

---

**ASSEMBLY MANUALS  
FOR KITO URETHANE WHEEL CRANES  
N6<sub>SERIES</sub>**

---

***ALWAYS SAVE THIS BOOK FOR FUTURE REFERENCE.***

**KITO**

Thank you for purchasing KITO N6 series Urethane Wheel Type Cranes.  
This crane uses urethane coated steel track wheels. Light weight wheels reduced noise and stable, the end truck is designed to improve work efficiency.  
All Kito products are manufactured in line with thorough quality controls. We are sure this crane will satisfy your requirements for durability.

## DEFINITIONS

**⚠ 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.

**⚠ CAUTION** : Read this manual carefully to properly assemble your crane. Refer to other manuals provided with the equipment for instructions on operation and safety.

Application notes ;

This manual is exclusively applied to N6C model cranes. Almost all parts of N6C model cranes have no interchangeability with N6 model cranes.

All of N6C type end carriages can not be assembled with G1 type geared motor but with G1B type geared motor only.

### <CONTENTS>

|  |    |
|--|----|
| 1. End carriage parts.....                           | 1  |
| 2. Travel rail preparation.....                      | 1  |
| 3. Girder preparation.....                           | 3  |
| 4. End carriage punching and assembly.....           | 4  |
| 5. Painting.....                                     | 14 |
| 6. Erecting the end carriage on the travel rail..... | 14 |

# 1. End carriage parts

Check the delivered product conforms to your order. Follow the instructions herein to assemble parts.

The end carriage and geared motor are packaged separately (Fig. 1 and Fig. 2).

## End carriage packaging details

| Part     | End carriage |                        |
|----------|--------------|------------------------|
|          | End carriage | Bolts and accessories* |
| Low-head | 2 sets       | 1 set                  |
| Overhead |              | —                      |

\*High tension bolts (H.T.B.) are delivered to couple the end carriage to the girder as standard for low-head type.

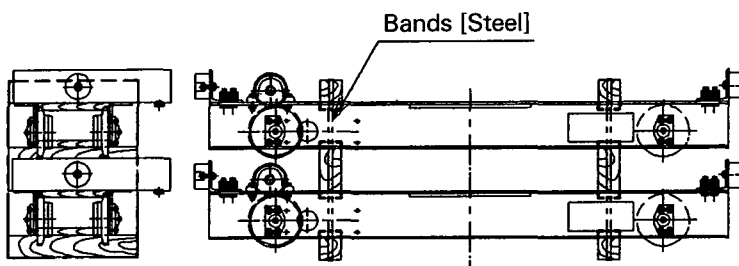


Fig. 1

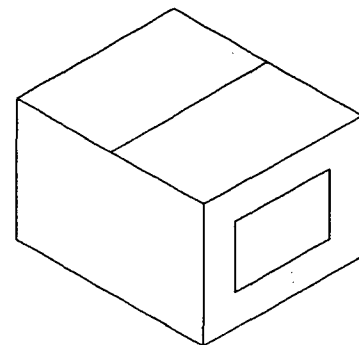


Fig. 2

# 2. Travel rail preparation

Travel rail size will depend on building structures and span (distance between pillars).

## 2.1 Determining rail size

### 2.1.1 Low-head cranes

#### Use I beam as travel rail

##### (1) Travel rail height

Select a travel rail with a height of 150 mm or higher (See H in Fig. 3). If less than 125 mm, make sure bolts and nuts do not protrude to the inside of the rail (Fig. 3).

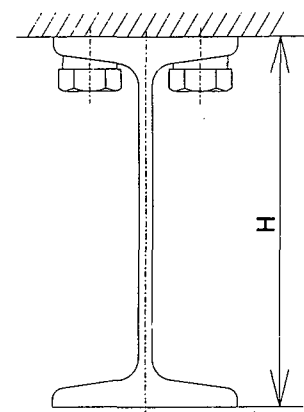


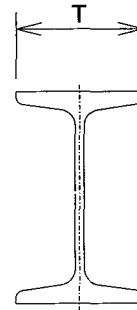
Fig. 3

(2) End carriage and travel rail combinations

Travel rail width (T) is determined by the type of end carriage used. Refer to Table 1 and Fig. 4.

**Table 1** Unit:mm

| End carriage |          | JIS Travel rail width (T) |
|--------------|----------|---------------------------|
| Type         | Code     |                           |
| CEL010-9     | N6CL310V | 125 to 150                |
| CEL020-9     | N6CL320V |                           |



**Fig. 4**

**2.1.2 Overhead cranes (single and double girder)**

(1) Use a H-beam for the travel rail.

Travel rail width (T) is determined by type of end carriage. Refer to Table 2.

**Table 2** Unit:mm

| End carriage |          | JIS Travel rail width (T) | End carriage |           | JIS travel rail width [T] |
|--------------|----------|---------------------------|--------------|-----------|---------------------------|
| Type         | Code     |                           | Type         | Code      |                           |
| CEO010-9     | N6CO310E | 100 to 150                | WCO030-15    | N6KO530E  | 150 to 200                |
| CEO010-18    | N6CO610E | 150 to 200                | WCO030-21    | N6KO730E  |                           |
| CEO020-12    | N6CO420E |                           | WCO030-27    | N6KO930E  |                           |
| CEO030-15    | N6CO530E |                           | WCO075-15    | N6KO575E  |                           |
| CEO030-18    | N6CO630E |                           | 150 to 200   | WCO075-21 | N6KO775E                  |
| CEO030-21    | N6CO730E | 200 to 250                | WCO075-27    | N6KO975E  |                           |
| CEO050-12    | N6CO450E |                           | 150 to 200   | WCO150-15 | N6KO515E                  |
| CEO050-18    | N6CO650E | WCO150-21                 |              | N6KO715E  |                           |
| CEO075-18    | N6CO675E | 150 to 200                | WCO200-15    | N6KO521E  | 250 to 300                |
| CEO075-21    | N6CO775E |                           | WCO200-15H   | N6KB521E  |                           |
| CEO100-12    | N6CO411E |                           | WCO200-21    | N6KO721E  |                           |
| CEO100-21    | N6CO711E |                           | WCO200-21H   | N6KB721E  |                           |
| CEO100-21H   | N6CB711E | 200 to 250                | WCO200-27    | N6KO921E  |                           |
|              |          |                           | WCO200-27H   | N6KB921E  |                           |

Note : Contact Kito for details on using rails not listed in the above table.

## 3. Girder preparation

Shop drawings of girders are not provided with the end carriage. Contact Kito with the type of end carriage purchased, as the shop drawing based on JIS material is available upon request.

### 3.1 Determining girder size

Girder size based on JIS material depends on the rated load of your hoist and travel rail span. Select your girder from the table on page 35 in the Kito Crane catalogue.

In case you use girder other than JIS material, make sure that your selected girder has sufficient strength for your crane.

Also, note that girder combinations in the table vary whether using an electric chain hoist or a wire rope hoist.

NOTE : If using an electric chain hoist with motorized trolley, or motorized traverse hoist (wire rope hoist), use a girder with a height of 200 mm or more.

#### 3.1.1 Girders for low-head cranes

Select your girder from the table on page 35 in the Kito Crane catalogue.

#### 3.1.2 Girders for overhead cranes

##### <Single girder>

(1) For spans of 16m or less

Select your girder from the table on page 35 in the Kito Crane catalogue.

(2) For spans over 16m

Contact Kito or your local Kito dealer for girders not included on tables in the Kito Crane catalogue.

##### <Double girder>

Contact Kito or your local Kito dealer for selecting girder.

## 3.2 Girder manufacture

### <For low-head cranes>

Overhang dimensions are marked 400mm as shown in Fig. 5. Contact Kito or your local Kito dealer for longer dimensions. Refer to Fig. 5.

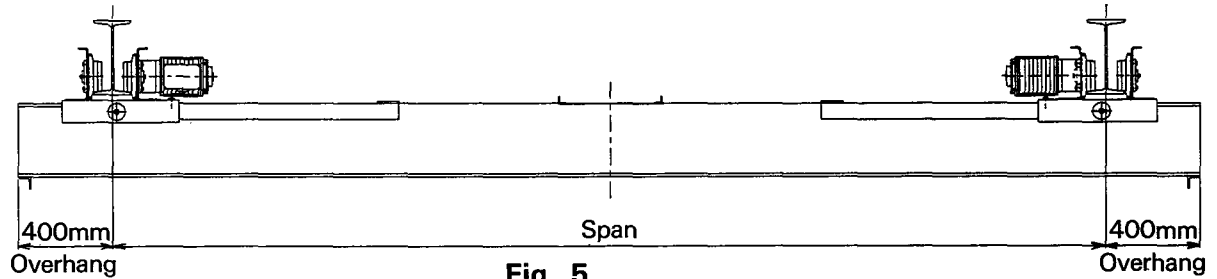


Fig. 5

### <For overhead cranes>

Due to building structures, sometimes girder ends need to be notched or trimmed. Depth of cut limit, however, varies with girder material. Refer to Fig. 6 and contact Kito or your local Kito dealer for details.

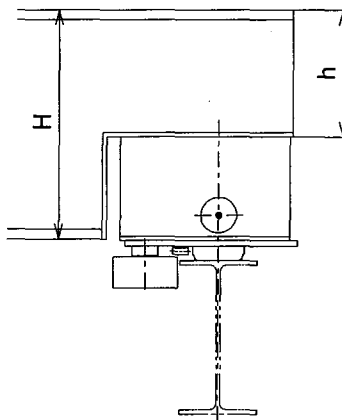


Fig. 6

## 4. End carriage punching and assembly

Punch holes in the end carriages to couple with girder, but note that hole pitch will vary with girder size.

### 4.1 Punching holes in low-head end carriages

Once girder size has been determined, drill holes at a pitch that conforms to the girder. Refer to Fig. 7 and Tables 3 and 4.

NOTE: Never open holes with a gas torch.

- Maintain dimension "e" when making holes regardless of the size of the girder.

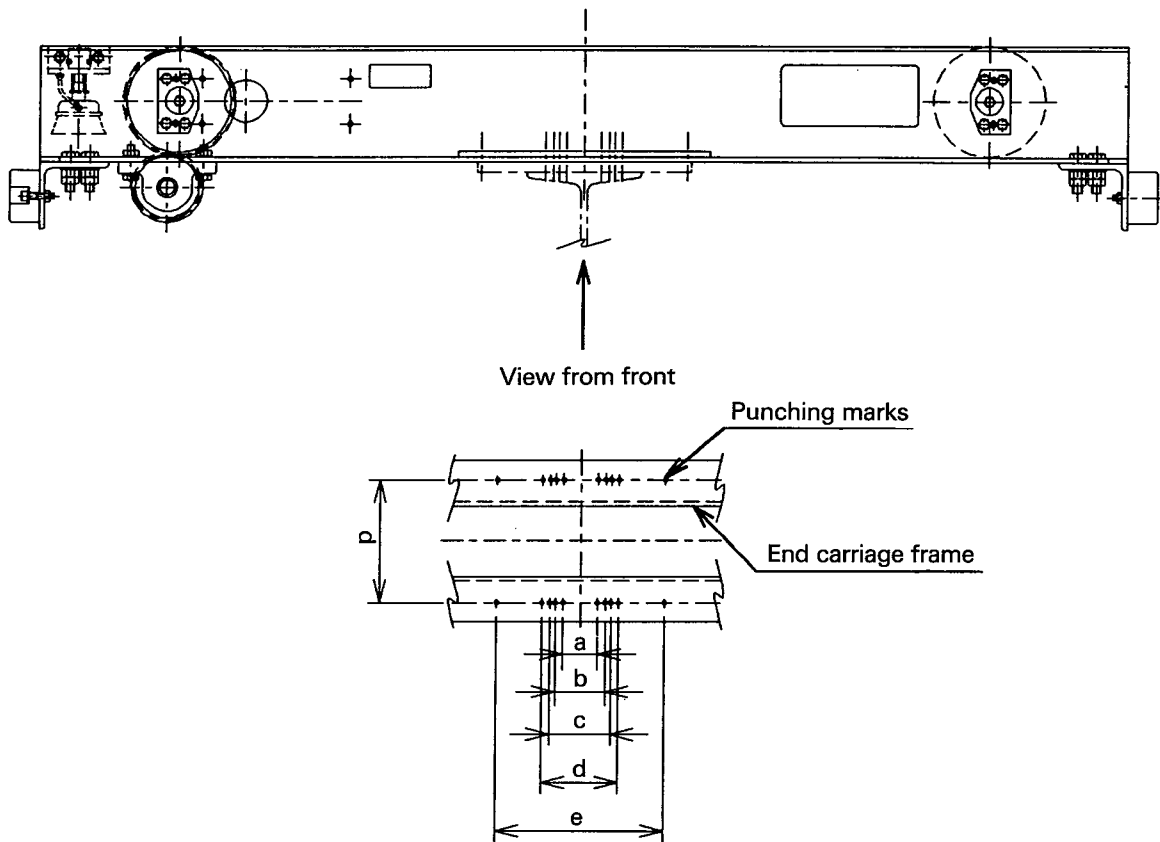


Fig. 7

Table 3 Girder width (B) and punch pitch for JIS I-beams

Unit:mm

| End carriage<br>Type | Girder width (B)<br>Code | Girder width (B) |     |     |     |     | p     | Hole<br>diameter | Bolt<br>diameter |
|----------------------|--------------------------|------------------|-----|-----|-----|-----|-------|------------------|------------------|
|                      |                          | 75               | 100 | 125 | 150 | —   |       |                  |                  |
|                      |                          | a                | b   | c   | d   | e   |       |                  |                  |
| CEL010-9             | N6CL310V                 | 45               | 65  | 80  | 100 | 270 | T+121 | φ16              | M14<br>(H.T.B.)  |
| CEL020-9             | N6CL320V                 | —                | 65  | 80  | 100 | 270 | T+131 | φ18              | M16<br>(H.T.B.)  |

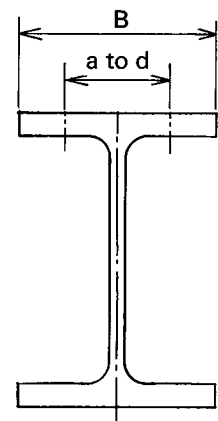
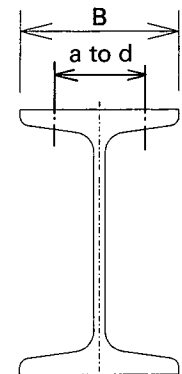
T : travel rail width

Table 4 Girder width (B) and punch pitch for JIS H-beams

Unit:mm

| End carriage<br>Type | Girder width (B)<br>Code | Girder width (B) |     |     |             |     | p     | Hole<br>diameter | Bolt<br>diameter |
|----------------------|--------------------------|------------------|-----|-----|-------------|-----|-------|------------------|------------------|
|                      |                          | 75               | 100 | 125 | 150·175·200 | —   |       |                  |                  |
|                      |                          | a                | b   | c   | d           | e   |       |                  |                  |
| CEL010-9             | N6CL310V                 | 45               | 65  | 80  | 100         | 270 | T+121 | φ16              | M14<br>(H.T.B.)  |
| CEL020-9             | N6CL320V                 | —                | 65  | 80  | 100         | 270 | T+131 | φ18              | M16<br>(H.T.B.)  |

T : travel rail width



### 4.1.1 End carriage assembly for low-head cranes

(1) End carriage to girder assembly

Assemble parts, as shown in Fig. 8, with the provided bolts, nuts and washers.(Table 5)

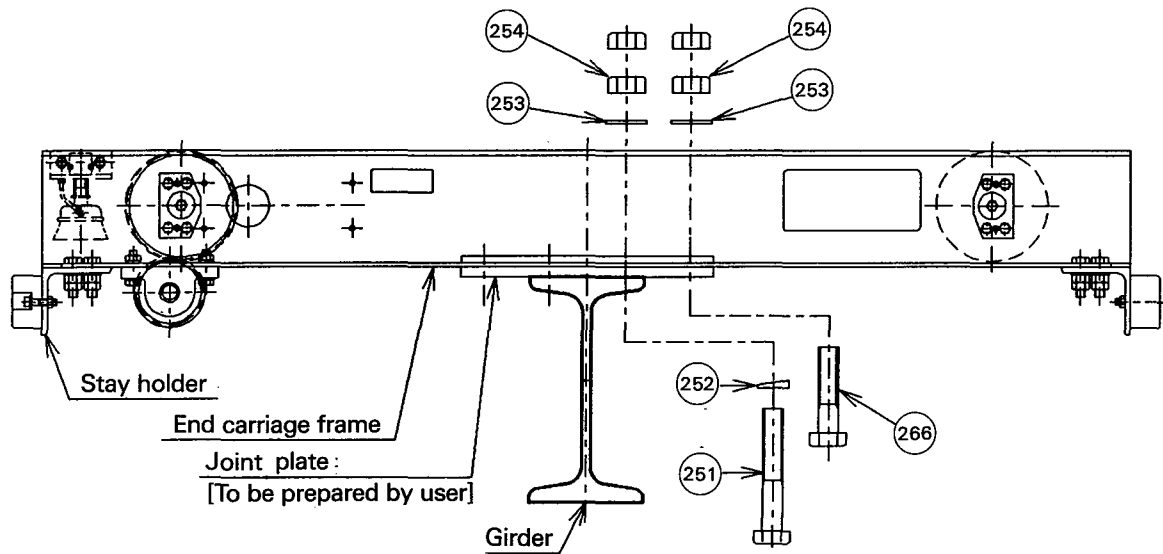


Fig. 8

Table 5

Unit:mm

| Part No.     |          | 251          | *1 252         | 253     | 254 | 266          |
|--------------|----------|--------------|----------------|---------|-----|--------------|
| End carriage | Part     | Bolt(H.T.B.) | Tapered washer | Washer  | Nut | Bolt(H.T.B.) |
| Type         | Code     |              |                |         |     |              |
| CEL010-9     | N6CL310V | M14×85×65    | 8° for M14     | For M14 | M14 | M14×60×40    |
| CEL020-9     | N6CL320V | M16×105×85   | 8° for M16     | For M16 | M16 | M16×75×55    |

NOTE \*1: Tapered washer part No. 252 is used only for I-beam girders.

\*2: Bolt length varies depending on how much of the girder coupling is notched or trimmed. Contact Kito or your local Kito dealer for details.



(2) Stay holder assembly and hole punching

<For JIS rail>

The stay holder can be used as is. The stay holders are holed as they are to assemble with end carriage according to travel rail width (T) (Refer to Fig. 9). Assemble end carriage frame based on travel rail width determined.

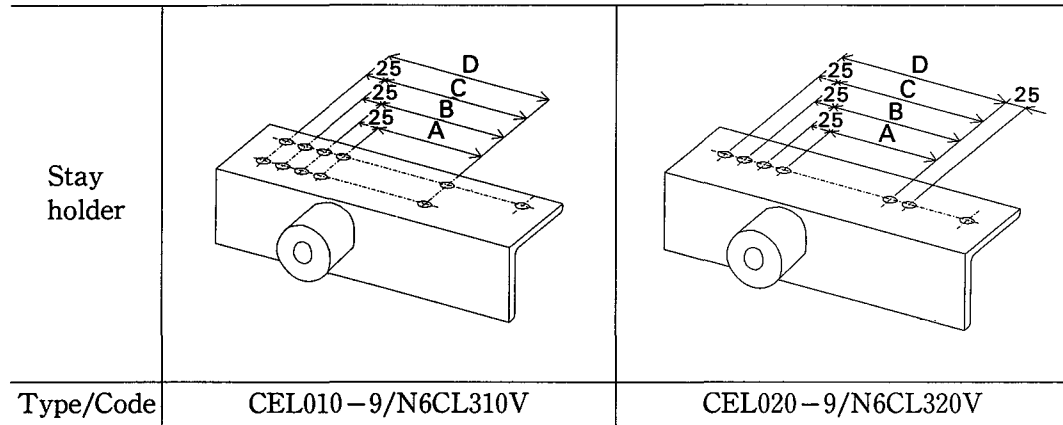


Fig. 9

Table 6 JIS rail width (T) and stay holder holes

Unit:mm

| End carriage |          | Hole |   |     |     |
|--------------|----------|------|---|-----|-----|
| Type         | Code     | A    | B | C   | D   |
| CEL010-9     | N6CL310V | —    | — | 125 | 150 |
| CEL020-9     | N6CL320V | —    | — | 125 | 150 |

<For other than JIS rail>

Make holes in the stay holders A and B coupled with the end carriage in accordance with travel rail width (T).

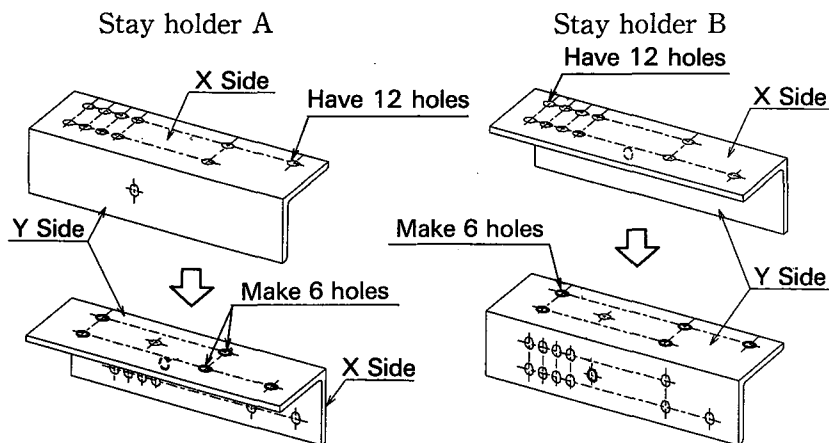


Fig. 10

As shown in the above Fig. 10, holes were made in X side for JIS rails.

Make holes in Y side in accordance with travel rail width (T). Drawing for the holes are packed in the end carriage.

(3) Assembling pinion axle, collars and washers

<For JIS rail>

The pinion axle can be used for JIS rail as is.

Numbers of collar A determined by the travel rail width (T) is built in the pinion axle for adjustment of collar A, by referring to Fig. 11 and Table 7.

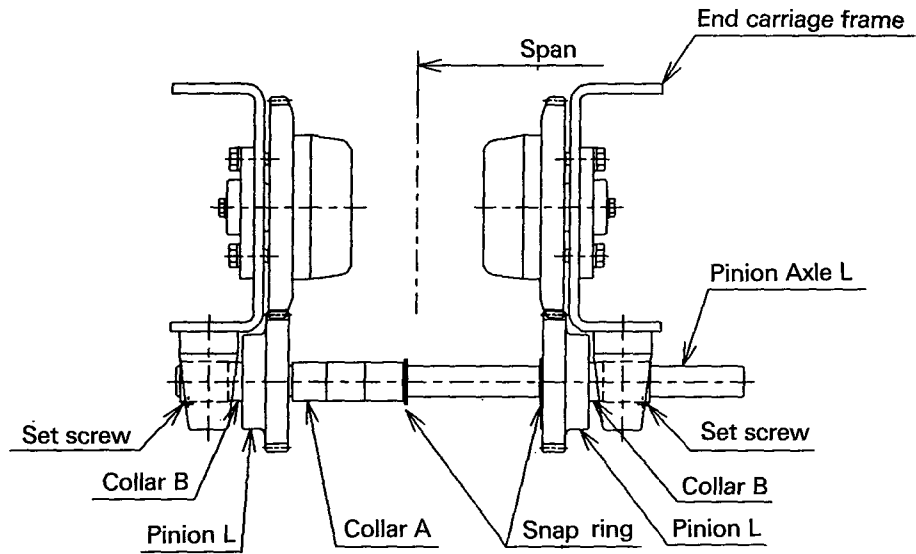


Fig. 11

Table 7 Numbers of collar

Unit:mm

| End carriage |          | Applicable travel rail width(T) |     |     |     |
|--------------|----------|---------------------------------|-----|-----|-----|
| Type         | Code     | 75                              | 100 | 125 | 150 |
| CEL010-9     | N6CL310V | —                               |     | 2   | 3   |
| CEL020-9     | N6CL320V |                                 |     |     |     |

<For other than JIS rail>

The pinion axle can be used for travel rail other than JIS material. Numbers of collar A determined by the travel rail width (T) is built in the pinion axle (Fig. 12) for adjustment of collar A by referring to Fig. 12 and Table 8.

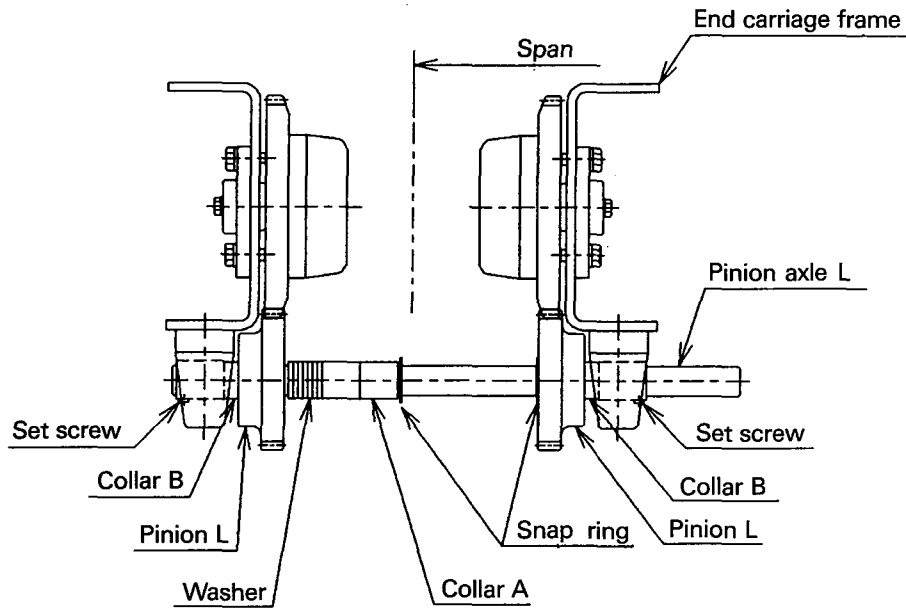


Fig. 12

Numbers of washer and collar A for travel rail width (T)

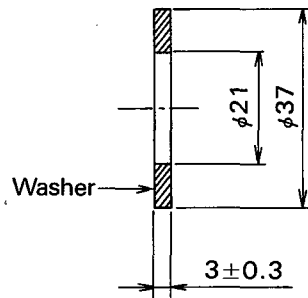


Table 8

| Type     | Code     |
|----------|----------|
| CEL010-9 | N6CL310V |
| CEL020-9 | N6CL320V |

| T               | (in) | 4 <sup>5</sup> / <sub>16</sub> | 5   | 5 <sup>3</sup> / <sub>16</sub> | 5 <sup>5</sup> / <sub>16</sub> | 5 <sup>7</sup> / <sub>16</sub> | 5 <sup>9</sup> / <sub>16</sub> | 5 <sup>11</sup> / <sub>16</sub> | 6   |
|-----------------|------|--------------------------------|-----|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|-----|
|                 | (mm) | 125                            | 127 | 131                            | 135                            | 137                            | 143                            | 149                             | 150 |
| Nos of washer   |      | 0                              | 0   | 2                              | 3                              | 4                              | 5                              | 0                               | 1   |
| Nos of collar A |      | 2 p'cs                         |     |                                |                                |                                |                                | 3 p'cs                          |     |

(4) End carriage adjustment

The gap between the track wheel flange and the travel rail is important in determining whether the crane travels smoothly on the rails or not. Adjust the end carriage inner distance S referring to Fig. 13 and Table 9.

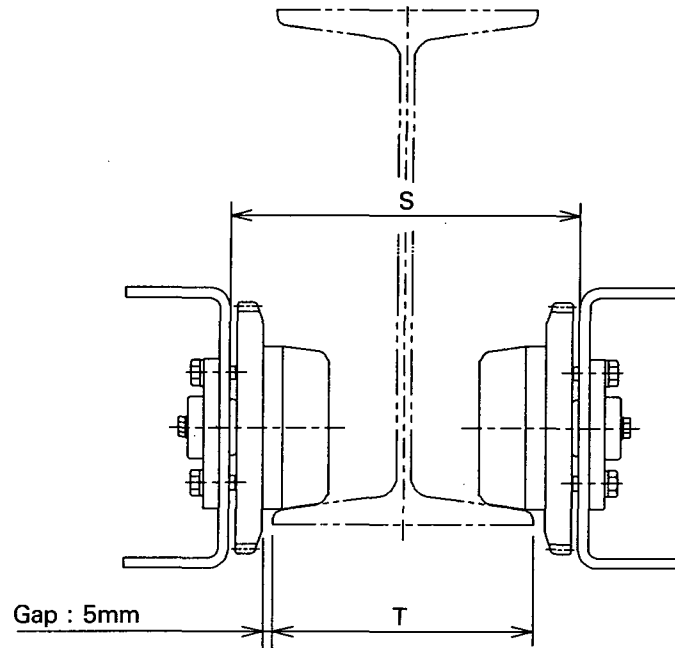


Fig. 13

Table 9

| End carriage |          | Unit:mm |
|--------------|----------|---------|
| Type         | Code     | S       |
| CEL010-9     | N6CL310V | T+51    |
| CEL020-9     | N6CL320V |         |

(5) Bolt tightening torque

High tension bolts (H.T.B.) are used to couple the end carriage to the girder. Tighten bolts to the appropriate torque (Table 10).

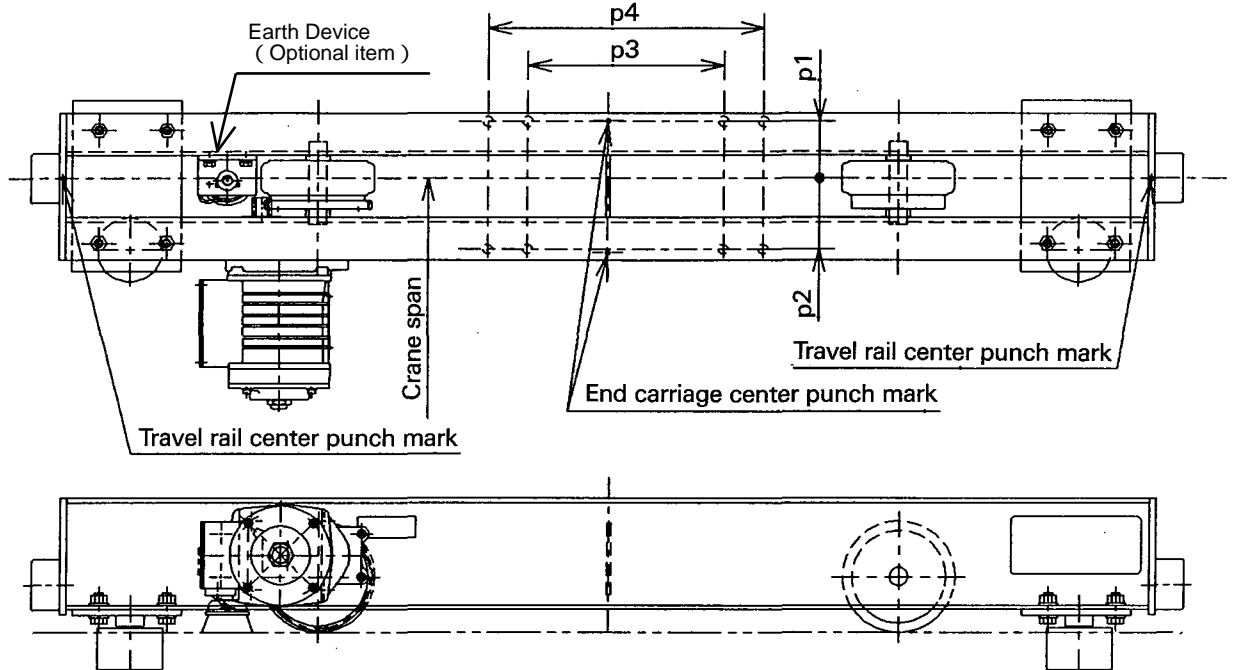
Table 10 Tightening torque

| H.T.B.                    | M14  | M16  |
|---------------------------|------|------|
| Tightening torque (kg·cm) | 1150 | 2580 |

## 4.2 Punching holes in overhead cranes

With overhead cranes, the center punch of the end carriage ( $\times 2$ ) and travel rail ( $\times 2$ ) are already opened in the connecting surface. Girder bolt holes can be aligned from these punches. Refer to Fig. 14 and Table 11.

NOTE: Never open holes with a gas torch.



- (1) Numbers, arrangement and sizes of the fixing bolts are only for your reference. Determine them depending on an actual girder which you choose.
- (2) Make every processing correctly enough by means of drilling based on both wheel base center punch marks and travel rail center punch marks.

Fig. 14

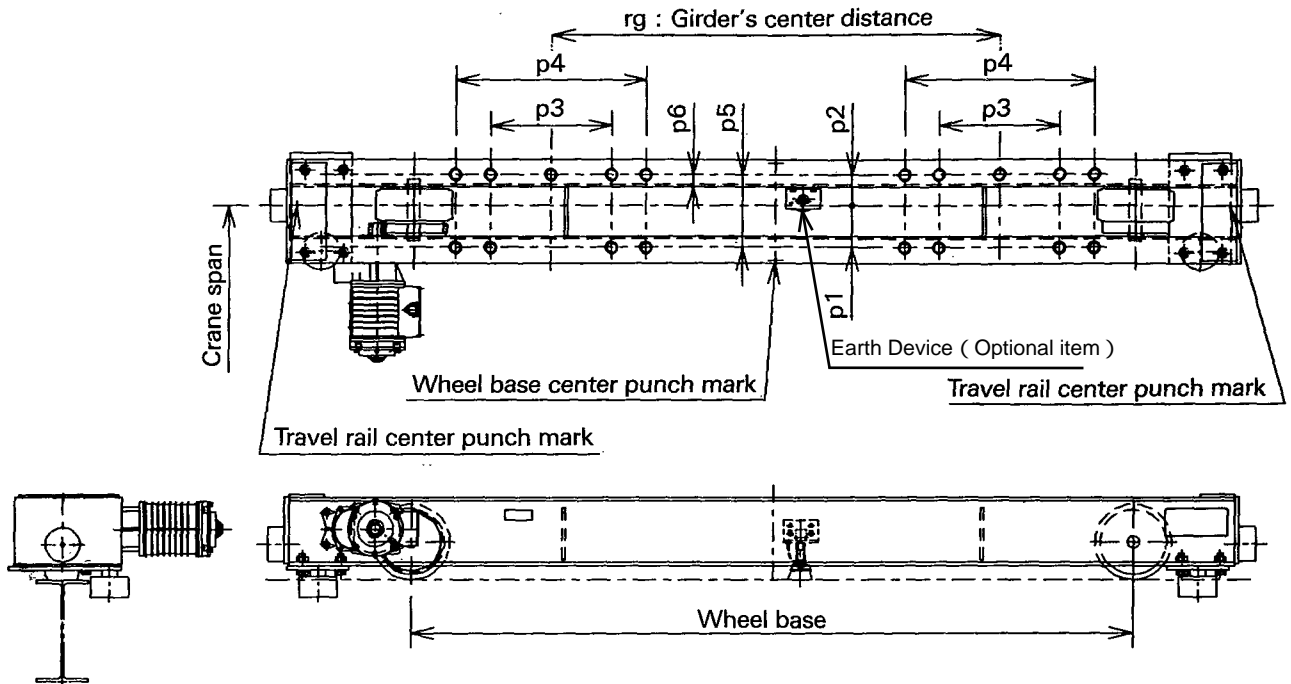
Table 11 Girder holes

| End carriage |          | p1  | p2  | p3    | p4     | Recommended bolt size |                 |
|--------------|----------|-----|-----|-------|--------|-----------------------|-----------------|
| Type         | Code     |     |     |       |        | Hole diameter         | Bolt diameter   |
| CEO010-9     | N6CO310E | 69  | 92  | B+100 | p3+110 | φ18                   | M16<br>(H.T.B.) |
| CEO010-18    | N6CO610E | 97  | 121 |       |        |                       |                 |
| CEO020-12    | N6CO420E | 89  | 113 |       |        |                       |                 |
| CEO030-15    | N6CO530E | 112 | 145 |       |        |                       |                 |
| CEO030-18    | N6CO630E | 112 | 145 |       |        |                       |                 |
| CEO030-21    | N6CO730E | 112 | 145 |       |        |                       |                 |
| CEO050-12    | N6CO450E | 112 | 145 |       | p3+120 | φ22                   | M20<br>(H.T.B.) |
| CEO050-18    | N6CO650E | 109 | 162 |       |        |                       |                 |
| CEO075-18    | N6CO675E | 129 | 175 |       |        |                       |                 |
| CEO075-21    | N6CO775E | 144 | 190 |       |        |                       |                 |
| CEO100-12    | N6CO411E | 144 | 190 |       |        |                       |                 |
| CEO100-21H   | N6CB711E | 194 | 249 |       |        |                       |                 |

B : Girder width

<When only the center punches for the wheel base and travel rail have been made>

Refer to Fig. 15 and Table 12 for applicable models.



- (1) Numbers, arrangement and sizes of the fixing bolts are only for your reference. Determine them depending on an actual girder which you choose.
- (2) Make every processing correctly enough by means of drilling based on both wheel base center punch marks and travel rail center punch marks.
- (3) Determine the dimensions p3, p4 and rg depending on girder type and assembly method.

Fig. 15

Table 12

| End carriage |          |       |       |    |    |     |      |    | Unit:mm       |                 |
|--------------|----------|-------|-------|----|----|-----|------|----|---------------|-----------------|
| Type         | Code     | p1    | p2    | p3 | p4 | p5  | p6   | rg | Hole diameter | Bolt size       |
| WCO030-15    | N6KO530E | 103.5 | 136.5 |    |    | 240 | 46.5 |    | φ22           | M20<br>(H.T.B.) |
| WCO030-21    | N6KO730E | 106   | 159   |    |    | 265 | 47.5 |    |               |                 |
| WCO030-27    | N6KO930E | 122   | 173   |    |    | 295 | 53.5 |    |               |                 |
| WCO075-15    | N6KO575E | 132   | 178   |    |    | 310 | 53.5 |    |               |                 |
| WCO075-21    | N6KO775E | 111   | 164   |    |    | 275 | 52.5 |    |               |                 |
| WCO075-27    | N6KO975E | 122   | 173   |    |    | 295 | 54   |    |               |                 |
| WCO150-15    | N6KO515E | 134.5 | 180.5 |    |    | 315 | 56   |    |               |                 |
| WCO150-21    | N6KO715E | 139.5 | 185.5 |    |    | 325 | 61   |    |               |                 |
| WCO200-15    | N6KO521E | 167.5 | 222.5 |    |    | 390 | 59   |    |               |                 |
| WCO200-15H   | N6KB521E | 167.5 | 222.5 |    |    | 390 | 59   |    |               |                 |
| WCO200-21    | N6KO721E | 171.5 | 223.5 |    |    | 395 | 63   |    |               |                 |
| WCO200-21H   | N6KB721E | 171.5 | 223.5 |    |    | 395 | 63   |    |               |                 |
| WCO200-27    | N6KO921E | 171.5 | 223.5 |    |    | 395 | 63   |    |               |                 |
| WCO200-27H   | N6KB921E | 171.5 | 223.5 |    |    | 395 | 63   |    |               |                 |

## 4.2.1 End carriage assembly for overhead cranes

### (1) End carriage assembly

Overhead end carriages do not come with bolts, nuts and washer for coupling the end carriage to the girder, therefore supply them yourself. Refer to Tables 11 and 12 for type of end carriage and bolt size.

NOTE : Use high tension bolts (H.T.B.) to couple the end carriage to the girder.

### (2) Gap adjustment between side roller and travel rail

The side rollers of the end carriage are not adjusted to your travel rail width when delivered. Keep the gap between the side rollers and the travel rail at 5 mm. Refer to Fig. 16-1, 16-2, Table 13 and 14

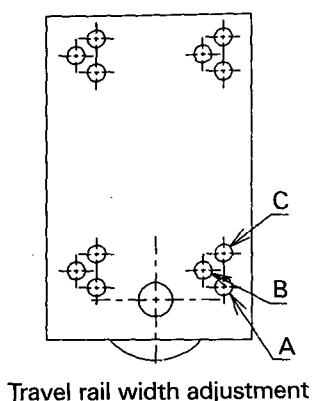


Fig. 16-1

<For single girder>

Table 13

| End carriage |          | Reference | A   | B   | C   | Bolt size       |
|--------------|----------|-----------|-----|-----|-----|-----------------|
| Type         | Code     |           |     |     |     |                 |
| CEO010-9     | N6CO310E | Fig16-1   | 100 | 125 | 150 | M12<br>(H.T.B.) |
| CEO010-18    | N6CO610E |           |     |     |     |                 |
| CEO020-12    | N6CO420E |           |     |     |     |                 |
| CEO030-15    | N6CO530E |           |     |     |     |                 |
| CEO030-18    | N6CO630E |           |     |     |     |                 |
| CEO030-21    | N6CO730E |           | 150 | 175 | 200 | M16<br>(H.T.B.) |
| CEO050-12    | N6CO450E |           |     |     |     |                 |
| CEO050-18    | N6CO650E |           |     |     |     |                 |
| CEO075-18    | N6CO675E |           |     |     |     |                 |
| CEO075-21    | N6CO775E |           |     |     |     |                 |
| CEO100-12    | N6CO411E | Fig16-2   | 200 | 250 | -   | M20<br>(H.T.B.) |
| CEO100-21    | N6CO711E |           |     |     |     |                 |
| CEO100-21H   | N6CB711E |           |     |     |     |                 |

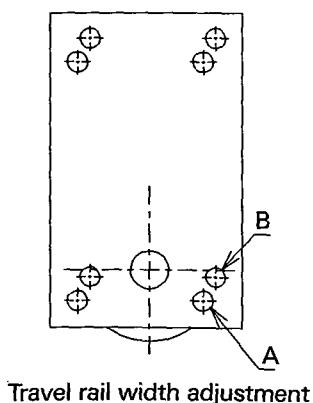


Fig. 16-2

<For double girder>

Table 14

| End carriage |          | Reference | A   | B   | C   | Bolt size       |
|--------------|----------|-----------|-----|-----|-----|-----------------|
| Type         | Code     |           |     |     |     |                 |
| WCO030-15    | N6KO530E | Fig16-1   | 150 | 175 | 200 | M16<br>(H.T.B.) |
| WCO030-21    | N6KO730E |           |     |     |     |                 |
| WCO030-27    | N6KO930E |           |     |     |     |                 |
| WCO075-15    | N6KO575E |           |     |     |     |                 |
| WCO075-21    | N6KO775E |           |     |     |     |                 |
| WCO075-27    | N6KO975E | Fig16-2   | 175 | 200 | -   | M20<br>(H.T.B.) |
| WCO150-15    | N6KO515E |           |     |     |     |                 |
| WCO150-21    | N6KO715E |           |     |     |     |                 |
| WCO200-15    | N6KO521E |           | 250 | 300 | -   |                 |
| WCO200-15H   | N6KB521E |           |     |     |     |                 |
| WCO200-21    | N6KO721E |           |     |     |     |                 |
| WCO200-21H   | N6KB721E |           |     |     |     |                 |
| WCO200-27    | N6KO921E |           |     |     |     |                 |
| WCO200-27H   | N6KB921E |           |     |     |     |                 |

## 4.2.2 Bolt tightening torque

### (1) End carriage and girder

Use high tension bolts (H.T.B.) to couple the end carriage to the girder.

Tighten bolts to the appropriate torque. (Table 15)

**Table 15 Tightening torque**

| H.T.B.                    | M16  | M20  |
|---------------------------|------|------|
| Tightening torque (kg·cm) | 3000 | 5820 |

### (2) Roller axle

The side rollers move by horizontal force when the crane is in motion. Tighten the axles with the tightening torque in Table 16, to eliminate any looseness.

**Table 16 Tightening torque**

| H.T.B.                    | M12  | M16  | M20  |
|---------------------------|------|------|------|
| Tightening torque (kg·cm) | 1200 | 3000 | 5820 |

## 5. Painting

The end carriage comes coated with a paint-base primer. Refer to the below table when selecting a top coat.

| End carriage length   | 1500mm and less                          | 1501mm and more                          |
|-----------------------|--|--|
| Primer                | Melamine resin base                      | Phenol alkyd base                        |
| Compatible top coat   | Melamine resin base<br>Phenol resin base | Phenol resin base<br>Melamine resin base |
| Incompatible top coat | Epoxy resin base<br>Urethane base        | Lacquer base                             |

NOTE 1 : When adding your top coat, never paint over bolts and nuts. Paint coated threads will make it harder to loosen parts and thus maintenance more difficult.

### 2 : Protective shield for name plate

The name plate on the end carriage is covered with a protective shield, therefore you can paint over it directly. Be sure to strip off the shield when finished painting.

## 6. Erecting the end carriage on the travel rail

Refer to "Assembly, wiring and test run" in the Motorized Crane Instruction Manual.



**KITO**

Global Website: [kito.com](http://kito.com)



Utilizing 70% post-consumer recycled paper pulp