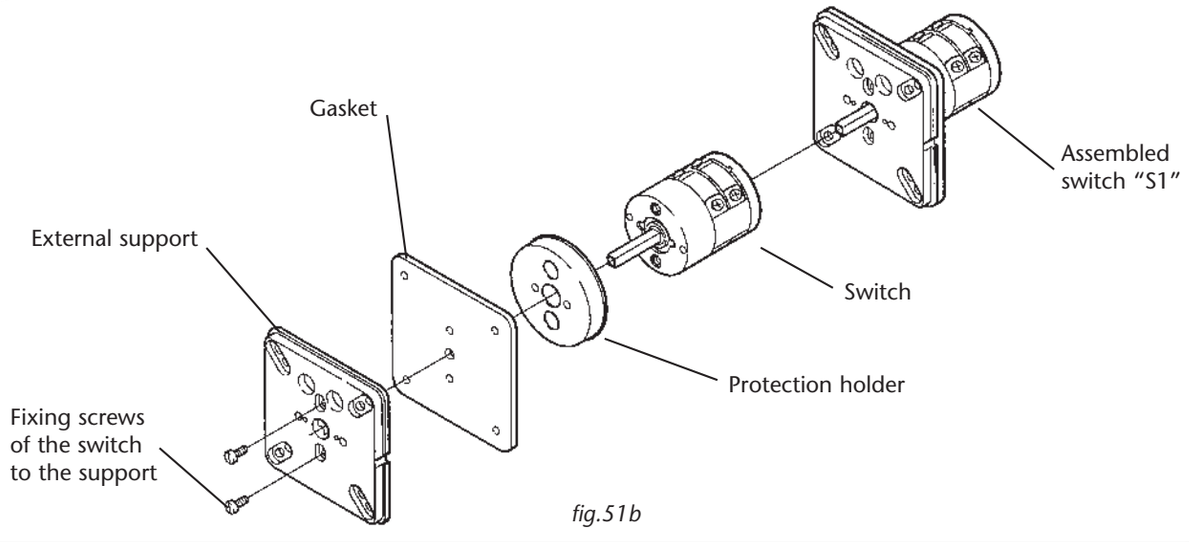


fig.51b

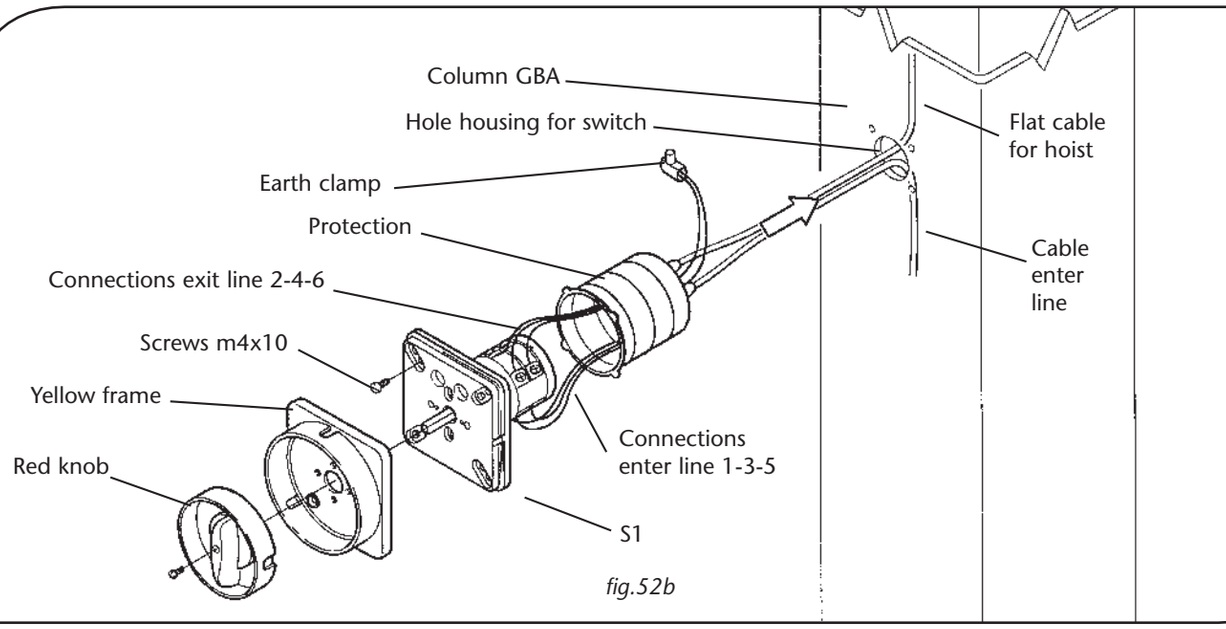


fig.52b

The user or installer assigned by the user must:

- ***Install in the immediate vicinity of the crane,a line switch, protected against short circuits, showing its function with the appropriate label.***
- ***Have earthing connected, to the structure of the crane, corresponding to the handling points for this purpose*** *(fig. 53).*

4.3.7 Assembly of the trolley/hoist

Assembly of the trolley/hoist on the crane with a section bar:

See "instructions for use", of the trolley/hoist, included in this publication.

In the case of the lifting unit fitted with electric trolley, make sure the striker plates are fitted -1-, for the electric limit switches of the trolley, inside the blocks on the arm, fixing them with the related screws (fig. 54).

Assembly of the trolley/hoist on the "channel section" arm crane (fig. 55):

1. Extract the channel trolley and the related hoist from any packing.
2. Remove the split pin **1** and unscrew the suspension pivot **2.**
3. Insert the eyebolt (or the suspension hook) of the hoist in the trolley plate **3** or in the brake beam **4,** respectively, when using a simple or double trolley.
4. Put back the pivot **2** and put the split pin back in place **1.**
5. Position the hoist/trolley unit on a pallet and lift this until the lead-in height of the head of the channel section is reached.
6. Working at a height, insert the pre-assembled lifting unit in the channel section and put the closing cover **5** in place, then tighten the fixing components **6**.

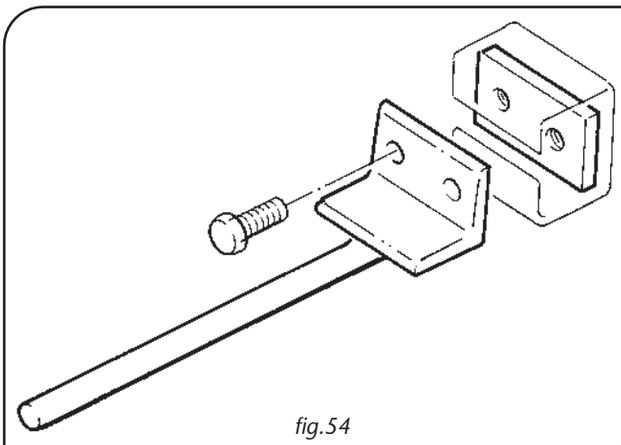


fig.54

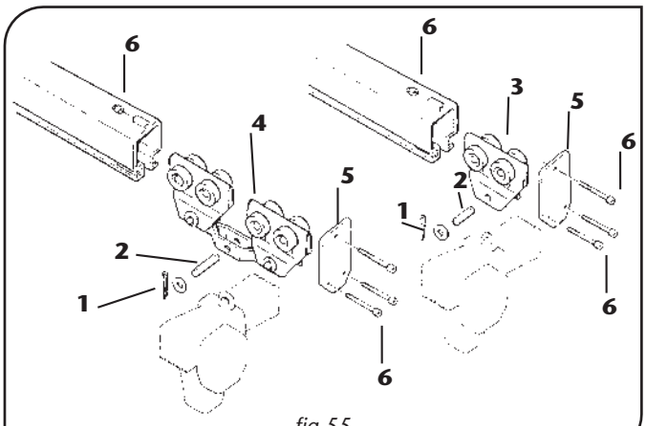


fig.55

Electrical connections of the lifting unit *(trolley/hoist):*

To connect the festooned cable of the power line to the terminals of the electrical apparatus of the lifting unit, see "Instructions for use", of the trolley/hoist, included in this publication.

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

4.4 Putting the machine into operation

4.4.1 Preliminary operations - Adjustments and test runs

Before putting the jib crane into use, carry out the following operations:

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

- **Check the correct installation of the crane:**
  - Check there are no obvious faults following the installation of the crane.
  - Check that all the bolted joints are correctly tightened.
  - Check that the sliding track of the trolley wheels is intact, which must be free from obstacles, upward projecting bumps, depressions, and foreign bodies.
  - Check the uniform sensitivity of the flexing of the arm, in all its amplitude.
  - Check that the arm can freely rotate, related to the absence of obstacles in the whole area of operation of the crane and any interference.
  - Adjust the ascent limit switches of the electric hoist (see information in the related “Instructions for use”), to allow the maximum possible run. The ascent limit switch must be adjusted so that the hook at its lowest point is about 10 cm from the ground.
  - Check that there are end catches and/or striker plates of the arm and trolley.
  - Check there are striker plates which function for the intervention of the travel limit switches, when installed with electric trolley. These should be adjusted so they do not come into contact with the buffers.
  - Check there are no leaks of lubricant.
  - Check during the trial runs that there are no strange noises and/or vibrations and/or incorrect movements (skidding of the wheels or, spontaneous movements of the trolley and/or the arm, etc).

- **Check the functioning of the correct rotation direction of the motors:**
  - **If the crane is fitted with a hoist and electric trolley:**
  - Operate the “right/left” direction buttons and check that the trolley moves following the directional arrows on the crane girder;
  - **If the crane is fitted with electric hoist and push-trolley:**
  - Operate, for brief distances, the “ascent/descent” buttons, taking care to operate first in one direction (descent), and then in the other (ascent) with two brief impulses necessary only to ascertain the correct direction of rotation, without using any electric limit switches.

- ***Proceed first to the check of the travel movements, if electric, and then to the lifting check and, in any case, avoid intervening using the lifting limit switch.***
- ***If the rotation direction of the motors does not correspond to the controls of the push-button control panel the limit switches do not halt the movement, and malfunctioning can occur.***
- ***If the direction of the movement does not correspond to the function shown on the push button control panel, halt the manoeuvre.***

4.4.2 Inspection of the jib crane – Suitability for use

- *The jib crane is marketed considering inspections carried out by the manufacturer on similar prototypes, subjected to checks for their suitability for use on the structural parts (columns, brackets, arms, etc.).*
- *DONATI SOLLEVAMENTI S.r.l. carries out its check of manufacture within the company "Quality system", certified by ICIM with No.0114, according to standard UNI EN ISO 9001: 2008. This guarantees the constant quality and conformity of the prototypes inspected of all the parts of the jib cranes.*
- *The inspection procedure, described below, refers to ascertaining the functional and performance responsiveness of the jib crane installed in its place of use, complete in all its parts (fixings, structure, lifting unit, lifting accessories, etc.).*
- *The inspection of the crane installed is the responsibility and task of the user and must be carried out by specialized staff (installer) who will assemble it, by scrupulously following the instructions in this manual.*
- *The installer must carry out the inspection and complete all the "Inspection Report" and complete the "Suitability for use" certificate.*

After carrying out the "empty" test runs, carry out the dynamic test runs; these test runs are carried out with masses of value corresponding to the lifting capacity shown on the crane label uprated by the coefficient of overload 1,1 (load equals 110% of the nominal load). The static test runs are carried out with an overload coefficient of 1,25 (load equals 125% of the nominal load).

All tests must be carried out in no windy conditions

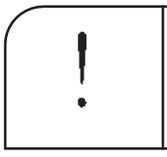
Proceed to the testing of the jib crane, in the following way:

Empty test runs:

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

Dynamic test runs:

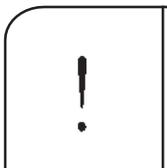
- prepare adequate weights for the test runs with load equal to **nominal lifting capacity x 1,1** and suitable equipment for the harnessing and lifting of the load.
- harness the load, taking care to position the hook vertically to avoid skew rope falls.
- slowly tension the sling so as not to cause tearing, if available do the test runs with load using the "slow" speed.
- slowly lift the load and check that this happens with no difficulty and that there are no anomalous noises, clear deformations or sagging in the structure of the crane, in the support structures and/or the anchorings.
- repeat the test run at maximum speed, if available, doing the preceding checks.
- check the functionality of the "ascent and descent" limit switches, when installed, and/or any clutch device fitted.
- check the functionality of the lifting brake, checking that the weight is braked in adequate time and that there is no skidding of the load, after releasing the button.
- carry out the same checks also for the trolley travelling movements and rotation of the arm, checking the functionality of the limit switches, without bringing the load to the maximum height (lift it to a height of one metre from the ground).
- operate first at slow speed, if available, and then at maximum speed.
- check the correct sliding of the trolley on the girder, and ascertain that there are no no anomalous noises, evident permanent deformations or anomalous sagging of the structure of the crane, of the support structure and/or the anchorings.
- check the functioning of the "emergency stop" button which must stop and inhibit all the movements. Any function of the hoist and/or trolley must stop, in the shortest possible time and space, without showing anomalies, side skids, dangerous oscillations, etc. which threaten the stability.
- check the braking spaces and stopping spaces during lifting travelling and rotation, checking the stability of the mass manoeuvred.



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

Static test runs:

- use suitable masses for the test runs equal to: **nominal lifting capacity x 1,25** and suitable equipment for slinging and lifting the load.
- put in the sling the load **used for the dynamic test runs** (nominal capacity x 1,1) taking care to position the hook on the vertical to avoid skew runs.
- tension the sling slowly to avoid tearing, if available carry out the test runs using the "slow" speed.
- lift the load and stop it in a suspended position at a height of 10cm.
- gradually apply weight on it until reaching an overload value equal to 25% of the nominal lifting capacity
- leave the weight suspended for no less than 10 minutes.
- check that the weight suspended (load + overload) does not yield (the lifting brake and the clutch device/load limiting switch, if installed, must not skid).
- release the load and check that there are no evident deformations and/or sagging of the structures of the crane, the support structures and/or the anchorings.



- ***During the static test run NO movement of the crane must be activated.***
- ***The testing of the jib crane must be repeated at the annual checks*** *(see paragraph 6.3.2).*

4.5 Out of service

4.5.1 Storage and conservation of parts

If the jib crane and its component parts should be put in the warehouse and kept** (storage), **to avoid damage or deterioration proceed in the following way:

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

4.5.2 Reuse after storage

Before putting the jib crane back into use after a long storage period, the following operations must be carried out:

- **Structure:**
  - eliminate traces of lubricant from the structure and from the sliding girder of the trolley
  - clean any grease residue from the holes and skim the threads of the holes
  - clean the mating surfaces at the joints
  - repair any structural damage (scratched surfaces, peeling paint, etc.)

- **Mechanisms:**
  - check for any leakage and if necessary, refill the levels of lubricant
  - verify that the mechanisms are correctly tightened to the related structure
  - eliminate traces of rust from sliding parts which are accessory to the commands
  - lubricate the thrust bearing of the hook and the unpainted mechanisms (shafts, etc.)
  - eliminate any residual water from concave parts

- **Electrical equipment:**
  - eliminate any condense from the motors and terminal boards; dry with jets of air
  - check the integrity and functioning of the brakes
  - clean the surfaces of the brake gaskets thoroughly, eliminating all traces of humidity, lubricants and varnishes
  - check the integrity and functioning of the limit switches
  - check the parts and the electrical components are intact
  - dry contactor contacts
  - clean closure surfaces thoroughly, clean threaded holes of all containers
  - check the smoothness of the festooned electric lines
  - carefully check the functioning and efficiency of the push-button control panel

5. - FUNCTIONING AND USE OF THE JIB CRANE

5.1 Functions of the jib crane

5.1.1 Intended use - Foreseen use - Designated use

The manually rotated jib cranes, in the GBA column-mounted version and the GBP wall-mounted version are produced for the manoeuvring of goods inside a building, in a yard or to serve operative positions.

- **The jib cranes** have three functions:
  - **they lift** a load vertically, using the hook of the lifting block, generally made up of a manual or electric chain hoist and using suitable accessories for such an operation;
  - **they move** a load, with the help of an electric or manual hoist-carrying trolley which slides along the radial axis of the arm of the crane;
  - **they rotate** the load, around the constraint axis of the arm, by pushing by hand the load, using the surrounding circular area, delineated by the rotation range of the arm.

- If the crane is fitted with an **electric hoist and a travelling push-trolley** the movements can be activated by:
  - using the **push-button control panel** with the push-buttons of "ascent" and "descent" for control of the lifting movement
  - **by pushing** to control the **travelling trolley**

- If the crane is fitted with an **electric hoist and travelling electric trolley** the movements are activated by:
  - using the **push-button control panel** with push-buttons of "ascent" and "descent" for control of the **lifting** movement
  - using the **push-button control panel** with push-buttons of "right" and "left" for the control of the **travelling** movement.

- If the crane is fitted with **manual hoist and manual trolley** the movements are activated by:
  - **mechanical action** of the manoeuvre chain of the hoist for **lifting**
  - by **pushing** to control the **travelling** trolley.

- In all cases the **rotation movement of the arm** is activated manually with **push-training**.
- **When it is controlled by the push-button control panel,** the push-buttons activate the function when they are held down and control of the auxiliary slow lifting and travelling speeds, it can be activated as follows:
  - with **separate push-buttons** which keep the "high" and "low" speed controls separate.
  - **with a single push-button** with two positions, the first position is the "low" speed and the second position is the "high" speed.

- **The emergency stop button** is red and mushroom-shaped, and activates the **stop** function when pressed right down.
- To allow the jib crane to work it is necessary to bring the **emergency stop button** to its most "raised" gear speed position and then push the **start buttons** one after the other.
- The push-button control panel is pendant from the hoist and can be used by the operator on the ground while following the travelling movement of the trolley and/or the rotation of the arm.
- The electric movements of the jib crane can also be controlled through a radio-control system, the functions of the buttons are the same as the ones on the pendant push-button panel.

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

5.1.2 Permitted loads, loads not permitted

The loads must:

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

⚠

Handling of the following loads in not permitted:
- ***one with a weight (including accessory) greater than the nominal capacity of the crane (fig. 56)***
- ***with an uneven mass with respect to the centre of gravity.***
- ***with surfaces which are not resistant enough to withstand the pressure of the hold.***
- ***those which are classified as dangerous (e.g. flammable, explosive, radioactive material), because of their chemicophyisical characteristics.***
- ***harmful toxic materials or products, unless handled in suitable safety containers (e.g.: corrosive chemical products, products having biological risks, etc.).***
- ***loose foodstuffs, which may come into direct contact with parts of the hoist or with its lubricants.***
- ***those which may change their static and/or chemicophisycal configuration or their centre of gravity during handling.***
- ***hose without the accessories outlined in the following point.***

5.1.3 Lifting accessories

The following are usually allowed:

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

⚠

The following accessories are not usually allowed:
- ***those with functional characteristics which may provoke a level of dynamic stress superior to that admissible for the hoist or accidental overloading.***
- ***those which may collide with parts of the jib crane (fig. 57).***
- ***those which compromise free handling of the load.***
- ***those which are connected to independent electrical lines.***

⚠

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

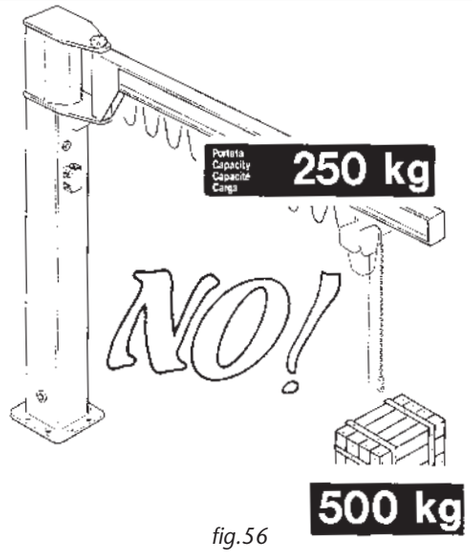


fig.56

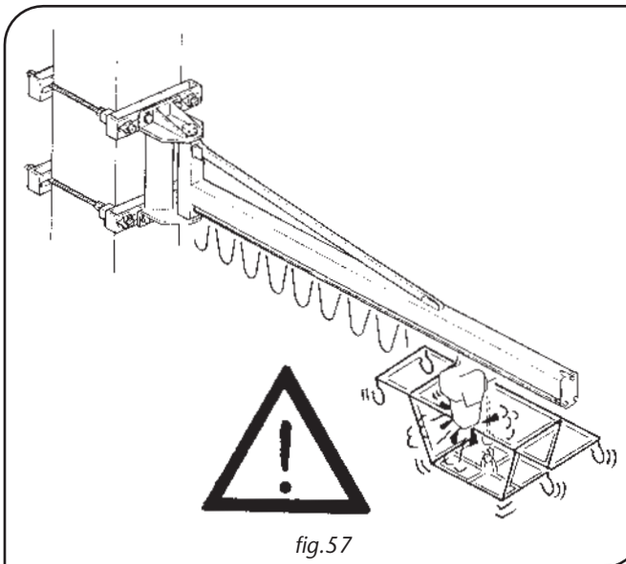


fig.57

5.2 Operating conditions

5.2.1 Operating environment

- **The operating environment must have the following characteristics:**
  - **temperature:** min. –10°C; max. +40°C, max. relative humidity 80%.
  - **indoor use:** as the jib crane is not exposed to atmospheric conditions no particular precautions need be taken.
  - **outdoor use:** the jib crane may be exposed to atmospheric conditions during and after use. The electric parts of the hoist and trolley have IP55 protection, however, protecting the hoist and trolley with a shelter of some kind is recommended (fig. 58).

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

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

5.2.2 Danger zones and people exposed to risk

Danger zones are all areas, in any operative phase, where the people present can be subjected to a risk which constitutes a danger for their safety, health or psychophysical integrity. It is necessary to inform the **people potentially exposed,** that the jib crane operator does not always work with sufficient visibility to prevent all potential risks of crushing, hitting and dragging. These people must, therefore, take care to avoid exposing themselves to such risks during manoeuvres in these areas (fig. 59).

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

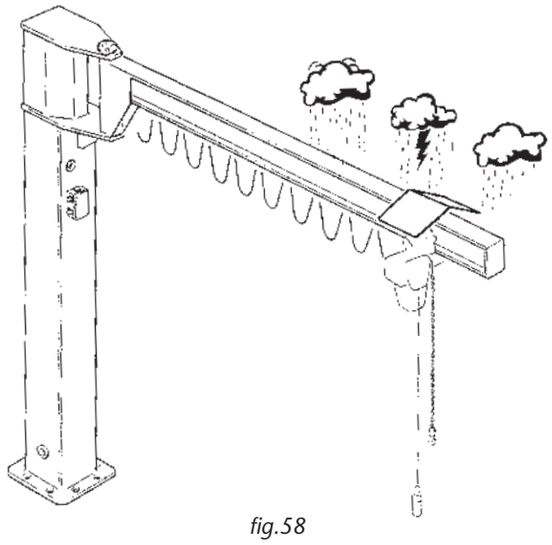


fig.58

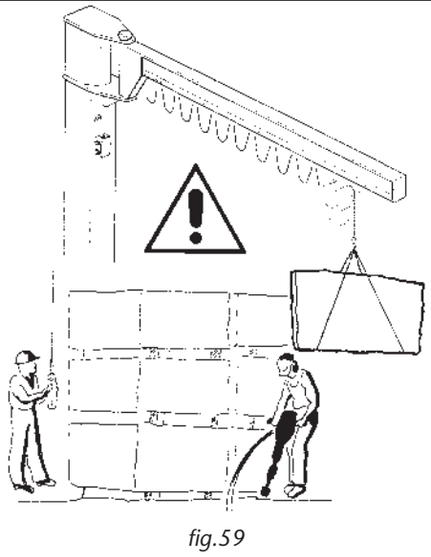


fig.59

5.2.3 Illumination of the work area

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

- ***The level of illumination must guarantee the maximum level of safety possible for the operation of the crane (fig. 60).***
- ***The installation of a supplementary lighting system is obligatory in zones with insufficient illumination, avoiding shadows which impede or reduce visibility in the operative and/or neighbouring areas.***

5.2.4 The operator

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

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

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

- ***The operator must not let anybody come near during the handling of the jib crane and forbid the use to external people, in particular to people under 16 years of age.***
- ***The use of the crane is forbidden to non-authorised or untrained people.***
- ***The operator must use suitable personal protection devices (PPD = gloves, protective footwear).***

5.2.5 The lifting capacity of the jib crane

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

- ***The loading capacity of the crane and its accessories must never be overcome by applying overloads*** (fig. 61).
- ***The crane must never be equipped with a lifting device (hoist) with a nominal lifting capacity superior to that of the crane.***
- ***The speed limit for lifting of 24m/min must never be exceeded if not reducing the lifting capacity of the crane accordingly.***

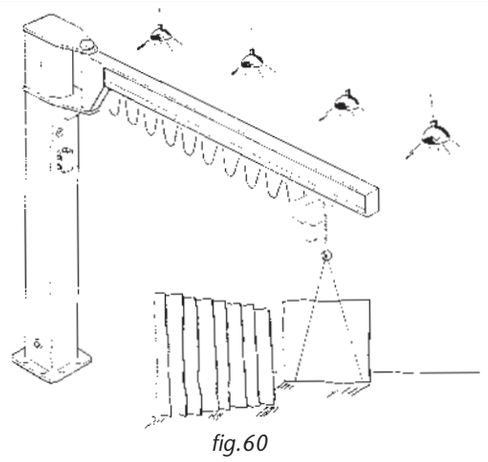


fig.60

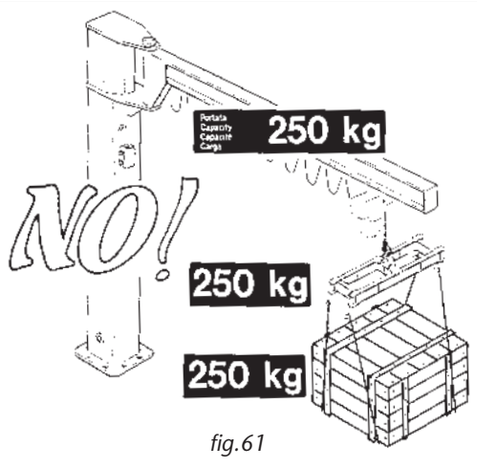


fig.61

5.2.6 Manoeuvres: lifting, trolley traverse and arm rotation

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

- Engagement of the load by the hook of the hoist and by the lifting accessories must be carried out with great care, delicately and without jolting.
- Begin a lifting operation by slowly stretching the chain until the load has been lifted by a few centimetres, stop the manoeuvre and check the hold and stability of the load.
- At the end of the manoeuvre, place the load on the ground carefully and remove the hook of the hoist.
- **During lifting manoeuvres** the operator must avoid resting the hook on the ground or on loads to be lifted, to avoid free oscillation of the chain. The operator must absolutely avoid making skew falls with the chain, which are always dangerous and difficult to control (fig. 62)
- **During trolley travelling manoeuvres** it is obligatory to avoid violent collisions between the trolley /hoist and the end buffer plates so as not to cause serious repercussions on the mechanical organs and on the steel structure.
- **During manual travelling and/or rotation manoeuvres of the arm** the operator must handle the load by pushing it and never by pulling it towards himself, to avoid the risk of crushing (fig. 63).

- ***Operate with care and diligence, follow the manoeuvre constantly and visually check the balance of the mass being moved.***
- ***Avoid sharp or jolting movements which are very damaging to the stability of the load because of the dynamic effects which are generated.***
- ***Never lift loads with an unbalanced and non barycentric engagement. Never neglect to hook the load and secure all original sling accessories. Do not secure the load with improvised slinging.***
- ***Never leave the load suspended, once the handling operation has begun it must be completed in the shortest time possible and the load must be positioned without crushing the lifting accessories.***

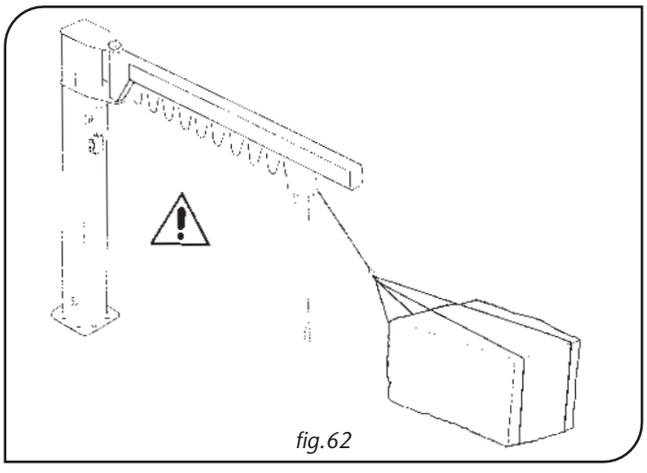


fig.62

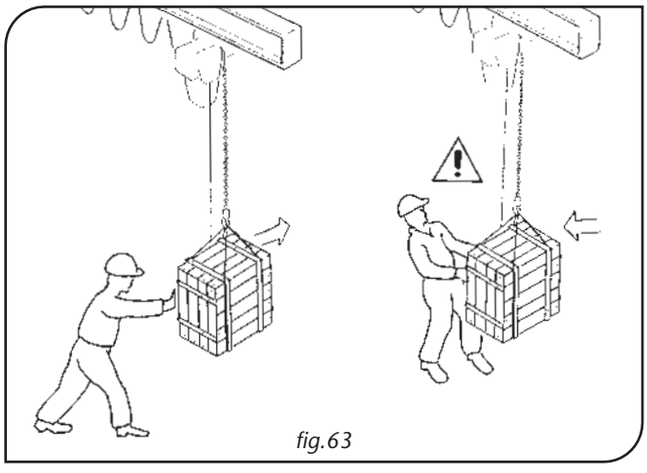


fig.63

5.2.7 Safety devices

- Cutting out the power supply of the crane must be done by switching off the line switch/selector (not included in the supply) and/or by pushing the “emergency stop” button on the push-button panel.
- An electric and/or mechanical lock prevents simultaneous use of commands for the two directions of the motors for both high and low speeds.
- A lack of voltage causes all movements of the hoist and trolley to be stopped immediately, as the motors are equipped with an automatic braking device.
- A safety latch is installed on the lifting hook to prevent accidental unhooking of the slinging and/or loading
- The lifting, translation and rotation limit switches bound the maximum vertical and horizontal traveling of the load. They are emergency devices and are not suitable for turning off the machine or to begin new operations.

- ***When the safety devices are not supplied by DONATI SOLLEVAMENTI S.r.l., they must be installed by the purchaser.***
- ***Use of the jib crane and/or application of the CE marque, shown here on the right, is forbidden before the crane has been completed according to the specifications detailed in this point.***

CE

5.3 Setting up – Starting the jib crane

To begin operational activities with the crane carry out the following operations:

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

5.4 Switching off at the end of use

To shut down the crane at the end of work it is necessary to:

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

When a manual hoist is used:

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

When an electric hoist is used:

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

5.5 Criteria and precautions of use

- *The correct use of the jib crane guarantees the safe and full performance of the machine.*
- *These potentialities are only guaranteed if the following instructions are strictly adhered to:*

- **ALWAYS** follow the directions and instructions in the use and maintenance manuals and check the integrity of the components and parts of the crane.
- **ALWAYS** heed the instructions and warnings displayed on the machine; the warning label plates located on the crane and in the manoeuvre zone are accident-prevention signs and must always be perfectly legible.
- **ALWAYS** ensure that the crane operates in an environment protected from atmospheric agents (rain, wind, snow, etc.), or, if in the open, that it has adequate shelter or protection.
- **ALWAYS** check that the capabilities of the crane correspond with the job which needs to be done (work cycles – intermittence – duration of use – load to be moved).
- **ALWAYS** check the suitability of the structures (walls,columns,foundations) which support the jib crane (fig. 64).
- **ALWAYS** ascertain the adequacy of the state of maintenance of the crane (cleaning, lubrication) and its main components (hook, chains, push-button control panel, limit switches, motoreducers, wheels, brakes, etc.).
- **ALWAYS** verify the correct response of the movements of the trolley and the hoist.
- **ALWAYS** test the functioning of the emergency stop button.
- **ALWAYS** check the efficiency of the brakes and of the limit switches and of the electric system.
- **ALWAYS** check the efficiency of the chain, hook block, hook and push-button panel and that they are intact.
- **ALWAYS** ensure that the hook is not worn, damaged or without a spring catch.
- **ALWAYS** check the suitability and efficiency of the slinging (ropes, chains, bands,...).

- **ALWAYS** check that the sliding track of the trolley is at a height which does not allow the operator to interfere with the hoist/trolley and/or its moving parts. If this isn't possible arrange appropriate shelters or signs positioned in the danger zone (fig. 65).
- **ALWAYS** when moving manually push the load and avoid pulling it towards itself (fig. 66).
- **ALWAYS** ensure the lifting unit (hoist and hook) is centered on the perpendicular of the load before slinging and moving it.
- **ALWAYS** appropriately secure the load slings to the lifting hook and stretch the slings with slow,safe movements.
- **ALWAYS** operate in the best conditions as far as lighting and load visibility are concerned.
- **ALWAYS** ensure, before maneuvering, that the rotation of the arm is free from obstacles and that during lifting, travelling and rotation, the load does not meet obstacles (fig. 67).
- **ALWAYS** operate outside the maneuvering area of the lifted load.
- **ALWAYS** carry out the handling avoiding jogging.
- **ALWAYS** avoid combinations of handlings, such as operating the lifting and the translation push-buttons at the same time and be careful not to cause hunting of the load.
- **ALWAYS** use "slow" speeds for approaching and positioning operations (fig. 68).
- **ALWAYS** at the end of work, position the crane arm, the load hook and the push-button panel, so they are not a collision risk (fig. 69).
- **ALWAYS** push the red emergency stop button on the push-button panel before leaving the command post and switch off the cutout switch of the crane.
- **ALWAYS** switch off power to the machine during checks, repairs, ordinary maintenance.
- **ALWAYS** for all operations, use adequate safety protection devices (DPI, gloves, etc.).
- **ALWAYS** point out any functioning anomalies (faulty working, possible breakings, incorrect movements and unusual noise) to the person in charge of the specific department and put the machine out of service.
- **ALWAYS** follow the maintenance programme and record, for each check, any specific observations, especially regarding the hook, chains, brakes, and limit switches.

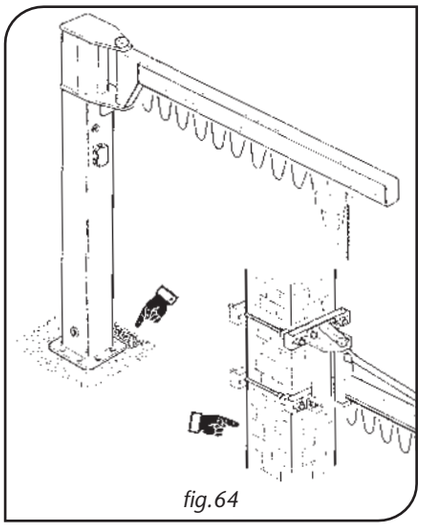


fig.64

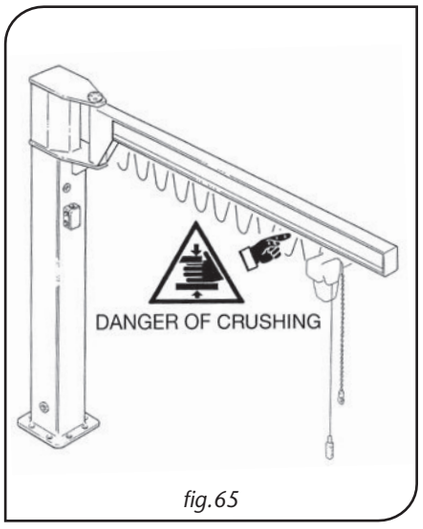


fig.65

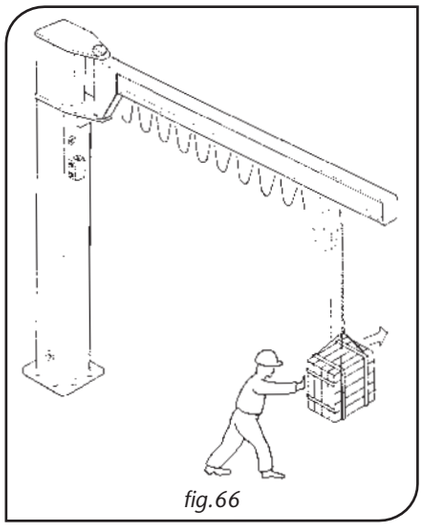


fig.66

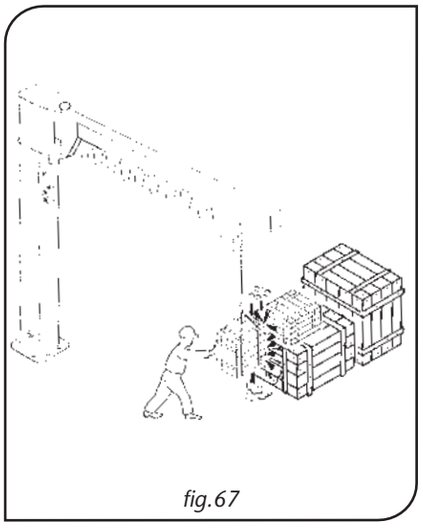


fig.67

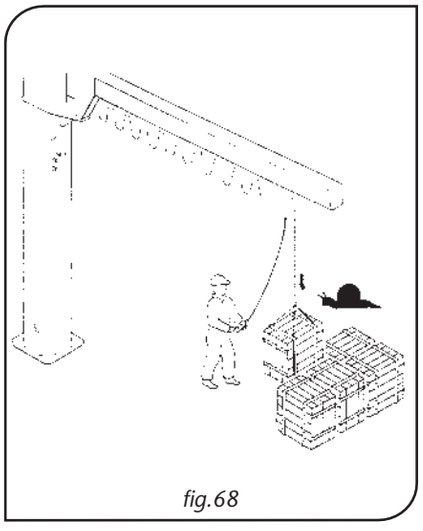


fig.68

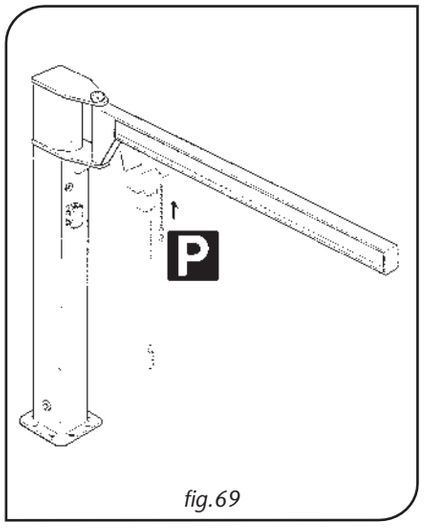


fig.69

5.6 Contraindications of use

- ***The use of the jib crane for manoeuvres which are not permitted, improper use and a lack of maintenance can carry risks of grave danger for the health and safety of the operator and of the people in the area, as well as risks of damage for the work environment and can compromise the functionality and intrinsic safety of the machine.***
- ***The actions described below, which obviously cannot cover the entire range of possible "bad uses" of the crane, are the most predictable ones, and are absolutely forbidden:***

5.6.1 Use not intended and not allowed - Foreseeable and unforeseeable inappropriate use

- **NEVER** use the crane to lift and transport people (fig. 70).
- **NEVER** lift loads heavier than the nominal lifting capacity nor equip the crane with hoists with a nominal lifting capacity greater than that of the crane itself (fig. 71).
- **NEVER** lift loads while people are walking under the suspended load.
- **NEVER** walk, stop, operate and maneuver under the suspended load.
- **NEVER** permit unqualified staff or under 18 years of age to use the crane.
- **NEVER** use the crane unless psychophsically suited to the work.
- **NEVER** use the crane unless provided with suitable personal protection (PPD, gloves, etc.).
- **NEVER** operate without taking the necessary care during lifting and travelling of the trolley and rotation of the arm maneuvers.
- **NEVER** rotate the load and /or the arm of the crane and/or pull the push-trolley using the cable of the push-button panel (fig. 72).
- **NEVER** touch the slings during tensioning in contact with the load and between the hook and the slinging.
- **NEVER** leave the suspended load unattended.
- **NEVER** use the crane for jobs other than those for which it was designed, do not use it for other operations such as painting ceilings, changing light bulbs, a place to rest scaffolding on, etc.
- **NEVER** lift unbalanced loads.
- **NEVER** allow the load or the hook to swing during translation or rotation.
- **NEVER** place the chain in a diagonal position for pulling.
- **NEVER** use the crane or its lifting apparatus for pulling or dragging.
- **NEVER** use slingings without having previously checked their suitability.
- **NEVER** use the chain of the hoist for grounding a welder.
- **NEVER** lift loads with the hoist.
- **NEVER** use the crane to keep tension or to extract elements tied to the ground.
- **NEVER** perform a hook run, after having positioned a load, in a way which causes the chain to wobble.

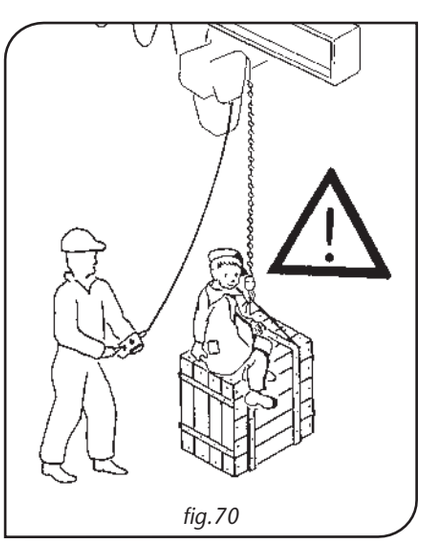


fig.70

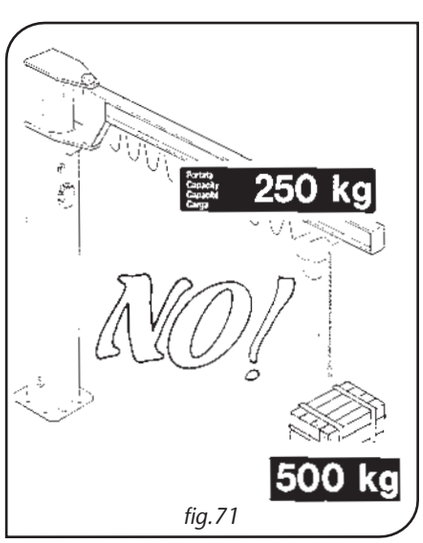


fig.71

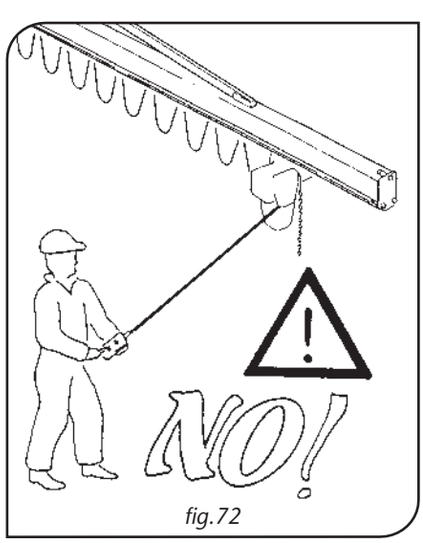


fig.72

- **NEVER** hit the supporting structures of the building, of machines and systems with the load or the arm (fig. 73).
- **NEVER** use two cranes at the same time to lift the same load (fig. 74).
- **NEVER** employ two simultaneous movements when using the crane, wait until tho movement has come to a complete stop before beginning another.
- **NEVER** use the crane in unforeseen atmospheric conditions or, of installed outside, in hostile, unfavourable and /or dangerous atmospheric conditions (strong wind, heavy rain, etc.) - (fig. 75).
- **NEVER** use or act on the hoist in conditions where illumination and/or visibility are insufficient.
- **NEVER** use the crane where the use of flameproof componentry is required.
- **NEVER** use the limit switch devices and the overload device continuously.
- **NEVER** approach at maximum speed the areas of "end of the runs" when translating or rotating.
- **NEVER** use the crane when there is a large drop in the voltage or when one of the phases is lacking.
- **NEVER** perform sudden changes of direction during lifting, travelling and rotation operations.
- **NEVER** press the control buttons on the push-button panel repeatedly.
- **NEVER** modify the function characteristics of the crane and/or its components.
- **NEVER** tamper with the settings of the safety-devices (limit switches, clutch device) - (fig. 76).
- **NEVER** carry out temporary repairs or procedures for putting the machine back into operation which do not comply with the instructions.
- **NEVER** use non-original spare parts or spare parts which have not been recommended by the manufacturer.
- **NEVER** leave the crane at the end of a job without having implemented the safety procedures.
- **NEVER** carry out maintenance, inspections or repairs without having put the crane out of service.
- **NEVER**, during maintenance work: (fig. 78)
- use unsuitable equipment
- lean ladders on the column, on the hoist, on the trolley, or on the arm of the crane
- work without personal protection devices
- carry out work without having removed the load
- **NEVER** use the crane if it is not totally responsive in all its operating functions.

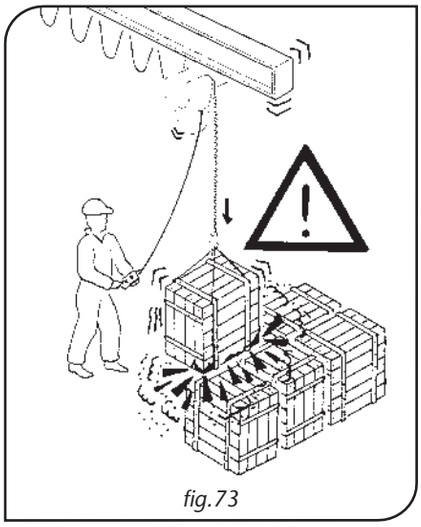


fig.73

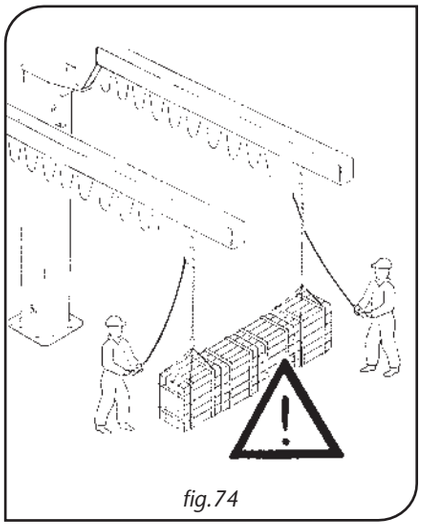


fig.74

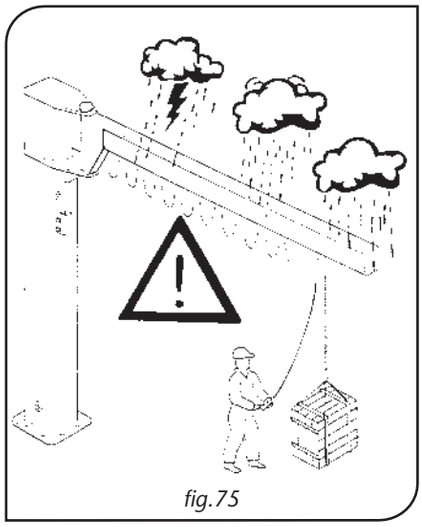


fig.75

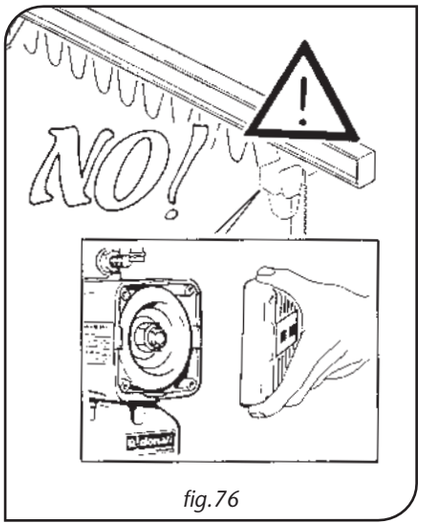


fig.76

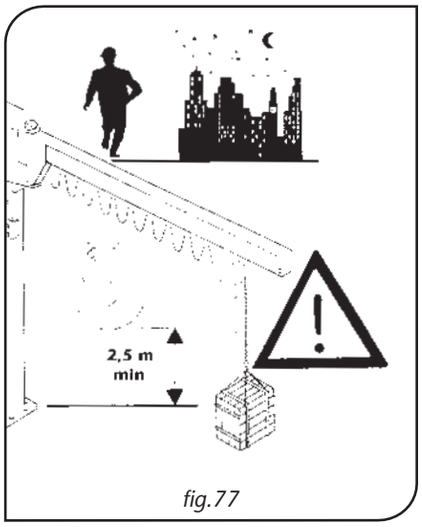


fig.77

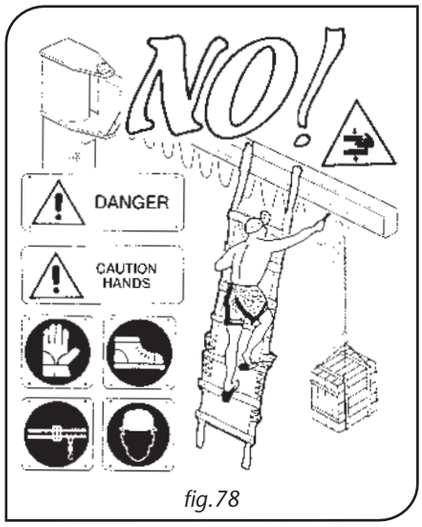


fig.78

6. - MAINTENANCE OF THE JIB CRANE

6.1 Safety precautions

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

- *Maintenance staff of the jib crane must:*
  - *be well trained*
  - *have read this publication*
  - *have an excellent knowledge of the accident prevention regulations*
- *Unauthorised staff must be outside the work area during operations*

Such precautions are covered in greater detail in this chapter, whenever a procedure which may carry a risk of damage or accident is required, through **WARNING** and **DANGER** notes:

WARNING notes precede an operation which, if not correctly carried out, may cause damage to the crane and its components.

DANGER notes precede an operation which, if not correctly carried out, may cause injury to the operator.

Pay attention to the following WARNING NOTES during maintenance work:

Before putting the jib crane back into operation after a breakdown, it must be inspected thoroughly and checked for evidence of any damage which may have occurred and the procedure in paragraph 5.3 must be repeated.

Never alter the settings or positionings of the safety devices, unless expressly required in order to deal with a breakdown. Tampering with them can cause serious damage to the crane and its components.

Pay attention to the following DANGER NOTES during maintenance work:

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

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

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

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

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

Always use protective gloves during maintenance work.

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

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

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

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

6.2 The qualifications of maintenance staff

To be capable to adequately carry out maintenance work of jib cranes maintenance staff must:
- Know the laws in force related to accident prevention during work carried out on machines with motor transmissions and be able to apply them.
- Have read and understood chapter 3 “Safety and Accident Prevention”.
- Be able to use and consult this document.
- Know the functioning of the machine.
- Recognise irregularities regarding functioning and when necessary take necessary measures to rectify them.

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

	Operator of the jib crane.	

- **Typical maintenance activities:**

  - Verification of proper functioning of the jib crane. Cooperation with staff appointed to periodical and/or extra maintenance work, after having informed them of any anomalies found in the functioning.
  - Cleaning and lubrication of the parts of the crane (hoist) which the operator is normally in contact with (push-button panel, hook) and simple maintenance work which does not require intervention at a height (e.g. lubrication of the thrust bearing of the hook).

- **Technical knowledge required:**

  - knowledge of the functions and use of the jib crane.
  - knowledge of the lubricants utilised in the crane and in the hoist and of the dangers associated with their use.

- **Qualification required:**

  - suitability to the work in relation to the specific operative and environmental characteristics.

	Mechanical maintenance officer	

- **Typical maintenance activities:**

  - mechanical regulation of the clearance of brakes and mechanisms
  - test movements and mechanical regulation of the safety devices
  - check mechanical clearance and wear of the components (chain, hook, etc.)
  - replacement of components which can wear out (chain, hook, chain guide, pulleys) according to this publication
  - ordinary maintenance of mechanical units after substitution of parts with original spare parts

- **Technical knowledge required:**

  - good knowledge of mechanical lifting systems and handling with a manual and motor driven system
  - good knowledge of safety devices used on the hoist (limit switches, brakes, overload switch, etc.)
  - basic knowledge of the moderately difficult techniques for electric checking and adjustment (limit switch adjustment, replacement of fuses, motor connection, etc.)
  - knowledge of the methods of measurement and testing to determine the actual state of the conditions of the crane and of the hoist (tests of: brakes, chain and hook wear, wheel wear, anomalous noise, etc.)
  - logical trouble-shooting methods of non complex breakdowns and evaluation of the results
  - ability to arrange the necessary measures to put the hoist back into working order
  - ability to write a maintenance intervention report

- **Qualification required:**

  - Complete training of an industrial mechanic having a specialisation in and experience of lifting-system maintenance or of industrial handling.

Electrical maintenance officer

- **Typical maintenance activities:**

  - intervention on the electrical equipment beginning from the electrical circuit diagrams
  - test of the execution of movements and electric adjustment of the safety devices
  - check of the wear of electrical components (contacts of the electrical equipment)
  - repairs of the electric units after replacement of parts with original spare parts

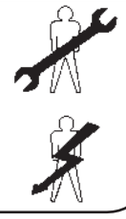
- **Technical knowledge required:**

  - good knowledge of electrical plants and installations
  - good knowledge of the electrical componentry and of the safety devices used in the hoist (limit switches, brakes, etc.)
  - knowledge of moderately difficult electrical checks and adjustments (replacement according to the original diagrams: motors, limit switches, push-button panel, control console, cables, etc.)
  - basic knowledge of moderately difficult techniques for mechanical checks and adjustments (wear testing, adjustment of mechanical stops, etc.)
  - knowledge of the methods of measurement and testing to determine the actual state of the conditions of the hoist (tests of the efficiency and reliability of the electrical equipment)
  - knowledge of trouble-shooting methods in case of power failure or breakdown and experience of electric command and control systems of lifting and handling equipment
  - ability to arrange the necessary measures to put the hoist back into working order
  - ability to write a maintenance intervention report

- **Qualification required:**

  - Complete training of an industrial electrician having a specialisation in and experience of lifting-system maintenance or of industrial handling.

Electromechanical maintenance officer:
He is an operator whose professional profile, as well as including the typical characteristics of the electrical maintenance officer, also combines and synthesizes the competence and abilities required of the mechanical maintenance officer.



Mechanical technician

- **Typical maintenance activities:**

  - mechanical adjustments of the safety devices, calibrations and tests (annual load test)
  - normal maintenance work after substitution of complex and/or critical mechanical componentry in order to maintain safety levels (fixing components, arm, reducers, motors, etc.)
  - repair of mechanical units after extra maintenance work has been carried out (structural repairs requiring soldering, mechanical work on board of the crane, etc.)

- **Technical knowledge required:**

  - knowledge of industrial mechanical lifting and handling systems with proof of specific training
  - specific knowledge of safety devices used on the hoist (limit switches, brakes, overload switch, etc.)
  - basic knowledge of techniques for electric checking and adjustment (motor test)
  - specific competence about the methods of measurement and testing to determine the actual state of the conditions of the crane and the hoist (test of: brakes, push-button panel, control console, limit switch etc.)
  - specific competence of logical trouble-shooting methods in case of breakdown and evaluation of the results
  - ability to direct the necessary measures to put the jib crane back into working order
  - ability to write a maintenance intervention report

- **Qualification required:**

  - Complete training as industrial mechanical technician and specific competence in lifting and handling systems.

Electrical technicians

- **Typical maintenance activities:**

  - electrical adjustment of safety devices, calibrations, and tests (annual load test)
  - normal maintenance work after substitution of complex and/or critical electrical componentry in order to maintain safety levels (lifting limit switch, motors, B.T. switchboard)
  - repair of electrical units after extra maintenance work has been carried out (repair of the electric motors with partial replacement, replacement of limit switches with variation in position, etc.)

- **Technical knowledge required:**

  - very good knowledge of electrical systems and installations on industrial lifting and handling equipment
  - specific knowledge of the electrical componentry and of the safety devices used in the hoist (limit switches, brakes, overload switch, etc.)
  - experience of the techniques used in electrical checks and adjustments (ability to alter the original diagrams to make improvements on: limit switches, push-button panel, control consoles, cables, etc.)
  - knowledge of the techniques for mechanical checks and adjustments (wear testing, test performance of mechanical components, adjustment of mechanical stops, test noise level, etc.)
  - specific competence in the methods of measurement and testing to determine the actual state of the conditions of the hoist (tests of the efficiency and reliability of the electrical equipment)
  - specific competence in trouble-shooting methods in all types of breakdown and evaluation of the results on the command and control electrical equipment of lifting machines
  - capacity to manage the measures necessary to put the jib crane and the hoist back into action and performance
  - ability to write a maintenance intervention report

- **Qualification required:**

  - Complete training of an industrial electrical technician having a specialisation in and specific experience of electrical apparatus of lifting and handling systems.

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

Special recommendations regarding maintenance:

1. If performed correctly maintenance work guarantees the safety of jib crane operators and reduces downtime to a minimum after a breakdown.
2. Repairs carried out opportunely prevent further deterioration of the crane and its components.
3. Use original spare parts and products.
4. To prepare the crane for maintenance work the following rules must be followed:

   - The staff appointed to do the ordinary or extraordinary maintenance work must have read and understood well all the instructions contained in this chapter and in chapter 3.
   - Extraordinary maintenance work must only be carried out by authorised, qualified staff, trained for the job.

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

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

6.3 Maintenance plan

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

- ***As maintenance work can be carried out at a dangerous height, staff must have appropriate means of support (scaffolding, platform, ladders etc.) which allows the work to be performed in safe conditions.***
- ***Staff must also have suitable personal protection devices (PPD) as set out by legislation in force.***

6.3.1 Daily and periodical maintenance

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

Maintenance operations are divided into:

Daily intervention to be performed by the crane operator:

- *general visual check*
- *functional checks: motors, limit switches, clutch device, empty test runs, push-button tests of "stopping" and of the other functions of the push-button panel*
- *check of the state of the chain and hook*
- *check the correct rotation of the crane arm*

Monthly intervention to be performed by qualified staff:

- *Visual check of every gear and for possible lubricant leakage*
- *Function check of the break at full load*
- *Check that anomalous noise and/or vibration are not present*
- *See to the lubrication of the gears and limit switches to guarantee normal functioning and to limit wear*
- *Check the functionality and integrity of the push-button panel and relative cable*

Quarterly checks to be performed by qualified staff:

- *Check efficiency and wear on: hook, chain and chain guide bar.*
- *Check wear on and hook block/underblock*
- *Check wear of wheels, sprocket wheels, guide rollers of the trolley*
- *Verify efficiency and functionality of overload switch*
- *Visual check inside switchboard for the presence of dust*
- *Check and cleaning of oxidised contacts and of any connectors outlets/plugs*
- *Check of lubrication of mobile trolley of any festooned cable and cable check*
- *Check efficiency and integrity of electricity supply line and its components*
- *Loaded check of motors and brakes and verify level of wear*
- *Check of efficiency and conservation of the structure (paintwork, corrosion, etc.)*

6.3.2 Frequency and deadlines for maintenance work

The periodicity of the following operations is for jib cranes used in normal working conditions and is valid up to the M5 group (ISO norm 4301/86) or 2 m (FEM rule 9.511).
If the jib crane is used normally and correctly for a daily 8 hour shift, overhaul can take place after a period of about 10 years (FEM rule 9.755 – S.W.P.). If used during a number of shifts then the maintenance periods must be reduced proportionately.

Table of periodic checks and maintenance

Object of the check	Periodic checks				Page
	Daily	Monthly	Quarterly	Annually	
Checks Inspections - Testing	General visual checks. Verify good functioning	General visual inspections	Wear check	Annual test	32
Signs pictograms warning signs and plates	Legibility of signs and pictograms, warning signs and plates	Visual inspections of wholeness and clening of plates and signs	Check suitability		18
Structural elements Welding Pivots Bolted couplings				Wear and efficiency check Check bolted and soldered joints	52
Chain Securing elements	Visual inspection		Wear and efficiency check		Hoist manual
Lifting hook	Visual inspection and check safety latch		Wear and efficiency check		Hoist manual
Load whorl Chain guide Transmission of the hook block			Check wear and efficiency		Hoist manual
Lifting reducer Translation reducer		Noise check			Hoist manual
Lifting motor Translation motor	Check correct functioning		Loaded testing		Hoist manual
Lifting brake Translation brake Rotation brake	Check correct functioning	Loaded testing of braking distances	Loaded testing Wear check		Hoist manual and page 54
Wheels and sprockets Rotation bearings			Wear check		Hoist manual and page 53
Trolley buffers anti-collision lug	Visual check			Wear and efficiency check	Hoist manual and page 53
Electrical system Push-button panel and cable	Check correct functioning	Visual inspection for external breakage push-button panel/ cable	Wear and efficiency check		Hoist manual and page 54
Overload switch Clutch device			Loaded testing	Calibration check	Hoist manual
Lifting limit switch Translation limit switch	Check correct functioning		Loaded testing Wear and efficiency check		Hoist manual
Cleaning and lubrication	Check correct state of cleanliness and lubrication	Inspection of general lubrication	Leakage check Lubricate chain, hook and mechanisms		Hoist manual and page 55

6.3.3 Check of efficiency of parts and components

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

Annual check of the efficiency of structural elements, welding, pivots and bolted couplings (fig. 79):

- The metal structures of the jib crane, as well as normal alterations due to environmental factors and wear of mobile parts (hinges), can be subject, even inadvertently or during handling operations, to bumps, contact or grazing with other equipment or to anomalous strain which can cause damage to the frames, welding and pivots. Therefore, after careful cleaning, the structures must periodically undergo scrupulous checks to ensure their suitability and if necessary, any damage be remedied.
- The brackets, composed of plates and pivot, which form hinged elements, are subject to wear as they are mobile, swinging elements exposed to sliding friction in the areas of contact. If excessive wear is found, substitute them during the check.
- All screw bolts, high resistance plugs and pins must be disassembled and carefully checked annually, and so must the relative seatings.
- Check the clamping couple of the fixing bolts of the column and the bracket, according to the given couples (see tables on page 12).

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

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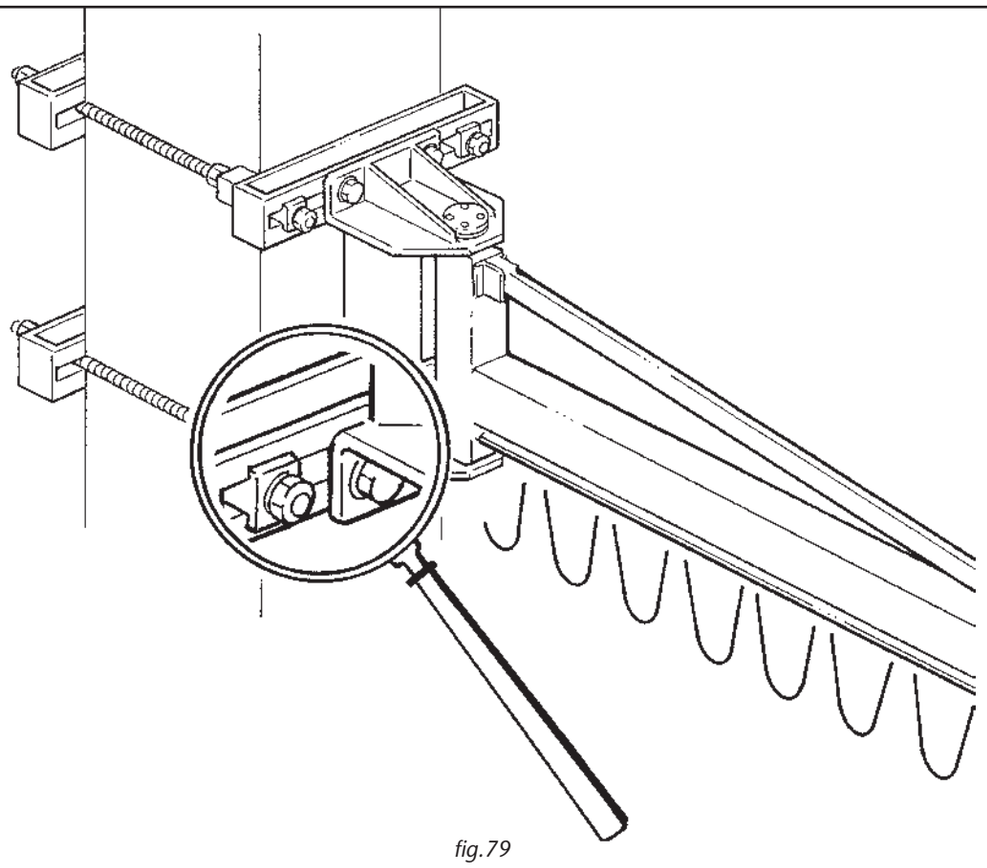

fig.79

Quarterly check of the efficiency of the wheels and the guide rollers of the "channel" trolleys *(fig. 80):*

- Check the wear of the rollingbands of wheels and guide rollers.
- Check the ball bearings which must be substituted in case of extreme noise or extreme friction, "stick-slip-motion", difficult and/or irregular rotation.

Replace wheels and/or guide rollers of the "channel" trolley if:
- ***The rolling diameter of the wheel shows a wear equal to or greater than 5 mm***
- ***The rolling diameter of the guide roller shows a wear equal to or greater than 2 mm***
- ***If it is necessary to replace even one wheel only, it is recommended to replace all trolley wheels in order to guarantee the best performance and life.***

Annual check of the efficiency of the trolley buffers *(fig. 81):*

- Check that the end stops are not deformed and that there are no signs of sagging in their fixing to the structures and that the buffer is intact and fixed well to its support.

Replace the buffers when there are:
- ***signs of breaking or permanent deformation, cuts, abrasion, incisions***

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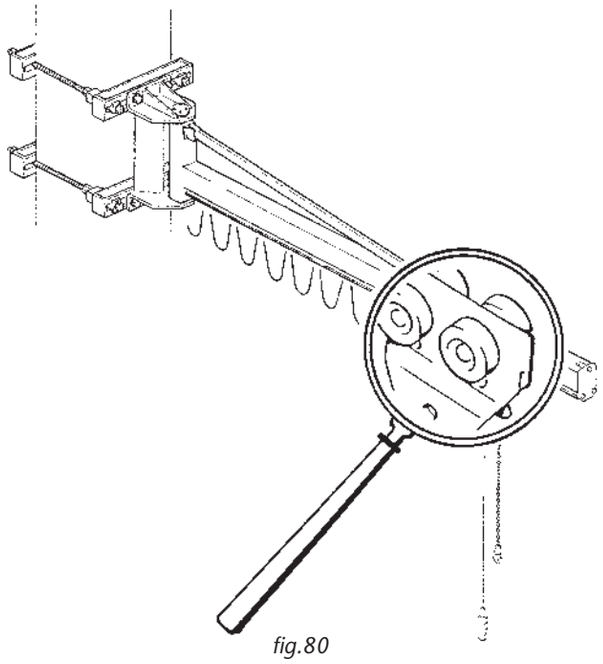

fig.80

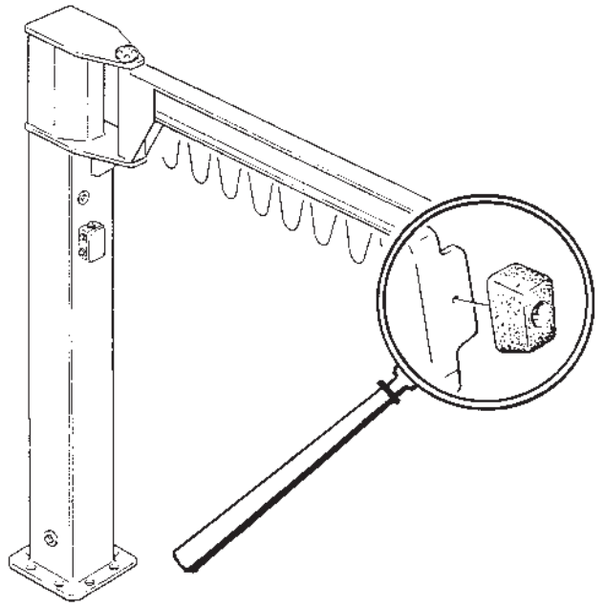

fig.81

Quarterly check of the efficiency of the brake of the rotation arm of the crane:

- Check the stability of the arm when empty and when fully loaded, at the end points and intermediate points of rotation; then checking that the arm, in any point of the rotation, keeps its position with moving spontaneously.
- When necessary have the brake of the crane adjusted, as described in paragraph 6.4.1 "Adjustment of the rotation brake of the crane arm", on page 56.

- *Replace the clutch plates of the brake when there is instability of the arm after adjusting the brake.*

IN CASE OF ANOMALIES:

- *It is forbidden to carry out corrective maintenance work on the brake of the rotation arm of the jib crane.*
- *Any operation, outside normal maintenance, on the brake of the rotation arm of the crane can be done by the assistance service of DONATI SOLLEVAMENTI S.r.l. or by staff authorized by them.*

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Quarterly check of the efficiency of the electric power supply:

- Check the efficiency of the festooned power cable, check there is no peeling, cuts, lacerations or other changes in the protection sheath.
- Check the seal of the protectors, the power cable, their clamps (in the connector block) and, if necessary, tighten them correctly.
- Check the efficiency of the conductors and the grounding connections, carrying out a check, and, if necessary, fixing all the grounding screws.
- Carry out a check of all the weather strips of the covers and the cable clamps.
- Check there are warning plates and that they are visible.

- *Do not hesitate to replace the electrical component, if it is no longer giving sufficient guarantee of functional reliability*
- *Never carry out improvised repairs*
- *Use original spare parts*

For information about checks of all the structural, mechanical and electromechanical components of teh lifting and translation units of the jib crane, see the relevant documentation included in this technical publication

- *Don't hesitate to replace the part and /or the component in question, when it no longer gives sufficient guarantee of safety and/or functional reliability.*
- *Never carry out improvised repairs!*

6.3.4 Cleaning and lubrication of the jib crane

- ***Cleaning can be carried out by staff who are not highly specialised.***
- ***It is necessary to keep clean the following elements at regular intervals:***
  - ***structure of the jib crane*** *(column, bracket, arm, etc.)*
  - ***mechanisms of the jib crane (pivots, braking device)***
  - ***electric parts of the jib crane*** *(festooned cable, sleds, etc.)*
  - ***components of the lifting unit and the translation unit*** *(wheels, chain, hook, hook block, push-button panel, etc.)*
- ***Cleaning at a height must be carried out by qualified staff equipped with suitable means and personal protection measures.***
- ***These operations are necessary every three months to allow the performing of the periodical checks.***

- Cleaning can be simply done using means, equipment, and detergents and solvents commonly used in general cleaning operations of industrial equipment as there are no particular controindications regarding the use of products or materials.
- Clean away any foreign fouling substances with aspirators, absorbent cloths, etc.
- Dry the grease and/or oil in excess on the parts.

The careful lubrication of the mechanism of the jib crane is necessary to guarantee the efficient service the hoist is intended for, as well as its duration.

- Over time the lubricating power is diminished due to the load stress, therefore proceed to the adjustment or renewal of the lubricants.
- The lubrication of the jib crane is very easy: apply a light amount of oil or grease, between the bearings and pivots, in the rotation points of the arm.
- It is very important to lubricate the lifting and translation mechanisms and the lubrication cycles for them are contained in the relevant technical publications included with this one.

- ***Lubricants, solvents and detergents are products which are toxic or damaging to health***
- ***If they come into direct contact with the skin they can cause irritation***
- ***If inhaled they can cause serious poisoning***
- ***If swallowed they can cause death***
- ***Use them with care using adequate personal protection measures (DPI)***
  Do not dump them, dispose of them in conformity with the legislative measures currently in force for toxic/harmful waste.

6.4 Adjusting and regulating

6.4.1 Adjusting the rotation brake of the crane arm

REMAINING RISKS ON THE CRANE DURING THE ADJUSTMENT OF THE BRAKE

DANGER / RISK	BAN / WARNING	OBLIGATION / PREVENTION
		
Risk of crushing in case of contact with the rotation arm when adjustments of the brake are being made.	**Warning!** Exposure to moving parts can cause danger.	• Adjustments of the brake must be carried out by qualified maintenance staff. • Use of protective gloves and, if necessary, safety harnesses.

- ***The brake of the jib crane must be adjusted so as to guarantee the stability of the arm in any of its positions with a maximum load.***
- ***The braking is mechanical and is ensured by two pushed clutch plates, which with adjusting screws work on a pressure plate, in contact with the rotation tube of the arm.***
- ***The clutch plates, which are asbestos-free, are subject to wear in relation to the intensity of service and when, after a period of use, there is a tendency of the arm to take up preferred positions putting itself in different positions to those required when the rotation action has not happened, adjustment must be made.***

To adjust the brake of the arm of the jib crane proceed as follows:

WARNING! When this operation is carried out at a height, on a scaffolding or other mobile equipment, the use of safety harnesses is obligatory.

1. Regulate the slidability of the rotation of the arm, using the braking system by means of the adjusster screws **1**, until you obtain the required flexing sensitivity (fig. 82).
2. Carry out the check of planarity of the arm with the help of a level. Carry out such a check rotating the arm by 90° to the left and to the right (fig. 83).

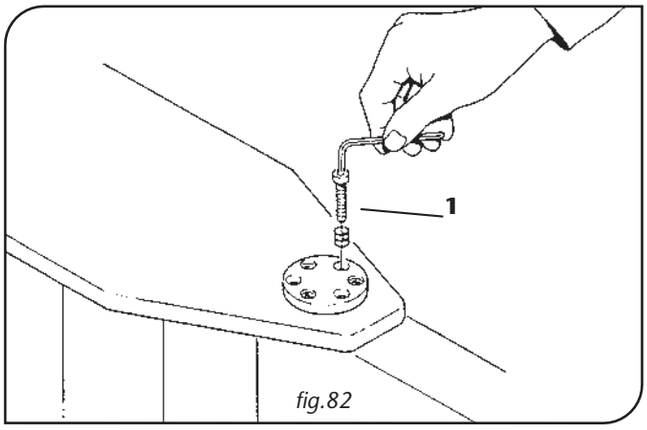


fig.82

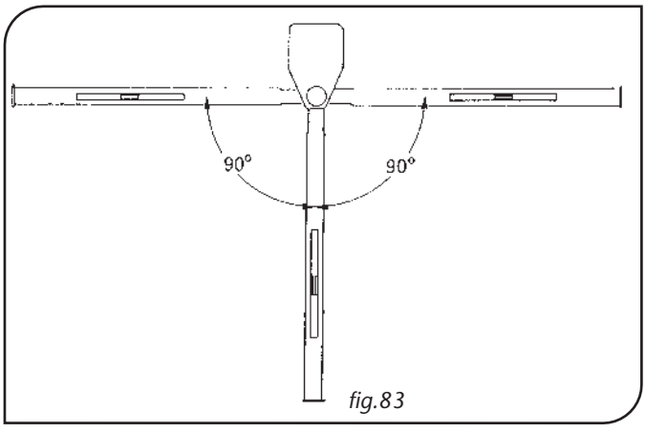


fig.83

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

6.5 Breakdowns and solutions

6.5.1 Main types of failure or breakdowns and possible solutions

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

Type of failure	Possible causes of breakdown	Possible solution
Rotation is blocked	• a foreign body has entered the rotation • seizure of the bearings	• remove the foreign body • replace the bearings
Difficult rotation	• scant lubrication of the bearings	• lubricate
Instability of the positioning of the arm	• excessive leaning of the rotation axis	• check the verticality of the crane and the clamping of the fixing system.

6.5.2 Authorised staff for intervention in case of breakdown

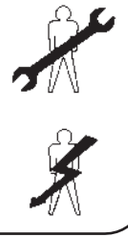
The staff authorised to intervene in most cases of breakdown, or where not indicated differently, are expert maintenance people or trained with a specific preparation on mechanical and electrical parts. Where shown, however, the intervention of specialised suitably-trained staff or the technical staff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

6.5.3 Putting out of service

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

6.6 Dismantling, disposal and scrapping

If the jib crane or its components, whether broken, worn out or at the end of their designated life, should no longer be usable nor repairable their demolition must be carried out.



- The demolitiion of the jib crane must be carried out using suitable equipment chosen according to the nature of the material on which to intervene (e.g.: shears, oxyhydrogen flame, saw, etc...)
- All the components must be dismantled and scrapped having been reduced to small pieces so that none of them can reasonably be used again.
- When the jib crane is scrapped their parts must be disposed of taking into account the different nature of them (metals, oils and lubricants, plastic, rubber, etc.) using possibly specialised companies and in any case according to what the relevant law requires regarding solid industrial waste.

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

7. - SPARE PARTS

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

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

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

DONATI SOLLEVAMENTI S.r.l.
Via Quasimodo, 17 - 20025 Legnano (Milano) - Italy
Tel. +39 0331 14811 - Fax +39 0331 1481880
E-mail: info@donaticranes.com - www.donaticranes.com

The use of non-origianl spare parts, as well as cancelling the warranty, can threaten the good functionings of the jib crane and/or related trolleys.

8. - WEIGHTS OF BRACKETS – ARMS - COLUMNS

C "Channel" Version

Code type	Bw	Aw	Code type	Cw	Aw
C01A20	15	33	**C30R20**	68	33
C01B20	15	33	**C30S20**	90	33
C02C20	30	45	**C35T20**	155	45
C02D20	30	63	**C35U20**	204	63
C01A30	15	46	**C30R30**	68	46
C01B30	15	46	**C30S30**	90	46
C02C30	30	60	**C35T30**	155	60
C02D30	30	133	**C35U30**	204	133
C01A40	15	59	**C30R40**	68	59
C01B40	15	59	**C30S40**	90	59
C02C40	30	75	**C35T40**	155	75
C02D40	30	83	**C35U40**	204	83
C03E40	50	162	**C40V40**	347	162
C01A50	15	72	**C30R50**	68	72
C01B50	15	72	**C30S50**	90	72
C02C50	30	90	**C35T50**	155	90
C02D50	30	99	**C35U50**	204	99
C03E50	50	191	**C40V50**	347	191
C01B60	15	85	**C30S60**	90	85
C02C60	30	105	**C35T60**	155	105
C02D60	30	172	**C35U60**	204	172
C03E60	50	220	**C40V60**	347	220
C03F60	50	248	**C40Z60**	432	248
C01B70	15	98	**C30S70**	90	98
C02C70	30	120	**C35T70**	155	120
C02D70	30	198	**C35U70**	204	198
C03E70	50	250	**C40V70**	347	250
C03F70	50	281	**C40Z70**	432	281

T "Cantilever" Version

Code type	Bw	Aw	Code type	Cw	Aw
T01A20	15	48	**T30R20**	68	48
T01B20	15	66	**T30S20**	90	66
T02C20	30	104	**T35T20**	155	104
T02D20	30	142	**T35U20**	204	142
T03E20	50	217	**T40V20**	347	217
T01A30	15	64	**T30R30**	68	64
T01B30	15	88	**T30S30**	90	88
T02C30	30	135	**T35T30**	155	135
T02D30	30	184	**T35U30**	204	184
T03E30	50	274	**T40V30**	347	274
T01A40	15	80	**T30R40**	68	80
T01B40	15	110	**T30S40**	90	110
T02C40	30	165	**T35T40**	155	165
T02D40	30	226	**T35U40**	204	226
T03E40	50	331	**T40V40**	347	331
T03F40	50	348	**T40Z40**	432	348
T01A50	15	96	**T30R50**	68	96
T01B50	15	132	**T30S50**	90	132
T02C50	30	196	**T35T50**	155	196
T02D50	30	268	**T35U50**	204	268
T03E50	50	388	**T40V50**	347	388
T03F50	50	485	-	-	-
T02D62	30	310	-	-	-
T03E62	50	358	**T40V62**	347	358
T03E65	50	432	**T40V65**	347	432
-	-	-	**T40Z62**	432	432
T03F65	50	480	**T40Z65**	432	480
T03F67	50	560	-	-	-
T03E72	50	505	**T40V72**	347	505
T03E75	50	546	**T40V75**	347	546
-	-	-	**T40Z72**	432	546
T03F75	50	638	-	-	-

H "Staybolted" Version

Code type	Bw	Aw	Code type	Cw	Aw
H02C40	30	92	**H35T40**	155	92
H02D40	30	119	**H35U40**	204	119
H03E40	50	150	**H40V40**	347	150
H03F40	50	183	**H40Z40**	432	183
H02C50	30	111	**H35T50**	155	111
H02D50	30	145	**H35U50**	204	145
H03E50	50	181	**H40V50**	347	181
H03F50	50	222	**H40Z50**	432	222
H02C60	30	130	**H35T60**	155	130
H02D60	30	170	**H35U60**	204	170
H03E60	50	212	**H40V60**	347	212
H03F60	50	262	**H40Z60**	432	262
H03F67	50	262	**H40Z67**	432	262
H02C70	30	150	**H35T70**	155	150
H02D70	30	196	**H35U70**	204	196
H03E70	50	243	**H40V70**	347	243
H03F70	50	301	**H40Z70**	432	301
H02D80	30	221	**H35U80**	204	221
H03E80	30	273	**H40V80**	347	273
H03F80	50	339	**H40Z80**	432	339
H03F85	50	380	**H40Z85**	432	380

Bw = bracket weight (kg)
Aw = arm weight (kg)
Cw = column weight (kg)

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