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Introduction to UKAI Casters – Table of Contents

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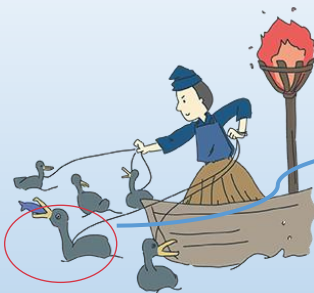
*Note: Page numbers refer to slide numbers.

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Origin of the UKAI Mark



Named after “UKAI”
(cormorant fishing) on the
Nagara River in Gifu
Prefecture

1. UKAI Casters were established in 1970
2. Pioneered the production of steel plate casters manufactured by pressing, as opposed to cast or welded casters

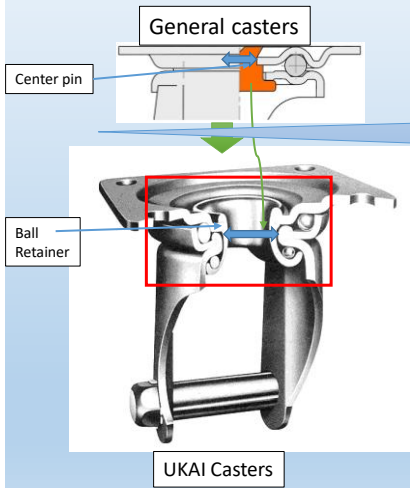
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Features of UKAI Casters

The patented structure of the ball retainer in the swivel support part provides smooth and stable swiveling over a long period, even under strong impacts



Uses a tubular ball retainer instead of a center pin
The swivel support area is large and can withstand strong impacts



Patented (Utility Model)
PAT.1242732

Although the patent has expired and similar structures are now used by other companies, this proves the excellence of the technology



What is a Caster?

According to the UKAI Caster catalog:

JPN Catalog P.5



Casters are attached to transportation equipment and other devices inside rooms and facilities, with the purpose of facilitating the relocation or transfer of cargoes, excluding people and animals, and moved by human power intermittently.

Purpose

Makes moving and transporting loads easier

Where

Attached to transport equipment and various machines

How

Used intermittently by human power

Speed Limnits
Below 4km/h



How to Use Casters

Examples:

Handcarts

Shopping carts

Roll boxes

Various equipment

And so on



Names of Each Parts and Dimensions

Names of Each Part and Dimensions

Caster SJ-150

Bracket J-150

Mounting plate

Swivel Part

Bracket Body

Shaft

Wheel S-150

Bearings

Wheel Rim

Tire

JPN Catalog P.7

Casters consist of bracket and wheel

The mounting plate has four holes for bolts to attach to the object.

This part rotates, and the caster faces in the direction of travel. It contains steel balls, bearings, etc.

This is where the wheels are attached.

The bracket and wheel are connected by a shaft.

The wheel center contains bearings or bushings for rotation.

It is located inside the wheel and is made of steel plate, aluminum die-cast, resin, etc.

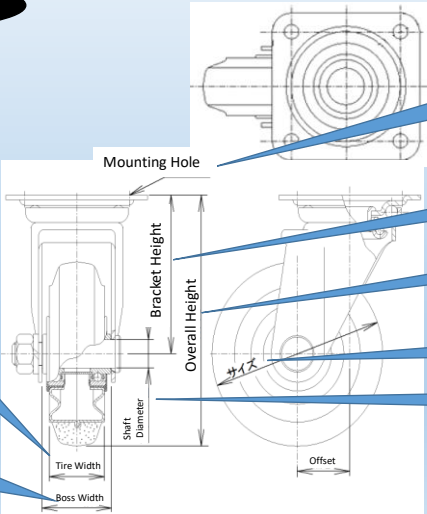
Tire materials include rubber, urethane, nylon, etc.



Caster Dimensions

Casters consist of bracket and wheel

JPN Ctalog P.7



The top plate has mounting holes. The hole diameter and pitch must match those of the mounting surface.

The height from the top plate to the center of the shaft hole.

The total height from the top plate seat surface to the wheel contact surface.

The outer diameter of the wheel

The shaft diameter

The width of the wheel

The width of the wheel's rotation center



Types of Casters

Swivel Caster



The caster can freely turn in the direction of travel

Rigid Caster



The caster only moves in one direction

Swivel Caster with Stopper



When you press the pedal, both the wheel rotation and the bracket swivel are locked



Left-side Stopper: The pedal is on the left side in the direction of travel

Rigid Caster with Stopper



When you press the pedal, only the wheel rotation is locked



Left-side Stopper: The pedal is on the left side in the direction of travel

JPN Catalog P.9

1. There are swivel casters that can freely turn in the direction of travel, and fixed casters that only move in one direction.
2. There are also types with stoppers that lock the wheel or bracket when the pedal is pressed.



When you press the pedal, only the wheel rotation is locked



Types of Casters with Stoppers

Double Stopper

When the stopper is ON

Both **wheel rotation** and **bracket swivel** are locked.

Single Stopper

When the stopper is ON

Only **wheel rotation** are locked.

- There are two types of casters with stoppers:
1. **Double stopper:** Stops both the wheel rotation and the bracket swivel at the same time.
 2. **Single stopper:** Stops only the wheel rotation.

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Load Capacity and Adequate Load of Casters

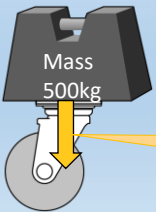
Load Capacity and Adequate Load

JPN Catalog P.5

Load Capacity	Upper limit for safe, smooth use for a long period of time. This value is listed in the catalog.
Adequate Load	When casters are attached to a cart (use of 4 casters), the load needs to be supported at 3points. Accordingly, please calculate the load, assuming 80% of the maximum load, as shown in the following. $\text{Adequate Load} = \text{Load Capacity per 1 pcs (daN)} \times 4 \text{ pcs} \times 0.8$

About the unit daN (decaNewton)

The unit of force used is daN (decanewton).
 $1\text{daN}=10\text{N}\approx 1.02\text{kgf}$ ($1\text{kgf}\approx 9.8\text{N}=0.98\text{daN}$)



the load on the casters is 500 kgf or 490 daN.

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Load Capacity and Adequate Load of Casters

Examples:

JPN Catalog P.5

The load to be carried should be 640 daN (652.8 kgf) or less

When using four casters on a cart:
 $200 \text{ daN (max load)} \times 4 \text{ (pcs)} \times 0.8 = 640 \text{ daN (652.8 kgf)}$

For caster SJ-150, the maximum load per caster is 200 daN (204.0 kgf).



1. The catalog lists the maximum load per caster in daN (1 daN = 1.02 kgf).
2. When using on a cart, use within the adequate load.

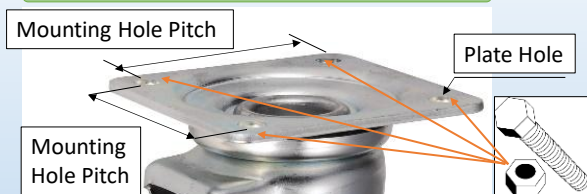
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How to Attach Casters

Plate-type caster



Screw-in type caster



1. Pass bolts through the four holes in the top plate and attach to the object (cart, equipment, etc.).
2. If the pitch or diameter of the mounting holes does not match, attachment is not possible.
3. The length of the bolts depends on the situation of the object.
4. There are also screw-in type casters (mainly for lighter loads).

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Introduction to UKAI Casters

The Model Number of UKAI Casters

●The Model Number of UKAI Casters

Wheel Type	Bracket Type	Wheel Size (mm)
S	J	- 150
150mm Medium Weight Rubber Wheel with Swivel Bracket		
RR	JM	- 150
150mm Heavy Duty MC Nylon Wheel with Swivel Bracket		


 SJ-150


 RRJM-150

JPN Catalog P.7

●The Model Number of UKAI Wheels

Wheel Type	Wheel Size (mm)
S	- 150
150mm Rubber Wheel	
RR	- 150
150mm MC Nylon Wheel	


 S-150

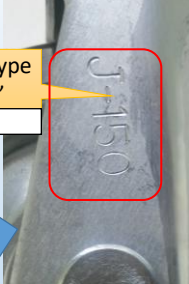
 RR-150


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Introduction to UKAI Casters

How to Read UKAI Caster Engraving

 UKAI Mark

 Bracket Type "J-150" J-150

 UKAI Mark

The direction of travel

Left side of the bracket

Right side of the bracket

Right side of wheel

Wheel Type	Bracket Type	Wheel Size (mm)
S	J	- 150

Wheel Type "S 150X45"⇒
S Type: Size 150mm / wheel width45mm
S-150

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Introduction of Main Casters (Part 1)

Medium Weight Caster Series J, K, JB, KBZ



Size: 75mm~300mm

- 1. Standard casters focused on cost performance
- 2. Available with stoppers to lock wheel rotation and bracket swivel

JPN Catalog P.19

Heavy Duty Caster Series JM, KH, JMB



Size: 50mm~200mm

- 1. Can carry heavy loads (max load 660 daN [673.2 kgf] for 200 mm size)
- 2. Available with stoppers to lock wheel rotation

JPN Catalog P.67

Stainless Steel Caster Series JA, KA, JAB, KABZ



Size: 75mm~200mm

- 1. Ideal for places exposed to water (uses JIS SUS304 stainless steel)
- 2. Available with stoppers to lock wheel rotation and bracket swivel

JPN Catalog P.43

Super Heavy Duty Caster Series JH, JHB



Size: 130mm~200mm

- 1. Can carry heavier loads (max load 800 daN [816.0 kgf] for 200 mm size)
- 2. Easy to move even with heavy loads (uses bearings in swivel part)

JPN Catalog P.77

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Introduction of Main Casters (Part 2)

Rich Urethane Caster Series RUJH, RUJHB, RUKH



Size: 150mm

- 1. Easy movement of heavy loads (over 60% reduction in starting resistance)
- 2. Less wheel wear (about 47% reduction in friction volume)

JPN Catalog P.87

Low Height Caster Series T, TN



Size: 50mm

- 1. Low mounting height (57 mm for 50 mm size)
- 2. Dustproof type also available

JPN Catalog P.83

Towing Caster Series JHW, KHW, KW



Size: 150mm~200mm

- 1. Nuts do not loosen even when towed (secured with split pins)
- 2. Easy to move even with heavy loads (uses bearings in swivel part)

JPN Catalog P.81

Heavy Duty Low Height Caster Series TH



Size: 50mm/65mm

- 1. Low mounting height (87 mm for 65 mm size)
- 2. Max load for 65 mm size: 450 daN [459.0 kgf]

JPN Catalog P.85

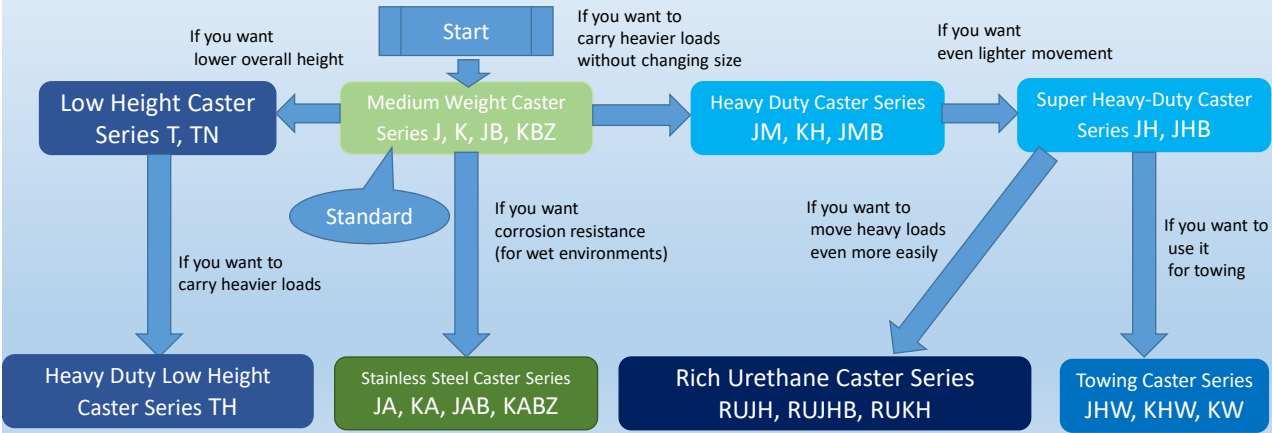
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Caster Selection (Flowchart)

The selection process for each caster is as follows:



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HS: Shore hardness
HR: Rockwell hardness
(higher number = harder)



Tire Materials and Features

Tire Material	Rubber	Urethane	Nylon	MC Nylon
In short	Most common wheel	Better properties than rubber	Excellent oil/weather resistance, no elasticity	Monomer cast nylon, a reinforced version of regular nylon
Hardness	HS65	HS95(antistatic HS90)	HR120	HR120
Elasticity	☆	◎	×	×
Compression Set	○	◎	☆	☆
Wear Resistance	◎	☆	☆	☆
Weather Resistance	○	☆	☆	☆
Oil Resistance (machine oil)	△	☆	☆	☆
Gasoline Resistance	×	◎	◎	◎
Heat Resistance (°C)	80(heat-resistant rubber 100)	70	70	130
Cold Resistance (°C)	-40	-30	-40	-40
Water Resistance	△	△	○	○
Chemical Resistance (acid / alkali)	△	×	◎	◎
Starting Performance	◎	◎(Rich Urethane ☆)	☆	☆

☆	Excellent
◎	Very Good
○	Good
△	Fair
×	Poor

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Introduction of Main Rubber Wheels

Polybutadiene Rubber Wheel S Type	Polybutadiene Red Rubber Wheel SR Type	Size: 75mm~300mm <ul style="list-style-type: none">1. Standard rubber wheels for medium-duty caster2. Wheel Rim: Steel3. Red rubber wheels (SR) that do not easily stain the floor, and heat-resistant rubber wheel (CR) with a heat resistance of 100 °C are also available JPN Catalog P.89	Heavy Duty Steel Rim / Polybutadiene Rubber Wheel RG Type 	Size: 100mm~200mm <ul style="list-style-type: none">1. Rubber wheels for heavy-duty casters2. Wheel Rim: Made of Aluminum alloy for die casting (ADC-12) (200mm size is steel rim)3. Maximum load for 200mm size: 410 daN [418.2 kgf] JPN Catalog P.97
Nylon Rim / Rubber Wheel PN Type	Nylon Rim / Rubber Wheel (Spindle Sleeve) PNA Type	Size: 75mm~200mm <ul style="list-style-type: none">1. Rubber wheels with nylon rim2. Ideal for locations exposed to water3. Stainless steel bearing wheel (PND) and spindle sleeve wheel (PNA) are also available JPN Catalog P.92 / P.94		



Introduction of Main Urethane Wheels

Urethane Rubber Wheel SUI Type	Antistatic urethane wheel SUIE Type	Size: 50mm~300mm <ul style="list-style-type: none">1. Standard urethane rubber wheels for medium-duty casters2. Wheel Rim: Steel3. Antistatic urethane wheel (SUIE) available for cleanroom use JPN Catalog P.91 / P.96	Heavy Duty Aluminum Rim / Urethane Rubber Wheel R Type 	Size: 100mm/130mm/150mm <ul style="list-style-type: none">1. Urethane rubber wheel For heavy-duty casters2. Wheel Rim: Aluminum alloy for die casting (ADC-12)3. Maximum load for 150mm size: 500 daN [510.0 kgf] JPN Catalog P.98
Nylon Rim / Urethane Rubber Wheel PNU Type	Nylon Rim / Urethane Rubber Wheel (Spindle Sleeve) PNUA Type	Size: 75mm~200mm <ul style="list-style-type: none">1. Urethane rubber wheels with nylon rim2. Ideal for locations exposed to water3. Stainless steel bearing wheel (PNUD) and spindle sleeve wheel (PNUA) are also available JPN Catalog P.93 / P.94	Heavy Duty Steel Rim / Urethane Rubber Wheel RF Type 	Size: 65mm~200mm <ul style="list-style-type: none">1. Urethane rubber wheel For heavy-duty casters2. Wheel Rim: Steel3. Maximum load for 200mm size: 600 daN [612.0 kgf] JPN Catalog P.98



Introduction of Main Nylon Wheels

Nylon Wheel PB Type		Nylon Wheel (Spindle Sleeve) P Type		Size: 75mm~200mm	Reinforced Nylon Wheel RGN Type	Size: 50mm~100mm
				<ol style="list-style-type: none">1. Lightweight, integrated resin wheels2. Ideal for locations exposed to water3. Stainless steel bearing wheel (PBD) and spindle sleeve wheel (P) are also available		<ol style="list-style-type: none">1. Reinforced nylon wheel For heavy-duty casters2. Made of nylon 6 mixed with glass fiber for reinforcement3. Maximum load for 100mm size: 500 daN [510.0 kgf]
JPN Catalog P.95 / P.96					JPN Catalog P.97	

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Introduction of Main MC Nylon Wheels (Part 1)

MC Nylon Wheel RR Type		Size: 50mm~200mm
		<ol style="list-style-type: none">1. Made of MC nylon, excellent in wear resistance and load capacity2. Maximum load for 200mm size: 660 daN [673.2 kgf]
50mm~100mm 130mm~200mm		JPN Catalog P.100

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Introduction of Main MC Nylon Wheels (Part 2)

MC Nylon Wheel UWB Type	MC Nylon Wheel (Spindle Sleeve) UWA	Size: 75mm~200mm	MC Nylon Wheel UWBS Type	Size: 75mm~250mm
		<ul style="list-style-type: none">1. Made of MC nylon, excellent in wear resistance and load capacity2. Ideal for locations exposed to water3. Stainless steel bearing wheels (UWBD) and spindle sleeve wheels (UWA) are also available4. Maximum load for 200mm size: 1,400 daN [1,428 kgf] (When using only the wheels)		<ul style="list-style-type: none">1. Narrower wheel width compared to UWB type, advantageous in cost and starting performance2. Stainless steel bearing wheel (UWBSD) also available3. Maximum load for 250mm size: 1,000 daN [1,020 kgf] (When using only the wheels)
JPN Catalog P.101 / P.102			JPN Catalog P.103	



Introduction of Pneumatic Rubber / Airless Wheel Casters

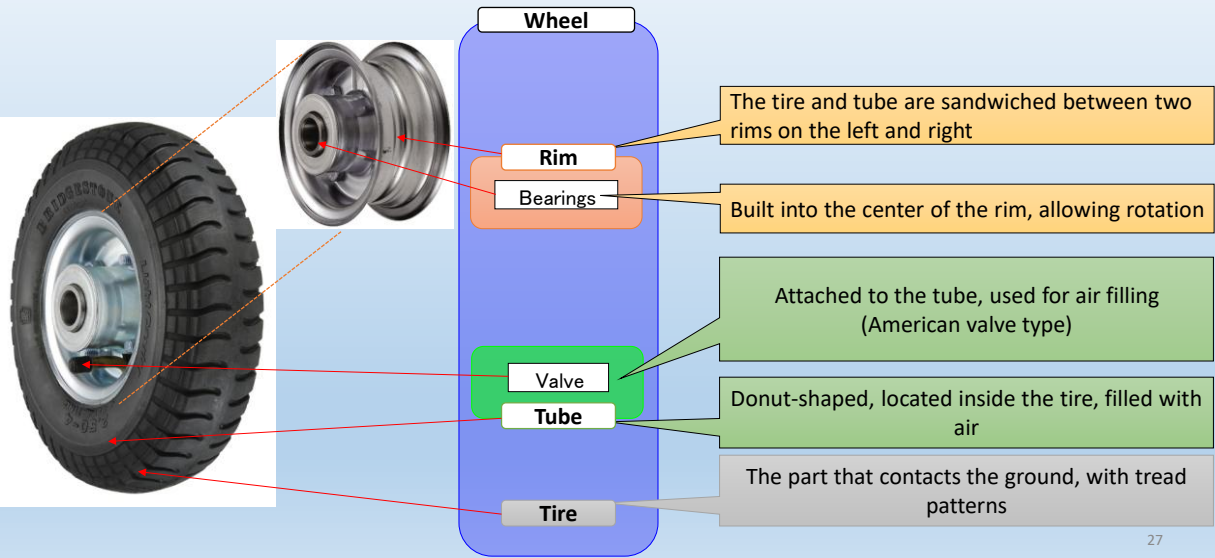
Casters with wheels like those used in wheelbarrows, equipped with pneumatic tires



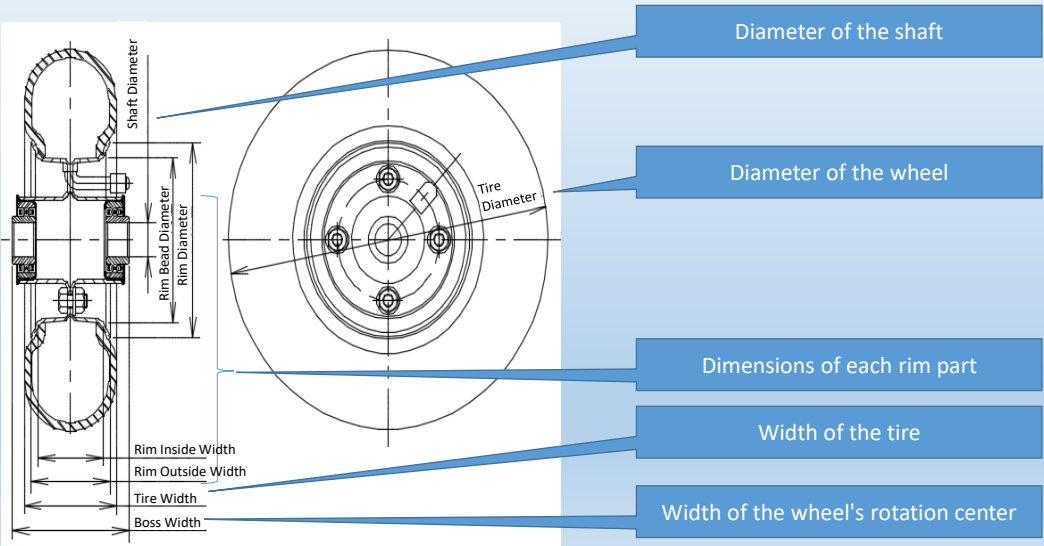
- 1. Pneumatic tires provide superior elasticity (cushioning) compared to regular rubber wheels
- 2. Tires have grooves, making them ideal for use on uneven surfaces, asphalt, soil, etc.
- 3. There are also puncture-proof tires available



Names of Each Part of Pneumatic Wheels




Dimension of Pneumatic Wheels





Introduction to UKAI Casters

JPN Catalog P.121





The Model Number of Pneumatic Wheels Casters

● The Model Number of UKAI Pneumatic Rubber / Airless Wheel Casters

HLJ	6 $\frac{1}{2}$ × 2 - 3	BLACK			
Bracket Type Swivel Caster	Tire Dia. 6 $\frac{1}{2}$ -inch	Tire Width 2inch	Rim Inside Width 3inch	Wheel Tire Color: Black	HLJ6 $\frac{1}{2}$ × 2-3 BLACK
HLK	2.50 - 4	PU GRAY			
Bracket Type Rigid Caster	Tire Dia. 2.5inch	Rim Inside Width 4inch	Wheel Foaming Urethane / Gray	HLK2.50-4 PU GRAY	

● The Model Number of UKAI Pneumatic Wheels

	6 $\frac{1}{2}$ × 2 - 3	HL	BLACK	4PR		
6 $\frac{1}{2}$ × 2-3HL BLACK	Tire Dia. 6 $\frac{1}{2}$ -inch	Tire Width 2inch	Rim Inside Width 3inch	HubLess	Wheel Tire Color: Black	Ply Rating (Tire strength)
	2.50 - 4	HL	PU GRAY	4PR		
2.50-4HL PU GRAY	Tire Dia. 2.5inch	Rim Inside Width 4inch	HubLess	Wheel Foaming Urethane / Gray	Ply Rating (Tire strength)	

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Introduction to UKAI Casters



Introduction of Pneumatic Rubber / Airless Wheel Casters

Swivel Caster HLJ/HLJY/HFJF JPN Catalog P.123	Rigid Caster HLK/HFKF JPN Catalog P.125	Swivel Caster with Stopper HLJB/HLJBF JPN Catalog P.128	HLJS/HLJYS JPN Catalog P.127
			
HLJ6 $\frac{1}{2}$ × 2-3 BLACK	HLK6 $\frac{1}{2}$ × 2-3 BLACK	HLETJB2.50-4 PU GRAY	HLJS6 $\frac{1}{2}$ × 2-3 GRAY
			
HLJ2.50-4 BLACK	HLK2.50-4 BLACK	HLJB3.00-4 BLACK	HLJYS6 $\frac{1}{2}$ × 2-3 PU

Both the wheel rotation and the bracket swivel are locked

Only the wheel rotation is locked

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Introduction of UKAI Pneumatic Rubber Wheels

Pneumatic Tires

- 1. Pneumatic Tires
- 2. Tire color : Black and Gray
- 3. Made by overseas manufacturers and Bridgestone
- 4. Risk of puncture



Puncture-Proof Tires (PU):

- 1. Foam urethane filled
61/2 x 2-3PU : urethane foam integrated
- 2. Tire color : Black and Gray
61/2 x 2-3PU: Only Gray
- 3. Almost the same cushioning as pneumatic tires
- 4. No risk of puncture



Airless Tires (AL)

- 1. Solid rubber wheel
- 2. Tire color: Only Black
- 3. Hard and heavy but excellent load capacity
- 4. No risk of puncture



Checklist for Usage Conditions

Please check the following usage conditions:

- 1. Loading method (e.g., cart, installed under equipment)
- 2. Mounting method (e.g., mounting hole pitch, diameter)
- 3. Load (e.g., 300kg including cart weight)
- 4. Usage Environment
 - 1. Floor material (e.g., concrete, asphalt, grating, steel plate)
 - 2. Floor condition (e.g., unevenness)
 - 3. Usage temperature (e.g., below -20° C)
 - 4. Environment (e.g., exposed to oil, water, steam, cleanroom)
 - 5. Location (e.g., indoor, outdoor)
- 5. Restrictions (height, noise, vibration, others)
- 6. Other
- 7. Other concerns beyond the above terms of use



FAQ (Frequently Asked Questions)

Q1 <i>I want to make it as easy to move as possible.</i>	A1 Taking the following measures will improve starting performance. ① Use rich urethane casters ② Change wheel material to a harder one (rubber → urethane → nylon) Note: Depending on the floor condition, harder wheels may not be suitable ③ Increase wheel diameter (e.g., change from 100mm to 200mm) ④ Narrow the tire width (e.g., change from UWB type to UWBS type) ⑤ Make the wheel contact surface rounded to reduce friction ※ In both ④ and ⑤, the contact area becomes smaller, reducing friction.
Q2 <i>I want to use it in environments exposed to water or chemicals.</i>	A2 ① Use stainless steel casters to prevent rust ② For chemical resistance, nylon and MC nylon are better than rubber or urethane
Q3 <i>I want to use it in high or low temperature environments.</i>	A3 ① Use heat-resistant rubber wheels (CR type) or MC nylon wheels ② Change the grease in the wheel bearings and brackets to heat-resistant or cold-resistant types (please inform the actual usage temperature)

Last Update: 2025/11/10

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UKAI PRODUCTS

Casters & Wheels

岐阜産研工業株式会社

Gifu Sanken Kogyo Co.,Ltd.

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