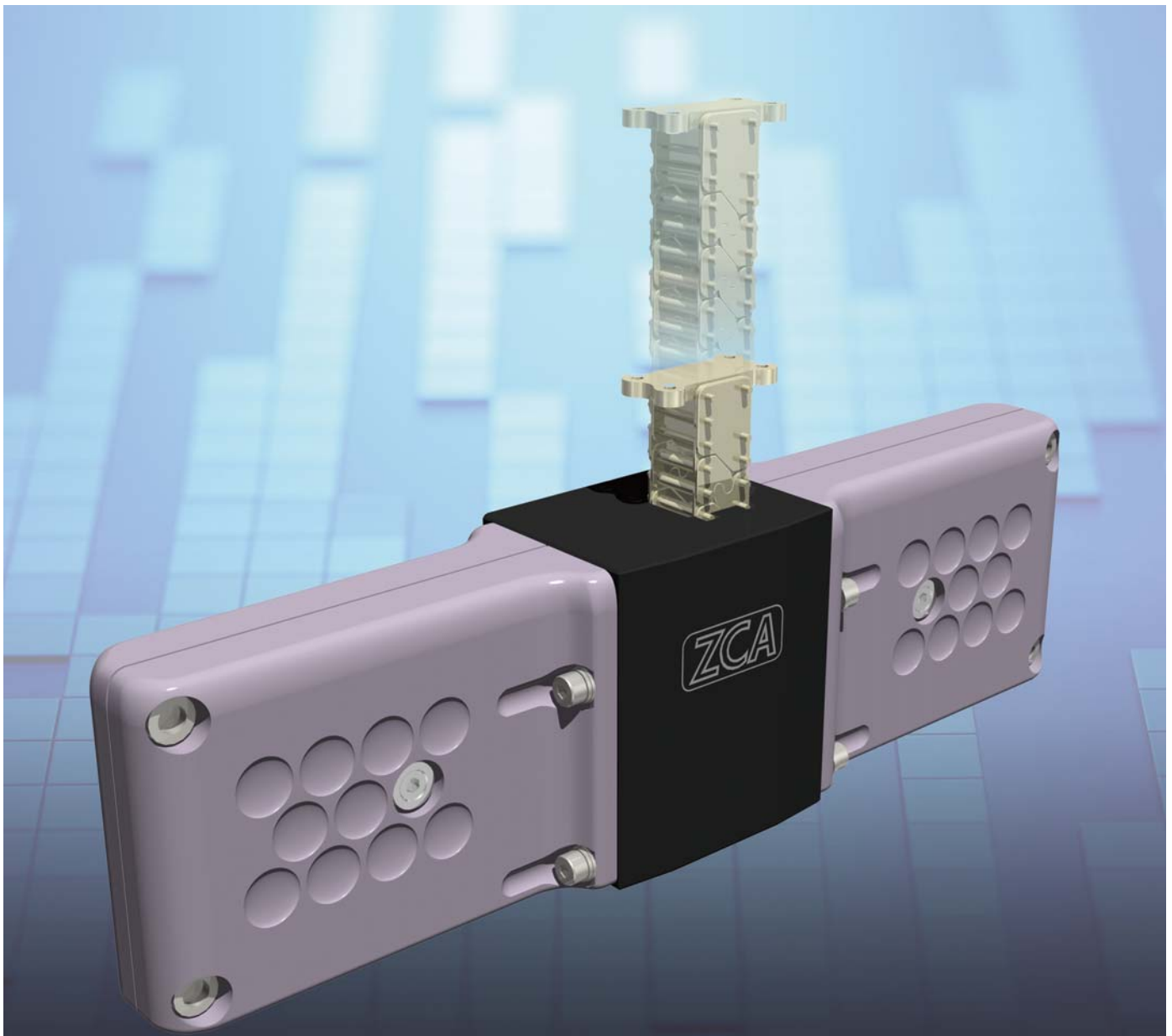


TSUBAKI ZIP CHAIN ACTUATOR[®]

Patent Pending

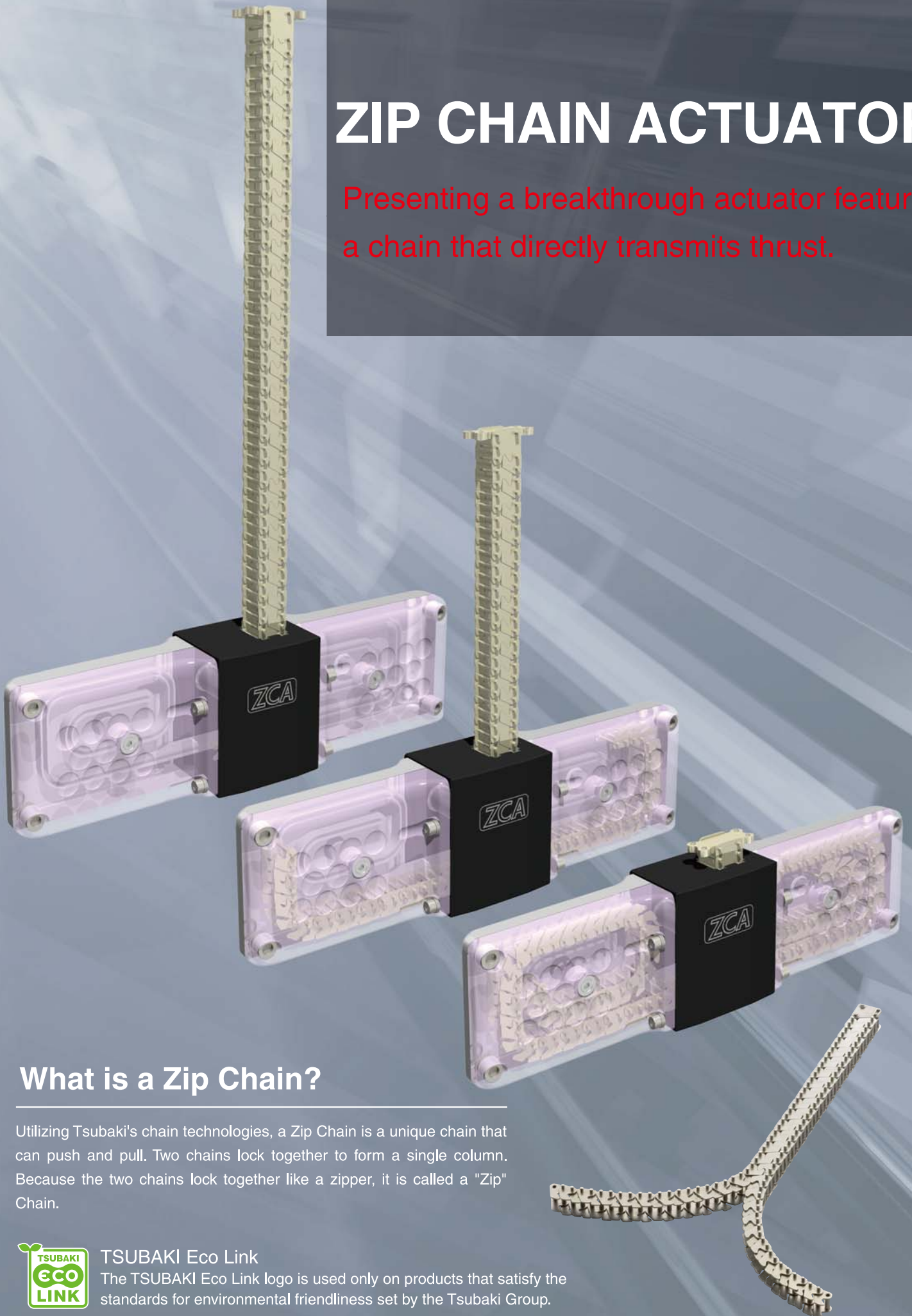


ZIP CHAIN ACTUATOR



ZIP CHAIN ACTUATOR

Presenting a breakthrough actuator featuring a chain that directly transmits thrust.



What is a Zip Chain?

Utilizing Tsubaki's chain technologies, a Zip Chain is a unique chain that can push and pull. Two chains lock together to form a single column. Because the two chains lock together like a zipper, it is called a "Zip" Chain.



TSUBAKI Eco Link

The TSUBAKI Eco Link logo is used only on products that satisfy the standards for environmental friendliness set by the Tsubaki Group.

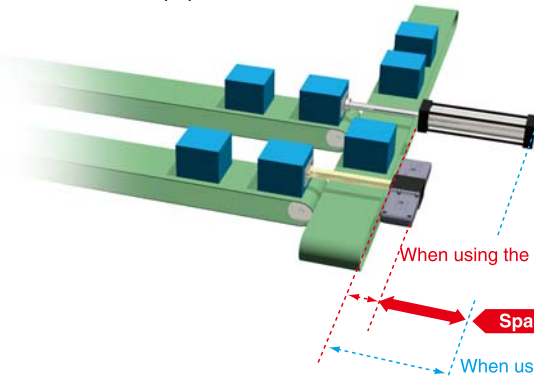
Feature

1

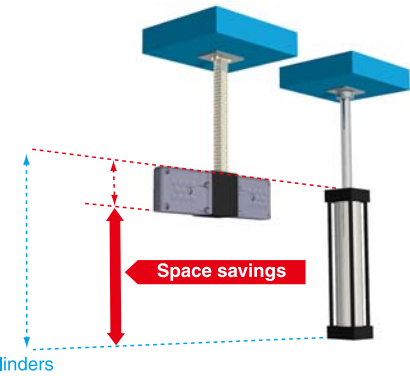
Compact

Can be installed in tighter spaces when compared to other cylinder/linear actuators. (space savings)

■ Transfer equipment



■ Lifting equipment



Feature

2

High-speed

Capable of high-speed operation when compared to screw actuators and compressed air/hydraulic cylinders. (max. 1,000 mm /sec.)

Feature

3

Eco-friendly

Power consumption is less than 1/30th when compared to compressed air/hydraulic cylinders.* Achieves high efficiency of nearly 90% in combination with dedicated sprockets.*

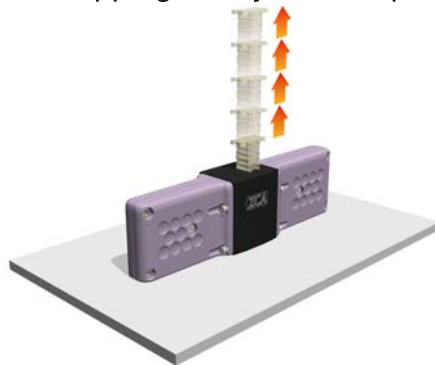
* Results may vary with usage conditions and lubrication state.

Feature

4

Multi-point stopping

Multi-point stopping at any desired position is possible by controlling input rotation.

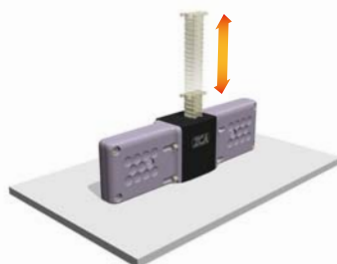


Feature

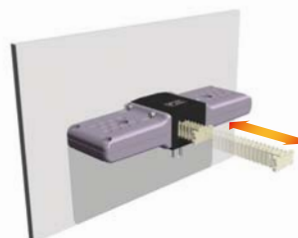
5

Installation direction freedom

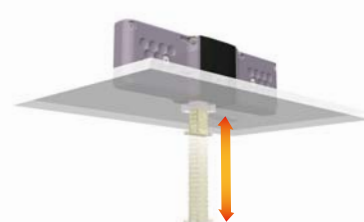
Vertical



Horizontal

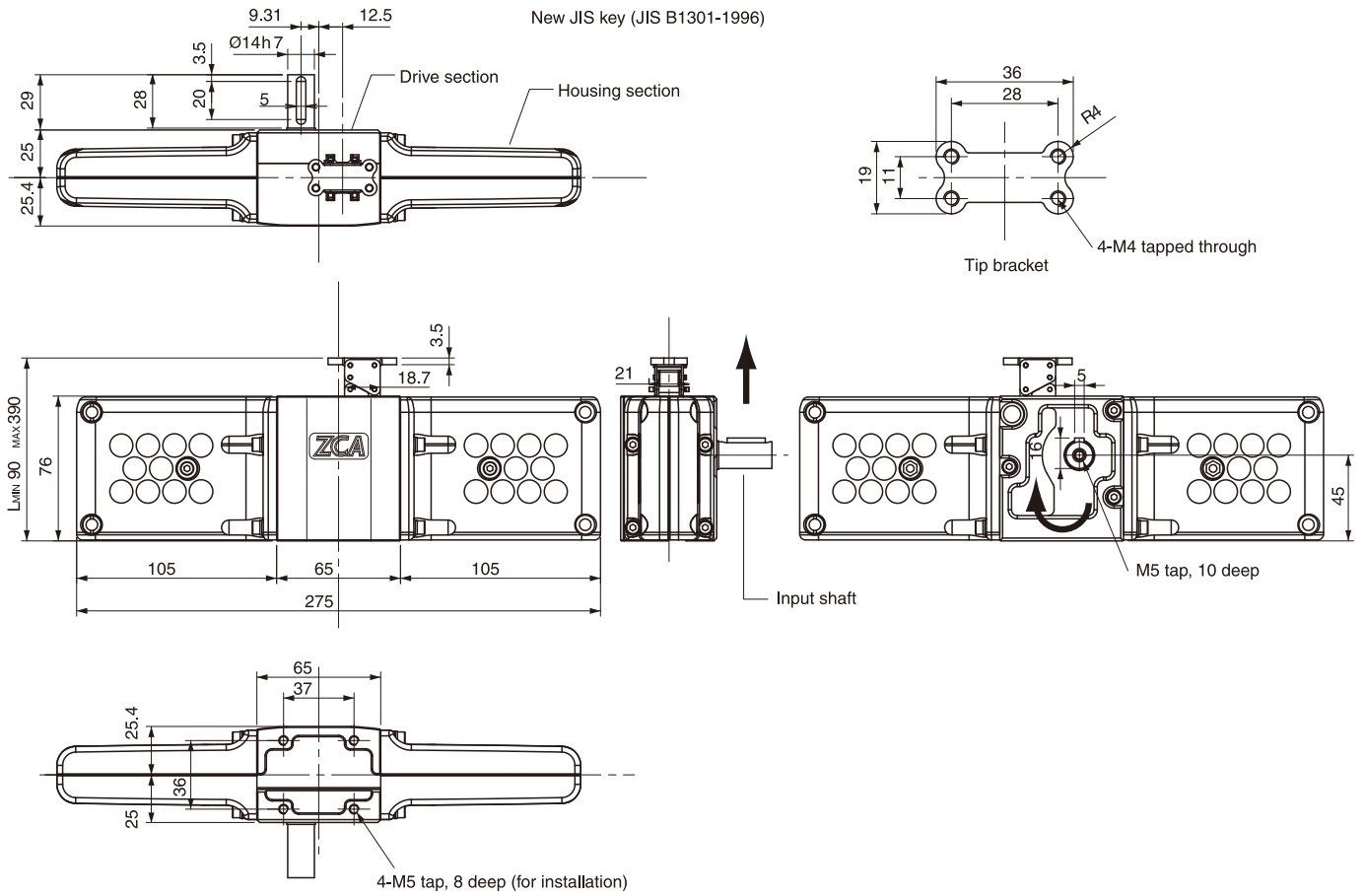


Hanging

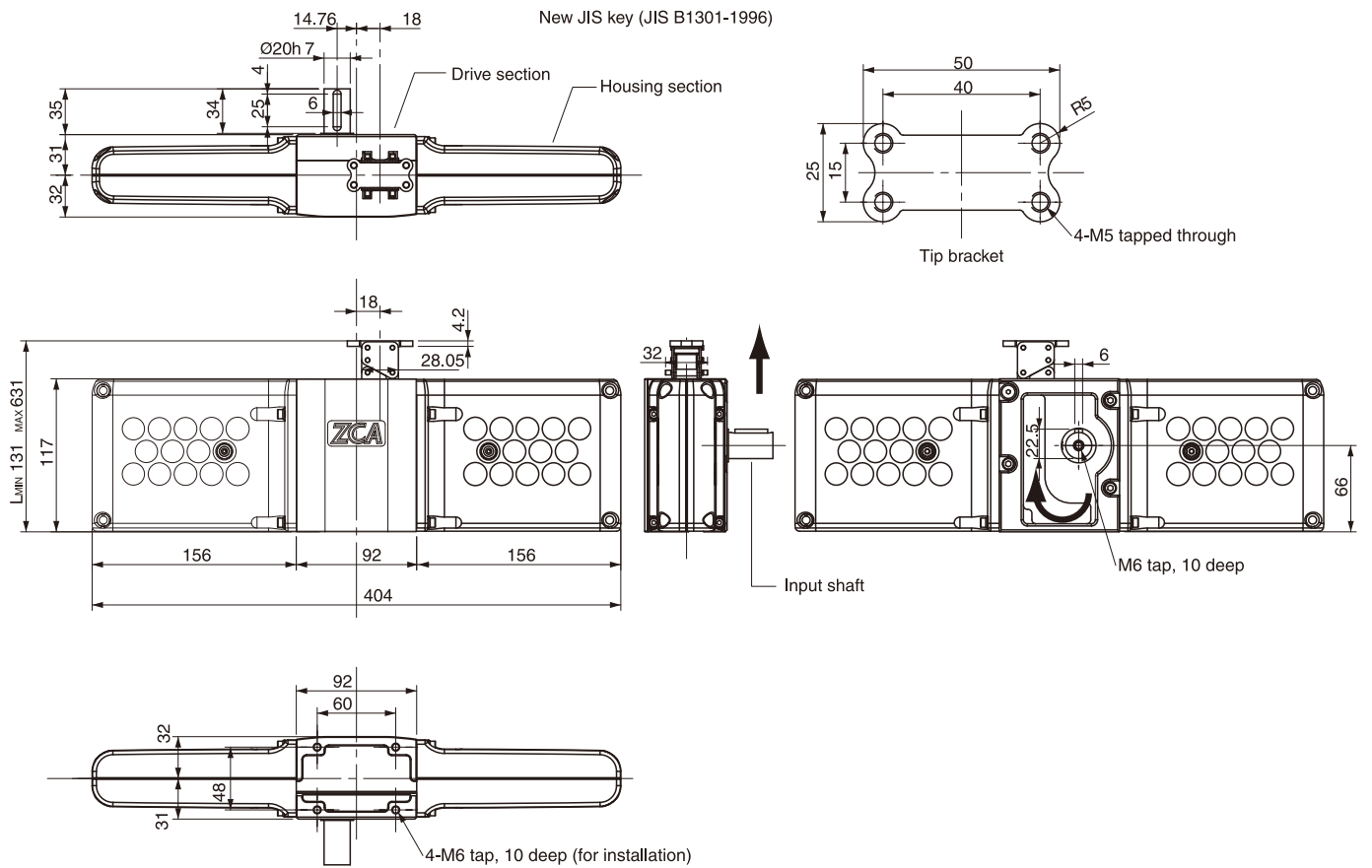


External diagrams

ZCA 025 N



ZCA 035 N



Model number designation

ZCA 025 N

ZIP CHAIN ACTUATOR

Without motor

Frame number: 025 Frame number: 035

Specifications

Model Number	Basic capacity*1 kN {kgf}	Stroke*2 mm	Maximum speed*3 mm/sec	Maximum input rotation speed r/min	Permissible input shaft torque N·m {kgf·m}	Zip Chain movement amount per input shaft rotation mm	Sprocket pitch diameter mm	Approximate weight kg
ZCA025N	0.4 {41}	300	1000	630	9.27 {0.94}	95.3	Ø30.92	1.9
ZCA035N	1.0 {102}	500	1000	420	34.8 {3.55}	142.9	Ø46.48	5.1

*1 Value when operating at a maximum 0.35 G (upper limit) acceleration. Same value when used both vertically and horizontally.

Note: Always install a linear guide.

*2 Use within the stroke range.

*3 Zip Chain speed at maximum input rotation speed.

Materials: Drive section (steel alloy), housing section (polyoxymethylene)

Paint color: Drive section (black: equivalent to Munsell N 2.0), housing section (purple-grey: equivalent to Munsell 0.8P 6.3/3.0)

Lubricant: Grease

Usage environment standards

Model Number	Environment	Usage temperature range	Relative humidity	Usage atmosphere
ZCA025N		0 to 60°C	85% or lower (no condensation)	Typical indoors
ZCA035N				

* Typical indoors indicates no rain or water getting on the product, dust at the level of a normal factory.

Selection

Usage conditions required for selection

- (1) Machinery used
- (2) Layout
- (3) Required thrust or load (P)
- (4) Operating speed
- (5) Stroke
- (6) Usage frequency number of starts/min
- (7) Usage environment

- Consider the properties of the load, refer to the service factor, and then find the corrected load (Fs).

Corrected load (Fs) N{kgf} = Required thrust (P) N{kgf} x Service factor (Sf)

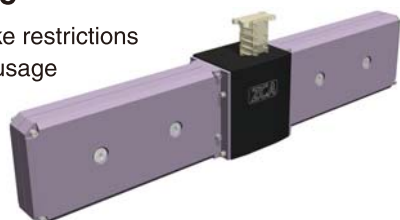
- First take into consideration the precautions on the following page, then select the applicable model number by the corrected load and required stroke.
- Contact customer service if any of these items are unclear.

Table Service factor (Sf)

Load properties	Usage example	Service factor
Smooth operation with no impacts Load inertia: low	Open and close a valve Switching a conveyor	1.0 to 1.3
Operation with light impacts Load inertia: medium	Transfer equipment Raising and lowering lifters	1.3 to 1.5

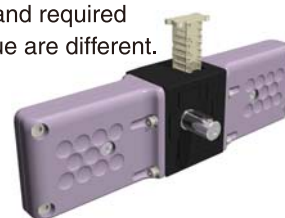
■ Long stroke

There are stroke restrictions depending on usage conditions.



■ Opposite-side input shaft

Basic capacity and required input shaft torque are different.



■ With hanging base

Prepared with a base.



■ With hypoid motor

Select the motor capacity and reduction ratio by the required thrust and speed.



Selection precautions

1. A motor with a speed reduction gear, a DC motor, a servo motor, or other motor can be used for the drive source. Since the Tsubaki Zip Chain Actuator (abbreviated as ZCA below) has extremely high efficiency, the motor may reverse depending on the applied load. A braking mechanism is always required to prevent reversing by coasting or by the load. Use a brake with a braking torque over 150% and that surpasses the holding torque.

$$T = \frac{F_s \times D_p}{2 \times 1000 \times \eta} + T_o$$

Model number		ZCA025N	ZCA035N
Overall efficiency		90%	90%
No load torque	N·m {kgf·m}	0.46 {0.047}	1.16 {0.12}

T : Required input torque N·m {kgf·m} F_s: Corrected load N {kgf} D_p: Sprocket pitch diameter (mm)
 η: ZCA overall efficiency T_o: Unloaded torque N·m {kgf·m}

2. Verify that all the loads that act on the ZCA (static, dynamic, starting, and stopping) do not exceed the basic capacity or permissible input shaft torque. Consider unforeseen situations and install an overload protection device.
3. Use the ZCA at an input rotation speed lower than the maximum input rotation speed. Calculate the necessary input rotation speed from the chain's operating speed.
 Chain speed (mm/sec) = Input rotation speed (r/min) x Zip chain movement amount per input shaft rotation (mm)/60
4. The duty factor (%ED) [Operating time/(Operating time + Rest time)] is dependent on the motor providing input, so it conforms to the capabilities of the drive source.
5. When attaching sprockets or pulleys to the input shaft, verify that the overhang load acting on the shaft is lower than the permissible value below.

$$\text{Permissible O.H.L.} \geq \frac{2 \times T \times f \times L_f}{R}$$

O.H.L. : Overhang load (N {kgf})
 T : Load torque (N·m {kgf·m})
 f : Transmission element factor
 R : Pitch diameter of sprocket, gear, pulley, etc. (m)

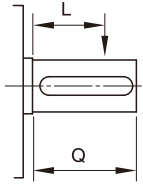


Table Transmission element factor (f)

Chain	Gear - Timing belt	V-belt
1.0	1.25	1.5

Table Factor by load operating position (L_f)

L/Q	0.25	0.5	0.75	1.0
L _f	0.9	1.0	1.15	1.2

Table Permissible O.H.L.

Model number		ZCA025N	ZCA035N
Permissible overhang load	N	443	1025
	{kgf}	45	104

6. The following kinds of loads may cause a reduction in ZCA performance, may have a negative impact on the life of the ZCA, or may damage the zip chain, drive section, tip bracket, or other part.
 - 1) Lateral loads - Always install a linear guide in the direction of travel so that no force (lateral load) is applied to the zip chain that will bend it.
 - 2) Impact loads
 - 3) Overloads

Installation and usage precautions

1. When a load is acting on the ZCA, do not operate the ZCA from the input shaft by hand. The input shaft is rotated by the load and is dangerous.
2. Accurately center the connection for the input shaft and drive shaft. Tsubaki recommends Tsubaki Couplings. (Key included.)
3. The ZCA uses grease for lubrication, so grease may splatter. Take all appropriate precautions in the usage environment. In particular, when using the ZCA in a suspended installation, grease may drip.
4. When using the ZCA in a suspended installation, additional tapping is required on the top of the drive section. When inquiring about the ZCA or when ordering the ZCA, request additional tapping.
 If the ZCA is hung using the tapping at the bottom of the drive section, there is a risk the ZCA will fall because of the load.
5. For the stroke, select and use the stroke for the ZCA allowing some leeway. If the stroke range is exceeded, the stopper will break and the chain will fall out or the tip bracket will collide with the drive section and damage the ZCA.
6. Do not perform press contact-stopping under any circumstances.
7. Set the limit switch installed to control the stroke, allowing for the amount of ZCA coasting.
8. The Zip Chain becomes a column by engaging many links together. When the chain is a column, some twisting or warping may occur.
9. The Zip Chain has been lubricated with grease in advance and is delivered ready to use. The lubrication cycle in normal use is generally 1 year or every 500,000 round-trips for the ZCA025N and every 350,000 round-trips for the ZCA035N. However, this will differ according to usage frequency and conditions. When lubricating the Zip Chain, first remove the old grease, and then evenly apply grease directly to the entire Zip Chain with a brush etc.
 (For details on the lubrication cycle and how to grease the Zip Chain, refer to the instruction manual.)

Power Cylinder

Linear actuator (electro-mechanical type), only simple wiring to electric power source is required.

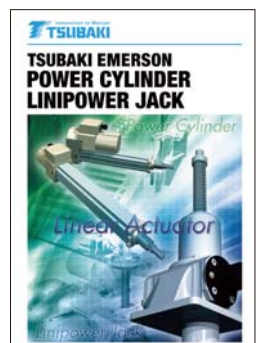
- Easy handling due to no hydraulics or pneumatics.
- High performance due to screw and nut mechanism.
- Safety device available for overloading.

Linipower Jack

Linipower Jacks are worm gear and machine screw or ball screw driven linear actuators.

- Operates by simply connecting to a motor.
- Machine screw, ball screw and high-lead ball screw types are available.
- Suitable for indoor, low-speed, low-frequency drives.

* Requests for catalogs, etc., can be submitted through our website at the URL on the last page, or by contacting Tsubaki Group directly via the contact information listed on the last page.



To safely use the Zip Chain Actuator



WARNING

Observe the items below to prevent danger.

- Do not release the brake when the load is acting on the zip chain actuator under any circumstances. If the brake is released while the load is acting on the zip chain actuator, the supported object may fall or the moving sections may suddenly start to move.
- Do not use the zip chain actuator in an explosive atmosphere. There is a risk of ignition, explosion, fire, and injury.
- When the zip chain actuator is used in personnel transport equipment, install protective equipment for safety on the transport equipment. There is a risk of injury to personnel by runaway equipment and of damage to the equipment.
- When the zip chain actuator is used in lifting equipment, install safety equipment on the lifting equipment to prevent falling. There is a risk of injury to personnel from the lifted object falling and of damage to the equipment.
- When the zip chain actuator is used in suspended equipment, install a safety fence and do not enter the area below any suspended objects for any reason.
- This product can be operated at extremely high speeds. Do not allow the extremities or body to get near moving sections of the equipment including the zip chain actuator. There is a risk of accidents that may entangle or crush body parts.
- Do not allow the body, any portion of the body, clothes, or any bodily adornments to come into contact with the zip chain while it is operating. There is a risk of bodily injury and of equipment damage.
- When installing, removing, maintaining, or inspecting the product:
 - Always work by following the instructions in the instruction manual.
 - In the electrical wiring, always observe the precautions listed in the instruction manual as well as the regulations in the electrical equipment standards and indoor wiring regulations. Grounding in particular is important for preventing electrocution, so always ensure that the product is reliably ground.
 - Turn off the source power supply in advance and ensure that the switch cannot be unintentionally turned on.
 - Wear clothing suited to the work and wear the appropriate protective gear (safety goggles, gloves, safety footwear, other necessary safety equipment).



CAUTION

Observe the items below to prevent accidents.

- Do not use the zip chain actuator outside of the specified range listed on the nameplate and external diagrams and in the catalog. There is a risk of injury and equipment damage.
- Use the zip chain actuator within the appropriate power supply voltage range. There is a risk of burning out the motor and of fire when using the zip chain actuator outside this range.
- Do not insert your fingers or objects into the zip chain actuator opening. There is a risk of injury and equipment damage.
- Functionality and performance may decrease because of part wear and the lifespan of parts. Inspect the parts regularly according to the instruction manual and contact the dealer where you purchased the zip chain actuator when functionality or performance is poor.
- Do not continue to use a damaged zip chain actuator. There is a risk of injury, equipment damage, and fire.
- Do not remove the nameplate.
- The guarantee of quality is only valid when an actuator is used that satisfies the required capabilities in the selection criteria established by Tsubaki and when it is used at the stipulated environmental conditions and maintained state.
- Customer alterations of the zip chain actuator are outside the scope of the Tsubaki warranty. Therefore, Tsubaki assumes no responsibility for these alterations.

Warranty

1. LIMITED WARRANTY

Products manufactured by Seller; (a) conform to the design and specifications if any, expressly agreed to in writing by Seller; and (b) are free of defects in workmanship and materials at the time of shipment. The warranties set forth in the preceding sentence are exclusive of all other warranties, express or implied, and extend only to Buyer and to no other person. All WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY EXCLUDED.

2. NON-RELIANCE

Buyer is not relying upon any advice, representations or warranties (except the warranties expressly set forth above) of Seller, or upon Seller's skill or judgment regarding the Seller's products. Buyer is solely responsible for the design and specifications of the products, including without limitation, the determination of suitability for Buyer's application of the products.

3. CLAIMS

- (a) Any claim relating to quantity or type shall be made to Seller in writing within 7 days after receipt of the products; any such claim made thereafter shall be barred.
- (b) Any claim under the above-stated Limited Warranty shall be made to Seller in writing within three (3) months after receipt of the products; any such claim made thereafter shall be barred.
- (c) Seller's liability for breach of warranty or otherwise is limited to repair or replacement, at Seller's option of non-conforming or defective products. Buyer waives all other remedies, including but not limited to, all rights to consequential, special or incidental damages, including, but not limited to, damages resulting from personal injury, death or damage to or loss of use of property.

- (d) Repair, alteration, neglect or misuse of the products shall void all applicable warranties.

4. INDEMNIFICATION

Buyer will indemnify, defend and hold Seller harmless from all loss, liability, damage and expense, including attorneys' fees, arising out of any claim (a) for infringement of any patent, trademark, copyright, misappropriation of trade secrets, unfair competition or similar charge by any products supplied by Seller in accordance with the design or specifications furnished by Buyer, or (b) arising out of or connected with the products or any items into which the products are incorporated, including, but not limited to, any claim for product liability (whether or not based on negligence or strict liability of Seller), breach of warranty, breach of contract or otherwise.

5. ENTIRE AGREEMENT

These terms and conditions constitute the entire agreement between Buyer and Seller and supersede any inconsistent terms and conditions, whether contained in Buyer's purchase order or otherwise, and whether made heretofore or hereafter. No statement or writing subsequent to the date hereof which purports to modify or add to the terms and conditions hereof shall be binding unless consented to in writing, which makes specific reference hereto, and which has been signed by the party against which enforcement thereof is sought. Seller reserves the right to change these terms and conditions without prior notice.



CAUTION

Product details described in this catalog are primarily intended to aid product selection. Always read the instruction manual before using any product to ensure correct use.



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