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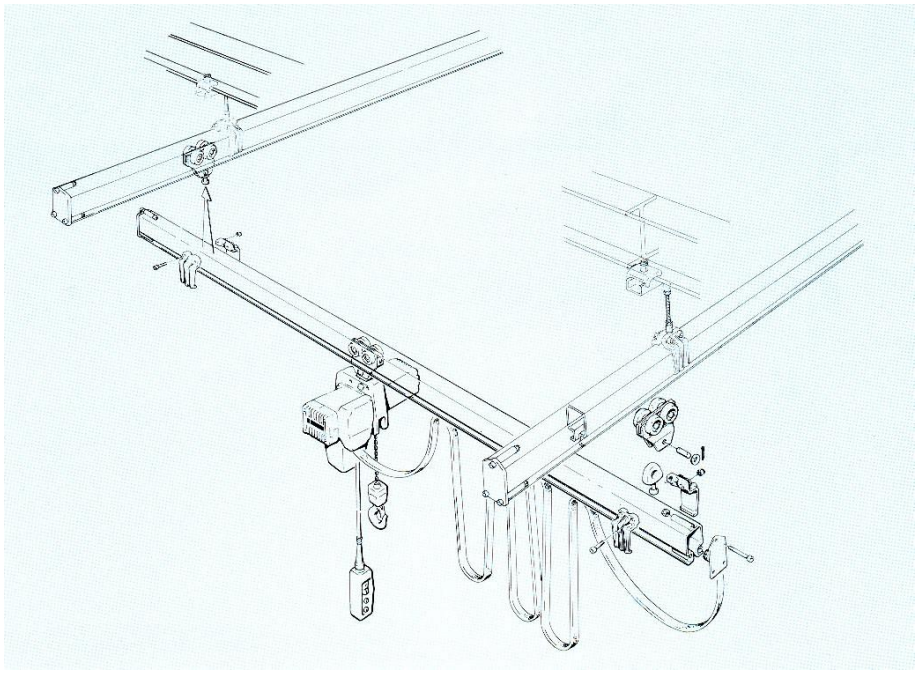
MANUAL TRAVEL SUSPENDED SYSTEMS

WITH CHANNEL PROFILES - DSC SERIES

- **SINGLE BEAM BRIDGE CRANE**
- **DOUBLE BEAM BRIDGE CRANE**



- INSTRUCTIONS

INSTALLATION - USE - MAINTENANCE

CE

KMAN11MG00

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1. - PRELIMINARY INFORMATION

1.1 Manual contents and recipients

§ This technical publication, marked with the code **KMAN11MG00**, refers to the "**Manual travel suspended type single or double beam bridge crane with channel profiles - DSC series"**, manufactured and sold by the company:

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§ It is related to their "intended use", their functional technical specifications and performance and the relative installation, use and maintenance instructions. It is addressed to:

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

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

1.2 Symbols: meaning and use

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

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

1.3 Collaboration with the user

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

1.4 Compliance with standards

§ The bridge cranes with channel profiles are designed and built in consideration of the **"Essential Safety Requirements"** of **Annex 1 of the EU Directive 2006/42/EC called the Machinery Directive**, transposed into Italian law with **D.Lgs.N.17/2010** and put on the market **with the CE mark** and **EC Declaration of Conformity - Annex IIA.**

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 of the CE Declaration of Conformity IIA

§ In addition the DSC series bridge cranes with channel profiles are in compliance with the following directives:

- **Low Voltage Directive 2014/35/UE.**
- **Electromagnetic compatibility directive 2004/30/UE.**

1.5.1 Manufacturer's liability

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

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

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

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

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

2. - DESCRIPTION OF THE MACHINE AND TECHNICAL INFORMATION

2.1 Suspended type bridge cranes with channel profiles

2.1.1 Intended use - Expected use - Intended purpose

§ The suspended type bridge cranes with channel profiles, in single or double beam version, are built to handle goods within a plant or work site. The crane lifts the load vertically in space, via hook on the lifting unit (electrical chain or manual hoist) and using accessories suitable for this operation.
§ The load can be pushed manually along the bridge traverse and longitudinal axes, using the hoist holder and bridge holder trolleys which can move within the special channel profile.
§ Bridge cranes move manually suspended on runways, they are also made with beams with a special channel profile, positioned at a height above the ground which thus remains completely free and available for production activities. The runways are generally hung on weight-bearing structures, with suspensions with adjustable staybolt and crossbeam with clamps (fig. 1).

Legend:

1. crossbeam/s weight-bearing structure/s of the bridge with channel profiles
2. hoist holder traverse unit
   2A push trolley with channels for single beam bridge
   2B push trolley with channels for double beam bridge
   extremity covers with stop-travel and field limit buffer
3. bridge movement unit (push trolley with channels)
   suspension brackets
4. suspension for bridge/s beams/s with ball joint with spacer
   eyebolts for two beam bridge

SA runway with channel profiles
9. connection piping
10. reciprocal anti-collision
11. runway suspension with threaded hole ball joint
12. threaded staybolt
13. fixing beam with clamps
14. lifting unit (electrical chain or manual hoist)
15. electric systems with festoons (if equipped with electrical

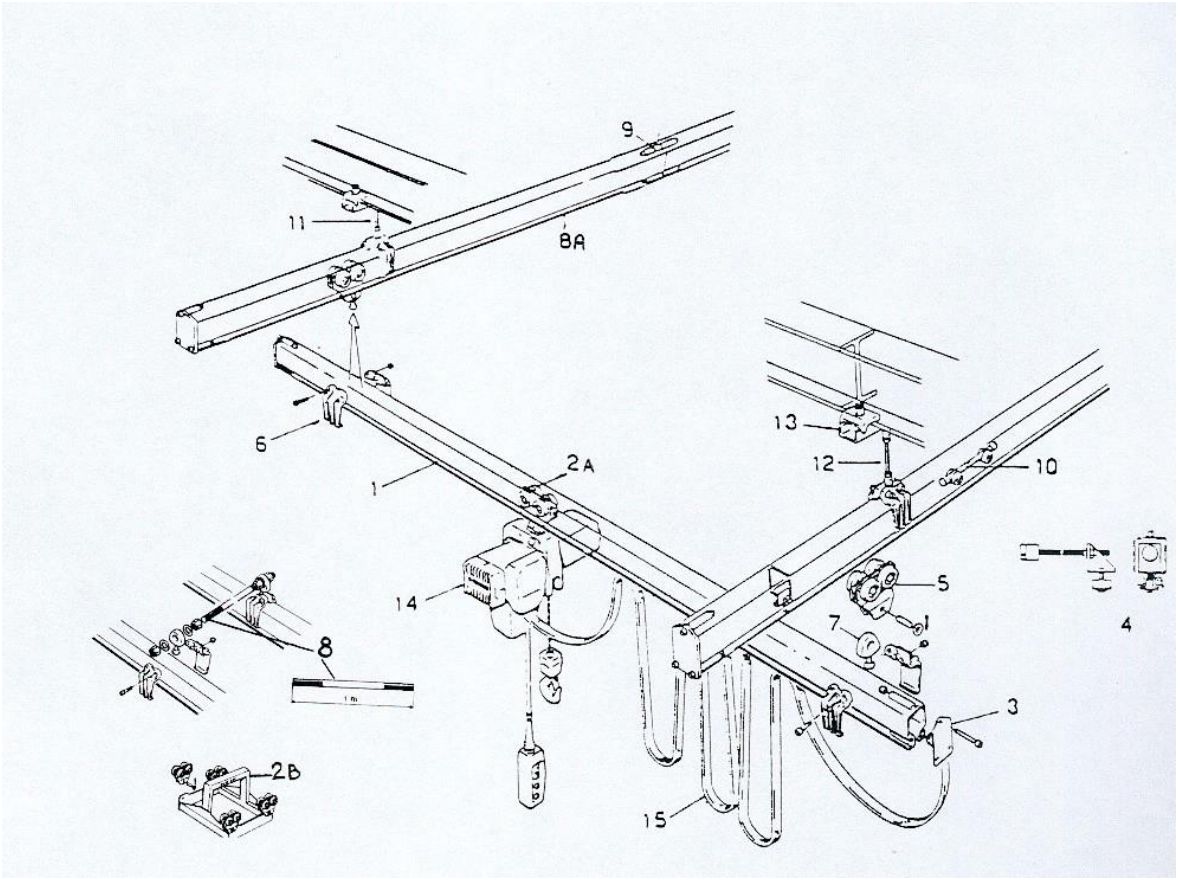


fig.1

2.1.2 Installation restrictions

§ The bridge cranes with channel profiles and related runways are set up for being attached, generally with swaying suspensions that avoid hyperstatic nodes, to an existing structure (pillars, walls, ceilings, weight-bearing beams, trusses, machine bodies, etc.) with a system of brackets and staybolts or with set screws, or, subject to testing, expansion bolts or chemical anchoring.

⚠	**The customer is responsible for verifying, directly or through personnel specifically professionally training, the suitability and adequacy of the weight-bearing structures, as well as the relative anchoring surface of the suspensions, which must ensure the stability and safety of the crane in all operating conditions, withstanding any resulting stress and dynamic effects.**

2.1.3 Composition of the bridge cranes with channel profiles

§ Bridge cranes with channel profiles are mainly used to handle loads of a moderate entity, max. 1000 kg., since they are moved manually without excessive force, generally using an electrical chain hoist as the lifting unit.
The hoist is suspended on the hoist holder trolley which moves inside the beams in the bridge channel.
§ The modular composition, through a limited number of parts used to create the composition of the bridge crane with channel profiles, due to its simplicity makes it possible for any installer, including non professional, to assemble multiple lifting system configurations on their own, easily and safely that are included in the following use limits:

- **suspended cranes for capacities from 125 to 1000 kg, with centre to centre distance up to 7 m between suspensions and spans.**

§ These elements make up the base of a modular handling system that is easy to compose and quick to assemble.. The installation operations and reconfiguration with any addition of additional parts and/or transfer of installed systems is performed by following the instructions contained in this manual and only acting on the bolted connections, thus excluding any welding operations.
§ The composition of the bridge crane with channel profiles is extremely simple since it is possible to identify the structure composed of the weight-bearing beam/s, lifting unit (generally an electrical chain hoist), the traverse and travel units formed by hoist holder and bridge holder trolleys and a series of accessories (support brackets, staybolts, electrical system, etc.).
§ The construction of the bridge crane with channel profiles uses the most evolved technology based on high industrialisation production processes and allows the creation of completely reliable and technically innovative machines through economies of scale. The high quality level is guaranteed and controlled by the company quality system certified based on the standard EN ISO 9001: 2000.

§ Structure and modular components: - ref. from -1- to -15- (fig.1)

- The structure of bridge cranes with channel profiles is composed of one (for a single beam crane) or two (for a double beam crane) main weight bearing beam/s -**1**-, built with the use of special press-forged or rolled steel sheet.
- Based on the capacity and the span of the crane to build, there are two construction sizes (P-G) of the channel profile and the size (G) can also be built in a reinforced model (GR). They are available in lengths and sectioning (from 2 to 7 m).
- The technical-dimensional specifications of the various parts with channels, for the P-G-GR types of profiles see (fig. 2), are shown in paragraph 2.2 “Technical specifications”.
- The traverse unit composed of trolley, pushed in the channel, hoist holder -**2**- (-**2a**- single beam trolley; -**2b**- double beam trolley) moves inside the channel on the lower flanges on the profile.
- Extremity covers -**3**- equipped with rubber buffers with high absorption capacity are positioned at the end of the weight-bearing beam/s with high resistance bolted connections. They act as limits for the hoist holder trolley. If an electrical hoist is used, powered by a cable with festoons between the beam channel profile, it is necessary to use the stop-limit and field switch -**4**- when the excessive accumulation of sliders or cable holder trolleys at the end of the beam make it opportune.
- The beam/s are connected and suspended to the travel unit composed of bridge holder trolleys -**5**-, using specific suspension brackets -**6**- equipped with ball joint suspension with eyebolt **-7-** and anchored to each other with high resistance bolts.

- For the crane with channel profiles, double beam version, the 2 beams of the bridge -**1**- are connected to each other with specific spacers -**8**- that define the centre to centre distance of the double beam trolley -**2b**- span
- The runways -**8A**- are in turn composed of the same type of channel profile that compose the weight-bearing beam of the bridge and are selected based on the forces due to the loads to handle and the pitch of the suspensions.
- The head connections necessary to provide an adequate and secure contiguity to the bars of the various sections of the channel parts composing the runways, are built with high resistance bolted connections connected to each other with connecting pipes -9- specifically welded to the end of the same profiles.
- The welded pipes -**9**- also act as connecting parts for the extremity cover with buffer -**3**- as in the case of the bridge beam and are positioned on the terminal ends of the channel profiles composing the runways.
- To limit or split any use or influence areas of one or more bridge cranes with channel profiles, along the runway, the travel and field limiter stop -**4**- can be used which is fixed to the channel of the runways by screws and safety nuts.
- When more than one bridge crane can operate on the same runway, an anti-collision system -**10**- needs to be installed, reciprocally, between one crane and the next to prevent hazardous situations from being generated for exposed persons caused by the cranes or their transported loads colliding during travel. The length of the anti-collision reciprocal devices -**10**- must be set up based on the volume of the transported masses and the distance that must be set for the bridge travel trolleys. Thus in relation to the runway and the relative suspensions and based on the concentration of reactions on the trolley wheels acting on the runways.
- The runway suspensions are built using the same brackets .**6**- that are used to suspend the crane beam, while the ball joints with threaded hole -**11**- are used for the swaying connection, via the threaded staybolt -**12**- and possible planarity regulator, between the runway suspension bracket and the beam with fixing clamps -**13**- to the support structure.
- Top quality steel is used to build the structures in order to ensure excellent safety and operating reliability conditions for the entire lifting system.

§ Paint and surface treatments:

- All of the parts that compose the metallic structure of the bridge crane and the runways undergo a metallic sandblasting treatment with SA grade, to eliminate any traces of oxidation and a chemical degreasing of the surfaces. The subsequent painting cycle entails the application of a layer of rust proofing and a final coat of yellow rustproof enamel to protect the parts against inclement weather and abrasion.
- The suspension accessories and the parts machined by machine tool (brackets, staybolts, ball joint heads, etc.) are protected against inclement weather with a “yellow galvanising” anodising galvanising treatment and black paint.

§ Traverse and travel unit: -2- / -5-

- The traverse and travel unit are composed of push trolleys which can be single or double, combined with each other by a connection beam based on the cross section and the size of the profile with channels used as well as the expected capacity. Each push trolley per channel is equipped with four wheels in steel which turn on permanently greased ball bearings. The trolleys travel in the profile with channels on the its lower flanges and are equipped with specific guide rollers to avoid scraping contacts on the flaps of the beam slot and the trolley structure. The weight-bearing structure of the trolleys is built of press-forged steel sheet and includes the housing and relative holes to allow the swaying connection with the hoist eyebolt and/or bridge ball joint heads using a specific pin in carbon steel. The trolleys are equipped with stops that, placed against the rubber buffers of the covers and travel limiters, have the function of limiting traverse and longitudinal movements ensuring maximum operating safety.

§ Lifting unit: -14-

- The suspended type bridge crane with beam with channel profiles is generally equipped with an electrical chain hoist.

§ Electrical system: -15-

- The system is created to power the hoist that traverses with the trolley on the bridge beam and longitudinally travels on the bridge along the runways.
- The electrical system is built using a flame retardant type generally flat cable with festoons, sliding on specific trolleys or sliders that travel for the entire length of the bridge beam and when included, of the runways, inserted inside the channel profile or on a specific track.
- The power line of the runways, in some cases very long, plus the bridge crane mounted on the same line, etc. can be created as a busway-trolley with guide trolley with socket pulled directly by the bridge.
- A connector block is supplied to install on the end head of one of the two runways for connection between the power line from the line switch/circuit breaker set up by the user and the power festoon (or the "busway-trolley") of the runways. A second connector block for possible connection between the runway power line and the hoist power festoon on the bridge beam can be supplied upon request.

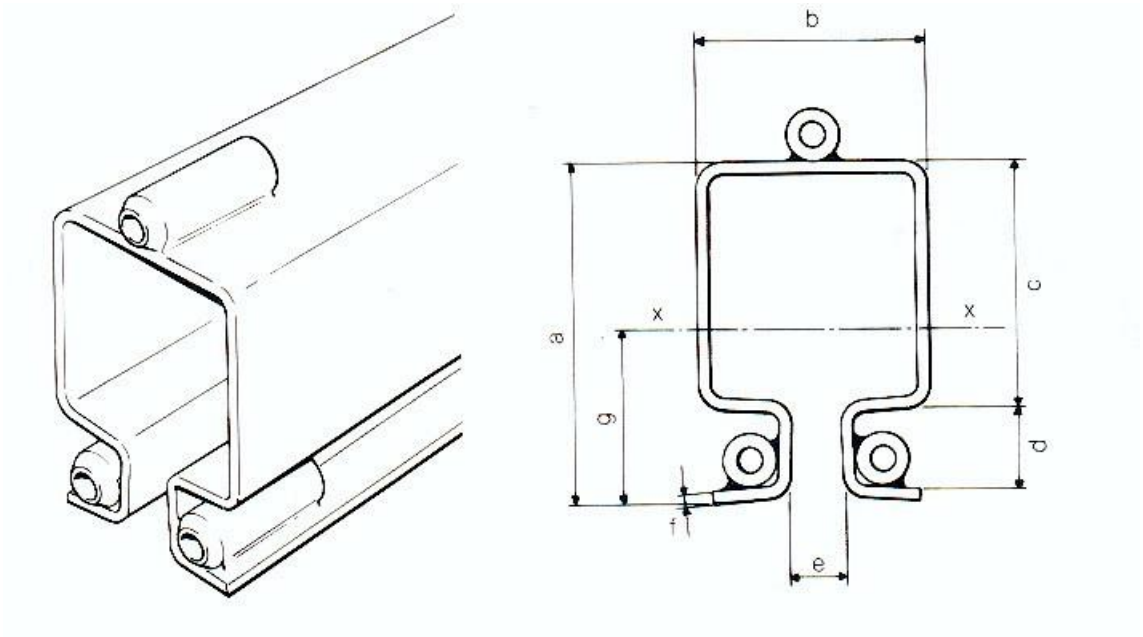


fig.2

Type	a	b	c	d	e	f	g	Weigh t kg	Wx min cm^3	Jx cm_4
P	110	76	81	25	16	4	55.8	11.5	38.5	214.7
G	167	100	132	30	25	5	84.5	20.5	101	864.2
GR	167	100	132	30	25	5	80.7	29.5	192	1551

2.2 Technical information and service conditions

2.2.1 Regulatory reference framework

§ In the designing and construction of the DSC series bridge cranes with channel profiles, the following standards and main technical rules have been taken into consideration:

- EN ISO 12100 : 2010 “Fundamental concepts, general design principles.”
- EN ISO 13849-1:2008 “Safety-related parts of control systems”
- EN-60204-32/2009 “Safety of machinery. Electrical equipment of machines. Requirements for hoisting machines”.
- EN-60529/97 “Degrees of protection provided by enclosures (IP Code)”
- ISO 4301-1/88 “Cranes and lifting appliances --. Classification”
- FEM 1.001/98 “Rules for the design of hoisting appliances”
- FEM 9.511/86 “Classification of mechanisms”
- FEM 9.755/93 “Measure for achieving safe working periods for motorised serial hoist units (S.W.P.)””

2.2.2 Protection and insulation of electrical parts

- Connector blocks: Protection IP55 - Maximum voltage insulation 500 V
- Cables: CEI 20/22 II - Maximum power insulation 450/750 V.

2.2.3 Electrical supply

- See the applied hoist.

2.2.4 Ambient use conditions

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

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

2.2.5 Noise - Vibrations

- The bridge cranes with channel profiles do not make significant noise during handling since they are moved manually.
- The vibrations produced by the bridge crane with channel profiles are of a minor amount and are not hazardous for the health of the personnel who operates it.
- Excessive noise or vibration may be caused by a fault which must be immediately reported and eliminated in order not to compromise the reliability of the bridge crane with channel profiles.

2.2.6 Use criteria and operating conditions

§ Use criteria:

One of the necessary conditions to obtain the complete operating compliance of the bridge crane with channel profiles, for the use it is intended for, as well as excellent and long-lasting operation of the same, consists of the correct selection of the machine model. This selection must be made based on the real service performance required as well as the ambient conditions where the crane will operate.
The parameters which must be carefully considered in the choice of crane with channel profiles are:

- **The capacity**: it must always be greater than the sum of the maximum load weights to lift and any lifting accessories (balances, pliers, suction cups, magnets, etc.).

- **The functional dimensions**: the above ground height of the trolley beam which determines the hook run of the hoist, the crane span, length of the runways and pitch of their suspensions, must be selected so as to guarantee the functional coverage of the area to be served in consideration of the surrounding encumbrances.

- **Nature of the load**: delicate or not determines by its positioning the choice of the most suitable lifting speed. In some cases it is indispensable to use hoists with two speeds with a slow positioning speed

- **Area of use**: the bridge crane with channel profiles, as a light standard produced crane with a limited structure is characterised, by its conception, by intrinsic high elasticity which becomes even more evident when it is used for handling loads close to the maximum lifting capacity and/or concentrated in the centre of the spans.

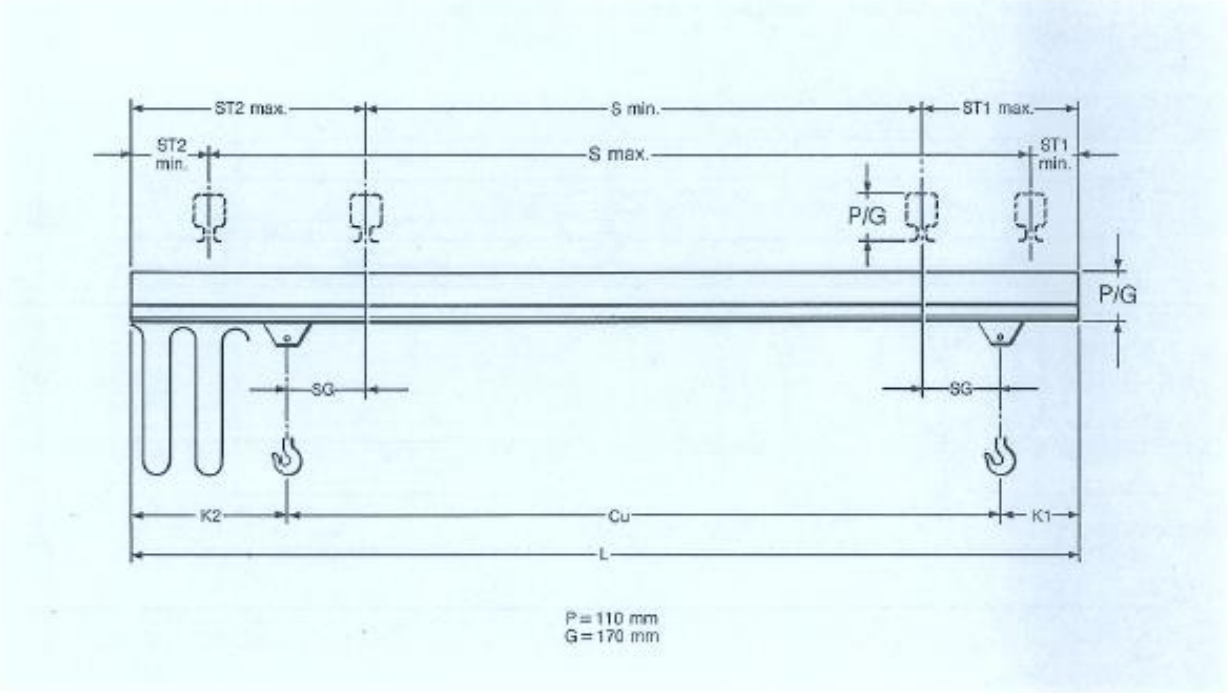
- **Area of use**: the bridge cranes with channel profiles are intended to be used inside and/or in a covered area, sheltered from bad weather and the wind. If they are used outdoors specific measures need to be taken adequate for the surface treatments (paint) as well as their “manuality” and stop against the wind effect.

- **Frequency of use**: if use is very high (frequent and/or repeated manoeuvres) with loads close to the maximum load or with use on very long runway sections, the consequent fatigue of the operator due to manual handling must be taken into consideration.

	**The correct evaluation of the parameters indicated above, may lead, if they are close the their limit values, to the need to use a crane with higher performance characteristics that, once declassed, may ensure greater rigidity and fewer traverse and travel forces.**

Technical characteristics and specifications - Overall dimensions - Weights

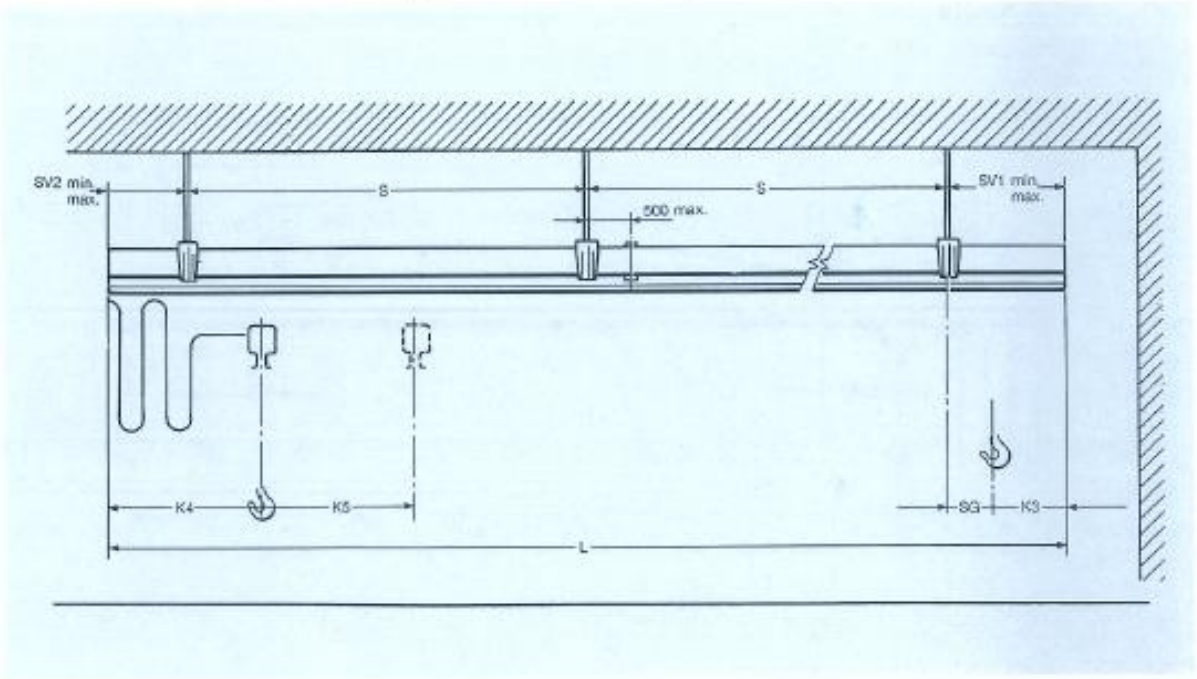
Channel profile system series DSC
Single beam bridge crane



Single beam bridge crane dimensions

Capacity	Beam length	Bridge beam profile	Hoist carrying trolley	Runway profile	Bridge carrying trolley	Bridge	Span mm S		Hook overhang mm SG	Bridge beam overhang mm ST1		ST2		Approach mm			Bridge weight
							Min.	Max.	Max.	Min.	Max.	Min.	Max.	K1	K2	Cu	
kg/daN	m	Type	Type	Type	Type	Type											kg/daN
125	3	P	CCP	P	CCP	M0103P	2400	2900	100	50	260	50	400	100	300	2600	50
				G	CCG	M0103G											
	4	P	CCP	P	CCP	M0104P	3090	3900	225	50	325	50	585	100	360	3540	60
				G	CCG	M0104G											
	5	P	CCP	P	CCP	M0105P	3660	4800	400	100	520	100	820	120	420	4460	120
				G	CCG	M0105G											
	6	G	CCG	P	CCP	M0106P	4290	5800	555	100	675	100	1035	120	480	5400	150
				G	CCG	M0106G											
	7	G	CCG	P	CCP	M0107P	4940	6800	700	100	820	100	1240	120	540	6340	180
				G	CCG	M0107G											
250	3	P	CCP	P	CCP	M0203P	2500	2900	50	50	150	50	350	100	300	2600	50
				G	CCG	M0203G											
	4	G	CCG	P	CCP	M0204P	3070	3800	225	100	345	100	585	120	360	3520	100
				G	CCG	M0204G											
	5	G	CCG	P	CCP	M0205P	3710	4800	375	50	495	100	795	120	420	4460	130
				G	CCG	M0205G											
	6	G	CCG	P	CCP/D	M0206P	4350	5800	525	100	645	100	1005	120	480	5410	160
				G	CCG	M0206G											
	7	GR	CCG	P	CCP/D	M0207P	4790	6800	775	100	895	100	1315	120	540	6340	240
				G	CCG	M0207G											
500	3	G	CCG	G	CCG	M0503G	2530	2800	25	100	145	100	325	120	300	2580	90
	4	G	CCG	G	CCG/D	M0504G	3220	3800	150	100	270	100	510	120	360	3520	120
	5	GR	CCG	G	CCG/D	M0505G	3860	4800	300	100	420	100	720	120	420	4460	180
	6	GR	CCG	G	CCG/D	M0506G	4500	5800	450	100	570	100	930	120	480	5400	220
	7	GR	CCG	G	CCG/D	M0507G	5140	6800	600	100	720	100	1140	120	540	6340	260
1000	3	G	CCG/D	G	CCG/D	M1003G	2200	2800	30	100	300	100	500	270	470	2260	110
	4	GR	CCG/D	G	CCG/D	M1004G	3080	3800	55	100	325	100	585	270	530	3200	160
	5	GR	CCG/D	G	CCG/D	M1005G	3880	4800	130	100	400	100	720	270	590	4140	200

Channel profile system series DSC
Single beam bridge crane



Runway dimensions for single beam bridge crane

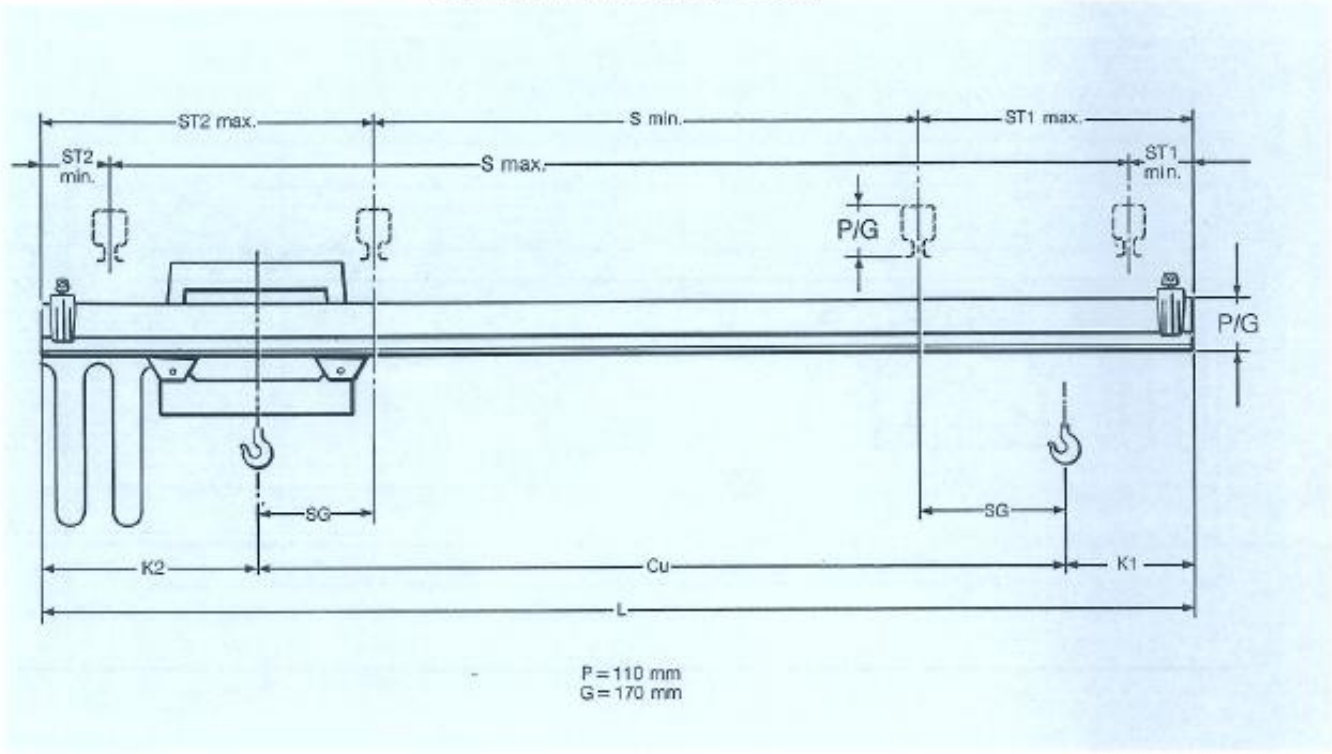
Capacity kg/daN	Interaxis S m	Runway profile Type	Hook overhang mm SG Max.	Runway profile overhang mm SV1 Min.	SV1 Max.	SV2 Min.	SV2 Max.	Approach mm K3	Eventual 2nd bridge K5
125	3	*CP	100	50	200	50	K4 + 100	100	
		CG	200	100	320	100	K4 + 200	120	500
	4	*CP	225	50	325	50	K4 + 225	100	
		CG	350	100	470	100	K4 + 350	120	500
	5	*CP	350	50	450	50	K4 + 350	100	
		CG	550	100	670	100	K4 + 550	120	500
	6	CG	800	100	920	100	K4 + 800	120	1000
	7	CG	1000	100	1120	100	K4 + 1000	120	1500
250	3	CP	50	50	150	50	K4 + 50	100	500
		CG	150	100	270	100	K4 + 150	120	500
	4	CG	250	100	370	100	K4 + 250	120	500
	5	CG	350	100	470	100	K4 + 350	120	500
	6	CG	500	100	620	100	K4 + 500	120	1000
	7	CGR	650	100	770	100	K4 + 650	120	2000
500	3	CG	80	100	330	100	K4 + 80	250	500
	4	CG	150	100	400	100	K4 + 150	250	1000
	5	CGR	200	100	450	100	K4 + 200	250	1500
	6	CGR	300	100	560	100	K4 + 300	250	2500
	7	CGR	400	100	660	100	K4 + 400	250	3500
1000	3	CG	40	100	290	100	K4 + 40	250	1000
	4	CGR	70	100	320	100	K4 + 70	250	1500
	5	CGR	100	100	350	100	K4 + 100	250	2500

* Values advised for a bridge

$K4 = \frac{L60}{1200}$ with festooned supply line

K4 = K3 with supply line in blindo trolley

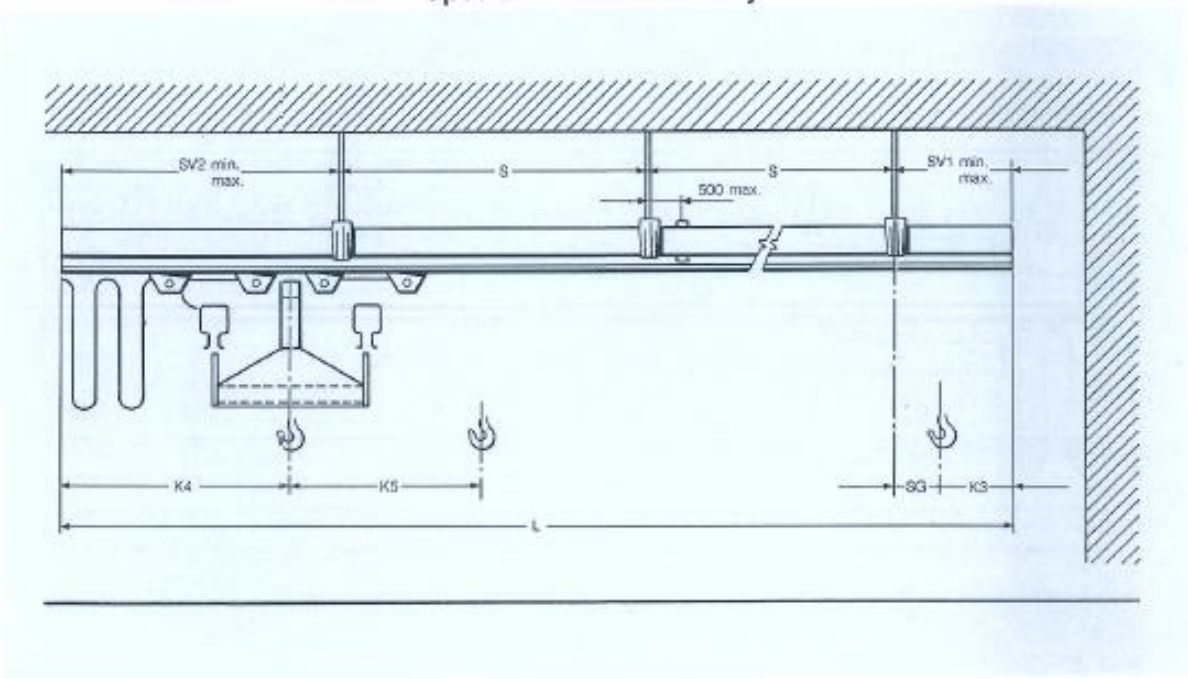
Channel profile system series DSC
Double beam bridge crane
Special manufacture only



Double beam bridge crane dimensions

Capacity	Beam length	Bridge beam profile	Hoist carrying trolley	Runway profile	Bridge carrying trolley	Bridge	Span mm S		Hook overhang mm SG	Bridge beam overhang mm ST1		ST2		Approach mm			Bridge weight
kg	m	Type	Type	Type	Type	Type	Min.	Max.	Max.	Min.	Max.	Min.	Max.	K1	K2	Cu	kg
125	4	P	CCP	P	CCP	B0104P	2540	3700	250	150	630	150	830	380	580	3040	140
				G	CCG	B0104G											
	5	P	CCP	P	CCP	B0105P	3290	4700	350	150	730	150	980	380	630	3990	210
				G	CCG	B0105G											
	6	P	CCP	P	CCP	B0106P	4040	5700	450	150	830	150	1130	380	680	4940	280
				G	CCG	B0106G											
	7	G	CCG	P	CCP	B0107P	4440	6600	600	200	1100	200	1460	410	770	5820	370
				G	CCG	B0107G											
250	4	P	CCP	P	CCP	B0204P	2640	3700	200	150	580	150	780	380	580	3040	140
				G	CCG	B0204G											
	5	G	CCG	P	CCP	B0205P	3220	4600	350	200	760	200	1020	410	670	3920	270
				G	CCG	B0205G											
	6	G	CCG	P	CCP	B0206P	3970	5600	450	200	860	200	1170	410	720	4870	320
				G	CCG	B0206G											
	7	G	CCG	P	CCP	B0207P	4720	6600	550	200	960	200	1320	410	770	5820	370
				G	CCG	B0207G											
500	4	G	CCG	G	CCG	B0504G	2570	3600	200	200	610	200	820	410	620	2970	145
	5	G	CCG	G	CCG	B0505G	3320	4600	300	200	710	200	970	410	670	3920	280
	6	G	CCG	G	CCG	B0506G	4070	5600	400	200	810	200	1120	410	720	4870	325
	7	GR	CCG	G	CCG	B0507G	4620	6600	600	200	1010	200	1370	410	770	5820	490
1000	4	G	CCG	G	CCG	B1004G	2770	3600	100	200	510	200	720	410	620	2970	150
	5	GR	CCG	G	CCG	B1005G	3520	4600	200	200	610	200	870	410	670	3920	375
	6	GR	CCG	G	CCG	B1006G	4270	5600	300	200	710	200	1020	410	720	4870	440

Channel profile system series DSC
Double beam bridge crane
Special manufacture only



Runway dimensions for double beam bridge crane

Capacity kg	Intervals S m	Runway profile Type	Hook overhang mm SG Max.	Runway profile overhang mm SV1 Min.	SV1 Max.	SV2 Min.	SV2 Max.	Approach mm K3	Approach mm Eventual 2nd bridge K5
125	3	*CP	170	50	720	50	K4 + 170	550	
		CG	225	100	775	100	K4 + 225	550	1100
	4	*CP	220	50	770	50	K4 + 280	550	
		CG	305	100	855	100	K4 + 305	550	1200
	5	*CP	285	50	835	50	K4 + 285	550	
		CG	370	100	920	100	K4 + 370	550	1300
	6	CG	450	100	1000	100	K4 + 450	550	1500
	7	CG	525	100	1075	100	K4 + 525	550	2000
250	3	CP	110	50	660	50	K4 + 110	550	1500
		CG	170	100	720	100	K4 + 170	550	1100
	4	CP	140	50	690	50	K4 + 140	550	2000
		CG	220	100	770	100	K4 + 220	550	1200
	5	CG	285	100	835	100	K4 + 285	550	1300
	6	CG	340	100	890	100	K4 + 340	550	1500
	7	CG	400	100	950	100	K4 + 400	550	2000
500	3	CG	110	100	715	100	K4 + 110	600	1200
	4	CG	155	100	755	100	K4 + 155	600	1300
	5	CG	180	100	780	100	K4 + 180	600	1500
	6	CG	225	100	825	100	K4 + 225	600	2000
	7	CGR	265	100	865	100	K4 + 265	600	3000
1000	3	CG	70	100	670	100	K4 + 70	600	1500
	4	CG	95	100	695	100	K4 + 95	600	2000
	5	CGR	110	100	710	100	K4 + 110	600	2500

* Values advised for a bridge

$K4 = \frac{L60}{1200}$ with festooned supply line

K4 = K3 with supply line in blindo trolley

3. SAFETY AND ACCIDENT PREVENTION

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

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

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

3.1 Authorised operator qualifications

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

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

3.2 General safety regulations

§ Before putting the bridge crane with channel profiles into service it is necessary to:

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

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

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

3.3 Safety warning signs

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

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

SIGNS USED TO INDICATE PROHIBITED ACTIONS

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

SIGNS USED TO INDICATE OBLIGATIONS

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

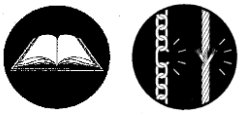
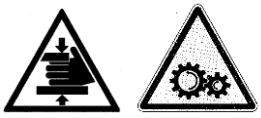
SIGNS USED FOR SAFETY INDICATIONS

SIGN	MEANING
 AUXILIARY LIGHTING	**The use of auxiliary lighting is recommended for the indicated interventions.**

3.4 Warnings on residual risks

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

RISKS DURING USE

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

RISKS DURING MAINTENANCE

HAZARD / RISK	PROHIBITION / WARNING	OBLIGATION / PREVENTION
 **Risk of electrocution - being shocked** in the case of maintenance on the electrical equipment without disabling the electrical supply	 • **It is prohibited** to work on the electrical equipment before having disconnected the bridge crane with channel profiles from the electrical line.	 • Assign the electrical maintenance operations to a qualified person • Perform the tests on the electrical equipment contained in the manual.
 **Risk of being crushed** in event of contact with the moving parts, pushed and not braked, of the bridge crane.	 • **Attention!** Exposure to moving parts may create hazardous situations.	 • Assign the bridge crane with channel profiles maintenance operations to a qualified person. • Use protective gloves and, if necessary, safety harnesses

3.5 Safety devices and instructions

3.5.1 Control devices

§ Series DSC bridge cranes with channel profiles can be controlled in the following manners:

1. If equipped with an **electrical hoist** and traverse trolley movements are activated:
   - **from a pushbutton panel** with "lift and lower" buttons to control the **lifting** movement.
   - **by pushing the load** to control the **traverse** trolley.
3. If equipped with a **manual hoist and trolley** movements are activated:
   - **by mechanical activation** of the hoist chain for the **lifting** movement.
   - **by pushing the load** to control the **traverse** trolley.
4. in all cases the **bridge crane with channel profiles travel** movement is activated manually by **pushing the load (**fig.3).

3.5 Safety and emergency devices

§ The DSC series **bridge cranes with channel profiles** are equipped with the following safety and emergency devices (fig.4):

1. **Trolley end limit switch**, mechanical stops that limit the maximum stroke of the trolley along the bridge beam/s.
2. **Bridge end limit switch**, mechanical stops that limit the maximum longitudinal stroke of the bridge along the runways.
3. **Anti-collision device**, available upon request, to prevent collision between two or more bridge cranes that, working in the same area and on the same runways, may interfere with each other and/or collide, same thing with their parts (hoists, etc.).

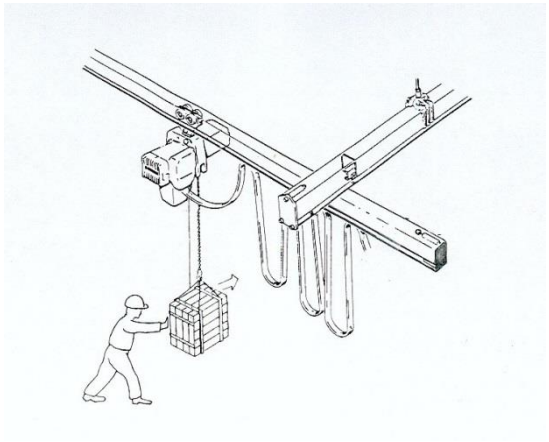


fig.3

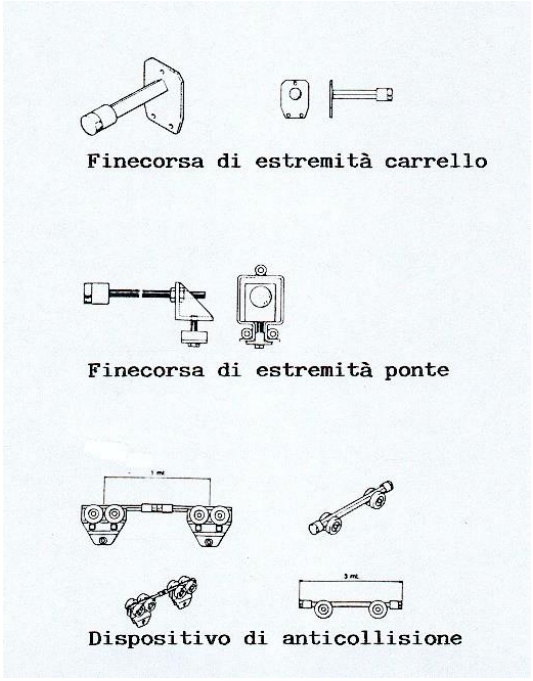


fig.4

3.5.3 Warning and notice devices - Signage summary

§ The DSC series **bridge cranes with channel profiles** are equipped with the following warning and signalling devices (fig.5):

- **Plates** present on the machine:
- manufacturer's logo (fig, 5a)
- bridge crane with channel profiles data plate with CE mark - (fig. 5c)
- plate indicating the maximum capacity of the bridge crane with channel profiles (fig. 5b)
- hoist plates, and trolley plate (if any)

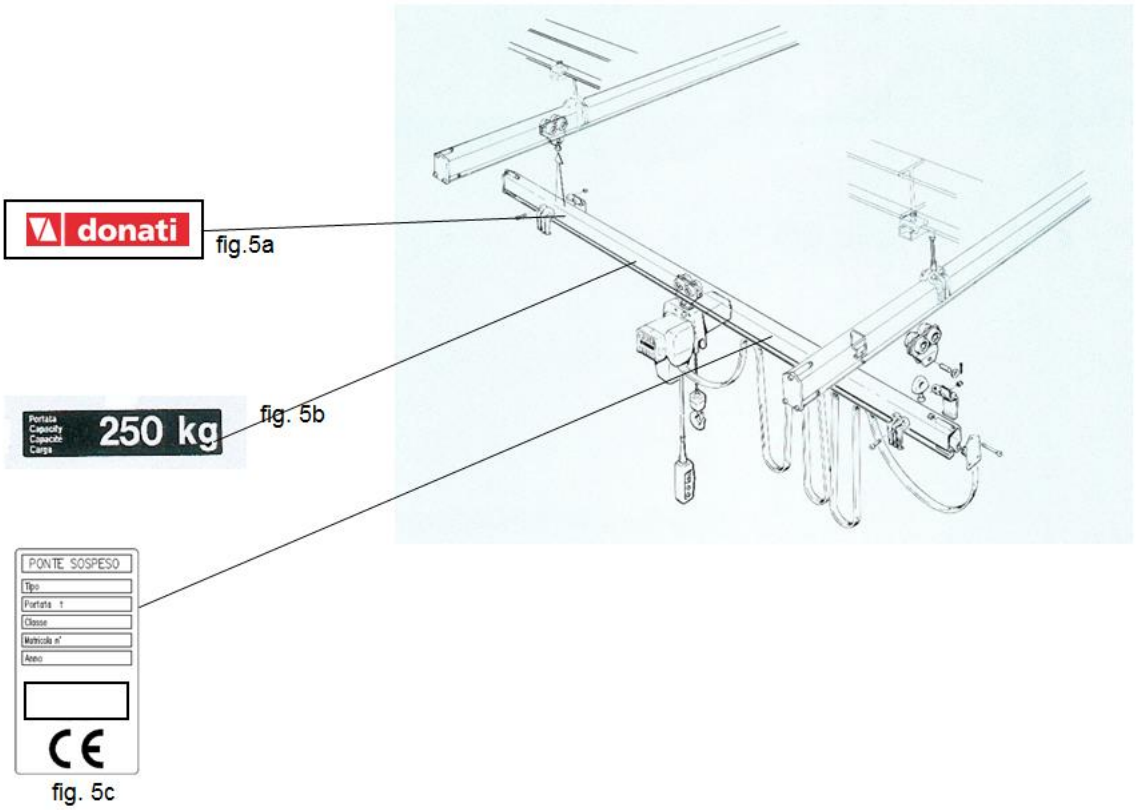


fig. 5c

§ Legibility and preservation of the plates

The plates must always be kept legible in terms of all the data contained in them by periodically cleaning them. If a plate deteriorates and/or is no longer legible, including just one of the informational items shown, it advisable to request another one from the manufacturer, quoting the data contained in this manual or on the original plate and then replace it.

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

4. - HANDLING - INSTALLATION - COMMISSIONING

4.1 - General notes for delivery

- **The DSC series bridge cranes with channel profiles are delivered unassembled, in their main parts including the runways, bridge, suspensions, electrical system and, if it is part of the supply, the lifting unit.**
- **The customer must handle the installation phases of the bridge crane with channel profiles, following the instructions contained in this chapter and possibly using specialised installers for the assembly.**

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

After receiving the supply check and make sure that:

- The shipping data (address of the recipient, no. of parcels, etc.) match what is contained in the accompanying documentation (transport document and/or any packing list).
- The technical/legal documentation supplied with the bridge crane with channel profiles includes (fig. 6):
  - the “User instructions” manual of the crane to install.
  - CE Declaration of Conformity.
  - Test logbook, when included.
  - instructions for using the hoist / trolley to install on the crane, if they are part of the supply.
- The packaging, if part of the supply, is in good condition, intact, and free from damage.

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

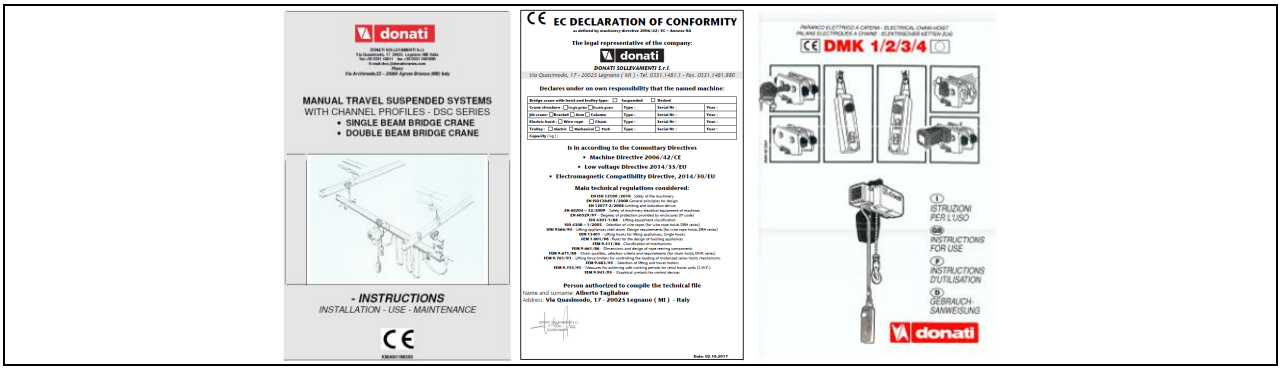


Fig.6

4.2 Packaging, transport and handling

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

4.2.1 Standard packaging

- The metalwork parts of the bridge crane with channel profiles are generally supplied without packaging. The bars of the channel profiles can be supplied in separate parcels or in strapped bundles and, where required, the bundle is equipped with a wood base. Hooking points are indicated on the parcels when necessary to make it easier to handle them during transport and installation operations (fig. 7).
- To make handling and assembly operations easier for the lifting unit, if it is part of the supply, it can be delivered in a cardboard box (with or without pallet) or, where included, in a crate or wooden cage or even simply on a pallet.
- When the lifting unit is delivered on a pallet, it is generally covered with a protection against dust composed of a polyethylene film.
- Any other accessories which are part of the supply (e.g. electrical system components) can be delivered inside cardboard boxes that, based on the weight to move, can be with or without a pallet.
- The standard packaging are not waterproof against rain and are designed for destination via land and not via sea, for covered and non-damp environments. Therefore special packaging or protections are excluded from the supply unless they are contained in the contract.
- If necessary the packaging can include signs and pictograms that provide important information regarding handling and transport (weight, lifting points, storage information, etc.) - (fig. 8).
- Appropriately preserved parcels can be stored for a period of around two years in covered environments where the temperature ranges from -20°C to +60°C with relative humidity of 80%. Specific packaging needs to be prepared for different environmental conditions.

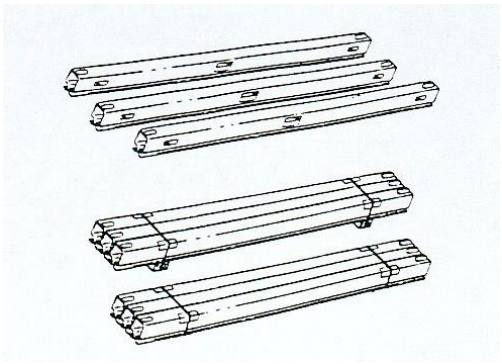


fig.7

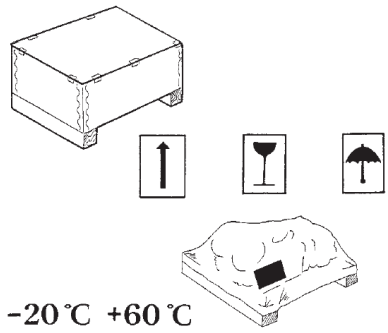


fig.8

4.2.2 Transport

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

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

4.2 3 Handling

To move the bridge crane with channel profiles proceed as follows:

- Prepare a limited and adequate area, with flat flooring or ground, for the unloading operations and ground assembly of all of the crane components.
- Based on the type of part/component or the packaging, prepare the equipment necessary for unloading and handling of the crane parts and its accessories taking into account their weight, overall dimensions and grasping and/or suspension elements.
- Prepare adequate wood beams of suitable dimensions to be placed below the parcels of metalwork (channels, etc.) to be handled.
- Unloading and handling may be performed by crane (e.g. mobile cranes, bridge cranes, etc.) or forklifts, with adequate capacity and characteristics and the use of special equipment is not required.
- The parcels of any accessories with a weight less than 30 kg (unlike those with a weight greater than 30 kg) do not shown any indication of their weight and can be handled by hand.
- Slinging of heavy parcels (e.g. channel bars) must be done using adequate equipment in order not to damage the painted surfaces.
- Grip the crane parts and its accessories with suitable slings (fig. 9) and move them very carefully to the area set up for unloading and avoid swinging, tilting and any dangerous unbalancing.
- When they have been moved check that the parts and parcels are intact and free from damage.

- **Moving of the bridge crane with channel profiles parts and relative accessories must be done very carefully and with adequate lifting and transport means, in order not to generate hazards due to the risk of a loss of stability.**
- **All of the parts or components must be placed or fixed stably in all phases or the movement, transport and storage phases and must not be flipped over or placed vertically** (fig. 10).

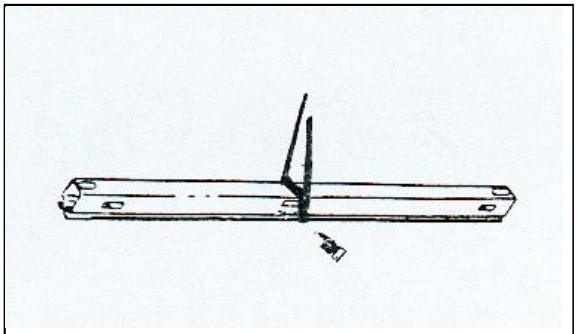


fig.9

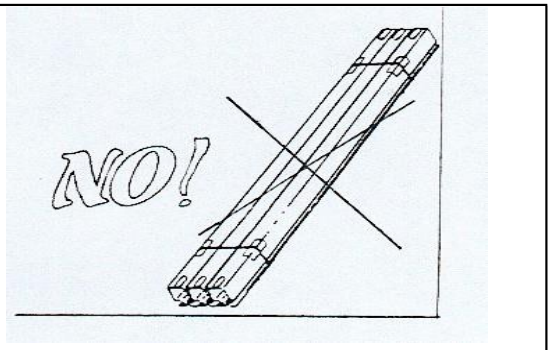


fig.10

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

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

- **Check the conditions of all the crane parts and in particular check that:**
  - **nothing has been crushed, deformed, bent or has any broken parts.**
  - **there is no damage to the components of the electrical system (if included)**
- **Dispose of the packaging as required by regional waste disposal laws based on the nature of the waste (wood, plastic, cardboard), after sorting it.**

4.3 Installation of the bridge crane with channel profiles

4.3.1 Installer duties and responsibilities


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

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

1. The crane capacity is ≥ compared to the load to lift.
2. The anchoring structures (pillars, walls, ceilings, beams, trusses, machine bodies, etc.) have been **"Declared suitable"** by the customer or expert technicians appointed by the customer.
3. The specifications of the lifting unit (trolley/hoist), if not part of the supply, are compatible with those of the bridge crane with channel profiles (see point 2.2,7) in relation to: (fig.11)
   - **Hoist capacity:** must be ≤ compared to the bridge crane in channel capacity.
   - **Weight of the trolley/hoist:** must be ≤ compared to the maximum weights.
   - **Lifting speed:** must be ≤ compared to the maximum speed allowed.
   - **Overall dimensions of the trolley/hoist:** must be ≤ compared to the maximum ones allowed.
   - **Reactions on the trolley wheels:** must be ≤ compared to the maximum ones allowed.

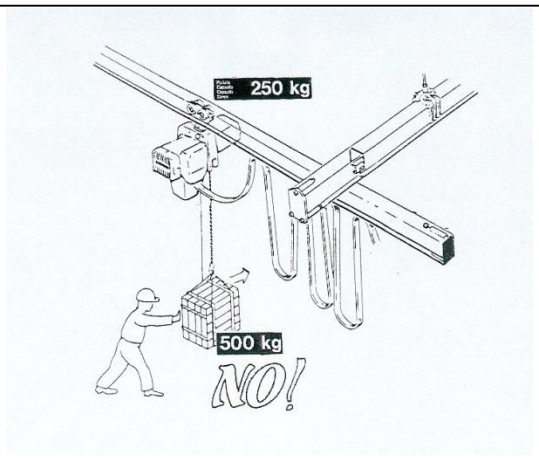


fig.11

Following the Bridge crane with channel profiles installation activities, the installer must:

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

4.3.2 Preparation of the installation site

	To allow the bridge crane with channel profiles installation, first perform the following operations:	

- Verify the presence of the suitable/adequate declaration of the support/anchoring structures;
- Verify the absence of clear defects of the support/anchoring structures (fig. 12);
- Verify the suitability of the manoeuvre spaces for the bridge crane with channel profiles, especially if operating in areas where other cranes or operating machines are present (fig. 13);
- Verify the capacity of the runways and structures when the crane is installed in addition to other existing ones and set up reciprocal anti-collision systems that provide adequate distances between the cranes (fig. 14);
- Verify the useful spans, which must be measured in at least three points of the plant (two near the end and one in a central position);
- Verify the suitability and correct operation of the mains: (fig.15)
  1) correspondence of the line voltage with the voltage required for the motors
  2) presence and suitability of the electrical line switch/circuit breaker;
  3) adequacy of the cable cross section of the electrical line;
  4) presence and suitability of the earthing system;
- Prepare the masses for the **dynamic tests** equal to: **rated capacity x 1.1**
- Prepare the masses for the **static tests** equal to: **rated capacity x 1.25**
- Prepare the equipment for slinging and lifting of the masses for the load tests
- Verify the presence of signs warning of the risks due to handling with the crane.

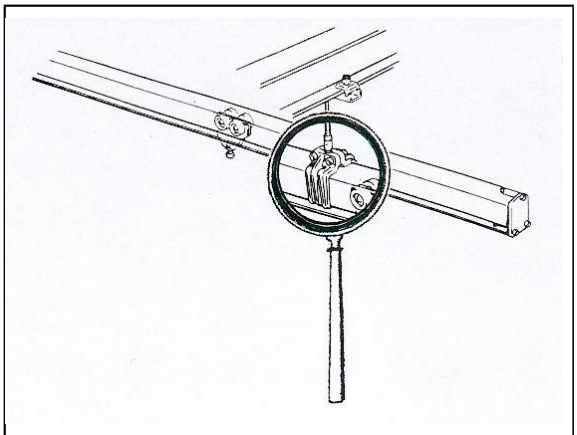


fig.12

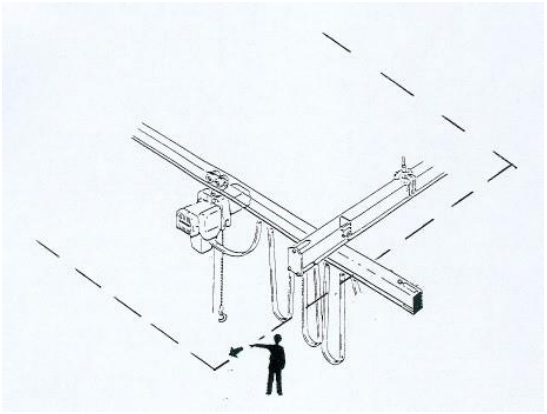


fig.13

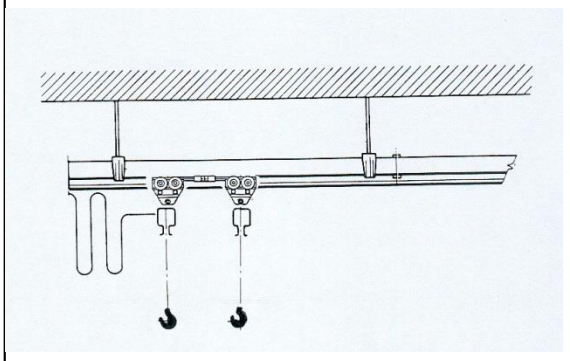


fig.14

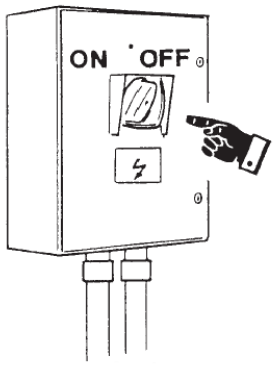


fig.15

4.3.3 Assembly of the rails

- **Before assembling the runway suspensions of the bridge crane with channel profiles, the support structure and anchoring surfaces need to be checked to make sure they are able to withstand the actions transmitted by the crane.**
- **Anchoring must be performed with specific accessories (brackets, staybolts, bolts, etc) or, when foreseen and after having certified the suitability, with expansion bolts or chemical anchoring.**

Assembly of the suspensions and runways:
phase 1 - on the ground, on a work bench (fig. 16)

- Remove all of the anchoring components from the packaging (if any) and after checking that they are in good condition and their function and quantity is correct, using the bill of materials in chapter 2 "the parts of the bridge crane with channel profiles" or the delivery note, put them on the work bench.
- If they are part of the supply, assemble the locking clamps -**5**- (screwing the nut on a few threads without tightening) on the anchor beams -**4**.. Insert the ball joint with threaded hole -**3**- in the specific seat on the beam (or on the suspension plate.
- After checking the suitability of the threading and checking their length, fit the threaded staybolts -**1**- with the relative nuts and washers.
- Mount the suspension brackets -**7**- inserting the ball joint -**3**- in the specific seat.
- Move the bracket set screws -**8**- closer without tightening so that the two half brackets are able to spread to allow insertion of the runway profile.

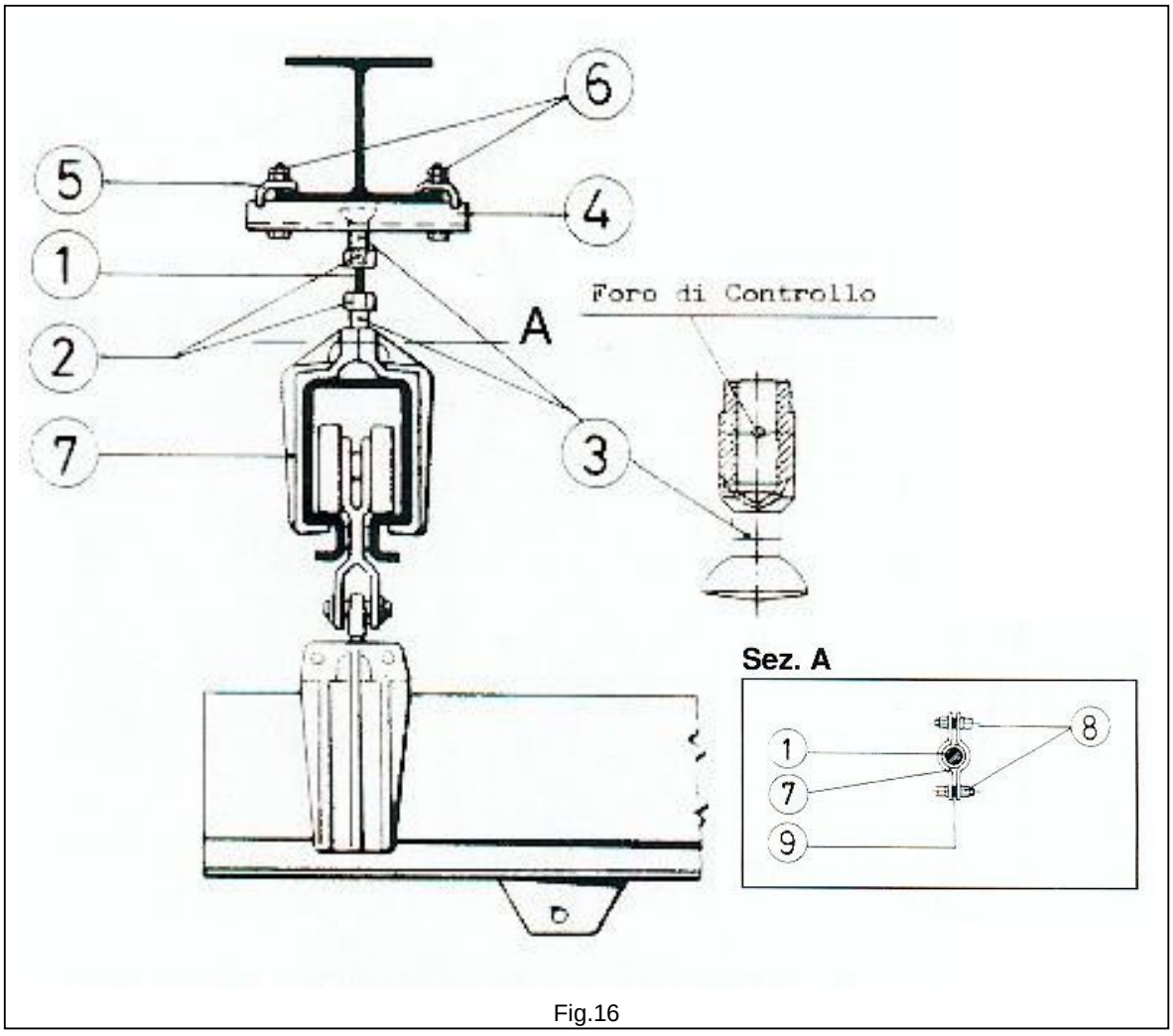


Fig.16

Assembly of the suspensions and runways:
phase - 2 - to be performed above ground with forklift and mobile scaffolding (fig. 16 bis)

- After having positioned the suspension components (crossbeams, staybolts and brackets) on a pallet, lift the pallet to the suspension anchoring height using a forklift and mobile scaffolding adequately selected based on the height and total weight to handle.
- Working above ground from the mobile scaffolding, anchor the crossbeam to the weight-bearing structure tightening the clamps with a torque wrench, with the specific nuts, according to the locking torque as required by the standard CNR UNI 10011/88.
- Tighten the threaded staybolt -**1**- in the hole of the ball joint -**3**-, checking that the threaded portion of the staybolt, screwed in the body of the joint, reaches at least the control hole.
- Fit the suspension bracket .**7**- on the staybolt -**1**- proceeding to tighten the threaded bush of the ball joint -**3**- on the lower portion of the threaded staybolt. Again in this case check that the staybolt threaded portion, screwed in the joint body, reaches the control hole. Completely tighten the self-locking counternut -2-
- After assembling all of the suspensions with staybolts in the same manner as the points above, assemble the sections of the runways with channel profiles.
  This operation can be performed with the use of a forklift or mobile crane for the lifting operations and with a mobile scaffolding for the assembly. The means must be adequately selected in relation to the height and total weight to handle.
- Stand well balanced in the barycentre of a pallet and carefully sling the profile section possibly using textile bands in order not to damage the surfaces of the channel, lift it being careful not to dangerously unbalance or swing the mass, until reaching the height to connect to the suspension bracket.
- Connect the runway profile section with the relative brackets keeping the profile supported, by the lifting equipment (forklift or mobile crane) with which it was lifted, until the brackets are completely locked and all of the bolted connections have been tightened, without locking them to avoid deforming the channel profile, that support the runway. Then removing the slinging and lower the lifting equipment releasing the channel suspended section.
- Use the same criteria to assembly all of the profile sections that compose the runways, connecting them to each other with the bolted connections passing through pipes welded on the heads of the channels.

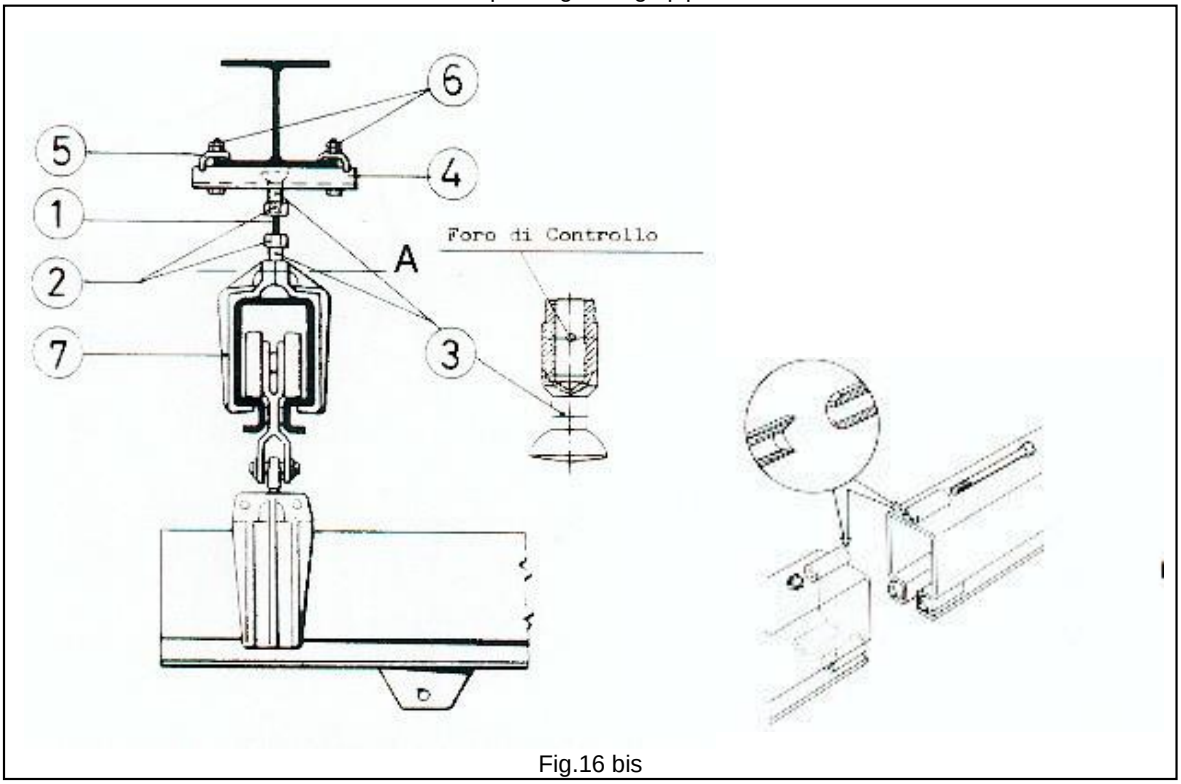


Fig.16 bis

- Check the planarity of the runways using a level placed above the profile and, if necessary, level by using the threaded staybolt-ball joint assembly and/or, if included, the planarity regulator. Then completely tighten down all of the bolted connections being careful not to deform the profile.
  If any planarity regulation operations are performed check that the threaded portions in the staybolts inside the bushes is always greater than the length delimited by the control hole.
- Fit the covers on one of the two ends of both runways, leaving the other one free which will be used to insert the head of the electrical system with wires, when included, as well as of the bridge crane with channel profiles (fig. 17).

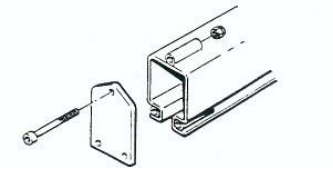


Fig.17

Assembly of the runway electrical system:
(if the crane is equipped with electrical utilities and if part of the supply)

§ The line electrical system that runs along the runways can be created in one of the following executions::

(1) cable with festoons on sliders in the profile of the channel runways.
(2) cable with festoons on trolleys in the profile of the channel runways.
(3) busway-trolley, positioned on the side of the runway with socket on the block.

§ System assembly in executions (1) and (2):

- Remove the cable and the cable holder trolleys or sliders from the packaging (if any)
- Insert the power cable in the cable holder sliders or trolleys in order to obtain a series of festoons of the same size, and lock it with the relative screws or seats.
- Insert the sliders or trolleys in the profile of the beam with channels of the runways
- at one end of the runway where prescribed, mount the connector block for connection with the power line from the main switch.
- connect the end of the end of the power cable with festoons to the terminal contained in the connector block located at the end of the runways.

§ System assembly in execution (3):

- In execution (3), busway-trolley, assemble all of the power line support components on the runway according to the “particular” instructions supplied by the manufacturer (fig.18).

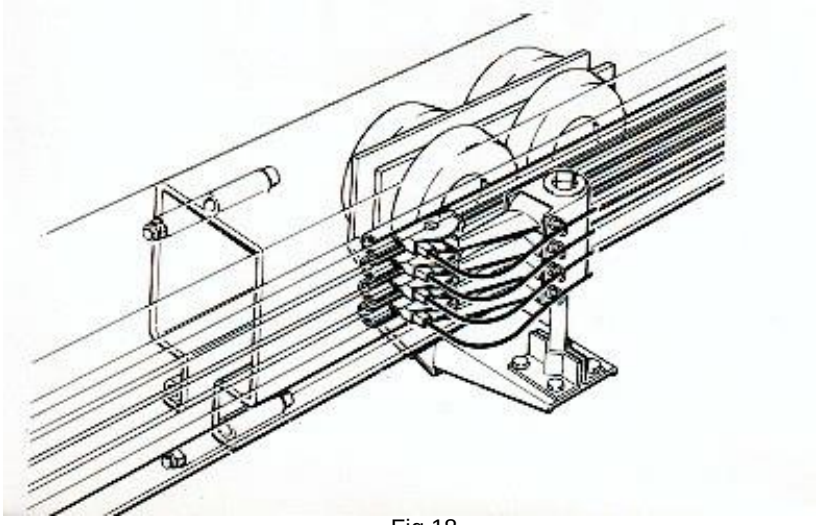


Fig.18

4.3.4 Assembly of the bridge crane with channel profiles

Assembly of the bridge with channel profiles: (single or double beam execution)
phase 1 - on the ground, on a work bench

- Remove all of the anchoring components from the packaging (if any) and, after checking that they are in good condition and their function and quantity is correct, put them on the work bench.
- Mount the suspension rods -**7**- inserting the ball joint with eyebolt -**10**- in the specific seat (fig. 19). (The number of brackets is 2 or 4 based on whether the crane is single or double beam).
- Move the bracket set screws closer without tightening so that the two half brackets are able to spread to allow insertion of the bridge beam profile.
- Position the suspension brackets on the bridge beams at a distance between them corresponding to the measurement of the runway span. Do not tighten the connections only move them to the nuts so that the brackets can be easily adapted to the span once the bridge is inserted in the runways (fig.20).
- Remove the suspension pin from the bridge holder travel trolleys
- Insert the eyebolts of the ball joints -**10**- in the specific compartment of the trolley plates -**11**- or in the connection crossbeams if a single or double trolley is used respectively, insert the pin -**12**- and spread the sides of the safety cotter pins -**13**-(fig.21).

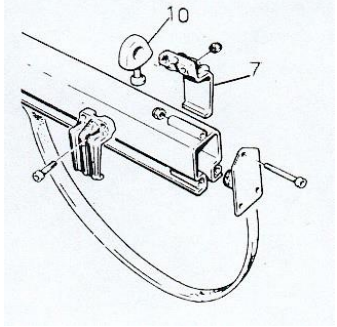


fig.19

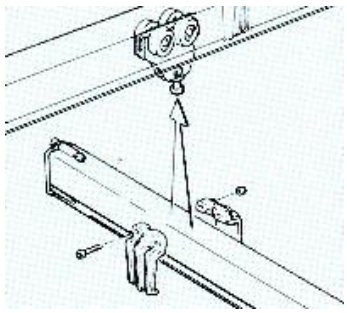


fig.20

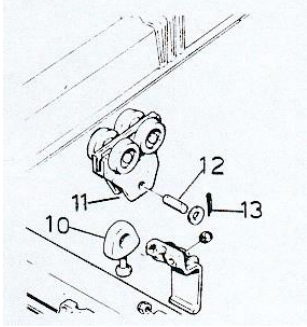


fig.21

Assembly of the bridge with channel profiles: (single or double beam execution)
phase - 2 - to be performed above ground with forklift and mobile scaffolding

- This above-ground assembly operation can be performed with the use of a forklift or mobile crane for the lifting operations and with a mobile scaffolding for the assembly.
  The means must be selected in relation to the height and total weight to handle.
- Stand well balanced in the barycentre of a pallet (if a forklift is used) or carefully sling the bridge beam of the crane with channel profiles possibly using textile bands in order not to damage the surfaces of the profile (if a mobile crane is used).
- Lift the bridge beam being careful not to unbalance or swing the mass dangerously. until reaching the connection height of the runways (fig.22).

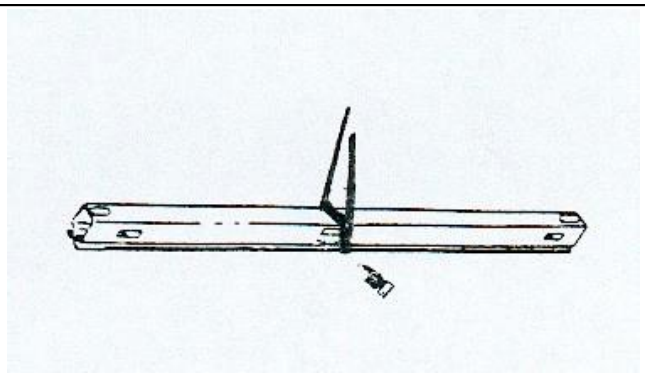


fig.22

- If the crane is in double beam execution perform these operations separately for each of the two beams, or at two different times (one beam at a time).
- Working to centre the trolleys from the plane above ground of the mobile scaffolding and making adequate movements with the lifting device, insert the bridge holder trolleys in the free end of the runway profile and put the relative extremity cover in its seat (fig.23).
- Completely tighten the bracket anchoring components, without deforming the slot of the profile where the trolley travels, after having checked, and if necessary stabilise, the exact span of the crane in relation to that of the runways.
- For a double beam crane with channel profiles, mount spacers -**14**- which determine the centre-to-centre distance of the hoist holder trolley (fig.24).
- When two or more bridge cranes are assembled on the same runway it is necessary to place anti-collision devices (fig.25) between one crane and the next or, field limiters (fig.26) when required.
  In these cases the relative power systems need to be set up so that they can travel and power the cranes completely independently from each other.

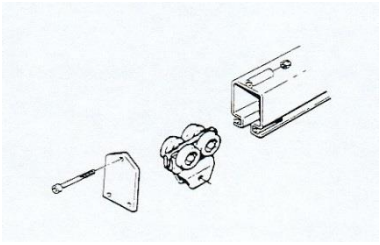


fig.23

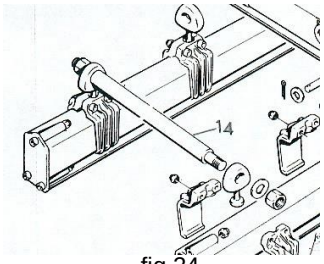


fig.24

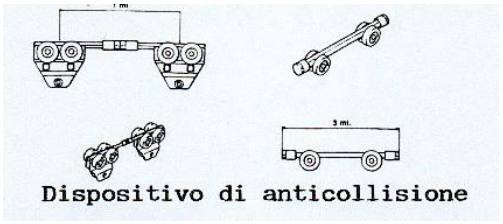


fig.25

fig.26

Assembly of the bridge electrical system:
(for crane equipped with electrical utilities)

- The electrical system of the electrical hoist (if included) that runs, transversely to the runways, along the bridge beam is generally standard and uses a flat cable with festoons running on sliders in the profile of the beams with channels.
- In relation to the type of runway power system, the electrical supply of the bridge can be busway-trolley, in this case the bridge power festoon made of flat cable is connected directly to the trolley terminals of the busway-trolley line which powers the runways or it can be composed, in the case of a festoon cable line, by the power cable of the runways which, transits directly from the runways to the beam of the bridge crane with channel profiles.
- Remove the cable (when it does not power the runways) and the cable holder sliders from the packaging (if any)
- Insert the power cable in the cable holder sliders in order to obtain a series of festoons of the same size, and lock it with the relative screws.
- Insert the sliders in the relative travel seat composed of the channel beam profile.
- When the power line of the runways is created in busway-trolley, when included, mount the connector block for connection with the power line on the bridge beam in the area prepared for this purpose, and the trolley pull arm of the block current socket.
- Connect the cable terminals, with festoons from the bridge beam and power from the runway line, to the terminal contained in the connector block, if included, located on the bridge channel beam.

4.3.5 Assembly of the trolley/hoist

See also the "User instructions" for the hoist, attached to this publication

Assembly of the trolley-hoist for cranes with channel profiles in single beam execution: phase 1 - to be performed on the ground on a work bench

- Remove the cotter pin -**1**- and pull out the suspension pin -**2**- of the hoist holder traverse trolley
- Insert the hoist suspension eyebolt -**3**- in the specific compartment -**4**- of the trolley plate or in the connection beam if used, respectively, on a single or double trolley.
- Refit the pin **-2-**, reposition the cotter pin **-1-** and spread the two safety side (fig.27).

Assembly of the trolley-hoist for cranes with channel profile in double beam execution: phase 1 - to be performed on the ground on a work bench

- Remove the cotter pin -**-1**- and pull out the suspension pin -**2**- of the hoist holder traverse trolley
- Insert the hoist suspension eyebolt -**3**- in the specific compartment of the double beam trolley (fig.28).
- Refit the pin **-2-**, reposition the cotter pin **-1-** and spread the two safety sides

Assembly of the trolley/hoist: (single or double beam execution)
phase - 2 - to be performed above ground with forklift and mobile scaffolding

- After having positioned the hoist-trolley unit on a pallet, lift it until reaching the height for fitting the head of the channel/s of the bridge using a forklift and mobile scaffolding adequately selected based on the height and total weight to handle.
- Working from the plane above ground of the mobile scaffolding, insert the pre-assembled unit in the channel/s and put the extremity cover in its seat, then tighten the anchoring components (fig.29).
- If the crane is equipped with an electrical hoist, connect the festoon power line cable running along the bridge beam in the electrical equipment connector block of the hoist as described in the attached user and maintenance installation manual.

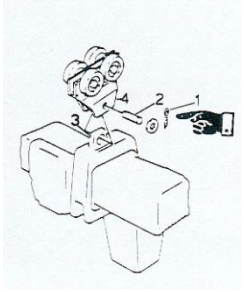


fig.27

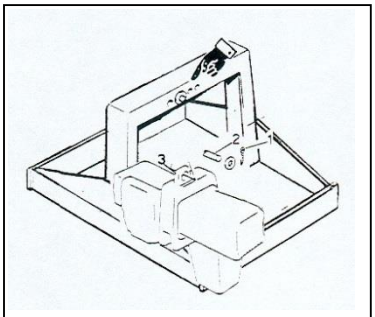


fig.28

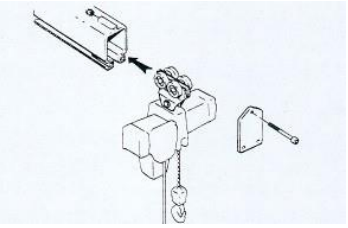


fig.29

Electrical connections of the lifting unit (hoist):

If the crane is equipped with electrical utilities, the customer must set up a thermal magnetic type general line circuit breaker or one protected with fuses and indicate its operation with a specific plate, install the switch in the immediate vicinity of the crane, which must be connected to the mains with a system certified in compliance with Law 46/90.

To connect the festoon power line cable in the lifting unit electrical equipment connector block, see the hoist "User instructions", attached to this publication

- **Never make the electrical connections with the voltage on**
- **Never make temporary connections or jump or makeshift connections**
- **Completely tighten all of the grommets**
- **Use the wiring diagrams corresponding to the hoist being worked on.**

4.4 - Commissioning

4.4.1 Preliminary tests - Adjustments and operating tests

	**Perform the following tests before commissioning the crane:**	

- **Check the suitability of the electrical system:** (for crane equipped with electrical hoist:)
  - Check that the line voltage and frequency, shown on the respective motor plates, correspond to those required for operation.
  - Check that the voltage value to the motors is within the limits of +/- 10% of the rated value.
  - Check for the presence and correct connection of the earth socket
- **Check the correct crane installation:**
  - Make sure that there are no clear defects after installation of the crane
  - Check that all of the bolted connections are correctly tightened
  - Check the conditions of the trolley wheel and bridge tracks, which must be free from obstacles, roughness, dips and foreign bodies.
  - Check the uniform bridge travel sensitivity, along its entire length
  - Check for the absence of obstacles in all of the area where the crane operates and check for any interferences.
  - Make sure the end stops of the trolley and bridge are present.
  - Make sure there is no lubricant leakage.
  - Make sure that no noises, and/or anomalous vibrations and/or incorrect movements are detected during the tests (spontaneous movements of the trolley and/or bridge, etc.).

	**Adjustments:** (for crane equipped with electrical hoist:)	

  - Adjust the electric hoist lift limit switch (see the information in the related “User instructions”) in order to allow the maximum stroke possible. The lower limit switch needs to be adjusted so that the hook, in its lowest point, is 10 cm from the ground.
- **Checking the operation of the correct rotation direction of the hoist motor:**
  - For short sections activate the “lift/lower” buttons, being careful to operate first in one direction (lower) and then in the other (lift) with two short pulses only necessary for verifying the correct rotation direction, without making any limit switches trip.
  - The automatic switches of the limit switches are emergency devices and must not be subjected to normal operation. If this need exists then other supplementary limit switches need to be installed for continuous operation in order that they trip before the emergency ones.

	• **Make sure that you do not hear any abnormal noises and/or vibrations and that there are no incorrect movements of the machine and its parts** • **Check the tightening of all the bolted connections after the first lifting operations.**

	• **Avoid making the lifting limit switch trip.** • **If the motor rotation direction does not coincide with the pushbutton controls the limit switches will not stop movement, and may cause faulty situations.** • **If the movement direction does not correspond with the pushbutton panel indications, stop the movement and invert the connection of the two line phases of the connector block.**

4.4.44.4.2 Acceptance test of the bridge crane with channel profiles - Suitable for use

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

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

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

To perform the acceptance test of the bridge crane with channel profiles proceed as follows:

§ No load test:

- **Crane equipped with electrical hoist:**
  - activate the crane functions:
  - activate the line general switch
  - put the pushbutton panel emergency stop button in the "start consensus" position
  - press the "start/alarm", if available on the hoist pushbutton panel
  - check the lifting operation by pressing the "lift and lower" buttons on the pushbutton panel (for two speed movements check its operation)
  - check the operation of the push trolley and bridge by moving manually
  - check the operation of the limit switches on all movements and/or the clutch device, when available

- **Crane equipped with manual hoist:**
  - check the correct travel of the lifting and manoeuvre chains of the manual hoist
  - check the operation of the push trolley and bridge by moving manually
  - check the operation of the limit switches of all movements

§ Dynamic test:

- **Crane equipped with electrical hoist:**
  - prepare adequate weights for the load tests equal to: **rated capacity x 1.1** and suitable equipment for slinging and lifting
  - sling the load positioning the hook vertically to the load to avoid oblique pulls
  - slowly tension the sling to prevent abrupt movements
  - perform the load tests using the “slow” speed if available
  - slowly lift the load and check that this occurs without problems and that no anomalous noise is heard, or clear permanent deformation or giving way of the support structures and/or anchorages
  - repeat the test at maximum speed performing the previous tests
  - check the operation of the lift and lower electric limit switches, when installed, and/or any clutch device
  - check the operation of the brake, checking that the weight is stopped in adequate time and that there is no shifting of the load, after releasing the button
  - check the operation of the mechanical “right-left” and “forward-backward” limits by moving the mass by pushing without bringing it to the maximum height (lift half a metre from the ground).
  - work first at slow speed, if available, and then at maximum speed
  - check the correct movement of the trolleys on the beam and make sure that no anomalous noise is heard, or clear permanent deformations or giving way of the support structure and/or anchorages
  - check the operation of the load limiter, if installed.
  - check the braking and stop spaces during the lifting, traverse and rotation movements, checking the stability of the mass after stopping the relative movement actions.

- **Crane equipped with manual hoist:**
  - prepare adequate weights for the load tests equal to: **rated capacity x 1.1** and suitable equipment for slinging and lifting
  - sling the load positioning the hook vertically to the load to avoid oblique pulls
  - lift the load and check that this occurs without problems and that no anomalous noise is heard, or clear permanent deformation or giving way of the support structures and/or anchorages
  - check the operation of the brake, checking that the weight is stopped in adequate time and that there is no shifting of the load,
  - check the operation of the mechanical “right-left” and “forward-backward” limits by moving the mass by pushing without bringing it to the maximum height (lift half a metre from the ground).
  - check the correct movement of the trolleys on the beam and make sure that no anomalous noise is heard, or clear permanent deformations or giving way of the support structure and/or anchorages
  - check the braking and stop spaces during the lifting, traverse and rotation movements, checking the stability of the mass after stopping the relative movement actions.

!	**The dynamic tests must be performed in the most unfavourable load conditions, i.e. combining lifting, traverse and bridge travel movements.**

§ Static test:

- **Crane equipped with electrical hoist:**
  - prepare adequate weights for the load tests equal to: **rated capacity x 1.25** and suitable equipment for slinging and lifting the load
  - sling the load **used for the dynamic tests** (rated capacity x 1.1) being careful to position the hook vertically to avoid oblique pulling
  - slowly tension the slinging to not generate tugs, perform the load tests using the “slow” speed if available
  - slowly tension the sling to avoid tugging, if available perform the load tests using the “slow” speed
  - gradually apply on it weights for an overload equal to 25% of the rated capacity
  - leave the weight suspended for a time not less than 10 minutes.
  - check that the suspended weight (load + overload) does not give way (the lifting brake and friction device/load limiter, if installed, must not slide).
  - release the load and make sure that deformations and/or giving way of the crane and support structures and/or anchorages are not detected.

- **Crane equipped with manual hoist:**
  - prepare adequate weights for the load tests equal to: **rated capacity x 1.25** and suitable equipment for slinging and lifting
  - sling the load positioning the hook vertically to the load to avoid oblique pulls
  - lift the load and check that this occurs without problems and that no anomalous noise is heard, or clear permanent deformation or giving way of the support structures and/or anchorages
  - stop it in suspended position, for a time not less than 10 minutes, at a height of 10 cm.
  - check that the suspended mass does not give way (the brake must not slip) and no clear permanent deformations and/or giving way of the support structure and/or anchorages are found.

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

4.5 Decommissioning

4.5.1 Storage and preservation of parts

If the bridge crane with channel profiles and its components need to be stored, to prevent damage or deterioration, proceed as follows:

- Check that there is no damage to the mechanisms, electrical systems if installed, lifting, traverse and travel units, the weight-bearing beam, runway channels and the relative suspension accessories and avoid scratching the surface structures.
- The materials, whether for indoor or outdoor installation, can be stored for a maximum period of two years in an environment with the following characteristics:
  - protected from inclement weather
  - relative humidity not greater than 80%
  - minimum temperature - 20°C
  - maximum temperature + 60°C
- For a storage period over two years ask the manufacturer for the storage procedures
- If these values should change during the storage it will be necessary to perform preliminary tests before operating the crane (see paragraph “Resetting after storage”
- If the temperature goes above or drops below the indicated values and the relative humidity is greater than 80% prepare protection packaging for the parcels with sacks and hygroscopic salts.
- Storage in outdoor areas requires:
  - wedges to lift off the floor for all parcels without pallet
  - protect all parcels with sacks and hygroscopic salts
  - if the machine has been built to operate outdoors the metal work parts do not require particular protections; on the contrary the parts machined on machine tool (machined surfaces, wheels, pins, etc.) must be protected with antioxidants (transparent paints, grease, etc.).
- Limit the material storage areas.

4.5.2 Resetting after storage

Before putting a bridge crane with channel profiles back into operation after a long period of storage, it is necessary to perform the following operations:

- **Structure:**
  - eliminate any traces of paint or lubricant from the structure and the tracks
  - cleaning the matching surfaces used for assembly
  - repair any structural damage (scratched surfaces, crumbling paint, etc.)
- **Mechanisms:**
  - check for any leaks and top up lubricant levels, if necessary
  - check the correct fixing of the mechanisms to the structures
  - check the conditions of the chain (clean and lubricate it), nuts and the return spools of the clutch device or load limiter
  - eliminate traces of oxidation from the accessory sliding parts of the control parts
  - lubricate the bearings and unpainted mechanical parts (shafts, pins, joints, etc.)
  - eliminate any water residue in the concave parts.
- **Electrical equipment:**
  - eliminate any condensation from the motors and connector blocks; dry with jets of air
  - check the conditions and operation of the lifting brakes
  - accurately clean the surfaces of the hoist brake eliminating any traces of moisture and lubricants
  - check the conditions and operation of the limit switches
  - check the conditions of the electrical parts and components
  - dry the contactor contacts
  - check the movement of the electric lines with festoons
  - carefully check the operation of the control pushbutton panel

5. - OPERATION AND USE OF THE BRIDGE CRANE WITH CHANNEL

5.1 - Functions of the bridge crane with channel profiles

5.1.1 Intended use - Expected use - Intended purpose

§ The suspended type bridge crane with channel profiles, in single or double beam version, are built to handle goods within a plant or work site. The crane lifts the load vertically in space, via hook on the lifting unit (electrical chain or manual hoist) and using accessories suitable for this operation.

§ The load can be pushed manually along the bridge traverse and longitudinal axes, using the hoist holder and bridge holder trolleys which can move within the special channel profile.

§ Bridge cranes move manually suspended on runways, they are also made with beams with a special channel profile, positioned at a height above the ground which thus remains completely free and available for production activities. The runways are generally hung on weight-bearing structures, with suspensions with adjustable staybolt and crossbeam with clamps (fig. 1).

§ The functions of the bridge crane with channel profiles are concentrated in three main movements:
- **vertical:** lifting of the load, by a electrical chain hoist or manual hoist
- **traverse:** manual traverse, pushing the load, with movement of the hoist holder trolley
- **longitudinal:** manual travel, pushing the load, with the crane trolley along the runways

§ These movements are activated by:

- **Crane equipped with electrical hoist:**
  - **pushbutton panel:** by pressing the **lift** or **lower** control keys for **lifting** movements
  - **manual push: right** or **left** for **traverse** movements
  - **manual push: forward** or **backward** for **travel** movements

- The pushbutton panel lift and lower buttons activate the function when they are held pressed down and may be the two click type: the first to control the “slow” speed, the second to control the “fast” one.
- The emergency stop button, present on the pushbutton panel is generally mushroom shaped, red, and activates the **stop** function when pushed all the way down.
- To permit operation of the hoist mounted on the crane it is necessary to turn the **emergency stop** button clockwise and bring it into the “lifted” start consensus position and then press the green **start** button when available.
- The pushbutton panel is suspended from the hoist and can be operated by the operator on the ground, following the movement of the trolley (right/left) and/or travel of the crane (forward/backward).

- **Crane equipped with manual hoist:**
  - **manual push:** on the manoeuvre chain to control **lifting** movement
  - **manual push: right** or **left** for **traverse** movements
  - **manual push: forward** or **backward** for **travel** movements

- **The operator must always pay utmost attention during maneuvers without ever losing sight of the work area and the handled load in order not to compromise his safety and/or that of any exposed persons**
- **It is prohibited to control the bridge crane with channel profiles movements while on board it.**

5.1.2 Permitted loads, unpermitted loads

§ The loads must be:

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

§ Handling the following loads is not allowed:

- **whose weight, including any accessories, exceeds the crane capacity** (fig. 30).
- **with weights that are unbalanced compared to their centre of gravity.**
- **with surfaces that are not sufficiently resistant to the pressure exercised by the grip**
- **that, due to their chemical and physical characteristics, have been classified as hazardous, for example: flammable, explosive, radioactive, etc. materials**
- **toxic or handful materials or products, if not handled in specific safe containers, for example; corrosive chemical products, with biological risks, etc.**
- **bulk food products or substances, that can come into direct contact with the hoist parts or with its lubricants.**
- **that can change their static and/or chemical and physical configuration or their barycentre during handling**
- **not equipped with accessories as per the following point**

5.1.3 Lifting equipment

§ The following are generally allowed:

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

§ The following accessories are generally not allowed:

- **with functional specifications that can cause dynamic overstress to the crane over those allowed or accidental overloading.**
- **that can collide with the parts of the bridge crane with channel profiles** (fig. 31).
- **that limit the free movement of the load.**
- **that are connected with independent electrical lines.**

The weight of the lifting accessories must be subtracted from the rated capacity of the bridge crane with channel profiles.

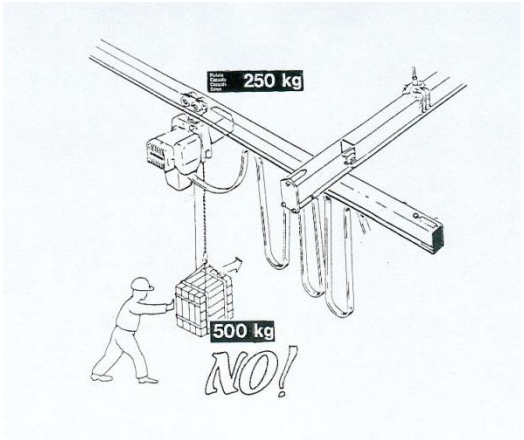


fig.30

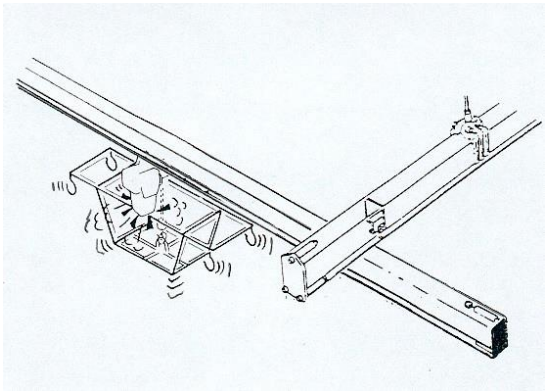


fig.31

5.2 - Operating conditions

5.2.1 Operating environment

- **The operating environment must have the following specifications:**
- **temperature:** min. - 10°C; max.: + 40°C : relative humidity max. 80%.
- **use in an indoor environment:** in this case the bridge crane with channel profiles is not exposed to inclement weather and does not require any special precautions.
- **use outdoors:** the bridge crane with channel profiles may be exposed to inclement weather during and after use. The electrical parts must be equipped with protection IP55, it is also recommended to protect the hoist with overhangs and guards (fig. 32)
  To prevent oxidation protect the structure with adequate treatments and lubricate rotating parts.
  Outdoor use of the bridge crane with channel profiles is permitted if there is no exceptionally bad weather, which could modify the values of the expected loads, for example heavy rain, heavy snowfall, strong wind, etc.

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

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

5.2.2 Hazardous areas and exposed persons

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

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

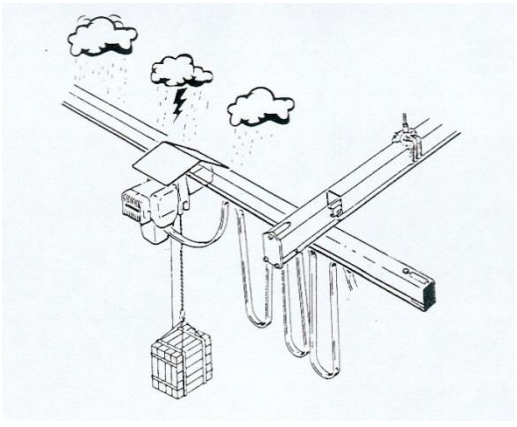


fig.32

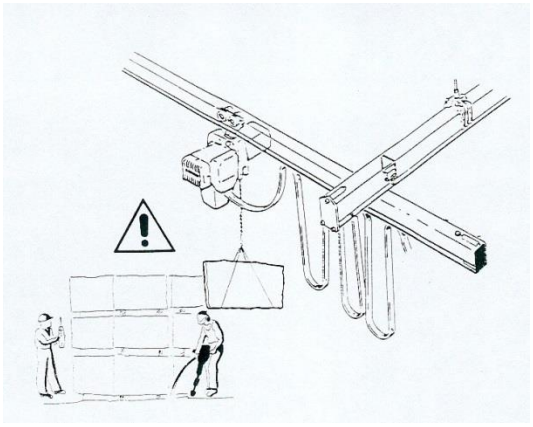


fig.33

5.2.3 Work area lighting

§ The DSC series bridge cranes with channel profiles are not equipped with their own lighting system. Consequently, the workplace of the operator assigned to use the crane must be adequately lighted and ensure maximum visibility.

- **The level of ambient light must always be such as to ensure the maximum possible safety for crane operations** (fig.34)**.**
- **It is mandatory to install supplementary lighting systems in areas that are not sufficiently lit, thus preventing shadow areas that inhibit or reduce the visibility in the operating and/or surrounding areas**

5.2.4 Operator

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

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

- **The operator must not allow anyone to come close during the use of the bridge crane with channel profiles and prevent it from being used by unauthorised personnel, especially minors under age 16.**
- **The use of the crane by unauthorised and uninformed persons is prohibited.**
- **The operator must always use adequate personal protection equipment (P.P.E. = gloves, protective shoes)**

5.2.5 Capacity of the bridge crane with channel profiles

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

- **The capacity of the crane or its accessories must never be exceed by applying overloads** (fig. 35).
- **The crane must never be equipped with lifting equipment (hoist) with a rated capacity over the same.**
- **The lifting speed of 24 m/min must never be exceeded, unless the crane capacity is adequately reduced.**

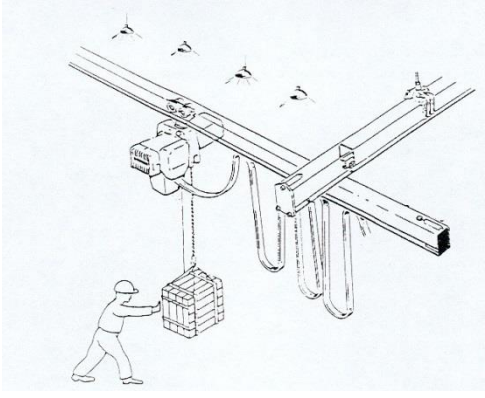


fig.34

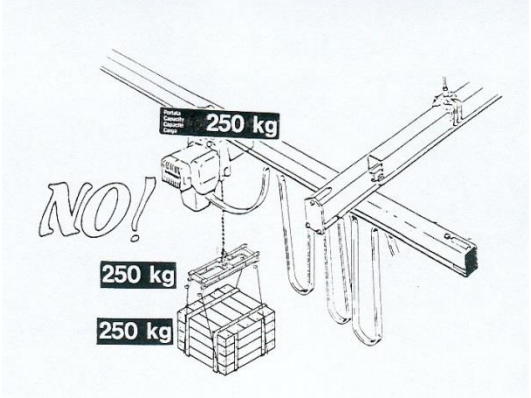


fig.35

5.2.6 Maneuvers: lifting, trolley traverse and bridge travel

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

- Gripping of the load with the hoist hook and the lifting accessories needs to be carried out carefully, gently and without abrupt movements.
- Start the lifting operation by slowly tensioning the chain until lifting the load a few centimetres, stop the manoeuvre and check the hold and the stability of the load.
- At the end of handling, carefully place the load and release the hoist hook,
- **During lifting manoeuvres** the operator must avoid putting the hook on the ground or on the loads to lift, to prevent the chain from shifting. The operator must absolutely avoid making oblique pulls which are always dangerous and hard to control (fig. 36).
- **During manual trolley traverse or bridge travel manoeuvres** it is mandatory to avoid violent collisions between the trolley/hoist and the end bumpers, in order not to cause serious repercussions on the mechanical parts and metalwork. The operator must handle the load by pushing it and never by pulling it towards himself, to prevent the risk of being crushed (fig. 37).

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

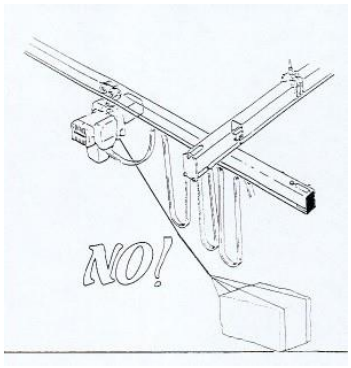


fig.36

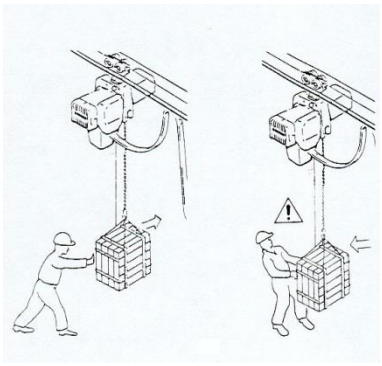


fig.37

5.2.7 Safety devices

§ Disabling of the crane power must be performing by disabling the line switch/circuit breaker (not included in the supply) and/or by pressing the "emergency stop" button on the pushbutton panel.
§ An electric or mechanical interlocking device prevents simultaneous control in both hoist motor rotation directions, both at slow and fast speed.
§ A power failure will cause the hoist to block immediately; it is equipped with a self-braking motor.
§ A safety catch is installed on the lifting hook to prevent accidental unhooking of the slings and/or load.
§ The lifting, traverse and travel limit switches limit the maximum vertical and horizontal travel of the load. They are emergency devices and not suitable as operating stops.

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

5.3 - Installation of the bridge crane with channel profiles

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

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

5.4 Deactivating at the end of work

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

1. Position the crane in a recovery position making sure of its stability and taking care that it does not generate risks of collision or interferences with surrounding structures and/or machines
2. Release the lifting hook from the slings used to handle the load
3. Lift the hook, where possible, to a height not under 250 cm, i.e. so that it does not create disturbances and danger for the movement of people and things below the crane.

If used with a manual hoist:

4. Make sure the manoeuvre chain does not generate risks of being drawn in

If used with a electrical hoist:

4. Stop all crane movements by pressing the “stop” button of the pushbutton panel
5. Put the pushbutton panel in the “do not disturb” position
6. Deactivate the power by putting the general switch in the “OFF” or “0” (zero) position.

5.5 - Use criteria and precautionary measures

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

- **ALWAYS** follow the indications and instructions contained in the installation and user manuals and check the conditions of the crane components and parts.
- **ALWAYS** comply with the instructions and warning shown on the machine; the warning plates on the crane and the manoeuvre areas are accident prevention warnings and they must always be perfectly legible.
- **ALWAYS** make sure that the crane works in an environment protected from inclement weather (rain, wind, snow, etc.) or, if outdoors, that it is equipped with suitable guards.
- **ALWAYS** check the compliance of the crane performance in relation to its intended service (duty cycles - intermittence - use time - load to handle) .
- **ALWAYS** check the soundness of the structures that support the bridge crane with channel profiles and the suitability of the runways (fig.38).
- **ALWAYS** make sure the maintenance conditions of the crane are adequate (cleaning and lubrication) and of its main components (hook, chains, pushbutton panel, limit switches, wheels, brakes, etc.).
- **ALWAYS** check the correspondence of hoist movements
- **ALWAYS** test the operation of the emergency stop button.
- **ALWAYS** constantly check the efficiency of the brake, limit switches and electrical system.
- **ALWAYS** check the conditions of the chain, block, hook and pushbutton panel.

- **ALWAYS** check that the hook is not worn, damaged or missing its spring catch.
- **ALWAYS** check the suitability and efficiency of the slings (ropes, chains, bands, etc.).
- **ALWAYS** check that the track for movement of the trolley, is installed at a height which does not allow the operator to interfere with the shape of the trolley hoist and/or moving parts. If this is not possible install appropriate guards or signs located in the risk area (fig. 39).
- **ALWAYS** act on the load by pushing it during manual handling with trolley traverse and bridge travel and avoid pulling it towards yourself (fig.40).
- **ALWAYS** make sure to have centred the lifting unit (hoist and hook), on the perpendicular axis of the load before performing the slinging and handling of the load.
- **ALWAYS** correctly secure the slings of the load to the lifting hook and tension the slings with slow and safe manoeuvres.
- **ALWAYS** work in the best lighting conditions of the area and visibility of the load.
- **ALWAYS** make sure before any manoeuvres that during lifting, traverse and travel that the load will not encounter obstacles (fig.41).
- **ALWAYS** work outside the manoeuvre range of the lifted load.
- **ALWAYS** activate the various movements avoiding the use of control impulses in rapid succession.
- **ALWAYS** avoid combining movements by activating the lift and traverse buttons at the same time and being careful not to generate swaying of the load.
- **ALWAYS** use the “slow” speeds for approach and positioning operations (fig.42).
- **ALWAYS** position the bridge, lifting hook and pushbutton panel at the end of working in a manner that they are not in danger of colliding (fig.43).
- **ALWAYS** press the red emergency stop button on the pushbutton panel and disable the crane general switch before leaving the manoeuvre position.
- **ALWAYS** turn off the machine voltage for inspections, repairs and routine maintenance operations.
- **ALWAYS** use suitable personal protection equipment (PPE, gloves, etc.) for all operations
- **ALWAYS** report any operating anomalies (defective behaviour, suspected breakage, incorrect movements and noise that is not normal) to the department head and put the machine in non-working conditions.
- **ALWAYS** comply with the maintenance operation program and register, for each test, any observations related in particular to the hook, chains, brakes and limit switch.

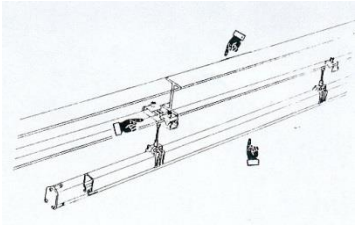


fig.38

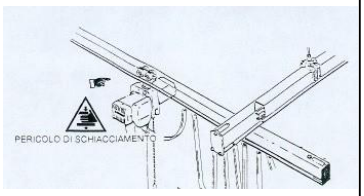


fig.39

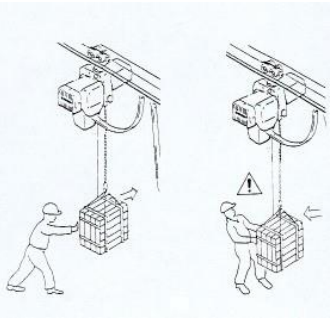


fig.40

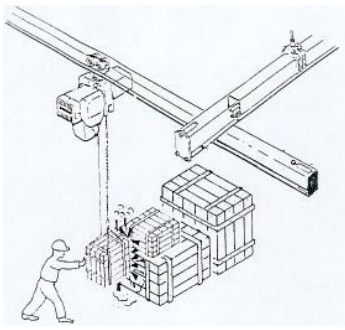


fig.41

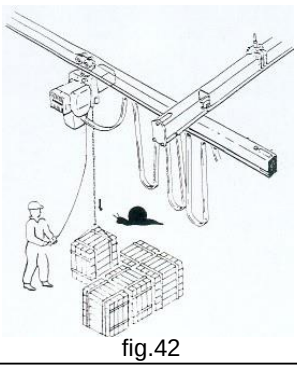


fig.42

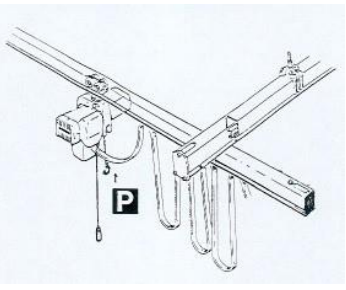


fig.43

5.6 - Use contradictions

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

5.6.1 Unintended and unpermitted use - Predictable and unpredictable incorrect use

- **NEVER** use the bridge crane with channel profiles to lift and transport people (fig.44).
- **NEVER** lift loads greater than the rated capacity nor equip the crane with hoists with a rated capacity higher than the crane capacity (fig.45).
- **NEVER** lift loads while people are transiting in the manoeuvring area below.
- **NEVER** move through, stand, work or manoeuvre under the suspended load.
- **NEVER** allow the crane to be used by unauthorised personnel or minors under 16 years of age.
- **NEVER** use the crane if not mentally and physically fit.
- **NEVER** use the crane without adequate personal protection equipment (PPE, gloves, etc.).
- **NEVER** operate without due attention during lifting, traverse and travel manoeuvres of the bridge crane.
- **NEVER** turn the load and/or pull the trolley or bridge using the pushbutton panel cable (fig.46).
- **NEVER** put your hands on the slings during the "tensioning" phase in the contact areas with the load and between the hook and slings.
- **NEVER** leave a suspended load unsupervised.
- **NEVER** use the crane for services other than those for which it is intended, avoid using it for other operations for example painting ceilings, changing light bulbs, as a support for scaffolding, etc.
- **NEVER** lift unbalanced loads.
- **NEVER** swing the load of the hook during the traverse and/or travel.
- **NEVER** put the chain in a diagonal pull position.
- **NEVER** use the crane or its lifting equipment for pulling or dragging operations.
- **NEVER** use slings without having previously checked their suitability.
- **NEVER** use the hoist chain as earthing for the welding machine.
- **NEVER** lift loads with the tip of the hook.
- **NEVER** use the crane to keep items attached to the ground tensioned or to extract them.
- **NEVER** lift "guided" loads without having set up adequate safety measures.
- **NEVER** continue the hook stroke after having placed the load causing the chain to shift.

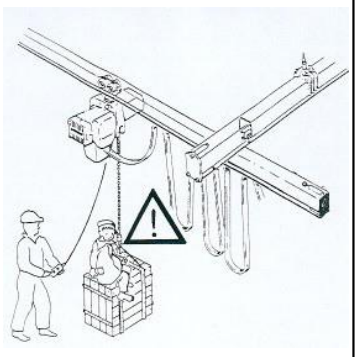


fig.44

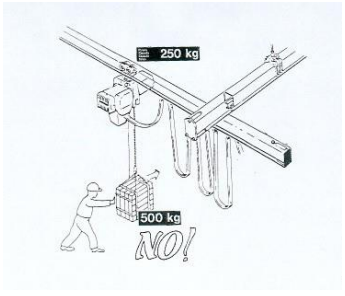


fig.45

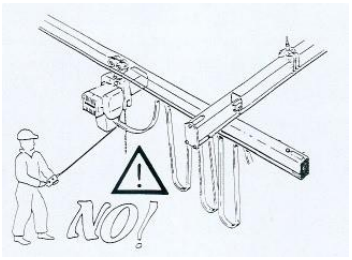


fig.46

- **NEVER** bump into the plant structures, machines and systems with the load or bridge (fig. 47)-
- **NEVER** use two cranes at the same time to lift the same load (fig. 48).
- **NEVER** use the crane with two simultaneous movements, wait until the movement in progress has completely stopped before starting another one.
- **NEVER** use the crane in unpermitted environmental conditions or, if installed outdoors, in harsh, unfavourable and/or dangerous environmental conditions (strong wind, strong rain, etc.) - (fig. 49).
- **NEVER** use or work on the crane in insufficient lighting and/or visibility conditions.
- **NEVER** use the crane in areas where the use of non-explosive components is required.
- **NEVER** make the limit switches or load limiter trip continuously.
- **NEVER** reach the “stroke end” at full speed in traverse and travel movements.
- **NEVER** use the crane in the presence of a sharp mains voltage drop or if one of the three phases is missing.
- **NEVER** perform abrupt changes in direction in the lifting, traverse and travel manoeuvres.
- **NEVER** repeatedly activate the pushbutton panel control buttons.
- **NEVER** change the functional and performance characteristics of the crane and/or its components.
- **NEVER** tamper with the settings of the safety devices (limit witches, clutch device) - (fig.50)
- **NEVER** perform temporary repairs or reset interventions not in compliance with the instructions.
- **NEVER** use non-original spare parts or those not prescribed by the manufacturer.
- **NEVER** entrust extraordinary maintenance and repair operations to personnel not instructed by the manufacturer.
- **NEVER** leave the crane at the end of work without having put the safety procedures into place (fig.51).
- **NEVER** perform, maintenance, inspections or repairs without turning off the crane.
- During maintenance phases, **NEVER**: (fig.52)
  - use unsuitable tools
  - lean ladders on the column, hoist trolley or crane bridge beam/s
  - work without individual protection devices.
  - intervene without having removed the lifted load
- **NEVER** use the crane if it is not perfectly compliant in all its operating functions.

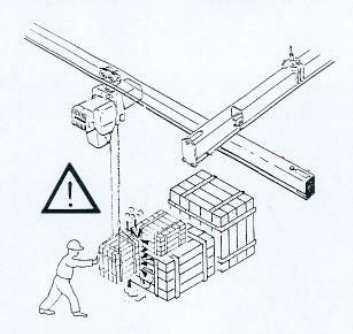


fig.47

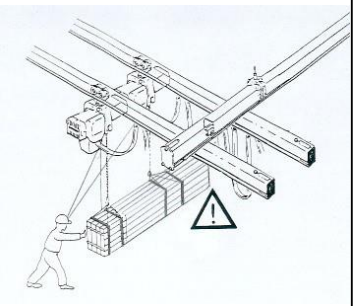


fig.48

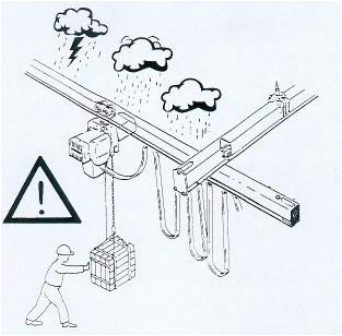


fig.49

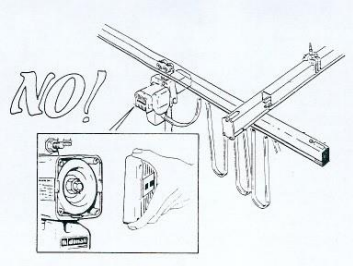


fig.50

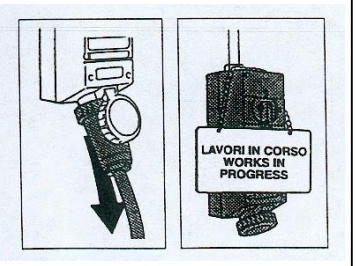


fig.51

fig.52

6. - MAINTENANCE OF THE BRIDGE CRANE WITH CHANNEL

6.1 Safety precautionary measures

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

- **The personnel assigned to bridge crane with channel profiles maintenance must:**
  - **be well trained**
  - **have read this publication**
  - **have an in-depth knowledge of accident prevention laws**
  - **Unauthorised personnel must remain outside of the work area during**

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

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

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

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

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

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

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

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

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

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

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

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

Always use protective gloves during maintenance operations.

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

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

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

Pay maximum attention to all of the RESIDUAL RISKS shown on the bridge crane with channel profiles and included in this publication.

6.2 Qualification of personnel assigned to maintenance

§ To be able to adequately perform maintenance of the bridge crane with channel profiles, the personnel assigned to maintenance must:

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

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

	Operator assigned to use of the bridge crane with channel profiles.	

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

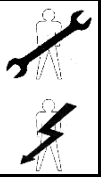
	Mechanical maintenance personnel	

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

Electrical maintenance personnel

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

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



Mechanical technician

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

Electrical technician.

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

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

Special recommendations regarding maintenance:

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

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

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

6.3 Maintenance plan

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

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

6.3.1 Daily and routine maintenance.

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

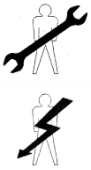
§ Maintenance operations are divided into:

Daily operations, handled by the operator assigned to crane use:

- general visual inspections
- functional tests with testing of motors, limit switches, clutch device, brakes with no load, "stop" button, and other functions of the pushbutton panel
- testing of the chain and hook conditions
- testing of correct trolley and bridge travel

Monthly operations, handled by qualified personnel:

- visual inspection of each mechanism and any lubricant leaking
- functional testing of full load brakes
- checking that no anomalous noises and/or vibrations exist
- greasing of the mechanisms and limit switches to ensure regular operation and limit wear
- testing of the operation and conditions of the pushbutton panel and relative cable.



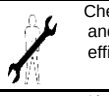
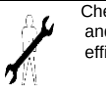
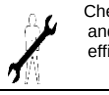
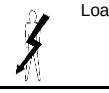
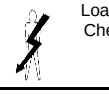
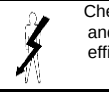
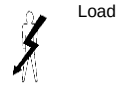
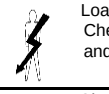
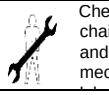
Quarterly operations, handled by qualified personnel:

- check the efficiency and wear of: hook, chain and chain guide
- check the nut, block/subblock wear
- check the wheel and guide roller wear of the traverse trolley and bridge
- check the efficiency and operation of the load limiter.
- inspect the interior of the panels to check for the presence of dust
- check and clean oxidised contacts and any plug/socket connectors
- check the greasing of the mobile trolleys of the cable line and check the cables
- check the efficiency and conditions of the power line and its components
- test the motors and brakes with load with check of wear
- check the efficiency and preservation of the structure (paint, oxidation, etc.)

6.3.2 Frequency and deadlines for maintenance interventions.

§ The frequency of the following operations refers to a bridge crane with channel profiles used in normal operating conditions and are valid up to service group M5 (standard ISO 4301-1) or 2m (FEM 9.511 rule).
§ If the use of the bridge crane with channel profiles is normal and correct for a daily 8 hour shift, the following overhaul may be performed after a use period of approximately 10 years (FEM 9.755 - S.W.P. rule)
§ If used is over various shifts, the maintenance periods need to be changed proportionately.

Table of periodic checking and maintenance operations

Subject of the check ⇓	Periodic checks				Useful
	Daily	Monthly	Quarterly ☒	Annual ☒	
Checks Inspections - Acceptance tests	 General visual checks Correct operation	 General visual inspections	 Check wear	 Annual acceptance test	page 32
Warnings and pictograms, Signs and plates	 Legibility of warnings and pictograms, signs and	 inspections of conditions and cleaning of plates and signs	 Check suitability		page 19
Structural elements Welding - Pins Bolted connections				 Check wear and efficiency Check	page 52
Chain Anchoring parts	 Visual inspection		 Check wear and efficiency		Hoist manual
Lifting hook	 Inspection and test spring catch		 Check wear and efficiency		Hoist manual
Loading nut Chain guide Block return			 Check wear and efficiency		Hoist manual
Lifting reducer		 Noise test			Hoist manual
Lifting motor	 Check correct operation		 Load test		Hoist manual
Lifting brake	 Check correct operation	 Load tests of the braking space	 Load tests Check wear		Hoist manual
Trolley wheels Guide rollers Rotation bearings			 Check bearing noise	 Check wheels	page 53
Buffers/ bridge and trolley anti-collision devices	 Visual inspection			 Check wear and efficiency	page 53 and page 54
Electrical system Pushbutton panel and cable	 Check correct operation	 Inspection of external pushbutton panel/cable	 Check wear and efficiency		Hoist manual and page 54
Load limiter Clutch device			 Load test	 Check the calibration	Hoist manual
Lifting limit switch Traverse limit switch	 Check correct operation		 Load tests Check wear and efficiency		Hoist manual
Cleaning and lubrication	 Check correct cleaning and lubrication conditions	 General lubrication inspection	 Check for chain, hook and mechanism		Hoist manual and page 55

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

6.3.3 Test of part and component efficiency

The following instructions should be scrupulously complied with for the single parts of the bridge crane with channel profiles:

Annual test of the efficiency of the structural elements, welding, pins and bolted joints (fig. 53):

- The metallic structure of the bridge crane with channel profiles, in addition to normal alternations due to environmental factors and wear of moving parts, may be subject, including unexpectedly or during handling operating phases, to collisions, contacts or scraping with other equipment or abnormal stress that can damage the metalwork frames, welding and pins. Therefore the structures, after perfect cleaning, must periodically undergo scrupulous tests to check their suitability and repair any damage.
- The brackets composed of plates and pin, that form the hinged parts are subject to wear since they are mobile and swinging parts subject to radiating friction in the contact area. Replace them if any excessive wear is found when they are checked.
- All of the grub screws, high resistance pins and pins must be disassembled and carefully checked along with their seats on an annual basis.
- Check the tightening of all fixing bolts of the suspensions and connections.

Repair the hinged structures and parts or replace them if the following occurs:

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

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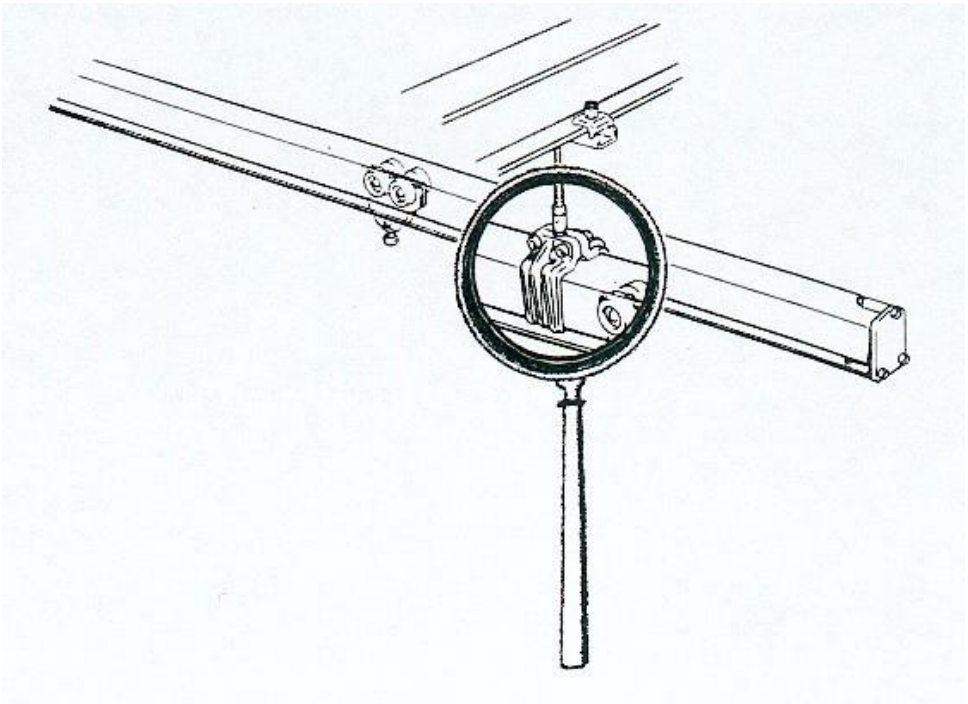


fig.53

Annual test of efficiency of wheel and guide rollers of the trolleys with channel profiles(fig.54):

- Check the wear of the rolling band of the wheels and guide rollers.
- Check the ball bearings every three months. They need to be replaced if there is excessive noise or if they have excessive friction, “tugging”, difficult and/or irregular rotation

Replace the wheels and/or guide rollers of the trolley with channel profiles if:

- **The rolling diameter of the wheel has wear ≥ of 5 mm**
- **The rolling diameter of the guide roller has wear ≥ of 2 mm**
- **If even just one wheel needs to be replaced, to obtain the best operating guarantee and duration it is advisable to replace all of the trolley wheels**

Annual test of the trolley and bridge buffer efficiency: (fig.55)

- Check that the end stops are not deformed and that there are no sign of their anchoring to the structures giving way and that the buffer is intact and correctly fixed in its mounting.

Replace the buffers if they have:

- **Signs of breakage or permanent deformation, cuts, abrasions or incisions**

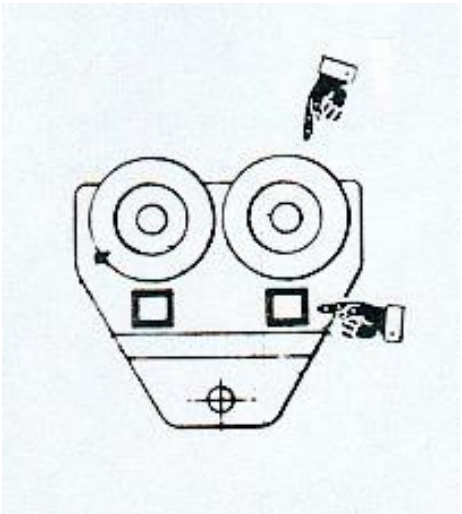
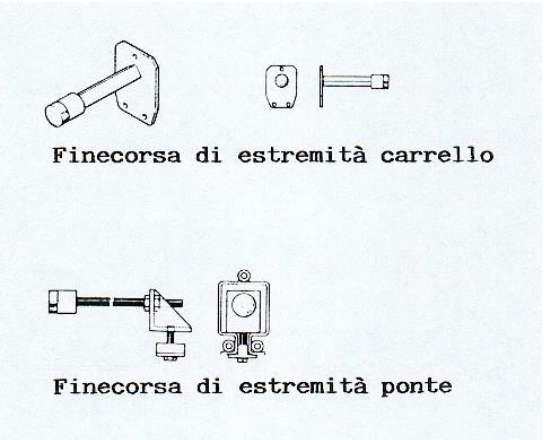


fig.54



(Travel and field limiter stop) see page 4

fig.55

Quarterly test of the limit switches and the mechanical anti-collision devices:

- Check the preservation conditions and correct tripping of the mechanical limits
- Check the mechanical conditions of the mobile anti-collision parts and check the tightening of the fixing screws.

Replace the limit switch stops or anti-collision devices if they have:

- **Signs of breakage or permanent deformation, cuts, abrasions or incisions**

Quarterly test of the efficiency of the power electrical system:

- Check the efficiency of the power cable, make sure there are no worn patches, cuts, abrasions or other alterations of the protection sheathing.
- Check the tightening of the conductors, power cable, their terminals (in the connector block) and, if necessary, tighten them correctly.
- Check the efficiency of the conductors and earth connections, checking them and fixing all of the earthing screws if necessary.
- Check all of the seals of the covers and grommets.
- Check for the presence and efficiency of the warning plates located on the cover

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

For information on the tests of all the structural, mechanical and electromechanical tests of the lifting and traverse units incorporated in the bridge crane with channel profiles, see the relative documentation attached to this technical publication.

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

6.3.4 Cleaning and lubrication of the bridge crane with channel profiles

- **Cleaning can be performed by personnel who is not highly specialised.**
- **It is periodically necessary to keep the following parts clean:**
  - **bridge crane with channel profiles structures** (runways, bridge beam/s, etc.)
  - **bridge crane with channel profiles mechanisms** (pins, connections, hinges)
  - **electrical parts** (wires, cables, trolleys, busway trolley, etc.)
  - **components of the lifting and traverse unit** (wheels, chain, hook, block, pushbutton panel, etc.).
- **Overhead cleaning above ground must be performed by qualified personnel equipped with suitable means and personal protection equipment.**
- **These operations are necessary on a quarterly basis to permit activation of periodic tests.**

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

Accurate management of the bridge crane with channel profiles mechanism lubrication is a necessary condition for guaranteeing the effective compliance to its intended service as well as its duration.

- The lubricating power decreases over time due to stress, so it is necessary to restore or renew the lubricants.
- The lubrication of the bridge crane with channel profiles is very simple. The parts or components that must be periodically subjected to lubrication cycles, through the application of a light payer of grease are dense oil include:
  - the suspension ball joints
  - the cable holder trolleys or slides of the power system
  - the wheels and guide rollers of the traverse and travel trolleys
- The lubrication of the lifting mechanisms is very important, their lubrication cycles are contained in the relative documentation attached to this technical publication.

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

6.4 Troubleshooting

6.4.1 Main causes of malfunctions or faults and possible solutions

§ The columns of the table below show the main malfunction conditions that can be reasonably predicted and the type of problem, potential cause of the fault and possible solutions.

Fault type	Possible fault causes	Possible solution
the travel movement of the hoist holder or bridge holder trolley is blocked	• **introduction of foreign body in the channel of the bridge beam or runway** • **wheel bearings broken**	• **remove the foreign body from the channel** • **replace the bearing**
Difficult travel of the bridge and/or trolley and/or slider of the electrical system, which requires excessive effort	• **blockage of the channel track** • **not enough lubrication of the bearings or sliders** • **inadequate bridge span**	• **clean the inside of the channel** • **lubricate the track** • **check the span**
Unstable position of the bridge or trolley	• **runway or bridge beam not sufficiently level**	• **level the runway or the bridge beam**

6.4.2 Personnel authorised to intervene in the event of a failure

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

6.4.3 Decommissioning

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

6.5 Disassembly, disposal and scrapping

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

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

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

7. - SPARE PARTS

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

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

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

DONATI SOLLEVAMENTI S.r.l.
Via Quasimodo, 17 20025 Legnano (MI) Italia
Tel.+39 0331 14811 fax +39 0331 1481880
E-mail: dvo.info@donaticranes.com

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

8. - TEST LOGBOOK

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

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

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

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