Drive UNITS FOR CRANES

"DGT" Wheel Groups + "DGP" Offset Geared Motors

Endcarriages

for Single girder and Double girder Bridge Cranes

donati

OPERATING MANUAL

INSTALLATION - USE - MAINTENANCE

CE

MAN19MG01

CONTENTS

	page
1. PRELIMINARY INFORMATION	5
1.1 Contents and recipients of the operating manual	5
1.2 Symbols: meaning and usage	5
1.3 Collaborating with users	6
1.4 Conformity to norms and regulations	6
1.5 Manufacturer's liability and warranty	7
2. DESCRIPTION OF COMPONENTS AND TECHNICAL SPECIFICATIONS	8
2.1 "DGT" series drive units for cranes	8
2.1.1 Intended and proper usage	8
2.1.2 The range of drive units	8
2.1.3 Components on drive units	9
2.2 "DGT" series endcarriages for bridge cranes	10
2.2.1 Intended and proper usage	10
2.2.2 The range of endcarriages	10
2.2.3 Components on endcarriages	11
2.3 Technical specifications and operating conditions	12
2.3.1 Regulatory framework	12
2.3.2 Electrical power – Protection and insulation of electrical parts	12
2.3.3 Surface finish	12
2.3.4 Environmental conditions for standard usage	12
2.3.5 Noise emissions - Vibrations	12
2.3.6 Classification of "DGT" series drive units	13
2.3.7 Operating limitations and technical specifications for "DGT" series drive units	14
2.3.8 Operating limitations and technical specifications for "DGT" series endcarriages	27
2.3.9 Sample guidelines for selecting endcarriages and related drive units	38
3. SAFETY AND ACCIDENT PREVENTION MEASURES	40
3.1 Operator qualifications	40
3.2 General safety norms and regulations	41
3.3 Safety symbols and warning labels	41
3.4 Warnings inherent to residual risks	43
3.5 Safety devices and indications	44
3.5.1 Control devices	44
3.5.2 Safety and emergency devices	44
3.5.3 Identification nameplate and markings	45
4. HANDLING - INSTALLATION – SET-UP	46
4.1 General notes on the shipment	46
4.2 Packaging, transport and handling	46
4.2.1 Standard packaging	46
4.2.2 Transport	47
4.2.3 Lifting points and handling equipment	47
4.2.4 Handling	48
4.2.5 Removing the packaging	48
4.3 Installing "DGT" drive units and endcarriages	48
4.3.1 Setting up "DGT" drive units onto a crane beam	49
4.3.2 Setting up "DGT" endcarriages onto a bridge crane	52
4.3.3 Connections and electrical diagrams	53
4.4 Setup and preparation	54
4.4.1 Preliminary operations	54
4.4.2 Settings and operating tests	54
4.4.3 Testing the "DGT" drive units and endcarriages – getting ready for operation	54
4.5 Disabling the units	56
4.5.1 Storing the units and parts	56
4.5.2 Resetting up the units after storage	56

CONTENTS **page**

5. OPERATION	57
5.1 Functions on “DGT” drive units and endcarriages	57
5.1.1 Intended and proper usage	57
5.1.2 Admissible and inadmissible loads	57
5.2 Operating conditions	57
5.2.1 Operating environment	57
5.2.2 Danger areas and exposed personnel	58
5.2.3 Lighting conditions in the work area	58
5.2.4 Operators	58
5.2.5 Load bearing capacities on “DGT” drive units and endcarriages	59
5.2.6 Driving operations	59
5.2.7 Safety devices	59
5.3 Safety measures and precautions	60
5.4 Counterindications	61
5.4.1 Improper and unintended usage – Foreseeable and unforeseeable improper usage	61
6. MAINTENANCE	62
6.1 Safety precautions	62
6.2 Qualifications for maintenance personnel	64
6.3 Maintenance program	67
6.3.1 Daily and periodic maintenance	67
6.3.2 Maintenance frequency and deadlines	68
6.3.3 Checking the operating efficiency of parts and components	69
6.3.4 Cleaning and lubrication	71
6.4 Setting the brake on the motors on “DGT” drive units and endcarriages	72
6.5 Disassembling the “DGP” drive motoreducer	75
6.6 Replacing parts and components	76
6.6.1 Replacing the brake on the motors on “DGT” drive units and endcarriages	76
6.6.2 Replacing the wheels on “DGT” drive units	77
6.7 Troubleshooting guide	78
6.7.1 Malfunctions and irregularities	78
6.7.2 Malfunctions on components and possible solutions	79
6.7.3 Personnel authorized to intervene in case of malfunctions	79
6.7.4 Disabling the units	79
6.8 Dismantling and disposing of the units	80
7. SPARE PARTS	80

1. – PRELIMINARY INFORMATION

1.1 Contents and recipients of the operating manual

- This technical publication, identified with the code **MAN19MG01**, refers to the following products, hereinafter also referred to as **"components"**:
  - **Drive units**, comprising the **"DGT" series Wheel Groups**, in combination with the **"DGP" series Offset Geared motors**;
  - **"DGT" series endcarriages for single girder and double girder bridge cranes**;

  designed, manufactured and introduced on the market by:

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

- In relation to its "intended use," technical and functional specifications, performance characteristics and installation, use and maintenance instructions, the manufacturer directs its attention at:
  - the production plant or work site coordinator
  - operators in charge of transport, handling and installation
  - personnel charged with maintenance operations
- This operating manual must be kept under the care of a person responsible for the machinery's operation, in an appropriate location, so that it is always available for consultation in the best possible state of conservation.
- If this operating should go missing or become damaged, a replacement copy must be ordered directly from the manufacturer, citing the code of this present operating manual.

- **The manufacturer maintains the material and intellectual property rights to this publication and forbids its dissemination and/or duplication, even partial, without its prior written consent.**
- Copyright© 2012 by ***DONATI SOLLEVAMENTI S.r.l.***

1.2 Symbols: meaning and usage

- This operating manual makes use of various symbols to call the reader's attention to and emphasize the importance of certain safety considerations.

The table below provides a list of symbols used in the manual, and their related meaning.

SYMBOL	MEANING	EXPLANATION, RECOMMENDATIONS, NOTES
	Danger	• Indicates danger with the risk of an accident, even death related. • Failure to respect the safety instructions related to this symbol can lead to extremely dangerous situations placing the unit's operator and/or persons exposed at risk! • **Abide strictly to all safety precautions indicated!**
	Warning	• Represents a warning notice for the possible deterioration of components or the operator's personal belongings. • **Important warning - pay maximum attention.**
	Caution **Note**	• Provides information or useful information on key functions.
	• **Visual control** • **Take action**	• An eye-shaped symbol tells the reader to: **a)** proceed with a visual control check. **b)** proceed with the operating sequence. **c)** read or take note of a setting or measurement, check an indication, etc.

1.3 Collaborating with users

- This operating manual represents the state-of-the-art in technology at the time of the introduction to the market of the components illustrated herein.
- Any integrations to this operating manual the manufacturer deems appropriate to send to users must be duly conserved together with the original manual.
- The manufacturer is available to its customers to provide further information and to consider proposals for improvements, so as to render this manual more responsive to the needs of users.

1.4 Conformity to norms and regulations

- The components illustrated in this publication have been designed and produced in conformity with current legislation in Italy, adopting the following **European Community Directives:**
  - **Machinery Directive 2006/42/CE**;
  - **Low Voltage Directive 2006/95/CE**;
  - **Electromagnetic Compatibility Directive 2004/108/CE**.
- Specifically, in relation to the obligations outlined in **Machinery Directive 2006/42/CE**, the **"DGT" series Drive Units and Endcarriages** are:
  - conceived and manufactured as per the **"Essential Safety Requisites"** cited in **Attachment I**;
  - the **travelling Endcarriages** are introduced into the market, as prescribed in **Attachment II,** equipped with a **CE Marking** and **EC Declaration of Conformity – Attachment II A**.
  - the **Drive Units** are introduced into the market, as prescribed in **Attachment II**, equipped with a **Declaration of Incorporation – Attachment II B**, as **incomplete machinery**, i.e. designed to be incorporated with other machinery, the components illustrated herein present **no CE marking**.

CE EC DECLARATION OF CONFORMITY

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

The legal representative of the company:

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 2006/95CE**
- **Electromagnetic Compatibility Directive, 2004/108/CE**

Main technical regulations considered:

EN ISO 12100 part : 1ª - 2ª /2005 – Safety of the machinery
EN ISO13849-1/2006 General principles for design
EN 12077-2/2008 Limiting and indication device
EN 60204 – 32/98 – Safety of machinery electrical equipment of machines
EN 60529/92 – Degrees of protection provided by enclosures (IP code)
ISO 4301-1/86 – Lifting equipment classification
ISO 4308 – 1/86 – Selection of wire ropes (for wire rope hoists DRH series)
UNI 9466 – 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: **Massimo Soldati**
Address: **Via Quasimodo, 17 - 20025 Legnano (MI) - Italy**

DONATI SOLLEVAMENTI S.r.l.
OPERATIONS DIRECTROR
MR. GODIO GIULIO

Date: 04.07.2012

facsimile of the EC Declaration of Conformity Attachment II A

DECLARATION OF INCORPORATION

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

The legal representative of the company:

DONATI SOLLEVAMENTI S.r.l.

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

Declares that the "Incomplete machine" called:

Motor gearbox	**Type:**	**Serial Nr:**	**Year:**
Wheel box	**Type:**	**Serial Nr:**	**Year:**

Is in according to the following basic safety requirements of annex I:

R.E.S. 1.1.1. – 1.1.2. – 1.1..3. – 1.1.5. – 1.3.1 – 1.3.2. – 1.3.3. – 1.3.4. – 1.5.1. – 1.5.4. – 1.5.8. – 1.5.9. – 1.7.3. – 1.7.4. – 1.7.4.1. – 1.7.4.2. – 1.7.4.3. – 4.1.1. – 4.1.2. – 4.1.2.1. – 4.1.2.2. – 4.1.2.3. – 4.1.3. – 4.2.2.

The relevant technical documentation is compiled in accordance with Annex VII B of the Machinery Directive 2006/42/EC and that "Incomplete Machine" conforms to the following EC Directives:

- **Low voltage Directive, 2006/95/EC**
- **Electromagnetic Compatibility Directive, 2004/108/EC**

While declaring that the "Incomplete Machine" must not be put into service until the final machinery in which it is incorporated, has been declared to conform to the provisions of the Machinery Directive 2006/42/EC,
We undertake to transmit, in response to a specific request of national authorities, relevant information about the "Incomplete Machine"

Person authorized to provide appropriate documentation:

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

DONATI SOLLEVAMENTI S.r.l.
OPERATIONS DIRECTROR
MR. GODIO GIULIO

Data: 03/07/2012

facsimile of the Declaration of Incorporation Attachment II B

1.5 Manufacturer's liability and warranty

- In relation to the components illustrated herein and in reference to the indications outlined in this operating manual, the manufacturer ***DONATI SOLLEVAMENTI S.r.l.*** declines any **responsibility** in the case of:
  - usage contrary to Italian legislation on safety and accident prevention measures;
  - wrongful preparation and setup of components in the worksite, and/or on structures and machinery the components are set to operate on;
  - faulty electrical line voltage specifications;
  - failure to observe the instructions provided in this operating manual;
  - non-authorized modifications or interventions on the product;
  - installation on the part of non-qualified or ill-trained personnel.
- So as to avail itself of the **warranty**, as outlined in the certificate below, the buyer must meticulously observe the prescriptions indicated in this operating manual, specifically:
  - always operate within the product's usage and performance limitations;
  - always carry out constant and diligent maintenance, as outlined in this operating manual;
  - entrust the use and operation of lifting equipment and machinery fitted with the **"DGT" series drive units and endcarriages** to operators with proven experience and skills, and appropriately trained in their usage;
  - make use of the manufacturer's original spare parts exclusively.

- **The usage designations and configurations foreseen for the "DGT" series sliding units and beams are the ones admissible. Do not attempt to use these components disregarding the indications provided.**
- **The instructions provided in this manual do not substitute, but summarize the obligations stipulated under current legislation on accident prevention regulations.**

WARRANTY CERTIFICATE

Whereas:

- ***DONATI SOLLEVAMENTI S.r.l***. is the **Manufacturer** of the **"DGT" series Wheel Groups and endcarriages** illustrated in this technical manual.
- ***DONATI SOLLEVAMENTI S.r.l.*** carries out manufacturing controls in accordance with its company instituted **"Quality system,"** certified by **ICIM** as **No. 0114**, in compliance with the **UNI ISO 9001:2008** norm.

"DGT" series Wheel Groups and endcarriages are covered by the following warranty formula:

1. The warranty on these components extends to 36 months from delivery, as indicated by the date of the invoice, taking into consideration the specifications and exclusions cited herein and excepting different explicit agreements between the parties. This warranty is subordinate to the notification by registered mail, within 8 days of discovering faults or defects and recognizing their subsistence on the part of Donati Sollevamenti S.r.l.
2. The warranty covers exclusively parts which prove defective due to causes imputable to Donati Sollevamenti S.r.l., and comprises the replacement or repair of defective parts, with the exclusion of disassembly, assembly and shipping costs. Parts which Donati Sollevamenti S.r.l. recognizes as defective shall be shipped ex-works from the production facilities in Agrate (MB).
3. Regarding components provided by third parties (commercially available electrical and mechanical components) the warranty conditions which can be exercised towards their respective manufacturers and suppliers shall prevail.
4. Parts damaged during transport and handling operations shall remain excluded from the warranty, including parts subject to normal wear (e.g. brake friction seals) and/or deterioration caused by atmospheric and environmental agents. Excluded from this warranty are malfunctions deriving from, insufficient, incorrect or lack of maintenance, the inexperience of operating personnel, improper usage, non-authorized unforeseen usage, non-authorized modifications or repairs, mishandling and interventions on components carried out by non-qualified personnel or in defiance of the manufacturer's specifications.
5. The validity of the warranty is subordinate to correct installation, periodic controls and maintenance, as outlined in this operating "installation, usage and maintenance" manual, including diligent annotations in the "Control Registry" of all periodic maintenance interventions, controls, verifications and tests.
6. The replacement of defective parts does not entail the renewal of the warranty period on the entire machine. Donati Sollevamenti S.r.l. remains in all cases exempt of all liability or obligation of indemnity of any form, and the buyer agrees to forego any requests for expenses or damages, whether direct and/or indirect, even towards third parties, due to machine stoppages.
7. The warranty shall be considered void if non-original Donati spare parts and/or parts not approved by Donati are used.
8. The Court of Legnano shall be the sole and exclusive place of jurisdiction for any legal claims and disputes which may arise.

DONATI SOLLEVAMENTI S.r.l.

2. – DESCRIPTION OF COMPONENTS AND TECHNICAL SPECIFICATIONS

2.1 "DGT" series endcarriages for cranes

2.1.1 Intended and proper usage

- The **drive units for cranes comprise "DGT" series wheel groups in combination with "DGP" series offset geared motors**, are built specifically for handling lifting systems on rails, such as, for example, travelling cranes, trolley cranes, wall-mounted cranes, etc. and/or related running trolleys, guaranteeing the precise alignment for moving structures, control over high shifting speeds, while facilitating installation and maintenance.
- **"DGT" series wheel groups and "DGP" series offset geared motors** are modular components specifically designed for **drive units for cranes** by manufacturers of machinery and industrial lifting and handling installations.
- Running movements (forward and reverse) **must be enabled electrically**.

2.1.2 The range of Drive Units

- These **drive units for cranes** are designed and engineered based on the principle of modular components which, in addition to the more common versions commercially available, when assembled to one other in relation to the user's requirements, allow for the fast and economical realization of multiple standard and special configurations.
- **DONATI drive units** are configured in **6 production sizes**, for which the basic components are:
  - 6 sizes of **"DGT" series wheel groups** (Ø 125, Ø 160, Ø 200, Ø 250, Ø 315 and Ø 400)
  - 4 sizes of **"DGP" series offset geared motors** (DGP 0, DGP 1, DGP 2 and DGP 3)
  - 4 sizes of **self-braking motors** (motor 71, motor 80, motor 100 and motor 112)

<table>
<tr><th colspan="6">Wheel Group configurations based on combinations between "DGT" Wheels and "DGP" Motoreducers</th></tr>
<tr><th colspan="2">"DGT" wheels</th><th colspan="4">"DGP" series swinging gear motors</th></tr>
<tr><th>Size</th><th>Ø (mm)</th><th>"DGP" reducers size 0</th><th>"DGP" reducers size 1</th><th>"DGP" reducers size 2</th><th>"DGP" reducers size 3</th></tr>
<tr><td>1</td><td>125</td><td rowspan="2">Motors size 71</td><td rowspan="4">Motors size 71</td><td rowspan="2">Motors size 80</td><td>=</td><td>=</td></tr>
<tr><td>2</td><td>160</td><td>=</td><td>=</td></tr>
<tr><td>3</td><td>200</td><td>=</td><td rowspan="3">Motors size 80</td><td rowspan="4">Motors size 100</td><td>=</td></tr>
<tr><td>4</td><td>250</td><td>=</td><td>=</td></tr>
<tr><td>5</td><td>315</td><td>=</td><td colspan="2">=</td><td rowspan="3">Motors size 112</td></tr>
<tr><td rowspan="2">6</td><td>400</td><td>=</td><td colspan="2">=</td></tr>
<tr><td>400 R</td><td>=</td><td colspan="2">=</td><td>=</td></tr>
</table>

- The **6 production sizes for "DGT" series Wheel Groups** cover the following operating limitations:
  - **Capacity** of the lifting and/or traversing equipment:
    - from **1000 to 40,000 kg**
  - Running **speed**:
    - single speed, from **3.2** to **25 m/min**;
    - two-speed, from **12.5/3.2** to **80/20 m/min**.

- The modular design of the basic components (wheels, reducers and motor) allows for two configurations of **"DGT" series drive units**:
  - **Idle drive units** (fig. 1a)
  - **Motor driven units** (fig. 1b)

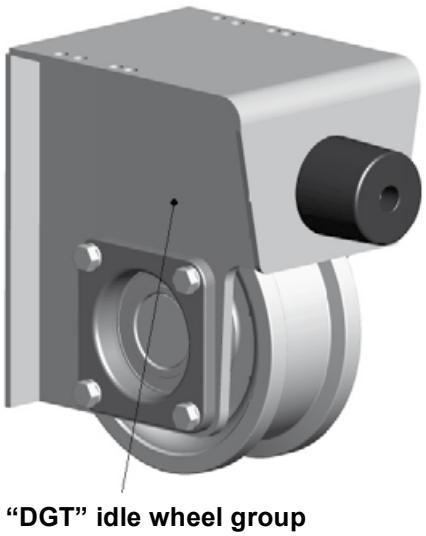
- The flexibility of the numerous fastening solutions adopted allow for assembly on a variety of mechanical frame types, as well as easy integration with a number of accessories available on the market, such as, for example, guide systems, or collision proof systems, whether mechanical, electrical or electronic, or speed control and crane and trolley stop position systems.

2.1.3 Components on Drive Units

- **"DGT" series wheel groups:**
  The drive wheels Ø 125, Ø 160, Ø 200, Ø 250 and Ø 315 are carbon steel moulded. The wheels Ø 400 and Ø 400 R are cast-iron.
  - All wheels revolve on radial bearings, permanently lubricated, with the exception of the larger capacity Ø 400 R wheel, which is fitted with roller bearings.
  - They are available in either neutral (idle) operation or ready to be set up as drive units in combination with a offset geared motors.
  - In drive operation, the direct coaxial connection between the oscillating reducer's exit shaft and the slotted hub on the drive wheel ensures high safety standards and operating reliability.
  - Wheels are available in a standard version with a double flange, and can be supplied, on request, in various sliding band widths in relation to the type of traversing rail they are intended to slide on.
  - Whether in idle or drive operation, the wheels are supported and contained within an electro-welded plated frame which acts as a support box for the entire group, and as an joining element between the operating head frame or trolley with which the wheel group is to be assembled.

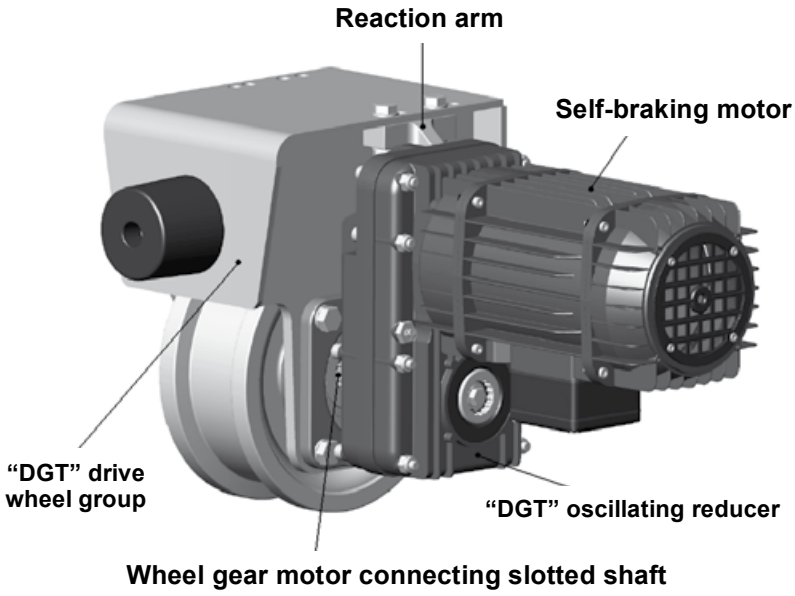
- **"DGP" series offset geared motors:**
  Reducers are designed as a "offset" type with a concave shaft, featuring parallel axes with two or three stages of reduction, and permanent oil-bath lubrication.
  - Engineered with cylindrical high resistance steel gears, featuring spiral toothing, thermically treated, entirely supported on ball bearings.
  - Sized to resist a lifetime of stress and wear, in accordance to the pertinent ISO service group.
  - The connection between the reducer and sliding wheel is guaranteed by a slotted shaft connecting the holes on both parts, while the reducer fastened to the wheel group makes use of a system comprising a reaction arm fastened to the wheel group, and an elastic counter bearing with rubber buffers and a setscrew. The entire reducer-wheel connection system guarantees both high quality sliding operation and maximum duration over time with low maintenance, thanks to the elimination of rigid connections.

  The electric motors are asynchronous, featuring a progressive start-up, with standard ventilation, self-braking with axial shifting of the rotor guaranteeing a fast, reliable mechanical braking over time.
  - Conical brakes are fitted with asbestos-free braking gaskets, featuring an extended braking surface.
  - The brake block comprises a fan which ensures proper cooling for the brake and motor, shifting axially with the motor shaft; the brake function is activated automatically in the case of a power outage.
  - The connection between the motor and swinging reducer features a joint contained within a coupling housing.



Idle Drive Unit

fig. 1a



Powered Drive Unit

fig. 1b

2.2 "DGT" series Endcarriages for bridge cranes

2.2.1 Intended and proper usage

- The **endcarriages** are designed for handling operations on rails on **bridge cranes**:
  - **at a running speed of from 3.2 to 25 m/min;**
  - **at two running speeds, from 12.5/3.2 to 80/20 m/min;**

  operating on:
  - **single girder, with a capacity of up to 20,000 kg and gauge of up to 25 m**;
  - **double girder, with a capacity of up to 40,000 kg and gauge of up to 27 m**.
- The **endcarraiges** are equipped with **drive units** comprising **"DGT" series wheel groups**, which, in combination with **"DGP" series offset geared motors**, guarantee:
  - accurate alignments;
  - control over high running speeds;
  - easy installation and maintenance.

2.2.2 The range of endcarraiges

- The range of **endcarriages for bridge cranes** are designed in **6 production sizes** corresponding to the dimensions of the respective wheels, in **17 configurations** based on **7 different wheel pitch lengths** calibrated in relation to the gauges and type of bridge crane they are combined with, i.e.:
  - **6 "DGT" series drive wheel group sizes:**

  (Ø 125, Ø 160, Ø 200, Ø 250, Ø 315 and Ø 400/400 R)
  - **17 configurations based on the wheel pitch:**

  (1800 mm; 2100 mm; 2400 mm; 2700 mm; 3300 mm; 3600 mm; 3900 mm)

Operating limitations for endcarriages on SINGLE GIRDER or DOUBLE GIRDER bridge cranes, in relation to span

Endcarriage type "DGT" Size	Wheel Ø R mm	basis mm	Span (m) on SINGLE GIRDER [M] or DOUBLE GIRDER [D] bridge crane. 6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	125	1800				M																		
		2400				D					M		D											
		3300														M		D						
2	160	1800				M																		
		2400				D					M		D											
		3300														M		D						
3	200	2100					M																	
		2700					D						M		D									
		3600																M		D				
4	250	2100					M																	
		2700	M		D				D				M		D									
		3600																M		D				
		3600 R																	M					
5	315	2400						M																
		3900											D											
6	400	3900											D											
	400 R	3900 R															D							

Endcarriages are equipped with **Drive Units**, comprising **"DGT" series Wheel Groups** in combination with **"DGP" series Offset Geared Motors**, as outlined in section 2.1.

2.2.3 Components on travelling beams

- The **endcarriges for bridge cranes** are generally supplied in pairs, each beam girder comprising the following parts and components:
  - **Body framework in tubular construction**, or load bearing beam girder:
    - The load bearing structure, in a tubular construction, comprises two semi-frames built in special sectioned steel, joined together by a continuous seam welding process. The special profiled section of the semi-frames allows for easy assembly and maintenance of the bolted joints between the beam and girders.
    - The special construction design also allows for the passage of electrical cables.
    - Its closed body design avoids problems due to rusting and internal corrosion, thereby reducing costly maintenance and controls on the beam.
    - The bridge crane girders are securely assembled to the sliding beam structures by a system of high resistance traction bolts adopting a stress bearing pin system.
  - **Idle drive units** ("DGT" idle wheel group - fig. 1a);
    - see description at section 2.1
  - **Powered drive units** ("DGT" motor driven wheel group with "DGP" swinging gear motor - fig. 1b);
    - see description at section 2.1
  - **Cross plate connecting the endcarriages to the crane's beam** (on **Single girder** bridge cranes - pic. 2a)
  - **Cross plates connecting the endcarriages to the crane's beams** (on **Double girder** bridge cranes-pic. 2b)
    - Specially designed the plates connect the endcarriages to the girder/s on the bridge crane. Built in steel plating in different sizes, they are welded to the bridge crane girders, whether tubular or HE plated sectioned, with perforations for laterally joining or fastening to the travelling beam structures.
  - **Accessories** (limit strokes, drive arms, etc.)
    - The lengthwise limit switch on the travelling beams, when supplied, is a rotating type with a double cross-rod ensuring for two-speed cranes a dual function of pre-deceleration and stopping in both directions, and is housed on the DGT drive unit.
- The **endcarriages** are also easily integrated and combined with a variety of accessories, such as, for example: mechanical or electrical/electronic anti-collision systems, operating speed and stop position control systems, mechanical type limit stroke or cycle counter (worm screw limit), electrical systems (dynamo speed gauge), electronic systems (encoders), thereby guaranteeing cost efficient operation.

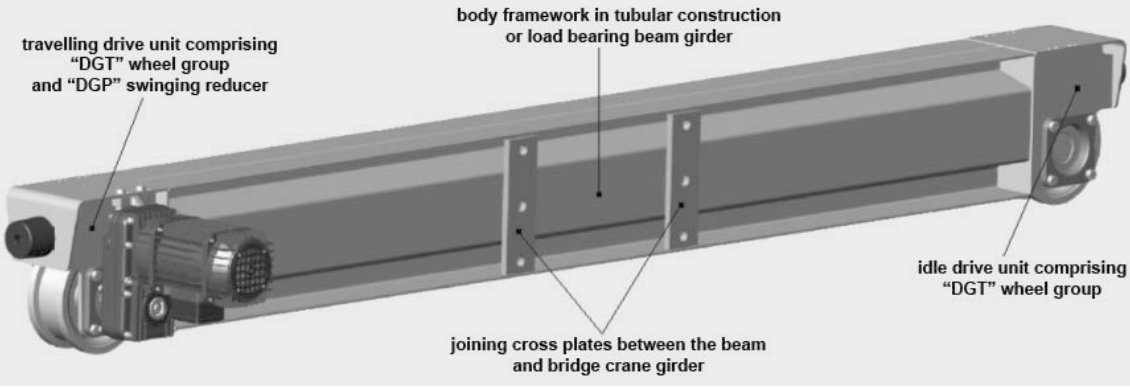


fig. 2a - endcarriage for SINGLE GIRDER bridge crane

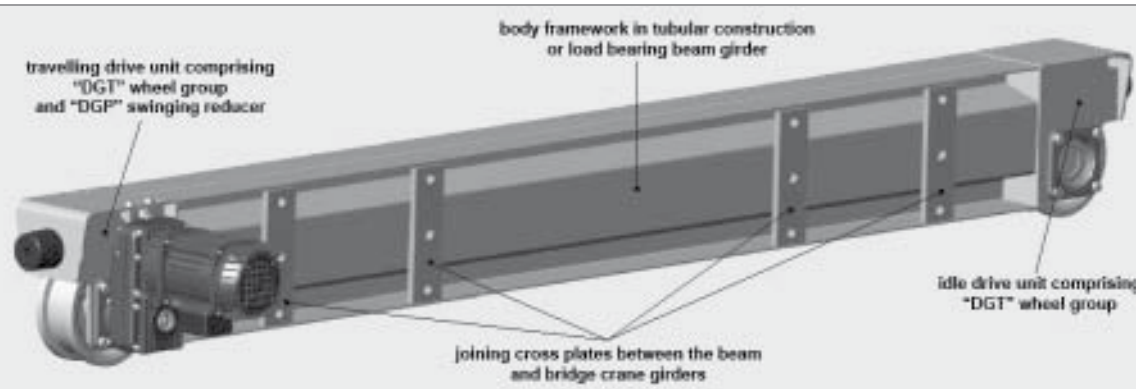


fig. 2b - endcarriage for DOUBLE GIRDER bridge crane

2.3 Technical specifications and operating conditions

2.3.1 Applicable norms and regulations

- The following norms and technical principles have also been taken into consideration in the design and manufacturing of **"DGT" series Drive Units and Endcarriges for bridge cranes**:
  - EN ISO 12100 parts: 1st – 2nd /2005 "Safety of the machinery"
  - EN ISO 13849-1/2006 "General principles for design"
  - EN 60529/92 "Degrees of protection provided by enclosures (IP Codes)"
  - ISO 4301/86 "Lifting equipment Classification"
  - ISO 8306/85 "Tolerances for travelling girders"
  - FEM 1.001/98 "Rules for the design of hoisting appliances"
  - FEM 9.511/86 "Classifications for mechanisms"
  - FEM 9.683/95 "Selection of lifting and travel motors"
  - FEM 9.755/93 "Measures for achieving safe working periods for serial hoist units (S.W.P.)"

2.3.2 Electrical power – Protection and insulation of electrical parts

- The motors on the **Drive Units** are designed to be powered through three-phase alternating current: 400 V - 50Hz. in accordance with IEC 38-1.
- **Drive Unit** motors: Protection IP55 (motor) - IP23 (brake); class "F" insulation.
- Limit switch: minimum protection IP65; max. Insulation voltage 500 V

2.3.3 Surface finish

- Finishing on the bodywork on the **"DGT" series Drive units and Endcarriages** and protection from atmospheric and environmental agents (dust, gas, etc.) is guaranteed by a special paintwork finish which applies a chrome and lead free primer coat of 40 microns in thickness of yellow enamel; surfaces are previously prepared with SA 2 degree metallic sanding in accordance with SVENSK STANDARD SIS 055900. The finish is oven dried for 40 min. at a temperature of 60-80°C.
- The special waterproof paintwork finish adopted for electro-mechanical parts (swinging reducer and self-braking drive motor), obtained using an electrostatic process and the complete sealing of parts, guarantees their inalterability over time and constant high performance characteristics, even in particularly hostile environments.

2.3.4 Environmental conditions for standard usage

- Operating temperature: minimum - 10°C; maximum + 40°C
- Maximum relative humidity: 80% - Maximum altitude 1000 m above sea level.
- Standard **Drive units and Endcarriages for bridge cranes** must be installed in a well aerated working environment, free of corrosive vapours (acidic vapours, saline mists, etc.), and are designed to operate in a covered environment, protected from atmospheric elements.

It is forbidden to operate the "DGT" series Drive units and Endcarriages in a potentially explosive environment, i.e. in which the use of anti-explosive components is mandatory.

2.3.5 Noise emissions - Vibrations

- Noise emission levels emanating from the **Drive units and Endcarriages** during traversing operations, whether empty or fully loaded, are in all cases inferior to a value of 80 dB (A), as measured at a distance of 1 m and 1.6 m from the ground.
- The incidence of environmental characteristics such as the transmission of sound through metallic structures, reflection caused by combined machinery and surrounding walls, are not taken into consideration in the value indicated.
- Vibrations produced by the **Drive units and Endcarriages** during traversing operations are not considered dangerous for the health and wellbeing of personnel operating the lifting equipment on which the units are installed.
- Excessive vibrations can be caused by a malfunction, which must be immediately pointed out and eliminated so as to safeguard the reliability of components.

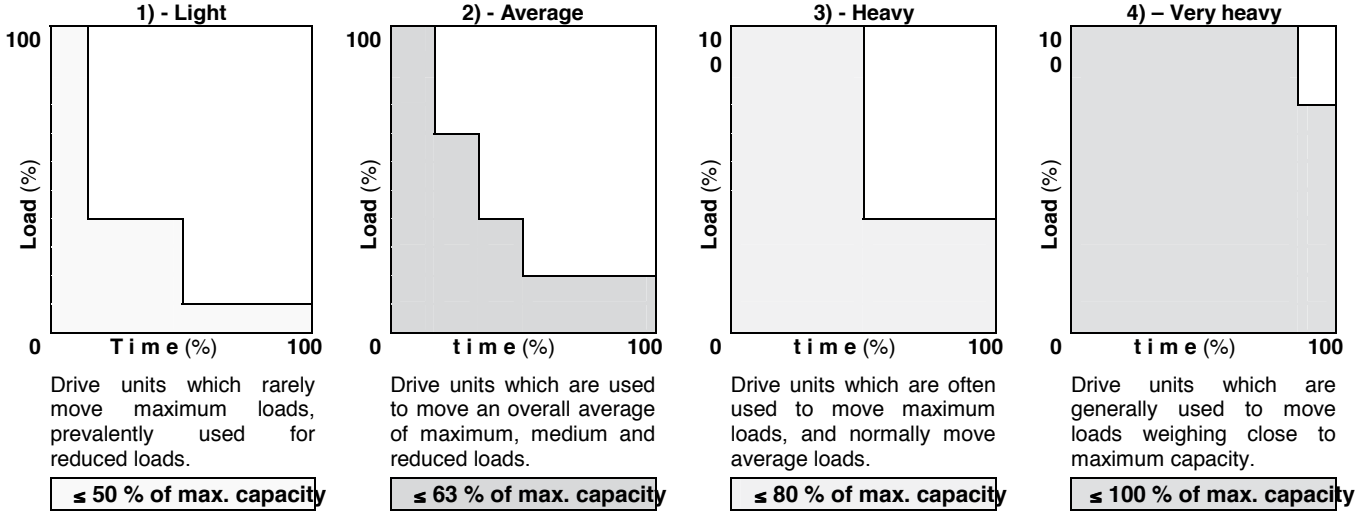
2.3.6 Classification of "DGT" series units

- The ISO 4301/86 and FEM 9.511/86 ordinances allow for the classification of the **service group** for the **"DGT" series Drive units** in relation to operating conditions, so as to guarantee their complete compliance to the working conditions they are subjected to.

- The parameters required for determining the operating limits of **"DGT" series Endcarriages** are:

A) the **degree of mechanical stress**
B) the **average daily operating time**

A) The **degree of mechanical stress** is evaluated taking into consideration the loads effectively being moved, falling into one of the four load capacity categories shown below, which determine the type of service.



Drive units which rarely move maximum loads, prevalently used for reduced loads.

≤ 50 % of max. capacity

Drive units which are used to move an overall average of maximum, medium and reduced loads.

≤ 63 % of max. capacity

Drive units which are often used to move maximum loads, and normally move average loads.

≤ 80 % of max. capacity

Drive units which are generally used to move loads weighing close to maximum capacity.

≤ 100 % of max. capacity

B) Average daily running time (Tm = Hours), determined as follows:

- **Tm** (hours) = $\frac{\textbf{Pm x C/h x Rt}}{\textbf{30 x S}}$

where:

- **Pm** (m) is the average distance covered = L/2, i.e. the average of the travelling length L for the "DGT" Unit;
- **C/h** (No. of cycles per hour) is the number of complete strokes travelled (forward and reverse manouevres) covered in an hour;
- **Rt** (hours) is the time the sliding is employed during the course of a day;
- **S** (m/min) is the running speed, i.e. the space which can be covered by a "DGT" Unit in one minute.

- After having determined the **degree of mechanical stress** and the **average daily operating time** for the **"DGT" series Drives**, use the table below to classify the **Service Group** for related components.

Degree of mechanical stress		**Average daily operating time - Tm** (hrs)				
1) – Light load	**≤ 50 % of max. capacity**	≤ 4	≤ 8	≤ 16	> 16	–
2) – Average load	**≤ 63 % of max. capacity**	≤ 2	≤ 4	≤ 8	≤ 16	> 16
3) – Heavy load	**≤ 80 % of max. capacity**	≤ 1	≤ 2	≤ 4	≤ 8	≤ 16
4) – Very heavy load	**≤ 100 % of max. capacity**	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 8

Service group for mechanisms on "DGT" sliding units	according to ISO 4301/86	**M4**	**M5**	**M6**	**M7**	**M8**
	according to FEM 9.511/86	**1Am**	**2m**	**3m**	**4m**	**5m**

Intermittent use in compliance with regulation FEM 9.683/95	Intermittency ratio RI (%)	25	30	40	50	60
	No. of startups per hour (A/h)	150	180	240	300	> 360
	No. of cycles per hour (C/h)	25	30	40	50	> 60

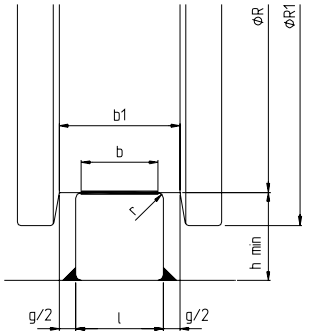
Dual polarity 2-speed motors	No. of startups per hr (A/h)	Primary speed	1/3 (33.3 % of the total no. of startups per hour)
		Slow speed	2/3 (66.7 % of the total no. of startups per hour)
	Daily operating time (Tm)	Primary speed	2/3 (66.7 % of the average daily operating time)
		Slow speed	1/3 (33.3 % of the average daily operating time)

! ***DONATI SOLLEVAMENTI S.r.l.*** **guarantees the safe and long-lasting use of its "DGT" series Drive units only if they are employed in conformity with the parameters corresponding to the service group in which they are classifed.**

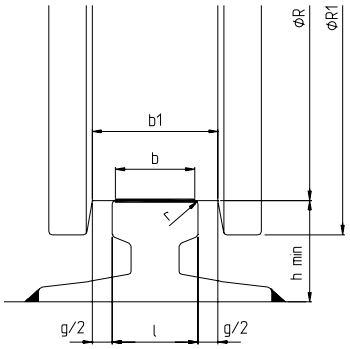
2.3.7 Operating limitations and technical specifications for "DGT" series Drive units

- For complete technical specifications on **"DGT" series Drive units for cranes**, in relation to their intended operation, check and match the parameters limiting the operation of the **wheel group** in combination with the **"DGP" swinging gear motors** and related **self-braking motors**, in relation to the following user specifications:
  - operating loads on the wheels
  - width and shape of the traversing rail
  - sliding speed
  - number of wheel groups and gear motors employed.

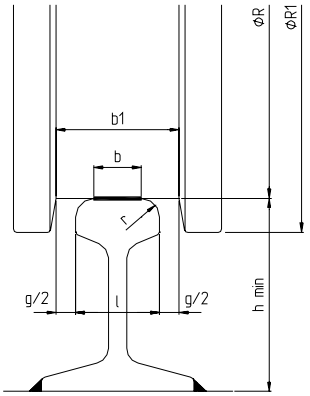
Specifications for sliding rails and maximum contact area



Square laminated rail UNI 6013 - DIN 1013
Flat laminated rail UNI 6014 - DIN 1017



Burbak type rail - DIN 536



Vignole type rail - UNI 3141

Wheel specifications				Rail (mm)			Type of runways rail and maximum operating contact surface - b (mm)							
Type Ø / ØR (mm)	Max. Rx (kg)	Wheel internal width (mm)		width b (mm)		h (mm)	Square laminated UNI 6013 - DIN 1013 Flat laminated UNI 6014 - DIN 1017		Burbak - DIN 536			Vignole - UNI 3141		
		type	b1	max.	min.	min.	l	b = l - 2r	type	l	b = l - 2r	type	l	b = l - 4/3r
125	3.670 36 kN	standard	50	40	35	30	40	38	=	=	=	=	=	=
		maximum	60	50	45	30	50	**48**	A 45	45	**37**	21 - 27	50	**34**
		special	70	60	55	30	60	**58**	A 55	55	**45**	36	60	**44**
160	4.893 48 kN	standard	55	45	40	30	40	38	A 45	45	**37**	=	=	=
		maximum	65	55	50	30	50	**48**	A 55	55	**45**	21 - 27	50	**34**
		special	80	70	65	30	70	**68**	A 65	65	**53**	46 50	65 67	**46** **49**
200	7.340 72 kN	standard	60	50	45	30	50	48	A 45	45	**37**	21 - 27	50	**34**
		maximum	70	60	55	30	60	**58**	A 55	55	**45**	30 36	56 60	**40** **44**
		special	90	80	75	30	80	**78**	A 75	75	**59**	60	72 (1)	**55**
250	10.805 106 kN	standard	70	60	55	30	60	58	A 55	55	**45**	30 36	56 60	**40** **44**
		maximum	80	70	65	30	70	**68**	A 65	65	**53**	46 50	65 67	**46** **49**
		special	100	90	85	30	90	**88**	A 75	75 (*)	**59**	=	=	=
315	14.679 144 kN	standard	75	65	60	40	60	58	A 65	65	**53**	36 46	60 65	**44** **47**
		maximum	85	75	70	40	70	**68**	A 75	75	**59**	50 60	67 (1) 72	**48** **55**
		special	110	100	95	40	100	**98**	A 100	100	**80**	=	=	=
400	18.960 186 kN	standard	85	75	70	40	70	68	A 75	75	**59**	50 60	67 (1) 72	**48** **55**
		maximum	95	85	80	40	80	**78**	=	=	=	=	=	=
400 R	30.580 (2) 300 kN	special	115	100	95	40	100	**98**	A 100	100	**80**	=	=	=

- The clearance between the internal width of the wheel and the maximum rail width must be contained within: slack ≥ 10 mm and ≤ 15 mm
- (1) wheel with increased slack =18 mm
- (2) theØ 400 wheel is sized identical to the Ø 400 wheel but allows for a greater reaction since its is fitted with roller bearings
- Recommended rails appear in gray, together with operating contact area values, verified in relation to maximum static reaction

Operating limits for wheels in relation to the rail's contact surface and the running speed

- The following diagrams (pages 15, 16 and 17) illustrate average **admissible** reactions **R ave. [*average R*]** (expressed in kg) on **Drive unit wheels**, in relation to the speed and to the operating width "b" of the rail, as specified in the table on page 14.
- The correct choice of wheel is based on the average reaction **– R ave. [*average R*]**, exercised on the wheel. This value is derived from the following equation:

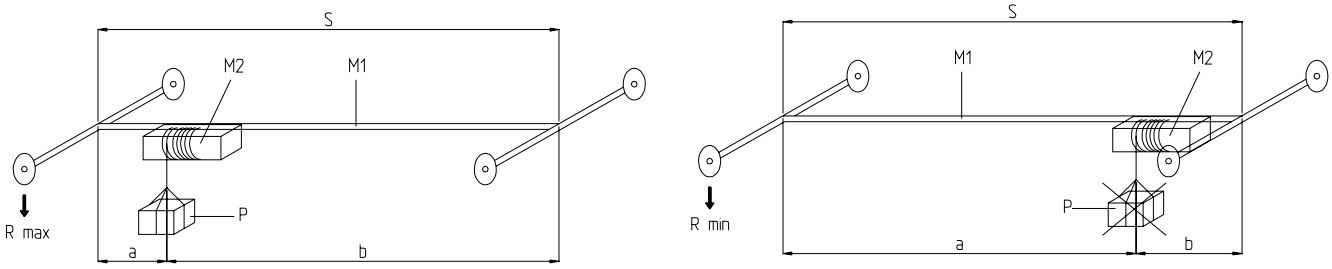
$$\text{R ave.} = \frac{2 \cdot \text{R max.} + \text{R min.}}{3}$$

where R max. is the most unfavourable load condition, equal to:

$$\text{R max.} = \frac{M1}{4} + \left(\frac{M2 + P}{2}\right) \cdot \left(1 - \frac{a}{S}\right)$$

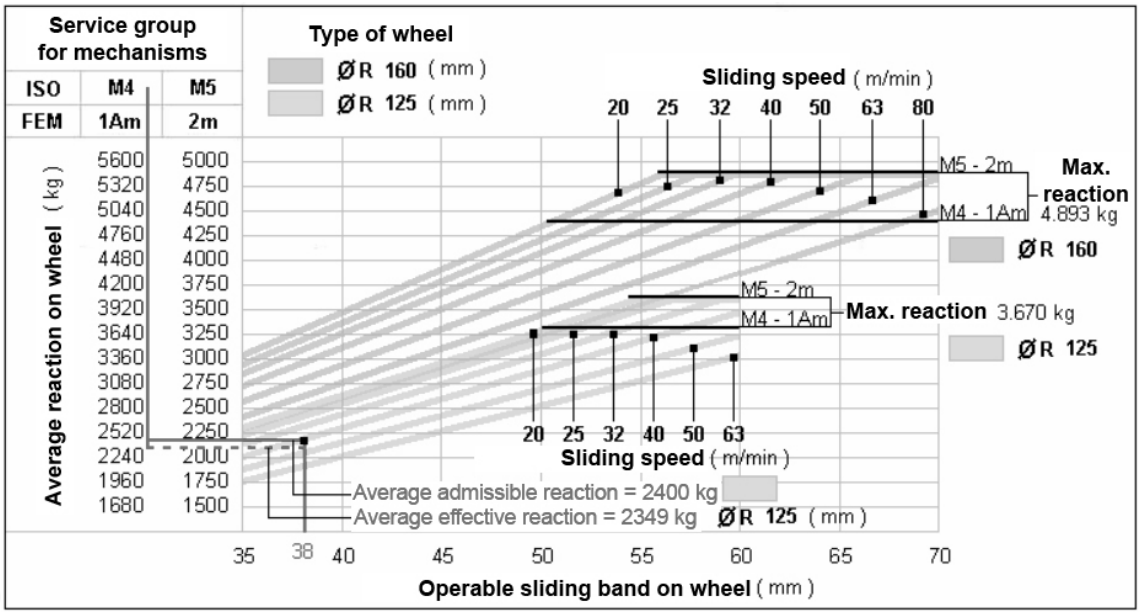
while the minimum reaction R min. is:

$$\text{R min.} = \frac{M1}{4} + \frac{M2}{2} \cdot \frac{a}{S}$$



w here: **M1** = crane mass, i.e. its proper weight, expressed in kg
M2 = hoist/trolley mass, i.e. their proper weight, expressed in kg
P = nominal crane capacity, expressed in kg

Average admissible reactions from wheels Ø 125 and 160, in relation to the rail width and the running speed



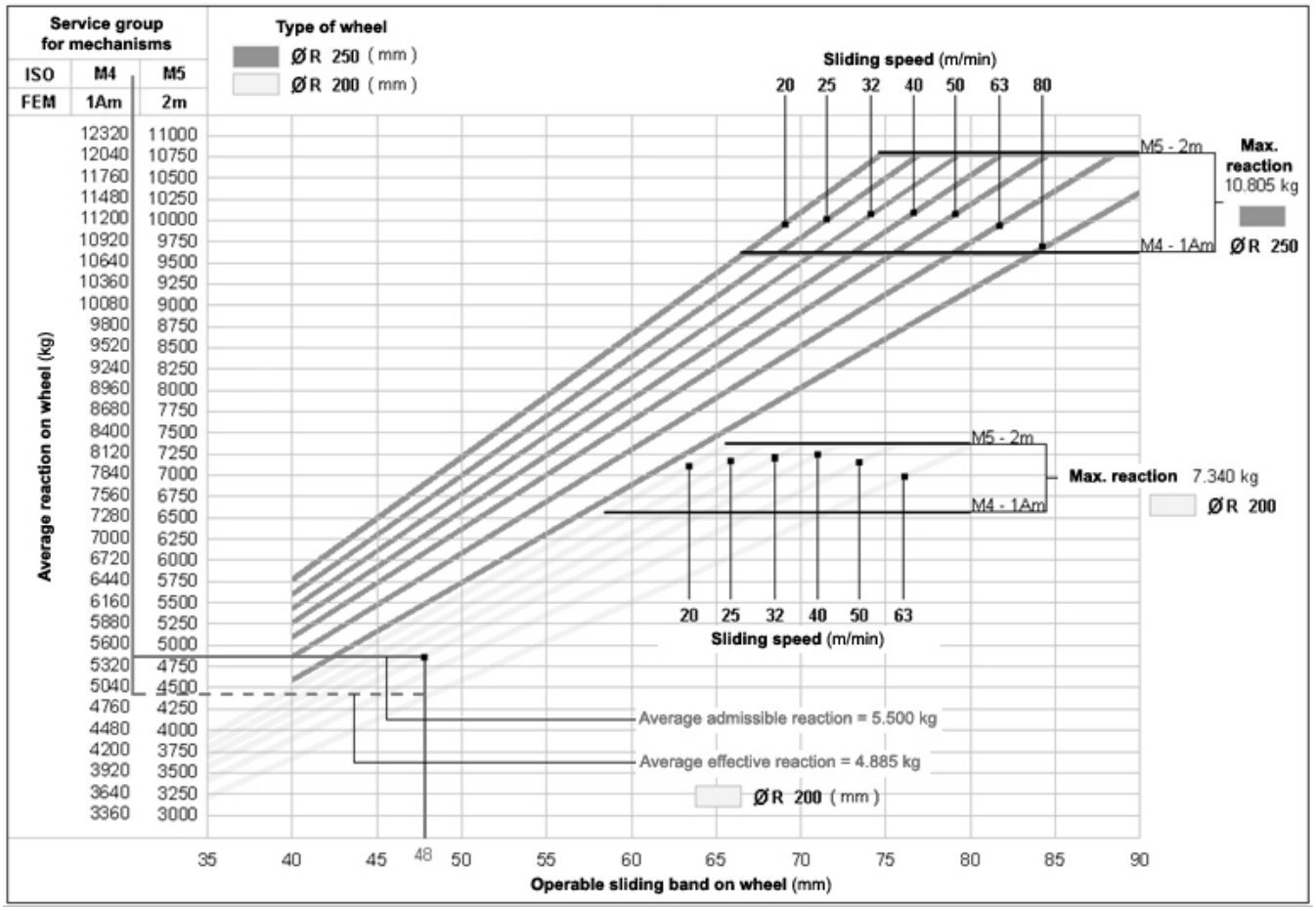
Example of verification of suitability for a Ø 125 wheel (see example 1 at page 38)

Data calculated:

- Rail operating width: b = 38 mm
- Running speed: 40/10 m/min;
- Service group: ISO M4 (FEM 1Am)
- Average effective reaction: R ave. = 2349 kg
- Maximum effective reaction: R max. eff. = 3203 kg

The average admissible reaction is ≅ 2400 kg > than the average effective reaction of 2349 kg the wheel is subjected to;
The maximum admissible reaction is = 3670 kg > than the maximum effective reaction of 3203 kg.

Average admissible reactions from wheels Ø 200 and 250, in relation to the operating width and travelling speed



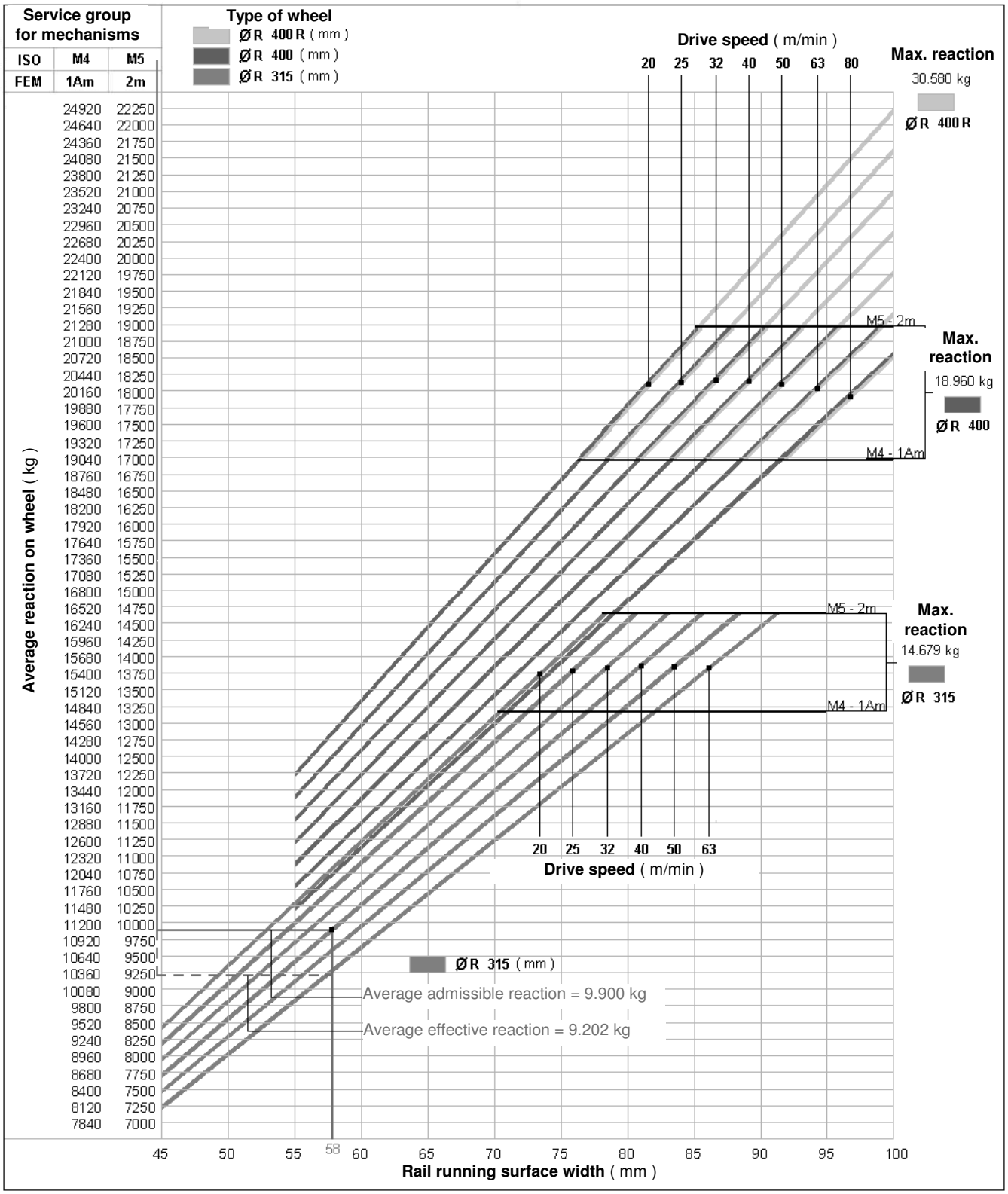
Example of verification of suitability for a Ø 200 wheel (see example 2 at page 39)

Data calculated:

- Rail operating width: b = 48 mm
- Running speed: 40/10 m/min;
- Service group: ISO M4 (FEM 1Am)
- Average effective reaction: R ave. = 4885 kg
- Maximum effective reaction: R max. eff.= 6581 kg

The average admissible reaction is ≅ 5500 kg > than the average effective reaction of 4885 kg the wheel is subjected to;
The maximum admissible reaction is = 7340 kg > than the maximum effective reaction of 6581 kg

Average admissible reactions from wheels Ø 315 and 400, in relation to the operating width and travelling speed



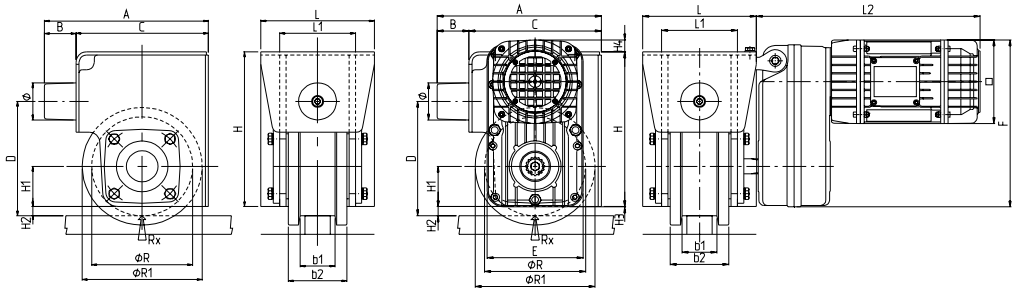
Example of verification of suitability for a Ø 315 wheel (see example 3 at page 39)

Data calculated:

- Rail operating width: b = 58 mm
- Running speed: 40/10 m/min;
- Service group: ISO M4 (FEM 1Am)
- Average effective reaction: R ave. = 9202 kg
- Maximum effective reaction: R max. eff.= 11,963 kg

The average admissible reaction is ≅ 9900 kg > than the average effective reaction of 9202 kg the wheel is subjected to;
The maximum admissible reaction is = 14.679 kg > than the maximum effective reaction of 11.963 kg

Dimensions and headroom of wheel drive groups based on combinations with the related motoreducers



Idle drive units **Drive powered units**

Wheel specifications			Wheel group dimensions (mm)													Size		Motoreducers dimensions (mm)					
type Ø ØR (mm)	Max. Rx (kg)	Wheel internal width	b1	b2	L1	L	Ø R1	A	B	C	D	Ø	H	H1	H2	Reducer	Motor	L2	□	E	F	H3	H4
125	3.670 36 kN	standard	50	80	100	160	150	200	30	170	145	50	220	55	7.5	0	71	332	135	138	223	0	3
		maximum	60													1	71	368	135	152	270	10.5	39.5
		special	70	90	110											1	80	383	150	152	278	10.5	47.5
160	4.893 48 kN	standard	55	93	120	180	190	260	50	210	185	60	250	65	15	0	71	332	135	138	223	-10	-17
		maximum	65													1	71	368	135	152	270	0.5	19.5
		special	80	105	130											1	80	383	150	152	278	0.5	27.5
200	7.340 72 kN	standard	60	100	135	200	230	325	65	260	230	80	290	75	25	1	71	356	135	152	270	-9.5	-10.5
		maximum	70													1	80	372	150	152	278	-9.5	-2.5
																2	80	398	150	227	357	26	41
		special	90	120	145											2	100	436	190	227	376	26	60
250	10.805 106 kN	standard	70	110	149	230	280	375	65	310	275	80	335	90	35	1	71	356	135	152	270	-24.5	-40.5
		maximum	80													1	80	372	150	152	278	-24.5	-32.5
																2	80	398	150	227	357		
		special	100	135	165											2	100	436	190	227	376	11	11
																						11	30
315	14.679 144 kN	standard	75	120	159	260	350	470	80	390	335	100	385	105	52.5	2	80	368	150	227	357	-4	-24
		maximum	85													2	100	406	190	227	376	-4	-5
		special	110	150	180											3	112	500	225	265	456	15	56
400	18.960 186 kN	standard	85	135	170	290	440	570	100	470	385	125	440	145	55	2	80	362	150	227	357	-44	-39
		maximum	95													2	100	400	190	227	376	-44	-20
400 R	30.580 300 kN	special	115	155	190											3	112	500	225	265	456	-25	41

• Quotas L2 in gray refer to wheels operating with a “standard” and “maximum” sheave:
• For Ø 315 and Ø 400 wheels with a “special” sheave, the quota L2 increases by 10 mm, with respect to the values listed in the table

Types and reduction ratios for “DGP” offset reducers

“DGP” offset reducers		3 reduction stages (torques)				2 reduction stages (torques)			
Size 0	Type	031	032	033	034	021	022	023	024
	Reduction ratio	87.85	70.35	57.61	45.20	34.49	28.10	23.46	18.94
Size 1	Type	131	132	133	134	121	122	123	124
	Reduction ratio	89.45	69.98	56.35	44.35	35.10	28.87	22.77	18.50
Size 2	Type	231	232	233	234	221	222	223	224
	Reduction ratio	140.65	109.45	88.10	72.57	55.42	43.24	35.66	29.50
Size 3	Type	331	332	333	334	=			
	Reduction ratio	88.67	70.36	56.65	44.33				

- Determining the reducer type:
  E.g. reducer 132, where:
  - 1 = reducer size 1
  - 3 = No. of reduction stages (torques)
  - 2 = reduction ratio 69.98

Specifications and codes for self-braking motors combinable with "DGP" offset gearboxes

Motor size	Type	Poles (no.)	Rpm (rpm)	Power (kW)	Torque (Nm)	Ia (A)	In (A)	cos φ	Motor code
71 M 20 series	71K8C	8	645	0.08	1.09	1.20	0.90	0.45	M21AP80050
	71K4CA	4	1370	0.16	1.09	2.20	0.80	0.55	M21AP40050
	71K4CB	4	1370	0.20	1.36	2.70	1.00	0.55	M21AP40051
	71K2CA	2	2740	0.32	1.09	3.60	1.00	0.75	M21AP20050
	71K2CB	2	2700	0.40	1.36	4.50	1.30	0.70	M21AP20051
	71K2L	2	2740	0.50	1.70	5.20	1.30	0.72	M21AP2I050
	71K3C	2/8	2760/650	0.32/0.07	1.09	3.60/1.10	1.00/0.80	0.70/0.55	M21AP30050
	71K3L	2/8	2760/630	0.40/0.09	1.36	4.40/1.20	1.20/0.90	0.75/0.60	M21AP30051
80 M 30 series	80K8C	8	660	0.12	1.70	2.00	1.20	0.45	M31AP80050
	80K8L	8	630	0.16	2.18	2.20	1.30	0.48	M31AP80051
	80K4CA	4	1360	0.25	1.70	3.10	0.90	0.65	M31AP40050
	80K4CB	4	1370	0.32	2.18	3.90	1.10	0.65	M31AP40051
	80K2CA	2	2740	0.50	1.70	5.80	1.30	0.80	M31AP20050
	80K2CB	2	2750	0.63	2.18	7.70	1.70	0.75	M31AP20051
	80K2L	2	2770	0.80	2.73	9.70	1.90	0.80	M31AP2I050
	80K3C	2/8	2740/650	0.50/012	1.70	5.20/1.60	1.30/1.10	0.85/0.60	M31AP30050
	80K3L	2/8	2760/650	0.63/0.15	2.18	6.70/1.90	1.60/1.30	0.82/0.57	M31AP30051
100 M 50 series	100K8C	8	680	0.32	4.36	4.60	1.7	0.50	M51AP80050
	100K8L	8	670	0.40	5.46	5.40	2.50	0.45	M51AP80051
	100K4CA	4	1390	0.63	4.36	8.50	1.70	0.70	M51AP40050
	100K4CB	4	1390	0.80	5.46	8.90	2.00	0.80	M51AP40051
	100K2CA	2	2820	1.25	4.36	16.50	2.90	0.83	M51AP20050
	100K2CB	2	2800	1.60	5.46	21.00	3.70	0.80	M51AP20051
	100K2L	2	2780	2.00	6.82	23.00	4.30	0.86	M51AP2I050
	100K3C	2/8	2820/680	1.25/0.31	4.36	15.70/3.60	3.10/1.80	0.84/0.60	M51AP30050
	100K3L	2/8	2790/660	1.60/0.39	5.46	21.00/4.00	3.50/2.30	0.86/0.60	M51AP30051
112 M 60 series	112K8L	8	690	0.63	8.72	8.60	3.40	0.50	M61AP80050
	112K4C	4	1430	1.25	8.72	20.50	3.60	0.65	M61AP40050
	112K2L	2	2800	3.20	10.92	39.00	6.50	0.88	M61AP2I050
	112K3L	2/8	2850/690	2.50/0.62	8.72	33.00/7.30	5.60/3.40	0.85/0.50	M61AP30050

Specifications for self-braking motors are related to the M4 service group (1Am) – RI 40% – Power voltage 400 V

Codes for "DGT" drive wheel groups ready for matching with "DGP" offset gearboxes

"DGP" offset reducers	Gruppo ruota motrice "DGT" Ø (mm)						
	125	160	200	250	315	400	400 R
size 0	DGT1A0M10	DGT2A0M10	=	=	=	=	=
size 1	DGT1A0M30	DGT2A0M30	DGT3A0M10	DGT4A0M12	=	=	=
size 2	=	=	DGT3A0M30	DGT4A0M32	DGT5A0M12 (r) DGT5A0M22 (l)	DGT6A0M12 (r) DGT6A0M22 (l)	DGT6A0M62 (r) DGT6A0M72 (l)
size 3	=	=	=	=	DGT5A0M32 (r) DGT5A0M42 (l)	DGT6A0M32 (r) DGT6A0M42 (l)	DGT6A0M82 (r) DGT6A0M92 (l)

- The configuration (r) = right and (l) = left, for wheel groups Ø 315 and Ø 400 refers to the positioning of the welded reaction arm
- The codes refer to drive wheels with a standard sheave width. In the case of wheels with different sheave widths, replace the letter **M** in the code with the letter **P** for wheels with a maximum sheave width, or **S** for wheels with a special sheave width

Max. weights for "DGT" drive wheel groups coupled with "DGP" offset gearboxes

"DGT" drive wheel group Ø (mm)			125	160	200	250	315	400	400 R
"DGP" offset gearmotors	"DGP" reducers size 0	"DGP" motors size 71	max. 32 kg	max. 40 kg	=	=	=	=	=
	"DGP" reducers size 1	"DGP" motors size 71	max. 36 kg	max. 44 kg	max. 54 kg	max. 73 kg	=	=	=
		"DGP" motors size 80	max. 38 kg	max. 48 kg	max. 58 kg	max. 75 kg	=	=	=
	"DGP" reducers size 2	"DGP" motors size 80	=	=	max. 75 kg	max. 94 kg	max. 125 kg	max. 197 kg	max. 197 kg
		"DGP" motors size 100	=	=	max. 83 kg	max. 102 kg	max. 133 kg	max. 205 kg	max. 205 kg
	"DGP" reducers size 3	"DGP" motors size 112	=	=	=	=	max. 172 kg	max. 236 kg	max. 236 kg

Partnumbers and weights for "DGT" idle wheel groups

"DGT" idle wheel group Ø (mm)	125	160	200	250	315	400	400 R
Partnumber	DGT1A0M00	DGT2A0M00	DGT3A0M00	DGT4A0M00	DGT5A0M00	DGT6A0M00	DGT6A0M50
Weight (kg)	15.5	23.5	37.5	57.0	88.0	152.0	152.0

- The partnumbers refer to idle wheels with a standard sheave width. In the case of wheels with different sheave widths, replace the letter **M** in the partnumber with the letter **P** for wheels with a maximum sheave width, or **S** for wheels with a special sheave width

Travelling masses at 1 speed, based on the combination of components

Nominal speed (m/min)	Travelling mass (kg) ISO service group (FEM) M4 (1Am)	M5 (2m)	"DGT" wheel group Ø (mm)	"DGP" motoreducer Reducer Type	Motor Type	Self-braking motor specifications Poles (N°)	Power (kW)	Partnumbers for components "DGT" drive wheel group	"DGP" motoreducer
3.2	7.400	7.400	**125**	**031**	**71K8C**	8	0.08	DGT1A0M10	P0M2B18AA0
	14.700	14.700	**200**	**231**	**80K8C**	8	0.12	DGT3A0M30	P2M3B18AA0
4	7.400	7.400	**125**	**032**	**71K8C**	8	0.08	DGT1A0M10	P0M2B28AA0
	9.800	8.000	**160**	**031**	**71K8C**	8	0.08	DGT2A0M10	P0M2B18AA0
	14.700	14.700	**200**	**232**	**80K8C**	8	0.12	DGT3A0M30	P2M3B28AA0
	20.800	16.600	**250**		**80K8C**	8	0.12	DGT4A0M32	
	21.600	21.600		**231**	**80K8L**	8	0.16		P2M3B18KA0
5	6.700	5.360	**125**	**033**	**71K8C**	8	0.08	DGT1A0M10	P0M2B38AA0
	7.400	7.400		**133**	**80K8C**	8	0.12	DGT1A0M30	P1M3B38AA0
	8.000	**6.400**	**160**	**032**	**71K8C**	8	0.08	DGT2A0M10	P0M2B28AA0
	9.800	9.800		**132**	**80K8C**	8	0.12	DGT2A0M30	P1M3B28AA0
	9.600	**7.600**	**200**	**131**	**71K8C**	8	0.08	DGT3A0M10	P1M2B18AA0
	14.400	11.500			**80K8C**	8	0.12		P1M3B18AA0
	14.700	14.700			**80K8L**	8	0.16		P1M3B18KA0
	16.800	**13.400**	**250**	**232**	**80K8C**	8	0.12	DGT4A0M32	P2M3B28AA0
	21.600	18.000			**80K8L**	8	0.16		P2M3B28KA0
	21.600	21.600			**100K8C**	8	0.32		P2M5B28AA0
	18.400	**14.700**	**315**	**231**	**80K8C**	8	0.12	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B18AA0
	23.300	**18.600**			**80K8L**	8	0.16		P2M3B18KA0
	29.400	29.400			**100K8C**	8	0.32		P2M5B18AA0
6.3	7.400	7.400	**125**	**031**	**71K4CA**	4	0.16	DGT1A0M10	P0M2B14AA0
	6.400	**5.100**	**160**	**033**	**71K8C**	8	0.08	DGT2A0M10	P0M2B38AA0
	9.800	8.000		**133**	**80K8C**	8	0.12	DGT2A0M30	P1M3B18AA0
	14.700	14.700	**200**	**231**	**80K4CA**	4	0.25	DGT3A0M30	P2M3B14AA0
	9.000	**7.200**	**250**	**131**	**71K8C**	8	0.08	DGT4A0M12	P1M2B18AA0
	13.500	**10.800**			**80K8C**	8	0.12		P1M3B18AA0
	18.000	14.400			**80K8L**	8	0.16		P1M3B18KA0
	21.600	21.600		**233**	**100K8C**	8	0.32	DGT4A0M32	P2M5B38AA0
	14.600	**11.700**	**315**	**232**	**80K8C**	8	0.12	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B28AA0
	18.600	**14.900**			**80K8L**	8	0.16		P2M3B28KA0
	29.400	29.400			**100K8C**	8	0.32		P2M5B28AA0
	20.800	**16.600**	**400**	**231**	**80K8L**	8	0.16	DGT6A0M12 (r) DGT6A0M22 (l)	P2M3B18KA0
	41.400	33.100			**100K8C**	8	0.32		P2M5B18AA0
	41.400	**33.100**	**400 R**	**231**	**100K8C**	8	0.32	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B18AA0
	51 700	**41 400**			**100k8L**	8	0.40		P2M5B18KA0
8	7.400	6.658	**125**	**032**	**71K4CA**	4	0.16	DGT1A0M10	P0M2B24AA0
	9.800	8.000	**160**	**031**	**71K4CA**	4	0.16	DGT2A0M10	P0M2B14AA0
	9.800	9.800		**131**	**71K4CB**	4	0.20	DGT2A0M30	P1M2B14KA0
	6.000	**4.800**	**200**	**133**	**71K8C**	8	0.08	DGT3A0M10	P1M2B38AA0
	9.400	**7.500**			**80K8C**	8	0.12		P1M3B38AA0
	12.000	**9.600**			**80K8L**	8	0.16		P1M3B38KA0
	14.700	14.700		**232**	**80K4CA**	4	0.25	DGT3A0M30	P2M3B24AA0
	10.400	**8.300**	**250**	**132**	**80K8C**	8	0.12	DGT4A0M12	P1M3B28AA0
	13.800	**11.000**			**80K8L**	8	0.16		P1M3B28KA0
	21.600	17.200		**231**	**80K4CA**	4	0.25	DGT4A0M32	P2M3B14AA0
	21.600	21.600			**80K4CB**	4	0.32		P2M3B14KA0
	14.600	**11.700**	**315**	**233**	**80K8L**	8	0.16	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B38KA0
	29.200	23.400			**100K8C**	8	0.32		P2M5B38AA0
	29.400	29.400			**100K8L**	8	0.40		P2M5B38KA0
	16.300	**13.000**	**400**	**232**	**80K8L**	8	0.16	DGT6A0M12 (r) DGT6A0M22 (l)	P2M3B28KA0
	32.600	**26.000**			**100K8C**	8	0.32		P2M5B28AA0
	41.400	33.100			**100K8L**	8	0.40		P2M5B28KA0
	32.600	**=**	**400 R**	**232**	**100K8C**	8	0.32	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B28AA0
	41.400	**33.100**			**100K8L**	8	0.40		P2M5B28KA0

- The specifications refer to single motoreducer; in the case of two or more motoreducers, multiply travelling mass by the number of motoreducers used.
- Verify that, in relation to the rail's operating width (b), the average reaction (R ave.) is compatible with alues listed in the diagram at pages 15, 16 and 17.
- The values for travelling mass in gray require a verification of average reaction (R ave.) on each wheel, which must not exceed following Rx. max. values:

Ø 125	Ø 160	Ø 200	Ø 250	Ø 315	Ø 400	Ø 400 R
R ave. ≤ Rx max. ≤ 3670 kg (36 kN)	**R ave. ≤ Rx max. ≤ 4893 kg** (48 kN)	**R ave. ≤ Rx max. ≤ 7340 kg** (72 kN)	**R ave. ≤ Rx max. ≤ 10.805 kg** (106 kN)	**R ave. ≤ Rx max. ≤ 14.679 kg** (144 kN)	**R ave. ≤ Rx max. ≤ 18.960 kg** (186 kN)	**R ave. ≤ Rx max. ≤ 30.580 kg** (300 kN)

Travelling masses at 1 speed, based on the combination of components

Nominal speed (m/min)	Travelling mass (kg) ISO service group (FEM) M4 (1Am)	M5 (2m)	"DGT" wheel group Ø (mm)	"DGP" motoreducer Reducer Type	Motor Type	Self-braking motor specifications Poles (N°)	Power (kW)	Partnumbers for components "DGT" drive wheel group	"DGP" gearmotor
10	6.700	5.360	125	033	71K4CA	4	0.16	DGT1A0M10	P0M2B34AA0
	7.400	6.720			71K4CB	4	0.20		P0M2B34KA0
	8.000	**6.400**	160	032	71K4CA	4	0.16	DGT2A0M10	P0M2B24AA0
	9.800	8.000			71K4CB	4	0.20		P0M2B24KA0
	9.800	9.800		132	80K4CA	4	0.25	DGT2A0M30	P1M3B24AA0
	9.600	**7.600**	200	131	71K4CA	4	0.16	DGT3A0M10	P1M2B14AA0
	12.000	**9.600**			71K4CB	4	0.20		P1M2B14KA0
	14.700	12.200			80K4CA	4	0.25		P1M3B14AA0
	14.700	14.700			80K4CB	4	0.32		P1M3B14KA0
	11.200	**8.900**	250	133	80K8L	8	0.16	DGT4A0M12	P1M3B38KA0
	17.200	**13.700**		232	80K4CA	4	0.25	DGT4A0M32	P2M3B24AA0
	21.600	18.000			80K4CB	4	0.32		P2M3B24KA0
	21.600	21.600			100K4CA	4	0.63		P2M5B24AA0
	18.500	**14.800**	315	231	80K4CA	4	0.25	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B14AA0
	23.300	**18.600**			80K4CB	4	0.32		P2M3B14KA0
	29.400	29.400			100K4CB	4	0.63		P2M5B14AA0
	26.000	**20.800**	400	233	100K8C	8	0.32	DGT6A0M12 (r) DGT6A0M22 (l)	P2M5B38AA0
	33.100	**26.500**			100K8L	8	0.40		P2M5B38KA0
	42.800	41.300		331	112K8L	8	0.63	DGT6A0M32 (r) DGT6A0M42 (l)	P3M6B18AA0
	33.100	=	400 R	233	100K8L	8	0.40	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B38KA0
	51.600	**41.300**		331	112K8L	8	0.63	DGT6A0M82 (r) DGT6A0M92 (l)	P3M6B18AA0
12.5	7.400	7.400	125	031	71K2CA	2	0.32	DGT1A0M10	P0M2B12AA0
	6.400	**5.100**	160	033	71K4CA	4	0.16	DGT2A0M10	P0M2B34AA0
	8.000	**6.400**			71K4CB	4	0.20		P0M2B34KA0
	9.800	8.000		133	80K4CA	4	0.25	DGT2A0M30	P1M3B34AA0
	9.800	9.800			80K4CB	4	0.32		P1M3B34KA0
	7.600	**6.000**	200	132	71K4CA	4	0.16	DGT3A0M10	P1M2B24AA0
	9.600	**7.600**			71K4CB	4	0.20		P1M2B24KA0
	12.000	**9.600**			80K4CA	4	0.25		P1M3B24AA0
	14.700	12.200			80K4CB	4	0.32		P1M3B24KA0
	14.700	14.700		231	80K2CA	2	0.50	DGT3A0M30	P2M3B12AA0
	11.200	**9.000**	250	131	71K4CB	4	0.20	DGT4A0M12	P1M2B14KA0
	14.000	**11.200**			80K4CA	4	0.25		P1M3B14AA0
	18.000	**14.400**			80K4CB	4	0.32		P1M3B14KA0
	21.600	21.600		233	100K4CA	4	0.63	DGT4A0M32	P2M5B34AA0
	14.800	**11.900**	315	232	80K4CA	4	0.25	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B24AA0
	18.600	**14.900**			80K4CB	4	0.32		P2M3B24KA0
	29.400	29.400			100K4CA	4	0.63		P2M5B24AA0
	20.800	**16.600**	400	231	80K4CB	4	0.32	DGT6A0M12 (r) DGT6A0M22 (l)	P2M3B14KA0
	41400	33 100			100K4CA	4	0.63		P2M5B14AA0
	41400	**33 100**	400 R	231	100K4CA	4	0.63	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B14AA0
	52 600	**42 100**			100K4CB	4	0.80		P2M5B14KA0
16	7.400	6.656	125	032	71K2CA	2	0.32	DGT1A0M10	P0M2B22AA0
	9.800	8.000	160	031	71K2CA	2	0.32	DGT2A0M10	P0M2B12AA0
	9.800	9.800		131	71K2CB	2	0.40	DGT2A0M30	P1M2B12KA0
	6.000	**4.800**	200	133	71K4CA	4	0.16	DGT3A0M10	P1M2B34AA0
	7.500	**6.000**			71K4CB	4	0.20		P1M2B34KA0
	9.400	**7.500**			80K4CA	4	0.25		P1M3B34AA0
	12.000	**9.600**			80K4CB	4	0.32		P1M3B34KA0
	14.700	14.700		232	80K2CA	2	0.50	DGT3A0M30	P2M3B22AA0
	10.800	**8.600**	250	132	80K4CA	4	0.25	DGT4A0M12	P1M3B24AA0
	13.800	**11.000**			80K4CB	4	0.32		P1M3B24KA0
	21.600	17.200		231	80K2CA	2	0.50	DGT4A0M32	P2M3B12AA0
	21.600	21.600			80K2CB	2	0.63		P2M3B12KA0
	14.600	**11.600**	315	233	80K4CB	4	0.32	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B34KA0
	28.900	23.100			100K4CA	4	0.63		P2M5B34AA0
	29.400	29.400			100K4CB	4	0.80		P2M5B34KA0
	16.300	**13.000**	400	232	80K4CB	4	0.32	DGT6A0M12 (r) DGT6A0M22 (l)	P2M3B24KA0
	32.300	**25.800**			100K4CA	4	0.63		P2M5B24AA0
	41.400	33.100			100K4CB	4	0.80		P2M5B24KA0
	32.300	=	400 R	232	100K4CA	4	0.63	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B24AA0
	41.400	**33.100**			100K4CB	4	0.80		P2M5B24KA0

- The specifications refer to single motoreducer; in the case of two or more motoreducers, multiply travelling mass by the number of motoreducers used.
- Verify that, in relation to the rail's contact surface(b), the average reaction (R ave.) is compatible with the values listed in diagram at pages 15, 16, 17.
- The values for travelling mass in gray require a verification of average reaction (R ave.) on each wheel, which must not exceed following Rx. max. values:

Ø 125	Ø 160	Ø 200	Ø 250	Ø 315	Ø 400	Ø 400 R
R ave. ≤ Rx max. ≤ **3670 kg** (36 kN)	R ave. ≤ Rx max. ≤ **4893 kg** (48 kN)	R ave. ≤ Rx max. ≤ **7340 kg** (72 kN)	R ave. ≤ Rx max. ≤ **10.805 kg** (106 kN)	R ave. ≤ Rx max. ≤ **14.679 kg** (144 kN)	R ave. ≤ Rx max. ≤ **18.960 kg** (186 kN)	R ave. ≤ Rx max. ≤ **30.580 kg** (300 kN)

Travelling masses at 1 speed, based on the combination of components

Nominal speed (m/min)	Travelling mass (kg) ISO service group (FEM) M4 (1Am)	M5 (2m)	"DGT" wheel group Ø (mm)	"DGP" motoreducer Reducer Type	Motor Type	Self-braking motor specifications Poles (N°)	Power (kW)	Partnumbers for components "DGT" drive wheel group	"DGP" motoreducer
20	6.720	5.376	125	033	71K2CA	2	0.32	DGT1A0M10	P0M2B32AA0
	7.400	6.720			71K2CB	2	0.40		P0M2B32KA0
	8.000	**6.400**	160	032	71K2CA	2	0.32	DGT2A0M10	P0M2B22AA0
	9.800	8.000			71K2CB	2	0.40		P0M2B22KA0
	9.800	9.800		132	71K2L	2 by inverter	0.50	DGT2A0M30	P1M2B2IKA0
	9.600	**7.600**	200	131	71K2CA	2	0.32	DGT3A0M10	P1M2B12AA0
	12.000	**9.600**			71K2CB	2	0.40		P1M2B12KA0
	14.700	12.200			71K2L	2 by inverter	0.50		P1M2B1IKA0
	14.700	14.700			80K2CB	2	0.63		P1M3B12KA0
	11.200	**8.900**	250	133	80K4CB	4	0.32	DGT4A0M12	P1M3B34KA0
	17.200	**13.700**		232	80K2CA	2	0.50	DGT4A0M32	P2M3B22AA0
	21.600	17.200			80K2CB	2	0.63		P2M3B22KA0
	21.600	21.600			80K2L	2 by inverter	0.80		P2M3B2IKA0
	18.500	**14.800**	315	231	80K2CA	2	0.50	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B12AA0
	23.300	**18.600**			80K2CB	2	0.63		P2M3B12KA0
	29.400	23.700			80K2L	2 by inverter	0.80		P2M3B1IKA0
	29.400	29.400			100K2CA	2	1.25		P2M5B12AA0
	25.800	**20.600**	400	233	100K4CA	4	0.63	DGT6A0M12 (r) DGT6A0M22 (l)	P2M5B34AA0
	33.100	**26.500**			100K4CB	4	0.80		P2M5B34KA0
	42.800	41.300		331	112K4C	4	1.25	DGT6A0M32 (r) DGT6A0M42 (l)	P3M6B14AA0
	33.100	**26.500**	400 R	233	100K4CB	4	0.80	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B34KA0
	51 700	**41 300**		331	112K4C	4	1.25	DGT6A0M82 (r) DGT6A0M92 (l)	P3M6B14AA0
25	5.360	**4.288**	125	034	71K2CA	2	0.32	DGT1A0M10	P0M2B42AA0
	6.700	5.360			71K2CB	2	0.40		P0M2B42KA0
	7.400	6.700			71K2L	2 by inverter	0.50		P0M2B4IKA0
	7.400	6.700		134	80K2CA	2	0.50	DGT1A0M30	P1M3B42AA0
	6.400	**5.100**	160	033	71K2CA	2	0.32	DGT2A0M10	P0M2B32AA0
	8.000	**6.400**			71K2CB	2	0.40		P0M2B32KA0
	9.800	8.000			71K2L	2 by inverter	0.50		P0M2B3IKA0
	9.800	9.800		133	80K2CB	2	0.63	DGT2A0M30	P1M3B32KA0
	7.600	**6.100**	200	132	71K2CA	2	0.32	DGT3A0M10	P1M2B22AA0
	9.600	**7.600**			71K2CB	2	0.40		P1M2B22KA0
	12.000	**9.600**			71K2L	2 by inverter	0.50		P1M2B2IKA0
	12.000	**9.600**			80K2CA	2	0.50		P1M3B22AA0
	14.700	12.000			80K2CB	2	0.63		P1M3B22KA0
	14.700	14.700			80K2L	2 by inverter	0.80		P1M3B2IKA0
	9.000	**7.200**	250	131	71K2CA	2	0.32	DGT4A0M12	P1M2B12AA0
	11.200	**8.900**			71K2CB	2	0.40		P1M2B12KA0
	13.800	**11.000**			71K2L	2 by inverter	0.50		P1M2B1IKA0
	17.200	**13.800**			80K2CB	2	0.63		P1M3B12KA0
	21.600	17.200		233	100K2CA	2	1.25	DGT4A0M32	P2M5B32AA0
	21.600	21.600			100K2CB	2	1.60		P2M5B32KA0
	14.800	**11.900**	315	232	80K2CA	2	0.50	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B22AA0
	18.600	**14.900**			80K2CB	2	0.63		P2M3B22KA0
	23.700	**18.900**			80K2L	2 by inverter	0.80		P2M3B2IKA0
	29.400	29.400			100K2CA	2	1.25		P2M5B22AA0
	16.500	**13.200**	400	231	80K2CA	2	0.50	DGT6A0M12 DGT6A0M22	P2M3B12AA0
	20.800	**16.600**			80K2CB	2	0.63		P2M3B12KA0
	26.500	**21.200**			80K2L	2 by inverter	0.80		P2M3B1IKA0
	41.400	33.100			100K2CA	2	1.25		P2M5B12AA0
	41.400	**33.100**	400 R	231	100K2CA	2	1.25	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B12AA0
	53 000	**42 400**			100K2CB	2	1.60		P2M5B12KA0
	66 200	**53 000**			100K2L	2 by inverter	2.00		P2M5B1IKA0

- The specifications refer to single motoreducer; in the case of two or more motoreducers, multiply travelling mass by the number of motoreducers used.
- Verify that, in relation to the rail's contact surface(b), the average reaction (R med.) is compatible with the values listed in diagram at pages 15, 16, 17.
- The values for travelling mass in gray require a verification of average reaction (R med.) on each wheel, which must not exceed following Rx. max. values:

Ø 125	Ø 160	Ø 200	Ø 250	Ø 315	Ø 400	Ø 400 R
R ave. ≤ Rx max. ≤ **3670 kg** (36 kN)	R ave. ≤ Rx max. ≤ **4893 kg** (48 kN)	R ave. ≤ Rx max. ≤ **7340 kg** (72 kN)	R ave. ≤ Rx max. ≤ **10.805 kg** (106 kN)	R ave. ≤ Rx max. ≤ **14.679 kg** (144 kN)	R ave. ≤ Rx max. ≤ **18.960 kg** (186 kN)	R ave. ≤ Rx max. ≤ **30.580 kg** (300 kN)

Travelling masses at 2 speeds, based on the combination of components

Nominal speed (m/min)	Travelling mass (kg) ISO service group (FEM) M4 (1Am)	M5 (2m)	"DGT" wheel group Ø (mm)	"DGP" motoreducer Reducer Type	Motor Type	Self-braking motor specifications Poles (N°)	Power (kW)	Partnumbers for components "DGT" drive wheel group	"DGP" motoreducer
12.5/3.2	7.400	7.400	125	031	71K3C	2/8	0.32/0.07	DGT1A0M10	P0M2B13AA0
	7.400	7.400			71K2L	2 by inverter	0.50		P0M2B1IKA0
	14.700	14.700	200	231	80K3C	2/8	0.50/0.12	DGT3A0M30	P2M3B13AA0
16/4	7.400	6.656	125	032	71K3C	2/8	0.32/0.07	DGT1A0M10	P0M2B23AA0
	7.400	6.656			71K2L	2 by inverter	0.50		P0M2B2IKA0
	9.800	8.000	160	031	71K3C	2/8	0.32/0.07	DGT2A0M10	P0M2B13AA0
	9.800	9.800		131	71K3L	2/8	0.40/0.09	DGT2A0M30	P1M2B13KA0
	14.700	14.700	200	232	80K3C	2/8	0.50/0.12	DGT3A0M30	P2M3B23AA0
	21.600	17.200	250	231	80K3C	2/8	0.50/0.12	DGT4A0M32	P2M3B13AA0
	21.600	21.600			80K3L	2/8	0.63/0.15		P2M3B13KA0
20/5	6.720	5.376	125	033	71K3C	2/8	0.32/0.07	DGT1A0M10	P0M2B33AA0
	7.400	6.720			71K3L	2/8	0.40/0.09		P0M2B33KA0
	7.400	6.720			71K2L	2 by inverter	0.50		P0M2B3IKA0
	8.000	**6.400**	160	032	71K3C	2/8	0.32/0.07	DGT2A0M10	P0M2B23AA0
	9.800	8.000			71K3L	2/8	0.40/0.09		P0M2B23KA0
	9.800	9.800		132	71K2L	2 by inverter	0.50	DGT2A0M30	P1M2B2IKA0
	9.600	**7.600**	200	131	71K3C	2/8	0.32/0.07	DGT3A0M10	P1M2B13AA0
	12.000	**9.600**			71K3L	2/8	0.40/0.09		P1M2B13KA0
	14.700	12.000			71K2L	2 by inverter	0.50		P1M2B1IKA0
	14.700	12.000			80K3C	2/8	0.50/0.12		P1M3B13AA0
	14.700	14.700			80K3L	2/8	0.63/0.15		P1M3B13KA0
	17.200	**13.700**	250	232	80K3C	2/8	0.50/0.12	DGT4A0M32	P2M3B23AA0
	21.600	17.200			80K3L	2/8	0.63/0.15		P2M3B23KA0
	21.600	21.600			80K2L	2 by inverter	0.80		P2M3B2IKA0
	18.500	**14.800**	315	231	80K3C	2/8	0.50/0.12	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B13AA0
	23.300	**18.600**			80K3L	2/8	0.63/0.15		P2M3B13KA0
	29.400	23.700			80K2L	2 by inverter	0.80		P2M3B1IKA0
	29.400	29.400			100K3C	2/8	1.25/0.31		P2M5B13AA0
25/6.3	5.360	**4.288**	125	034	71K3C	2/8	0.32/0.07	DGT1A0M10	P0M2B43AA0
	6.700	5.360			71K3L	2/8	0.40/0.09		P0M2B43KA0
	7.400	6.700			71K2L	2 by inverter	0.50		P0M2B4IKA0
	7.400	6.700		134	80K3C	2/8	0.50/0.12	DGT1A0M30	P1M3B43AA0
	6.400	**5.100**	160	033	71K3C	2/8	0.32/0.07	DGT2A0M10	P0M2B33AA0
	8.000	**6.400**			71K3L	2/8	0.40/0.09		P0M2B33KA0
	9.800	8.000			71K2L	2 by inverter	0.50		P0M2B3IKA0
	9.800	9.800		133	80K3C	2/8	0.50/0.12	DGT2A0M30	P1M3B33AA0
	7.600	**6.100**	200	132	71K3C	2/8	0.32/0.07	DGT3A0M10	P1M2B23AA0
	9.600	**7.600**			71K3L	2/8	0.40/0.09		P1M2B23KA0
	12.000	**9.600**			71K2L	2 by inverter	0.50		P1M2B2IKA0
	12.000	**9.600**			80K3C	2/8	0.50/0.12		P1M3B23AA0
	14.700	12.000			80K3L	2/8	0.63/0.15		P1M3B23KA0
	14.700	14.700			80K2L	2 by inverter	0.80		P1M3B2IKA0
	11.200	**9.000**	250	131	71K3L	2/8	0.40/0.09	DGT4A0M12	P1M2B13KA0
	13.800	**11.000**			71K2L	2 con inverter	0.50		P1M2B1IKA0
	13.800	**11.000**			80K3C	2/8	0.50/0.12		P1M3B13AA0
	17.200	**13.800**			80K3L	2/8	0.63/0.15		P1M3B13KA0
	21.600	21.600		233	100K3C	2/8	1.25/0.31	DGT4A0M32	P2M5B33AA0
	14.800	**11.900**	315	232	80K3C	2/8	0.50/0.12	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B23AA0
	18.600	**14.900**			80K3L	2/8	0.63/0.15		P2M3B23KA0
	23.700	**18.900**			80K2L	2 by inverter	0.80		P2M3B2IKA0
	29.400	29.400			100K3C	2/8	1.25/0.31		P2M5B23AA0
	20.800	**16.600**	400	231	80K3L	2/8	0.63/0.15	DGT6A0M12 (r) DGT6A0M22 (l)	P2M3B13KA0
	26.500	**21.200**			80K2L	2 by inverter	0.80		P2M3B1IKA0
	41.400	33.100			100K3C	2/8	1.25/0.31		P2M5B13AA0
	41.400	**33.100**	400 R	231	100K3C	2/8	1.25/0.31	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B13AA0
	53 000	**42 400**			100K3L	2/8	1.60/0.39		P2M5B13KA0
	66 200	**53 000**			100K2L	2 by inverter	2.00		P2M5B1IKA0

- The specifications refer to single motoreducer; in the case of two or more motoreducers, multiply travelling mass by the number of motoreducers used.
- Verify that, in relation to the rail's contact surface(b), the average reaction (R ave.) is compatible with the values listed in diagram at pages 15, 16, 17.
- The values for travelling mass in gray require a verification of average reaction (R ave.) on each wheel, which must not exceed following Rx. max. values:

Ø 125	Ø 160	Ø 200	Ø 250	Ø 315	Ø 400	Ø 400 R
R ave. ≤ Rx max. ≤ **3670 kg** (36 kN)	R ave. ≤ Rx max. ≤ **4893 kg** (48 kN)	R ave. ≤ Rx max. ≤ **7340 kg** (72 kN)	R ave. ≤ Rx max. ≤ **10.805 kg** (106 kN)	R ave. ≤ Rx max. ≤ **14.679 kg** (144 kN)	R ave. ≤ Rx max. ≤ **18.960 kg** (186 kN)	R ave. ≤ Rx max. ≤ **30.580 kg** (300 kN)

Travelling masses at 2 speeds, based on the combination of components

Nominal speed (m/min)	Travelling mass (kg) ISO service group (FEM) M4 (1Am)	M5 (2m)	"DGT"wheel group Ø (mm)	"DGP" motoreducer Reducer Type	Motor Type	Self-braking motor specifications Poles (N°)	Power (kW)	Partnumbers for components "DGT" drive wheel group	"DGP" motoreducer
32/8	**4.160**	**3.328**	125	021	**71K3C**	2/8	0.32/0.07	DGT1A0M10	P0M2A13AA0
	5.200	**4.160**			**71K3L**	2/8	0.40/0.09		P0M2A13KA0
	6.500	5.200		121	**71K2L**	2 by inverter	0.50	DGT1A0M30	P1M2A1IKA0
	6.500	5.200			**80K3C**	2/8	0.50/0.12		P1M3A13AA0
	7.400	6.656			**80K3L**	2/8	0.63/0.15		P1M3A13KA0
	7.400	6.656			**80K2L**	2 by inverter	0.80		P1M3A1IKA0
	5.000	**4.000**	160	034	**71K3C**	2/8	0.32/0.07	DGT2A0M10	P0M2B43AA0
	6.300	**5.000**			**71K3L**	2/8	0.40/0.09		P0M2B43KA0
	7.900	**6.300**			**71K2L**	2 by inverter	0.50		P0M2B4IKA0
	7.900	**6.300**		134	**80K3C**	2/8	0.50/0.12	DGT2A0M30	P1M3B43AA0
	9.800	8.000			**80K3L**	2/8	0.63/0.15		P1M3B43KA0
	9.800	9.800			**80K2L**	2 by inverter	0.80		P1M3B4IKA0
	7.600	**6.000**	200	133	**71K3L**	2/8	0.40/0.09	DGT3A0M10	P1M2B33KA0
	9.600	**7.600**			**71K2L**	2 by inverter	0.50		P1M2B3IKA0
	9.600	**7.600**			**80K3C**	2/8	0.50/0.12		P1M3B33AA0
	12.000	**9.600**			**80K3L**	2/8	0.63/0.15		P1M3B33KA0
	14.700	12.000			**80K2L**	2 by inverter	0.80		P1M3B3IKA0
	14.700	14.700		221	**100K3C**	2/8	1.25/0.31	DGT3A0M30	P2M5A13AA0
	10.800	**8.600**	250	132	**71K2L**	2 by inverter	0.50	DGT4A0M12	P1M2B2IKA0
	10.800	**8.600**			**80K3C**	2/8	0.50/0.12		P1M3B23AA0
	13.500	**10.800**			**80K3L**	2/8	0.63/0.15		P1M3B23KA0
	17.200	**13.700**			**80K2L**	2 by inverter	0.80		P1M3B2IKA0
	21.600	21.600		234	**100K3C**	2/8	1.25/0.31	DGT4A0M32	P2M5B43AA0
	14.600	**11.600**	315	233	**80K3L**	2/8	0.63/0.15	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B33KA0
	18.500	**14.800**			**80K2L**	2 by inverter	0.80		P2M3B3IKA0
	28.900	23.100			**100K3C**	2/8	1.25/0.31		P2M5B33AA0
	29.400	29.400			**100K3L**	2/8	1.60/0.39		P2M5B33KA0
	20.700	**16.500**	400	232	**80K2L**	2 by inverter	0.80	DGT6A0M12 (r) DGT6A0M22 (l)	P2M3B2IKA0
	32.300	**25.800**			**100K3C**	2/8	1.25/0.31		P2M5B23AA0
	41.400	33.100			**100K3L**	2/8	1.60/0.39		P2M5B23KA0
	32.300	=	400 R	232	**100K3C**	2/8	1.25/0.31	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B23AA0
	41.400	**33.100**			**100K3L**	2/8	1.60/0.39		P2M5B23KA0
	51 700	**41 300**			**100K2L**	2 by inverter	2.00		P2M5B2IKA0
40/10	**3.360**	**2.688**	125	022	**71K3C**	2/8	0.32/0.07	DGT1A0M10	P0M2A23AA0
	4.200	**3.360**			**71K3L**	2/8	0.40/0.09		P0M2A23KA0
	5.250	**4.200**			**71K2L**	2 by inverter	0.50		P0M2A2IKA0
	5.250	**4.200**		122	**80K3C**	2/8	0.50/0.12	DGT1A0M30	P1M3A23AA0
	6.695	5.356			**80K3L**	2/8	0.63/0.15		P1M3A23KA0
	7.400	6.720			**80K2L**	2 by inverter	0.80		P1M3A2IKA0
	5.000	**4.000**	160	021	**71K3L**	2/8	0.40/0.09	DGT2A0M10	P0M2A13KA0
	6.300	**5.000**		121	**71K2L**	2 by inverter	0.50	DGT2A0M30	P1M2A1IKA0
	6.300	**5.000**			**80K3C**	2/8	0.50/0.12		P1M3A13AA0
	7.900	**6.300**			**80K3L**	2/8	0.63/0.15		P1M3A13KA0
	10.000	8.000			**80K2L**	2 by inverter	0.80		P1M3A1IKA0
	7.600	**6.000**	200	134	**71K2L**	2 by inverter	0.50	DGT3A0M10	P1M2B4IKA0
	7.600	**6.000**			**80K3C**	2/8	0.50/0.12		P1M3B43AA0
	9.400	**7.600**			**80K3L**	2/8	0.63/0.15		P1M3B43KA0
	12.000	**9.600**			**80K2L**	2 by inverter	0.80		P1M3B4IKA0
	14.700	14.700		222	**100K3C**	2/8	1.25/0.31	DGT3A0M30	P2M5A23AA0
	10.800	**8.600**	250	133	**80K3L**	2/8	0.63/0.15	DGT4A0M12	P1M3B33KA0
	13.500	**10.800**			**80K2L**	2 by inverter	0.80		P1M3B3IKA0
	21.600	17.200		221	**100K3C**	2/8	1.25/0.31	DGT4A0M32	P2M5A13AA0
	21.600	21.600			**100K3L**	2/8	1.60/0.39		P2M5A13KA0
	11.600	**9.300**	315	234	**80K3L**	2/8	0.63/0.15	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3B43KA0
	14.800	**11.900**			**80K2L**	2 by inverter	0.80		P2M3B4IKA0
	23.000	**18.400**			**100K3C**	2/8	1.25/0.31		P2M5B43AA0
	29.400	23.700			**100K3L**	2/8	1.60/0.39		P2M5B43KA0
	29.400	29.400			**100K2L**	2 by inverter	2.00		P2M5B4IKA0
	13.000	**10.400**	400	233	**80K3L**	2/8	0.63/0.15	DGT6A0M12 (r) DGT6A0M22 (l)	P2M3B33KA0
	16.500	**13.200**			**80K2L**	2 by inverter	0.80		P2M3B3IKA0
	25.800	**20.600**			**100K3C**	2/8	1.25/0.31		P2M5B33AA0
	33.100	**26.400**			**100K3L**	2/8	1.60/0.39		P2M5B33KA0
	41.300	33.100			**100K2L**	2 by inverter	2.00		P2M5B3IKA0
	42.800	41.300		331	**112K3L**	2/8	2.50/0.62	DGT6A0M32 (r) DGT6A0M42 (l)	P3M6B13KA0
	33.100	**26.400**	400 R	233	**100K3L**	2/8	1.60/0.39	DGT6A0M62 (r)	P2M5B33KA0
	41.300	**33.100**			**100K2L**	2 by inverter	2.00	DGT6A0M72 (l)	P2M5B3IKA0
	51 600	**41 300**		331	**112K3L**	2/8	2.50/0.62	DGT6A0M82 (r)	P3M6B13KA0
	66 000	**52 800**			**112K2L**	2 by inverter	3.20	DGT6A0M92 (l)	P3M6B1IAA0

- The specifications refer to single motoreducer; in the case of two or more motoreducers, multiply travelling mass by the number of motoreducers used.
- Verify that, in relation to the rail's contact surface(b), the average reaction (R ave.) is compatible with the values listed in diagram at pages 15, 16, 17.
- The values for travelling mass in gray require a verification of average reaction (R ave.) on each wheel, which must not exceed following Rx. max. values:

Ø 125	Ø 160	Ø 200	Ø 250	Ø 315	Ø 400	Ø 400 R
R ave. ≤ Rx max. ≤ **3670 kg** (36 kN)	R ave. ≤ Rx max. ≤ **4893 kg** (48 kN)	R ave. ≤ Rx max. ≤ **7340 kg** (72 kN)	R ave. ≤ Rx max. ≤ **10.805 kg** (106 kN)	R ave. ≤ Rx max. ≤ **14.679 kg** (144 kN)	R ave. ≤ Rx max. ≤ **18.960 kg** (186 kN)	R ave. ≤ Rx max. ≤ **30.580 kg** (300 kN)

Travelling masses at 2 speeds, based on the combination of components

Nominal speed (m/min)	Travelling mass (kg) ISO service group (FEM) M4 (1Am)	M5 (2m)	"DGT" wheel group Ø (mm)	"DGP" motoreducer Reducer Type	Motor Type	Self-braking motor specifications Poles (N°)	Power (kW)	Partnumbers for components "DGT" drive wheel group	"DGP" motoreducer
50/12.5	**2.640**	**2.112**	125	023	**71K3C**	2/8	0.32/0.07	DGT1A0M10	P0M2A33AA0
	3.300	**2.640**			**71K3L**	2/8	0.40/0.09		P0M2A33KA0
	4.125	**3.300**			**71K2L**	2 by inverter	0.50		P0M2A3IKA0
	4.125	**3.300**		123	**80K3C**	2/8	0.50/0.12	DGT1A0M30	P1M3A33AA0
	5.197	**4.157**			**80K3L**	2/8	0.63/0.15		P1M3A33KA0
	6.600	5.280			**80K2L**	2 by inverter	0.80		P1M3A3IKA0
	5 000	**4 000**	160	022	**71K2L**	2 by inverter	0.50	DGT2A0M10	P0M2A2IKA0
	5 000	**4 000**		122	**80K3C**	2/8	0.50/0.12	DGT2A0M30	P1M3A23AA0
	6 300	**5 000**			**80K3L**	2/8	0.63/0.15		P1M3A23KA0
	8 000	**6 300**			**80K2L**	2 by inverter	0.80		P1M3A2IKA0
	6 000	**4 800**	200	121	**71K2L**	2 by inverter	0.50	DGT3A0M10	P1M2A1IKA0
	7 600	**6 000**			**80K3L**	2/8	0.63/0.15		P1M3A13KA0
	9 400	**7 600**			**80K2L**	2 by inverter	0.80		P1M3A1IKA0
	14 700	12 000		223	**100K3C**	2/8	1.25/0.31	DGT3A0M30	P2M5A33AA0
	14 700	14 700			**100K3L**	2/8	1.60/0.39		P2M5A33KA0
	8 600	**6 900**	250	134	**80K3L**	2/8	0.63/0.15	DGT4A0M12	P1M3B43KA0
	10 800	**8 600**			**80K2L**	2 by inverter	0.80		P1M3B4IKA0
	17 200	**13 800**		222	**100K3C**	2/8	1.25/0.31	DGT4A0M32	P2M5A23AA0
	21 600	17 200			**100K3L**	2/8	1.60/0.39		P2M5A23KA0
	21 600	21 600			**100K2L**	2 by inverter	2.00		P2M5A2IKA0
	9 200	**7 400**	315	221	**80K3L**	2/8	0.63/0.15	DGT5A0M12 (r) DGT5A0M22 (l)	P2M3A13KA0
	11 800	**9 400**			**80K2L**	2 by inverter	0.80		P2M3A1IKA0
	18 400	**14 700**			**100K3C**	2/8	1.25/0.31		P2M5A13AA0
	23 600	**18 900**			**100K3L**	2/8	1.60/0.39		P2M5A13KA0
	29 400	29 400		333	**112K3L**	2/8	2.50/0.62	DGT5A0M32 (r) DGT5A0M42 (l)	P3M6B33KA0
	20 700	**16 600**	400	234	**100K3C**	2/8	1.25/0.31	DGT6A0M12 (r) DGT6A0M22 (l)	P2M5B43AA0
	26 500	**21 200**			**100K3L**	2/8	1.60/0.39		P2M5B43KA0
	33 000	26 400			**100K2L**	2 by inverter	2.00		P2M5B4IKA0
	41 200	33 000		332	**112K3L**	2/8	2.50/0.62	DGT6A0M32 (r)	P3M6B23KA0
	42 800	42 200			**112K2L**	2 by inverter	3.20	DGT6A0M42 (l)	P3M6B2IAA0
	33 000	**26 400**	400 R	234	**100K2L**	2 by inverter	2.00	DGT6A0M62 (r) DGT6A0M72 (l)	P2M5B4IKA0
	41 200	**33 000**		332	**112K3L**	2/8	2.50/0.62	DGT6A0M82 (r)	P3M6B23KA0
	52 700	**42 100**			**112K2L**	2 by inverter	3.20	DGT6A0M92 (l)	P3M6B2IAA0
63/16	**2.080**	**1.664**	125	024	**71K3C**	2/8	0.32/0.07	DGT1A0M10	P0M2A43AA0
	2.600	**2.080**			**71K3L**	2/8	0.40/0.09		P0M2A43KA0
	3.250	**2.600**			**71K2L**	2 by inverter	0.50		P0M2A4IKA0
	3.250	**2.600**		124	**80K3C**	2/8	0.50/0.12	DGT1A0M30	P1M3A43AA0
	4.095	**3.276**			**80K3L**	2/8	0.63/0.15		P1M3A43KA0
	5.200	**4.160**			**80K2L**	2 by inverter	0.80		P1M3A4IKA0
	5 000	**4 000**	160	123	**80K3L**	2/8	0.63/0.15	DGT2A0M30	P1M3A33KA0
	6 300	**5 000**			**80K2L**	2 by inverter	0.80		P1M3A3IKA0
	6 000	**4 800**	200	122	**80K3L**	2/8	0.63/0.15	DGT3A0M10	P1M3A23KA0
	7 600	**6 000**			**80K2L**	2 by inverter	0.80		P1M3A2IKA0
	12 000	**9 600**		224	**100K3C**	2/8	1.25/0.31	DGT3A0M30	P2M5A43AA0
	14 700	12 000			**100K3L**	2/8	1.60/0.39		P2M5A43KA0
	6 900	**5 500**	250	121	**80K3L**	2/8	0.63/0.15	DGT4A0M12	P1M3A13KA0
	8 600	**6 900**			**80K2L**	2 by inverter	0.80		P1M3A1IKA0
	13 500	**10 800**		223	**100K3C**	2/8	1.25/0.31	DGT4A0M32	P2M5A33AA0
	17 200	**13 800**			**100K3L**	2/8	1.60/0.39		P2M5A33KA0
	21 600	17 200			**100K2L**	2 by inverter	2.00		P2M5A3IKA0
	14 600	**11 700**	315	222	**100K3C**	2/8	1.25/0.31	DGT5A0M12 (r) DGT5A0M22 (l)	P2M5A23AA0
	18 700	**14 900**			**100K3L**	2/8	1.60/0.39		P2M5A23KA0
	23 400	**18 700**			**100K2L**	2 by inverter	2.00		P2M5A2IKA0
	29 300	23 500		334	**112K3L**	2/8	2.50/0.62	DGT5A0M32 (r)	P3M6B43KA0
	29 400	29 400			**112K2L**	2 by inverter	3.20	DGT5A0M42 (l)	P3M6B4IKA0
	16 400	**13 100**	400	221	**100K3C**	2/8	1.25/0.31	DGT6A0M12 (r) DGT6A0M22 (l)	P2M5A13AA0
	21 000	**16 800**			**100K3L**	2/8	1.60/0.39		P2M5A13KA0
	32 800	**26 200**		333	**112K3L**	2/8	2.50/0.62	DGT6A0M32 (r)	P3M6B33KA0
	42 000	33 600			**112K2L**	2 by inverter	3.20	DGT6A0M42 (l)	P3M6B3IAA0
	32 800	**26 200**	400 R	333	**112K3L**	2/8	2.50/0.62	DGT6A0M82 (r)	P3M6B33KA0
	42 000	**33 600**			**112K2L**	2 by inverter	3.20	DGT6A0M92 (l)	P3M6B3IAA0

- The specifications refer to single motoreducer; in the case of two or more motoreducers, multiply travelling mass by the number of motoreducers used.
- Verify that, in relation to the rail's contact surface(b), the average reaction (R ave.) is compatible with the values listed in diagram at pages 15, 16, 17.
- The values for travelling mass in gray require a verification of average reaction (R ave.) on each wheel, which must not exceed following Rx. max. values:

Ø 125	Ø 160	Ø 200	Ø 250	Ø 315	Ø 400	Ø 400 R
R ave. ≤ Rx max. ≤ **3670 kg** (36 kN)	R ave. ≤ Rx max. ≤ **4893 kg** (48 kN)	R ave. ≤ Rx max. ≤ **7340 kg** (72 kN)	R ave. ≤ Rx max. ≤ **10.805 kg** (106 kN)	R ave. ≤ Rx max. ≤ **14.679 kg** (144 kN)	R ave. ≤ Rx max. ≤ **18.960 kg** (186 kN)	R ave. ≤ Rx max. ≤ **30.580 kg** (300 kN)

Travelling masses at 2 speeds, based on the combination of components

Nominal speed (m/min)	Traversable mass (kg) ISO service group (FEM) M4 (1Am)	M5 (2m)	"DGT" wheel group Ø (mm)	"DGP" motoreducer Reducer Type	Motor Type	Self-braking motor specifications Poles (N°)	Power (kW)	Partnumbers for components "DGT" drive wheel group	"DGP" motoreducer
80/20	**2 000**	**1 600**	160	024	**71K3C**	2/8	0.32/0.07	DGT2A0M10	P0M2A43AA0
	2 500	**2 000**			**71K3L**	2/8	0.40/0.09		P0M2A43KA0
	3 200	**2 500**			**71K2L**	2 by inverter	0.50		P0M2A4IKA0
	3 200	**2 500**		124	**80K3C**	2/8	0.50/0.12	DGT2A0M30	P1M3A43AA0
	4 000	**3 200**			**80K3L**	2/8	0.63/0.15		P1M3A43KA0
	5 000	**4 000**			**80K2L**	2 by inverter	0.80		P1M3A4IKA0
	5 400	**4 300**	250	122	**80K3L**	2/8	0.63/0.15	DGT4A0M12	P1M3A23KA0
	6 900	**5 500**			**80K2L**	2 by inverter	0.80		P1M3A2IKA0
	10 800	**8 600**		224	**100K3C**	2/8	1.25/0.31	DGT4A0M32	P2M5A43AA0
	13 500	**10 800**			**100K3L**	2/8	1.60/0.39		P2M5A43KA0
	17 200	**13 800**			**100K2L**	2 by inverter	2.00		P2M5A4IKA0
	16 500	**13 200**	400	222	**100K3L**	2/8	1.60/0.39	DGT6A0M12 (r)	P2M5A23KA0
	20 600	**16 500**			**100K2L**	2 by inverter	2.00	DGT6A0M22 (l)	P2M5A2IKA0
	25 800	**20 600**		334	**112K3L**	2/8	2.50/0.62	DGT6A0M32 (r)	P3M6B43KA0
	33 000	**26 400**			**112K2L**	2 by inverter	3.20	DGT6A0M42 (l)	P3M6B4IAA0
	33 600	**26 900**	400 R	334	**112K2L**	2 by inverter	3.20	DGT6A0M82 (r)	P3M6B4IAA0
								DGT6A0M92 (l)	

- The specifications refer to single motoreducer; in the case of two or more motoreducers, multiply travelling mass by the number of motoreducers used.
- Verify that, in relation to the rail's contact surface(b), the average reaction (R ave.) is compatible with the values listed in diagram at pages 15, 16, 17.
- The values for travelling mass in gray require a verification of average reaction (R ave.) on each wheel, which must not exceed following Rx. max. values:

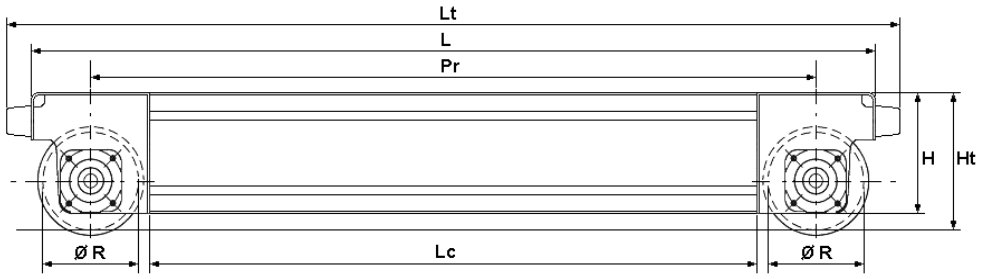
Ø 125	Ø 160	Ø 200	Ø 250	Ø 315	Ø 400	Ø 400 R
R ave. ≤ Rx max. ≤ **3670 kg** (36 kN)	R ave. ≤ Rx max. ≤ **4893 kg** (48 kN)	R ave. ≤ Rx max. ≤ **7340 kg** (72 kN)	R ave. ≤ Rx max. ≤ **10.805 kg** (106 kN)	R ave. ≤ Rx max. ≤ **14.679 kg** (144 kN)	R ave. ≤ Rx max. ≤ **18.960 kg** (186 kN)	R ave. ≤ Rx max. ≤ **30.580 kg** (300 kN)

2.3.8 Operating limitations and technical specifications for "DGT" series endcarriages

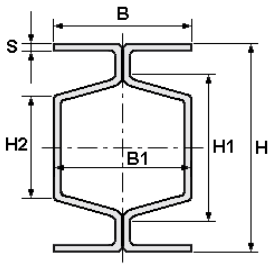
- For complete technical specifications on **"DGT" series endcarriages for bridge cranes**, in relation to their intended operation, check and match the parameters limiting the operation of the **endcarriages** in combination with the **"DGP" offset geared motors** and related **self-braking motors**, in relation to the operating parameters for the bridge crane on which the endcarriages will be installed.

- Operating parameters required for selecting endcarriages:
  - type of bridge crane (mono or dual rail);
  - load bearing capacity;
  - gauge;
  - ISO / FEM service group;
  - inflection point, with a nominal load on the beam's mid-section;
  - loads on the wheels;
  - width and shape of the rail;
  - Drive speed.

Geometrical specifications based on the endcarriages for SINGLE or DOUBLE GIRDER bridge cranes



Endcarriage construction



Tubular beam section

Endcariage type			Endcarriage dimensional data (mm)										Inertial data on tubular section						
	Wheel																		
"DGT" size	Ø R (mm)	basis (mm)	Lc	L	Lt	S	B	H	B1	H1	H2	Ht	Wt cm^3	Jx cm^4	Wx cm^3	Jy cm^4	Wy cm^3	Area (cm^2) At	Ao
1	125	1800	1630	1970	2030	4	160	220	150	138	100	227	120.0	2423.0	220.0	889.0	111.0	17.6	24.8
		2400	2230	2570	2630	6				127	90		162.0	3450.0	313.0	1224.0	153.0	26.4	37.2
		3300	3130	3470	3530														
2	160	1800	1590	2010	2110	4	180	250	170	164	120	265	163.0	3607.0	288.0	1336.0	148.0	20.0	28.0
		2400	2190	2610	2710	6				157	114		233.0	5194.0	415.0	1894.5	210.0	30.0	42.0
		3300	3090	3510	3610														
3	200	2100	1840	2360	2490	5	200	290	188	194	147	315	276.0	6839.0	471.0	2363.0	236.0	29.	38.8
		2700	2440	2960	3090	8				166	120		361.0	10119.0	698.0	3275.0	327.5	46.4	62.0
		3600	3340	3860	3990														
4	250	2100	1790	2410	2540	5	230	335	218	228	180	370	392.0	10772.0	643.0	3803.0	330.	33.5	44.8
		2700	2390	3010	3140	8				211	157		547.0	16135.0	963.0	5462.0	475.0	53.6	71.0
		3600	3290	3910	4040														
		3600 R						345				375		22430.0	1300.0	6326.0	550.0	55.2	93.0
5	315	2400	2010	2790	2950	6	260	385	244	266	204	437	597.0	19214.0	998.0	6467.0	497.0	46.2	60.0
		3900	3510	4290	4450	10				230	170		829.0	29610.0	1538.0	9397.0	723.0	77.0	101.0
6	400	3900	3430	4370	4570	10	290	440	274	285	217	495	1189.0	44920.0	2042.0	14293.0	986.0	88.0	113.0
	400 R	3900 R						460				505		72260.0	3141.7	17573.0	1211.9	92.0	167.0

Operating limitations for endcarriages on SINGLE GIRDER bridge cranes based on: Capacity - ISO/FEM group - Span

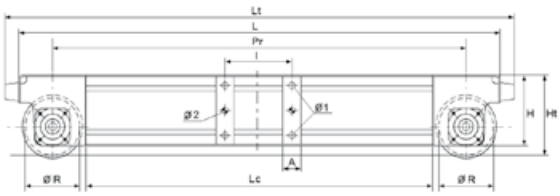
Capacity (kg)	Group ISO/FEM	Gauge (m) 6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1000	M4/1Am																				
	M5/2m																				
1250	M4/1Am																				
	M5/2m																				
1600	M4/1Am																				
	M5/2m																				
2000	M4/1Am														1 – 125 – 3300						
	M5/2m																				
2500	M4/1Am				1 – 125 – 1800						1 – 125 – 2400										
	M5/2m																				
3200	M4/1Am																				
	M5/2m																				
4000	M4/1Am																				
	M5/2m															2 – 160 – 3300					
5000	M4/1Am																				
	M5/2m																				
6300	M4/1Am																		3 – 200 – 3600		
	M5/2m				2 – 160 – 1800						2 – 160 – 2400										
8000	M4/1Am																				
	M5/2m																				
10000	M4/1Am				3 – 200 – 2100								3 – 200 – 2700								
	M5/2m																		4 – 250 – 3600		
12500	M4/1Am																				
	M5/2m						4 – 250 – 2100						4 – 250 – 2700						4 – 250 – 3600 R		
16000	M4/1Am																				
	M5/2m																				
20000	M4/1Am	4 – 250 – 2700						5 – 315 – 2400													

Admissible travelling mass from encarriages on a SINGLE GIRDER bridge crane [Travelling mass (kg) = capacity + crane weight + weight of trolley/hoist]

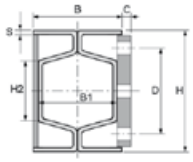
1 - 125			2 - 160			3 - 200			4 - 250				5 - 315
1800	2400	3300	1800	2400	3300	2100	2700	3600	2100	2700	3600	3600 R	2400
8.400		7.400	11.100		9.800	15.800		14.800	22.000	24.400	19.000	24.800	28.600

Note: operating limitations determined using Donati components (hoist, trolley, etc.) and sectioned beams sized as per arrow **a = Span / 750**

Endcarriages for SINGLE GIRDER cranes with connection cross plates to "bridge girder"



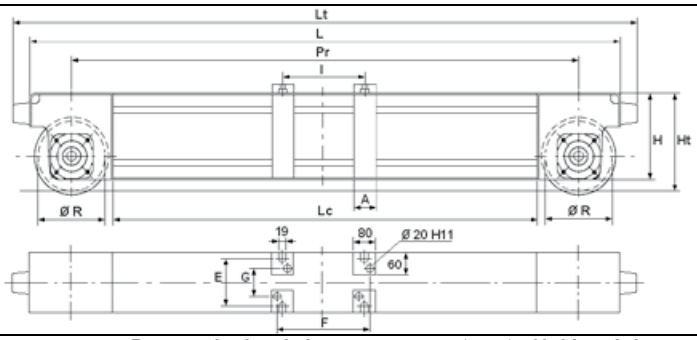
Connection of beam-girder "Lateral" configuration



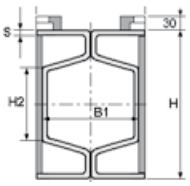
Beam joining area section

Endcarriage type	Beam codes in relation to max. span (mm) of bridge girder: Max. width	Quota l	Couple beam code	Max. width	Quota l	Couple beam code	Max. width	Quota l	Couple beam code	(for other quotas see page 27) Quotas (mm) A	C	D	Ø1	Ø2	Weight (kg)
1 – 125 – 1800			S118F1...			S118F2...			=						82
1 – 125 – 2400	305	360	S124F1...	370	430	S124F2...	450	510	S124F3...	60	7	165	18	20	128
1 – 125 – 3300			S133F1...			S133F2...			S133F3...						165
2 – 160 – 1800			S218F1...			S218F2...			=						105
2 – 160 – 2400	305	360	S224F1...	370	430	S224F2...	450	510	S224F3...	60	7	190	20	20	160
2 – 160 – 3300			S233F1...			S233F2...			S233F3...						205
3 – 200 – 2100			S321F1...			S321F2...			S321F3...						170
3 – 200 – 2700	360	420	S327F1...	410	480	S327F2...	500	560	S327F3...	80	9	225	22	25	255
3 – 200 – 3600			S336F1...			S336F2...			S336F3...						330
4 – 250 – 2100			S421F1...			S421F2...			S421F3...						220
4 – 250 – 2700	410	480	S427F1...	490	560	S427F2...	565	640	S427F3...	80	9	270	26	25	330
4 – 250 – 3600			S436F1...			S436F2...			S436F3...						410
4 – 250 – 3600 R			S437F1...			S437F2...			S437F3...						428
5 – 315 – 2400	410	500	S524F1...	490	580	S524F2...	615	710	S524F3...	100	12	305	30	32	340

Referred partial codes are applyed to couples of endcarriages without counterplates. In case of couples of endcarriages with counterplates, replace letter **F**, in fifth position, with letter **L**.



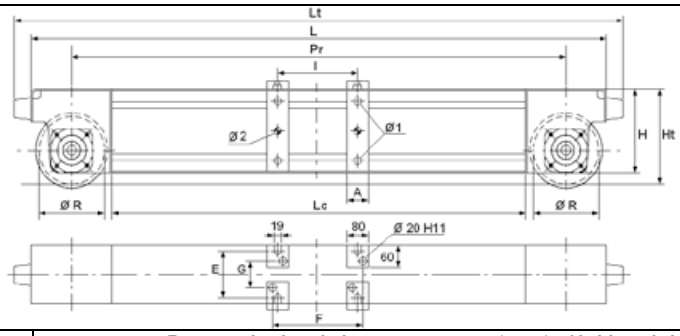
Joining of beam-girder in "Supported" configuration



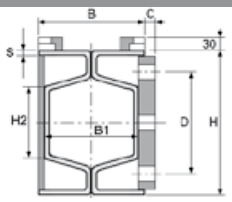
Beam joining area section

Endcarriage type	Beam codes in relation to max. span (mm) of bridge girder												(for other quotas see page 27) Quotas (mm)			Weight (kg)
	Max. width	Quota I	Quota F	Couple beam code	Max. width	Quota I	Quota F	Couple beam code	Max. width	Quota I	Quota F	Couple beam code	A	E	G	
1 – 125 – 1800				S118S1...				S118S2...				=				82
1 – 125 – 2400	305	360	402	S124S1...	370	430	472	S124S2...	450	510	552	S124S3...	60	120	78	128
1 – 125 – 3300				S133S1...				S133S2...				S133S3...				165
2 – 160 – 1800				S218S1...				S218S2...				=				105
2 – 160 – 2400	305	360	402	S224S1...	370	430	472	S224S2...	450	510	552	S224S3...	60	140	98	160
2 – 160 – 3300				S233S1...				S233S2...				S233S3...				205
3 – 200 – 2100				S321S1...				S321S2...				S321S3...				170
3 – 200 – 2700	360	420	462	S327S1...	410	480	522	S327S2...	500	560	602	S327S3...	80	160	118	255
3 – 200 – 3600				S336S1...				S336S2...				S336S3...				330
4 – 250 – 2100				S421S1...				S421S2...				S421S3...				220
4 – 250 – 2700	410	480	522	S427S1...	490	560	602	S427S2...	565	640	682	S427S3...	80	190	148	330
4 – 250 – 3600				S436S1...				S436S2...				S436S3...				410
4 – 250 – 3600 R				S437S1...				S437S2...				S437S3...				428
5 – 315 – 2400	410	500	542	S524S1...	490	580	622	S524S2...	615	710	752	S524S3...	100	220	178	340

Referred partial codes are applyed to couples of endcarriages without counterplates. In case of couples of endcarriages with counterplates, replace letter **S**, in fifth position, with letter **A**.



Connection of beam-girder in "Lateral+Supported" configuration

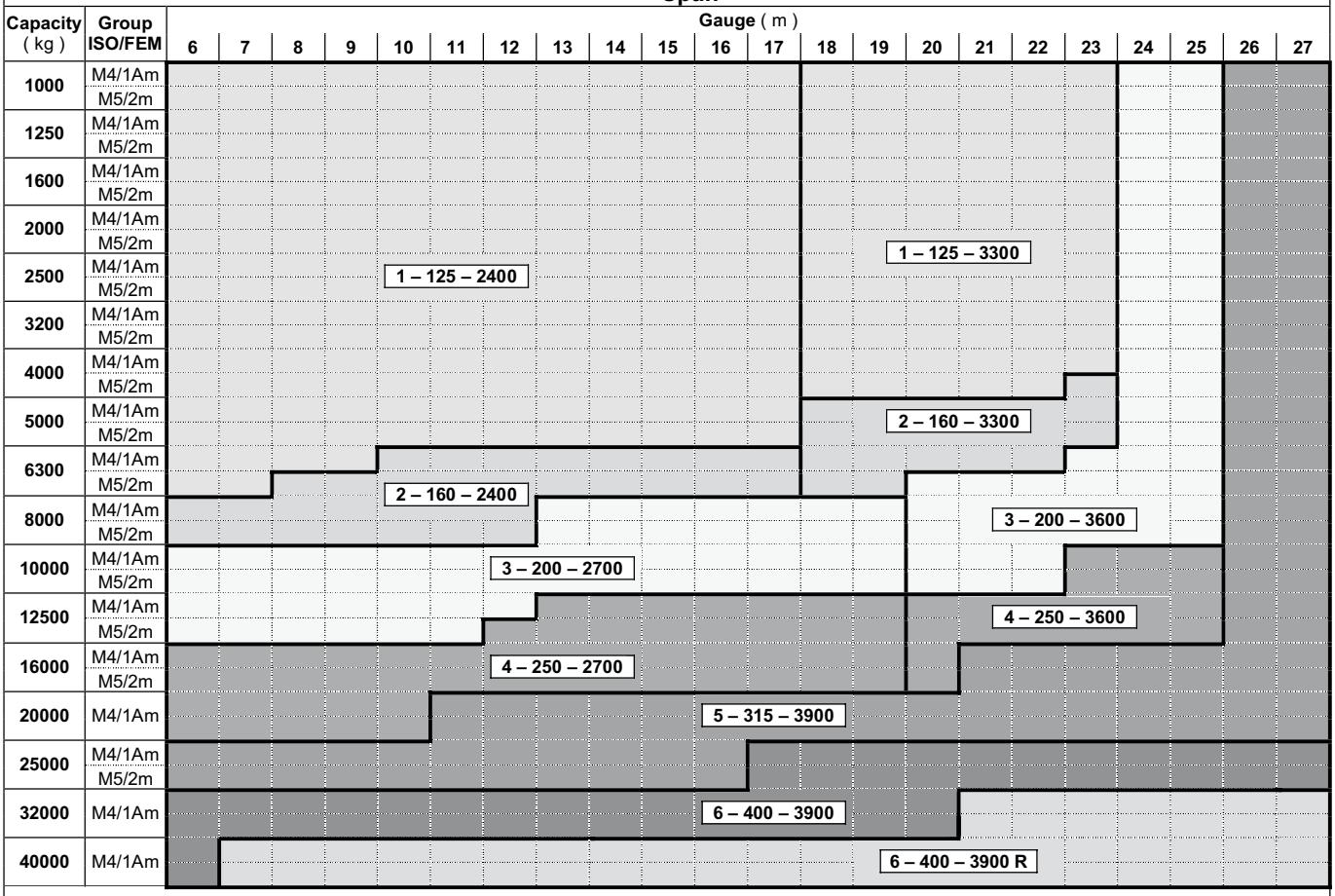


Beam joining area section

Endcarriage type	Beam codes in relation to max. span (mm) of bridge girder												(for other quotas see page 27) Quotas (mm)							Weight (kg)
	Max. width	Quota I	Quota F	Couple beam code	Max. width	Quota I	Quota F	Couple beam code	Max. width	Quota I	Quota F	Couple beam code	A	C	D	E	G	Ø1	Ø2	
1 – 125 – 1800				S118D1...				S118D2...				=								86
1 – 125 – 2400	305	360	402	S124D1...	370	430	472	S124D2...	450	510	552	S124D3...	60	7	165	120	78	18	20	132
1 – 125 – 3300				S133D1...				S133D2...				S133D3...								169
2 – 160 – 1800				S218D1...				S218D2...				=								109
2 – 160 – 2400	305	360	402	S224D1...	370	430	472	S224D2...	450	510	552	S224D3...	60	7	190	140	98	20	20	164
2 – 160 – 3300				S233D1...				S233D2...				S233D3...								209
3 – 200 – 2100				S321D1...				S321D2...				S321D3...								174
3 – 200 – 2700	360	420	462	S327D1...	410	480	522	S327D2...	500	560	602	S327D3...	80	9	225	160	118	22	25	259
3 – 200 – 3600				S336D1...				S336D2...				S336D3...								334
4 – 250 – 2100				S421D1...				S421D2...				S421D3...								224
4 – 250 – 2700	410	480	522	S427D1...	490	560	602	S427D2...	565	640	682	S427D3...	80	9	270	190	148	26	25	334
4 – 250 – 3600				S436D1...				S436D2...				S436D3...								414
4 – 250 – 3600 R				S437D1...				S437D2...				S437D3...								432
5 – 315 – 2400	410	500	542	S524D1...	490	580	622	S524D2...	615	710	752	S524D3...	100	12	305	220	178	30	32	344

Referred partial codes are applyed to couples of endcarriages without counterplates. In case of couples of endcarriages with counterplates, replace letter **D**, in fifth position, with letter **C**.

Operating limitations for endcarriages on DOUBLE GIRDER bridge cranes based on: Capacity - ISO/FEM group - Span

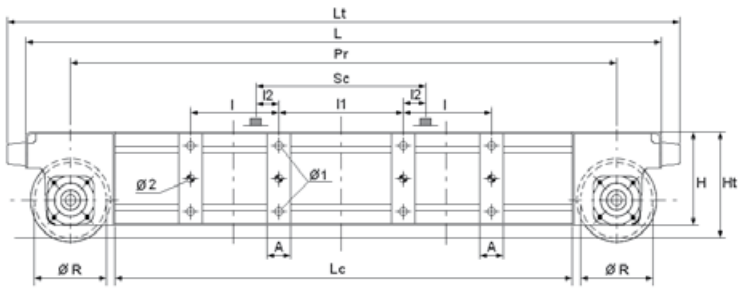


Admissible travelling mass from beams on a DOUBLE GIRDER bridge crane [Traversing mass (kg) = capacity + crane weight + weight of trolley/hoist]

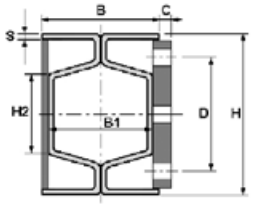
1 - 125		2 - 160		3 - 200		4 - 250		5 - 315	6 - 400	6 - 400 R
2400	3300	2400	3300	2700	3600	2700	3600	3900	3900	3900 R
9.300	10.400	11.500	13.200	17.100	18.800	25.000	25.500	35.900	46.000	62.000

Note: operating limitations determined using Donati components (hoist, trolley, etc.) and sectioned beams sized as per arrow **a = Gauge / 750**

Endcarriages for DOUBLE GIRDER cranes with connection cross plates to “bridge girders”



Joining of beam-girder in “Lateral” configuration



Beam joining area section

Endcarriage type	Couple beam codes based on the gauge of the double girder trolley, type of girders on the bridge crane and max. girder span				(for other quotas see page 27) Quotas (mm)								Weight (kg)
	Double girder trolley Gauge (mm)	Bridge crane girders Type	Max. span (mm)	Couple beam code	I	I1	I2	A	C	D	Ø1	Ø2	
1 – 125 – 2400	1000	Beam	305	W124F1...	360	870	65	60	7	165	18	20	130
			370	W124F2...	430	865	67.5						
		HE	300	W124FA...	360	640	180						
	1200	Beam	305	W124F4...	360	1070	65						
			370	W124F5...	430	1065	67.5						
		HE	300	W124FD...	360	840	180						

Beams for DOUBLE GIRDER cranes with connecting cross plates to “bridge girders” - “Lateral” connection

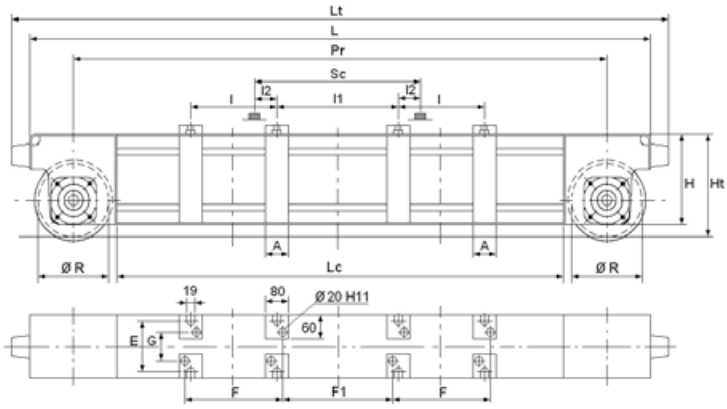
Endcarriage type	Couple beam codes based on the gauge of the double girder trolley, type of girders on the bridge crane and max. girder span				(for other quotas see page 27)								Weight (kg)
	Double girder trolley Gauge (mm)	Bridge crane girders Type	Max. width (mm)	Couple beam code	Quotas (mm) I	I1	I2	A	C	D	Ø1	Ø2	
1 – 125 – 3300	1000	Beam	305	W133F1...	360	870	65	60	7	165	18	20	167
			370	W133F2...	430	865	67.5						
			450	W133F3...	510	805	97.5						
		HE	300	W133FA...	360	640	180						
	1200	Beam	305	W133F4...	360	1070	65						
			370	W133F5...	430	1065	67.5						
			450	W133F6...	510	1005	97.5						
		HE	300	W133FD...	360	840	180						
	1400	Beam	305	W133F7...	360	1270	65						
			370	W133F8...	430	1265	67.5						
			450	W133F9...	510	1205	97.5						
		HE	300	W133FG...	360	1040	180						
2 – 160 – 2400	1000	Beam	305	W224F1...	360	870	65	60	7	190	20	20	162
			370	W224F2...	430	865	67.5						
		HE	300	W224FA...	360	640	180						
	1200	Beam	305	W224F4...	360	1070	65						
			370	W224F5...	430	1065	67.5						
		HE	300	W224FD...	360	840	180						
2 – 160 – 3300	1000	Beam	370	W233F2...	430	865	67.5						207
			450	W233F3...	510	816	92						
		HE	300	W233FA...	360	640	180						
	1200	Beam	370	W233F5...	430	1065	67.5						
			450	W233F6...	510	1016	92						
		HE	300	W233FD...	360	840	180						
	1400	Beam	370	W233F8...	430	1265	67.5						
			450	W233F9...	510	1216	92						
		HE	300	W233FG...	360	1040	180						
3 – 200 – 2700	1000	Beam	360	W327F1...	420	830	85	80	9	225	22	25	260
			410	W327F2...	480	846	77						
		HE	300	W327FA...	420	580	210						
	1200	Beam	360	W327F4...	420	1030	85						
			410	W327F5...	480	1046	77						
		HE	300	W327FD...	420	780	210						
	1400	Beam	360	W327F7...	420	1230	85						
			410	W327F8...	480	1246	77						
		HE	300	W327FG...	420	980	210						
3 – 200 – 3600	1000	Beam	360	W336F1...	420	830	85						335
			410	W336F2...	480	846	77						
			500	W336F3...	560	846	77						
		HE	300	W336FA...	420	580	210						
	1200	Beam	360	W336F4...	420	1030	85						
			410	W336F5...	480	1046	77						
			500	W336F6...	560	1046	77						
		HE	300	W336FD...	420	780	210						
	1400	Beam	360	W336F7...	420	1230	85						
			410	W336F8...	480	1246	77						
			500	W336F9...	560	1246	77						
		HE	300	W336FG...	420	980	210						
4 – 250 – 2700	1000	Beam	410	W427F1...	480	846	77	80	9	270	26	25	335
			490	W427F2...	560	846	77						
		HE	300	W427FA...	480	520	240						
	1200	Beam	410	W427F4...	480	1046	77						
			490	W427F5...	560	1046	77						
		HE	300	W427FD...	480	720	240						

Endcarriages for DOUBLE GIRDER cranes with connection plates to “bridge girders” - “Lateral” connection

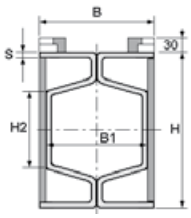
Endcarriage type	Couple beam codes based on the gauge of the double girder trolley, type of girders on the bridge crane and max. girder span				(for other quotas see page 27) Quotas (mm)								Weight (kg)
	Dual-rail trolley gauge Gauge (mm)	Bridge crane girders Type	Max. width (mm)	Couple beam code	I	I1	I2	A	C	D	Ø1	Ø2	
4 – 250 – 3600	1000	Beam	490	W436F2...	560	846	77	80	9	270	26	25	415
			565	W436F3...	640	841	79.5						
		HE	300	W436FA...	480	520	240						
	1200	Beam	490	W436F5...	560	1046	77						
			565	W436F6...	640	1041	79.5						
		HE	300	W436FD...	480	720	240						
	1400	Beam	490	W436F8...	560	1246	77						
			565	W436F9...	640	1241	79.5						
		HE	300	W436FG...	480	920	240						
5 – 315 – 3900	1000	Beam	410	W539F1...	500	826	87	100	12	305	30	32	635
			490	W539F2...	580	826	87						
			615	W539F3...	710	805	97.5						
		HE	300	W539FA...	500	500	250						
	1200	Beam	410	W539F4...	500	1026	87						
			490	W539F5...	580	1026	87						
			615	W539F6...	710	1005	97.5						
		HE	300	W539FD...	500	700	250						
	1400	Beam	410	W539F7...	500	1226	87						
			490	W539F8...	580	1226	87						
			615	W539F9...	710	1205	97.5						
		HE	300	W539FG...	500	900	250						
6 – 400 – 3900	1400	Beam	410	W639F7...	500	1226	87	100	12	350	36	32	810
			490	W639F8...	580	1226	87						
			615	W639F9...	710	1205	97.5						
		HE	300	W639FG...	500	900	250						
6 – 400 – 3900 R	1400	Beam	410	W640F7...	500	1226	87						940
			490	W640F8...	580	1226	87						
			615	W640F9...	710	1205	97.5						
		HE	300	W640FG...	500	900	250						

Referred partial codes are applyed to couples of endcarriages without counterplates. In case of couples of endcarriages with counterplates, replace letter **F**, in fifth position, with letter **L**.

Beams for DOUBLE GIRDER cranes with connection cross plates to “bridge girders” - “Supported” configuration



Joining of beam-girder in “Supported” configuration



Beam joining area section

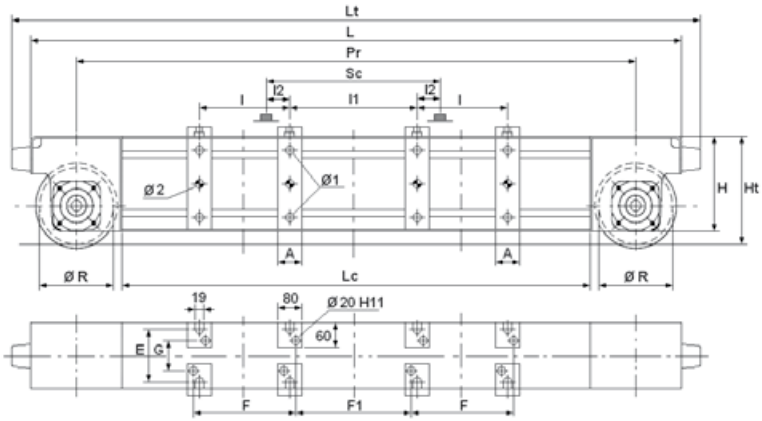
Endcarriage type	Couple beam codes based on the gauge of the double girder trolley, type of girders on the bridge crane and max. girder span				(for other quotas see page 27) Quotas (mm)								Weight (kg)
	Double girder trolley Gauge (mm)	Bridge crane girders Type	Max. width (mm)	Couple beam code	I	I1	I2	F	F1	A	E	G	
1 – 125 – 2400	1000	Beam	305	W124S1...	360	870	65	402	828	60	120	78	130
		Beam	370	W124S2...	430	865	67.5	472	823				
		HE	300	W124SA...	360	640	180	402	598				
	1200	Beam	305	W124S4...	360	1070	65	402	1028				
		Beam	370	W124S5...	430	1065	67.5	472	1023				
		HE	300	W124SD...	360	840	180	402	798				
1 – 125 – 3300	1000	Beam	305	W133S1...	360	870	65	402	828				167
		Beam	370	W133S2...	430	865	67.5	472	823				
		Beam	450	W133S3...	510	805	97.5	552	763				
		HE	300	W133SA...	360	640	180	402	598				
	1200	Beam	305	W133S4...	360	1070	65	402	1028				
		Beam	370	W133S5...	430	1065	67.5	472	1023				
		Beam	450	W133S6...	510	1005	97.5	552	963				
		HE	300	W133SD...	360	840	180	402	798				
	1400	Beam	305	W133S7...	360	1270	65	402	1228				
		Beam	370	W133S8...	430	1265	67.5	472	1223				
		Beam	450	W133S9...	510	1205	97.5	552	1163				
		HE	300	W133SG...	360	1040	180	402	998				
2 – 160 – 2400	1000	Beam	305	W224S1...	360	870	65	402	828	60	140	98	162
		Beam	370	W224S2...	430	865	67.5	472	823				
		HE	300	W224SA...	360	640	180	402	598				
	1200	Beam	305	W224S4...	360	1070	65	402	1028				
		Beam	370	W224S5...	430	1065	67.5	472	1023				
		HE	300	W224SD...	360	840	180	402	798				
2 – 160 – 3300	1000	Beam	370	W233S2...	430	865	67.5	472	823				207
		Beam	450	W233S3...	510	816	92	552	774				
		HE	300	W233SA...	360	640	180	402	598				
	1200	Beam	370	W233S5...	430	1065	67.5	472	1023				
		Beam	450	W233S6...	510	1016	92	552	974				
		HE	300	W233SD...	360	840	180	402	798				
	1400	Beam	370	W233S8...	430	1265	67.5	472	1223				
		Beam	450	W233S9...	510	1216	92	552	1174				
		HE	300	W233SG...	360	1040	180	402	998				
3 – 200 – 2700	1000	Beam	360	W327S1...	420	830	85	462	788	80	160	118	260
		Beam	410	W327S2...	480	846	77	522	804				
		HE	300	W327SA...	420	580	210	462	538				
	1200	Beam	360	W327S4...	420	1030	85	462	988				
		Beam	410	W327S5...	480	1046	77	522	1004				
		HE	300	W327SD...	420	780	210	462	738				
	1400	Beam	360	W327S7...	420	1230	85	462	1188				
		Beam	410	W327S8...	480	1246	77	522	1204				
		HE	300	W327SG...	420	980	210	462	938				

Beams for DUAL-RAIL cranes with joining cross plates to "bridge girders" - "Supported" operation

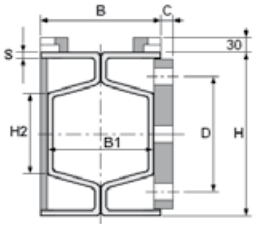
Endcarriage type	Couple beam codes based on the gauge of the double girder trolley, type of girders on the bridge crane and max. girder span				(for other quotas see page 27) Quotas (mm)								Weight (kg)
	Double girder trolley Gauge (mm)	Bridge crane girders Type	Max. width (mm)	Couple beam code	I	I1	I2	F	F1	A	E	G	
3 – 200 – 3600	1000	Beam	360	W336S1...	420	830	85	462	788	80	160	118	335
			410	W336S2...	480	846	77	522	804				
			500	W336S3...	560	846	77	602	804				
		HE	300	W336SA...	420	580	210	462	538				
	1200	Beam	360	W336S4...	420	1030	85	462	988				
			410	W336S5...	480	1046	77	522	1004				
			500	W336S6...	560	1046	77	602	1004				
		HE	300	W336SD...	420	780	210	462	738				
	1400	Beam	360	W336S7...	420	1230	85	462	1188				
			410	W336S8...	480	1246	77	522	1204				
			500	W336S9...	560	1246	77	602	1204				
		HE	300	W336SG...	420	980	210	462	938				
4 – 250 – 2700	1000	Beam	410	W427S1...	480	846	77	522	804	80	190	148	335
			490	W427S2...	560	846	77	602	804				
		HE	300	W427SA...	480	520	240	522	478				
	1200	Beam	410	W427S4...	480	1046	77	522	1004				
			490	W427S5...	560	1046	77	602	1004				
		HE	300	W427SD...	480	720	240	522	678				
4 – 250 – 3600	1000	Beam	490	W436S2...	560	846	77	602	804				415
			565	W436S3...	640	841	79.5	682	799				
		HE	300	W436SA...	480	520	240	522	478				
	1200	Beam	490	W436S5...	560	1046	77	602	1004				
			565	W436S6...	640	1041	79.5	682	999				
		HE	300	W436SD...	480	720	240	522	678				
	1400	Beam	490	W436S8...	560	1246	77	602	1204				
			565	W436S9...	640	1241	79.5	682	1199				
		HE	300	W436SG...	480	920	240	522	878				
5 – 315 – 3900	1000	Beam	410	W539S1...	500	826	87	542	784	100	220	178	635
			490	W539S2...	580	826	87	622	784				
			615	W539S3...	710	805	97.5	752	763				
		HE	300	W539SA...	500	500	250	542	458				
	1200	Beam	410	W539S4...	500	1026	87	542	984				
			490	W539S5...	580	1026	87	622	984				
			615	W539S6...	710	1005	97.5	752	963				
		HE	300	W539SD...	500	700	250	542	658				
	1400	Beam	410	W539S7...	500	1226	87	542	1184				
			490	W539S8...	580	1226	87	622	1184				
			615	W539S9...	710	1205	97.5	752	1163				
		HE	300	W539SG...	500	900	250	542	858				
6 – 400 – 3900	1400	Beam	410	W639S7...	500	1226	87	542	1184	100	250	208	810
			490	W639S8...	580	1226	87	622	1184				
			615	W639S9...	710	1205	97.5	752	1163				
		HE	300	W639SG...	500	900	250	542	858				
6 – 400 – 3900 R	1400	Beam	410	W640S7...	500	1226	87	542	1184				940
			490	W640S8...	580	1226	87	622	1184				
			615	W640S9...	710	1205	97.5	752	1163				
		HE	300	W640SG...	500	900	250	542	858				

Referred partial codes are applyed to couples of endcarriages without counterplates. In case of couples of endcarriages with counterplates, replace letter **S**, in fifth position, with letter **A**.

Endcarriages for DOUBLE GIRDER cranes with connection plates to "bridge girders"-"Lateral+Supported" configuration



Joining of beam-girder in "Lateral+Supported" configuration



Beam joining area section

Endcarriage type	Couple beam codes based on the gauge of double girder trolley, type of girders on the bridge crane and max. girder span			(for other quotas see page 27) Quotas (mm)												Weight (kg)
	Double girder trolley Gauge (mm)	Bridge crane girders Max. width (mm)	Couple beam code	I	I1	I2	F	F1	A	C	D	E	G	ø1	ø2	
1 – 125 – 2400	1000	305	W124D1...	360	870	65	402	828								138
		370	W124D2...	430	865	67.5	472	823								
	1200	305	W124D4...	360	1070	65	402	1028								
		370	W124D5...	430	1065	67.5	472	1023								
1 – 125 – 3300	1000	305	W133D1...	360	870	65	402	828								175
		370	W133D2...	430	865	67.5	472	823								
		450	W133D3...	510	805	97.5	552	763	60	7	165	120	78	18	20	
	1200	305	W133D4...	360	1070	65	402	1028								
		370	W133D5...	430	1065	67.5	472	1023								
		450	W133D6...	510	1005	97.5	552	963								
	1400	305	W133D7...	360	1270	65	402	1228								
		370	W133D8...	430	1265	67.5	472	1223								
		450	W133D9...	510	1205	97.5	552	1163								
2 – 160 – 2400	1000	305	W224D1...	360	870	65	402	828								170
		370	W224D2...	430	865	67.5	472	823								
	1200	305	W224D4...	360	1070	65	402	1028								
		370	W224D5...	430	1065	67.5	472	1023								
2 – 160 – 3300	1000	370	W233D2...	430	865	67.5	472	823								215
		450	W233D3...	510	816	92	552	774	60	7	190	140	98	20	20	
	1200	370	W233D5...	430	1065	67.5	472	1023								
		450	W233D6...	510	1016	92	552	974								
	1400	370	W233D8...	430	1265	67.5	472	1223								
		450	W233D9...	510	1216	92	552	1174								
3 – 200 – 2700	1000	360	W327D1...	420	830	85	462	788								268
		410	W327D2...	480	846	77	522	804								
	1200	360	W327D4...	420	1030	85	462	988								
		410	W327D5...	480	1046	77	522	1004								
	1400	360	W327D7...	420	1230	85	462	1188								
		410	W327D8...	480	1246	77	522	1204								
3 – 200 – 3600	1000	360	W336D1...	420	830	85	462	788								343
		410	W336D2...	480	846	77	522	804								
		500	W336D3...	560	846	77	602	804								
	1200	360	W336D4...	420	1030	85	462	988								
		410	W336D5...	480	1046	77	522	1004								
		500	W336D6...	560	1046	77	602	1004								
	1400	360	W336D7...	420	1230	85	462	1188								
		410	W336D8...	480	1246	77	522	1204								
		500	W336D9...	560	1246	77	602	1204								

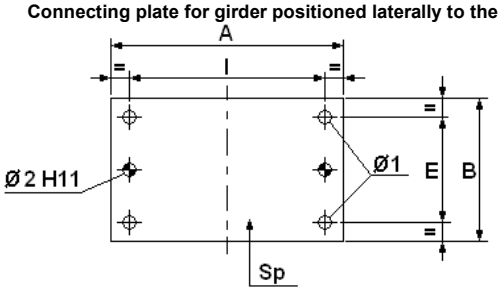
Endcarriages for DOUBLE GIRDER cranes with connection plates to "bridge girders"-"Lateral + Supported" configuration

Endcariage type	Couple beam codes based on the gauge of double girder trolley, type of girders on the bridge crane and max. girder span			(for other quotas see page 27) Quotas (mm)												Weight (kg)
	Double girder trolley gauge (mm)	Bridge crane girders Max. span (mm)	Couple beam code	I	I1	I2	F	F1	A	C	D	E	G	Ø1	Ø2	
4 – 250 – 2700	1000	410	W427D1...	480	846	77	522	804	80	9	270	190	148	26	25	343
		490	W427D2...	560	846	77	602	804								
	1200	410	W427D4...	480	1046	77	522	1004								
		490	W427D5...	560	1046	77	602	1004								
4 – 250 – 3600	1000	490	W436D2...	560	846	77	602	804								423
		565	W436D3...	640	841	79.5	682	799								
	1200	490	W436D5...	560	1046	77	602	1004								
		565	W436D6...	640	1041	79.5	682	999								
	1400	490	W436D8...	560	1246	77	602	1204								
		565	W436D9...	640	1241	79.5	682	1199								
5 – 315 – 3900	1000	410	W539D1...	500	826	87	542	784	100	12	305	220	178	30	32	643
		490	W539D2...	580	826	87	622	784								
		615	W539D3...	710	805	97.5	752	763								
	1200	410	W539D4...	500	1026	87	542	984								
		490	W539D5...	580	1026	87	622	984								
		615	W539D6...	710	1005	97.5	752	963								
	1400	410	W539D7...	500	1226	87	542	1184								
		490	W539D8...	580	1226	87	622	1184								
		615	W539D9...	710	1205	97.5	752	1163								
6 – 400 – 3900	1400	410	W639D7...	500	1226	87	542	1184	100	12	350	250	208	36	32	818
		490	W639D8...	580	1226	87	622	1184								
		615	W639D9...	710	1205	97.5	752	1163								
6 – 400 – 3900 R	1400	410	W640D7...	500	1226	87	542	1184								948
		490	W640D8...	580	1226	87	622	1184								
		615	W640D9...	710	1205	97.5	752	1163								

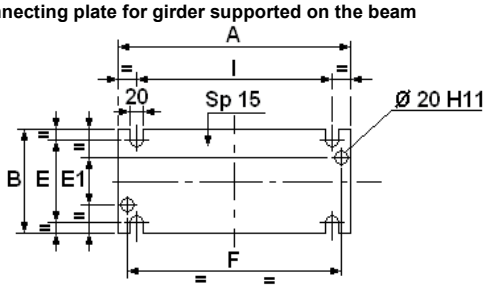
Referred partial codes are applyed to couples of endcarriages without counterplates. In case of couples of endcarriages with counterplates, replace letter **D**, in fifth position, with letter **C**.

Geometric specifications for "girder-beam" connecting plates for SINGLE and DOUBLE GIRDER bridge cranes

Connecting plate for girder positioned laterally to the beam



Connecting plate for girder supported on the beam



Beam type		Max. beam width	Plate positioned laterally to the beam									Plate supported on the beam							
				Dimensions (mm)									Dimensions (mm)						
Size "DGT"	Ø Wheel (mm)	W (mm)	Type	A	I	B	Ø 1	E	Ø 2	Sp	Weight (kg)	Type	F	A	I	B	E	E	Weight (kg)
1	125	305	L 11	420	360	220	18	165	20	12	8.6	A 11	402	440	360	160	120	78	8.0
		370	L 12	490	430						10.0	A 12	472	510	430				9.3
		450	L 13	570	510						11.6	A 13	552	590	510				10.8
2	160	305	L 21	420	360	250	20	190	20	12	9.7	A 21	402	440	360	180	140	98	9.0
		370	L 22	490	430						11.5	A 22	472	510	430				10.5
		450	L 23	570	510						13.3	A 23	552	590	510				12.2
3	200	360	L 31	500	420	290	22	225	25	15	16.8	A 31	462	500	420	200	160	11	11.5
		410	L 32	560	480						18.5	A 32	522	560	480				13.0
		500	L 33	640	560						21.6	A 33	602	640	560				14.7
4	250	410	L 41	560	480	335	26	270	25	15	21.8	A 41	522	560	480	230	190	14	14.9
		490	L 42	640	560						24.5	A 42	602	640	560				17.0
		565	L 43	720	640						27.6	A 43	682	720	640				19.2
5	315	410	L 51	600	500	385	30	305	32	20	35.0	A 51	542	580	500	260	220	17	17.4
		490	L 52	680	580						40.4	A 52	622	660	580				20.0
		615	L 53	810	710						47.5	A 53	752	790	710				23.8
6	400	410	L 61	600	500	440	36	350	32	20	40.5	A 61	542	580	500	290	250	20	19.5
		490	L 62	680	580						46.1	A 62	622	660	580				22.2
	400 R	615	L 63	810	710						55.1	A 63	752	790	710				26.6

Field of application for "girder-beam" connecting plates for Single girder M and DOUBLE D GIRDER bridge cranes

Plate type	Beam type																														
	1					2					3					4						5				6						
	125					160					200					250						315				400			400 R			
	1800		2400		3300	1800		2400		3300	2100		2700		3600	2100		2700		3600	3600 R	2400		3900		3900			3900 R			
L 11 A 11	M		M	D	M D																										
L 12 A 12	M		M	D	M D																										
L 13 A 13			M		M D																										
L 21 A 21						M		M	D	M D																					
L 22 A 22						M		M	D	M D																					
L 23 A 23								M		M D																					
L 31 A 31											M		M	D	M D																
L 32 A 32											M		M	D	M D																
L 33 A 33											M		M		M D																
L 41 A 41																M		M	D	D D	M										
L 42 A 42																M		M	D	M D	M										
L 43 A 43																M		M		M D	M										
L 51 A 51																						M		D							
L 52 A 52																						M		D							
L 53 A 53																						M		D							
L 61 A 61																									D			D			
L 62 A 62																									D			D			
L 63 A 63																									D			D			

2.3.9 Sample guidelines for selecting endcarriages and drive Units

To make the right choice of **"DGT" series endcarriages in combination with drive units**, firstly establish the functional parameters determining their operating limitations, defining and/or verifying the following factors (see the examples for various operating situations as illustrated below):

1. Define the crane's functional specifications: Capacity (kg), ISO (FEM) service group, Gauge (m) and running speed (m/min);
2. Define the crane's mass (weight = kg), including all accessory parts (panel, electrical system, etc.);
3. Define the weight (kg) of the lifting and traversing equipment, i.e. the weight of the hoist + trolley (or winch/trolley);
4. Calculate the total mass to be moved, i.e. the nominal Capacity + the weight of the crane + the weight of the trolley/hoist (or winch/trolley);
5. Select the type of beams from the "Operating limitations" tables, at pages 28 or 30, based on: Capacity, ISO (FEM) group and Gauge;
6. Check that the mass to be moved is ≤ with respect to the travelling mass, as indicated at the margin of the "Operating limitations" tables at pages 28 or 30;
7. Verify the maximum, minimum and average reactions (kg) on the wheels, in relation to the load's juxtapositions/eccentricities;
8. Verify the correspondence of the width of the contact area in relation to the type of rail on which the wheels run;
9. Select the electromechanical drive components (select the offset motoreducer group) from the tables on pages 20 to 26.
10. Determine the code for the beams, based on the type selected and structural configuration for the connection with the bridge beam(s), using: the tables at pages 28 – 29 for a SINGLE GIRDER crane, and the tables at pages 30 – 36 for a DOUBLE GIRDER crane.
11. Using the "Geometric specifications" table at page 37, determine the type of "beam-girder" connecting plates.

1st Example: Single girder travelling bridge crane - Capacity 5 t - Span 16 m

1. nominal load P = 5000 kg; ISO service group M4 (FEM 1Am); gauge 16 m; 2 crane running speeds = 40/10 m/min;
2. weight of crane + accessories : M1 = ~ 2500 kg
3. weight of hoist + trolley : M2 = ~ 500 kg
4. total travelling mass : 5000 + 2500 + 500 = 8000 kg
5. from the diagram at page 8, with a capacity of 5000 kg; ISO group M4 (FEM 1Am) and span 16 m, select the endcarriages:

Type	**1 – 125 – 2400**	**or:**	**DGT size**	**1**	**Wheel Ø** (mm)	**125**	**Wheel basis** (mm)	**2400**

6. from the diagram at page 28, we can deduce that the endcarriages 1 – 125 – 2400 admit masses of up to 8400 kg > than the 8000 kg to haul:
7. at this point, check the suitability of the wheel Ø 125 for the selected endcarraiges, in relation to its admissible reactions and the type of rail, calculated as illustrated at page 15 for gauge "S" = 16.000 mm and supposing a juxtaposition "a" = 1000 mm:
   - R max. = 2500/4 + [(500 + 5000)/2] • (1 – 1000/16.000) ≅ 3203 kg
   - R min. = 2500/4 + 500/2 • 1000/16.000 ≅ 641 kg
   - R ave. = (2 • R max. + R min.)/3 = (2 • 3203 + 641)/3 ≅ 2349 kg < than 3670 kg, corresponding to the admissible Rx max.;
8. supposing a flat laminated rail, with l = 40 and operating band b = 38 (see table at page 14), from the diagram at page 19 we can deduce that, for a Ø 125 wheel with a standard sheave width, considering the factors (speed and operating bandwidth), the average admissible reaction for the service group M4 (1Am) is: R ave. admissible ≅ 2400 kg > of the ~ 2349 kg the wheel is subject to (example at page 15);
9. based on the selected speed and calculation of mass to be traversed for each drive wheel, derive the following components from the table at page 24:

Nominal speed (m/min)	**The travelling mass** (kg) **from each gearmotor in the service group ISO M4** (FEM 1Am) **is in kg:**	**"DGT" wheel group Ø** (mm)	**"DGP" motoreducer**		**Self-braking motor specs**		**"DGP" motoreducer partnumber**
			Reducer Type	**Motor** Type	**Poles** (N°)	**Power** (kW)	
40/10	**4200** > of 4000 kg to be hauled	**125**	**022**	**71K3L**	**2/8**	**0.40/0.09**	**P0M2A23KA0**

10. supposing a "Lateral" connected girder-beam configuration and a girder span width > than 305 and ≤ than 370, from the table at page 28, we can deduce that the endcarriages type 1 – 125 – 2400 have a partnumber: S124L2...;
11. from the "Geometric specifications" table at page 37, we can deduce that, for the beams in question with a "Lateral" connected girder-beam configuration and a girder span width > than 305 and ≤ 370, the type of "girder-beam" connecting cross plates are: L12

2nd Example: Double girder travelling bridge crane - Capacity 10 t - Span 20 m

1. nominal load P = 10,000 kg; ISO service group M4 (FEM 1Am); gauge 20 m; 2 crane running speeds = 40/10 m/min;
2. weight of crane + accessories : M1 ≅ 5.900 kg
3. weight of hoist + trolley : M2 ≅ 750 kg
4. total travelling mass : 10.000 + 5900 + 750 = 16.650 kg
5. from the diagram at page 10, with a capacity of 10.000 kg; ISO group M4 (FEM 1Am) and span 20 m, select the endcariages:

Type	**3 – 200 – 3600**	**or:**	**DGT size**	**3**	**Wheel Ø** (mm)	**200**	**Wheel basis** (mm)	**3600**

6. from the diagram at page 30, we can deduce that the endcarriages 3 – 200 – 3600 admit masses of up to 18.800 kg > than the 16.65000 kg to haul;
7. at this point, check the suitability of the wheel Ø 200 for the selected endcarriages, in relation to its admissible reactions and the type of rail, calculated as illustrated at page 16 for gauge "S" = 20.000 mm and supposing a juxtaposition "a" = 1000 mm:
   - R max. = 5900/4 + [(750 + 10.000)/2] • (1 – 1000/20.000) ≅ 6581 kg
   - R min. = 5900/4 + 750/2 • 1000/20.000 ≅ 1494 kg
   - R ave. = (2 • R max. + R min.)/3 = (2 • 6581 + 1494)/3 ≅ 4885 kg < than 7340 kg, corresponding to the admissible Rx max.;
8. supposing a flat laminated rail, with I = 50 and operating band b = 48 (see table at page 14), from the diagram at page 16 we can deduce that, for a Ø 200 wheel with a standard sheave width, considering the factors (speed and operating bandwidth), the average admissible reaction for the service group M4 (1Am) is: R ave. admissible ≅ 5500 kg > of the ~ 4885 kg the wheel is subject to (example at page 16);
9. based on the selected speed and calculation of mass to be traversed for each drive wheel, derive the following components from the table at page 24:

Nominal speed (m/min)	**The travelling mass** (kg) **from each motoreducer in the service group ISO M4** (FEM 1Am) **is in kg:**	**"DGT" wheel group Ø** (mm)	**"DGP" motoreducer**		**Self-braking motor specs**		**"DGP" motoreducer partnumber**
			Reducer Type	**Motor** Type	**Poles** (N°)	**Power** (kW)	
40/10	**9.400** > of 8325 kg to be hauled	**200**	**134**	**80K3L**	**2/8**	**0.63/0.15**	**P1M3B43KA0**

10. supposing a "Lateral + Supported" connected girder-beam configuration with a double girder trolley gauge of 1200 mm and a girder span width > than 360 and ≤ 410, from the table at page 35, we can deduce that the beams type 3 – 200 – 3600 have a partnumber: W336C5... ;
11. from the "Geometric specifications" table at page 37, we can deduce that, for the beams in question with a "Lateral + Supported" connected girder-beam configuration and a girder span width > than 360 and ≤ 410, the type of "girder-beam" connecting cross plates are: L32 + A32

3rd Example: Double girder travelling bridge crane - Capacity 16 t - Span 27 m

1. nominal load P = 16.000 kg; ISO service group M5 (FEM 2m); gauge 27 m; 2 crane running speeds = 40/10 m/min;
2. weight of crane + accessories : M1 ≅ 14.600 kg
3. weight of hoist + trolley : M2 ≅ 1400 kg
4. total travelling mass : 16.000 + 14.600 + 1400 = 32.000 kg
5. from the diagram at page 10, with a capacity of 16.000 kg; ISO group M5 (FEM 2m) and span 27 m, select the endcarraiges:

Type	**5 – 315 – 3900**	**or:**	**DGT size**	**5**	**Wheel Ø** (mm)	**315**	**Wheel basis** (mm)	**3900**

6. from the diagram at page 30, we can deduce that the beams 5 – 315 – 3900 admit masses of up to 35.900 kg > of the 32.000 kg to haul:
7. at this point, check the suitability of the wheel Ø 315 for the selected beams, in relation to its admissible reactions and the type of rail, calculated as illustrated at page 17 for gauge "S" = 27.000 mm and supposing a juxtaposition "a" = 1200 mm:
   - R max. = 14.600/4 + [(1400 + 16.000)/2] • (1 – 1200/27.000) ≅ 11.963 kg
   - R min. = 14.600/4 + 1400/2 • 1200/27.000 ≅ 3681 kg
   - R ave. = (2 • R max. + R min.)/3 = (2 • 11.963 + 3681)/3 ≅ 9.202 kg < than 14.679 kg, corresponding to the admissible Rx max.;
8. supposing a flat laminated rail, with I = 60 and operating band b = 58 (see table at page 14), from the diagram at page 17 we can deduce that, for a Ø 315 wheel with a standard sheave width, considering the factors (speed and operating bandwidth), the average admissible reaction for the service group M5 (2m) is: R ave. admissible ≅ 9900 kg > of the ~ 9202 kg the wheel is subject to (example at page 17);
9. based on the selected speed and calculation of mass to be traversed for each drive wheel, derive the following components from the table at page 24:

Nominal speed (m/min)	**The travelling mass** (kg) **from each motoreducer in the service group ISO M5** (FEM 2m) **is in kg:**	**"DGT" wheel group Ø** (mm)	**"DGP" motoreducer**		**Self-braking motor specs**		**"DGP" motoreducer partnumber**
			Reducer Type	**Motor** Type	**Poles** (N°)	**Power** (kW)	
40/10	**18.400** > of 16.000 kg to be hauled	**315**	**234**	**100K3C**	**2/8**	**1.25/0.31**	**P2M5B43AA0**

10. supposing a "Supported" connected girder-beam configuration with a double girder trolley gauge of 1200 mm and a girder span width > than 410 and ≤ than 490, from the table at page 34, we can deduce that the endcarriages type 5 – 315 – 3900 have, partnumber: W539A5... .
11. from the "Geometric specifications" table at page 37, we can deduce that, for the beams in question with a "Supported" connected girder-beam configuration and a girder span width > 410 and ≤ 490, the type of "girder-beam" connecting cross plates are: A52

3. – SAFETY AND ACCIDENT PREVENTION MEASURES

- **"DGT" series drive units and endcarriages** are engineered and manufactured based on the most advanced technical know-how, and are designed to be operated safely.
- Dangers for personnel operating the equipment can be totally eliminated and/or notably reduced only if the components are used in accordance with the instructions outlined in this operating manual, by authorized and specially trained and prepared personnel.

In relation to installation, use and maintenance tasks to be carried out on "DGT" series drive units and endcarriages, operating personnel are responsible for the following operations:

- Incorporating components in assembling lifting equipment (crane, trolley, etc.).
- Completion of component and missing parts (electrical controls) in conformity with directives stipulated by current legal norms and regulations in force
- Setup and assembly of components, and managing its operation;
- Performing operations of a different nature on components, specifically in relation to maintenance, controls and repairs, of any and all parts, before the machine's start-up, during its operation or even after its shutdown.
- Personnel must be absolutely informed regarding potential dangers inherent in conducting work operations, both in relation to operating the equipment and the correct use of safety devices on the machine.
- Personnel must also carefully observe all safety norms and regulations contained in this section of the operating manual, in order to prevent potentially dangerous situations.

3.1 Operator qualifications

- The table below outlines professional operator profiles with related pictograms, so as to better define the field of intervention and consequent responsibilities for each OPERATOR, provided by specific training and qualifications, as required for every type of intervention.

PICTOGRAM	OPERATOR PROFILE
 GENERIC OPERATOR	**Generic operator:** Personnel qualified to perform only tasks which do not imply technical interventions on the **"DGT" drive units and/or endcarriages**, such as, for example: transport, reception of goods, storage, usage, etc.
 MECHANICAL MAINTENANCE PERSONNEL	**Mechanical maintenance personnel:** Personnel qualified to intervene on components under normal conditions, as well as carry out normal adjustment on machine parts, ordinary maintenance interventions and simple mechanical repairs.
 ELECTRICAL MAINTENANCE PERSONNEL	**Electrical maintenance personnel:** Personnel qualified to intervene on components under normal conditions, and responsible for normal interventions on electrical parts, settings, including simple electrical maintenance and repairs.
 MECHANIC	**Mechanic:** Technician specialized in carrying out complex and extraordinary operations of a mechanical nature, such as, for example, assembling **"DGT" drive units and/or endcarriages** onto lifting equipment.
 ELECTRICIAN	**Electrician:** Technician specialized in carrying out complex and extraordinary operations of an electrical nature, such as, for example, incorporating **"DGT" drive units and/or endcarriages** onto lifting equipment.

3.2 General safety norms and regulations

- Before installing and operating the **"DGT" drive units** and/or **endcarriages**:
  - Carefully read and understand this operating manual;
  - Know what safety devices are available and know their location (e.g. endstrokes);
- Some tasks which need to be carried out on components in operation (e.g. setting the limit switches) expose operators to potentially dangerous situations; operators must therefore carefully observe the following:
  - Personnel must be authorized and specifically trained on operating procedures, dangerous situations which may arise, and on correct procedures to prevent and avoid such dangers.
  - If operating personnel is required to remove the cover on the motor drive terminals, due to specific technical maintenance, inspections or repairs, they must immediately replace the safety guards at the end of such operations.
  - Personnel must ascertain that, at the end of any intervention on machine components, no tools, foreign objects or mechanical parts are forgotten inside.
  - For their own personal safety and whenever possible before work operations, personnel conducting maintenance, inspections and repairs must enact all required preventive safety measures, specifically checking that the **"DGT" drive units** and/or **endcarriages** have been:
    - set in stop mode (no power or movement) and in a stationary position;
    - disabled (power cut off);
    - subjected to preventive measures (warning signs, blocking devices, etc.) so as to avoid accidental or unforeseen start-ups.
  - Electrical maintenance personnel intervening on live electrical components must proceed with extreme caution.

3.3 Safety symbols and warning labels

- This operating manual uses signals and pictograms to highlight or call the reader's attention to dangerous situations resulting from residual risks or actions which must necessarily be conducted according to safety procedures indicated in this manual.

DANGER AND WARNING SYMBOLS USED	
SYMBOL	**MEANING**
DANGER: LIVE ELECTRICAL PARTS	**Warning label indicating live electrical parts** affixed to electrical equipment (e.g. covers on motor terminals) and any live structure or component.
GENERIC DANGER	**Warning: generic danger** (completed with a caption indicating the type of danger)
DANGER: WATCH YOUR HANDS!	**Warning: danger to upper limbs** from mechanical parts in motion (e.g. wheels, beam girder, etc.)
DANGER: WATCH YOUR FEET!	**Warning: danger to lower limbs** from mechanical parts in motion (e.g. wheels, beam girder, etc.)
DANGER OF GETTING CAUGHT UP IN MOVING PARTS	**Warning: danger of getting caught up and being dragged** by moving parts (e.g. wheels, beam girder, etc.)
DANGER: OVERHEAD LOADS	**Warning: danger from overhead loads** in motion during installation and maintenance phases.

WARNING SYMBOLS USED TO INDICATE ACTIONS WHICH ARE FORBIDDEN	
SYMBOL	**MEANING**
DO NOT REMOVE THE PROTECTIONS	**It is forbidden to remove protective devices on the machine in motion or when it is powered on.**
DO NOT CONDUCT MANOEUVRES	**It is forbidden to conduct manoeuvres during maintenance operations on moving parts.**
DO NOT TOUCH	**It is forbidden to touch, mishandle, disable or extract devices and/or components.**
NO ACCESS	**During technical interventions, access to non-authorized personnel is forbidden.**

WARNING SYMBOLS USED TO INDICATE OBLIGATIONS	
SYMBOL	**MEANING**
CONSULT THE MANUAL	**Consult the manual when this symbol appears** preceding or within an indication (instructions, adjustments, maintenance, etc.),
OPERATORS MUST WEAR GLOVES	**Operating personnel must wear safety gloves.**
OPERATORS MUST WEAR A HELMET	**Operating personnel must wear safety protective helmets.**
OPERATORS MUST WEAR SAFETY FOOTWEAR	**Operating personnel must wear safety non-slip footwear.**
OPERATORS MUST WEAR A SAFETY HARNESS	**Operating personnel must wear safety harnesses when working at altitudes with a risk of falling.**

SYMBOLS USED FOR SAFETY INDICATIONS	
SYMBOL	**MEANING**
SUPPLEMENTAL LIGHTING	**Supplemental lighting is recommended for interventions in which this label appears.**

3.4 Warnings inherent to residual risks

- After having carefully considered the dangers present in all operating phases for **"DGT" drive** and/or **endcarriages**, the following measures have been adopted so as to eliminate, as far as possible, risks for operators and/or limit or reduce risks deriving from dangers which cannot totally be eliminated at their source. However, in spite of all the precautions adopted on the machine, the following **residual risks** remain; these risks can be eliminated or reduced through the following preventive measures:

RISKS DURING OPERATION		
DANGER / RISK	**CAUTION / WARNING**	**OBLIGATION / PREVENTION**
Risks from the danger of becoming ensnared and/or crushed, following contact with the **beams and/or wheels** in motion, where such components are accessible to operators.	• **Warning!** Exposure to moving parts can create dangerous situations. • **Caution!** Do not touch moving **Beams and/or Wheels**.	• **Ascertain** that the rail/wheel contact area is **> 2.7 m** above the walking area. • For quotas < **2.7 m**, enact **special technical measures**.

RISKS DURING MAINTENANCE		
DANGER / RISK	**CAUTION / WARNING**	**OBLIGATION / PREVENTION**
Risk of electrocution when performing maintenance on electrical motors without cutting off electrical power first.	• **Caution!** Do not intervene on electrical motors without cutting off electrical power first. • **Caution!** Do not restart the motors without replacing the covers on the terminals.	• Entrust electrical maintenance operations to qualified personnel only. • Perform controls on electrical equipment as required by norms. • After controls, replace the covers on the terminals.
Risks from the danger of becoming ensnared, crushed and/or exposed to falling loads during inspections, adjustments and maintenance on **Beams and/or Wheels.**	• **Warning! Exposure to moving parts can create dangerous situations**. • **Caution!** Do not intervene on moving parts • **Caution!** Access to non-authorized personnel is forbidden.	• Entrust maintenance operations to qualified personnel only. • Make use of suitable personal safety devices and equipment when carrying out adjustments on parts and components.

3.5 Safety devices and indications

3.5.1 Control devices

☞	• **"DGT" drive units and endcarriages are supplied without command and control devices, which must be provided by the buyer incorporating these components onto an industrial lifting or handling system.** • **"DGT" drive units and endcarriges must not be operated before they have been incorporated, in conformity with indications outlined in Machinery Directive 2006/42/CE, and a "CE Marking" has been affixed, as shown here, on the whole of the lifting or handling system they are assembled onto.**	CE

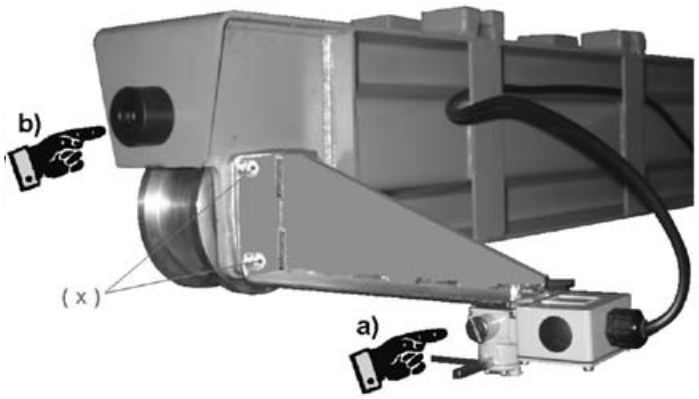
3.5.2 Safety and emergency devices

"DGT" drive units and endcarriages are equipped with the following devices:

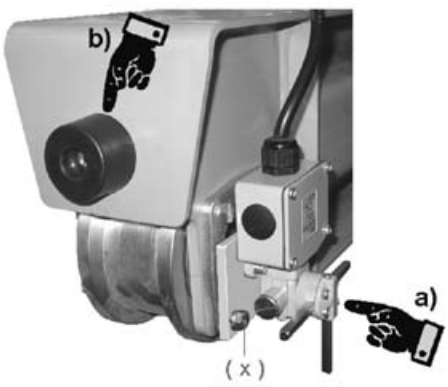
1. **Brakes** (fig. 3): mechanical, negative type, incorporated in the drive motors (self/braking) for forward / reverse manoeuvres.
   The brakes intervene automatically in case of a electrical power failure, and are sized to stop the maximum load the **"DGT" drive units and endcarriages** can move in total safety and in the shortest time possible, at the maximum travelling speed.

fig. 3

2. **Limit switches** (fig. 4)
   a) **Electrical**: rotating, shaft-cross type, when included; equipped with sensitive micro-switches which, by activating the auxiliary circuit, limit the lengthwise stroke of the running beams in forward/reverse manoeuvres. For **"DGT" drive units and endcarriages** with two operating speeds, in addition to the stop function in both directions, electrical limit strokes also ensure a pre-slowdown function, switching from "high" speed to "low" speed;
   b) **Mechanical**: provided as standard equipment, comprising shock absorbing buffers in hard rubber, sized to absorb forces from kinetic energy generates by the travelling of the bridge crane, in an eventual accidental strike, i.e. in case the electrical limit strokes fail to work.



Positioning of "DGT" limit strokes 1, 2 and 3:
limit stroke arm fastened by 4 screws (x) on the wheel support



Positioning of "DGT" limit strokes 4, 5 and 6:
limit stroke fastened by 2 lower screws (x) on the wheel support

fig. 4

⚠	• **The electrical limit switches, when included, are not connected!** • **It is obligatory to install and connect the electrical limit switch before setting up and operating the "DGT" drive units and endcarriages, checking to make certain they intervene correctly, as outlined at section 4.4 "Setup and Preparation".**

3.5.3 Identification nameplate and markings

- **"DGT" drive units and endcarriages** are equipped with the following identification nameplates (fig. 5):
  - nameplate on **"DGT" drive unit** (fig.5a) or **endcarriage** (fig.5b), containing:
    - manufacturer's logo, name and address;
    - specific weight of the wheel group or beam girder;
    - type, serial number and code of the wheel group or beam girder;
    - year of manufacture.
  - identification nameplate on the **"DGP" offset geared motors**, containing (fig.5c):
    - manufacturer's logo, name and address;
    - specific weight of the motoreducer;
    - type, serial number and code of the motoreducer;
    - year of manufacture.
  - identification nameplate on the **self-braking motor**, containing (fig.5d):
    - manufacturer's logo, name and address;
    - specific weight of the motoreducer;
    - type, serial number and code of the motor;
    - year of manufacture.
    - typical electrical specifications for the motor (power, absorption, etc.);
    - CE marking for the following European Community Directives:
      - Low Voltage Directive 2006/95/CE;
      - Electromagnetic Compatibility Directive 2004/108/CE.

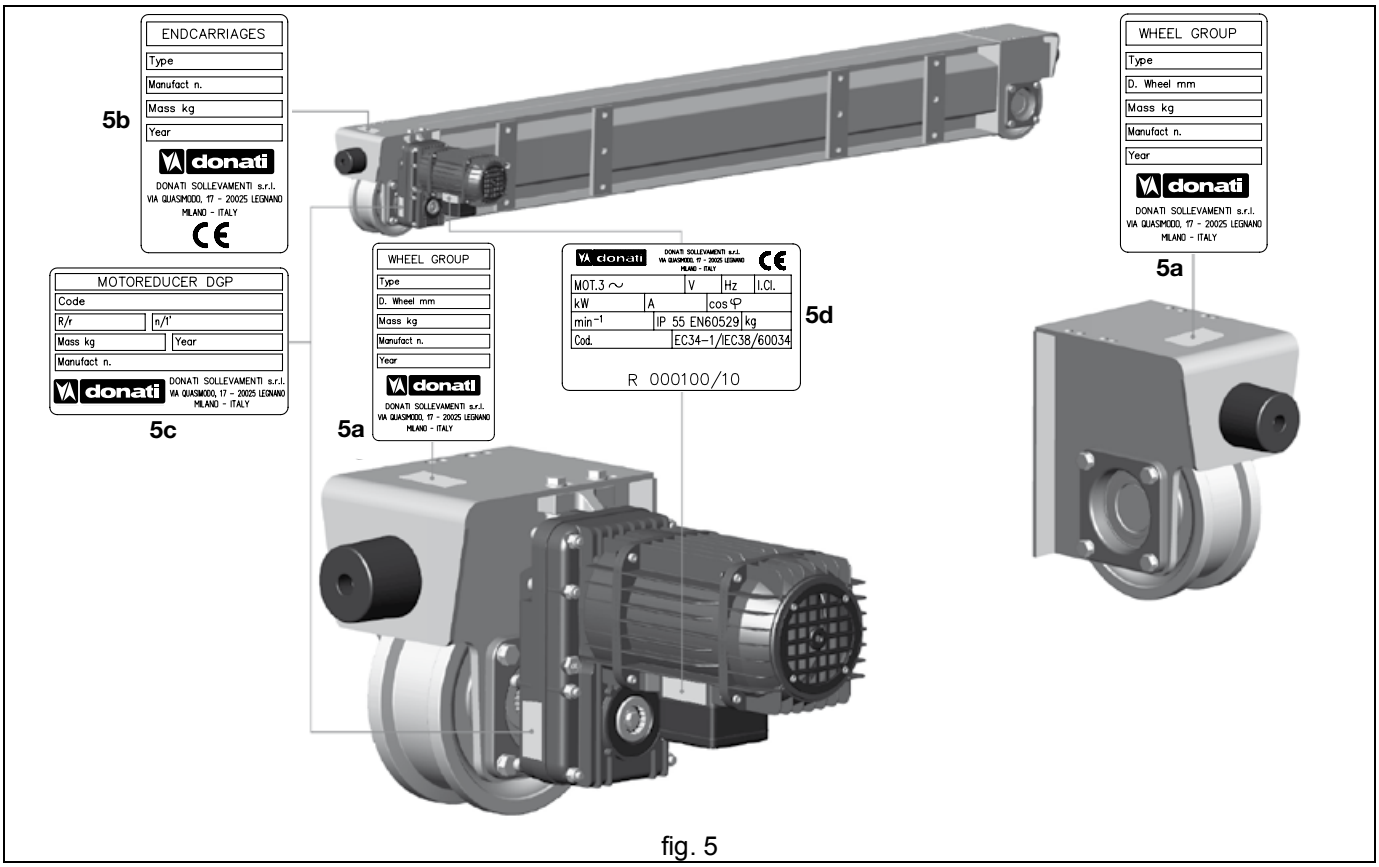


fig. 5

- **Readability and conservation of identification nameplates:**
  - Identification nameplates must be cleaned periodically so that they are legible at all times and properly display information for all personnel.
  - If a nameplate becomes deteriorated and/or is no longer legible, even if only partially, a replacement should be requested from the manufacturer, citing the information contained in this operating manual or on the original nameplate.

4. - HANDLING - INSTALLATION – SETUP

4.1 – General notes on the shipment

☞	• **"DGT" drive units and endcarriages are, as far as is possible, shipped pre-assembled in their main parts.** • **The Buyer can proceed with installation phases (incorporating the units onto industrial lifting or handling equipment) by following the instructions contained in this section of the operating manual, entrusting such tasks to qualified personnel.**

⚠	• **Due to the delicate and important nature of the operations described in this section, serious risks for the health and safety of personnel can be incurred if such operations are carried out inappropriately during the installation and use of the industrial lifting or handling equipment on which the components are assembled.** • **As such, these operations must be performed by professionally trained and qualified personnel specialized in the construction and/or assembly of lifting systems, with special expertise in electromechanics, and equipped with personal safety and accident prevention working equipment conforming to current legislative ordinances on matters related to safety and accident prevention in the workplace, after having carefully read this operating manual.**

👁	**On reception of the shipment, check to make certain that:**	

- The documentation provided with the components, attached to this operating manual, comprises the EC Declaration of Conformity – Attachment II A or Declaration of Incorporation– Attachment II B.
- The packaging, if part of the shipment, is in good condition, and does not present damages.

!	**In case of damage or missing parts, notify the shipping company of the irregularity, annexing a written statement to the accompanying document and notifying *DONATI SOLLEVAMENTI S.r.l.* of the mishap within eight days of receiving the goods.**

4.2 Packaging, transport and handling

☞	**Before carrying handling operations on the "DGT" drive units and endcarriages, read the following:**

4.2.1 Standard packaging

- To facilitate handling and assembly operations, components are generally shipped separately or in carton boxes, on appropriately bound pallets. Special protections or packagings are therefore excluded from the shipment.
- In some cases, components can be packed in a crate or wooden case.
- When materials are shipped on pallets, they are generally covered and protected against dust with a plastic film wrapping.
- Swinging gearmotors and related accessories are generally shipped inside carton boxes, which, depending on the mass being handled, may or may not be equipped with pallets.
- Standard packagings are not provided with protection against rain, and are foreseen for destinations via ground and not sea shipments, for covered and non humid environments.
- Packages, suitably conserved, can be stored for a period of around two years in a covered environment in which the temperature is comprised between - 20°C and + 60°C with a relative humidity of 80%.

☞	**Any special packaging, waterproofed and/or for destinations shipped by sea, can be appropriately prepared at the Buyer's request.**

4.2.2 Transport

- Entrust all transport operations to qualified personnel, capable of guaranteeing a correct handling of materials;
- During transport operations, the manufacturer recommends avoiding the following:
  - do not place onto the components other packages which may cause damage;
  - do not place the beam girders on the wheels, placing them onto wooden blocks instead (fig. 6);
  - do not tilt or overturn pallets, crates/cases or boxes containing the materials, so as to prevent dangerous oscillations and ensure constant stability.

☞	***DONATI SOLLEVAMENTI S.r.l.*** **declines all responsibility for transport operations performed by the Buyer or shipping companies appointed by the Buyer.**

4.2.3 Lifting points and handling equipment

- To ensure safe handing operations, in relation to the configuration foreseen, the **"DGT" drive units** or **endcarriages** and related accessories are fitted with the following lifting points:

A. **"DGT" drive units**, comprising the **wheel groups** and related **"DGP" offset geared motors:**

1. **"DGT" wheel groups** are fitted with special holes for handling purposes, situated in the upper section of the wheel bearing flanges, which enable lifting using a transverse bar of suitable diameter, and a lifting accessory (slinging the group using two chains or straps) - (fig. 7).

The wheel groups weight less than 30 kg and as such can be handled manually.

2. **"DGP" offset geared motors**, which are always provided separately from wheel groups or running beams, when their weight exceeds 30 kg and cannot be handled manually must be lifted using suitable straps fitted like a "noose" in the gearmotor connection area (fig. 8).
3. The handling operations outlined at points 1 and 2 must be performed using lifting machinery (a bridge or jib crane, etc.), adopted in relation to the weight of the mass indicated on the packaging being handled.
4. If the packagings are placed onto pallets, the pallet must be handled using a fork lift or transpallet, adopted in relation to the weight being handled, whereas individual packagings (if they cannot be handled manually) must be lifted using lifting equipment and related accessories, as outlined below.

B. **"DGT" drive units**, comprising the **beam girder** cover and **"DGP" offset geared motors:**

1. The **beam girders** can be handled using a fork lift or lifting machinery (a bridge or jib crane, etc.) equipped with suitable straps fitted like a "noose". Lifting equipment adopted must be selected in relation to the mass indicated on the packaging and employed so as to ensure proper balancing. (fig. 9).
2. For handling **"DGP" offset geared motors**, proceed as outlined at points A2 and A3.

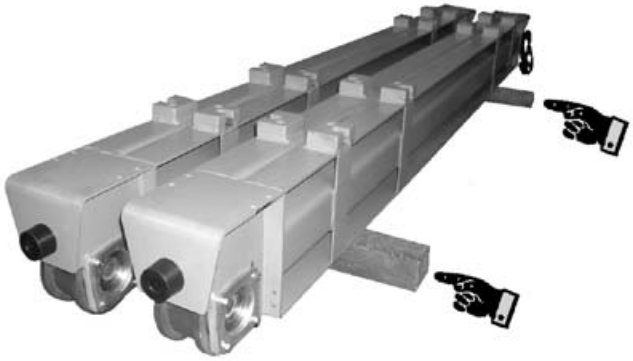


fig. 6

fig. 7

fig. 8

fig. 9

4.2.4 Handling

	For handling operations on "DGT" drive units or **endcarriages, proceed as follows:**	

- Prepared a suitable demarcated area, with a flat level flooring, for unloading and storing the materials.
- Depending on the type of shipping packaging and indications illustrated at point 4.2.3, prepare the necessary equipment for unloading and handling the various packagings, taking into consideration their weight, dimensions and lifting elements.
- No special tools are required.
- Any packages with accessories weighing less than 30 kg can be handled manually.
- Secure and lift all components with care in the unloading area, avoiding dangerous oscillations and unbalancing of the loads being moved.
- Once the handling operations have been completed, check the packages to make certain they have not been damaged.

	All materials must be handled with care, using suitable transport and lifting equipment, so as to avoid generating dangerous risks due to a loss of stability.

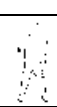
4.2.5 Removing the packaging

- Open the packagings and remove the various parts using suitable equipment in relation to their weight and lifting points (see point 4.2.3).
- Check to make certain all materials in the shipment are whole and that no parts and/or accessories are missing. Promptly notify the manufacturer of any damage or missing parts.
- To store the materials, follow the instructions outlined at section 4.5.1 "Storing the units and parts".

	Dispose of all packaging materials following the indications prescribed by local ordinances in relation to their nature (wood, plastic, carton) and differentiating the materials for recycling purposes.

4.3 – Installing "DGT" drive units and endcarriages

	• **The installation of "DGT" drive units and endcarriages, in their various configurations, refers to the process of "incorporating" the components into a more complex assembly.** • **Specifically, two types of "incorporating" processes can be adopted:** **1. Incorporating the "DGT" drive units onto a crane beam** (sect. 4.3.1) **2. Incorporating the "DGT" drive units onto a bridge crane** (sect. 4.3.2)

	Before proceeding with "incorporating" the "DGT" drive units and beams, carry out the following controls:	

- check that the performance specifications of the components are suitable for the type of service required (capacity, speed, ISO/FEM classification, dimensions of sliding rail, available space, etc.).
- check that no damage has resulted to component during transport operations.
- if the component has been stored in a humid or tropical location for en extended period of time, check the brakes, and if necessary, remove the gluing on the brake surfaces.
- use grease to lubricate the drive shaft that will be joined to the offset geared motor and wheel.

4.3.1 Setting up "DGT" sliding units onto a crane beam

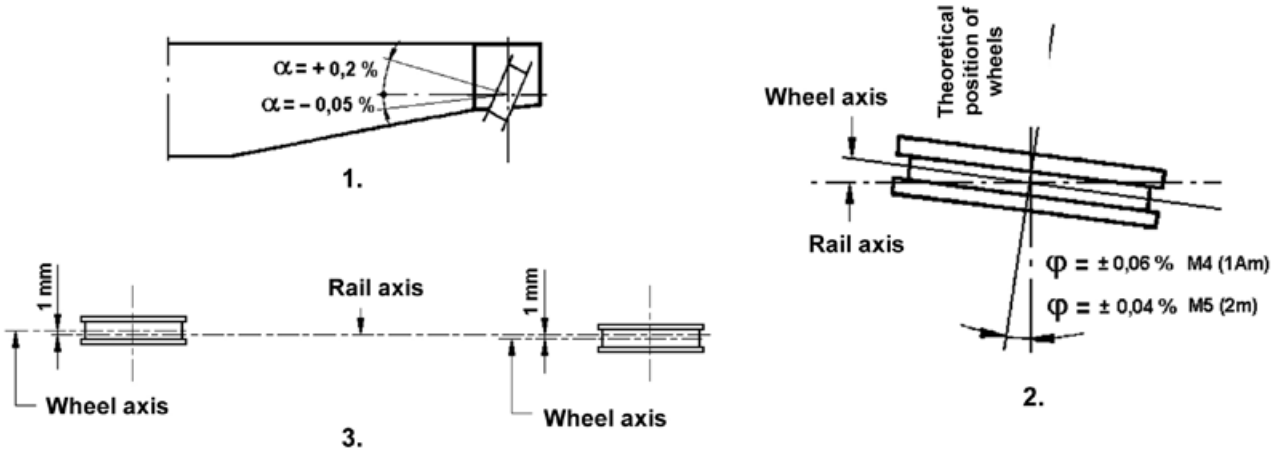
- **"DGT" drive units are designed to be incorporated using an electric welding process on the beam girders;**
- **The structural element (beam frame) to which the "DGT" drive units can be welded can comprise a beam or tubular section** (fig. 10)**, whose dimensions (height and width) are compatible with the connecting plate on the drive units** (see point 2.3.7; table on "Clearance requirements for wheel groups" at page 18)**.**
- **The joining welding between the "DGT" drive units and beam frame must be sized and performed by the Buyer, taking into consideration the loads, geometric shape, material S235JR-EN 10027, and applicable regulations..**

To assemble the beams incorporating the "DGT" drive units using an electric welding process, be sure to respect the tolerances prescribed by ISO regulation 8306/85 and FEM regulation 1.001/98 – book 8, i.e.

1. The angle (α) of the wheel axis with respect to a horizontal plane must be comprised between + 0.2 % and – 0.05 %

2. The angular deviation (φ) of the wheels with respect to a theoretical horizontal plane must be:
- ± 0.06 % for beam girders classified up to service group M4 (1Am)
- ± 0.04 % for beam girders classified from service group M5 (2m) up to M8 (5m)

3. The wheel centres (wheel axis) must not deviate more than ± 1 mm from the rail axis (track)



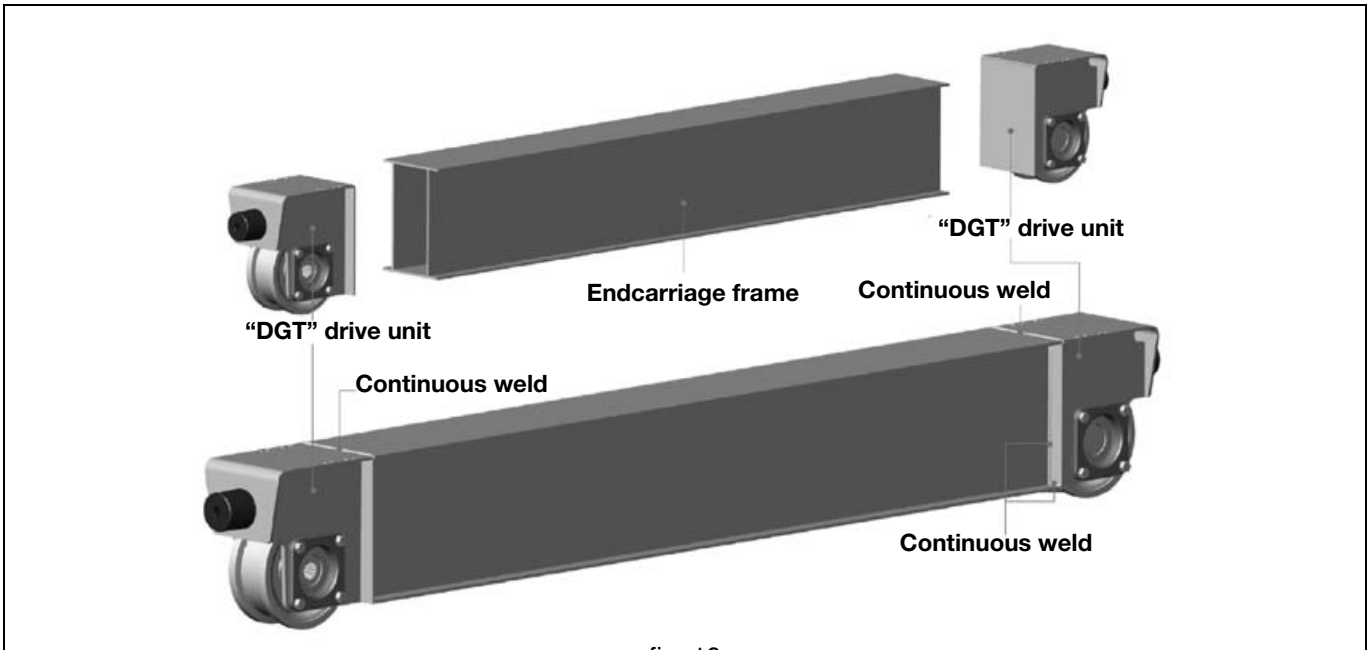


fig. 10

Assembling the "DGP" offset geared motor (fig. 11)**:**

1. Follow the indications in the diagrams (fig. 11a and 11b) to assemble the reaction arm (1) onto the wheel group (2), using the screws and nuts (3). This operation is not necessary for "DGT" drive units sizes 5 and 6, since their reaction arms are welded to their respective wheel groups.
2. Clean and lubricate, then assemble the drive shaft (4) onto the grooved shaft on the motoreducer (5), fastening it with the screws (6);
3. Clean and lubricate, then insert the drive shaft (4), jutting out from the motoreducer (5), into the grooved borehole on the wheel (7);
4. Fasten the motoreducer (5) to the reaction arm (1) using the screw and nut (8) and inserting the rings (9), according to the correct sequence illustrated in the diagrams (fig. 11a and 11b), and the rubber shock absorbing buffers, compressing them by about 1 mm (10).

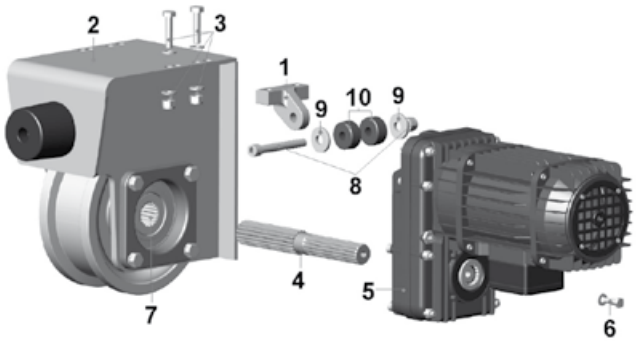
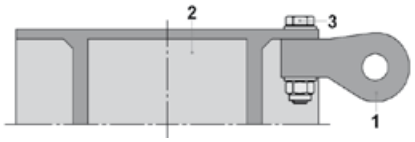
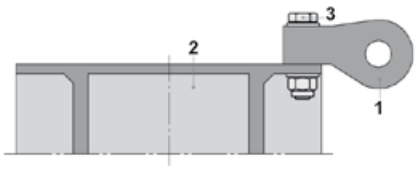
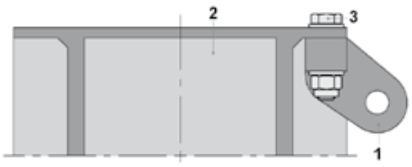
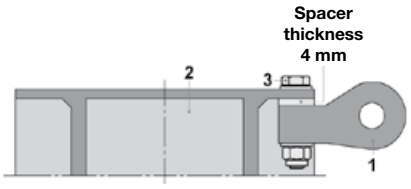


fig. 11

Assembly diagram for reaction arms on "DGT" drive units 1 and 2

"DGT" wheel group		Combination of "DGT" wheel groups with "DGP" offset geared motors (valid for both "left" and "right" operation)	
Size	Ø (mm)	"DGP" offset geared motors Size 0	"DGP" offset geared motors Size 1
1	125		
2	160		

Assembly diagram for rubber shock absorbing buffers on "DGT" drive units 1 and 2

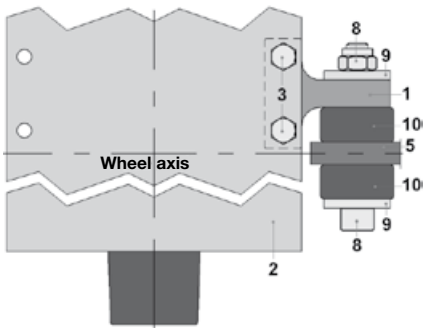
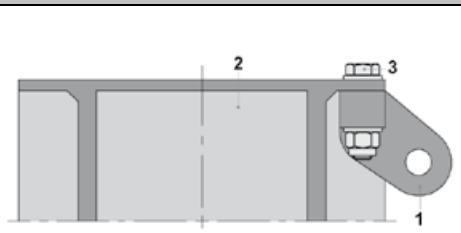
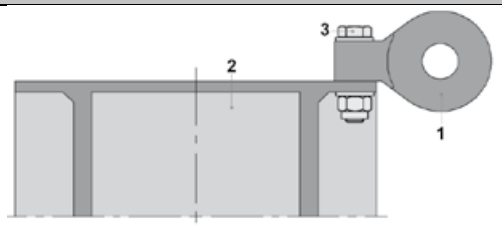
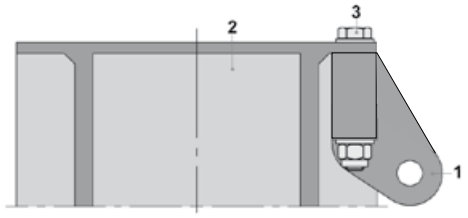
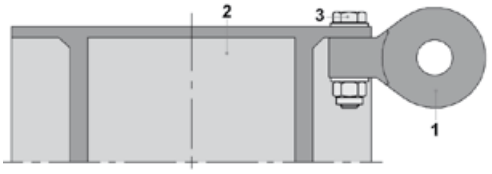
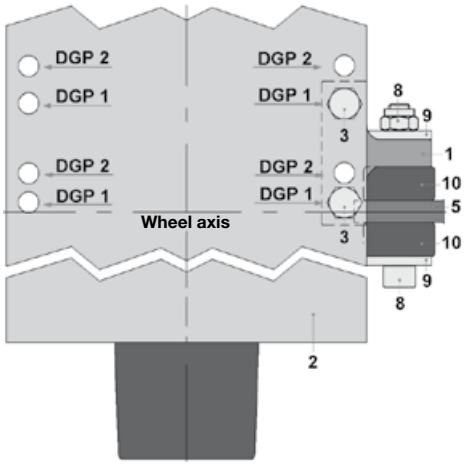
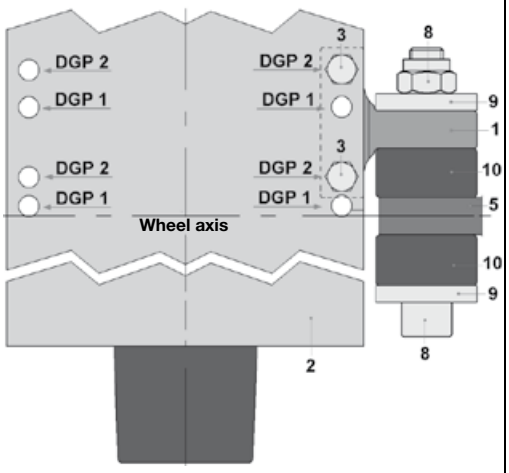
"DGT" wheel group		Combination of "DGT" wheel groups with "DGP" offset geared motors (valid for both "left" and "right" operation)	
Size	Ø (mm)	"DGP" offset geared motors Size 0	"DGP" offset geared motors Size 1
1	125		
2	160		

fig. 11a

Assembly diagram for reaction arms on "DGT" drive units "DGT" 3 and 4

"DGT" wheel group Size	Ø (mm)	Combination of "DGT" wheel groups with "DGP" offset geared motors (valid for both "left" and "right" operation)	
		"DGP" offset geared motors Size 1	"DGP" offset geared motors Size 2
3	200		
4	250		

Assembly diagram for rubber shock absorbing buffers on "DGT" drive units "DGT" 3 and 4

"DGT" wheel group Size	Ø (mm)	Combination of "DGT" wheel groups with "DGP" offset geared motors (valid for both "left" and "right" operation)	
		"DGP" offset geared motors Size 1	"DGP" offset geared motors Size 2
3	200		
4	250		

Assembly diagram for rubber shock absorbing buffers on "DGT" drive units "DGT" 5 and 6

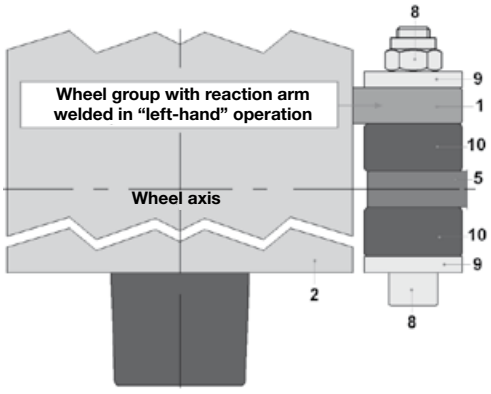
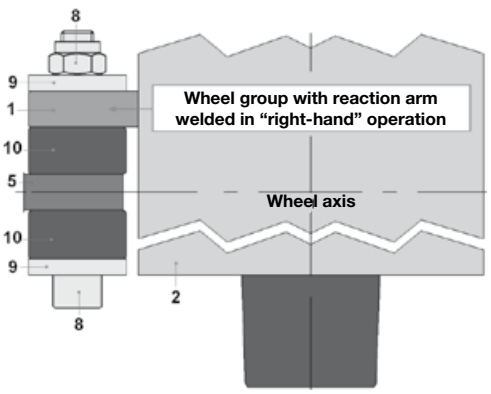
"DGT" wheel group Size	Ø (mm)	Combination of "DGT" wheel groups with "DGP" swinging geared motors, in "left" and "right" operation	
		"DGP" offset geared motors Size 2	"DGP" offset geared motors Size 3
5	315		
6	400		
	400 R		

fig. 11b

4.3.2 Setting up "DGT" drive units onto a bridge crane

- **"DGT" endcarriages are designed standard to be assembled to the beam girder(s) on a bridge crane, using bolted joints;**
- **Connecting elements between the "DGT" endcarriages and the girder(s) on the crane are standard joining "beam-girder" cross-plates** (see point 2.3.8. – table on "Geometric specifications" at page 37)**;**
- **The joining cross-plates must be welded onto the girder(s) on the crane by the Buyer, taking into consideration the material S235JR-EN 10027 and applicable standards;**
- **The joint between the "DGT" endcarriages and "beam-girder" cross-plates must be bolted using the screws only, in class 8.8, included in the shipment, respecting applicable fastening and tightening torques** (fig. 14)**.**

Assemble the "DGT" endcarriages to the beam girder(s) on the bridge crane following the structural configuration foreseen, which, relative to the "beam-girder connection," whether in MONORAIL or DUALRAIL version, can be either:

- **L = Beam connection in "Lateral" connection** (fig. 12)
  1. Set the girder alongside the beam, allowing the holes on the cross-plate (1) to match those on the beam (2);
  2. Insert the screws (3), taking care to maintain the nuts and rings (4) on the outside, i.e. on the plate (1);
  3. Screw on and set the nuts (4) without tightening them, to allow the insertion of the centring pins (5);
  4. Insert the pins (5) to the endstroke, then tighten the nuts (4), applying tightening torque as required (fig. 14).
- **A = Beam connection in "Supported" connection** (fig. 13)
  1. Set the girder alongside the beam, allowing the slots on the cross-plate (1) to match those on the blocks (2);
  2. Insert the screws (3) into the support blocks (2);
  3. Screw on and set the nuts (4) without tightening them, to allow the insertion of the centring pins (5);
  4. Insert the pins (5) to the endstroke, then tighten the nuts (4), applying tightening torque as required (fig. 14).
- **L + A = Beam connection in "Lateral + Supported" connection**
  1. Proceed as outlined at previous points **L + A**, inserting the centring pins (5) for operation A.

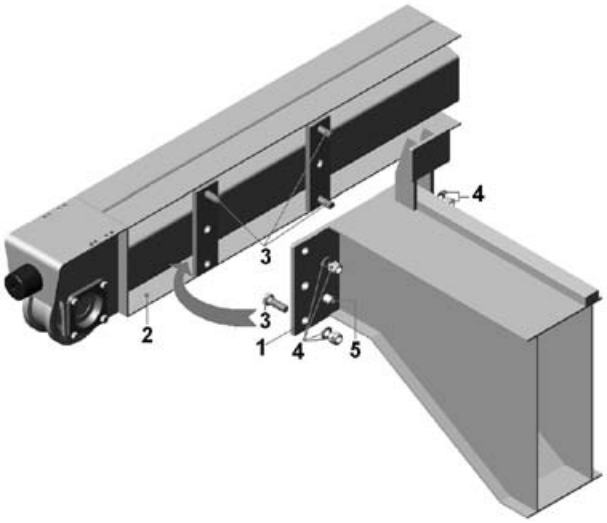


fig. 12

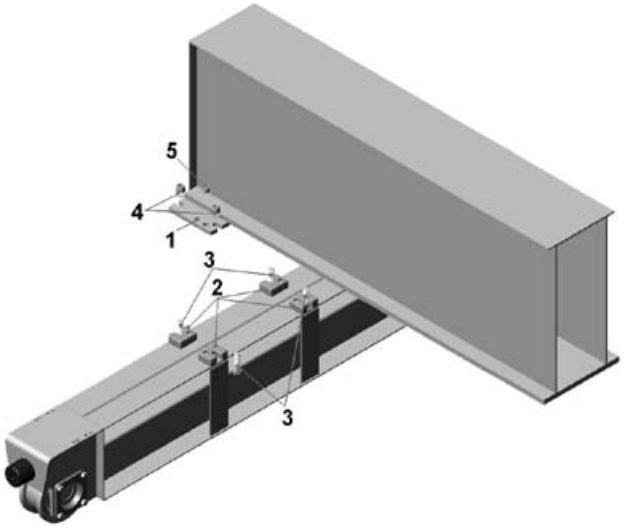


fig. 13

"DGT" beams Size	Ø wheels (mm)	Beam connection in "Lateral" operation Ø (mm)	Screw class 8.8 length (mm)	tightening torque (Nm)	Ø centring pin (mm)	Beam connection in "Supported" operation Ø (mm)	Screw class 8.8 length (mm)	tightening torque (Nm)	Ø centring pin (mm)
1	125	M 16 x 2.0	55	205	20	M 18 x 2.5	65	283	20
2	160	M 18 x 2.5	55	283					
3	200	M 20 x 2.5	60	400	25				
4	250	M 24 x 2.0	70	731					
5	315	M 27 x 2.0	80	1070	32				
6	400 / 400 R	M 33 x 2.0	90	1890					

fig. 14

4.3.3 Connections and electrical diagrams

- **"DGT" drive units are equipped with self/braking electric motors, designed to be electrically powered by a three-phase alternating current, at the voltage specifications indicated on the motor's nameplate.**
- **Motor specifications (power, absorption, etc.) are outlined at page.19**
- **The electrical connection diagram is indicated on the nameplate inside the terminal cover on each motor.**

Set the electrical connections on the motors as follows:

1. Check to make certain the voltage indicated on the nameplates on the motors for the sliding units corresponds to the power voltage available.
2. Verify the suitability and correct operation of the electrical system and **grounding**.
3. Perform the electrical connections on the motor terminals, in relation to their type, as indicated in the electrical diagram (fig. 15), i.e. connect the suitably sectioned four-pole cable to the respective terminals, connecting the yellow/green conductor to the ground terminal and tightening the terminals to avoid bad contacts.

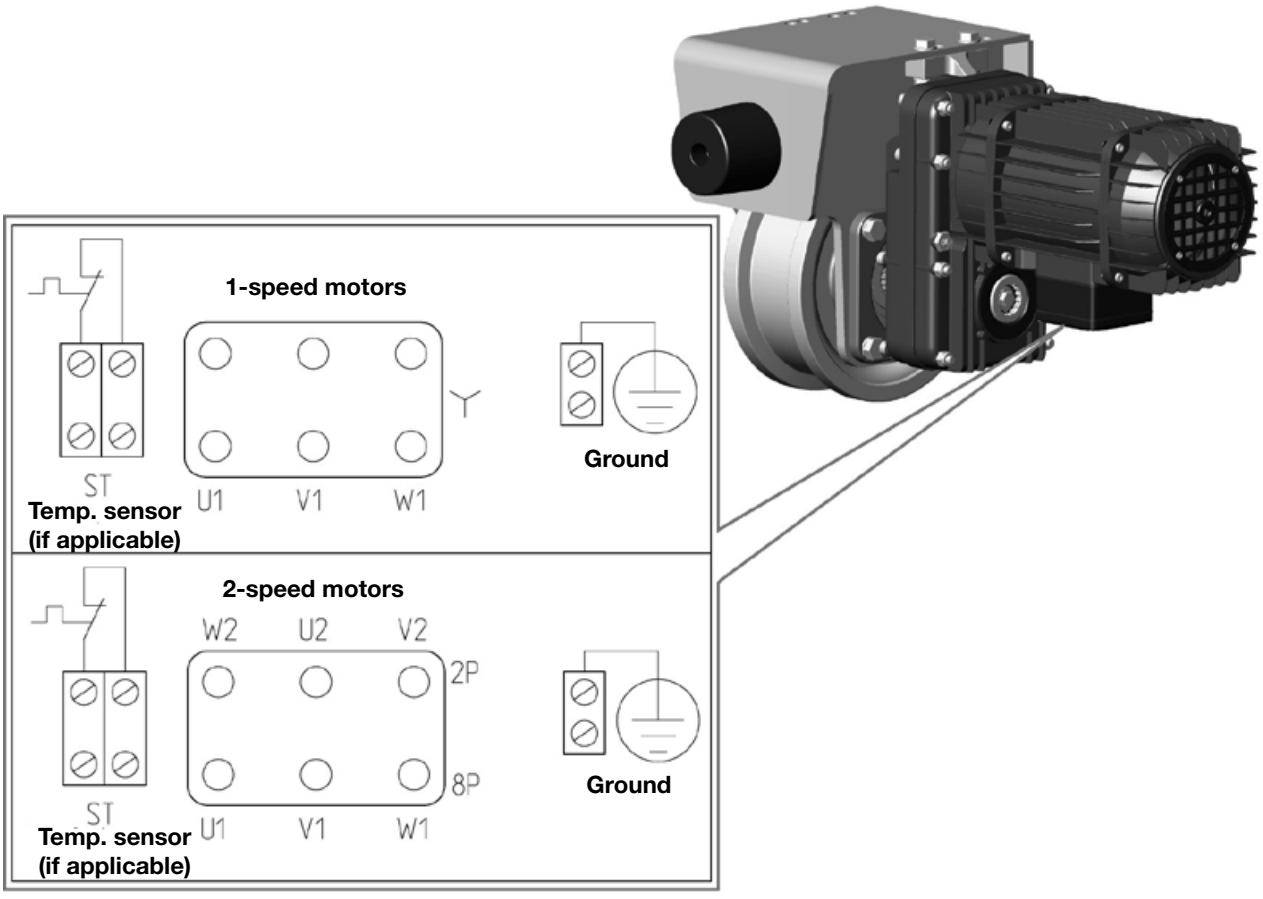
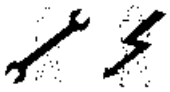


fig. 15

- **Never carry out electrical connections with the power on**
- **Never carry out provisional or hasty connections**
- **Tighten all cable clamps**
- **Replace the covers on the terminals, after having completed the electrical connections**

4.4 – Setup and preparation

4.4.1 Preliminary operations

	Before operating the "DGT" drive units and endcarriages, perform the following control checks:	

- **Check the lubrication on the mechanisms:** (see also point 6.3.4 "Cleaning and lubrication")
  - Make certain there are no lubricant leaks.
- **Check the suitability of the electrical system:**
  - Make certain the limit strokes are installed, correctly positioned and locked in place.
  - Control the line voltage and frequency, as indicated on the identification nameplates on the motors, correspond to operating specifications.
  - Make certain the voltage on the motors falls within a +/- 10% limit of the nominal value.
- **Check the efficiency and suitability of the installation structures for the components:**
  - Control the strength and suitability of the structures on which the components will operate, specifically ascertaining that:
    - the dimensions of the rails are compatible with the wheel's sheave width (see table at page 14);
    - the tolerances for the rails conform to specifications as per norm ISO 8306/85 or regulation FEM 1.001/98.
    - the sliding runs on the wheels are exempt from obstacles, unevenness, depressions, and foreign objects.
  - Make certain operating and manoeuvring spaces are sufficient and ascertain there are no interferences.
  - Verify the presence of the mechanical end-stops and the alignment of the shock absorbing buffers.
- **Verify the correct direction of rotation of the drive motors:**
  - By activating the "forward/reverse" movements, make certain the movements of the **"DGT" drive units** or **endcarriages** occur in the corresponding directions.

If the direction of the movements does not correspond to the required function, immediately stop the manoeuvre and invert the connection of two of the phase connections for the motors in question.

	If the direction of rotation of the motors does not correspond to the controls, the limit strokes will not stop the movement.

4.4.2 Settings and operating tests

	As per their design, "DGT" endcarriages are equipped with electrical limit microswitches limiting the stroke along the travelling run.

	Setting the electrical limit devices on the "DGT" endcarriages (if part of the shipment)**:**	

1. Check the correct positioning of the limit stroke actuators on the **"DGT" endcarriages**.
2. Make certain the stroke of the **beams** complies to that which is required, and if necessary, adjust accordingly:
   - Tests on the limit strokes are conducted bringing the **beams** to the extreme limit of their run. Perform the test several times; the **beams** must stop in the preset position and ensure an adequate "overstroke" before reaching the mechanical end-stops, and avoid a collision.
   - Check the correct positioning of the mechanical end-stops on the girder, which must be capable of supporting an eventual bumping into the rubber shock absorbers on the **drive units on the beams**, in case the electrical limit switch fail to operate correctly.
   - Check the correct positioning of any pre-slowdown devices, in the case of two-speed operation, so as to avoid reaching the limit stroke end-stops at maximum speed..

	The automatic limit stroke switches are emergency devices with safety functions, rather than working devices, and MUST NOT be subjected to regular and/or continuous operation. **If this need arises, supplementary operable limit stroke switches must be installed, set so that they are activated in advance with respect to the emergency switches.**

4.4.3 Testing the "DGT" drive units and beams – getting ready for operation

☞	• **"DGT" drive units and beams are thoroughly tested at the Manufacturer's production facilities to ascertain their performance and operating response. However, these tests must be repeated once the installation is complete, in order to guarantee optimal and safe operating performance for the components in their installation.** • **The test phases comprise a precise sequence of operations, which, as described below, must be accurately respected by technicians conducting the tests.**

- After having conducted operating tests "on empty," proceed with the dynamic test; these tests are carried out with weight masses corresponding to the equipment's nominal lifting capacity, increased by the overload coefficient 1,1 (load equal to 110% of the nominal load). Static tests are conducted with an overload coefficient of 1,25 (load equal to 125% of the nominal load).

!	**All tests must be conducted in the absence of wind.**

👁	**Proceed with testing the "DGT" drive units or beams as follows:**	

- **Empty performance tests:**
  - switch on the power switch
  - set the emergency stop button to the "enable operation" position
  - press the "operation/alarm" button (if available)
  - verify the "forward/reverse" sliding function
  - in the case of movements at two speeds, verify their operability
  - check the operation of the motor brakes in their "forward/reverse" movements
  - check the operation of the electrical limit strokes in their "forward/reverse" movements

- **Dynamic test:**
  - prepare suitable masses for loading tests equal to: **nominal capacity x 1,1**
  - lift the load and check for proper "forward/reverse" sliding operation, making certain there are no irregular noises, obvious deformations or yielding of the structure
  - in the case of movements at two speeds, verify their operability
  - verify the system's operation in "emergency stopping" conditions. Sliding functions must stop in the shortest time and space possible, without irregularities, swerving, dangerous oscillations, etc., or loss of stability.
  - check braking and stopping spaces during sliding phases. For a mass moving at a typical speed of 40 m/min, the amplitude of these spaces can indicatively be estimated at between 1,5 and 2 m, without the insurgence of consistent load oscillations.

- **Static test:**
  - lift the load used for the dynamic tests, stopping it in a suspended position at a height of 50 cm, then gradually apply masses onto it until reaching an overload value equal to 25% of the maximum nominal capacity.
  - leave the load suspended for a test time of no less than 10 minutes.
  - following the test, check for the absence of obvious deformations or structural yielding.

4.5 Disabling the units

4.5.1 Storing the units and parts

	If the "DGT" drive units and endcarriages must be stored for an extended period, proceed as follows to avoid damage or deterioration:	

- Protect all mechanisms and work surfaces with rust-proofing products.
- The materials are designed for indoor installation and can be stored up to a maximum period of two years in a protected environment presenting the following specifications:
  - protected from atmospheric agents
  - relative humidity not exceeding 80%
  - temperature: minimum - 20°C; maximum + 60°C
- If these conditions should become altered during storage, preliminary control checks must be conducted before setting up and operating the equipment (see sect. 4.5.2 "Resetting up the units after storage")
- If the temperature in the storage area exceeds or falls below the values indicated, and the relative humidity exceeds 80% set up protections using barriers and hygroscopic salts.
- For outdoor storage:
  - set blocks under all materials not placed onto pallets
  - protect all materials using barriers and hygroscopic salts
- Demarcate and cordon off the material storage areas.

4.5.2 Resetting up the units after storage

	Before operating the "DGT" drive units and endcarriages after an extended storage period, proceed as follows:	

- **Structure:**
  - eliminate traces of lubricant or products adopted to preserve the structure
  - clean boreholes of any grease residue
  - clean all surfaces around joint areas
  - repair any structural damage (scratched surfaces, scarred paintwork, etc.)

- **Mechanisms:**
  - check for lubricant leaks; if any are found, contact the technical servicing department at Donati Sollevamenti S.r.l.
  - make certain all mechanisms are properly set and fixed onto the structures.
  - eliminate residues of water from grooved sections on the mechanisms or structure.
  - use grease to moderately lubricate toothed joints and couplings on wheels and reducers.

- **Electrical equipment:**
  - eliminate any condensation from the motors and terminals; dry using jets of air
  - check the operation of the brakes for damage and wear
  - carefully clean surfaces on braking seals, eliminating traces of humidity
  - check the operation of the limit switches
  - conduct electrical rigidity and insulation tests for storage periods exceeding 6 months
  - carefully check the operation an efficiency of all electrical conductors

5. - OPERATION

5.1 – Functions on "DGT" endcarriages and beams

5.1.1 Intended and proper usage

- The **drive Units**, comprising **"DGT" series Wheel Groups** in combination with **"DGP" series Offset Geared motors** and **"DGT" endcarriages** equipped with drive units, are designed for handling operations on rails set onto lifting equipment, such as, for example, bridge cranes, trolley and wall mounted cranes, etc. and/or related travelling trolleys, guaranteeing accurate alignments for handling structures, control over high operating speeds, and easy installation and maintenance.
- **"DGT" series Wheel Groups** and **"DGP" series Offset Geared motors**, comprising the **drive units** are modular components specifically designed for **endcarriages** on industrially designed **bridge cranes**.
- Forward and reverse running movements **must be activated electrically**.

5.1.2 Admissible and inadmissible loads

- **Loads must be** compatible with performance specifications for **"DGT" drive units and endcarriages:** in terms of shape, dimensions, weight, balance and temperature.

The handling of the following types of loads is not admissible:
- **weight exceeding the capacities of "DGT" drive units and endcarriages**
- **chemical-physical specifications classifies loads as dangerous (e.g. inflammable, explosive, radioactive materials, etc.)**
- **loosely packed food products or substances, which can come into direct contact with parts on the "DGT" drive units and endcarriages or their lubricants**
- **loads whose static and/or chemical-physical configuration or balance can be altered during handling operations**

5.2 – Operating conditions

5.2.1 Operating environment

- **The operating environment must present the following specifications:**
  - **temperature:** min. -10°C; max. +40°C; **relative humidity:** max. 80%; **maximum altitude:** 1000 m a.s.l.
  - **indoor environment: "DGT" drive units and endcarriages** not exposed to atmospheric agents do not require particular precautionary measures.
  - **outdoor environment: "DGT"drive units and endcarriages** can be exposed to atmospheric agents during and after operation. Electrical parts are classified as minimum protection IP55; however, it is advisable to protect the motors with a roof covering or protective guard.
    To avoid the formation of rust, protect the frames with suitable rust-proofing treatments and keep all mechanisms well lubricated.

Standard series "DGT" drive units and endcarriages must not be operated in environments and areas presenting the following characteristics:
- **Vapours, fumes or highly corrosive and/or abrasive dust particles** (when such conditions cannot be avoided, intensify maintenance care)**.**
- **Flames and/or heat exceeding admissible temperatures.**
- **Fire or explosion hazards, and where the use of anti-explosive and/or spark-proof components is required.**
- **Areas presenting strong electromagnetic fields, which can generate accumulations of electrostatic loads.**
- **Direct contact with loosely packed food substances.**

5.2.2 Danger areas and exposed personnel

- Danger areas are all areas where, in relation to the installation height (< 2700 mm), i.e. accessibility of the **"DGT" drive units** or **endcarriages**, during any operating phase, exposed personnel are placed at risk of a situation which is dangerous for their safety, health or psychophysical integrity. **Personnel potentially exposed** must be informed that the operator using the **"DGT" drive units** or **endcarriages** does not always operate in conditions of sufficient visibility in **dangerous areas** or with respect to handling trajectories, in order to completely or immediately prevent all risks of potential accidentally falling loads, collisions and entangling for exposed personnel.

	The user must set up suitable signs and demarcations to prevent or limit access to outside and/or non-operating personnel in the operating areas relative to the "DGT" drive units or **endcarriages, where the latter are accessible or set at a height of less than 2700 mm.**

5.2.3 Lighting in the work area

- **"DGT" drive units** and **endcarriages** are not equipped with their own lighting system. Consequently, the operator's work area must be suitably lit and must guarantee maximum visibility.

	• **Ambient lighting must always be such as to guarantee the operability of the "DGT" drive units** and **endcarriages in maximum safety conditions.** • **For operations in areas not sufficiently lit, operators must be equipped with a supplementary lighting system, illuminating shadowy areas that can prevent or reduce visibility in operating and/or bordering areas.**	

5.2.4 Operators

- **Operators** are all personnel who, in relation to the **"DGT" drive units** or **endcarriages**, perform the following tasks:
  - the transport, handling, assembly, installation, adjustment and testing of components and parts
  - set-up, use, cleaning, maintenance and repairs on components and parts
  - disassembly, disposal and demolition of components and parts
  - **operators** must be persons suited to the type of work required and psychophysically capable of complying to tasks related to **"DGT" drive units** or **endcarriages** during all operating phases and particularly during handling operations.
  - **the operator charged with the operation** of the **"DGT" drive units** or **endcarriages** must be stationed in a non-dangerous position, so as to be able to foresee and/or prevent possible dangerous movements from handled loads. The operator must follow the safety indications provided, so as to obtain conditions which respect maximum safety for himself and for other personnel, in particular carefully observing all indications contained in this operating manual.

	• **The operator must not allow anyone to approach the "DGT" drive units or endcarriages during their operation, preventing outside persons from operating the units, especially children under 18 years of age.** • **It is strictly forbidden to allow non-authorized and non-informed persons to operate the "DGT" drive units or endcarriages.**

5.2.5 Load bearing capacities on "DGT" drive units and beams

- **The maximum load bearing capacity** on **"DGT" drive units and endcarriages**, in the operation configuration foreseen, is defined by the values for **maximum reaction R max**. (kg) and **Average Reaction R ave**. (kg), admissible for the wheels.
- These reactions are calculated as illustrated in the table **"Operating limits for wheels in relation to the rail's operating contact area and travelling speed"** at page 15, and verify accordingly based on the limitations expressed in the diagrams at pages 15, 16 and 17.
- Operating limitations in relation to **Capacity, ISO/FEM Service Group and Gauge** for **girders on MONORAIL and DUALRAIL bridge cranes** are defined in the respective charts at pages 28 and 30.

	Never exceed the maximum load bearing capacity on "DGT" drive units and endcarriages.

5.2.6 Drive operations

- As a rule, perform one movement at a time, since this is the only way a manoeuvre can be started, stopped and kept constantly under watch by the operator, who must avoid continuous and repeated jog type movements, even in the case of small shiftings.
- Limit switches are set so as to operate in proximity to the extremities of runs. Avoid travelling manoeuvres with short and repeated jog type movements or sudden inversions of course, which, in addition to casuing damage to mechanical parts, can also generate dangerous load oscillations, with risks of collisions or violent impacts between the **"DGT" drive units** or **endcarriages** and the endstroke mechanical stops.

	• **Operate with attention and diligence, keeping a constant watch on manoeuvres, and visually controlling the balancing of loads being handled.** • **Avoid sudden manoeuvres and "jolts," which are damaging to the reliability of the drive motors, as well as to the load's stability, due to dynamic effects generated by such movements**

5.2.7 Safety devices

- A power failure will cause the driving movement to stop in the shortest possible time and space, since the electrical motors are equipped with automatic braking devices. However, the adjustment of the braking torque on the motors must be such as to prevent generating sudden braking, which can result in the dangerous tilting of handled loads.
- The limit switch demarcate the maximum horizontal travel of the **"DGT" drive units** or **endcarriages**. They are emergency devices and are not suitable as operating stops or acknowledgement devices for subsequent operations.

	When excluded from the *DONATI SOLLEVAMENTI S.r.l.*, shipment, the electrical limit switch devices must mandatorily be installed by the Buyer.

5.3 - Safety measures and precautions

- **Correct usage of the "DGT" drive units** and **endcarriages allows users to take fully advantage of their performance specifications in complete safety.**
- **Performance specifications are guaranteed only if the indications listed hereunder are followed attentively:**

- **ALWAYS** follow the instructions outlined in the operating and maintenance manual, and make certain all components and parts on the "DGT" drive units and endcarriages function properly.
- **ALWAYS** make certain the "DGT" drive units and endcarriages operate in a working environment that is protected from atmospheric agents (rain, wind, snow, etc.), or, if operated outdoors, that they are equipped with suitable guards or protections.
- **ALWAYS** make certain the "DGT" drive units and endcarriages handle loads that are compatible with their capacity specifications, in shape, dimensions, weight, balancing and temperature.
- **ALWAYS** verify that performance specifications on the "DGT" drive units and endcarriages correspond to the service they are used for (work cycles – operating time – loads handled).
- **ALWAYS** make certain the travelling runs on the "DGT" drive units and endcarriages are positioned at a height of > 2.7 m from the flooring, i.e. such as to ensure that the operator will not interfere with moving elements (wheels, girders). If this is not possible, set up appropriate guards or warning signs in danger areas.
- **ALWAYS** ascertain the proper maintenance status of the "DGT" drive units and endcarriages (wear, cleaning and lubrication) and their main components (wheels, reducers and motors, etc.).
- **ALWAYS** check the correct operation (spaces, efficiency times) of the self-braking motors and brakes.
- **ALWAYS** check the correct responses of all movements on the "DGT" drive units and endcarriages.
- **ALWAYS** check the efficiency of the limit switches, verifying their operation on a constant basis.
- **ALWAYS** activate forward reverse movements avoiding jolts and impulses in rapid succession.
- **ALWAYS** cut off power to the motors when carrying out inspections, repairs, or maintenance interventions.
- **ALWAYS** point out operating irregularities (faulty operation, malfunctions, suspected breakages, incorrect movements and abnormal noises) to the department coordinator, placing the "DGT" drive units and endcarriages out of service.
- **ALWAYS** respect the maintenance schedule, and at every control record any observations, especially related to: wear on the wheels, conditions of brakes and limit switches.
- **ALWAYS** replace the covers on the terminals following inspections or maintenance interventions on the motors.

5.4 – Counterindications

	• **Using the "DGT" drive units** and **endcarriages for inadmissible manoeuvres, their improper usage, and a failure to respect maintenance interventions can entail serious and dangerous risks for the health and wellbeing of the operator and other persons exposed.** • **The actions outlined hereunder, which obviously cannot cover the entire gamut of possibilities for "bad usage" of the components, nevertheless constitute those actions which are "reasonably" more predictable, and are absolutely forbidden:**	

5.4.1 Improper and unintended usage – Foreseeable and unforeseeable improper usage

- **NEVER** handle loads whose specifications exceed the nominal capacity of the "DGT" drive units and endcarriages.
- **NEVER** allow the use of the "DGT" drive units and endcarriages to non-qualified personnel or children under 18 years of age.
- **NEVER** operate the "DGT" drive units and endcarriages unless physically and psychologically fit.
- **NEVER** stand in the way of the "DGT" drive units and endcarriages when they are in movement, or touch the wheel-rail contact areas during handling operations.
- **NEVER** operate the units without proper attention during handling manoeuvres.
- **NEVER** abandon the "DGT" drive units and endcarriages with an unattended load on them.
- **NEVER** use the the "DGT" drive units and endcarriages for operations other than those for which they are designed (e.g. pulling or dragging objects)
- **NEVER** collide or impact load bearing structures, machinery or installations with the "DGT" drive units and endcarriages.
- **NEVER** leave the "DGT" drive units and endcarriages exposed to atmospheric agents at the end of work operations.
- **NEVER** allow the automatic limit switches to intervene continuously.
- **NEVER** operate the "DGT" drive units and endcarriages under a voltage shortage or lack of one of the phases.
- **NEVER** carry out sudden inversions of course during handling operations.
- **NEVER** operate the "DGT" drive units and endcarriages with impulses in rapid succession.
- **NEVER** modify the functions and performance specifications of the "DGT" drive units and endcarriages and/or their components.
- **NEVER** carry out hasty or temporary repairs and/or non conforming to the instructions.
- **NEVER** intervene on the "DGT" drive units and endcarriages in conditions of insufficient visibility.
- **NEVER** operate the "DGT" drive units and endcarriages in areas classified as "work areas with potentially explosive environments" or where the use of anti-explosive components is mandatory.
- **NEVER** mishandle the adjustments and settings on the safety devices (limit strokes, brakes).
- **NEVER** use non-original spare parts or parts not authorized by the manufacturer.
- **NEVER** entrust extraordinary maintenance and repairs to personnel not trained by the manufacturer.
- **NEVER** carry out maintenance or repairs without having firstly placed the "DGT" drive units and endcarriages out of service.
- **NEVER** during maintenance phases:
  - place or lean ladders or other equipment on the "DGT" drive units and endcarriages
  - intervene without having firstly removed the last load being handled

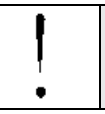
6. - MAINTENANCE

6.1 Safety precautions

- The accident prevention precautions contained in this section must be diligently observed during maintenance, so as to avoid damages to personnel and/or the “DGT” drive units and endcarriages.

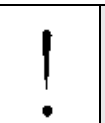
	• **Personnel carrying out maintenance on the “DGT” drive units and endcarriages must:**
	  • **be well trained;**
	  • **have read this operating manual;**
	  • **have an in-depth knowledge of accident prevention norms;**
	• **Non-authorized personnel must remain outside the work area during maintenance operations.**	

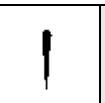
- The following precautions are reiterated in further detail in this section with a note of **WARNING** and **DANGER** every time a procedure is requested which can entail a risk of damage or injury**:**

	**WARNING notes precede operations which, unless correctly performed, can cause damage to the “DGT” drive units and endcarriages**

	DANGER notes precede operations which, unless correctly performed, can cause injury to the operator.

	Pay attention to the following WARNING NOTES during maintenance interventions:

	**Before restoring operation on the “DGT” drive units and endcarriages, following a malfunction, the units must be carefully inspected and controlled for any damage, repeating the procedure outlined at section 4.4 “Setup and preparation”**	

	**Never, unless expressly requested in order to eliminate a malfunction, intervene on the settings and positioning of safety devices (brakes, limit switches and related end stroke stops). Mishandling these devices can lead to serious damage to the “DGT” drive units and endcarriages**	

	Pay attention to the following DANGER NOTES during maintenance interventions:

	Cut off power to the "DGT" drive units and endcarriages, whenever it is not required, before carrying out maintenance operations. Affix a sign with the following indication: MACHINE IN MAINTENANCE STATUS – DO NOT POWER ON	

	Never exclude the safety devices (brakes, limit switches and related end stroke stops) installed on the "DGT" drives units and endcarriages. If this becomes necessary, affix appropriate warning signs and operate with maximum care.	

	Always make certain that a suitable ground connection exists and that it responds to ordinances in force. Failure to pro vide a ground connection for electrical equipment can cause serious damage to personnel.	

	Before restoring operation to the "DGT" drives units and endcarriages, always make certain that personnel charged with maintenance is at a safe distance (no longer at the units' operating height) and that no tools or materials have been left behind on the components.	

	Always make use of safety gloves during maintenance operations.	

	All accessible moving parts and transmission components (wheels and drive shafts), as well as electrical parts, must be exempt from risks due to accidental contacts. Replace protective covers on terminals before restoring operation.	

	Pay maximum attention to al RESIDUAL RISKS highlighted in this operating manual.	

6.2 Qualifications for maintenance personnel

- In order to capably and diligently perform maintenance operations on the **"DGT" drive units** or **endcarriages**, maintenance personnel must:
  - possess knowledge and expertise as required regarding current legislation in force on the prevention of injuries during work operations on machinery with motor drives, and be capable of applying such expertise;
  - have read and fully understood section 3 "Safety and Accident Prevention Measures";
  - know how to use and consult this operating manual;
  - be knowledgeable of the operation of the machine on which the **"DGT" drive units** or **endcarriages** are installed;
  - recognize any operating irregularities and act accordingly is necessary.

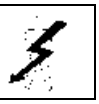
- **The following professionally trained personnel are authorized to carry out maintenance operations on the "DGT" drive units and endcarriages:**

	Operator entrusted with the use of the machine on which the "DGT" drive units and endcarriages are installed:	

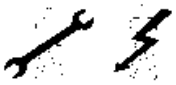
- **Typical maintenance tasks:**
  - check the correct operation of the **"DGT" drive units** or **endcarriages**;
  - collaborate with personnel carrying out periodic and/or extraordinary maintenance, providing information in the case of irregularities.
  - **Knowledge and expertise requested:**
  - knowledge of functions and use of the **"DGT" drive units** or **endcarriages**.
- **Qualifications requested:**
  - qualified for work operations in relation to specific operative and environmental conditions.

	Mechanical maintenance personnel:	

- **Typical maintenance tasks:**
  - mechanical adjustments on braking torque and slack;
  - verification of operating movements and mechanical adjustment of safety devices;
  - control of mechanical play and wear on components (wheels, shafts, etc.);
  - replace worn out components (wheels, brakes, etc.) as outlined in this operating manual;
  - ordinary maintenance on mechanical groups, replacing worn out parts with original spare parts.
- **Technical knowledge and expertise requested:**
  - proper knowledge of motor driven mechanical lifting and handling systems;
  - proper knowledge of safety devices employed on **"DGT" drive units** or **endcarriages** (limit strokes, brakes, etc.);
  - elementary knowledge of electrical adjustment and control techniques of modest difficulty (adjustment of limit strokes, motor connections, etc.);
  - knowledge of measurement and testing methods so as to determine the effective status of the **"DGT" drive units** or **endcarriages** (verifications on: brake wear, wheel wear, abnormal noises, etc.);
  - logical search methods for non-complex malfunctions and evaluations of results;
  - capacity to organize measures capable of restoring proper performance to the **"DGT" drive units** or **endcarriages**;
  - capacity to draw up a summary of maintenance interventions.
- **Qualifications requested:**
  - complete training as an industrial mechanic, with specialization and experience in maintenance on industrial lifting and handling systems.

☞	**Electrical maintenance personnel:**	

- **Typical maintenance tasks:**
  - interventions on electrical equipment, consulting electrical diagrams;
  - verification of operating movements and electrical adjustment of safety devices (limit strokes);
  - control of wear on electrical components (limit strokes, etc.);
  - repairs on electrical components, replacing worn out parts with original spare parts.
- **Technical knowledge and expertise requested:**
  - proper knowledge of electrical systems and installations;
  - proper knowledge of electrical components and safety devices employed on **"DGT" drive units** or **endcarriages** (motors, limit switches, etc.);
  - knowledge of control techniques and electrical adjustments of average difficulty (replace parts according to original diagram for: motors, limit switches, cables, etc.);
  - elementary knowledge of control techniques and mechanical adjustments of modest difficulty (verify wear, adjust mechanical stops, etc.);
  - knowledge of measurement and testing methods so as to determine the effective status of electrical components on **"DGT" drive units** or **endcarriages** (motors, limit strokes, etc.);
  - knowledge of search methods for electrical malfunctions and experience on electrical command and control systems on lifting and handling equipment;
  - capacity to organize measures capable of restoring proper performance to the **"DGT" drive units** or **endcarriages**;
  - capacity to draw up a summary of maintenance interventions;
- **Qualifications requested:**
  - complete training as an industrial electrician, with specialization and experience in maintenance on industrial lifting and handling systems.

☞	**Electromechanical maintenance personnel:** • **Operators who possess specifications typical of electrical maintenance personnel, as well as the expertise and technical skills requested on mechanical maintenance personnel.**	

☞	**Mechanical technicians:**	

- **Typical maintenance tasks:**
  - mechanical adjustments on safety devices, calibrations and tests (load tests);
  - ordinary maintenance operations, replacing complex mechanical and/or critical components for safety purposes (wheels, reducers, motors, etc.);
  - repairs on mechanical groups, through extraordinary maintenance operations (repairs of structural parts and welding on **"DGT" drive units** or **endcarriages** (etc.);
- **Technical knowledge and expertise requested:**
  - proven knowledge and experience in the field of mechanical systems for industrial lifting and handling equipment, certified by specific training;
  - specific knowledge of safety devices as applied to **"DGT" drive units** or **endcarriages** (limit strokes, brakes, etc.);
  - fundamental knowledge of control techniques and electrical adjustments (verify motors);
  - specific expertise on measurement and testing methods so as to determine the effective status of **"DGT" drive units** or **endcarriages** (verify: brakes, limit strokes, etc.);
  - specific knowledge of logical search methods for malfunctions and evaluations of results;
  - capacity to organize measures capable of restoring proper performance to the **"DGT" drive units** or**endcarriages**;
  - capacity to draw up a summary of maintenance interventions.
- **Qualifications requested:**
  - complete training as an industrial mechanical technician, with specialization and experience in maintenance on industrial lifting and handling systems.

	Electrical technicians:	

- **Typical maintenance tasks:**
  - electrical adjustments on safety devices, calibrations and tests (load tests);
  - ordinary maintenance operations, replacing complex electrical and/or critical components for safety purposes (motors, limit switches, brakes, etc.);
  - repairs on electrical groups, through extraordinary maintenance operations (repairs on electrical motors with partial part replacements, replacing limit strokes with setting variations, etc.).
- **Technical knowledge and expertise requested:**
  - excellent knowledge of electrical systems and installations as related to industrial lifting and handling equipment;
  - specific knowledge of electrical components and safety devices employed on **"DGT" drive units** or **endcarriages** (motors, limit switches, brakes, etc.);
  - expertise in control techniques and electrical adjustments (capacity to intervene on the original layout for improvements on: limit strokes, control panels, cables, etc.);
  - knowledge of control techniques and mechanical adjustments (verify wear, verify performance of mechanical components, adjust and set mechanical stops, verify noise emissions, etc.);
  - specific expertise on measurement and testing methods so as to determine the effective status of **"DGT" drive units** or **endcarriages** (verify efficiency and reliability of electrical equipment);
  - specific knowledge of logical search methods for all malfunctions and evaluations of results on electrical command and control systems as related to lifting equipment;
  - capacity to organize measures capable of restoring proper performance to the **"DGT" drive units** or **endcarriages**;
  - capacity to draw up a summary of maintenance interventions.
- **Qualifications requested:**
  - complete training as an industrial electrical technician, with specialization and specific expertise in electrical equipment for industrial lifting and handling systems.

	Electromechanical technicians: • **Highly specialized operators who possess skills and expertise related to electrical and mechanical maintenance technicians.**	

	Special recommendations regarding maintenance:

1. When correctly performed, maintenance interventions guarantee the safety of operators working on the **"DGT" drive units** or **endcarriages** and reduce machine downtime to a minimum following a malfunction.
2. Repairs carried out ahead of time avoid further deterioration on the **"DGT" drive units** or **endcarriages.**
3. Use original products and spare parts as far as possible.
4. Observe the following guidelines when placing the system in maintenance status:
   - personnel carrying out ordinary and extraordinary maintenance interventions must read and fully understand all indications contained in this section and in section 3 of the operating manual.
   - extraordinary maintenance interventions must be carried out by authorized and specialized personnel only.

	Whenever possible, maintenance interventions on the "DGT" drive units or endcarriages must be carried out with the power cut off and in safety conditions, using suitable tools and personal protection equipment, in accordance with current regulations in force, affixing a sign with the warning: "MACHINE IN MAINTENANCE STATUS".

	For any other problems which may arise, and to order spare parts, please contact the Technical Service Department at *DONATI SOLLEVAMENTI S.r.l.*

6.3 Maintenance program

- The maintenance program comprises interventions of an ordinary nature, which foresee inspections, controls and verifications conducted by the machine's operator and/or by qualified personnel overseeing normal and periodic maintenance operations, which include replacing parts, adjustments and settings, and lubrication performed by specially trained technicians.

	• **Considering maintenance work can be carried out at a dangerous height, personnel must have appropriate means of support (scaffolding, platform, ladders etc.) which allows the work to be performed in safe conditions.** • **Personnel must also have suitable personal protection devices (PPD) in accordance with current legislation in force.**	

6.3.1 Daily and periodic maintenance

- Comprises maintenance operations that can be performed directly by the operator making use of the machine on which the **"DGT" drive units** or **endcarriages** are assembled, or by specially qualified personnel, as outlined in this operating manual, and/or in the attached documentation, which do not require the use of special tools and equipment.

- **Maintenance operations are divided into:**

	Daily interventions performed by the operator making use of the machine on which the "DGT" drive units or endcarriages are assembled: • general visual checks • functional checks on: motors, brakes and limit switches..	

	Monthly interventions to be performed by qualified personnel: • visual checks on mechanisms and lubricant leaks • functional checks on brakes at full load • checking for abnormal or irregular noises and/or vibrations.	

	Quarterly interventions to be performed by qualified personnel: • check for wear on wheels • functional checks on motors and limit strokes at full load • functional checks on brakes at full load and inspection of wear • verify efficiency and integrity of electrical cables powering the motors.	

6.3.2 Maintenance frequency and deadlines

- The frequency with which the following operations are carried out refers to **"DGT" drive units or endcarriages** used under normal operating conditions, and are valid up to service group M6 (ISO norm 4301/86); i.e. 3m (FEM ordinance 9.511).

- If the use of the **"DGT" drive units or endcarriages** is normal and correct for daily 8 hour shifts, their overhaul can be performed after a period of use of approximately 10 years (FEM ordinance 9.755 - S.W.P.). For usage over repeated and consecutive work shifts, intensify the frequency of maintenance periods proportionately.

Table of periodic checks and maintenance

Object of verification ⇓	Periodic maintenance checks				Page
	Daily	Monthly	Quarterly	Annualy	
• **Controls** • **Inspections** • **Tests**	General visual checks. Verify proper operation	General visual checks	Verify wear	Annual tests	55
Drive motors			Load tests		69
Brakes	Verify correct operation		Load tests Check braking spaces and wear		69
Reducers		Check noise emissions			69
Wheels		Visually verify wear	Verify instrumental wear		70
• **Structural elements** • **Pins and hinges** • **Bolted joints**				Verify efficiency of pins and hinges Check bolted/ welded joints	70
Rubber elastomer: • **Buffers** • **Shock absorbers**				Verify wear and efficiency	70
Limit switches	Verify correct operation		Load tests Verify wear and efficiency		71
Cables and electrical conductors			Check for broken parts and efficiency		71
Cleaning and lubrication		Check for lubricant leaks	General cleaning to allow verifications		71

6.3.3 Checking the operating efficiency of parts and components

	The Manufacturer recommends strictly observing the following instructions for individual parts on the "DGT" drive units or endcarriages:

	Quarterly efficiency control on the self-braking travelling motors:	
• Clean the drive motor on the swinging gearmotor, eliminating any dust from the frame, which can otherwise hinder its regular cooling function; check to make certain the vent openings are not clogged. • With a nominal load, check for abnormal noises (chaffing, rasping sounds). • Check to make certain the temperature of the frame does not exceed 110°C. If it does, look for causes and verify the type of operation the gearmotor is subjected to (see point 6.7 "Troubleshooting Guide"). • Verify the voltage and power absorption, comparing them with the nominal values reported on the motor's identification nameplate (see also motor specifications at point 2.3.7 - page 19 of this manual).		
	IN CASE OF A MALFUNCTION: • **It is forbidden to intervene with corrective maintenance inside the motors;** • **Any extraordinary maintenance operation on the self-braking travelling motors must be conducted by the *DONATI SOLLEVAMENTI S.r.l.* technical servicing department or by its authorized technicians.**	

	Check the efficiency of the self-braking travelling motors every three months:	
• Check to make certain the brake unlocks correctly with each intervention, and the rotor does not remain braked and/or chaffing is detected. • With a nominal load, control braking spaces, times and effectiveness and make certain they are the desired settings, i.e. those set during the setup phase. If this is not the case, cut off the power supply and check for wear on the surface of the brake lining and brake block, ascertaining any irregularities. • Where necessary, make adjustments to the brakes and/or replace them, as outlined in sections 6.4 "Settings" and 6.6 "Replacements"		
	• **Replace the brake if braking spaces, times and effectiveness are inadequate, even after having made adjustments.** **IN CASE OF IRREGULARITIES:** • **It is forbidden to intervene with corrective maintenance on the brakes;** • **Any extraordinary maintenance operation on the brakes must be conducted by the *DONATI SOLLEVAMENTI S.r.l.* technical servicing department or by its authorized technicians.**	

	Check the efficiency of the swinging reducers on a monthly basis:	
• Check noise levels on the drive swinging reducers to make certain there are no variations in intensity. Vibrations or excessive noise can reveal wear on the teeth or a malfunctioning bearing. • Check for lubricant leakage.		
	CAUTION: • **The swinging reducers are lubricated for life and do not require any maintenance nor lubricant refilling.** **IN CASE OF IRREGULARITIES:** • **It is forbidden to intervene with corrective maintenance on the reducers;** • **Any extraordinary maintenance operation on the reducers must be conducted by the *DONATI SOLLEVAMENTI S.r.l.* technical servicing department or by its authorized technicians.**	

	Visually check the efficiency of the drive wheels on a monthly basis: **Check the components on the drive wheels every three months:**	

- Visually check the wear and status of the edgings and rolling bands on the sliding wheels every month, and take measurements every three months.
- Control the pads to make certain there are no irregularities. Pads must be replaced if excessive noise or chaffing is present, or rotation in "jolts," and any difficult and/or irregular rotation.
- Check for the absence of play in the fittings between the wheel and grooved shaft, as well as between the shaft and reducer; the presence of play reveals the need to replace the grooved shaft and/or wheels.

	Replace the drive wheels if: • **The thickness of the edging/s on the wheel has diminished by ≥ 50%** • **The wheel's rolling diameter shows wear ≥ 5 mm** • **Should the drive wheels require replacing, to obtain the best guarantee in terms of operation and duration the Manufacturer recommends replacing both drive wheels** • **For the correct replacement procedure for the wheels, refer to section 6.6 "Replacing parts and components"**	

	On an annual basis, check the efficiency of the: • **structural elements** • **pins and hinges** • **bolted joints**	

- Metal frames on the **"DGT" drive units** or **endcarriages** can be subject to alterations due to environmental factors (corrosion, rust, etc.), which can cause damage to the framework and welding. As such, all frames require cleaning and annual controls to ascertain they are in perfect condition, repairing any damage found is required;
- The reaction arms on the swinging reducers, and hinged brackets and pins, are subject to wear, as moving and oscillating elements under ongoing friction in the contact area. Control these parts regularly and replace them in the case of excessive wear;
- On an annual basis, the screw pins on the reaction arms and their housings must be disassembled and carefully controlled;
- At least once a year, check to make certain all bolted joints are properly tightened.

	Repair frames or replace hinged elements under the following conditions: • **deformations:** lengthening, flattening, dents, folds; • **wear:** worn out parts, reductions in section, incisions, abrasion, corrosion, rust, scars, scratched paintwork; • **breakage:** weld cracks, fissures, cuts or incisions, broken parts; • **variations in section ≥ 10%, or in diameter or thickness ≥ 5 % with respect to initial values.**	

	On an annual basis, check the efficiency of the rubber elastomer • **buffers on the wheel group end stops** • **shock absorbers on the offset geared motors.**	

- Control the **buffers** to make certain they are not deformed or broken, that they do not present symptoms of aging (cracks, fissures, loss of elasticity) and are well fastened to the structures;
- Control the **shock absorbers on the offset geared motors** to make certain they are not flattened, do not present symptoms of aging (cracks, fissures, loss of elasticity) and are well fastened to the geared motor reaction arm.

	Replace the rubber elastomer parts under the following conditions: • **permanent deformations:** flattening; • **breakage:** splits, cuts or incisions, broken parts; • **signs of aging:** cracks, fissures, loss of elasticity. **In all cases, replace the rubber elastomer parts every 5 years, even if they appear apparently in good condition.**	

	Check the efficiency of the sliding limit strokes every three months:	

- Check their conservation status and operation (allow the limit switches to intervene several times) and specifically, check their operation during a normal manoeuvre with a full load, testing at low speed first (where this speed option is available);
- Control to make certain all cable runs, covers and seals are properly fitted;
- Check all moving mechanical elements (levers/springs) and tighten all screws.

	• **The limit switches are safety devices – as such their malfunctioning can compromise the safety of persons exposed!** • **Do not hesitate to replace limit strokes being tested if they do not appear to sufficiently satisfy operating reliability.** • **Never carry out hasty repairs on the limit strokes!** • **Use original spare parts.**	

	Check the efficiency of all cables and electric conductors every three months:	

- Check all flexible cables for cuts, abrasion, peeling and uncovered conductors;
- Check the efficiency of all conductors and ground connections on the electric motors, controlling and tightening all screws and terminals.
- Check all seals on the covers and cable runs.
- Check to make certain the identification nameplates are present on the motors, and in good condition.

	• **Replace any cables and/or conductors that appear broken, cut, peeled or eroded.** • **Never carry out hasty repairs.**	

6.3.4 Cleaning and lubrication

	• **"DGT" drive units or endcarriages must be thoroughly cleaned every three months, in order to allow for periodic control checks;** • **<u>Cleaning operations above ground level</u> must be carried out by qualified personnel making use of suitable equipped with individual safety and protection devices.**	

- Cleaning operations can be performed simply using tools, detergents or solvents commonly employed in general cleaning operations on industrial equipment.
- Remove smudges, stains and other foreign substances with an aspirator, absorbent cloths, etc.

	• **Sliding reducers on the "DGT" drive units and endcarriages are lubricated for life and do not require lubricant replacement.** • **However, since the proper lubrication of mechanisms on the reducers is an essential condition in guaranteeing their effective operating response and duration, on a monthly basis visually control that there are no lubricant leaks on the reducers.** • **If <u>significant leaks</u> are detected, immediately contact the servicing department at *DONATI SOLLEVAMENTI S.r.l.***	

	• **Lubricants, solvents and detergents are toxic/harmful products for our health which can:**
	  • **produce irritations in direct contact with skin;**
	  • **provoke serious intoxication if inhaled;**
	  • **cause death if swallowed.**
	• **Handle with care using suitable individual protection and safety equipment;**
	• **Do not disperse in the environment, dispose of in conformity with current legislative ordinances in force regarding toxic/harmful substances.**

6.4 Setting the brake on the motors on "DGT" drive units and endcarriages

- **The motor on the "DGT" drive units and endcarriages is a self-braking type with axial shifting of the rotor.**
- **Braking is mechanic and is provided by a conical brake block, equipped with a brake lining that is integral with the rotor, and which, in the absence of power, is thrust by a spring in contact with the braking surface on the brake cover.**
- **The brake linings do not contain asbestos, and are subject to wear depending on the intensity of work operations.**
- **Wear on the brake linings increases the amount of play between the lining and brake block; this leads to a progressive loss of brake torque and consequent brake skidding and lengthening of brake spaces; proper maintenance on the brake is consequently essential.**
- **Adjust the brake torque as follows:**
  - **A) On the outside, adjust the brake torque in the case of modest wear or to modify preset torque settings.**
  - **B) On the inside, restore the brake play in the case of heavy wear on the brake lining, increasing the motor shaft axial stroke > 1 mm.**

Adjustments on the brake on "DGT" drive units or endcarriages:
- **A) Externally set the brake torque**
- **B) Internally restoring the brake play**

WARNING! The use of a safety harness is mandatory when these operations are conducted above ground level.

- To make adjustments on the brake on **"DGT" drive units** or **endcarriages**, whether externally adjusting the brake torque **A)**, or internally restoring the brake play **B)**, the following **PRELIMINARY OPERATIONS** are required**:**
  1. Cut off power to the **"DGT" drive units** or **endcarriages**;
  2. Get to the work area above ground level in safety;
  3. Operating above ground level, remove the plastic grid (aerator), unscrewing the four screws completely, as shown in fig. 16.

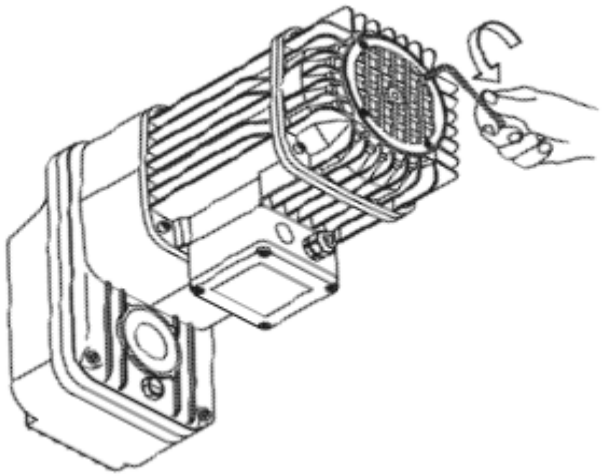


fig. 16

A) Externally setting the brake torque:

- **To increase or decrease the desired brake torque**, proceed as follows:
  1. Loosen the “hexagonal concave head” centre screw (fig. 17);
     - **to increase the brake torque:** remove one or more washers until obtaining the desired brake torque (fig. 18);
     - **to decrease the brake torque:** with all washers inserted under the “hexagonal concave head” screw, the spring thrust is at its minimum setting, and consequently the brake torque is also at a minimum.
  2. Reset the “hexagonal concave head” centre screw (with the desired washers) and tighten securely (fig. 19);
  3. Perform driving and braking tests, and if necessary repeat the above steps until obtaining the desired brake torque, after having reassembled the aerator and securely tightened the “hexagonal concave head” screws (fig. 20).

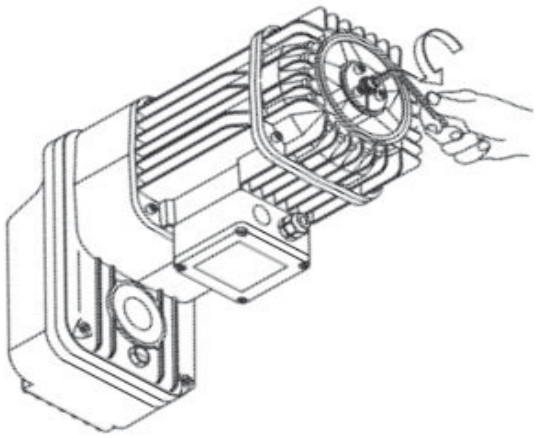


fig. 17

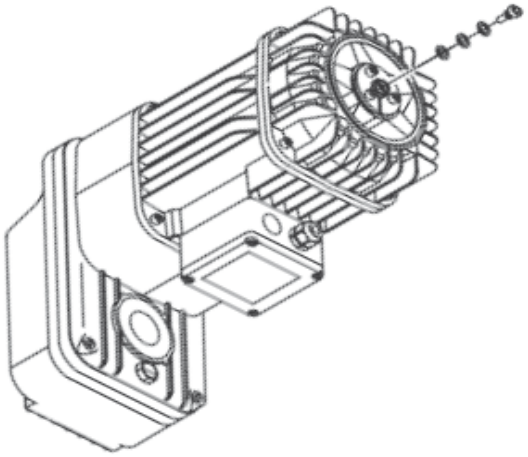


fig. 18

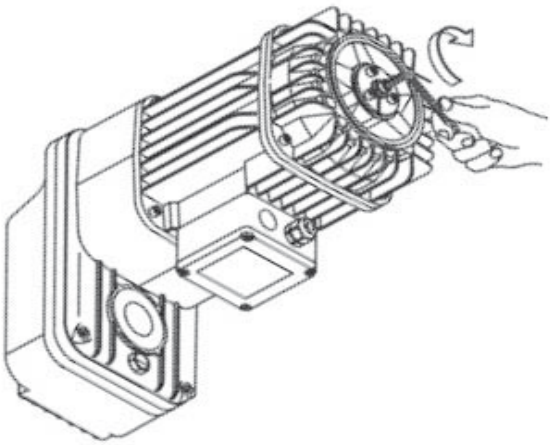


fig. 19

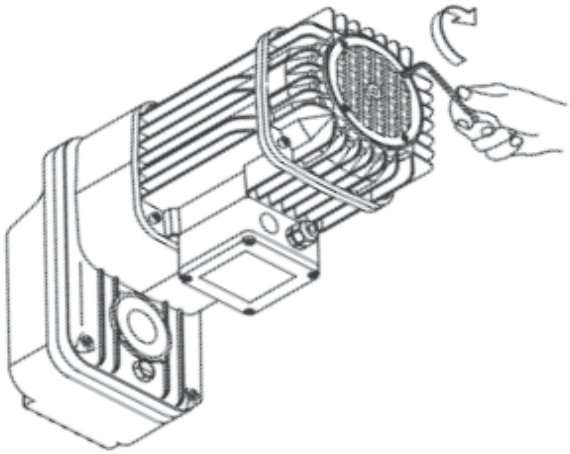


fig. 20

☞	**If the brake torque adjustment has been performed several times and the desired braking space is not achieved, proceed as outlined under the following point B) “Internally restoring the brake play.”**

B) - Internally restoring the brake play:

- **To reset the correct axial stroke on the motor shaft** (≅ 1mm), proceed as follows**:**
  1. Operating above ground level, remove the plastic grid (aerator), unscrewing the four screws completely, as shown in (fig. 16);
  2. Completely unscrew the three screws form the locking ring nut on the brake block (fig. 21);
  3. Remove the ring nut from the brake block, if necessary using a screwdriver in the slot (fig. 22);
  4. Turn the ring nut counter-clockwise 360°(1 complete turn), considering that a complete turn of the ring nut generates an axial shifting of the brake block of 1 mm;
  5. Draw the brake block in towards the ring nut, matching up the boreholes;
  6. Reset the three screws into their original housings on the ring nut, fastening them onto the block (fig. 23);
  7. Reassemble the grid (aerator), fastening the four screws back on completely (fig. 24).

When these steps have been completed, control the brake setting and play, to make certain they are correct, verifying (firstly on empty and subsequently with a nominal load) that:

- the motor rotates freely, without irregular noises, brake chaffing or the brake cover overheating.
- the brake operates silently, and the **"DGT" drive units** and **endcarriages** brake without any obvious slipping.

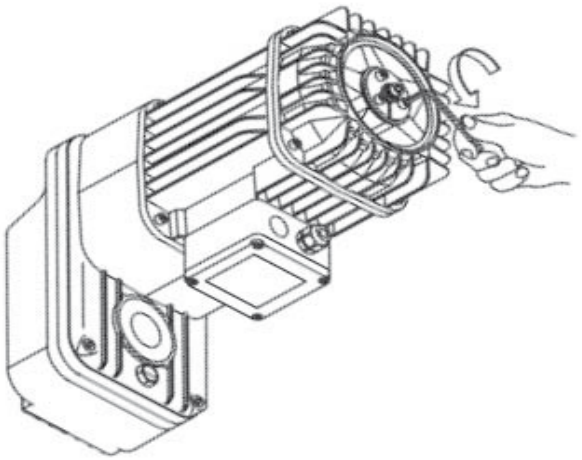


fig. 21

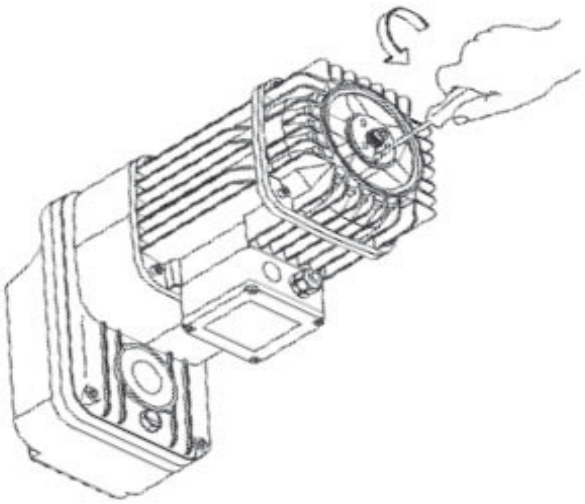


fig. 22

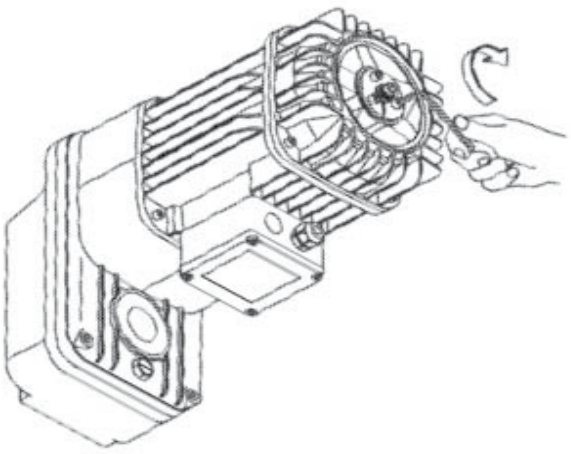


fig. 23

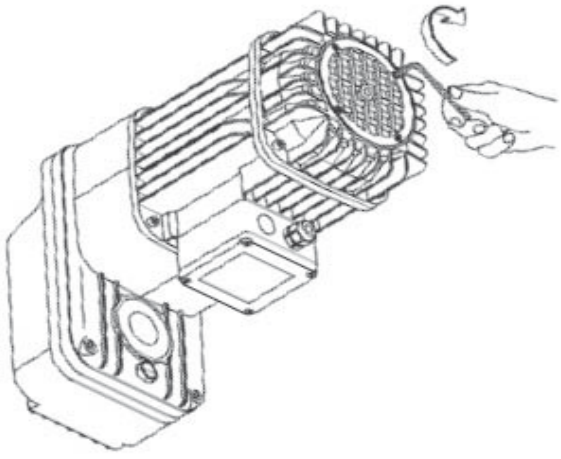


fig. 24

If the brake adjustment has been performed several times and the desired braking is not achieved, replace the motor cover as outlined at sect. 6.6.1, ordering original spare parts EXCLUSIVELY.

6.5 Disassembling the "DGP" offset geared motor

Disassembly operations must be carried out by qualified and trained personnel, and when working above ground level, equipped with:

- **suitable individual protection devices (e.g. safety harnesses, etc.);**
- **appropriate working tools (e.g. fork lift, crane, scaffolding, etc.).**

after carefully evaluating the following parameters:

- **type of working environment, ambient specifications and type of flooring**
- **height of the installation with respect to the flooring and available spaces**
- **dimensions and weight of the "DGP" offset geared motor to disassemble**

The "DGP" offset geared motor being disassembled must be moved SOLELY using LIFTING EQUIPMENT (crane, hoist, etc.) **and a suitable harness** (textile fabric sling) **fastened loop- like onto the connection area between the motor and swinging reducer** (fig. 25)**.**

Disassembling the "DGP" offset geared motor (fig. 26)**:**

1. Cut off power to the **"DGT" drive units** or **endcarriages**;
2. Sling the offset geared motor (1), using a textile fabric sling (2), fastened loop-like onto the motor (fig. 25) without, however, tensioning the harness;
3. Unfasten the screw and nut (3), and remove it from the reaction arm (4) on the operating head (5);
4. Remove from the geared motor (1) the screw and nut (3) and shock absorber group, comprising two buffers (6) and two pressure rings (7);
5. Completely extract the geared motor (1), integral with the drive shaft (8), from the wheel (9), maintaining it suspended from the lifting equipment with the harness (2);
6. Set the geared motor (1) on the ground, operating the lifting equipment.

fig. 25

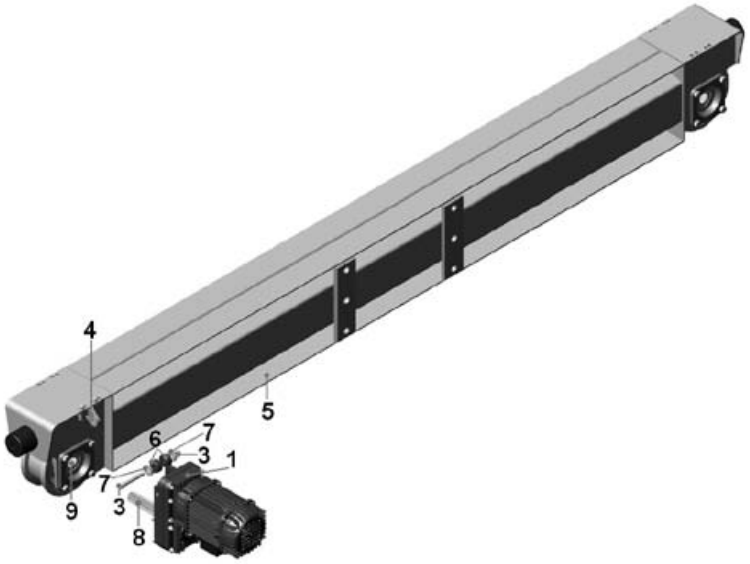


fig. 26

To reassemble the "DGP" offset geared motor once more onto the operating head, proceed by following the above steps in reverse sequence, i.e. as outlined in the procedure at page 50.

6.6 Replacing parts and components

	To guarantee the operating safety of the "DGT"endcarriages units and endcarriages, it is mandatory to use original spare parts or parts recommended by *DONATI SOLLEVAMENTI S.r.l.*

	Operations regarding the replacement of parts and components must be performed by qualified and specially trained personnel, and when working above ground level, equipped with: • **suitable individual protection devices (e.g. safety harnesses, etc.);** • **appropriate working tools (e.g. fork lift, crane, scaffolding, etc.).** **after carefully evaluating the following parameters:** • **type of working environment, ambient specifications and type of flooring** • **height of the installation with respect to the flooring and available spaces** • **dimensions and weight of the parts to be replaced**	

6.6.1 Replacing the brake on the motors on "DGT" drive units and endcarriages

	To replace the motor brake proceed as follows:	

1. Cut off power to the **"DGT" drive units** or **endcarriages**;
2. Access the work area safely;
3. Operating above ground level, remove the motor's brake cover, unfastening the four screws (fig. 27);
4. Completely unscrew the three screws form the locking ring nut on the brake block (fig. 28);
5. Unfasten the ring nut and remove the brake block and its worn out material;
6. Reassemble the new brake block (with the new brake lining) and screw the ring nut back on to the end of its stroke;
7. Fasten the ring nut to the brake block using the three screws (fig. 29);
8. Reassemble the motor cover, tightening it with the screws and nuts (fig. 30).
9. Proceed with the operating tests and adjustment of the braking torque as outlined at sect. 6.4.

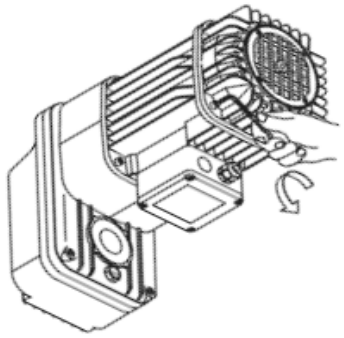


fig. 27

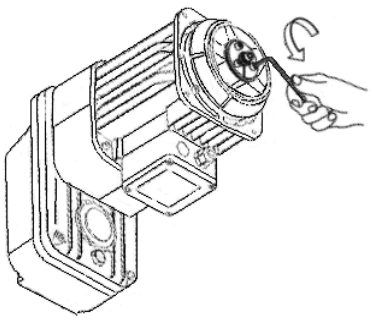


fig. 28

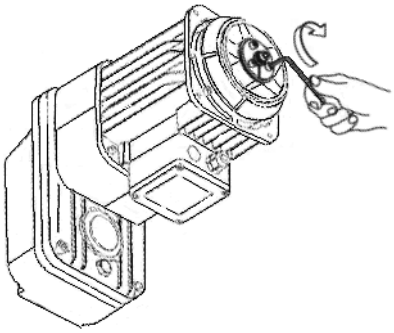


fig. 29

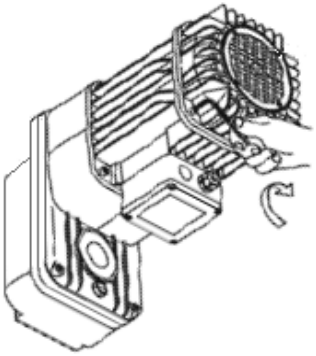


fig. 30

6.6.2 Replacing the wheels on "DGT" drive units

Operations regarding the replacement of the wheels must be performed by qualified and specially trained personnel, and when working above ground level, equipped with:
- **suitable individual protection devices (e.g. safety harnesses, etc.);**
- **appropriate working tools (e.g. fork lift, crane, scaffolding, etc.).**

after carefully evaluating the following parameters:
- **type of working environment, ambient specifications and type of flooring**
- **height of the installation with respect to the flooring and available spaces**
- **dimensions and weight of the wheels to be replaced**

The wheels must be moved <u>SOLELY</u> using LIFTING EQUIPMENT (crane, hoist, etc.) **and a suitable harness** (textile fabric sling) **fastened loop- like onto the perimeter of the wheel's sliding harness** (Fig. 31)**.**

It is advisable to replace all the wheels, even if some of them appear in good condition.

To replace the wheels proceed as follows (Fig. 32)**:**

1. For a power wheel, disassemble the offset geared motor (1), removing the wheel (2), then proceed as outlined at section 6.5 on page 75;
2. Using appropriate tools (jack, steeve, etc.), lift the operating head by a few centimeters (3) from the side of the wheel (2) to be replaced;
3. Sling the wheel to be disassembled (2), with a fabric harness (4) fastened loop-like onto the perimeter of the sliding harness (fig. 31), without tensioning it, however;
4. Remove the wheel supports (6) on both sides, unfastening the four screws (7), using a screwdriver if necessary;
5. Extract the wheel (2) from the operating head lifting unit housing (3), maintaining it suspended with the harness (4) and lifting equipment (5);
6. Set down the wheel (2) to be replaced, using the lifting equipment;
7. Set the wheel supports on the ground as well (6), if the bearings must be replaced as well (8).

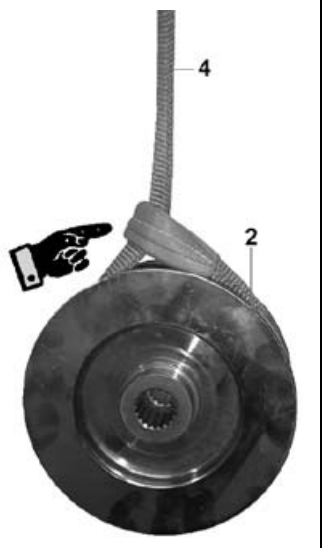


fig. 31

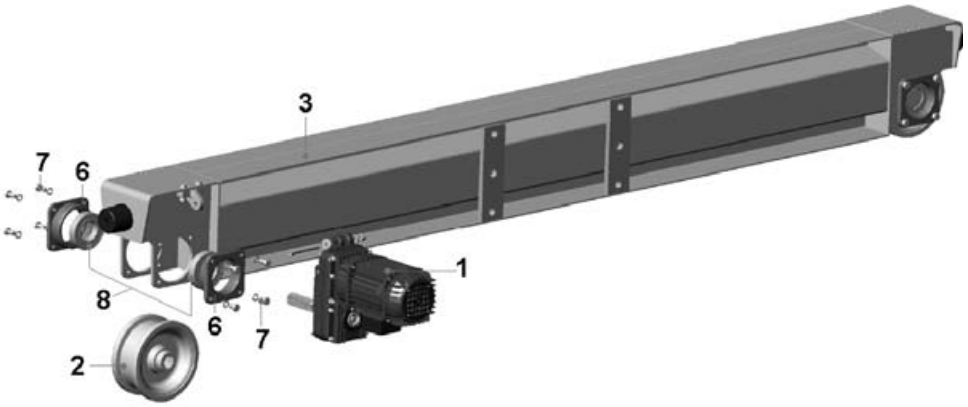


fig. 32

To reassemble the wheels on the operating head, proceed in reverse sequence.

6.7 Troubleshooting guide

6.7.1 Malfunctions and irregularities

- The following are the primary, reasonably foreseeable malfunctioning conditions related to operating functions on the **"DGT" drive units** or **endcarriages**.

PROBLEM	POSSIBLE CAUSES
A single "DGT" Unit or Beam won't start	• motor power cable • motor malfunction • blocked brake • reducer jammed • blocked wheel
The pair of "DGT" "DGT" Units or Beams won't start	• motor power cable • motor fuses • temperature sensors tripped (if available) • forward/reverse limit switch • forward/reverse contactor • forward/reverse command button
The driving operation won't stop in the required space	• worn out brake
The driving operation won't stop at the end of the stroke	• worn out brake • limit stroke operation
The reducer is excessively noisy	• lack of lubricant • incorrect/overly intense operation • unsuitable rail tolerances (planarity/parallelism)
Grating brake sound during braking	• check for dust • excessive play • worn out brake lining
Strident noise from the wheels (advancing in jolts)	• incorrect play between wheel and rail way • unsuitable rail tolerances (planarity/parallelism) • incorrect/overly intense operation
The "DGT" Units or Beams start up too slowly or uneasily and do not transfer the maximum load	• voltage malfunction • overload, incorrect/overly intense operation • a reducer is beginning to jam • incorrect contact between rail and wheel • unsuitable rail tolerances (planarity/parallelism)
The "DGT" Units or Beams skid on the rails	• obstacles on the rail way • oil, grease or paint on the rail way • unsuitable rail tolerances (planarity)

6.7.2 Malfunctions on components and possible solutions

- Primary causes of malfunctions on individual parts, and possible solutions.

PROBLEM	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
Brake skidding	* brake lining wear * presence of oil/grease	* set the play or replace the lining * clean the lining
Brake overheating	* incorrect operation * unsuitable environmental conditions * incorrect setting	* reset normal operating conditions * adjust the brake
Brake not releasing	* incorrect power supply * incorrect setting	* reset voltage values * adjust the brake
Brake tends to jam up	* unsuitable environmental conditions * inappropriate operation	* reset normal operating conditions
Limit switch is blocked on opening, does not reset	* activation head clogged * incorrect confirmation * interrupted connections	* clean and reset correct operating conditions
Motor too hot	* variation in voltage > 10% * poor cooling * ambient temperature > foreseen * use does not conform to service operation foreseen	* ensure correct line voltage * reset correct air circulation * adapt motor specifications * adapt service conditions to normal
Motor won't start	* burnt fuse * power malfunction * overload, burnt out due to high start-up frequencies, insufficient protection	* replace the fuse * check contactor/power cable * rewind the motor and ensure better protection * check the control device
Motor doesn't start up easily	* on start-up the tension or frequency decrease with respect to the nominal value	* improve line or power supply conditions
Motor buzzes and absorbs too much current	* defective winding * one power phase missing * reducer blocked * brake blocked * short circuit on power supply * short circuit on motor	* proceed with repairs * check power cable and/or contactor * request a specialized technician * check and if necessary set the brake * eliminate the short circuit * request a specialized technician
Motor short circuiting	* malfunction in winding	* re-wind up the motor

6.7.3 Personnel authorized to intervene in case of malfunctions

- Personnel authorized to intervene in cases of malfunctions, where not notified otherwise, are expert maintenance staff with specific training on mechanical and electrical parts.
- Where specifically indicated otherwise, on the other hand, the intervention of specialized servicing personnel for ***DONATI SOLLEVAMENTI S.r.l.*** or its authorized personnel is required.

6.7.4 Disabling the units

- Should the **"DGT" drive units** or **endcarriages** no longer be repairable, proceed with disabling them, requesting the intervention of specialized servicing personnel for ***DONATI SOLLEVAMENTI S.r.l.***, notifying the type of malfunction.

6.8 Dismantling and disposing of the units

	Should the "DGT" drive units and endcarriages, or their components, due to breaking, wear or at the end of their expected lifetime, no longer be usable or repairable. Proceed with their demolition:	

- The demolition of the **"DGT" drive units** or **endcarriages** must be carried out using appropriate tools and equipment depending on the nature of the materials (e.g. saw cutters, oxyhydrogen flame, hacksaw, etc.);
- All components must be dismantled and disposed of after having been reduced to small pieces so that none of these pieces can reasonably be re-used;
- When the **"DGT" drive units** or **endcarriages** are disposed of, their various parts must be scrapped taking into account their different nature (metal, oil and lubricants, plastic, rubber, etc.), possibly entrusting this task to authorized and specialized companies, and in all cases observing the regulations and ordinances stipulated by current legislation regarding the disposal of solid industrial waste materials.

	Do not attempt to re-use parts or components on the "DGT" drive units or **endcarriages which can appear still whole once they have been declared as no longer suitable through controls and/or part replacements conducted by specialized personnel.**

7. SPARE PARTS

	• **The "DGT" drive units and endcarriages are designed and built to not normally require spare parts DUE TO MALFUNCTIONS OR BREAKING, if used correctly and accompanied by suitable maintenance, as outlined in this operating manual.** • **Parts or components subject to normal wear or deterioration are available for a minimum period of 10 years.**

	• **Do not hesitate to replace a part and/or component being examined should it no longer be capable of providing satisfactory results or sufficient guarantees of safety and/or reliability.** • **Never carry out hasty repairs on parts and components!**

- Where malfunctioning parts must be replaced, it is compulsory to make use of original spare parts exclusively, requesting them directly from:

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

	In addition to rendering the warranty void, the use of non-original spare parts can compromise the proper operation of the "DGT" drive units and endcarriages.

Artestampa, Gallilate Lombardo (VA) 09-2012 19MG01

DONATI SOLLEVAMENTI S.R.L.

Via Quasimodo, 17 - 20025 Legnano (Milano) - Italy - tel. +39 0331 14811 - fax +39 0331 1481880
E-mail: info@donati-europe.com - www.donati-europe.com

DONATI Ltd.

Unit 40 - Farriers Way Ind. Est. - NETHERTON - LIVERPOOL L30 4XL - U.K.
tel. +44 (0)151 530 1139 - fax +44 (0)151 525 6613 - E-mail: sales@donati.co.uk

ISO 9001
Cert. n. 0114