

TSUBAKI ZIP CHAIN ACTUATOR

Patent Pending



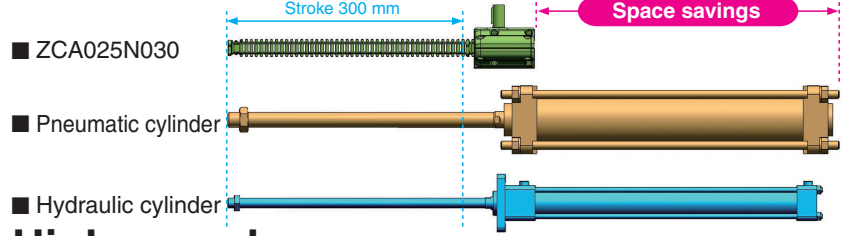
ZIP CHAIN ACTUATOR



ZIP CHAIN ACTUATOR

Presenting a breakthrough actuator featuring a special chain mechanism that directly transmits thrust

Feature 1 Compact
Requires smaller installation spaces compared to other linear actuators.
(Ultimate space saving achieved through kaizen activities)



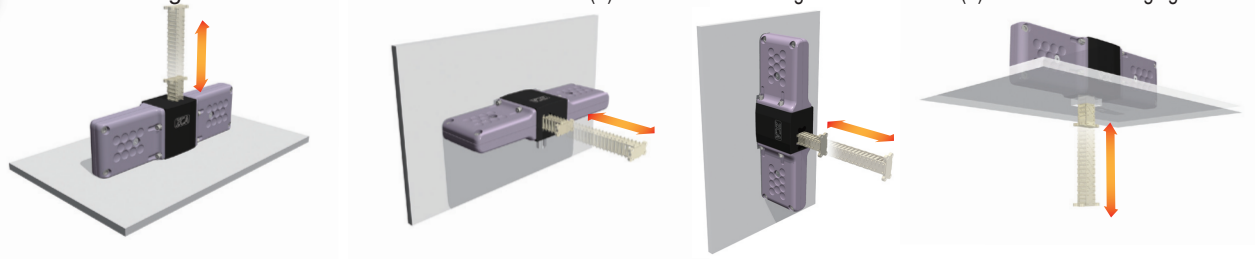
Feature 2 High-speed
Capable of high-speed operation when compared to screw actuators and compressed air/hydraulic cylinders. (max. 1,000 mm /sec.)

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.

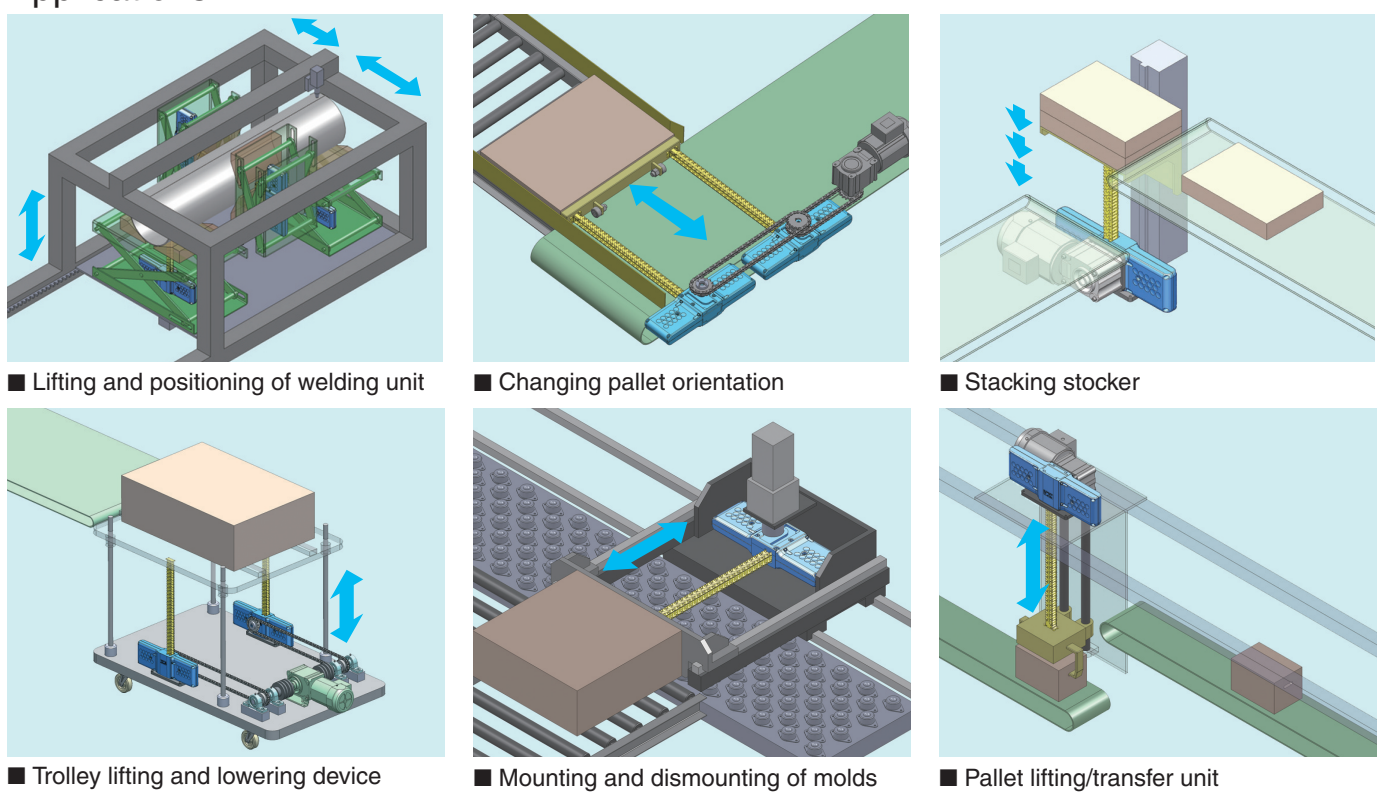
Feature 4 Multi-point stopping
Multi-point stopping at any desired position is possible by controlling input rotation.

Feature 5 Installation direction freedom

- Vertical lifting installation
- Horizontal lateral installation (Y)
- Horizontal longitudinal installation (T)
- Vertical hanging installation



Applications



Model numbering

Model without motor

ZCA 025 N 030 - □□□

	1	2	3	4	5
1 Product	ZCA	ZIP CHAIN ACTUATOR			
2 Housing number	025	Housing number 025			
	035	Housing number 035			
3 With/without motor	N	Without motor			
4 Stroke (Example)	030	300mm			
5 Option	B	With mounting base (For vertical hanging installation)			
	R	Input shaft on opposite side			
	J	With bellows (For vertical lifting or hanging installation)*2			
	P	Other options			

Combinations of Housing numbers and stroke distances

Housing number	025	035		
Stroke distance	030 (300mm)	050 (500mm)	075 (750mm)	100 (1000mm)

Model with motor

ZCA 035 M 050 L - V □□□

	1	2	3	4	5	6	7
1 Product	ZCA	ZIP CHAIN ACTUATOR					
2 Housing number	025	Housing number 025					
	035	Housing number 035					
3 With/without motor	M	With motor (hypoid motor with brake)*1					
4 Stroke (Example)	050	500mm					
5 Speed (Example)	L	61/73mm/sec (50/60Hz)					
6 Motor voltage	No symbol	200V class					
	V	400V class					
7 Option	B	With mounting base (For vertical hanging installation)					
	J	With bellows (For vertical lifting or hanging installation)*2					
	P	Other options					

*1 For motor specifications, see page 8.

*2 Bellows for the horizontal lateral installation and horizontal longitudinal installation will be separately manufactured. Please contact a Tsubaki representative.

Model List

Model without motor

Model number*1	Basic capacity*2 N {kgf}	Stroke*3 mm	Maximum speed*4 mm/s	Maximum input rotation speed r/min	Permissible input shaft torque N·m {kgf·m}	Zip Chain movement amount per input shaft rotation mm	Approximate weight kg
ZCA025N030	400 {40.8}	300	1,000	630	9.41 {0.96}	95.3	1.9
ZCA035N050	1000 {102}	500	1,000	420	34.7 {3.53}	142.9	5.1
ZCA035N075	1000 {102}	750					6.5
ZCA035N100	600 {61.2}	1000					7.5

Model with motor

Model number	50Hz		60Hz		Stroke*3 mm	Motor capacity W	Reduction ratio	Allowable frequency of startup/min	Approximate weight kg
	Thrust generation N {kgf}	Speed mm/s	Thrust generation N {kgf}	Speed mm/s					
ZCA025M030L	400 {40.8}*5	61	400 {40.8}*5	73	300	90	1/40	10	10.5
ZCA025M030M		122	382 {39.0}	146			1/20	10	
ZCA025M030H		243	167 {17.0}	291			1/10	10	
ZCA035M050L	1000 {102}*5	61	1000 {102}*5	73	500	200	1/60	7	14.0
ZCA035M075L					750				15.5
ZCA035M050M	1000 {102}*5	122	911 {93.0}	146	500	200	1/30	10	14.0
ZCA035M075M					750				15.5
ZCA035M050H	529 {54.0}	243	431 {44.0}	291	500	200	1/15	10	14.0
ZCA035M075H					750				15.5
ZCA035M100H					1000				16.5

*1 Model numbers indicated in bold letters are stocked products in Japan.

*2 Values represent basic capacities when tip bracket is mounted. If any other type of installation fixture is required, please contact us. Values are obtained when operated at a maximum 0.35 G (upper limit) acceleration. They are applicable regardless of the type of installation: vertical, horizontal or hanging.

However, when the input shaft is mounted on the opposite side, the values for basic capacity and the permissible input shaft torque vary depending upon the operating conditions. See pages 4 and 6.

*3 Use the unit with the stroke kept within the permissible range. Also, be sure to always attach a linear guide in the travelling direction.

*4 Zip Chain speed at maximum input rotation speed.

*5 Models with torque limitation. Motor output shaft torque exceeds the amount of generated thrust. Other combinations of generated thrust and speed are also available. Please contact a Tsubaki representative for other combinations.

Specifications

Drive section	Materials	Steel alloy	
	Paint color	Black, equivalent to Munsell N 2.0	
Housing section	Materials	Polyoxymethylene	
	Color	ZCA025□030	Purple-grey,
		ZCA035□050	Equivalent to Munsell 0.8P 6.3/3.0 (Molding)
		ZCA035□075	White (Machined part)
ZCA035□100			
Lubricant	Grease		

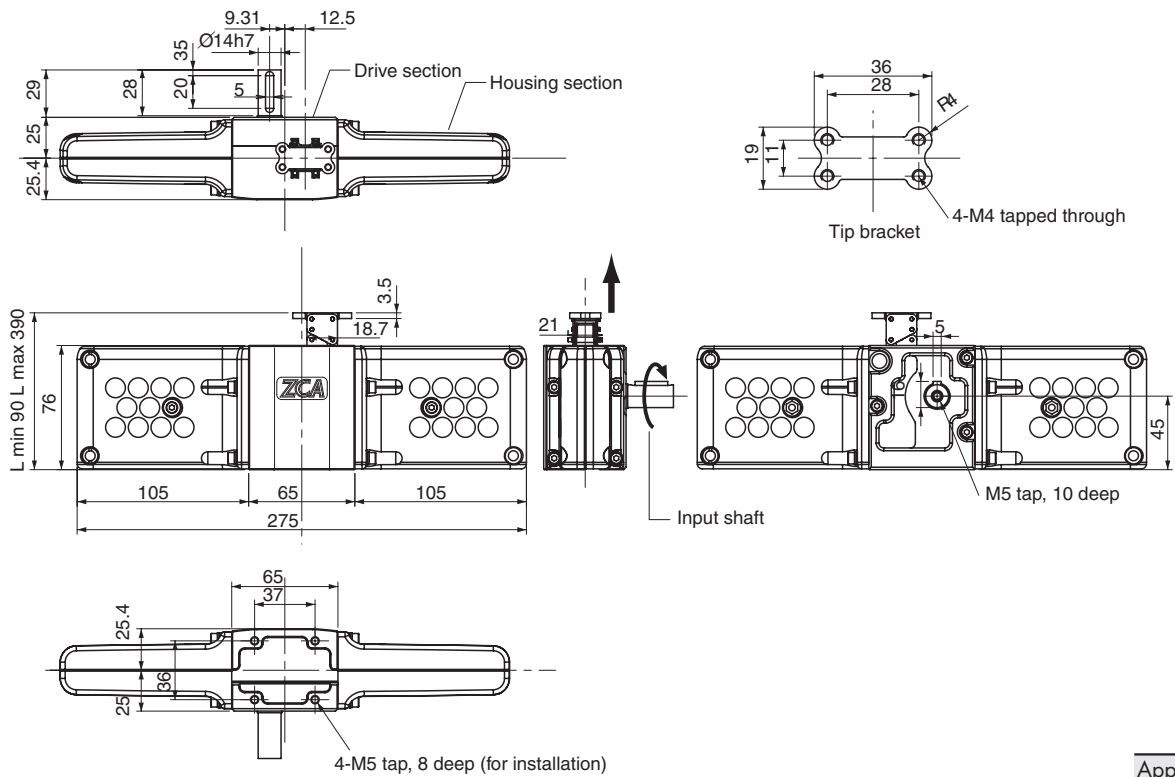
Outline dimensional drawings are for models using moldings for housing sections. Models using machined parts have different designs.

Operating environment requirements

Operating temperature	Model without motor	0 to 60°C
	Model with motor	0 to 40°C
Relative humidity	85% or less (No condensation)	
Altitude*	1000m or less above sea level	
Ambient atmosphere	Typical rain-free indoor environment with the amount of dust kept at a general factory level.	
Installation direction	The unit can be hung or mounted vertically or horizontally. However, regardless of the installation direction, be sure to mount a linear guide in the travelling direction. To hang the unit, a mounting base is required. (Model no. designation: B)	

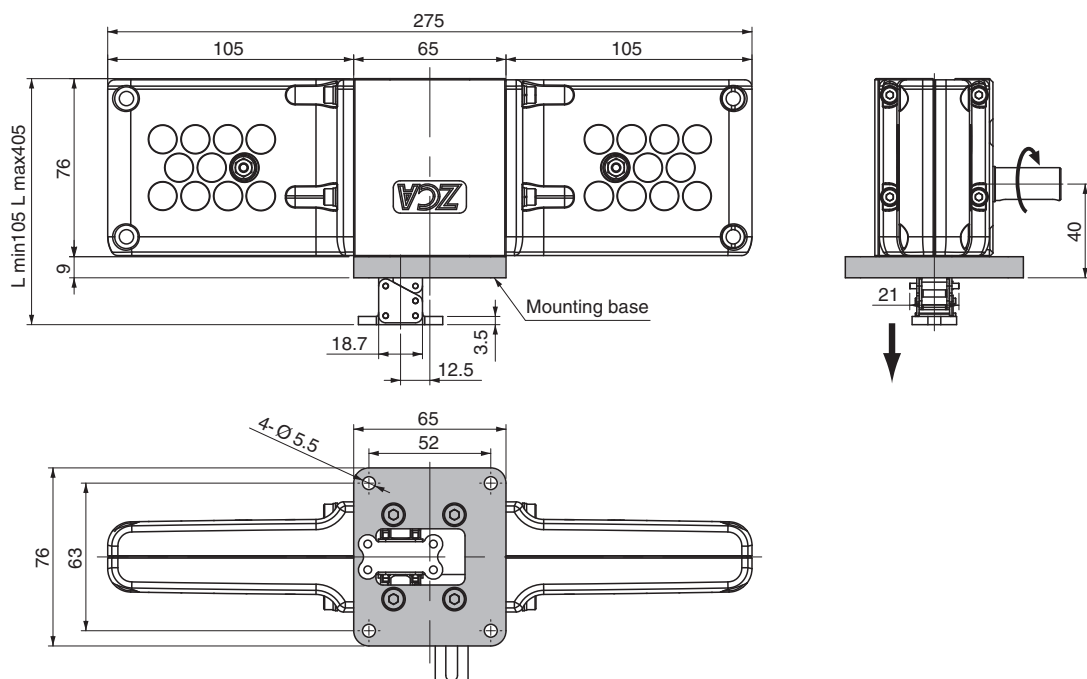
*Applicable to a model with motor.

ZCA025N030 (Basic type)



Approximate weight
Kg
1.9

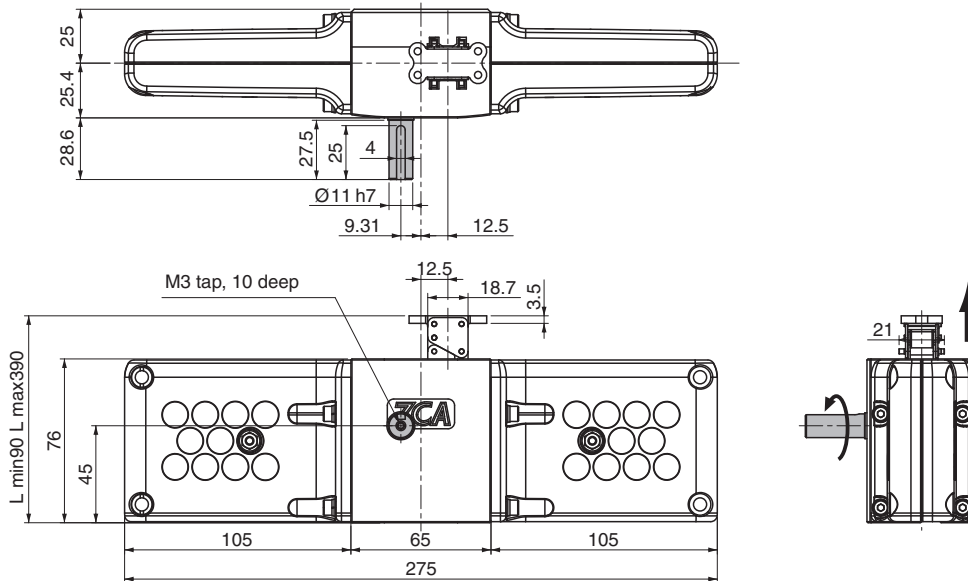
ZCA025N030-B (With mounting base)



Approximate weight
Kg
2.5

Outline Dimensional Drawing ZCA025N (Model without motor)

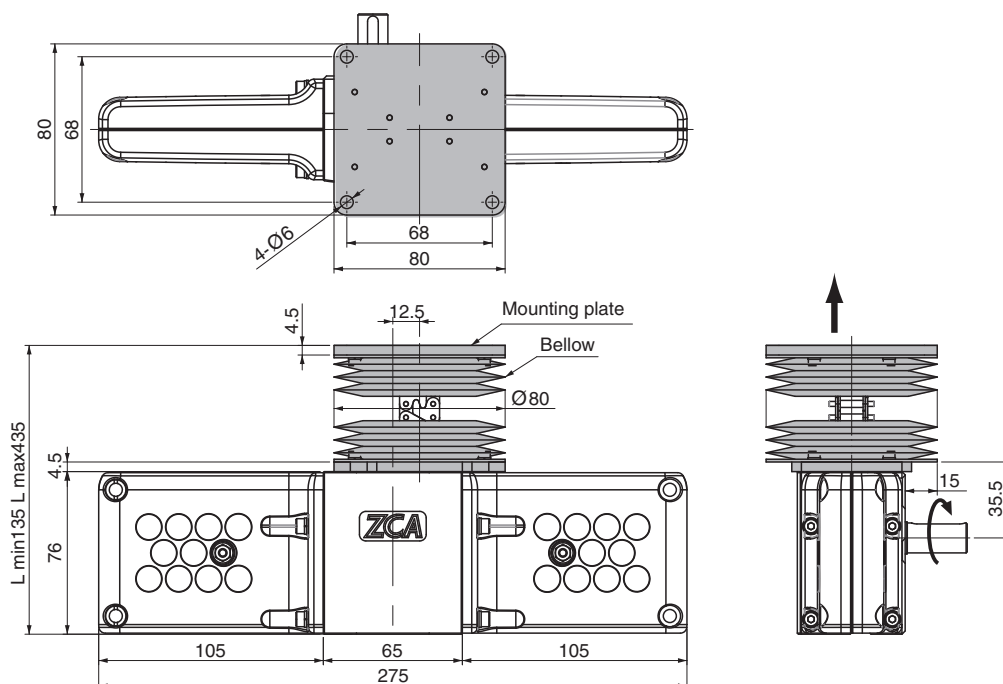
ZCA025N030-R (Input shaft on opposite side)



Model number	Basic capacity N {Kgf}		Permissible input shaft torque N·m {Kgf·m}		Allowable overhang load N {Kgf}	Approximate weight Kg
	Condition A	Condition B	Condition A	Condition B	Condition A	
ZCA025N030R	208 {21.2}	400 {40.8}	5.18 {0.53}	9.41 {0.96}	260 {26.6}	2.0

*Compared with the basic type, this model has smaller basic capacity, permissible input shaft torque and overhang load.
 Condition A When overhang load acts on output shaft (when driven by chain, belt, or the like)
 Condition B When overhang load does not act on output shaft (when driven by coupling or the like)

ZCA025N030-J (With bellows) Outline dimensional drawing of a model with bellows intended for vertical lifting installation

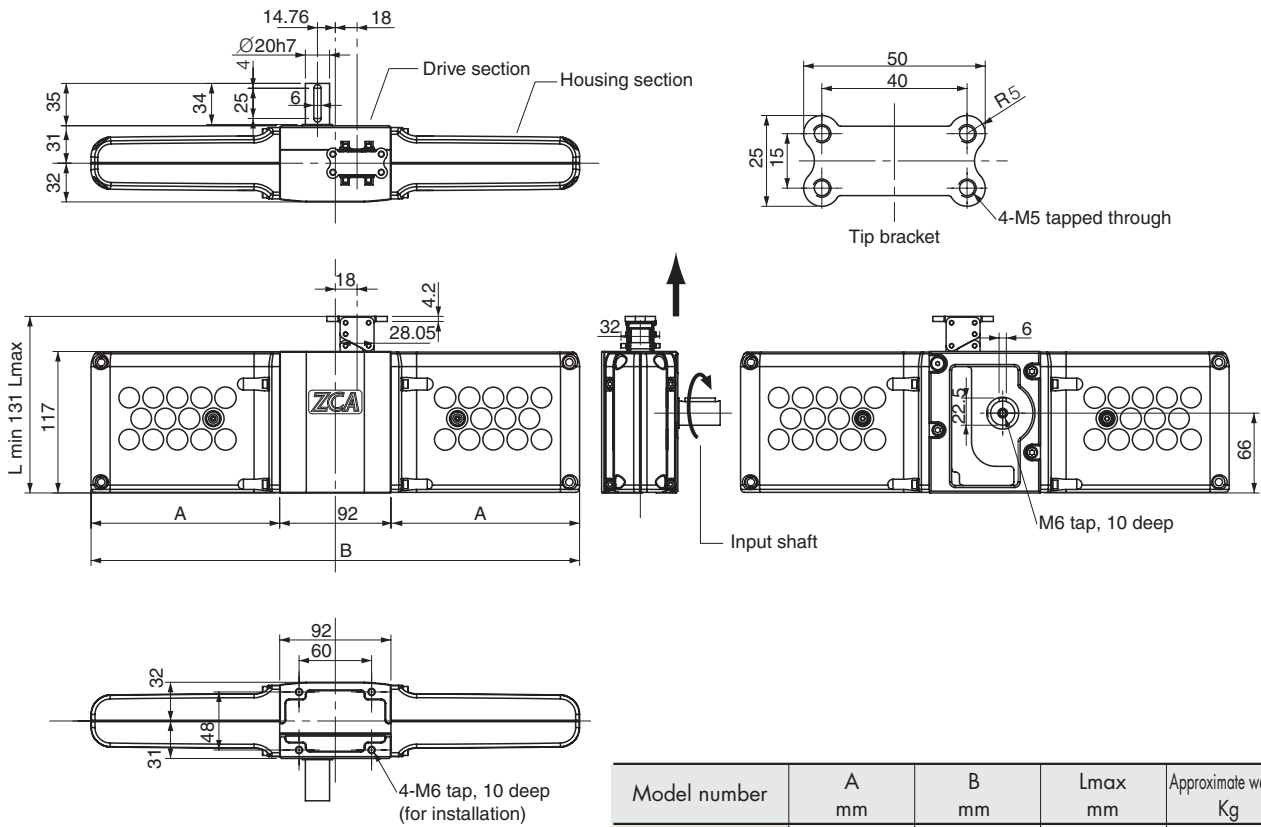


Approximate weight Kg
2.5

Bellows for the horizontal lateral installation (Y) and the horizontal longitudinal installation (T) and vertical hanging installation are separately manufactured. Please contact a Tsubaki representative for more information.

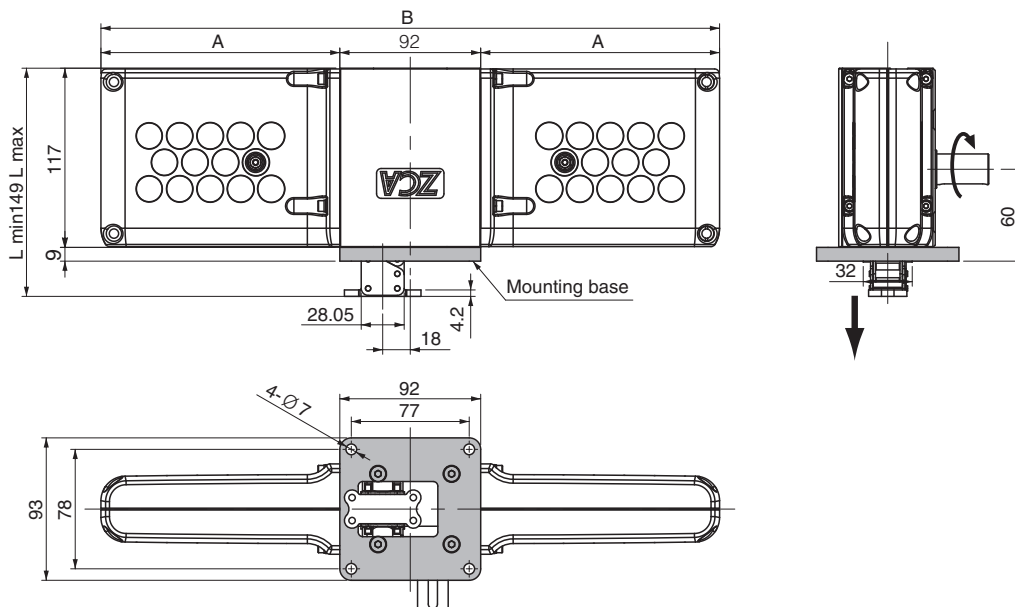
Outline Dimensional Drawing ZCA035N (Model without motor)

ZCA035N050 075 100 (Basic type)



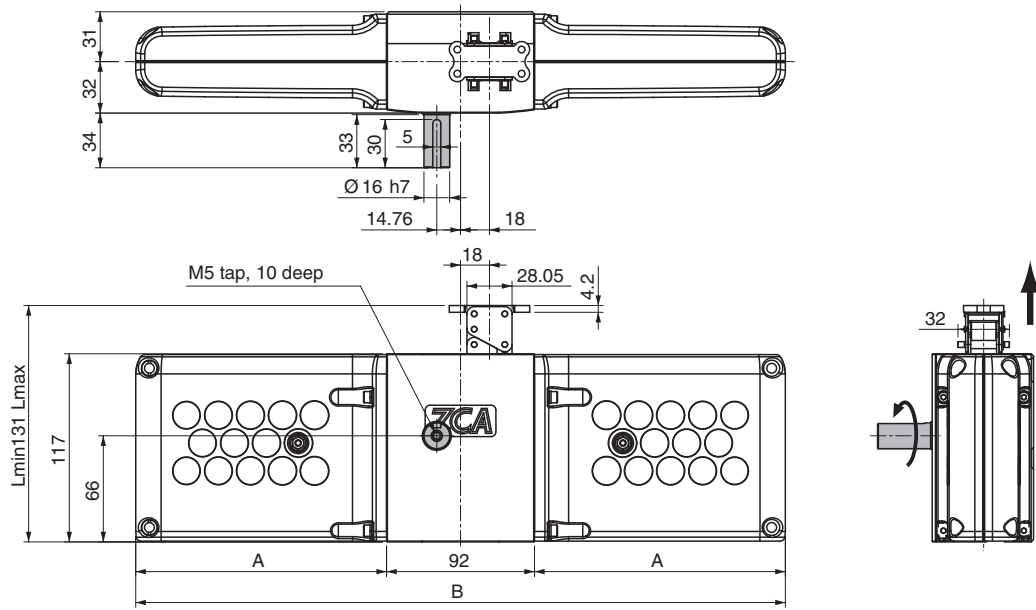
Model number	A mm	B mm	Lmax mm	Approximate weight Kg
ZCA035N050	156	404	631	5.1
ZCA035N075	218.5	529	881	6.5
ZCA035N100	281	654	1131	7.5

ZCA035N050 075 100-B (With mounting base)



Model number	A mm	B mm	Lmax mm	Approximate weight Kg
ZCA035N050B	156	404	649	5.5
ZCA035N075B	218.5	529	899	7.0
ZCA035N100B	281	654	1149	8.0

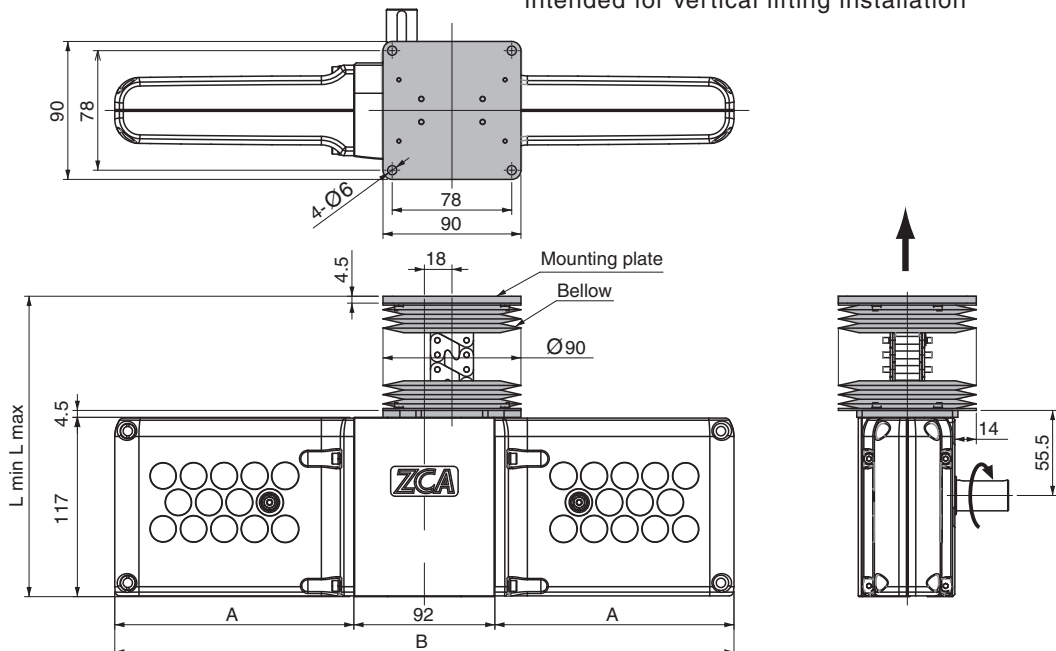
■ ZCA035N050 075 100-R (Input shaft on opposite side)



Model number	A mm	B mm	Lmax mm	Basic capacity N {Kgf}		Permissible input shaft torque N·m {Kgf·m}		Allowable overhang load N {Kgf}	Approximate weight Kg
				Condition A	Condition B	Condition A	Condition B		
ZCA035N050R	156	404	631	616 {62.9}	927 {94.6}	22.0 {2.24}	32.2 {3.29}	586 {59.8}	5.1
ZCA035N075R	218.5	529	881						6.5
ZCA035N100R	281	654	1131	600 {61.2}	21.4 {2.19}	7.5			

*Compared with the basic type, this model has smaller basic capacity, permissible input shaft torque and overhang load.
 Condition A When overhang load acts on output shaft (when driven by chain, belt, or the like)
 Condition B When overhang load does not act on output shaft (when driven by coupling or the like)

■ ZCA035N050 075 100-J (With bellows) Outline dimensional drawing of a model with bellows intended for vertical lifting installation

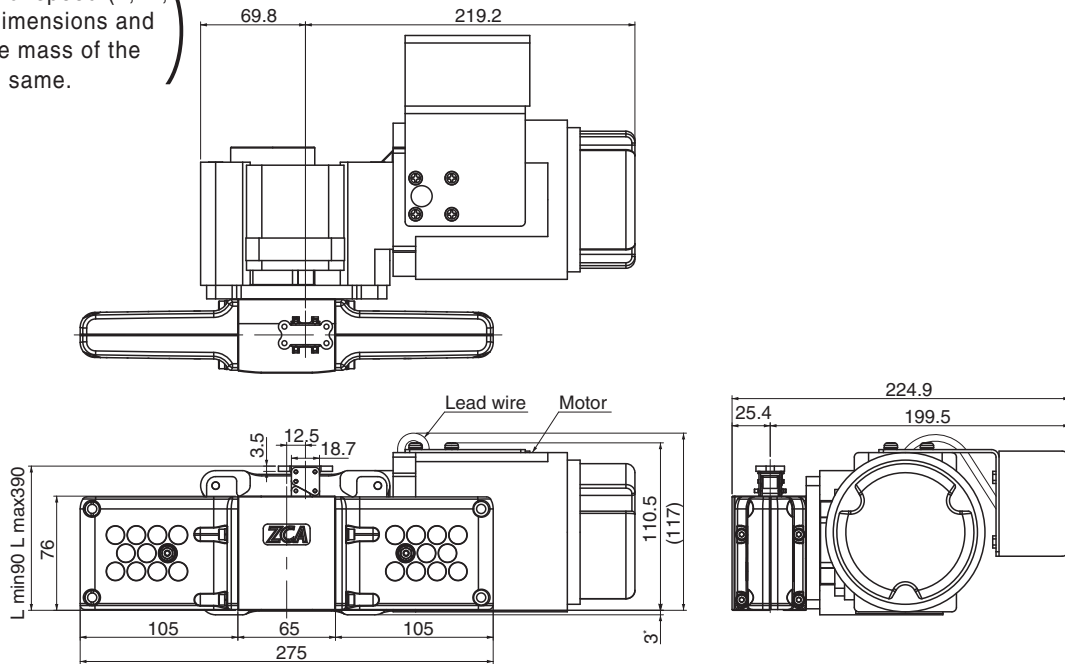


Bellows for the horizontal lateral installation (Y) and the horizontal longitudinal installation (T) and vertical hanging installation are separately manufactured. Please contact a Tsubaki representative for more information.

Model number	A mm	B mm	Lmin mm	Lmax mm	Approximate weight Kg
ZCA035N050J	156	404	196	696	5.5
ZCA035N075J	218.5	529	226	976	7.0
ZCA035N100J	281	654	246	1246	8.0

ZCA025M (Basic type)

(Regardless of speed (L, M, or H), the dimensions and approximate mass of the unit are the same.)

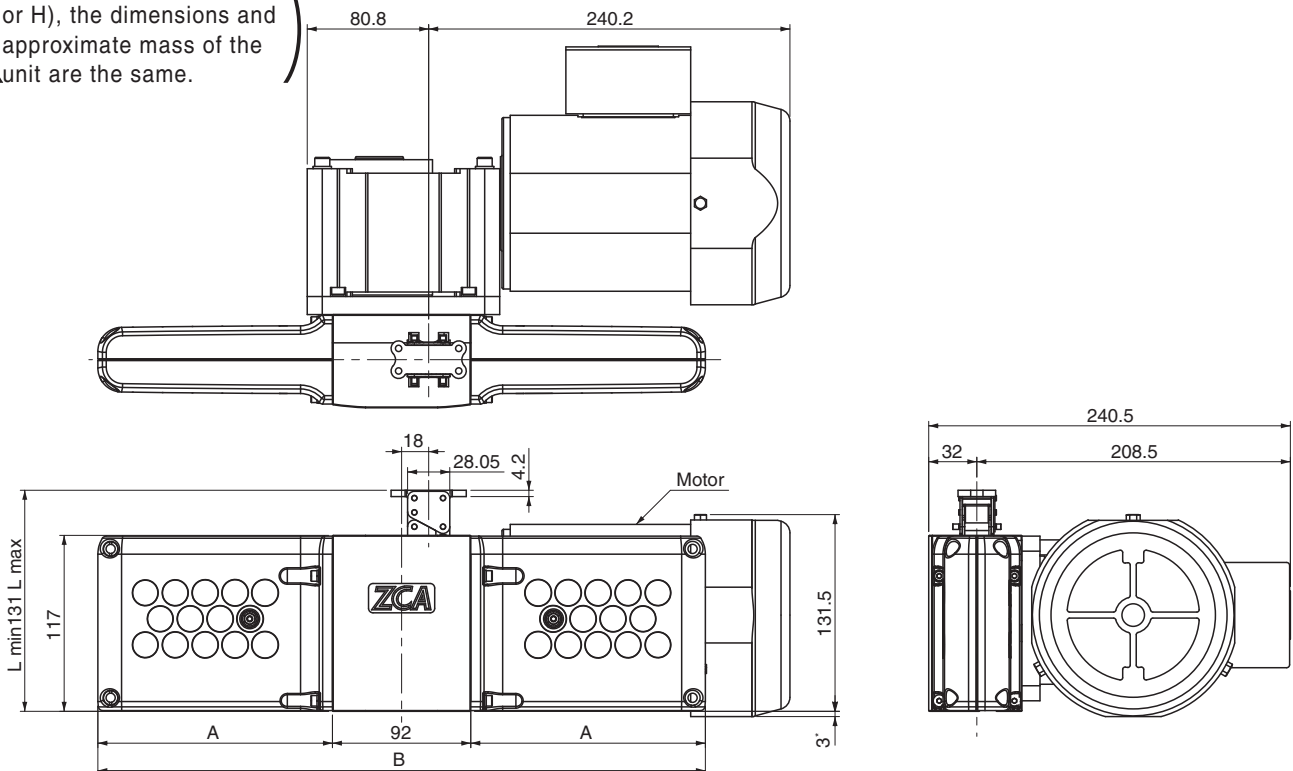


*Please note that the motor dimensions exceed the lower mounting surface of the ZCA.

Approximate weight Kg
10.5

ZCA035M (Basic type)

(Regardless of speed (L, M, or H), the dimensions and approximate mass of the unit are the same.)



* Please note that the dimensions of motor fan cover exceed the lower mounting surface of the ZCA.

Model number	A mm	B mm	Lmax mm	Approximate weight Kg
ZCA035M050	156	404	631	14.0
ZCA035M075	218.5	529	881	15.5
ZCA035M100	281	654	1131	16.5

(Note) A unit with a motor, mounting base and/or bellows can be also made to order. However, the dimensions of this type of unit are different from those for the unit with a motor. For details, please contact a Tsubaki representative.

Motor Specifications

Model number	ZCA025M	ZCA035M
Output	3-phase: 90W	3-phase: 200W
Power source	200/200/220V 50/60/60Hz	
Number of poles	4	
Type of protection	Totally enclosed (IP30)	Totally enclosed fan cooled (IP44)
Cooling system	Natural cooling type (No ventilation)	Self cooling type (Fan cooled)
Rating	Continuous	
Insulation class	E	
Type of brake	Power-off type, DC electromagnetic brake	
Speed reducer lubrication	Lubricating grease	
Paint color	Light grey (equivalent to Munsell N7.5)	

*Operation using an inverter

- Motor for the ZCA025M is not microsurge-resistant. A 200V-class motor can be driven from the inverter unless it is operated under operating conditions with low-frequency or a frequency of 60Hz or higher. (400v-class motors cannot be driven from the inverter regardless of operating conditions.)
- When applying brakes, be sure to keep the frequency below 60Hz (1800r/min).

Relationship between Motor Wiring and Direction of Chain Travel

(Example using a Tsubaki three-phase 200V class motor)

Wiring	ZCA025M	ZCA035M
AC simultaneous brake/ motor power stop operation		
(Inverter) AC separate brake/ motor power stop operation		
Direction of chain travel		

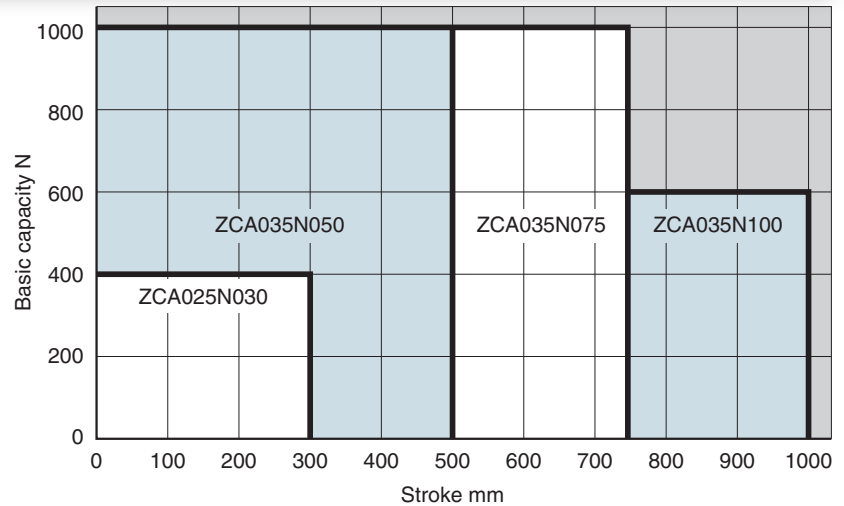
(M): motor (B): brake MC: magnetic contact OCR: over current relay DM200D: DC module

*Please note that on the ZCA035M, motor wiring and the traveling direction of the chain differ depending on the speed.

*Check the rotational direction before incorporating the ZCA into other equipment. Mounting the ZCA against the rotational direction may result in personal injury and/or damage to the unit.

Selection Chart

The chart to the right presents the relationship between stroke and basic capacity. Select a suitable model by confirming the required thrust per ZCA and stroke in the chart. If more detailed examination is necessary, check if your selection suits your application using the calculations shown below.



Selection Procedure

- (1) Machine used with the unit Machine structure, number of the ZCAs to be used, operating environment, etc.
- (2) Load Load characteristics, mass of load or workpiece, drive source, drive system, etc.
- (3) Installation-type Mounting direction (lifting, horizontal, hanging), linear guide system
- (4) Operating speed Speed required for ZCA operation
- (5) Stroke Actual stroke to be used

■ Table 1 Service factor Sf

1. Calculate the design load Fs

Consider the characteristics of the load, refer to the service factor (Table 1), and then calculate the design load (Fs).

Design load Fs N{kgf} =
Required thrust P N{kgf} x Service factor Sf

Load characteristics	Application example	Service factor
Smooth motion with no impact Load inertia: low	Switching a conveyor	1.0 to 1.3
Motion with light impact Load inertia: medium	Transfer equipment Raising and lowering lifters	1.3 to 1.5

2. Calculate the thrust required per unit Fs1

Obtain the thrust required per unit (Fs1) from the design load (Fs). If multiple units are operated simultaneously, calculate Fs1 by referring to the multi-factor (Table 2).

Thrust per ZCA Fs1 N{kgf} = Corrected load Fs N{kgf} ÷
(No. of units simultaneously operated x Multi-factor Fg)

■ Table 2 Multi-factor

No. of units operated simultaneously	1	2	4
Load sharing factor Fg	1.0	0.83	0.69

3. Select a model either with a motor or without a motor.

4. Provisionally select model number

Consult the model list to confirm that the thrust per unit Fs1 is below the basic capacity of ZCA. When deciding the stroke, ensure some allowance with the actual stroke to be used.

[When "without motor" is selected]

Consult the model list and provisionally select a model according to the thrust per unit and the stroke. Then, move on to *5 and further.

[When "with motor" is selected]

Consult the model list and provisionally select a model that satisfies the requirements for the thrust per unit, the operating speed of chain, and the stroke. Then, move on to *9.

5. Maximum speed

Confirm that the operating speed of ZCA does not exceed the predetermined maximum speed.

6. Check required input rotation speed

Calculate the required input rotation speed from the operating speed.

$N = V \times 60 / K$ N: Input rotation speed r/min V: Operating speed mm/sec K: Zip Chain travel distance per input shaft rotation mm (Table 3)

7. Check required input torque

Calculate the required input torque.

$$T = \frac{F_{s1} \times D_p}{2 \times 1000 \times \eta} + T_o$$

T : Required input torque N·m {kgf·m} F_{s1} : Required thrust per unit N {kgf}
 D_p : Sprocket pitch circle diameter mm (Table 3) η : ZCA overall efficiency (Table 3)
 T_o : Mean unloaded operating torque N·m {kgf·m} (Table 3)

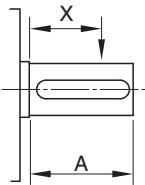
■ Table 3 Performance sheet

Model no.	ZCA025	ZCA035
Overall efficiency η	90%	90%
Mean unloaded operating torque N·m{kgf·m}	0.62 {0.063}	1.63 {0.17}
Zip Chain travel distance per input shaft rotation K mm	95.3	142.9
Sprocket pitch circle diameter D_p mm	∅30.92	∅46.48

*Mean value of torque required to continuously rotate input shaft while the unit is unloaded
 Torque varies pitch by pitch each time the chains engage with each other.

8. Study of allowable overhang load

If the input shaft is driven by a chain, gear, tooth belt, V-belt, etc., make sure that the overhang load is lower than the allowable value shown below.



■ **Table 4 Transmission element factor (f)**

Chain	Gear	Tooth belt	V-belt
1.0	1.25	1.5	

■ **Table 5 Load position factor (Lf)**

X/A	0.25	0.5	0.75	1.0
Lf	0.9	1.0	1.15	1.25

O.H.L.: Overhang load N {kgf}

T : Required input torque N·m {kgf·m}

f : Transmission element factor (Table 4) D : Pitch circle diameter of sprocket, gear, pulley, etc. m

Lf: Load position factor (Table 5)

■ **Table 6 Allowable overhung load**

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

Model number	ZCA025N □ (Basic type)	ZCA025N □-R (Input shaft on opposite side)	ZCA035N □ (Basic type)	ZCA035N □-R (Input shaft on opposite side)
Allowable overhung load N {kgf}	638 {65.0}	260 {26.6}	946 {96.4}	586 {59.8}

9. Select optional accessories

Select optional accessories according to the operating conditions.

- With mounting base
- Input shaft on opposite side
- With bellows

10. Decide the model no.

11. Calculate the required input capacity (for a model without motor)

Required input capacity P kW = T x N/9550

Note: When the mean unloaded operating torque makes up 25% or more of the required input torque, the torque fluctuation caused by engaging chains becomes larger. For smooth operation of the unit, select a model by increasing the mean unloaded operating torque (Table 3) by half.

■ Example of Selection

- (1) Machine used with the unitLifter, 1 ZCA used, inside factory (room temperature, dust is present)
- (2) Load or thrustLight impact, 588N{60kgf} per unit, without motor, connected with coupling
- (3) Installation type Vertical lifting, lifter functions also as guide mechanism.
- (4) Operating speed120mm/sec
- (5) Stroke650mm

Based on SI

1. Design load Fs (Service factor Sf = 1.3) is:
Fs = 588 × 1.3 = 764 N
2. Number of ZCAs to be installed is one (Fg=1.0). Thrust per unit Fs1 is:
Fs1 = 764 ÷ (1 × 1) = 764 N
- 3.4. "Without motor" is selected. Model ZCA035N075 is provisionally selected by considering the thrust per unit and stroke.
764 < 1000 N (ZCA035N075 Basic capacity)
5. Chain operating speed is 120mm/sec < 1000mm/sec and is within the range of permissible speed.
6. Required input rotation speed is: N = 120 × 60 / 142.9 = 50.4rpm
7. Required input torque is:
T = 764 × 46.48 / (2 × 1000 × 0.9) + 1.63 = 21.4N/m < 34.6N/m (Permissible input shaft torque)
Required input capacity is: P = 21.4 × 50.4 / 9550 = 0.11kW
8. It is not necessary to check the overhung load because the coupling is used for the connection.
9. Bellows are mounted due to the presence of dust in the operating environment.
Through the above procedure, model ZCA035N075-J was selected.

When "With motor (60Hz)" is selected for the above example

By consulting the model list, the model ZCA035M075M-J, which satisfies the requirements (thrust per ZCA: 764N, stroke: 650mm, chain operating speed: 120mm/sec) will be selected. The unit with this specification has the following capability: Generated thrust of 911N, maximum stroke of 750mm, and chain operating speed of 146mm/sec.

Based on gravity

1. Design load Fs (Service factor Sf = 1.3) is:
Fs = 60 × 1.3 = 78 N
2. Number of ZCAs to be installed is one (Fg=1.0). Thrust per unit Fs1 is:
Fs1 = 78 ÷ (1 × 1) = 78 kgf
- 3.4. "Without motor" is selected. Model ZCA035N075 is provisionally selected by considering the thrust per unit and stroke.
78 kgf < 102 kgf (ZCA035N075 Basic capacity)
5. Chain operating speed is 120mm/sec < 1000mm/sec and is within the range of permissible speed.
6. Required input rotation speed is: N = 120 × 60 / 142.9 = 50.4/rpm
7. Required input torque is:
T = 78 × 46.48 / (2 × 1000 × 0.9) + 0.17 = 2.18kgf·m < 3.54kgf·m (Permissible input shaft torque)
Required input capacity is: P = 2.18 × 50.4 / 974 = 0.11kW
8. It is not necessary to check the overhang load because the coupling is used for the connection.
9. Bellows are mounted due to the presence of dust in the operating environment.
Through the above procedure, the model ZCA035N075-J was selected.

When "With motor (60Hz)" is selected for the above example

By consulting the model list, the model ZCA035M075M-J, which satisfies the requirements (thrust per ZCA: 78kgf, stroke: 650mm, chain operating speed: 120mm/sec) will be selected. The unit with this specification has the following capability: Generated thrust of 93kgf, maximum stroke of 750mm and chain operating speed of 146mm/sec.

Installation Precautions

1. Since the ZCA uses grease for lubrication, it may spatter. Take all appropriate precautions to avoid any adverse effect on the usage environment. In particular, when using the ZCA in a hanging position (vertically hanging installation), grease may drip.
2. The ZCA can be installed in the vertical lifting or hanging directions or horizontally. However, when it is installed horizontally or in a hanging position, do not allow the weight of the unit and the weight of conveyed items to be placed on the mounting bolts. If the unit operates in such a condition, it may result in damage to the unit. Install the unit in a manner that prevents the mounting bolts from receiving any the load.(Figure 1)

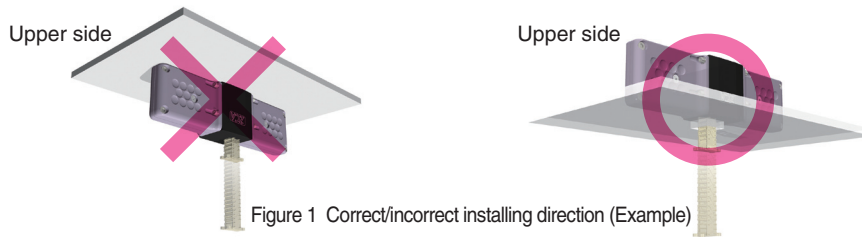


Figure 1 Correct/incorrect installing direction (Example)

3. When installing a model without a motor, prepare a pedestal to install a motor, speed reducer, and this unit on. The pedestal should be solid and rigid enough to sufficiently secure the alignment accuracy established during the installation even if the maximum load is applied. When connecting the input shaft to the transmission shaft, be sure to accurately align them with each other. We recommend using Tsubaki Couplings.
4. If the input shaft is driven by a chain, belt, or the like, make sure that the overhang load acting on the shaft is kept within the allowable overhang load. (For details, see Selection Procedure on pages 9 and 10.)
5. Install the ZCA securely using four mounting holes tapped on the unit and the end bracket respectively. (The mounting bolts are not supplied with the ZCA.) Refer to Table 1 and use suitably-sized mounting bolts that have a rigidity of class 10.9 or higher (JIS B1051). Take into account the strength of fixing parts to decide appropriate screw-in depths.

■ Table 1 Mounting bolt size

Model no.	Main body	End bracket
ZCA 025	M5	M4
ZCA 035	M6	M5

Apply screw lock when installing.

6. Do not perform contact stopping at the stroke end under any circumstances. Doing so may cause serious damage to the inside of main body.
7. Install the unit so that the load put on the main body will act on the shaft placed in the same travelling direction as that of the Zip Chain. If the direction of action or position is not correct, the Zip Chain may receive bending loads or lateral loads and may be damaged. (Figure 2)
Be sure to mount a linear guide in the direction of travel so that the Zip Chain is not subjected to direct lateral loads or bending, twisting moments.
8. A Zip Chain consists of two lengths of chain whose links engage each other to form a column. Some twisting or warpage may occur in this column.
9. Include leeway with the stroke used. If the actual stroke exceeds the determined range, it may damage the stopper, cause the chain to come off, or cause the end bracket to collide with the drive section, eventually damaging the unit.
10. Set the limit switch that is installed to control the stroke with inertia in mind.
11. Check the rotational direction of the input shaft and the traveling direction of the Zip Chain beforehand. (Refer to the outline dimensional drawings.)

An incorrect rotational direction may damage the unit.

When the unit is equipped with a motor, please note that the traveling direction of the chain in relation to the electrical wiring varies depending on speed.

12. Ensure that foreign substances such as dust and hot chips do not attach to or enter the Zip Chain or the opening of the drive section. These substances will accelerate wear in the unit and may lead to serious trouble such as chain fracture or damage to moving parts.
13. If the ZCA is installed using the bottom surface of the drive section, then the keyway of the input shaft will face almost perfectly upward at the stroke lower limit (see Figure 3). However, if synchronized a small amount of displacement will occur due to individual differences from backlash and so on. To prevent this, separately install a mechanism that adjusts phase.
14. When a ZCA is used in equipment hung from above, install a safeguard and safety fence as a precautionary measure against chain fracture, and refrain from entering the area beneath the suspended objects.
15. Using bellows intended for vertical lifting or hanging installation with horizontal lateral installations (Y) or horizontal longitudinal installations (T) will shorten the service life of the bellows. If bellows are needed in horizontal lateral (Y) or longitudinal (T) installations, be sure to use bellows that incorporate special parts designed for this purpose.

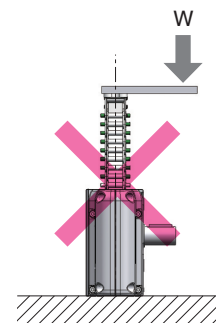


Figure 2

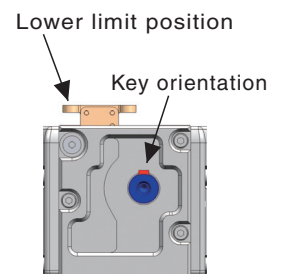


Figure 3

Operating Precautions

1. Confirm that all the loads acting on the ZCA, regardless of whether they are static or dynamic, do not exceed the basic capacity, permissible input shaft torque, and allowable overhang load. (For details, refer to the Selection Procedure on page 9.)
2. Install a shock absorber if necessary to protect the unit from direct impacts.
3. A motor with a speed reduction gear, a DC motor, a servo motor, or the like can be used as the drive source. Since this unit has extremely high efficiency, the motor may reverse depending on the applied load. Be sure to use a brake or brake motor to prevent reversing caused by inertia or load. Use a highly-responsive brake with a braking torque over 150%.
4. When the mean unloaded operating torque makes up 25% or more of the required input torque, the torque fluctuation caused by chain engagement increases chains becomes larger. For smooth operation of the unit, select a model by increasing the mean unloaded operating torque by half.
5. Though the mean unloaded operating torque may become high for some time after the first use of the unit, this is part of the bedding-in process. Use the unit as it is. Meanwhile, the torque will gradually even out.
6. On a model without motor, the duty factor (%ED) [Operating time/(Operating time + Rest time)] conforms to the capabilities of the drive source since it is dependent on the motor or equipment providing input.

Maintenance Precautions

1. The Zip Chain and the drive section have been lubricated with grease in advance, and the unit is delivered ready to use. For maintenance, use the recommended grease shown in Table 2. The lubrication cycle in normal use is generally 1 year. However, this will differ according to frequency and conditions of use. Refer to Table 3 for a guide.
2. When lubricating the Zip Chain, first remove the old grease with a brush or the like, and then evenly apply grease directly to the entire Zip Chain also with a brush or the like.

■ Table 2 Recommended grease

Section to apply	Manufacturer	Grease name
Zip chain and drive section	Showa Shell Sekiyu K. K.	*Shell Alvania EP Grease 2
	Idemitsu Kosan Co., Ltd.	Daphne Eponex SR No.2
	Exxon Mobil Corporation	Mobilux EP 2
	JX Nippon Oil & Energy Corporation	EPNOC Ap(N)2

*This grease is applied before shipment.

■ Table 3 Lubrication cycle reference

Frequency of use per day	Lubrication cycle		
	Model no.	ZCA 025	ZCA 035
2000 to 2700		6 months	4 months
1000 to 2000		8 months	5 months
1 to 1000		12 months	12 months

* Based on the frequency of use, lubricate every 500,000 cycles for the ZCA025 and every 350,000 cycles for the ZCA035. Apply the grease according to either the lubrication cycle or the frequency of use, whichever comes first.

***For details on the installation, operation, inspection and maintenance, read the instruction manual delivered together with the unit for proper operation.**

Zip Chain Actuator® Inquiry Sheet

Company	<input type="text"/>	Country	<input type="text"/>
Contact name	<input type="text"/>	Phone	<input type="text"/>
Address	<input type="text"/>	Fax	<input type="text"/>
Postal code	<input type="text"/>	E-mail	<input type="text"/>

Usage Conditions

1. Equipment

2. Operating environment

Ambient temperature °C Bellows (dust) Present Absent

3. No. of Zip Chain Actuators (per machine)

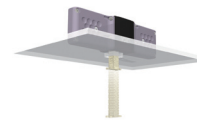
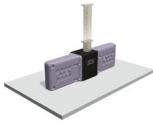
 /machine

4. Load characteristics

 Smooth motion with no impact Motion with light impact

5. Installation direction

Vertical lifting
 Horizontal lateral (Y)
 Horizontal longitudinal (T)
 Vertical hanging



For vertical hanging installation, be sure to install a safety device.

6. End bracket

Fixed
 Other (e.g. rotating)

7. Required thrust or load (per machine)

N or kgf

8. Linear guide mechanism (Be sure to install a guide mechanism.)

Please give a concrete description.

9. Operating speed

mm/sec

10. Stroke

mm

11. Frequency of use, number of start-ups

 → sec./cycle
 Extend Stop → Retract → Stop → (repeated)

times/min
 times/hr
 hours/day
 days/year

12. With/Without motor

<input type="checkbox"/> With <input type="checkbox"/> Without	Power source	3 phase 200V	Other
	Frequency	50Hz	60Hz Other

13. Layout and other information (e.g. 2-unit simultaneous operation)

For safe use of 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. Doing so may cause the unit to become flammable, explode or catch fire, or result in personal 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 equipment hung from above, install a safeguard and safety fence as a precautionary measure in case a chain should fracture, and refrain from entering the area beneath any suspended objects.
- This product can be operated at extremely high speeds. Keep hands and any other part of the body, clothes or accessories away from any movable parts in the equipment including the Zip Chain Actuator. Otherwise, they may be entangled or trapped in movable parts, resulting in personal injury or death and/or damage to the equipment.
- If a terminal box is used, do not operate the unit with the terminal box cover removed. When any work is performed on the terminal box, be sure to replace the cover after the work. Otherwise, it may result in electrical shock. Mount the cover securely.
- For transportation, installation, wiring, operation, maintenance and inspection of the unit:
 - Always work by following the instructions in the instruction manual.
 - Work must be performed by those who have specialized knowledge and skills. Otherwise explosion, ignition, fire, electrical shock, injury or damage to the equipment may result.
 - 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. In the event of power stoppage, take the same action.
 - 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.
- Check the rotational direction before incorporating the unit into the other equipment. Mounting the Zip Chain Actuator against the correct rotational direction may result in personal injury and/or damage to the unit.
- 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. Perform periodic inspections according to the instruction manual. If the unit shows degraded functionality and performance or is damaged, immediately stop operation and contact your local supplier. Not doing so may result in electrical shock, injury or fire.
- During the operation, the motor and speed reducer heat up to a high temperature. Keep hands or any other part of body from coming in contact with them. Otherwise, it may result in burn injury.
- Do not operate the unit with a load higher than the rated load applied. Doing so may result in injury and/or damage to the unit.
- 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.



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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