OWNER'S (OPERATOR'S) MANUAL AND SAFETY INSTRUCTIONS FOR KITO MANUAL CRANES

N6 SERIES

ALWAYS SAVE THIS BOOK FOR FUTURE REFERENCE.

KITO

Thank you for purchasing the Kito N6 series Manual Crane.
This crane has the simple construction of all our traveling cranes.
Assembly requires only that the girder be coupled to the end carriage.
Owing to thorough quality controls, this crane has been manufactured to satisfy requirements for durability.
However, improper handling, usage or maintenance may result in unforeseen accident or injury. Therefore, read thoroughly this manual before using the equipment.

Application notes ;
This manual includes N6 and N6C models. Both models have no interchangeability with each other. Models and types are classified in accordance with the next table.

Model \ Type	Plain	Geared
N6	PL005−6 PL010−6	Overhead type
N6C	PL005−3 PL005−9 PL010−9	Low−head type

〈CONTENTS〉

1. DEFINITIONS

⚠ DANGER : **indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

⚠ WARNING : **indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION : **indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.**

WLL : indicates maximum mass (working load limit) which a crane is designed to support in general service. Under WLL, all values are indicated in t (ton).

2. INTENDED PURPOSE

This crane has been designed for vertically lifting, lowering and horizontally carrying loads by means of the pendant push button switches, under normal atmospheric conditions of the work place.

3. BEFORE USE

3.1 Safety summary

Danger exists when heavy loads are transported, particularly when the equipment is not being used properly or is poorly maintained. Because accidents and serious injury could result, special safety precautions apply to the operation, maintenance and inspection of the KITO crane.

⚠ WARNING : **ALWAYS operate, inspect and maintain this Crane in accordance with applicable safety codes and regulations.**

Following these simple rules can help to avoid hoisting accidents ;

⚠ WARNING : **IMPROPER crane use could result in death or serious injury. To avoid these hazards :**

3.1.1 Before and during operation

NEVER lift or transport loads over or near people.

NEVER use a crane for lifting, supporting or transporting people.

NEVER leave a suspended load unattended.

NEVER lift more than the rated capacity.

NEVER reverse crane operation abruptly or inch the crane excessively in travel.

NEVER pull a load from an extreme angle.

NEVER allow the crane to impact the stopper or other cranes.

ALWAYS inspect the crane before use and at periodic intervals.

ALWAYS pay attention to load swing while operating the crane.

ALWAYS be aware of what is going on in the vicinity of the crane during use.

ALWAYS keep travel and traverse paths, and shelters, unobstructed.

ALWAYS operate the push buttons from a location from where both the hook and load can be seen.

ALWAYS check slings and loads are properly installed before use.

ALWAYS walk behind or alongside a suspended load, and keep eyes looking forward, while operating the crane.

ALWAYS **read the "Owner's (Operator's) Manual and Safety Instructions" for your hoist and crane respectively provided.**

3.1.2 Maintenance and checks

ALWAYS have maintenance, check and repairs performed by a qualified person.

ALWAYS place an "OUT OF SERVICE" sign on the crane when performing maintenance, checks or repairs.

ALWAYS **turn OFF power to the hoist and trolley before performing maintenance, checks or repairs.**

ALWAYS wear a helmet and safety belt when performing maintenance, checks or repairs.

4. Cranes 《Plain Type》

4.1 Features

(a) The end carriage uses pressformed frame designed by Kito.

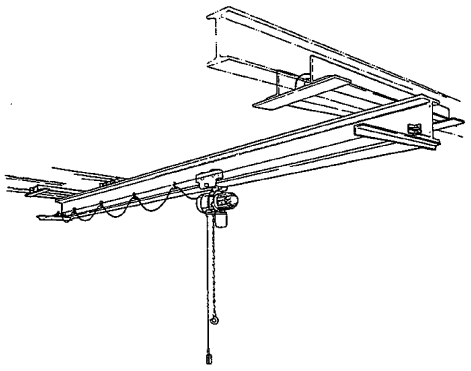
(b) Track wheels are toughened-pressed to improve durability and are used with spans of up to 6m and machine cut wheels are used for the span exceeding 6m up to 9m.

(c) The end carriage is fitted with side rollers to ensure safe travel for spans of 6.1 to 9.0m.

(d) High tension bolts (H.T.B.) are used to couple the end carriage to the girder, as standard for lowhead type.

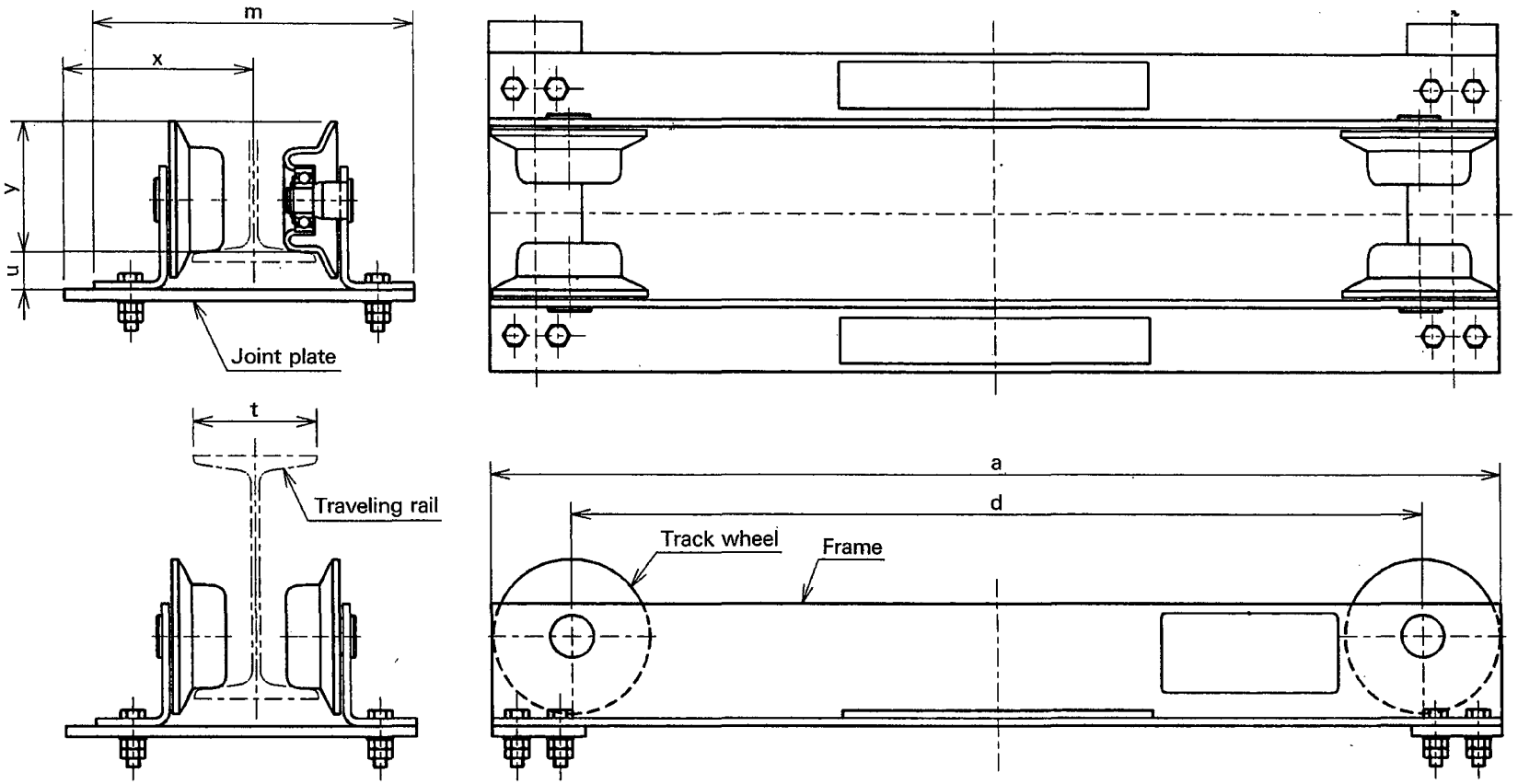
(e) The center punch for girder installation holes is marked on the end carriage to make centering easier.

General view (For your reference)



4.2 Specifications and outer appearance

Low-head plain type end carriage (without side rollers)



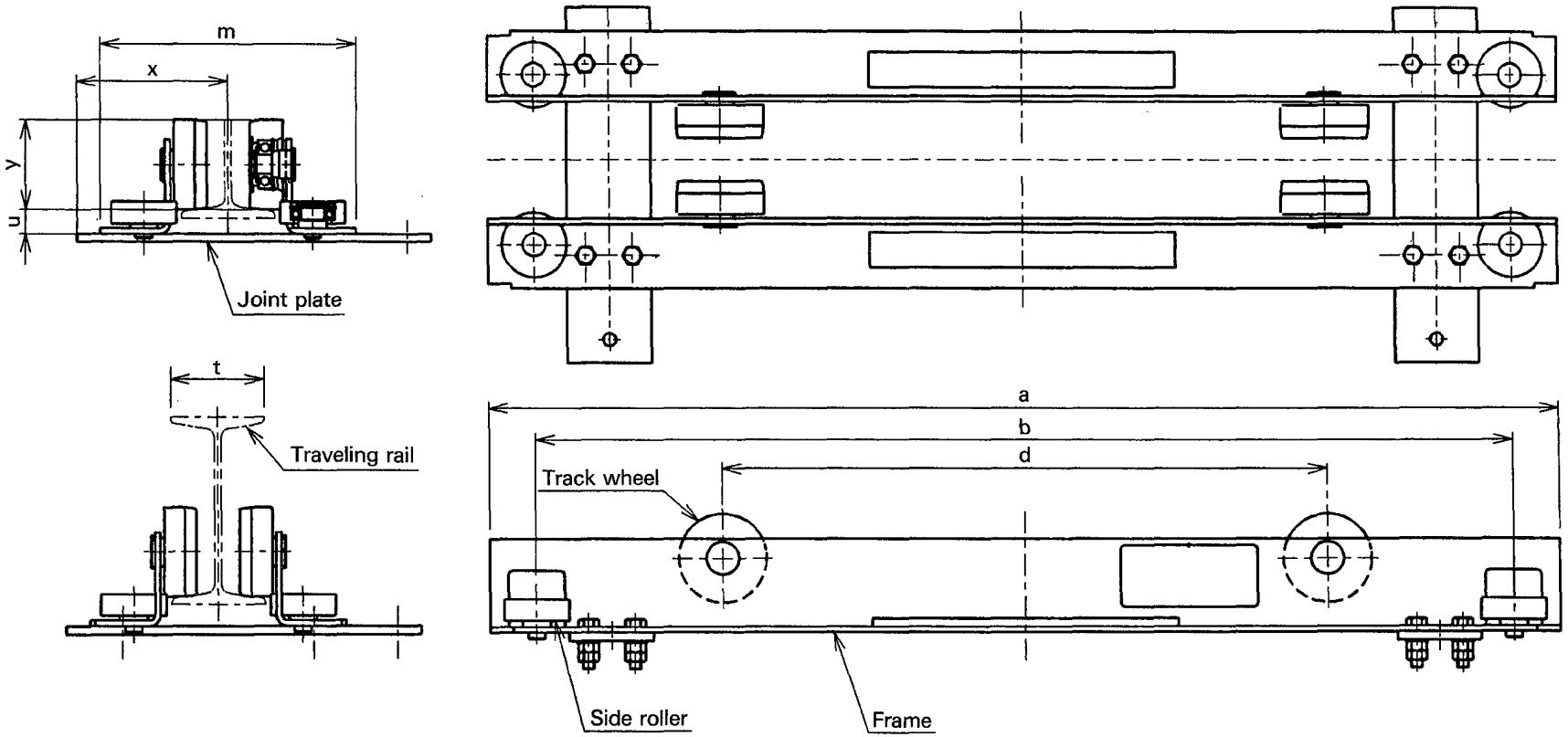
Frame size (mm)

WLL (t) \ Span (m)	3	6
0.5	85×60×6	
1		100×60×6

WLL	Max. span	Type	Code	Wheel diameter	Traveling rail I beam width	a	d	m	u	x	y※	Max. wheel pressure	Net weight
[t]	[m]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	[kg]
0.5	3	PL005-3	N6PL105V	71	75 to 100	470	350	t+157	25	206-t/2	89	180	27
	6	PL010-6	N6PL210V	85	75 to 125	830	700	t+161	31	206-t/2	106	360	45
1	6	PL010-6	N6PL210V	85	75 to 125	830	700	t+161	31	206-t/2	106	360	45

※Height from the upper surface of the traveling rail to the top of the end carriage.
WLL : Working load limit
Use I beam for the traveling rail.
I beam 100×75×5 can not be used for the above end carriage.

Low-head plain type end carriage (with side rollers)



Frame size (mm)

WLL (t) \ Span (m)	9
0.5	100×75×6
1	

WLL	Max. span	Type	Code	Wheel diameter	Traveling rail I beam width	a	b	d	m	u	x	y※	Max. wheel pressure	Net weight
[t]	[m]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	[kg]
0.5	9	PL010—9	N6PL310V	95	75 to 125	1150	1050	650	t+174	26	212−t/2	95	400	71
1	9	PL010−9	N6PL310V											

※Height from the upper surface of the traveling rail to the top of the end carriage.
WLL : Working load limit
Use I beam for the traveling rail.
I beam 100×75×5 can not be used for the above end carriage.

5. Assembly, wiring and test run

⚠ WARNING : ALWAYS make sure that the load supporting structures and load attaching device are strong enough to hold the weight of the load and hoist.
Have all assembly works by an authorized people. Off-limits to unauthorized people in assembly works area.

5.1 Assembly

For detailed assembly instructions, refer to the manual crane's assembly manuals. The end carriage can be easily set on the travel rails with the following procedure.

(a) Detach the end carriage frame from the girder as shown in Fig. 1, then temporarily fix it to the girder with rope or other means.
There is always the risk of the hoist and trolley moving when installing, therefore it is safer to fix them to the girder. Also, pay attention when assembling with the power supply cable, junction cable and other accessories.

(b) Installing as shown in Fig. 1.
Recouple the end carriage frame to the girder once the girder has been erected in place.

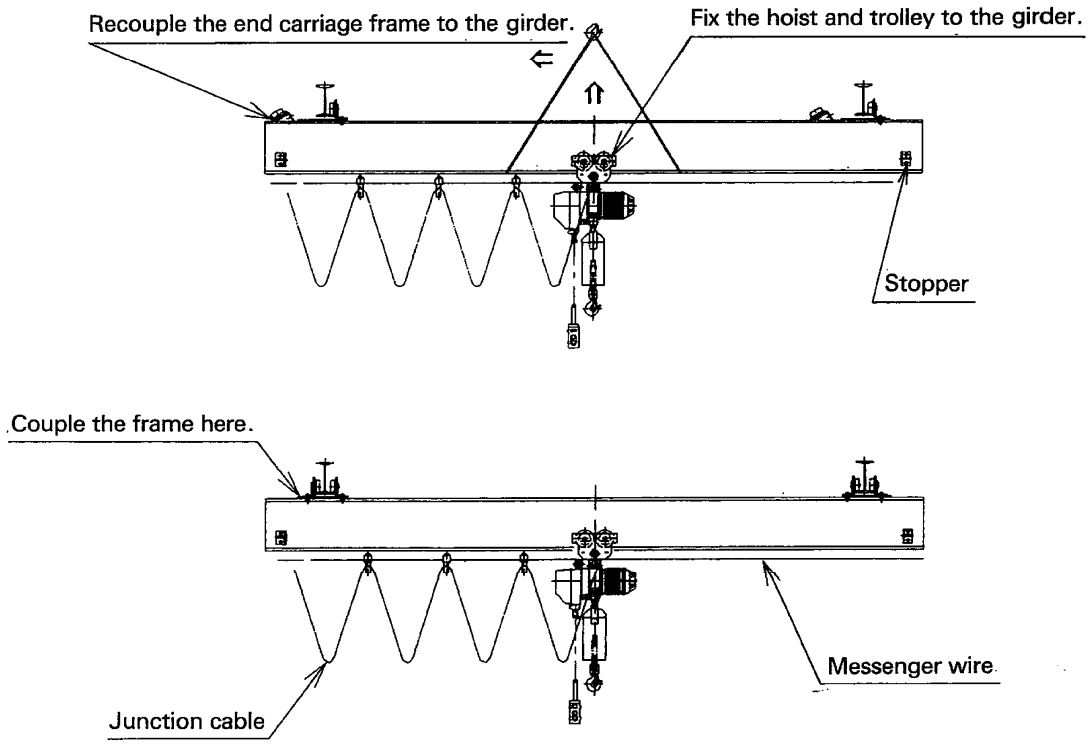


Fig. 1

(c) Precautions in installation (Refer to Fig. 2)

- Keep the end carriage frames parallel (A and B should be the same)
- Minimize any longitudinal discrepancy between end carriage frames (C dimension).
- Minimize any discrepancy between the left and right end carriage frames position (D should be minimized).

⚠ WARNING : If improperly assembled and installed, the crane will repeatedly strike the stopper on the travel rail. This may cause bolts to loosen or other trouble.

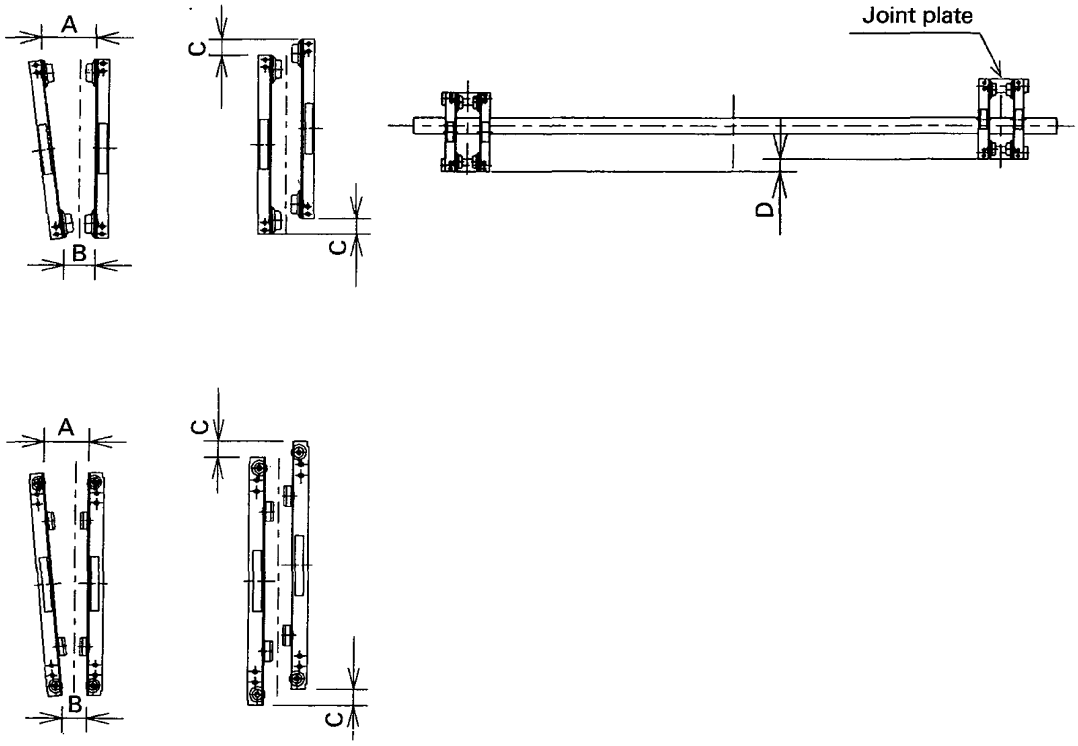


Fig. 2

⚠ WARNING : When installing the hoist and trolley on the girder, refer to the "Owner's (Operator's) Manual and Safety Instructions" for your hoist and crane respectively provided.

5.2 Wiring for electric hoist and trolley

⚠ DANGER : ALWAYS turn off power source or breaker switch to prevent electric shock before beginning the wiring process.
HAVE all wiring performed by an authorized electrician.

Power can be supplied by the cable power supply, tro-reel, high tro-reel or trolley duct systems. For wiring from the power source to the crane's control box, refer to "8. Power supply" in this manual.

5.3 Test run

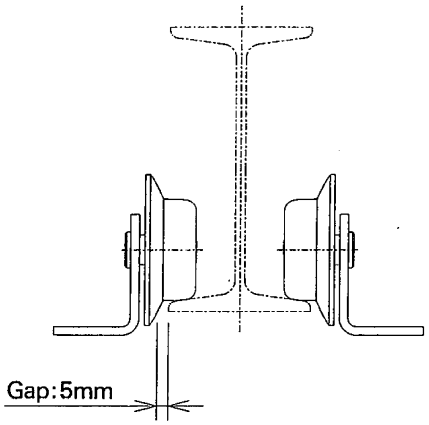
Recheck the following points after the crane has been installed.

(a) Make sure the stoppers are securely fastened, and that bolts are tight.

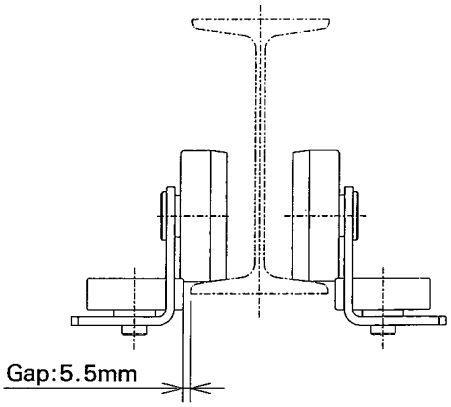
(b) Make sure bolts coupling the end carriages to the girders, and joint plate bolts are tight.

After the above checks, check the following points to see if the crane travels properly.

(c) Make sure the gap (approx. 5 mm) between the travel rail and track wheel flange is the same on both left and right sides.



(d) Make sure the gap (approx. 5.5 mm) between the travel rail and side rollers is the same on both left and right sides.



6. For better usage

There are things "to do" and "not to do", in order to safely operate the equipment and maintain it in proper working order for many years.

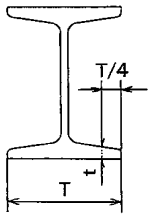
⚠ WARNING : Read carefully "Owner's (Operator's) Manual and Safety Instructions" for your hoist and crane respectively provided.

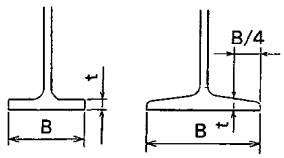
7. Maintenance and inspections

In order to safely operate the equipment and maintain it in proper working order for many years, perform daily, monthly and yearly checks on it. For your reference, sample monthly and yearly check lists are provided at the end of this manual.

7.1 Check items and criteria for judgement

Part	Check item	Inspection method	Discard limit/criteria	Remedy
Electric parts for hoist	**1. Power supply** [For cable power supply system]			
	• Messenger wire tautness	• Check visually.	• The wire must be sufficiently taut.	• Tighten where necessary.
	• Cable hanger installation and mobility	• Check visually.	• The cable must be hung at intervals but never twisted.	• Replace hangers where necessary.
	• Cable length	• Check visually.	• The cable must be longer than crane's maximum travel distance.	• Replace cable with a longer one where necessary.
	2. Ground connection	• Check grounded parts.	• Parts must be grounded to meet 100Ω resistance against ground.	• Ground parts in conformity with internal wiring regulations.
			• Insulating objects like paint must not be found on the travel surfaces.	• Remove any insulating objects.
	3. Insulation	• Measure charged and non-charged parts with an insulation resistance meter.	• Insulation resistance must be 0.5MΩ or more.	• Investigate the cause and eliminate the trouble.

Part	Check item	Inspection method	Discard limit/criteria	Remedy
Travel rail	**4. Travel rail** • Rail surface wear	• Check visually and use calipers where necessary.	• The travel rail surface must not be worn.  • Wear limit for T : Up to 5% of new part • Wear limit for t : Up to 10% of new part	• Replace worn parts.
	• Looseness in fixing bolts	• Try turning with a wrench.	• Fixing bolts and hook bolts must be sufficiently tight.	• Tighten where necessary.
	• Oil accumulation on rail surface	• Check visually.	• The rail surface must be free of oil.	• Clean where necessary.
	• Span	• Measure with a tape measure or other means.	• Crane span Low-head crane : ±4mm	• Adjust to the prescribed span.
	• Rail slope	• Measure with a level.	• Slope must be within 1/1000 of the distance between supporting beams.	• Adjust to the prescribed level.
	• Rail deformation	• Check visually and use calipers where necessary.	• For I-beams, no deformation or sagging must be found.	• Replace deformed parts.
Girder	**5. Girder** • Girder deformation	• Check visually and use calipers where necessary.	• For I-beam, no deformation or sagging must be found.	• Reinforce or replace parts as necessary.
	• Welded parts	• Check visually and perform color check where necessary.	• No cracks must be found. • No corrosion must be found.	• Reinforce or repair part as necessary.

<table>
<tr><th>Part</th><th>Check item</th><th>Inspection method</th><th>Discard limit/criteria</th><th>Remedy</th></tr>
<tr><td rowspan="3">Girder</td><td>• Girder wear</td><td>• Check visually and use calipers where necessary.</td><td>• The travel rail surface must not be worn.
• Wear limit for B : Up to 5% of new part
• Wear limit for t : Up to 10% of new part
  </td><td>• Replace worn parts.</td></tr>
<tr><td>• Looseness in fixing bolts</td><td>• Try turning with a wrench.</td><td>• Fixing bolts must be sufficiently tight.</td><td>• Tighten where necessary.</td></tr>
<tr><td>• Deflection</td><td>• Measure with a level when under rated load.</td><td>• Deflection must be within 1/800 or less of the span.</td><td>• Reinforce girders or lower the rated load.</td></tr>
<tr><td rowspan="7">End carriage</td><td>6. End carriage
• Track wheel wear</td><td>• Check visually.</td><td>〈For ϕ71 or ϕ85 outer diameter〉
• The contact surface must be smooth and free of any roughness.
• The flange must be free of nicks.</td><td>• Replace parts where exceeding their wear limit.</td></tr>
<tr><td></td><td>• Measure with calipers.</td><td>〈For ϕ95 outer diameter〉
• Wear limit is ϕ90.</td><td>• Replace parts where exceeding their wear limit.</td></tr>
<tr><td>• Missing or mispositioned snap rings</td><td>• Check visually.</td><td>• No snap rings must be missing or out of position.</td><td>• Put any out-of-place parts back in place.</td></tr>
<tr><td>• Diameter of left and right track wheels</td><td>• Measure with calipers or depress gauge.</td><td>• Difference in diameter must be within 1% or less.
mm
<table><tr><td>Diameter</td><td>ϕ71</td><td>ϕ85</td><td>ϕ95</td></tr><tr><td>Wear limit</td><td>1.0</td><td>1.0</td><td>1.0</td></tr></table></td><td>• Replace parts where exceeding their wear limit.</td></tr>
<tr><td>• Side roller wear</td><td>• Check visually or measure with calipers.</td><td>• Wear limit is ϕ61 for the standard ϕ70 diameter.</td><td>• Replace parts where exceeding their wear limit.</td></tr>
<tr><td>• Looseness in fixing bolts</td><td>• Try turning with a wrench.</td><td>• Fixing bolts must be sufficiently tight.</td><td>• Tighten where necessary.</td></tr>
</table>

8. Power supply

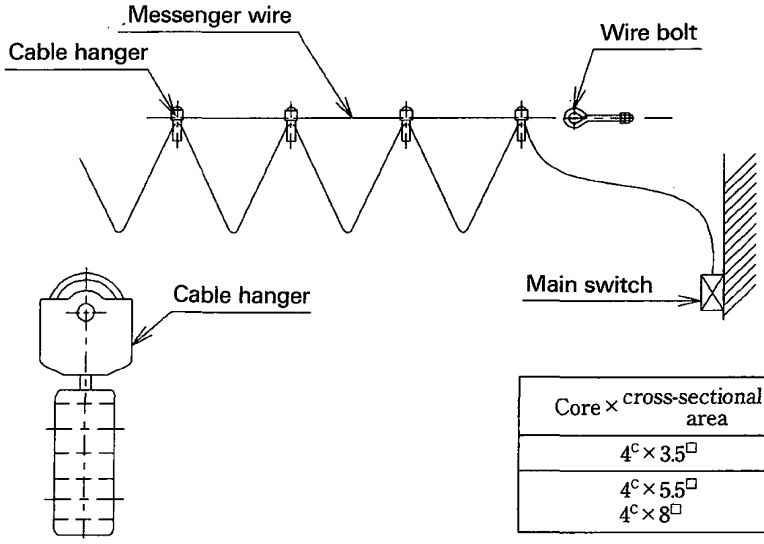
Power can be supplied to the crane by a cable power supply, tro-reel, high tro-reel or trolley duct systems. But, for convenience sake, the simple cable power supply system is herein explained.

8.1 Power supply method

(a) Cable power supply system

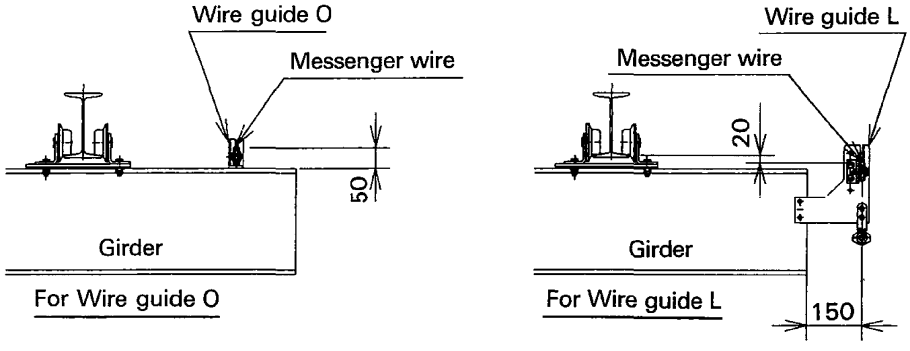
This is the widest used means of supplying power to the crane because it is easy to arrange the cable.

- Use a messenger wire with a diameter between $\phi 3$ and $\phi 6$.
- Keep messenger wire length under 20m.
- Refer to the Kito Crane catalogue for allowed cable length.



Core × cross-sectional area	Cable size
$4^C \times 3.5^{\square}$	$\phi 15.4$
$4^C \times 5.5^{\square}$ $4^C \times 8^{\square}$	$\phi 16.1 \sim \phi 19$

String the messenger wire along the girder with either the wire guide O or wire guide L.



[For wire guide O]

- The messenger wire can be strung along either the inside or outside of the span.

[For wire guide L]

- The messenger wire can be strung along the outside of the span and anchored at the end of the girder.

9. Troubleshooting

Trouble	Cause	Remedy
• The crane does not move smoothly.	• The end carriage is not set at a right angle to the girder or left and right end carriages are not parallel. • There is something wrong with the power collector. • Track wheels are unevenly worn. • A gap has formed between the side rollers and travel rail, most likely due to wear in the side roller.	• Set the end carriages at a right angle to the girder, and parallel with one another. • Clean or replace the power collector as necessary. • Replace the track wheels where necessary. • Replace the side rollers where necessary.

• Refer to troubleshooting in the "Safety Instructions" for your hoist and trolley respectively provided.

10. Cranes《Geared Type》

10.1 Features

[Low-head end carriage]

(a) Track wheels are easily taken off. This greatly shortens installation and maintenance work.

(b) High tension bolts (H.T.B.) are used to couple the end carriage to the girder, as standard for lowhead type.

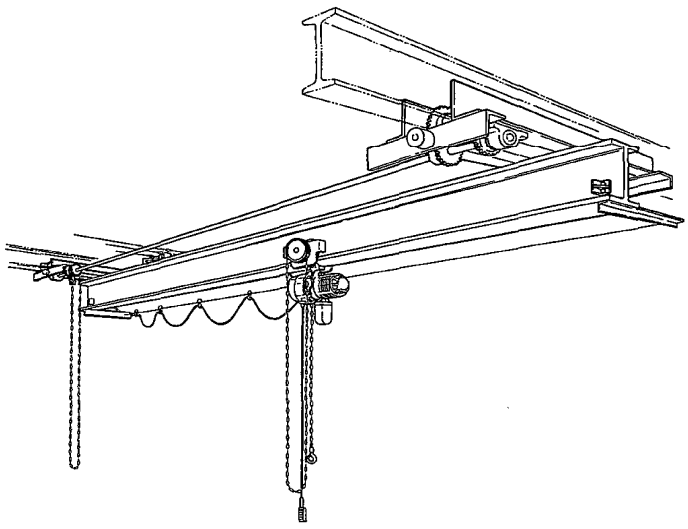
(c) The center punch for girder installation holes is marked on the end carriage to make centering easier.

(d) The end carriage is coated with a red primer when shipped from the factory. (However, drive parts are painted Munsell 6YR6/14)

(e) Track wheels are made of carbon steel to improve durability.

(f) The end carriage uses press-formed frame designed by Kito.

General view (For your reference)



[Overhead end carriage]

(a) The end carriage has an open frame construction to facilitate track wheel maintenance.

(b) The end carriage is built with side rollers to keep travel smooth and stable.

(c) The center punch for girder installation holes, girders and travel rails are marked on the end carriage to make centering easier.

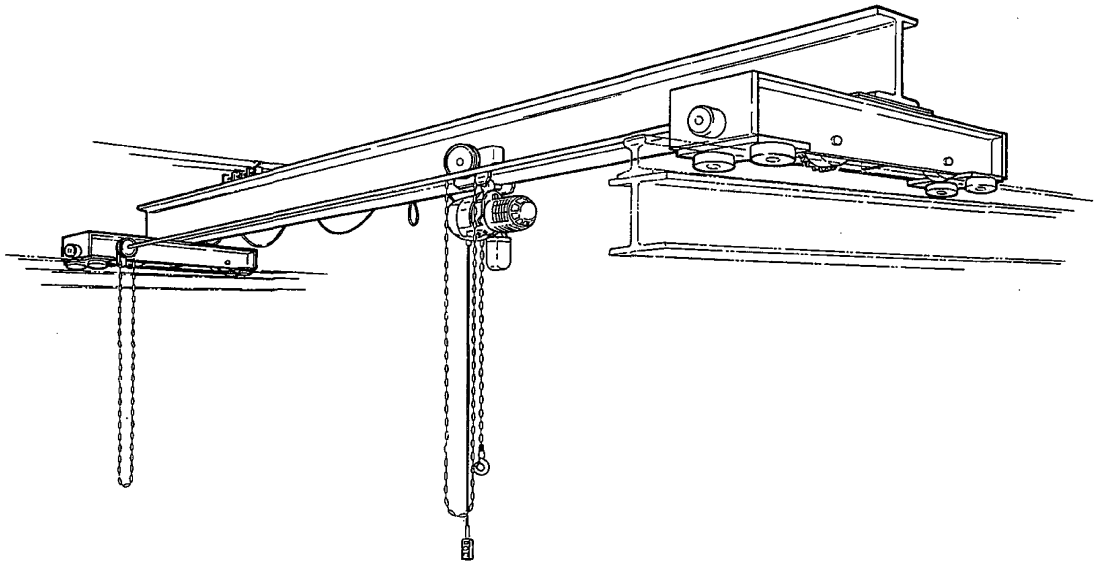
(d) Span is easily adjusted on-site because the end carriage is coupled to the frame by bolts.

(e) The end carriage is coated with a red primer when shipped from the factory. (However, drive parts are painted Munsell 6YR6/14)

(f) Track wheels are made of carbon steel to improve durability.

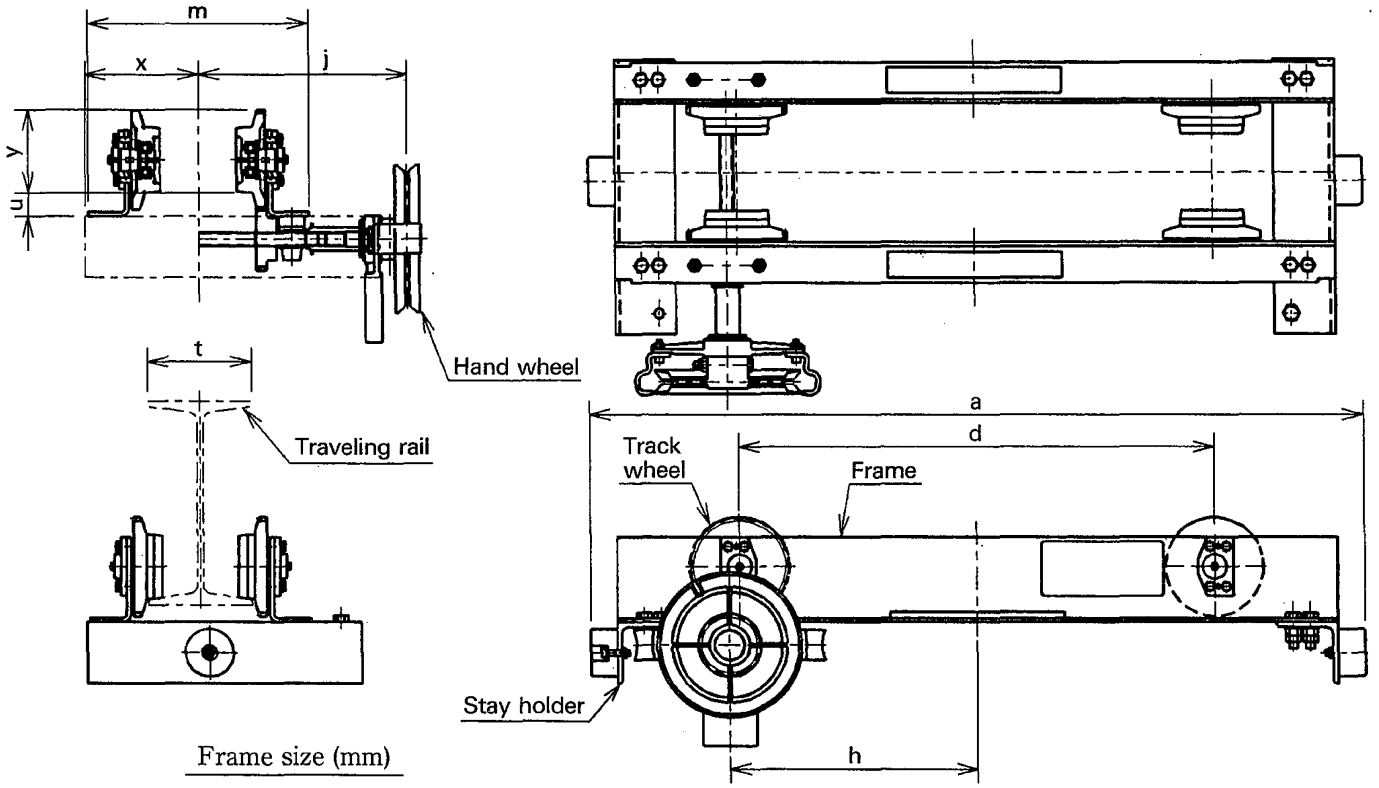
(g) The end carriage uses press-formed frame designed by Kito.

General view (For your reference)



10.2 Specifications and outer appearance

Low-head geared type end carriage [1/2]



Frame size (mm)

WLL (t) \ Span (m)	6	9	12
1	125×60×6	150×80×6	
2	170×70×30×6	180×75×33×6	

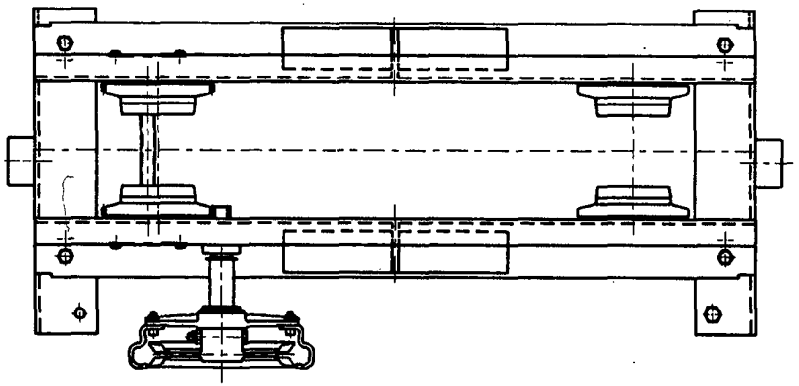
WLL	Max. span	Type	Code	Wheel diameter	Traveling rail I beam width	a	d	h	j	m	u	x	y※	Max. wheel pressure	Net weight
[t]	[m]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	[kg]
1	6	GL010－6	N6GL210V	95	75 to 150	1390	950	490	t/2+228	t+171	34	241－t/2	121	460	97
	12	GL010－12	N6GL410V	95	75 to 150	1840	1400	715		t+211	34	281－t/2	121	460	139
2	6	GL020－6	N6GL220V	110	100 to 150	1480	1030	530		t+191	36	281－t/2	138	950	126
	12	GL020－12	N6GL420V	110	100 to 150	1840	1400	715		t+201	36	281－t/2	145	950	166

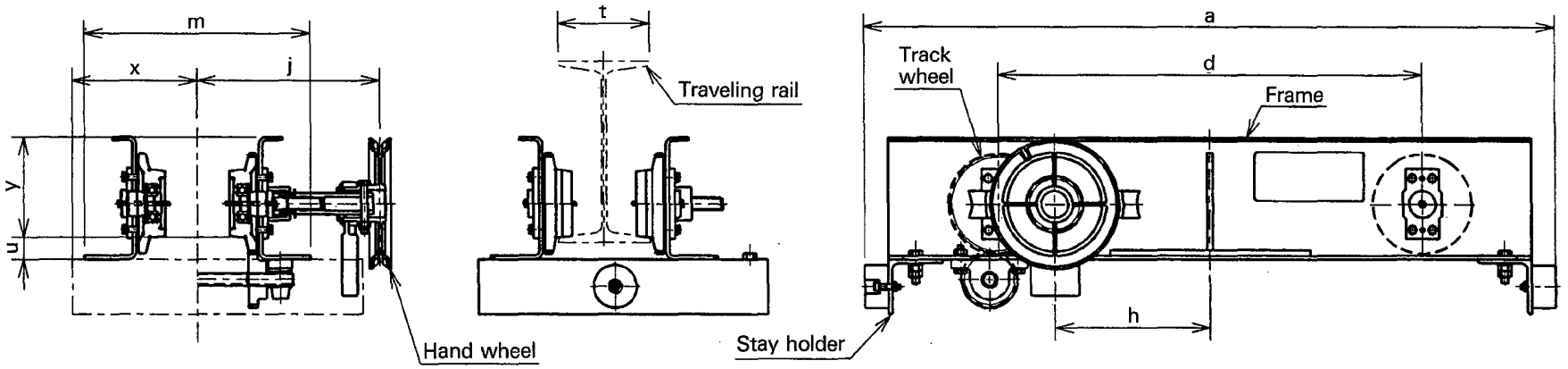
※Height from the upper surface of the traveling rail to the top of the end carriage.
WLL : Working load limit

Low-head geared type end carriage [2/2]

Frame size (mm)

WLL (t) \ Span (m)	6	9	12
3	200×85×38×6	215×90×40×6	
5	200×80×40×6	220×90×45×9	





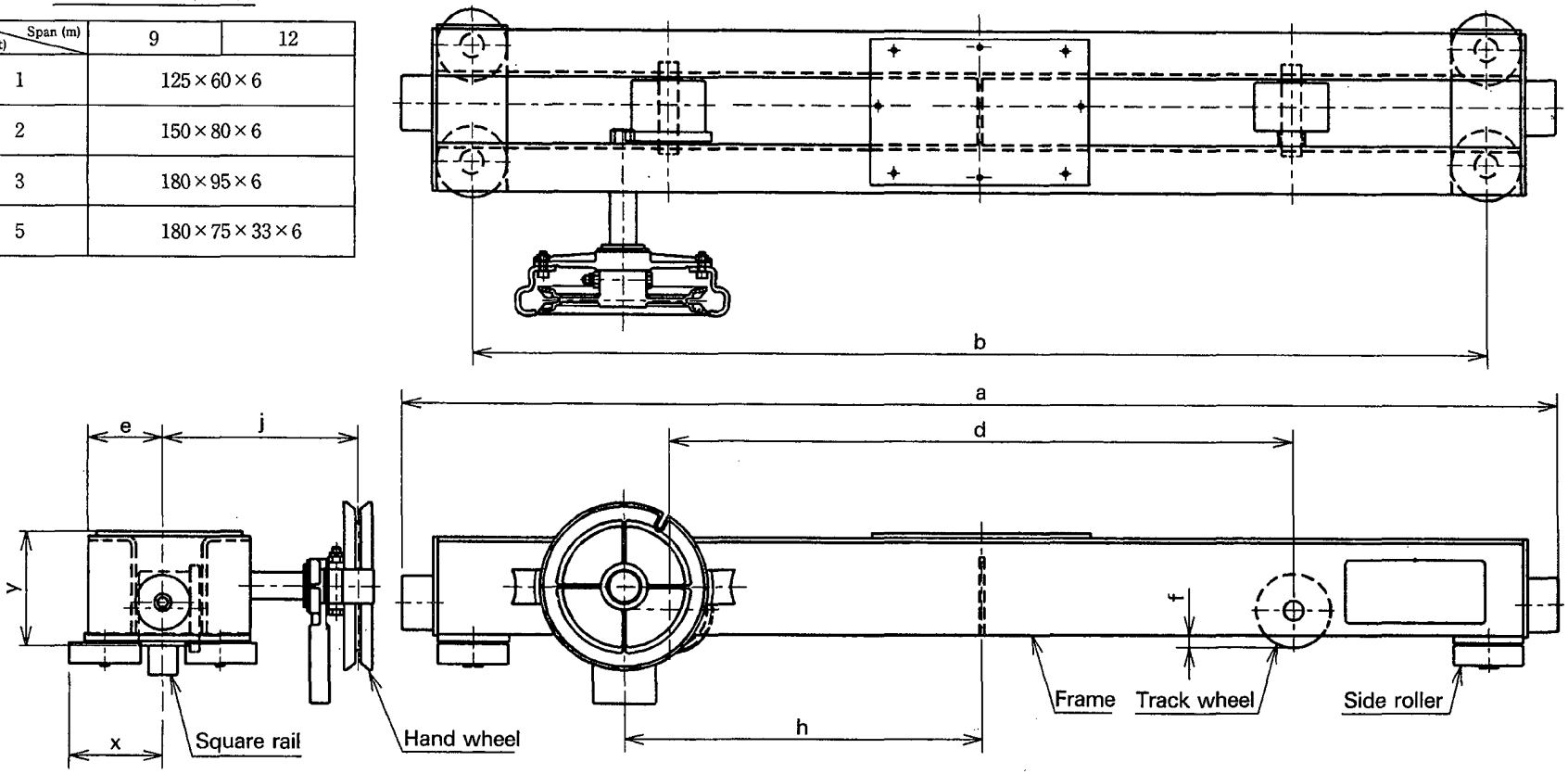
WLL	Max. span	Type	Code	Wheel diameter	Traveling rail I beam width	a	d	h	j	m	u	x	y※	Max. wheel pressure	Net weight
[t]	[m]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	[kg]
3	6	GL030－6	N6GL230V	110	100 to 150	1480	880	531	t/2＋221	t＋221	36	281－t/2	165	950	142
	12	GL030－12	N6GL430V	125		1840	1400	600	t/2＋222	t＋231	38	281－t/2	177	1100	202
5	6	GL050－6	N6GL250V	140	125 to 150	1480	850	539	t/2＋225	t＋211	40	281－t/2	174	1600	215
	12	GL050－12	N6GL450V	155		1840	1400	579	t/2＋234	t＋249	39	315－t/2	188	1800	292

※Height from the upper surface of the traveling rail to the top of the end carriage.
WLL : Working load limit
Use I beam for the traveling rail.

Overhead geared type end carriage

Frame size (mm)

WLL (t) \ Span (m)	9	12
1	125×60×6	
2	150×80×6	
3	180×95×6	
5	180×75×33×6	



WLL	Max. span	Type	Code	Wheel diameter	Square rail size	a	b	d	e	f	h	j	x	y※	Max. wheel pressure	Net weight
[t]	[m]			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	[kg]
1	12	GO010－12	N6GO410E	95	□32·□38·□40·□45	1580	1400	900	95	15.5	507	247	119	147	950	99
2	12	GO020－12	N6GO420E	125	□32·□38·□40·□45	1580			120	15.5	509	252	119	172	1800	130
3	12	GO030－12	N6GO430E	140	□38·□40·□45·□50	1580			135	15.5	521	252	123	202	2100	156
5	12	GO050－12	N6GO450E	210	□50	1590			119	18.5	561	257	143	205	4500	224

※Height from the upper surface of the traveling rail to the top of the end carriage.
WLL : Working load limit

11. Assembly, wiring and test run

⚠ WARNING : ALWAYS make sure that the load supporting structures and load attaching device are strong enough to hold the weight of load and hoist.
Have all assembly works by the authorized people. Off-limits to unauthorized people in assembly works area.

11.1 Assembly

For detailed assembly instructions, refer to the manual crane's assembly manuals. The end carriage can be easily set on the travel rails with the following procedure.

[Low-head type crane]

(a) Detach all track wheels and axles from the end carriage as shown in Fig. 3.
The end carriage frame can be erected without detaching it from the girder. Reassemble the track wheels and axles when the end carriage is in position.
There is always the risk of the hoist and trolley moving when installing, therefore it is safer to fix them to the girder. Also, pay attention when assembling with the power supply cable, junction cable and other accessories.

(b) Installing as shown in Fig. 3.

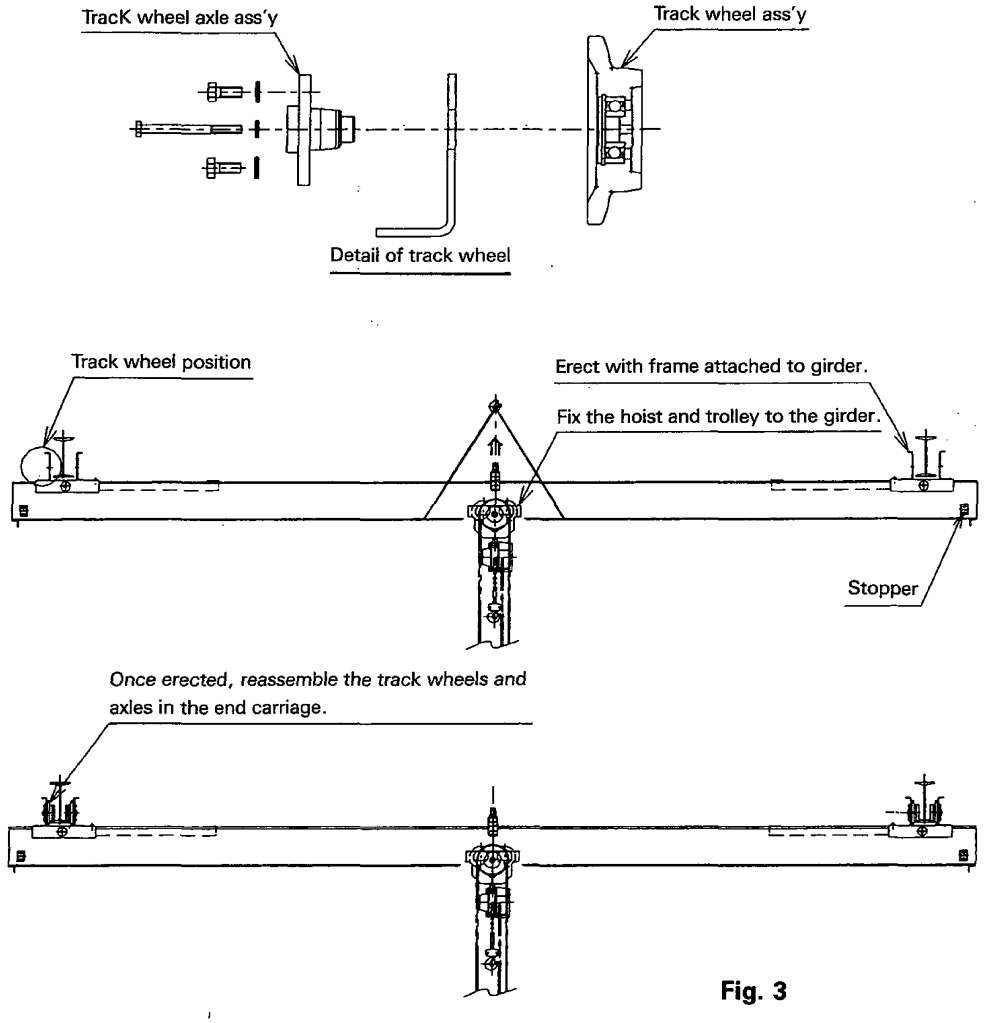


Fig. 3

(c) Precautions in installation (Refer to Fig. 4)

Pay attention to the following points when coupling the end carriage to the girder on-site.

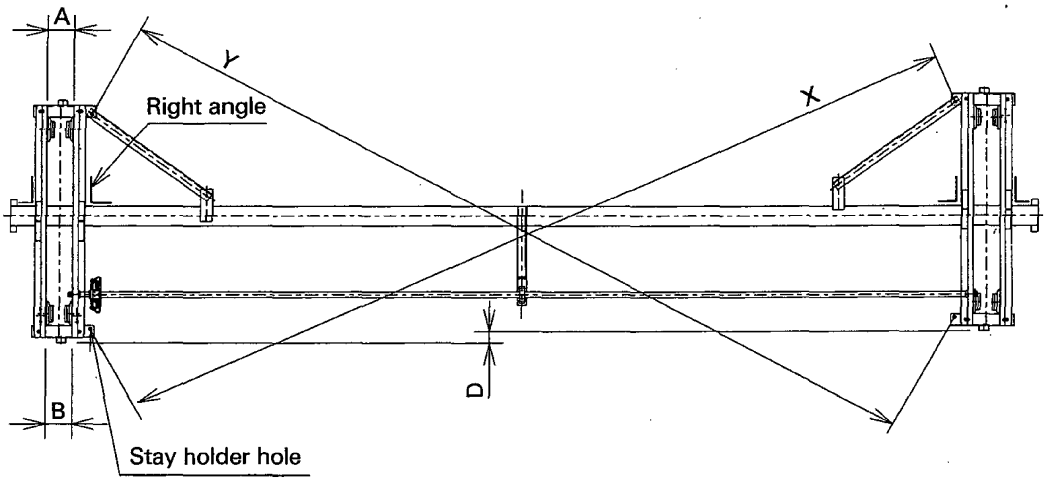


Fig. 4

- Keep the end carriage frames parallel (A and B should be the same).
- Minimize any discrepancy between the left and right end carriage frames position (D should be minimized).

⚠ WARNING : If improperly assembled and installed, the crane will repeatedly strike the stopper on the travel rail. This may cause bolts to loosen or other trouble.

- Keep the end carriage at a right angle to the girder.
- Minimize any discrepancy in angling between the left and right end carriage frames (X and Y dimensions).

⚠ WARNING : When installing the hoist on the girder, refer to the "Owner's (Operator's) Manual and Safety Instructions" for your hoist and crane respectively provided.

[Overhead type crane]

(a) Generally, the simple way to erect the completed crane is shown in Fig. 5. Lift the crane into position as following figure, then turn the crane so as to fit on the travel rails.

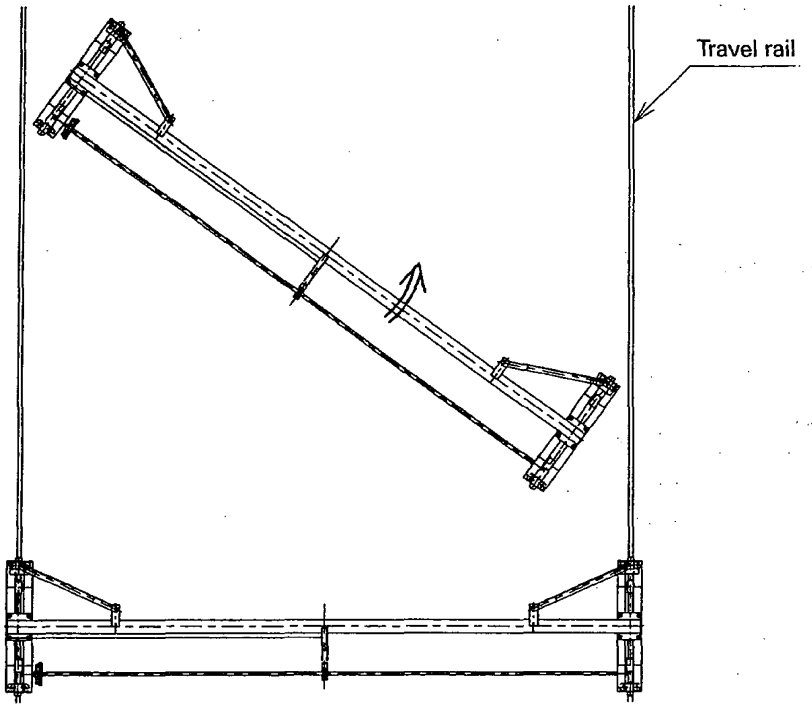


Fig. 5

(b) Precautions in installation (Refer to Fig. 6).

Pay attention to the following points when coupling the end carriage to the girder on-site.

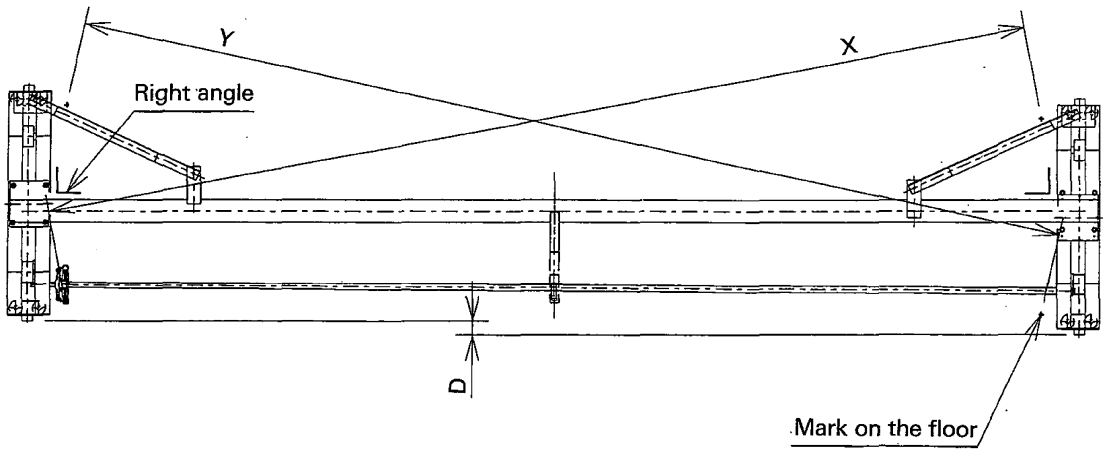


Fig. 6

• Minimize any discrepancy between the left and right end carriage frames position (D should be minimized).

⚠ WARNING : If improperly assembled and installed, the crane will repeatedly strike the stopper on the travel rail. This may cause bolts to loosen or other trouble.

• Keep the end carriage at a right angle to the girder.
• Minimize any discrepancy in angling between the left and right end carriage frames (X and Y dimensions).

⚠ WARNING : When installing the hoist on the girder, refer to the "Safety Instructions" for your hoist and trolley respectively provided.

11.2 Wiring for electric hoist and trolley

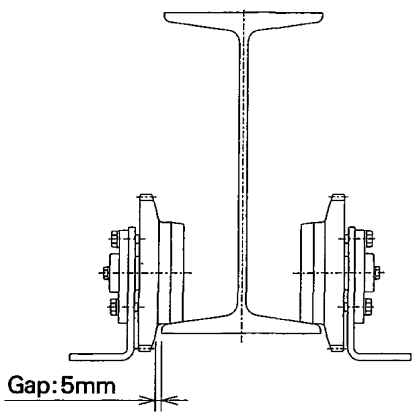
⚠ DANGER : ALWAYS turn off power source or breaker switch to prevent electric shock before beginning the wiring process.
HAVE all wiring performed by an authorized electrician.

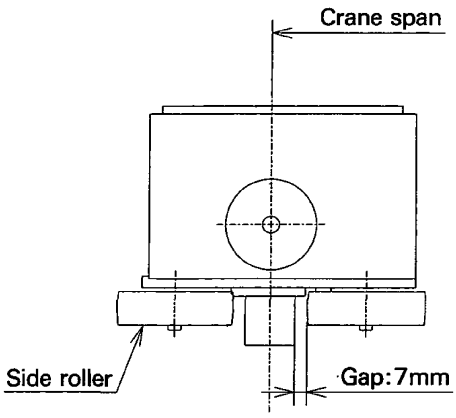
Power can be supplied by the cable power supply, tro-reel, high tro-reel or trolley duct systems. For wiring from the power source to the crane's control box, refer to "15. Power supply" in this manual.

11.3 Test run

Recheck the following points after the crane has been installed.
(a) Make sure the stoppers are securely set on the girder, and that bolts are tight.
(b) Make sure bolts coupling the end carriages to the girders, and stay holder bolts are tight.

After the above checks, check the following points to see if the crane travels properly.
(c) Make sure the gap (approx. 5 mm) between the travel rail and track wheel flange is the same on both left and right sides. (Left fig.)
(d) Make sure the gap (approx. 7 mm) between the travel rail and side rollers is the same on both left and right sides. (Right fig.)





12. For better usage

There are things "to do" and "not to do" , in order to safely operate the equipment and maintain it in proper working order for many years.

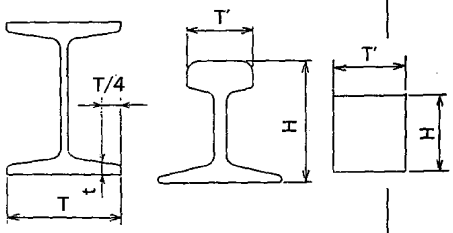
⚠ WARNING : Read carefully "Safety Instructions" for your hoist and trolley respectively provided.

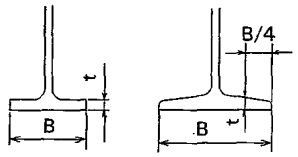
13. Maintenance and inspections

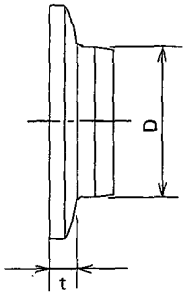
In order to safely operate the equipment and maintain it in proper working order for many years, perform daily, monthly and yearly checks on it. For your reference, sample monthly and yearly check lists are provided at the end of this manual.

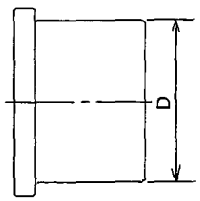
13.1 Check items and criteria for judgement (Geared type)

Part	Check item	Inspection method	Discard limit/criteria	Remedy
Electric parts for hoist	**1. Power supply** [For cable power supply system]			
	• Messenger wire tautness	• Check visually.	• The wire must be sufficiently taut.	• Tighten where necessary.
	• Cable hanger installation and mobility	• Check visually.	• The cable must be hung at intervals but never twisted.	• Replace hangers where necessary.
	• Cable length	• Check visually.	• The cable must be longer than crane's maximum travel distance.	• Replace cable with a longer one where necessary.
	2. Ground connection	• Check grounded parts.	• Parts must be grounded to meet 100Ω resistance against ground.	• Ground parts in conformity with internal wiring regulations.
			• Insulating objects like paint must not be found on the travel surfaces.	• Remove any insulating objects.
	3. Insulation	• Measure charged and non-charged parts with an insulation resistance meter.	• Insulation resistance must be 0.5MΩ or more.	• Investigate the cause and eliminate the trouble.

Part	Check item	Inspection method	Discard limit/criteria	Remedy
Travel rail	**4. Travel rail** • Rail surface wear	• Check visually and use calipers where necessary.	• The travel rail surface must not be worn.  • Wear limit for T : Up to 5% of new part • Wear limit for T' : Up to 10% of new part • Wear limit for t : Up to 10% of new part • Wear limit for H : Up to 10% of new part	• Replace worn parts.
	• Looseness in fixing bolts	• Try turning with a wrench.	• Fixing bolts and hook bolts must be sufficiently tight.	• Tighten where necessary.
	• Oil accumulation on rail surface	• Check visually.	• The rail surface must be free of oil.	• Clean where necessary.
	• Span	• Measure with a tape measure or other means.	• Crane span Low-head crane : ±4mm Overhead crane : ±7mm	• Adjust to the prescribed span.
	• Rail slope	• Measure with a level.	• Slope must be within 1/1000 of the distance between supporting beams.	• Adjust to the prescribed level.
	• Rail deformation	• Check visually and use calipers where necessary.	• For I-beams, no deformation or sagging must be found.	• Replace deformed parts.
Girder	**5. Girder** • Girder deformation	• Check visually and use calipers where necessary.	• For I-beam, no deformation or sagging must be found.	• Reinforce or replace parts as necessary.
	• Welded parts	• Check visually and perform color check where necessary.	• No cracks must be found. • No corrosion must be found.	• Reinforce or repair part as necessary.

<table>
<tr><th>Part</th><th>Check item</th><th>Inspection method</th><th>Discard limit/criteria</th><th>Remedy</th></tr>
<tr><td rowspan="3">Girder</td><td>• Girder wear</td><td>• Check visually and use calipers where necessary.</td><td>• The travel rail surface must not be worn.
 

• Wear limit for B : Up to 5% of new part
• Wear limit for t : Up to 10% of new part</td><td>• Replace worn parts.</td></tr>
<tr><td>• Looseness in fixing bolts</td><td>• Try turning with a wrench.</td><td>• Fixing bolts must be sufficiently tight.</td><td>• Tighten where necessary.</td></tr>
<tr><td>• Deflection</td><td>• Measure with a level when under rated load.</td><td>• Deflection must be within 1/800 or less of the span.</td><td>• Reinforce girders or lower the rated load.</td></tr>
<tr><td rowspan="2">End carriage</td><td>6. End carriage
• Track wheel wear</td><td>• Measure with calipers.
 

 
</td><td>• Wear in the travel surface and flange must not exceed in the below figures.
〈Track wheels for low-head crane〉 mm
<table>
<tr><td rowspan="2">φD</td><td>Standard dimension</td><td>φ95</td><td>φ110</td><td>φ125</td></tr>
<tr><td>When worn</td><td>φ90</td><td>φ105</td><td>φ119</td></tr>
<tr><td rowspan="2">t</td><td>Standard dimension</td><td>18</td><td>18</td><td>18.5</td></tr>
<tr><td>When worn</td><td>13</td><td>13</td><td>13.5</td></tr>
<tr><td rowspan="2">φD</td><td>Standard dimension</td><td>φ140</td><td>φ155</td><td></td></tr>
<tr><td>When worn</td><td>φ133</td><td>φ147</td><td></td></tr>
<tr><td rowspan="2">t</td><td>Standard dimension</td><td>19</td><td>17.5</td><td></td></tr>
<tr><td>When worn</td><td>12.5</td><td>12.5</td><td></td></tr>
</table>
〈Track wheels for overhead crane〉 mm
<table>
<tr><td rowspan="2">φD</td><td>Standard dimension</td><td>φ95</td><td>φ125</td><td>φ140</td></tr>
<tr><td>When worn</td><td>φ90</td><td>φ119</td><td>φ133</td></tr>
<tr><td rowspan="2">φD</td><td>Standard dimension</td><td>φ155</td><td>φ175</td><td>φ210</td></tr>
<tr><td>When worn</td><td>φ147</td><td>φ166</td><td>φ200</td></tr>
</table></td><td>• Replace parts where exceeding their wear limit.</td></tr>
</table>

<table>
<tr><th>Part</th><th>Check item</th><th>Inspection method</th><th>Discard limit/criteria</th><th>Remedy</th></tr>
<tr><td rowspan="5">End carriage</td><td>• Missing or mispositioned snap rings</td><td>• Check visually.</td><td>• No snap rings must be missing or out of position.</td><td>• Put any out-of-place parts back in place.</td></tr>
<tr><td>• Diameter of left and right track wheels</td><td>• Measure with calipers.</td><td>• Difference in diameter must be within 1% or less.
〈Track wheels for low-head crane〉 mm
<table>
<tr><td>Diameter</td><td>φ95</td><td>φ110</td><td></td></tr>
<tr><td>Wear limit</td><td>1.0</td><td>1.1</td><td></td></tr>
<tr><td>Diameter</td><td>φ125</td><td>φ140</td><td>φ155</td></tr>
<tr><td>Wear limit</td><td>1.2</td><td>1.4</td><td>1.5</td></tr>
</table>
〈Track wheels for overhead crane〉 mm
<table>
<tr><td>Diameter</td><td>φ95</td><td>φ125</td><td>φ140</td><td>φ155</td></tr>
<tr><td>Wear limit</td><td>1.0</td><td>1.2</td><td>1.4</td><td>1.5</td></tr>
<tr><td>Diameter</td><td>φ175</td><td>φ210</td><td></td><td></td></tr>
<tr><td>Wear limit</td><td>1.7</td><td>2.1</td><td></td><td></td></tr>
</table></td><td>• Replace parts where exceeding their wear limit.</td></tr>
<tr><td>• Greasing</td><td>• Check visually.</td><td>• The track wheel teeth and the tooth of the idling gear must be sufficiently greased.</td><td>• Grease where necessary.</td></tr>
<tr><td>• Side roller wear</td><td>• Check visually or measure with calipers.</td><td>• Roller wear must not exceed the below figures.
mm
<table>
<tr><td>Standard dimension</td><td>φ90</td><td>φ110</td><td>φ125</td></tr>
<tr><td>When worn</td><td>φ82</td><td>φ102</td><td>φ117</td></tr>
</table></td><td>• Replace parts where exceeding their wear limit.</td></tr>
<tr><td>• Looseness in fixing bolts</td><td>• Try turning with a wrench.</td><td>• Fixing bolts must be sufficiently tight.</td><td>• Tighten where necessary.</td></tr>
<tr><td rowspan="2">Drive parts</td><td>7. Drive parts
• Greasing</td><td>• Overhaul and check visually.</td><td>• Parts must be sufficiently greased.
• Greased parts must not be overly dirty or contaminated with foreign matter.</td><td>• Grease where necessary.
• Replace parts where necessary.</td></tr>
</table>

14. Track wheel disassembly and assembly

⚠ DANGER : NEVER perform disassembly and assembly works on the crane while it is supporting a load.
Off-limits to the area under the crane during the above works.

Low-head cranes come with detachable track wheel axles, in order to shorten installation and maintenance work.

14.1 Overhaul

Disassemble as described here following. Refer to Figs. 7 and 8 for help.

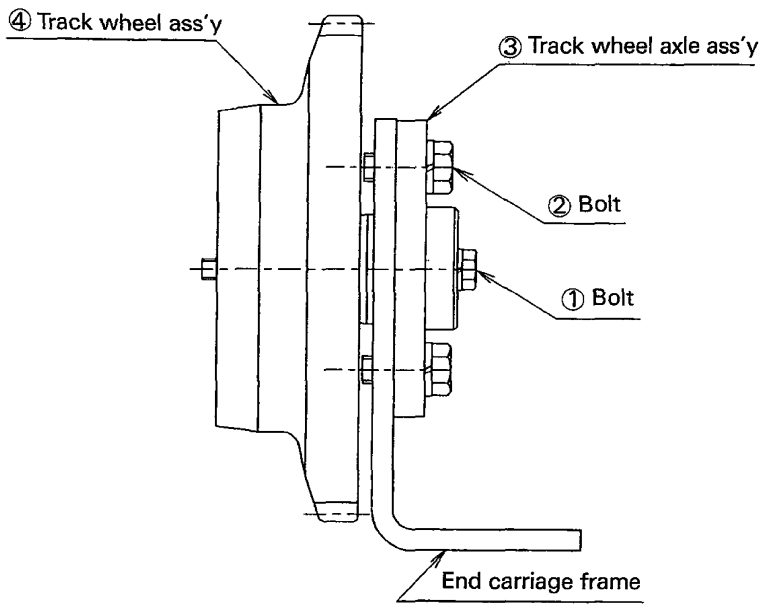


Fig. 7

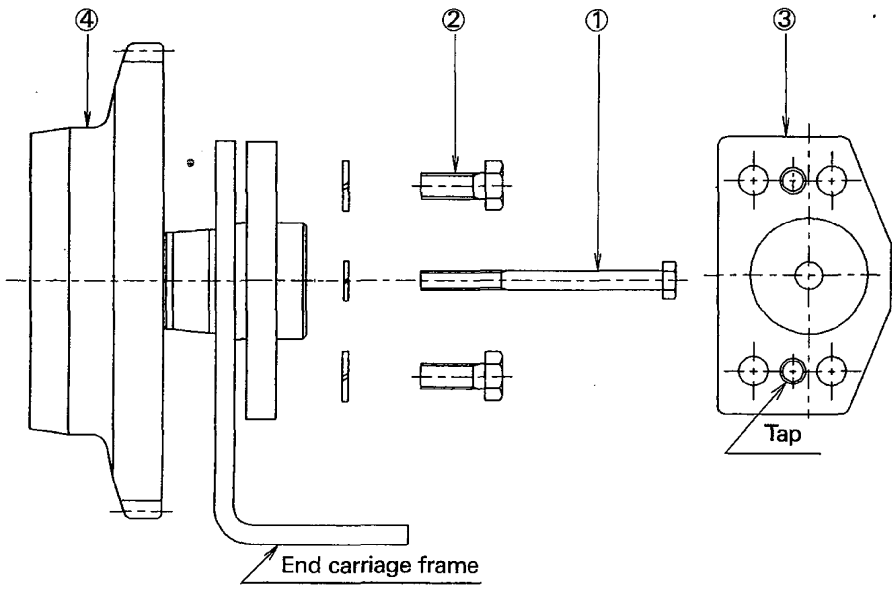


Fig. 8

Step 1 : Remove bolt ①, while holding the track wheel ④ by hand.

Step 2 : Remove bolt ②.

Step 3 : Remove the axle ass'y ③ from the end carriage frame, by screwing into the tap holes (× 2) on the axle ass'y with the bolt ②.

Step 4 : Remove the track wheel ④ from the axle ass'y ③.

14.2 Assembly

After installing the crane or maintenance, reassemble the track wheels as shown in Fig. 9.

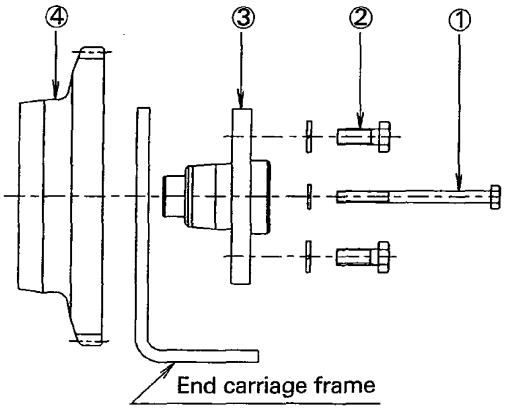


Fig. 9

Step 1 : While holding the track wheel ④ by hand, pass the axle ③ through the end carriage frame and insert inside the wheel bearing.

Step 2 : While holding the track wheel ④ by hand, screw bolt ① in until both the axle ③ and wheel ④ are fixed.

Step 3 : Press on the axle ③ until properly in place on the end carriage frame.

Step 4 : Screw bolt ② into the end carriage frame, until the axle ③ is fixed to the end carriage frame.

[After assemble check]

After assemble parts, check the following points before setting the track wheels on the travel rails.

(a) Make sure the wheels turn freely by hand.

(b) Make sure bolts are sufficiently tight.

15. Power supply

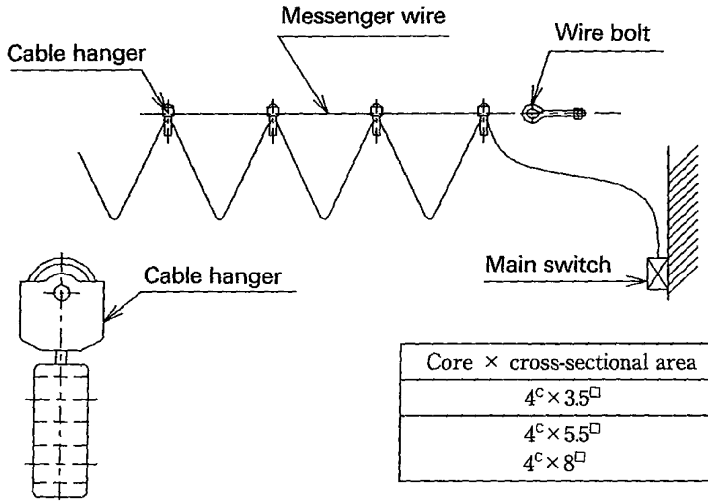
15.1 Power supply method

Power can be supplied from the source to the control box by a cable power supply, tro-reel, high tro-reel or trolley duct systems. But, for convenience sake, the simple cable power supply system is here explained.

(a) Cable power supply system

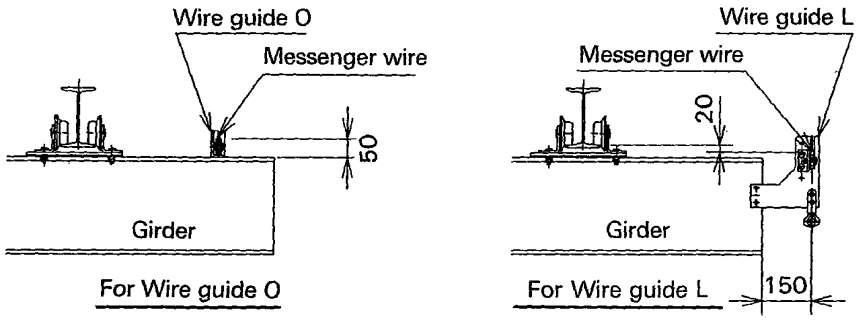
This is the widest used means of supplying power to the crane because it is easy to arrange the cable.

- Use a messenger wire with a diameter between $\phi 3$ and $\phi 6$.
- Keep messenger wire length under 20 m.
- Refer to the Kito Crane catalogue for allowed cable length.



Core × cross-sectional area	Cable size
$4^C \times 3.5^{\square}$	$\phi 15.4$
$4^C \times 5.5^{\square}$ $4^C \times 8^{\square}$	$\phi 16.1$ to $\phi 19$

String the messenger wire along the girder with either the wire guide O or wire guide L.



[For wire guide O]

- The messenger wire can be strung along either the inside or outside of the span.

[For wire guide L]

- The messenger wire can be strung along the outside of the span and anchored at the end of the girder.

16. Troubleshooting

Trouble	Cause	Remedy
• The crane does not move smoothly.	• The end carriage is not set at a right angle to the girder or left and right end carriages are not parallel. • The pillow block is improperly installed. • There is something wrong with the power collector. • Track wheels are unevenly worn. • The wheel axle bolts are loose. • A gap has formed between the side rollers and travel rail, most likely due to wear in the side roller.	• Set the end carriages at a right angle to the girder, and parallel with one another. • Adjust the pinion L to properly mesh with the wheel. • Clean or replace the power collector as necessary. • Replace the track wheels where necessary. • Tighten bolts where necessary. • Replace the side rollers where necessary.
• The hand wheel does not turn smoothly.	• The shaft is out of oil.	• Coat the shaft with lubricant.

• Refer to troubleshooting in the "Safety Instructions" for your hoist and trolley respectively provided.

17. WARRANTY

KITO Corporation ("KITO") extends the following warranty to the original purchaser ("Purchaser") of new products manufactured by "KITO" (KITO's Products).

(1) "KITO" warrants that KITO's Products, when shipped, shall be free from defects in workmanship and/or materials under normal use and service and "KITO" shall, at the election of "KITO", repair or replace free of charge any parts or items which are proven to have said defects, provided that all claims for defects under this warranty shall be made in writing immediately upon discovery and, in any event, within one (1) year from the date of purchase of KITO's Products by " "Purchaser" and provided, further, that defective parts or items shall be kept for examination by "KITO" or its authorized agents or returned to KITO's factory or authorized service center upon request by "KITO".

(2) "KITO" does not warrant components of products provided by other manufacturers. However to the extent possible, "KITO" will assign to "Purchaser" applicable warranties of such other manufacturers.

(3) Except for the repair or replacement mentioned in (1) above which is "KITO"'s sole liability and purchaser's exclusive remedy under this warranty, "KITO" shall not be responsible for any other claims arising out of the purchase and use of KITO's Products, regardless of whether "Purchaser"'s claims are based on breach of contract, tort or other theories, including claims for any damages whether direct, indirect, incidental or consequential.

(4) This warranty is conditional upon the installation, maintenance and use of KITO's Products pursuant to the product manuals prepared in accordance with content instructions by "KITO". This warranty shall not apply to KITO's Products which have been subject to negligence, misuse, abuse, misapplication or any improper use or combination or improper fittings, alignment or maintenance.

(5) "KITO" shall not be responsible for any loss or damage caused by transportation, prolonged or improper storage or normal wear and tear of KITO's Products or for loss of operation time.

(6) This warranty shall not apply to KITO's Products which have been fitted with or repaired with parts components or items not supplied or approved by "KITO" or which have been modified or altered.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

16. Parts list

The following is a parts list for your end carriage.

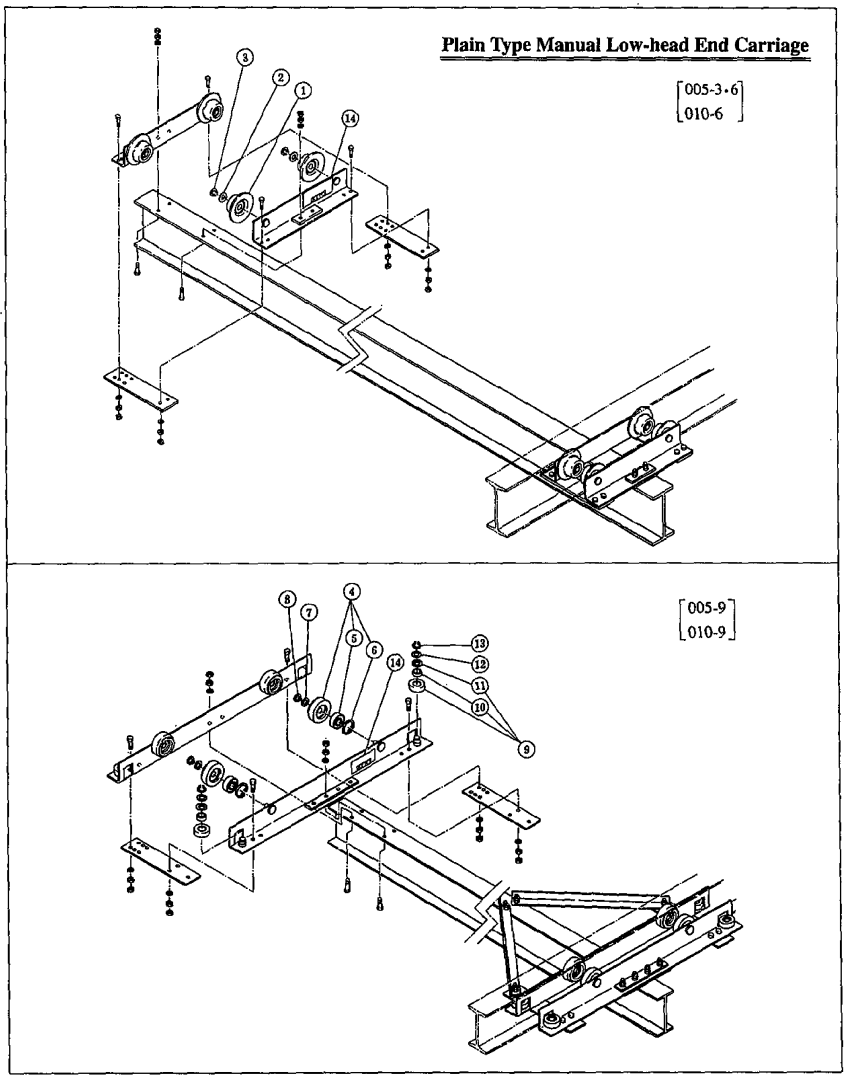


Fig. No.	Parts No.	Parts name	Number per unit	Type / Code	PL005-3 N6PL 105V	PL010-6 N6PL 210V	PL010-9 N6PL 310V	Note
①	N6PL-5102	Wheel S assembly	8		(TS2-1')	(TS2-2')	———	
②	N6PL-104	Track wheel washer	8		(T1-1')	(T1-2')	———	For track wheel axle
③	N6PL-106	Snap ring	8		(S-15)	(S-20)	———	For track wheel axle
④	N6PL-1102	Wheel assembly	8		———			
5	N6PL-107	Ball bearing	8		———		(6304ZZ)	For track wheel
6	N6PL-105	Snap ring	8		———		(R-52)	For track wheel
⑦	N6PL-125	Track wheel washer	8		———		(T1-2')	For track wheel axle
⑧	N6PL-106	Snap ring	8		———		(S-20)	For track wheel axle
⑨	N6PL-1108	Roller assembly	8		———			
10	N6PL-112	Ball bearing	8		———		(6005ZZ)	For roller
11	N6PL-110	Snap ring	8		———		(R-47)	For roller
⑫	N6PL-120	Roller washer	8		———			For roller axle
⑬	N6PL-111	Snap ring	8		———		(S-25)	For roller axle
⑭	N6PL-208	Name plate S	2					

Geared Type Manual Overhead End Carriage

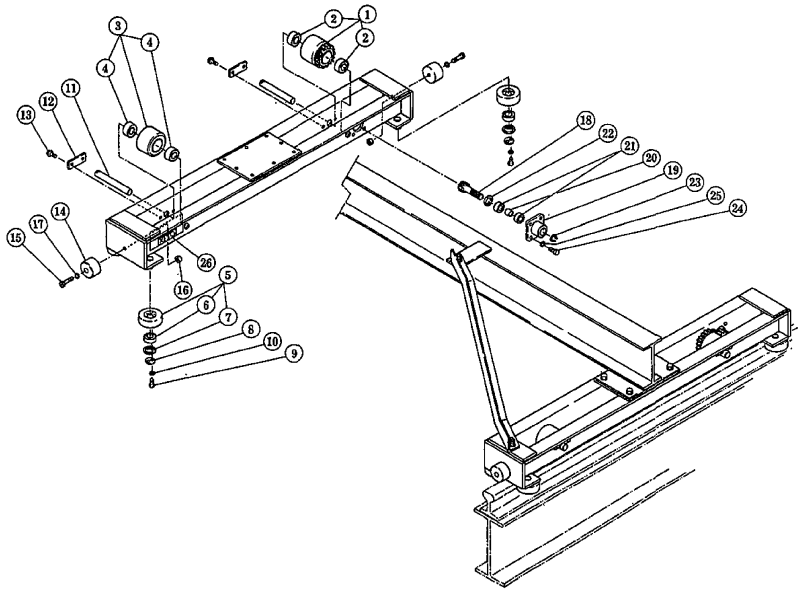


Fig. No.	Parts No.	Parts name	Number per unit	Type / Code	GO010-12 N6GO410E	GO020-12 N6GO420E	GO030-12 N6GO430E	GO050-12 N6GO450E	Note
①	N6QO-1101	Wheel A assembly	2						
2	N6QO-107	Ball bearing	4		(6305ZZ)	(6306ZZ)	(6307ZZ)	(6309ZZ)	For track wheel
③	N6QO-1102	Wheel B assembly	2						
4	N6QO-107	Ball bearing	4		(6305ZZ)	(6306ZZ)	(6307ZZ)	(6309ZZ)	For track wheel
⑤	N6QO-1108	Roller assembly	8						
6	N6QO-112	Ball bearing	8		(6205ZZ)			(6206ZZ)	For roller
7	N6QO-110	Snap ring	8		(R-52)			(R-62)	For roller
⑧	N6QO-120	Roller washer	8						
⑨	N6QO-121	Socket bolt	16		(M6x15x15)				For roller washer
⑩	N6QO-122	Spring washer	16		(2-M6)				For roller washer
⑪	N6QO-103	Track wheel axle	4						
⑫	N6QO-105	Key plate	4						
⑬	N6QO-151	Socket bolt with spring washer	8		(M8x16x16)				For key plate
⑭	N6QL-207	Buffer	4						
⑮	N6QL-258	Socket bolt	4		(M8x35x22)				For buffer
⑯	N6QL-259	Nut	4		(1-M8)				For buffer
⑰	N6QL-260	Washer	4		(1-M8)				For buffer
⑱	N6GO-301	Pinion axle G	2						
⑲	N6GO-303	Axle holder	2						
⑳	N6GO-306	Collar	2						
㉑	N6GO-310	Ball bearing	2		(6004ZZ)				For axle holder
㉒	N6GO-311	Snap ring	2		(R-42)				For axle holder
㉓	N6GO-312	Snap ring	2		(S-20)				For axle holder
㉔	N6GO-360	Bolt	8		(M8x18x18)				For axle holder installation
㉕	N6GO-361	Spring washer	8		(2-M8)				For axle holder installation
㉖	N6GO-208	Name plate S	2						

Geared Type Manual Low-head End Carriage

[010-6·12]
[020-6·12]

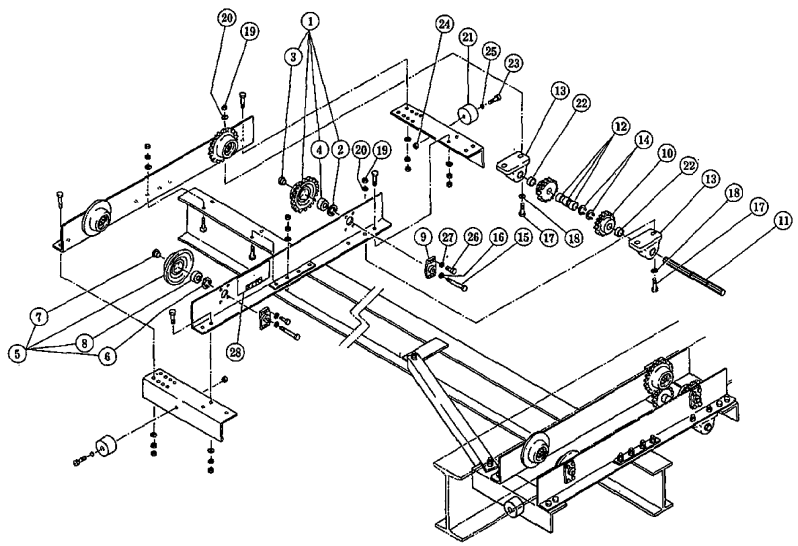


Fig. No.	Parts No.	Parts name	Number per unit	Type / Code	GL010-6 / N6GL210V	GL010-12 / N6GL410V	GL020-6 / N6GL220V	GL020-12 / N6GL420V	Note
①	N6QL-1101	Wheel A assembly	4						
2	N6QL-105	Snap ring	4		(R-52)		(R-62)		For track wheel
3	N6QL-106	Bush	4						For track wheel
4	N6QL-107	Ball bearing	4		(6304ZZ)		(6305ZZ)		For track wheel
⑤	N6QL-1102	Wheel B assembly	4						
6	N6QL-105	Snap ring	4		(R-52)		(R-62)		For track wheel
7	N6QL-106	Bush	4						For track wheel
8	N6QL-107	Ball bearing	4		(6304ZZ)		(6305ZZ)		For track wheel
⑨	N6QL-5103	Track wheel axle assembly	8						
⑩	N6QL-113	Pinion L	4						
⑪	N6QL-114	Pinion axle L	2						
⑫	N6QL-115	Collar A	6						
⑬	N6QL-116	Pillow block	4		(UCP204)				
⑭	N6QL-117	Snap ring	4		(S-20)				
⑮	N6QL-121	Bolt	8		(M6x70x25)		(M6x80x25)		For track wheel axle installation
⑯	N6QL-122	Spring washer	8		(2-M6)				For track wheel axle installation
⑰	N6QL-151	Bolt	8		(M10x40x26)				For pillow block
⑱	N6QL-152	Washer	8		(2-M10)				For pillow block
⑲	N6QL-153	Nut	8		(1-M10)				For pillow block
⑳	N6QL-154	Spring washer	8						For pillow block
㉑	N6QL-207	Buffer	4						
㉒	N6QL-209	Collar B	4						
㉓	N6QL-258	Socket bolt	4		(M8x35x22)				For buffer
㉔	N6QL-259	Nut	4		(1-M8)				For buffer
㉕	N6QL-260	Washer	4		(1-M8)				For buffer
㉖	N6QL-363	Bolt	32		(M8x20x20)				For track wheel axle ass'y
㉗	N6QL-364	Spring washer	32		(2-M8)				For track wheel axle ass'y
㉘	N6GL-208	Name plate S	2						

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[030-6·12
050-6·12]

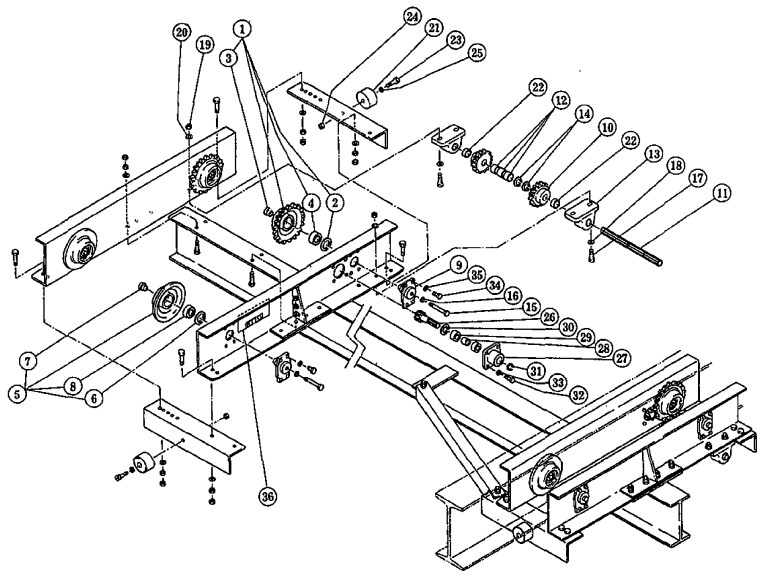

Fig. No.	Parts No.	Parts name	Number per unit	Type / Code	GL030-6 / N6GL230V	GL030-12 / N6GL430V	GL050-6 / N6GL250V	GL050-12 / N6GL450V	Note
①	N6QL-1101	Wheel A assembly	4						
2	N6QL-105	Snap ring	4		(R-62)	(R-72)	(R-80)	(R-90)	For track wheel
3	N6QL-106	Bush	4						For track wheel
4	N6QL-107	Ball bearing	4		(6305ZZ)	(6306ZZ)	(6307ZZ)	(6308ZZ)	For track wheel
⑤	N6QL-1102	Wheel B assembly	4						
6	N6QL-105	Snap ring	4		(R-62)	(R-72)	(R-80)	(R-90)	For track wheel
7	N6QL-106	Bush	4						For track wheel
8	N6QL-107	Ball bearing	4		(6305ZZ)	(6306ZZ)	(6307ZZ)	(6308ZZ)	For track wheel
⑨	N6QL-5103	Track wheel axle assembly	8						
⑩	N6QL-113	Pinion L	4						
⑪	N6QL-114	Pinion axle L	2						
⑫	N6QL-115	Collar A	6 (4)						4 for GL050-12
⑬	N6QL-116	Pillow block	4		(UCP204)				
⑭	N6QL-117	Snap ring	4		(S-20)				
⑮	N6QL-121	Bolt	8		(M6x80x25)	(M8x85x30)	(M8x100x38)	(M10x110x38)	For track wheel axle installation
⑯	N6QL-122	Spring washer	8		(2-M6)	(2-M8)		(2-M10)	For track wheel axle installation
⑰	N6QL-151	Bolt	8		(M10x40x26)			(M12x45x30)	For pillow block
⑱	N6QL-152	Washer	8		(2-M10)			(2-M12)	For pillow block
⑲	N6QL-153	Nut	8		(1-M10)			(1-M12)	For pillow block
⑳	N6QL-154	Spring washer	8		(1-M10)			(1-M12)	For pillow block
㉑	N6QL-207	Buffer	4						
㉒	N6QL-209	Collar B	4						
㉓	N6QL-258	Socket bolt	4		(M8x35x22)				For buffer
㉔	N6QL-259	Nut	4		(1-M8)				For buffer
㉕	N6QL-260	Washer	4		(1-M8)				For buffer
㉖	N6GO-301	Pinion axle G	2						
㉗	N6GO-303	Axle holder	2						
㉘	N6GO-306	Collar	2						
㉙	N6GO-310	Ball bearing	4		(6004ZZ)				For axle holder
㉚	N6GO-311	Snap ring	2		(R-42)				For axle holder
㉛	N6GO-312	Snap ring	2		(S-20)				For axle holder
㉜	N6QL-360	Bolt	8		(M8x18x18)				For axle holder installation
㉝	N6QL-361	Spring washer	8		(2-M8)				For axle holder installation
㉞	N6QL-363	Bolt	32		(M8x20x20)		(M12x30x30)		For track wheel axle ass'y
㉟	N6QL-364	Spring washer	32		(2-M8)		(2-M12)		For track wheel axle ass'y
㊱	N6GL-208	Name plate S	2						

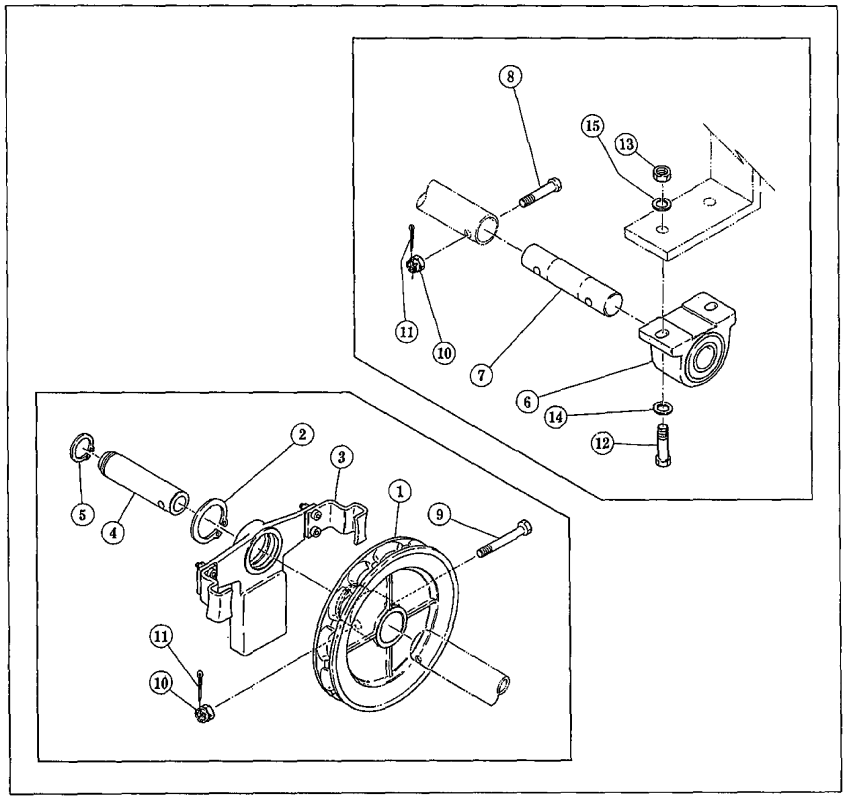

Fig. No.	Parts No.	Parts name	Type / Span / Number per unit	Hand wheel assembly		Note
				GA-9	GA-12	
				9m or less	9.1m to 12.0m	
①	N6GK-501	Hand wheel	1			
②	N6GK-508	Snap ring	1	(S-55)		
③	N6GK-5504	Guide plate assembly	1			
④	N6GK-523	Connecting shaft	2			
⑤	N6GK-520	Snap ring	2	(S-35)		
⑥	N6GK-518	Pillow block	1 (2)	(CUP207)		2 for span of 9.1 to12m
⑦	N6GK-521	Joint shaft	1 (2)			2 for span of 9.1 to12m
⑧	N6GK-525	Bolt A	3 (5)	(M10x60x26)		5 for span of 9.1 to12m
⑨	N6GK-526	Bolt B	1	(M10x80x26)		
⑩	N6GK-527	Slotted nut	4 (6)	(L-M10)		6 for span of 9.1 to 12m for bolt A·B
⑪	N6GK-528	Split pin	4 (6)	(2x14)		6 for span of 9.1 to 12m for bolt A·B
⑫	N6GK-530	Bolt	2	(M16x55x38)		For pillow block
⑬	N6GK-531	Nut	2	(1-M16)		For pillow block
⑭	N6GK-532	Washer	2	(1-M16)		For pillow block
⑮	N7GK-533	Spring washer	2	(2-M16)		For pillow block
⑯	K7NA-050	Chain	1 set	5ø		

Sample check lists (monthly and yearly inspection)

Model No.	Manufacturing No.	Date installed	Inspection No.

Location	Type of crane	Rated load	Crane manufacturing No.	Inspection valid until

○: Good △: Replace or adjust next time. ×: Requires replacement or adjustment immediately.

		Check list	Date checked					
Hoist	Body	Outer appearance						
		Abnormal noise						
		Gear oil						
		Yoke						
		Plug-socket connection						
		Name plate						
	Push button switches	Performance test						
		Wiring						
	Brake	Performance						
	Limit switches	Limit lever/Lever pin coupling						
		Cross guide movement						
		Stopper						
		Performance test						
	Load chain/ Wire rope	Outer appearance						
		Abnormal noises						
		Wear						
	Accessories	Yoke/Yoke bolt/Bottom yoke						
		Idle sheave						
		Chain spring						
		Hook state/Size						
		Hook movement						
		Hook latch						
		Chain container						
		Equalizer sheave						
Electric/manual trolley	Push button switches	Operation test						
		Wiring						
	Traverser	Name plate						
		Traverse test						
		Motor reduction gear to frame installation						
		Wheel surface/Teeth wear						
		Snap ring for fixing wheels						
		Frame deformation						

		Check list	Date checked					
Electric/Manual trolley	Traverser	Hangers/Bolts						
		Side rollers						
		Hand wheel/Hand chain						
		Accessory						
Crane	Electric parts	Control box						
		Contactor/Transformer						
	Travel rails	Outer appearance						
		Wear in travel surface						
		Grounding*						
	Girders	Name plate						
		Wear						
		Stoppers						
	End carriage	Wear in wheel path surface						
		Snap ring for fixing wheels						
		Frame deformation						
		Side rollers						
		Buffers						
	Drive mechanism	Grease						
		Motor brake						
		Delay starter						
		Hand wheel/Hand chain						
	Collector arm	Messenger wire tautness						
		Cable hangers						
		T-type hangers						
		Cable						
		Plug-socket connection						
		Fuse capacity*						
		Grounding*						
		Incoming power supply voltage*						
		Insulation resistance						
		Load test						
		Checked by						
		Supervised by						

*Check yearly.

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