SSJ01.02TSE
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TSUBAKI

LINISPEED JACK

Instruction Manual

ATTENTION

Make sure that this instruction manual is delivered
to the final user who uses this product.

NOTICE

In the case of special specification, it might be partially different from this instruction manual.
Refer to the attached final drawing for "★" sections.
※The final drawing of standard specification is not attached, so please check the catalog or website as necessary.

- Thank you for purchasing Tsubaki LINIPOWER JACK. This product should be handled by experienced engineers only. Before using the LINIPOWER JACK, you must read and understand the entire contents of this instruction manual.
- Units described herein are SI {Gravitational}. Figure in { } is for reference.

TSUBAKIMOTO CHAIN CO.

TSUBAKI

LINISPEED JACK

Safety Precaution

- You must read this instruction manual and other attached documents prior to use (installation, operation, maintenance, inspection, etc). Understand the equipment and read all instructions thoroughly before installing or operating.
- Keep this manual visible to all users
- Safety precautions in this manual are classified into two categories, “WARNING” and “CAUTION”. These are defined as follows:

WARNING	Death or serious injury may result from misusing the product without following the instructions.
CAUTION	Minor or moderate injury, as well as damage to the product may result from misusing the product without following the instructions.

Notice that under “CAUTION” lead to serious results depending on the surrounding situation. Therefore, this section is just as significant as the other, and requires much attention.

WARNING

- Do not relese the brake while the jack is supporting a load.Doing so could cause an elevated object to fall or cause unstable parts to move suddenly.
- Do not use the jack with a motor or electrical accessories in a combustible atmosphere.This may resulf in an explosion or fire.
- When using the jack with equipment for fransporting personnal or lifting equipment,protective devices should be installed to prevent accidents if the jack should break or fall.
- When using the jack for lifting equipment, provide safety devices on the equipment to prevent it from falling.
- Immediately turn off the power switch in the event of a power failure.Sudden power restoration may resulf in equipment damage or injury to jack operators.
- Do not use the jack beyond the scope of the specifications described on its nameplate or manufacturing specifications.
- Be sure to use the power supply indicated on the nameplate of the motor. improper power supply may cause a fire or motor burnout.
- Never approach of touch the rotary parts (input shaft,etc.) or the screw during operation.This may resulf in injury if a part of your body or clothing becomes caught in the moving parts.
- Completely discontinue use of a damaged jack to avoid injure, fire or other accidents.

⚠ CAUTION

- Do not remove the nameplate trom the jack.
- As the jack ages and parts begin to wear, its performance may decline.Use the instructions in this manual for effective inspection and maintenance.Have it repaired or replaced turough the distributor that you purchased it from if necessary.
- Product warranty is applicable as long as the unit is operated within the specifications and service conditions described in this manual or specifications that have been approved by Tsubaki.it is user's responsibility to prevent any destructive external conditions that may typically include severe shock loading, vibratory loads, mechanical or thermal overloads,or side loads.
- Any trouble caused by modeifications to the product by the customer is not covered by warranty and Tsubaki can not be considered liable for such damage.

Thank you for purchasing TSUBAKI LINISPEED JACK. To make best use of it, proper installation, operation, and maintenance is required. This manual contains such information and should be carefully read in order to maintain the performance of your Tsubaki LINISPEED JACK.

If you have any questions, consult the distributor you purchased the jack from or the Tsubaki sales office nearest to you (See the last page of this manual).

The jack's type, test number, and drawing number shown on the nameplate attached to the main body of the jack will be required when you contact your distributor or our sales office.

This instruction manual is subject to change for product improvement without notice.

—Contents—

1. Inspection upon receipt

1. Be sure the package is right side up to avoid injury when unpacking the product.
2. As soon as you receive the LINISPEED JACK, check the followings:
   （1）Make sure that the "type" stated on the nameplate conforms to that of your order specifications. Also, confirm that the accessories enclosed are the same as those you ordered.
   （2）Check that the nuts and bolts on the unit have not loosened.

Consult the distributor you purchased the product from if you encounter a problem.

In case you find product defects, please contact your distributor or our sales office with the description of following body nameplate.

※ Please check "TYPE", 'MFG No.' and 'DRAWING No.' of the nameplate when inquiring so that we can support smoothly.

※ Even if you return the product, please contact distributor you purchased and let them know "TYPE", "MFG No" and "DRAWING No."

2. Transportation

1. If the Jack has a hanger, use the hanger to lift it. Before lifting, check the packaging, outline drawing or catalog to confirm the weight of the jack. After the jack has been installed, avoid using the hanger to lift it and the equipment that is connected to. This may damage the bolts, causing injury or equipment damage if the equipment drops or the jack turns over.
2. The packaged product has uneven distribution of weight in the longitudinal direction. Be careful when you carry the product.

3. Installation

★1. Location of installation and atmosphere

Location	Indoor (No rain/water exposure)
Atmosphere	※Dust level should be that of a normal factory
Operating Temperature Range	−10℃ to 90℃
Relative Humidity	85% max.

※ Operating temperature range refers to the surface temperature of the jack during operation. To check, measure the surface temperature of the surface of the gear housing. Be sure all the rotating parts have completely stopped before proceeding to measure.

2. Do not place any obstacles that might prevent ventilation around the Jack. They can hinder cooling resulting in a fire caused by abnormal overheating.
3. Never step or hang on the Jack. This may result in injury.
4. The ball screw moves downward by its own weight. The same phenomenon occurs with the traveling nut as well. Provide anti-rotation measure to prevent the screw shaft from rotating at the time of installation.
5. Do not operate input shaft manually while loaded. Load pressure will rotate the shaft.
6. When using equipment that must avoid all contact with oil or grease such as food processing equipment, make sure a protective device such as an oil receiver is attached to prevent damage from oil leakage resulting from equipment damage or overuse.
7. When installing a motor and reducer unit in addition to the jack body, prepare a robust counter making allowance for a safety factor to prevent alignment accuracy at installation from being reduced even if the maximum load is applied. Make sure that the transmission shaft connected to the input shaft is aligned accurately (Fig.1).

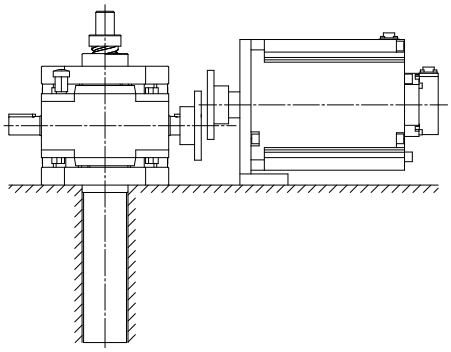


Fig. 1

8. Using a floating shaft may result in malfunction due to vibration depending on rotation speed, therefore, sufficiently consider rigidity of the shaft and backlash of the coupling.
9. To install a screw shaft or cover to the base, avoid drilling large holes so as not to reduce the surface area of contact between the jack and the base.
10. See table 1 for bolt sizes to fasten the jack. Strength class 8.8 or above bolts are usually used for mounting. Use 10.9 or above when load applies directly to the mounting bolts as in Fig.2.

Table 1. Mounting Bolt Sizes

Frame No.	Face Mount	Flange Mount	Bolt Size
	Bolt Size	Mounting hole	
015	4−M10	4−φ11	M10
030	4−M12	4−φ14	M12
050	4−M16	4−φ18	M16

11. When using the traveling nut type, be sure to support the screw shaft end with a bearing as shown in Figure 2. Failure to do so may result in breakage of the screw shaft.

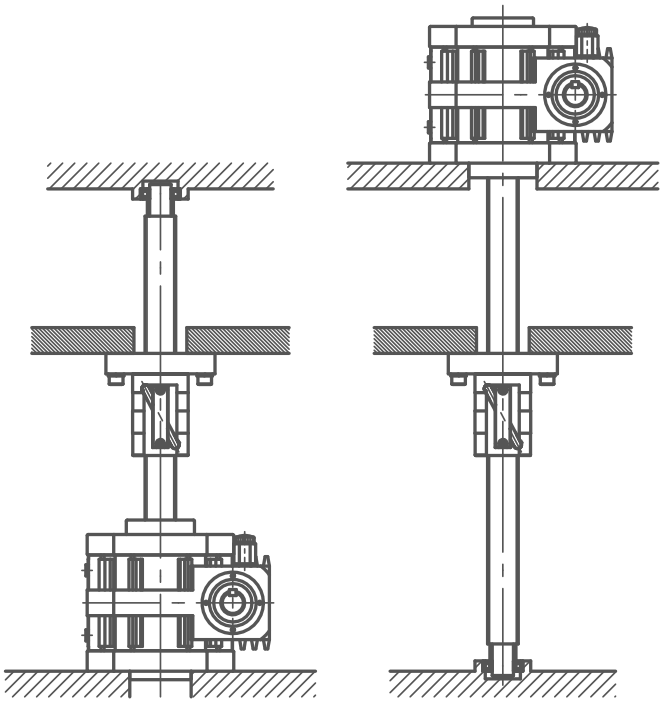


Fig. 2

12. With Flange mount, when the load direction is indicated by arrows in Fig.3, please limit screw compressive load/screw tensile load to 50% of allowable thrust.

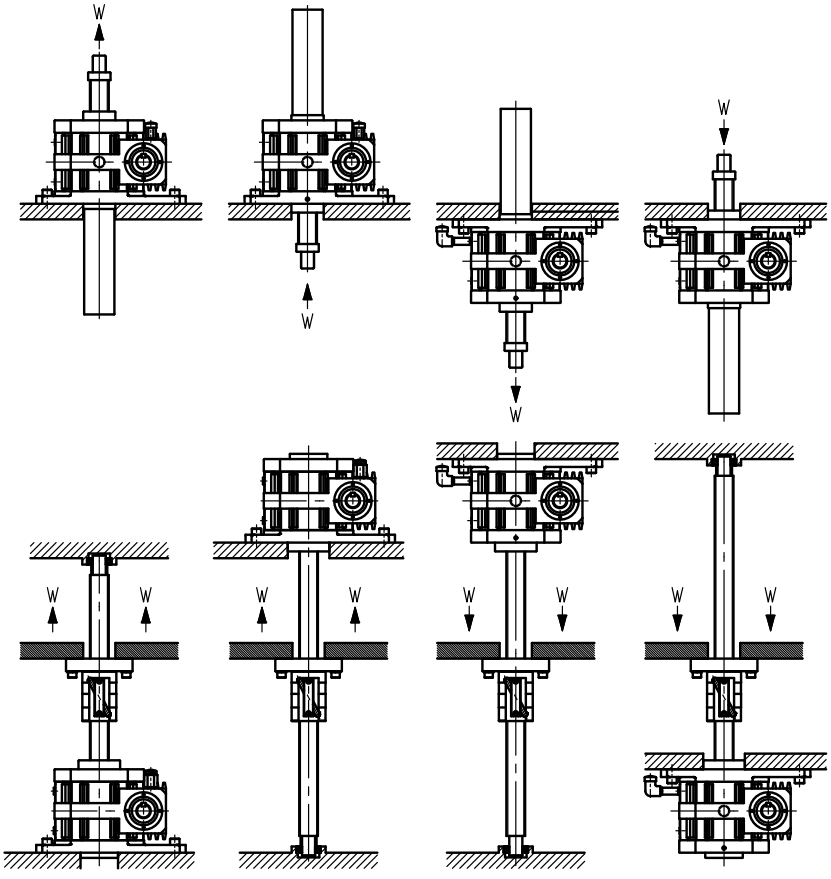


Fig. 3

13. Attach shaft end by applying an adhesive agent to its set screw. it is possible for the shaft end to become detached by the rotational torque applied to the shaft. To avoid this, use one of the following adhesives:
    Provide a locking mechanism to the shaft end when an end fitting is attached . The screw shaft receives a rotational torque and cause the end fitting to drop. Follow the instructions below to avoid drop of the end fitting.

    1) Apply an adhesive agent. Use the following brands or their equivalent. Read instructions and safety precautions provided with each product before applying.

Table 2. Tightening Agent

Maker	Brand
Henkel Japan Ltd.	#262, 271
Three Bond Co., Ltd.	#1307N

    2) After tightening the end fitting, fix with the attached set screw (cone point or cut point) as a locking device. For set screw sizes, refer to the end fitting configuration (dimensional drawing).
    3) In atmospheres with a lot of vibration or temperatures higher than the operating temperature range use dowel pins instead of set screws.

14. The jack's thrusting force may cause the screw shaft (or the nut in the case of traveling nut type) to rotate, therefore, a rotation prevention mechanism is required. When operating with the shaft end unconnected or pulling the rope, consult the appropriate rotation prevention type.
15. Do not use mechanical stops. This will cause major internal damage.
16. Apply load in the same direction as that of the screw shaft.
    Load from inappropriate angles can bend the shaft (Fig.4).
    For side load, make sure to use guides so the load or bending momentum do not apply directly to the jack.

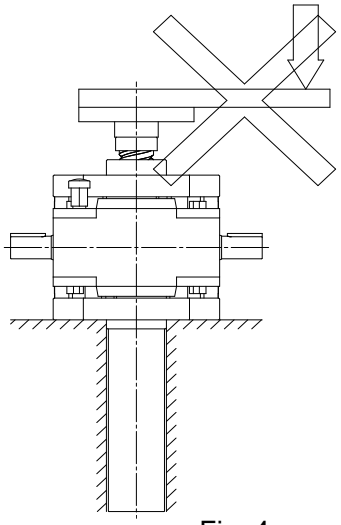


Fig. 4

17. Be certain that the jack rating exceed the maximum possible stroke. If the stroke capacity is exceeded, the shaft may disengage from the unit or fail to function.
18. Consider maximum possible inertia before setting the limit switch. This means calculating the maximum coasting distance affected by specific load and installation conditions. Also, install a mechanical stopper within the stroke range in case of emergency.

4. Operation

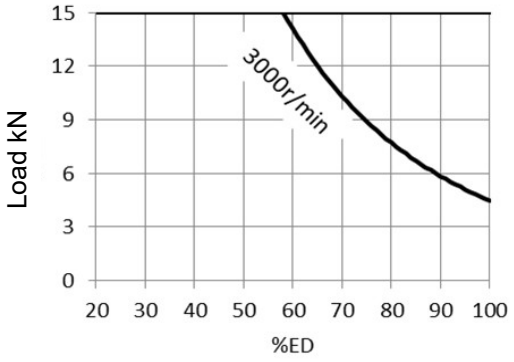
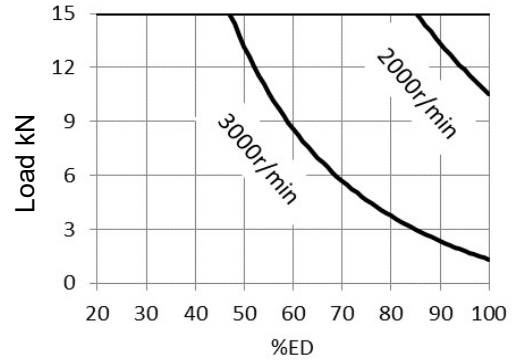
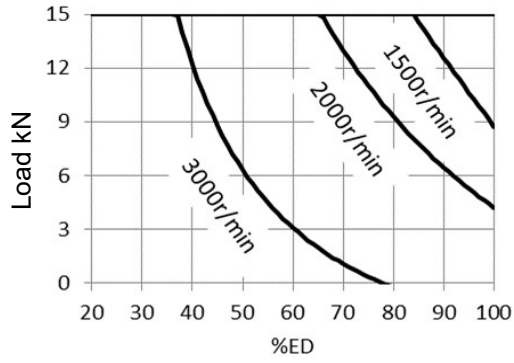
1. The Jack is shipped prepacked with grease. Before using, please apply the prepacked grease to plug and pressure vent. Otherwise oil leak may occur due to increased inner pressure.

2. Running-in is not performed before shipping. To optimize the performance, we recommend a day-long running-in with 1/2～1/3 load.

3. Be sure that the dynamic or static load carried or sustained by jack does not exceed its allowable thrust.

★4. The maximum input rotation speed is 3000r/min.

★5. Make sure that the surface temperature of the gear housing does not exceed temperature of -10ºC to 90ºC during operation. Please refer to Fig.5 for the standard duty cycle (%) ［ Operating time /(Operating time + Off time)］(Not guaranteed performance, in the case of up thrust or hanging load.)

Ambient temperature	SJ015H
20℃	
30℃	
40℃	

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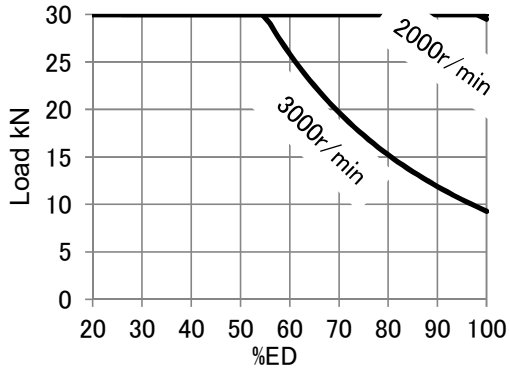
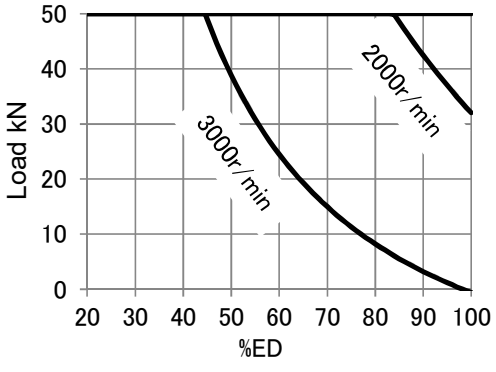
20℃		

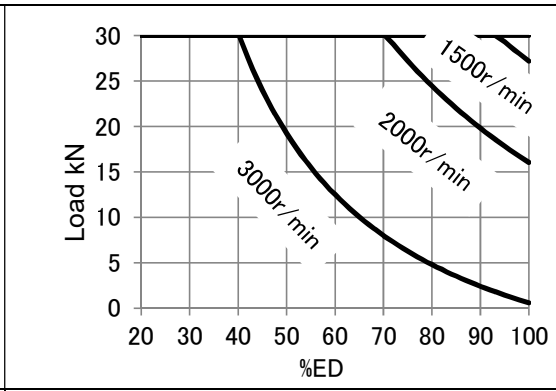
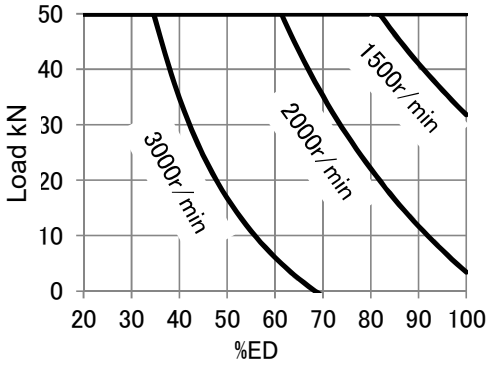
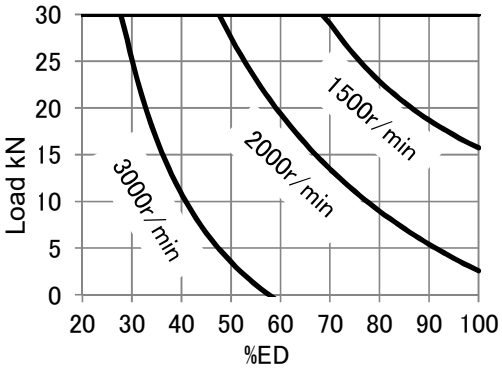
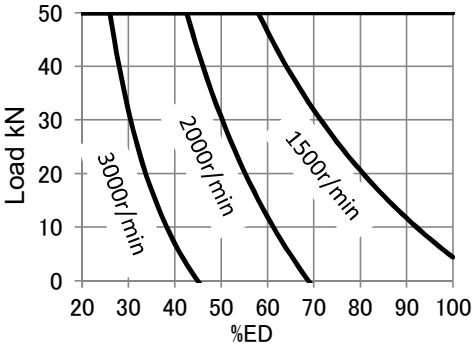
30℃		
40℃		

Fig.5

6. Be sure that starting torque is 200% or more of required running torque.
7. Be sure that ample driving power is available to drive the jack when using in temperatures below 0ºC. Low temperatures decrease the jack's efficiency due to the increased grease viscosity inside the gear box.
8. This Jack must have brake units that over power its holding torque because of its extremely high efficiency.
9. Never approach or touch the rotary parts (input shaft, etc.) or the screw during operation.

5. Maintenance and inspection

★1. The jack is shipped prepacked with grease and oil. Recommended grease and oil brands are shown in Table 3. Under normal operation, lubrication is required every 6 months, however, this interval may vary as frequency of use and conditions change. Severe operating conditions will require a self-lubricating system. See Table 4 for the lubrication cycle.

2. When lubricating the screw, use a brush to spread the grease on the screw after the old grease has been removed. See Table 5 for the amount of grease to be applied.

3. The lubrication cycle is shown as below.

- The first Lubrication is required after 1000hours or 3 months operation , whichever comes first.
- The second lubrication is required 5000hours or 1 year operation, whichever comes first.
- Please hasten the lubrication cycle if grease quality is found to be deteriorated (viscosity, color, etc.)
- Though oil scavenge is easier shortly after operation, burn injury risk is high. Before oil scavenge, make sure the case surface temperature cools down to 40～50℃.
- Make sure that lubrication oil level is kept up to the center of oil gauge, as in some rare occasions, due to oil surface tension, the leftover oil may look like down below the oil gauge even if oil has diminished.
- When replacing lubrication, it's recommended to rinse out the case with new grease.

  Note) Avoid using together with other brand greases.

Table 3. Recommended lubricant

Use Segment	Maker	Lubricant
Reducer Unit	Idemitsu Kosan	※Daphne Alpha Oil TE150
Screw Shaft	Mobil	※Mobil SHC Grease 681WT

※Prepacked lubricant of shipment.

Table 4. Lubricant, Grease, Replacement cycle

Jack operating cycle	Lubricating Cycle	Replacement cycle
	Screw Shaft	Reducer Unit
1001~ times / day	1 to 3 months	The shorter of the operation 5000 hours or 1 year.
501~1000 times / day	3 to 6 months	
~500 times / day	6 months to 1 yr.	

Table 5. Lubricant, Grease, Replacement amount

Frame No.	Amount of lubricant	Initial enclosed quantity
	Screw Shaft	Reducer Unit
015	10 - 15g	0.31L
030	10 - 15g	0.49L
050	20 – 30g	1.02L

※Value per 100 mm stroke.

4. Inspect the unit regularly for general backlash and overall screw unit condition.Check for visible particles caused by wear of the screw unit.Check the backlash between the worm and worm gear. Backlash in excess of 30° indicates that the worm and worm gear need to be replaced (Angle C in Fig. 6). In general, continuous operation without lubrication at the recommended intervals may cause shaft inefficiency and failure of the traveling nut.

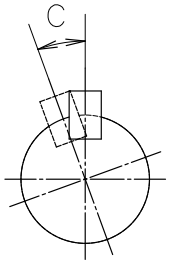


Fig.6 Input backlash

6. Trouble shooting

Most of jack troubles arise from improper lubrication, inappropriate selection, and misalignment. Please use the following trouble shooting table when investigating problems.

Table 6. Trouble shooting

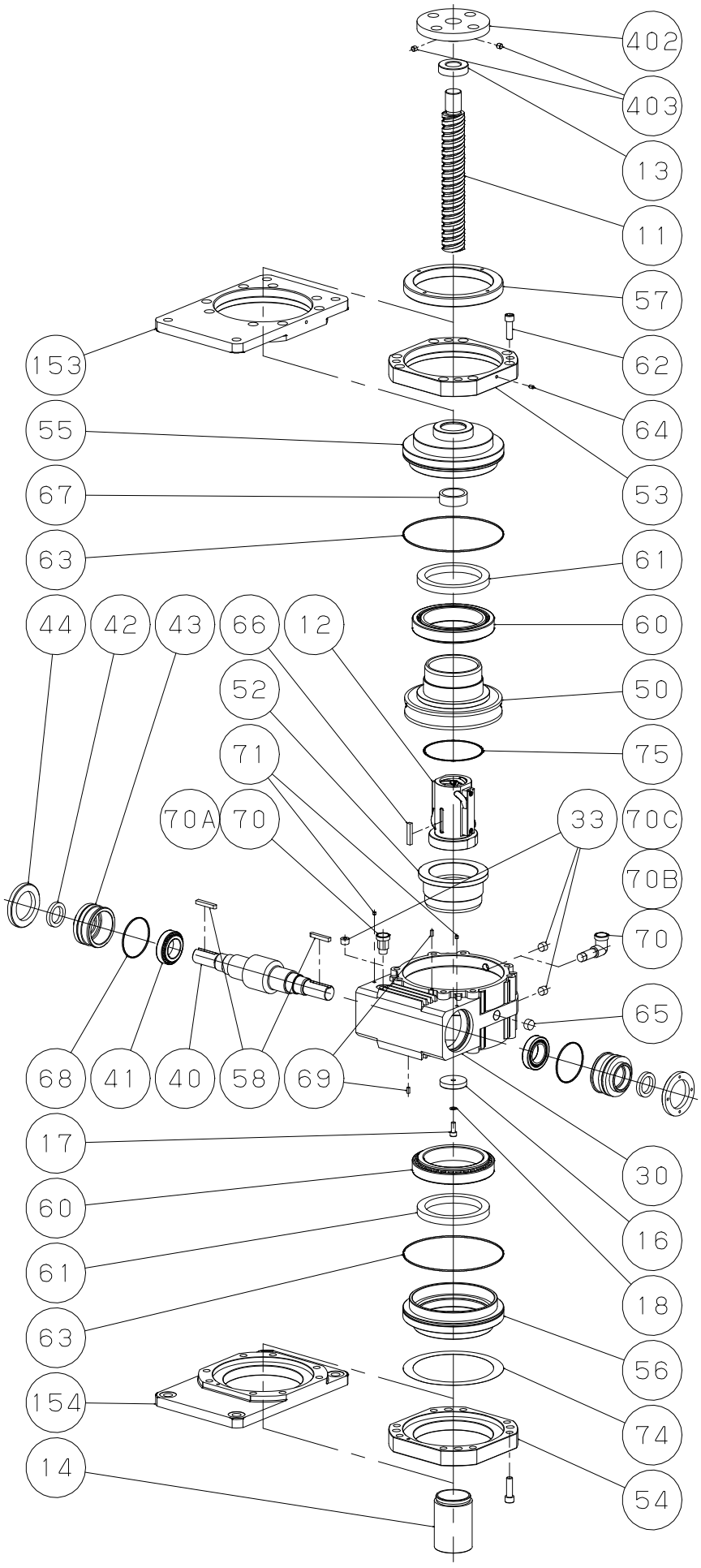
Trouble	Cause	Action
Gear Housing Failure	1. Over load	• Reduce the load or replace with a unit of sufficient capacity.
	2. Improper support	• Install the jack to a robust base and align proplerly.
	3. Mechanical shock	• Provide a shock absorbing device.
Input Shaft Failure	1. Improper centering	・Tube coupling may cause shaft failure. Please use flexible coupling. • Re-align as mentioned in installation page.
	2. Excessive overhung load	• Check the catalog for allowable loads and adjust.
	3. Overload	• See Gear Housing Failure #1.
	4. Impact load	・Provide a safety device to avoid possible impact loads.
	5. Excessive input	・When several jacks are connected in series, there is a limitation on the input shaft of the first jack due to the axia strength. If the current value exceeds the catalog value, reduce the load or change the jack to one with a larger capacity
Bearing Failure	1. Overload	• See Gear Case Housing #1.
	2. Excessive overhung load	• See Input Shaft Failure #2.
	3. Coupling misalignment	• See Input Shaft Failure #1.
	4. Coupling axial adjustment	・Although the specified pressure has been applied to the bearing, the input shaft can be rotated freely when no load is connected. If the rotation is heavy, some force may be applied to the input shaft in the axial direction. Remove the force.
	5. Abnormal force to worm wheel bearings	・See #5 (Maintenance and inspection) of this manual.
	6. Improper lubrication	• See Input Shaft Failure #4.
	7. Impact load	
Abnormal wear of travel nut/ worm wheel	1. overload	• See Gear Housing Failure #1.
	2. Improper lubrication	• See Bearing Failure #6.
Ball nut and traveling nuts damage, abnormal wear	1. Overload	• See Gear Housing Failure #1.
	2. Improper adjustment/installation	• Set the load so that it will be applied onto the same axis as the screw shaft.
	3. Improper lubrication	• See Bearing Failure #6.
	4. Inappropriate sizing	• Check the catalog for relationship between life and load.
	5. Mechanical shock	• Provide a shock absorbing device.
	6. Impact load	• Provide a safety device to avoid possible impact loads.
Shaft failure, Abnormal abration, abnormal noise	1. Overload	• See Gear Housing Failure #1.
	2. Improper adjustment/installation	• See Ball Nut Failure #2.
	3. Side load	• Provide a guide to avoid side loads
	4. Improper lubrication	• See Bearing Failure #6.
Gear housing surface temperature. (90℃ or higher)	1. Overload	• See Gear Housing Failure #1.
	2. Improper lubrication	• See Bearing Failure #6.
	3. Improper centering	・See Input Shaft Failure #1.
	4. Frequent	・See Shaft Failure #3.
		・Please lower the operation frequency according to the duty factor shown in 4. OPERATION.

7. Structure
7.1 Basic Structure

NO	Name of part	Qty
11	Ball screw shaft	1
12	Ball nut	1
13	Adaptor	1
14	Screw cover	1
16	Stopper plate	1
17	Hex socket bolt	1
18	Conical spring washer	1
30	Gear housing	1
33	Hex socket plug	2
40	WG Warm	1
41	Bearing	2
42	Oil seal	2
43	Bear holder	2
44	Pressure plate	2
50	WG Wheel	1
52	Wheel hub D	1
53	Base U	1
54	Base D	1
55	Bear holder U	1
56	Bear holder D	1
57	Pressure plate U	1
58	One round key	2
60	Bearing	2
61	Oil seal	2
62	Hex socket bolt	16
63	O ring	2
64	Hex socket set screw	2
65	Oil gauge	1
66	Double-sided key	1
67	Bush	1
68	O ring	2
69	Parallel pin	2
70	Pressure vent	1
70A	Male and Female socket	1
70B	Long nipple	1
70C	elbow	1
71	Hex socket set screw	2
74	Shim	
75	O ring	1
153	Flange Base U	1
154	Flange Base D	1
402	End fitting	1
403	Hex socket set screw	1

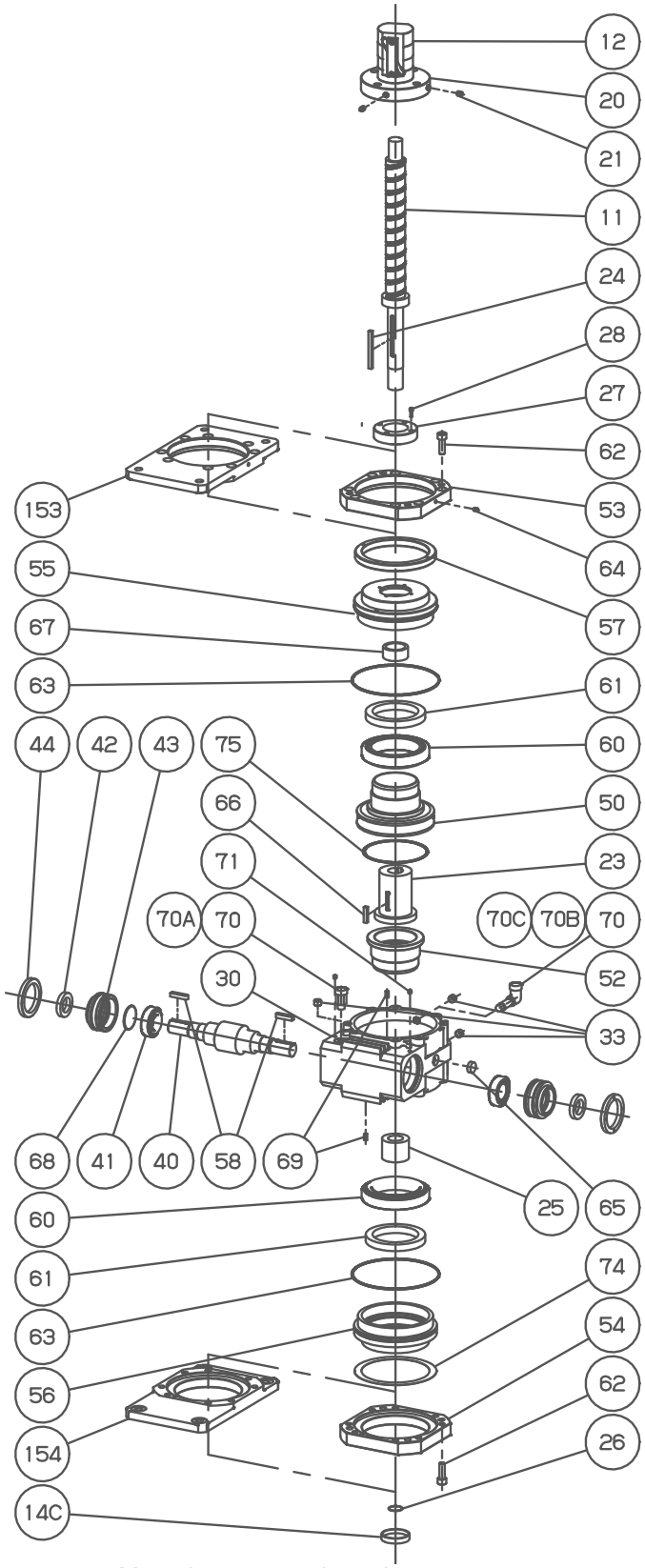
Mounting type and used parts

TU/BU	TS	TC	BS	BC
53	153	53	153	53
54	54	154	54	154
70A	70B 70C	70A	70A	70B 70C



7.2 Structure（Traveling nut type）

NO	Name of part	Qty
11	Ball screw shaft	1
12	Ball nut	1
14C	Seal cap	1
20	Travel Flange	1
21	Hex socket set screw	2
23	Dummy Nut	1
24	Double-sided key	1
25	Screw Shaft Nut	1
26	Snap ring	1
27	Cover	1
28	Hex socket bolt	4
30	Gear housing	1
33	Hex socket plug	2
40	WG Warm	1
41	Bearing	2
42	Oil seal	2
43	Bear holder	2
44	Pressure plate	2
50	WG Wheel	1
52	Wheel hub D	1
53	Base U	1
54	Base D	1
55	Bear holder U	1
56	Bear holder D	1
57	Pressure plate U	1
58	One round key	2
60	Bearing	2
61	Oil seal	2
62	Hex socket bolt	16
63	O ring	2
64	Hex socket set screw	2
65	Oil gauge	1
66	Double-sided key	1
67	Bush	1
68	O ring	2
69	Parallel pin	2
70	Pressure vent	1
70A	Male and Female socket	1
70B	Long nipple	1
70C	elbow	1
71	Hex socket set screw	2
74	Shim	
75	O ring	1
153	Flange Base U	1
154	Flange Base D	1



Mounting type and used parts

PU/HU	PS	PC	HS	HC
53	153	53	153	53
54	54	154	54	154
70A	70B 70C	70A	70A	70B 70C

8. Options

(1) **Position detection unit (option)**

Three types of position detection units can be built in at most.

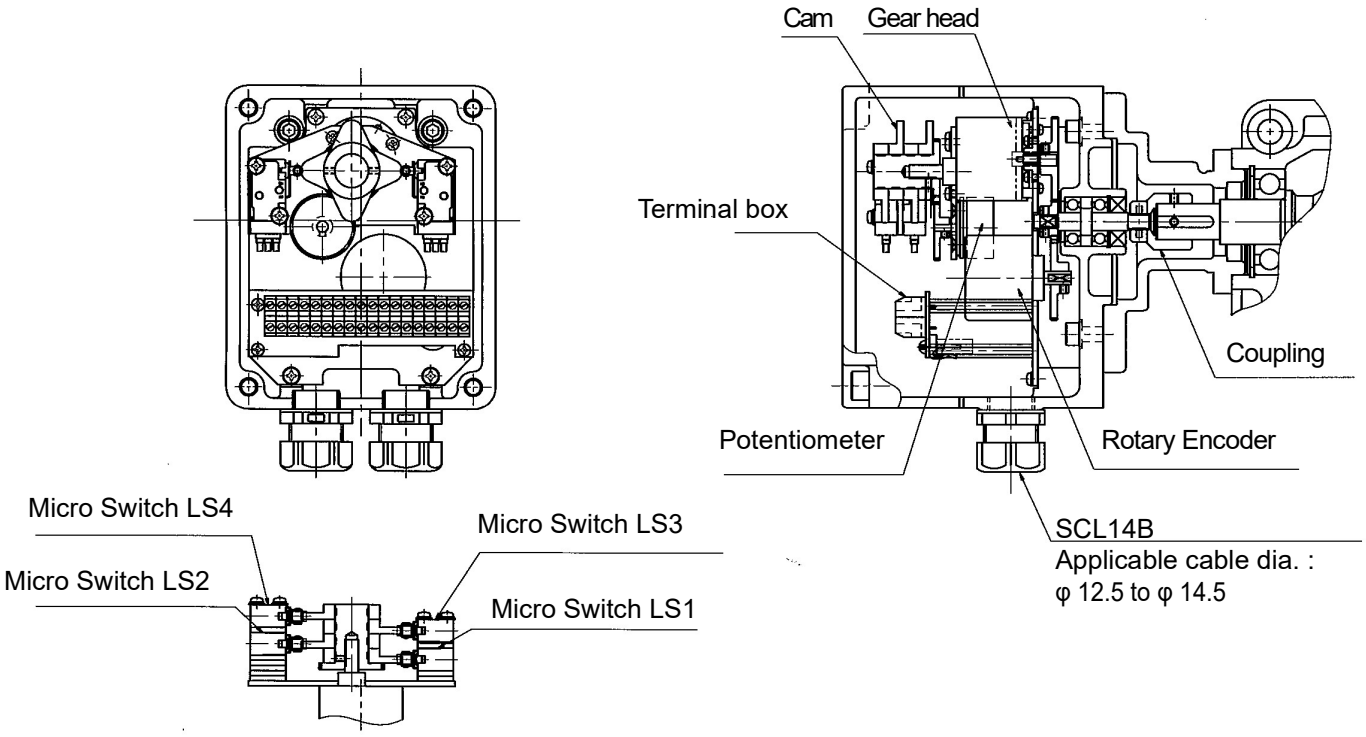
Micro switch: 4 pieces.

Potentiometer: 1 pc.

Rotary encoder: 1 pc.

Structure

Following shows the unit diagram consisting of micro switch, potentiometer and rotary encoder.

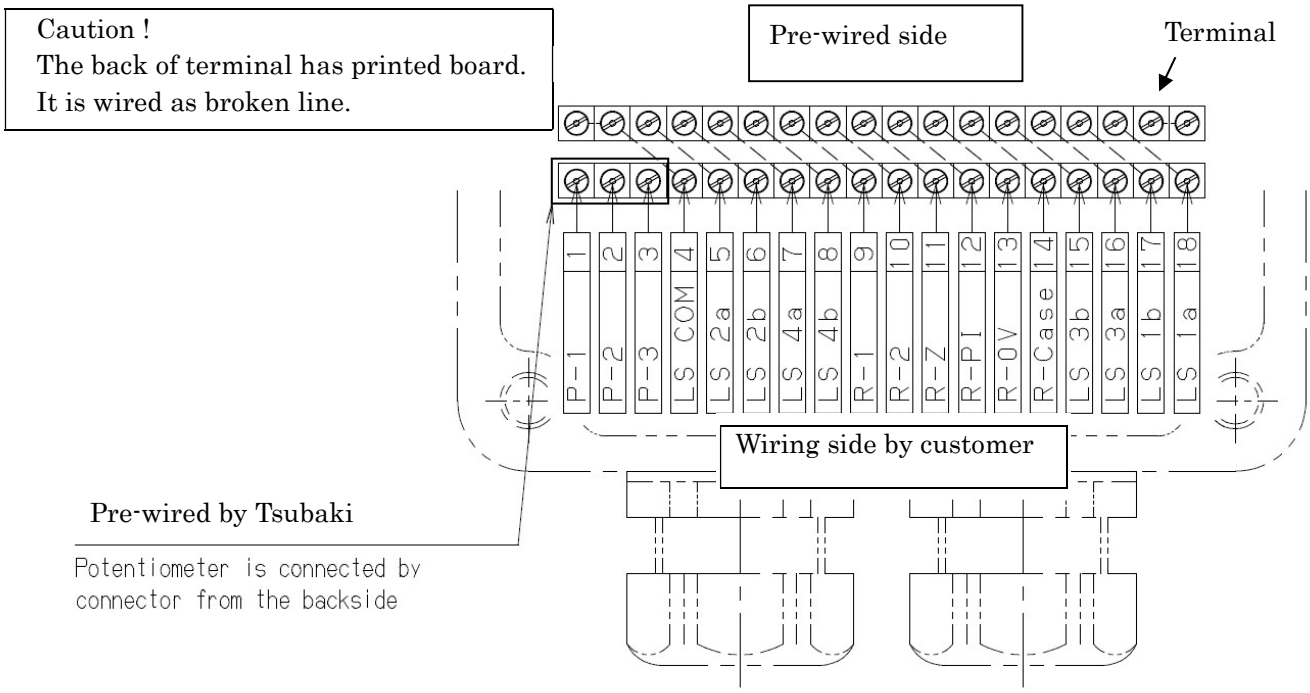


■ Note

1. Newly delivered micro switches have already been tested, but have not been adjusted for stroke. Therefore, you must carry out stroke adjustment after the unit is installed. Be sure to take into consideration the inertia of the jack when performing the stroke adjustment. If the travel screw is turned while the input shaft fixed after adjustment, the adjusted settings will change. Therefore, do not allow the travel screw to be turned (for traveling nut-types, do not allow the nut to be turned).
2. Position detection unit consists of precision parts. Never apply shock or vibration.
3. Never rotate LS cam strongly after fixing it by the set of screws. Otherwise, built in reducer can brake.

★■ Connection

1. Use the terminal block in the unit for the connection to each detector. Connection of each detector to terminal block is previously completed.
2. In case of long distance wiring, signal loss can get worse.
3. Make sure to ground the shield wire of the detector unit and signal.
4. Locate the signal and power line separately. Put noise filter, shield the signal line, in case there is a source of noise. Use shield wire for wiring rotary encoder.
5. Use suitable diameter of cable, which corresponds to the connector of position detection unit. In case of smaller diameter cable or bulk cable, waterproof is poor.
   Applicable cable diameter: SCL14B (12.5 to 14.5 mm dia.)
6. In case of wiring in rain or other wet environment, avoid water from entering the position detection unit. It will damage the product.



(2) **Specification of each position detector**

★ ■ Micro switch (Option code: K2 or K4)

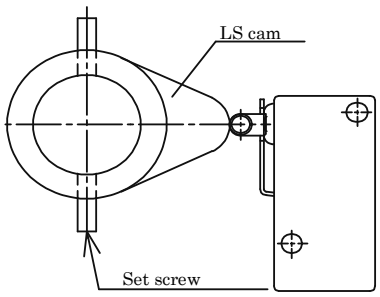
Specification of micro switch	
Type	D2VW-5L2A-1M or equivalent
Maker	OMRON
Contact configuration	
Capacity	AC250V4A (COSφ = 0.7)

※ In case of the special specification, confirm the final drawing because model number, specification or the number might be different.

Setting the internal LS (Option code: K2 or K4)

The position detection unit may contain either two or four microswitches for the internal LSs. The jack stroke runs the output from the rotation of the input axis through the reducer, and changes the cam rotation angle. When the cam reaches a specified position, it will activate the microswitch and stop the jack. Then adjustment of the cam positions should be carried out.

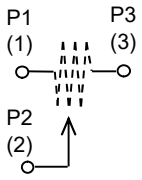
1. Ensure that all connections have been properly made when adjusting the stroke.
2. At approximately the center of the stroke, ensure that (1) the cam is stopped by the operation of the forward limit microswitch by screw extension and nut progression, and that (2) the cam is stopped by the reverse limit microswitch by screw contraction and nut reversal.
3. Be aware that the momentum of the jack will prevent it from stopping immediately when the microswitch is activated and that there will be a slight amount of overrunning. Take this into consideration and adjust the microswitch activation position to point slightly in front of where you actually want the jack to stop.
4. The rotary cam is affixed by two hexagonal bolts to the shaft directly connected to the reducer. Turn and adjust the cam after loosening these two bolts. Trying to turn the cam without loosening these bolts may damage the internal reduction gears. (Note: Use a hexagonal wrench [2size] for loosening the bolts).
5. Adjust the cams beginning with the one farthest away (if you start with the nearest cams you may not be able to move the farthest ones). After adjustment, be sure to tighten the bolts.



★ ■ Potentiometer (Option code: P)

1. Potentiometer is set at half of the resistance (500 ohm) at the middle of the stroke, unless otherwise specified.
2. Never rotate the screw or nut during transportation or installation, otherwise the relation between the stroke and resistance can get out of control. When the resistance is incorrect, reset 500 ohm at the middle of stroke.

Potentiometer output the stroke of the Linipower Jack as the change of the value of resistance.
※ In case of the special specification, confirm the final drawing because model number or specification might be different.

Potentiometer Specification		Terminal #
Type	CP-30	 ( ) indicates terminal No.
Maker	Sakae	
Total resistance	1.0kΩ	
Power rating	0.75W	
Insulation rating	AC1000V (1min)	
Effective electrical angle	355°	
Effective angle of rotation	360°(infinite)	

★ ■ Rotary encoder (Option code: R)

Encoder Specification		
Type	TS5305N251	
Maker	Tamagawa Seiki Co., Ltd	
Output pulse	600C / T	
Output form	Open collector	
Output wave	90° phase difference, 2 phase square wave, － home position signal	
Output voltage	H	－
	L	1V or less
Power supply	DC5V to 24V　100mA or less	

※ Rotary encoder is set to output 300 pulses per rotation of input shaft of Linipower Jack.
※ In case of the special specification, confirm the final drawing because model number or specification might be different.

Output connection

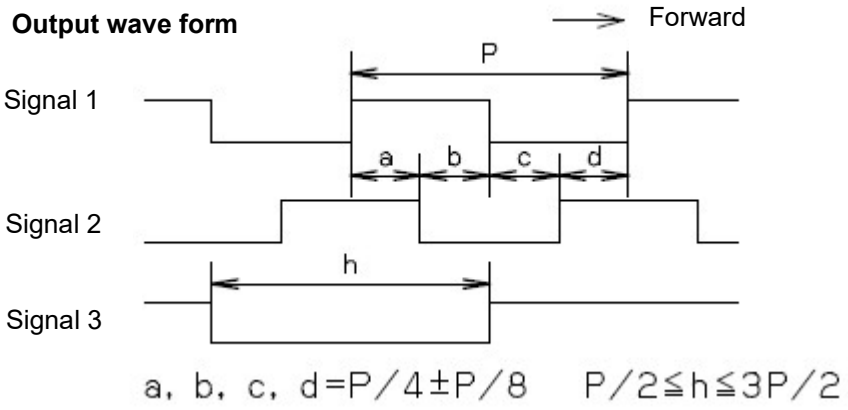
Signal 1	Signal 2	Signal Z	+5 to +24V	0V	Case
(9)	(10)	(11)	(12)	(13)	(14)

( ) represents the terminal number.

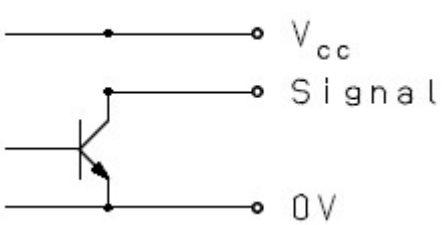
※ Use with an equipment like sequencer or program controller, which controls the stroke as a digital signal.

1. Standard type has built-in incremental type encoder
2. It is possible to set an accurate home position of the machine in combination with a limit switch because home position output is read out every 600 pulses.
3. Because the output is open collector type, output signal can be obtained when connected to a pull up resistor.
   Output voltage for signal 1 and 2: “H” is “(supply voltage - 1)V or more”
   “L” is “1V or less”.
   Reference for pull up resistance:　DC 5V: 220Ω /　DC12V: 470Ω　/ DC24V:1kΩ
4. Rotary encoder is a precision instrument. Never apply vibration or shock.
5. Use shield wire for wiring of rotary encoder.

Output wave form



Output circuit



9. Warranty

Tsubakimoto Chain Co.: hereinafter referred to as “Seller”
Customer: hereinafter referred to as “Buyer”
Goods sold or supplied by Seller to Buyer: hereinafter referred to as “Goods”

9-1. Warranty period without charge

18 months effective the date of shipment or 12 months effective the first use of Goods, including installation of Goods to Buyer’s equipment or machines - whichever comes first.

9-2. Warranty coverage

Should any damage or problem with the Goods arise within the warranty period, given that the Goods were operated and maintained under instructions provided in the manual, Seller would repair and replace at no charge once the Goods are returned to Seller. The following are excluded from the warranty.

1) Any cost related to removal or re-installation of Goods from the Buyer’s equipment or machines to repair or replace parts.
2) Cost to transport Buyer’s equipment or machines to the Buyer’s repair shop.
3) Costs to reimburse any profit loss due to any repair or damage and consequential losses caused by the Buyer.

9-3. Warranty with charge

Seller will charge any investigation and repair of Goods caused by:

1) Improper installation by failing to follow the instruction manual.
2) Insufficient maintenance or improper operation by the Buyer.
3) Incorrect installation of Goods into other equipment or machines.
4) Structure change of the Goods by any modifications or alterations by the Buyer.
5) Any repair by engineers other than the Seller or those designated by the Seller.
6) Operation in inappropriate environment not specified in the manual.
7) Force Majeure or forces beyond the Seller’s control such as natural disaster and injustice done by third party.
8) Secondary damage or problem incurred by the Buyer’s equipment or machines.
9) Defected parts supplied, or specified by the Buyer.
10) Incorrect wiring or parameter setting by the Buyer.
11) The end of life cycle of the Goods under normal use condition.
12) Losses or damages not liable to the Seller

9-4. Dispatch the Seller’s engineer

Service to dispatch Seller’s engineer for investigation, adjustment or trial testing, etc. of Seller’s Goods are at Buyer’s expense.

9-5. Others

- In accordance with the policy of Tsubakimoto Chain Co., the contents of this instruction manual are subject to change without notice.
- We take all possible measures to ensure that there is no error in writing or defect with the contents of this instruction manual.
- We highly appreciate it, if you would let us know any error or defects found in this instruction manual.

TSUBAKI LINISPEED JACK
China RoHS Instruction

本资料是中国ROHS的必备资料 (China RoHS requisite document)

Part Name	Hazardous Substances or Elements									
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	邻苯二甲酸二(2-乙基) 乙酯 (DEHP)	邻苯二甲酸丁苄酯 (BBP)	邻苯二甲酸二正丁酯 (DBP)	邻苯二甲酸二异丁酯 (DIBP)
蜗轮 (Worm wheel)	×	○	○	○	○	○	○	○	○	○
滑脂嘴 (Grease nipple)	×	○	○	○	○	○	○	○	○	○
螺丝套件 (Set Pieces)	×	○	○	○	○	○	○	○	○	○
位置检测装置 (Position Detecting Unit)	×	○	○	○	○	○	○	○	○	○

Note 1: The symbol of '○' indicates that the content of harmful substances in all homogeneous materials of the component does not exceed the requirements of the national standard for the restriction of the use of harmful substances in electrical and electronic products.
The symbol of '×' indicates that the content of harmful substances in at least one homogeneous material of the component exceeds the requirements of the national standard for the restriction of the use of harmful substances in electrical and electronic products.

Note 2: For components not listed above 'Note 1', the content of harmful substances does not exceed the requirements of the national standard for the restriction of the use of harmful substances in electrical and electronic products.

TSUBAKIMOTO CHAIN CO.

1-1, Kohtari-Kuresumi, Nagaokakyo

Kyoto 617- 0833, Japan

Website: https://tsubakimoto.com/

Global Associated Partners:

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