Tsubaki
Helical Power Drive
HDR/HDM Series

Instruction Manual

Thank you for purchasing this Tsubaki Helical Power Drive reducer.
In order to fully realize the characteristics of this reducer, please read the manual carefully and use it for installation and inspection. Please ensure that this manual is delivered to the customer who will use the reducer.

Tsubaki E&M Co.

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Safety precautions

Thank you for your patronage.
In order to use this reducer safely, always observe the following items.

- An experienced technician should perform any work when handling the HDR/HDM Series. The content listed in this instruction manual must also be carefully read and fully understood before using the reducer.
- Please ensure that this instruction manual is delivered to the customer who will use the reducer.
- Carefully store the instruction manual so that it can be used at any time before handling the reducer.
- The degree of harm and damage that can be expected to occur when the reducer is mishandled is essentially classified into the ranks of "DANGER" and "CAUTION", and these are indicated in the instruction manual. The definitions and indications are as follows.

⚠ DANGER	This indicates the possibility that a dangerous situation may occur, resulting in death or serious injury if the reducer is mishandled.
⚠ CAUTION	This indicates the possibility that a dangerous situation may occur, resulting in a moderate or light injury, or resulting in only physical damage, if the reducer is mishandled.

Depending on the situation, even items listed under CAUTION may result in serious consequences.
Both indicate important content that must always be observed.

⚠ DANGER

(Overall)
- Work to transport, install, run tubing and wiring, run/operate, and maintain/inspect the reducer must always be performed by a technician with specialized knowledge and skills. Otherwise there is a risk of injury and damage to equipment.
- When the reducer is installed in equipment to transport people, always install protective devices for safety on the equipment side. Otherwise there is a risk of accidents due to runaway equipment and damage to equipment.
- When the reducer is used in lift equipment, always install safety devices to prevent drops on the equipment side. Otherwise there is a risk of accidents due to the lift falling and damage to equipment.

⚠ CAUTION

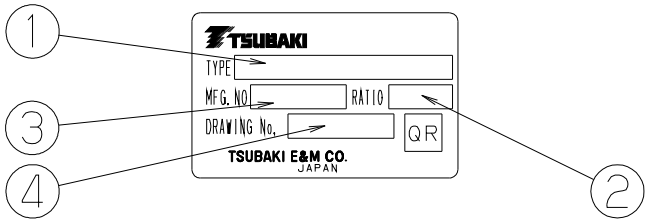
(Overall)
- Do not use the reducer outside of the specifications listed on the HDR/HDM Series nameplate or the reducer specifications in manufacturing specification document. Otherwise there is a risk of injury and damage to equipment.
- Do not insert fingers or objects into the openings on the HDR/HDM Series. Otherwise there is a risk of injury and damage to equipment.
- Do not use the HDR/HDM Series when damaged. Otherwise there is a risk of injury and damage to equipment.
- Do not remove the nameplate.
- Alterations to the reducer by the customer are not covered by the warranty and Tsubaki E&M assumes no responsibility for them.

(Upon receipt of your reducer)
- Check the orientation of the packaging and open it. Otherwise there is a risk of injury.
- Make sure the model number of the unit delivered matches your order. If the wrong reducer is installed, there is a risk of injury and damage to equipment.

1. When purchased

Inspect the following items upon receipt of your reducer.
1) Verify the specifications on the nameplate correspond to your order. Pay special attention to the shaft arrangement and rotational direction. Check this against the position of the input (motor) and output shafts, oil gauge and plugs.
Note) If the shaft arrangement does not match your order, the reducer will have a different amount of lubrication oil, and the oil gauge and plugs will also be in different positions.
2) Make sure all accessories, such as pressure vents, are included.
3) Check for any scratches or cosmetic defects caused during transport.
4) Check that no bolts are loose.

Nameplate legend



(1) TYPE (2) RATIO (3) MFG. NO (4) DRAWING No.

・When making an inquiry
If the content listed on the nameplate does not match the reducer, or when ordering the reducer and parts, please inform us of the following information.
(1) Type
(2) Ratio
(3) Manufacturing number
(4) Drawing number

2. Installation

(1) Ambient conditions

Install the reducer without a motor in an ambient temperature range from -10 to 50°C and the reducer with a motor in an ambient temperature range from -10 to 40°C in a location that is well-ventilated, less dusty, and low in humidity. Do not use the reducer in locations with corrosive liquids or gases, or in flammable or explosive locations. If the reducer is to be used outdoors, furnish a cover or similar protection to avoid direct exposure to rain.

(2) Transport

⚠ CAUTION

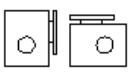
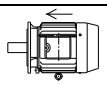
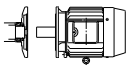
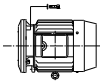
- Use caution when transporting the reducer as it is dangerous if it drops or falls over. If the HDR/HDM Series has lifting rings, always use those lifting rings. However, after the reducer is installed in the machinery, do not hoist the machinery itself with the lifting rings. Before hoisting the reducer, check the HDR/HDM Series weight on the nameplate, packaging, external diagram, or catalog, and do not suspend a reducer that exceeds the weight rating of the lifting rings. Otherwise there is a risk of damaging the lifting rings, injury from the reducer falling over, and damage to equipment.

Be sure to use the eye-nut on the top surface of the housing (fastened with a hex bolt) when transporting the reducer. Never hook wires or slings to the input/output shafts. Doing so may make the shaft eccentric or cause other problems which will shorten the life of the reducer or cause it to fail.

(3) Mounting the motor (applies to motor handling code Y for the HDM Series)

These procedures describe the motor mounting procedures for customer mounting. Note, the reducer ships with bolts for mounting the motor flange.

Motor installation procedures

Step	Installation procedure	Notes	Step	Installation procedure	Notes
1	Place the reducer so that the motor can be mounted easily. 	Take all necessary safety precautions during transportation.	3	Gently insert the motor output shaft into the reducer input shaft. 	Apply grease to the motor output shaft.
2	Align the position of the key on the motor output shaft to the keyway on the reducer input shaft. 	Take all necessary safety precautions when transporting the motor.	4	Fully tighten the supplied hex bolts to the motor flange using the spring washers. 	Make sure the motor has entered the reducer properly, then tighten the bolts.

Motor flange mounting bolts — Unit: mm

Motor KW	0.75	1.5	2.2 3.7	5.5 7.5	11 15	18.5 22	30	37 (45)
Mounting bolts	M10 x 30	M10 x 30	M12 x 30	M12 x 35	M16 x 40	M16 x 40	M16 x 40	M16 x 40

(4) Installation

⚠ DANGER

When hoisting the reducer to transport it, do not enter the area underneath it. Otherwise there is a risk of accidents due to the reducer falling.

⚠ CAUTION

- Do not place obstructions around the HDR/HDM Series that will interfere with ventilation. This will hinder cooling and may result in burns or a fire due to abnormal heating.
- Do not get on the HDR/HDM Series or hang from it under any circumstances. Otherwise there is a risk of injury.
- Do not touch the keyways on the shafts of the HDR/HDM Series with bare hands. Otherwise there is a risk of injury.
- For equipment that is averse to greasiness such as food machinery, take precautions for an accidental oil leak due to a breakdown or the service life and install damage prevention equipment such as an oil pan. Otherwise there is a risk the reducer may become faulty due to an oil leak.

- Mounting to the driven shaft (hollow output shaft type) -

- Check the direction of rotation before connecting the reducer to the driven machine. There is a risk of injury and damage to equipment by mistaking the direction of rotation.
- Lightly tap the end of the output shaft with a plastic hammer to insert it. Do not tap the casing or the oil seal.
- Always secure the shaft to the driven shaft to prevent them from coming apart.

(Solid output shaft type)

- Install on a smooth flat installation surface that can easily withstand the weight of the equipment. The installation angle should be within ±1°.
- Use bolts compliant to JIS strength class 10.9T for installation.

Recommended bolts

Size	000	010	020	030	040	050	060	070	080	090
Recommended bolts	M12 x 45	M16 x 55	M16 x 55	M20 x 60	M24 x 70	M24 x 80	M30 x 90	M36 x 100	M36 x 110	M36 x 110

Note) Failure to install the reducer correctly may result in vibration, noise, and reduced life.
Note) If the reducer is installed at an angle that exceeds ±1°, the oil level and the location of the oil gauge and each plug will no longer apply.

(Hollow output shaft type)

The normal practice is to mount the hollow output shaft type reducer to the driven machine, and then fix it in place with a torque arm or tie rod to keep it from turning by reaction force.

(1) Mounting to the driven shaft

The shaft to which the reducer is to be mounted should be g7. The hollow shaft bore is finished to H8.

Recommended driven shaft length

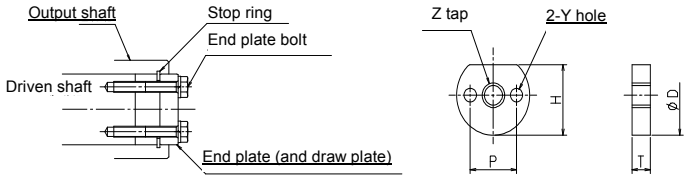
Size	000	010	020	030	040	050	060	070	080	090
Recommended length	178	182	208	238	260	294	354	386	430	580

- Mount as outlined here.

Step	Mounting procedures
1	Install the key on the driven shaft. Note) Use a bar key. Do not use a tapered or gib headed key. Doing so may make the output shaft eccentric or cause other problems which will shorten the life of the reducer or cause it to fail.
2	Hoist the reducer using the eye-nut on the top of the housing and slowly insert it onto the driven shaft. Align the phase of the key before inserting it. Note) If the shaft fits too tightly, help the hollow output shaft slide smoothly by lightly tapping the end with a plastic hammer. (Apply grease or molybdenum disulfide to the driven shaft.) Be careful not to damage the oil seal.
3	Use an end plate to fix the reducer and driven shaft in the thrust direction. The end plate can be fixed on the driven shaft with a stop ring in the stop ring groove of the hollow output shaft, or by fixing it to the end of the shaft, but taking disassembly into consideration, we recommend the method securing the stop ring and end plate. Place a stop ring in the stop ring groove on the hollow output shaft and mount the end plate on the reducer output shaft side of the stop ring. Then fix the end plate to the driven shaft with hex bolts.

Recommended end plate dimensions (also used as draw plate)

Size	Plate						Bolt for plate (with spring washer)	Stop ring size
	φD	T	H	Z	2-Y hole	P		
000	54.6	14	48	M16	11	32	2-M10 x 55	C55
010	64.6	14	57	M24	14	40	2-M12 × 60	C65
020	74.6	14	67	M24	14	48	2-M12 × 60	C75
030	84.6	17	75	M30	14	55	2-M12 × 65	C85
040	94.6	17	85	M30	18	60	2-M16 x 75	C95
050	109.6	20	99	M30	18	60	2-M16 x 85	C110
060	124.4	20	113	M30	18	70	2-M16 x 85	C125
070	139.4	24	127	M36	22	80	2-M20 x 100	C140
080	169.4	24	156	M36	22	90	2-M20 x 100	C170
090	199.4	24	184	M36	22	120	2-M20 x 100	C200



- **If the driven shaft is vertical and points down**

  Use the stop ring and bolts as shown in the figure above to prevent the reducer from falling off, and take all safety precautions necessary.
  Note) Always apply Loctite or similar locking agent to the bolts.

- **If the driven shaft faces up**

  Machine a shoulder on the driven shaft to prevent movement in the thrust direction.

(2) Securing
(Torque arm)
- Secure as outlined here.

Step	Mounting procedures
1	Mount the torque arm to the reducer. Select the proper mounting bolts by referring to the recommended installation bolts for the S type. Note) The torque arm is subject to reaction force from the reducer. Use a torque arm robust enough by considering the bending moment under maximum torque, such as when starting and stopping.
2	Mount the reducer on the driven shaft, then mount the torque arm to the frame of the machine. When mounting the torque arm to the machine frame, leave clearance between the reducer and driven shaft to avoid causing eccentric loads. Note) If the torque arm is fixed to the machine frame, the reducer output shaft bearings and the driven shaft could break due to excessive radial and thrust loads, so always provide the torque arm a degree of freedom. Note) To reduce shock, use rubber bushings between the torque arm and mounting bolts on the machine frame side.

(Tie rod)

・ Please consult with Tsubaki E&M.

(Flange and base mounting notes)

・Install on a smooth flat installation surface that can easily withstand the weight of the equipment.
・Select mounting bolts recommended for the solid output shaft type reducer.
・Mount as outlined here.

Step	Mounting procedures
1	Free the driven shaft in the thrust direction.
2	Insert the reducer into the driven shaft, then mount to the flange surface and base surface.
3	Fix the reducer in the thrust direction of the driven shaft.
4	Fix the driven shaft in the thrust direction.

Note) If the reducer is mounted on its flange surface and base surface after it is fixed to the driven shaft in the thrust direction, the bearings on the reducer or the driven shaft will be subject to thrust force which could result in reduced life or machine failure.

(5) Connection (input shaft of the HDR Series, solid output shaft type)

⚠CAUTION

- Connecting the motor and driven machine (input shaft of the HDR Series, solid output shaft type) -

・When connecting the HDR/HDM Series to a motor and the driven machine, pay careful attention to centering, belt tension, and the parallelism of the pulleys. When directly connected, pay careful attention to the accuracy of the direct connection. When belt driven, correctly adjust the belt tension. Before operation, ensure that the tie bolts for the pulleys and couplings have been fully tightened. Otherwise there is a risk of injury due to flying debris and damage to equipment.
・Install a cover so that rotating components will not be touched. Otherwise there is a risk of injury.
・When the HDR/HDM Series will rotate independently, remove the key that is temporarily installed to the output shaft. Otherwise there is a risk of injury.

- The input and output shaft diameters are finished to h7.
- When using a coupling or similar element to connect the input and output shaft to another shaft, align and fix it in place so that the center of the mating shaft is aligned accurately. Any eccentricity in the shafts will shorten the life of the gears, bearings, and shaft, resulting in vibration and noise. Center alignment is also important when using flexible couplings to prevent from transmitting radial loads from the coupling. We recommend our Flexible Couplings.
- When mounting couplings, pulleys, and sprockets on the shaft, be careful not to bend the shaft and not to scratch the bearings and oil seals.

(6) Wiring (applies to motor handling code S and SB for the HDM Series)

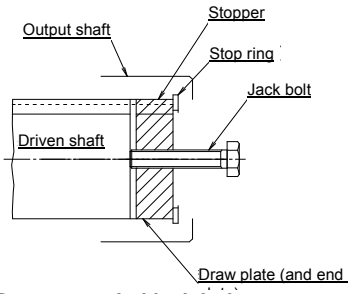
- Refer to the separate instruction manual for details on motor wiring.

(7) Removal (hollow output shaft type)

- When removing the reducer from the driven shaft, supply your own jack bolt and stopper, as illustrated in the figures below, with an end/draw plate (explained earlier) and a stop ring. The driven shaft length is the recommended driven shaft length explained earlier.

- Remove as outlined here.

Step	Mounting procedures
1	Loosen the hex bolt used to fix the end plate, and remove the end plate.
2	Mount the end/draw plate and stopper on the driven shaft side.
3	Insert the jack bolt in the tap on the draw plate and pull the reducer from the driven shaft.



Recommended jack bolt Unit: mm

Size	000	010	020	030	040	050	060	070	080	090
Jack bolt (fully threaded)	M16 x 100	M24 x 150	M24 x 150	M30 x 180	M30 x 180	M30 x 180	M30 x 180	M36 x 250	M36 x 250	M36 x 250

3. Lubrication

(1) Introduction

- The HDR/HDM Series are both filled with lubrication oil (Shell Omala S2G150) when shipped from the factory, and they can be used without further lubrication.
  However, you should still check the oil level in the oil gauge after completing the installation. If the oil level does not appear in the oil gauge, supply oil until it is visible.
- Even when the oil level falls below the oil gauge when changing the oil or when the oil has decreased due to whatever conditions, the remaining oil will occasionally appear to be remaining at the lower end of the oil gauge due to surface tension. Therefore, in managing the oil level, please check that the oil level is maintained in the middle of the oil gauge.

Note) For a mounting direction other than that ordered, the reducer will have a different amount of lubrication oil, and the oil gauge and plugs will also be in different positions.
Note) Contact us if the ambient temperature is less than 0°C or higher than 50°C.
Note) For input speeds slower than 500 r/min, switch to an oil recommended in the following table.

- After completing the installation, be sure to replace the plug on the oil filling port with the supplied pressure vent.

(2) Oil replacement

- First change: 500 hours after starting operation. Subsequent changes: 2500 hours or 6 months, whichever comes first.

Step	Replacement procedures
1	Perform the oil replacement when the machine is stopped. Note) The housing and oil level are very hot immediately after stopping. Wait for the housing surface to cool before replacing the oil.
2	Have a drip pan ready and place it under the reducer's drain plug.
3	Remove the drain plug with an Allen key wrench to drain the oil. Remove the pressure vent to allow the oil to drain quickly. Note) Do not loosen the drain plug all at once. Otherwise, oil may splash out.
4	Apply sealant to the drain plug and fully tighten it in place. Note) Shin-Etsu silicone one-component RTV rubber or an equivalent product is recommended for the sealant.
5	Check the mounting direction examples and refer to the following tables to determine the proper oil volume. Pour the recommended oil into the oil inlet until visible in the oil gauge. Note) If the reducer is mounted at a sharper angle than shown in the mounting examples, fill with a little more oil than indicated below.
6	After filling, attach the pressure vent.

Drain plug size

Size	000/010	020/030	040/050/060	070/080/090
Plug sizes	"3/8"	"1/2"	"3/4"	"1"

Recommended oil

Input speed	1750 to 500 r/min		Less than 500 r/min	
Ambient temperature	0°C to 35°C	35°C to 50°C	0°C to 35°C	35°C to 50°C
Brand	Type 2 industrial gear oil			
Manufacturer	ISO-VG 150	ISO-VG 220	ISO-VG 220	ISO-VG 320
Showa Shell	Omala S2 G 150	Omala S2 G 220	Omala S2 G 220	Omala S2 G 320
Exxon Mobile	Mobile Gear 600XP-150	Mobile Gear 600XP-220	Mobile Gear 600XP-220	Mobile Gear 600XP-320
Idemitsu	Daphne Super Gear Oil 150	Daphne Super Gear Oil 220	Daphne Super Gear Oil 220	Daphne Super Gear Oil 320
COSMO Oil	COSMO Gear SE 150	COSMO Gear SE 220	COSMO Gear SE 220	COSMO Gear SE 320

Lubrication oil volume

Shaft arrangement \ Size	000	010	020	030	040	050	060	070	080	090
Mounting code 1	3 (3)	6 (5)	8 (7)	12 (11)	18 (15)	27 (24)	30 (27)	48	70	120
Mounting code 2, 3	4 (4)	6 (6)	8 (8)	12 (13)	20 (18)	29 (26)	34 (31)	50	75	130

Note) (1) Figures in ( ) for 010 to 040 indicate the oil volume for a right angle type 2-stage housing.
(2) The oil volume differs for mounting codes not listed above. Contact us for the proper oil volume.

(3) Supplying grease

-Follow the procedures outlined as follows to supply grease every 1000 hours of operation.

Step	Replacement procedures
1	Add grease when the machine is stopped.
2	Supply grease through the grease nipples listed in the table below. Use only the recommended grease. Note) Do not over grease. Doing so may cause the reducer to heat up.

- Maintain the reducer with the following procedures.

Recommended grease

Manufacturer	Brand (industrial all-purpose grease JIS grade 2)
Exxon Mobile	Mobilux EP2
Showa Shell	Alvania EP No. 2
JX Nippon Oil & Energy	EPNOC AP 2

Manufacturer	Brand (industrial all-purpose grease JIS grade 2)
Idemitsu	Daphne Eponex EP No. 2
COSMO Oil	COSMO Dynamax No. 2

Grease volume

(1) Right angle shaft type: Input section for shaft arrangement B, and middle and output sections for mounting codes 2 and 3.

Size	0003	0103	0203	0303	0403	0503	0603	0703	0803	0903	0002	0102	0202	0302	0402	0502	0602
Input section	20	20	30	30	40	60	150	200	200	300	20	30	30	40	60	150	200
Middle section 1	5	5	5	10	20	20	20	40	50	100	-	-	-	-	-	-	-
Middle section 2	5	10	10	20	20	40	50	70	100	200	5	10	10	20	20	40	50
Output section	10	15	20	30	50	60	130	150	300	400	10	15	20	30	50	60	130

(2) Parallel shaft type: Input, middle, and output sections for mounting codes 2 and 3.

Size	0103	0203	0303	0403	0503	0603	0703	0803	0903	0102	0202	0302	0402	0502	0602	0702	0802	0902
Input section	5	5	5	5	10	10	20	20	20	5	5	10	20	20	20	40	50	100
Middle section 1	5	5	10	20	20	20	40	50	100	-	-	-	-	-	-	-	-	-
Middle section 2	10	10	20	20	40	50	70	100	200	10	10	20	20	40	50	70	100	200
Output section	15	20	30	50	60	130	150	300	400	15	20	30	50	60	130	150	300	400

Note) Reducers are shipped with approximately 3 times the amount of grease listed above.
Do not over grease. Doing so may cause the reducer to heat up.

Grease nipple size

Size	000 to 050	060 to 090
Nipple size	A-M6F	A-PT1/8

4. Operation

DANGER

- During operation, do not get near or touch any rotating bodies (shafts or other parts). Otherwise there is a risk of being caught in those parts resulting in injury.

CAUTION

- For a specification with a fan cover, do not insert your hand in the fan cover. Otherwise there is a risk of being caught in those parts resulting in injury.
- During operation, the HDR/HDM Series reaches high temperatures. Use caution not to touch the reducer with your hands or body. Otherwise there is a risk of burns.
- When a problem occurs, immediately stop operation. Otherwise there is a risk of injury.
- Do not use the reducer with a load that exceeds the rated load. Otherwise there is a risk of injury and damage to equipment.
- Do not loosen the oil plugs during operation. Otherwise lubrication oil may spray out resulting in burns.
- When running the reducer in reverse, first stop it, and then run it in reverse. Forward and reverse operation by plucking may damage the HRD/HDM Series and the driven machine.

(1) Inspecting prior to use

Upon completing the installation, check the following prior to operation:

- Is the direction of rotation is correct?
- Is the connection to the driven shaft secure?
- Are there any loose mountings or bolts?

Make sure the equipment incorporates failsafe measures to prevent accidents from occurring due to the use of the reducer, or in the event the reducer malfunctions.

(2) Trial run

Before running in production, run the reducer without loading. Verify the rotating direction, and check for abnormalities such as vibration, noise, and heat. Gradually increase the load.

(3) Production run

Verify the following after starting production:

- There is no abnormal vibration, noise, heat, etc.

・ The reducer is not subject to shock or overloads.

Note) Loading the reducer above the allowable capacity can shorten the life of the gears, resulting in damage to the reducer. Do not load the reducer above its allowable torque.

Note) The reducer may generate heat during the first two or three days of operation. This is expected and is not a problem.
However, if the housing temperature exceeds 93°C, it could indicate an incorrect oil level or improper installation. Check each location. Note, do not touch the reducer with your bare hands when checking. Doing so may cause burns.

5. Maintenance

⚠ DANGER

・In inspection and maintenance during operation, do not touch any rotating bodies (shafts or other parts). Otherwise there is a risk of being caught in those parts resulting in accident.

・When entering the inside of the product to inspect it while stopped, first confirm that the rotation of the motor and the driven machine has stopped, and sufficiently cool the inside of the product, and then you must work while ventilating the interior. While performing the inspection work, arrange a factor for confirming safe working conditions on the exterior, and always confirm safety with the worker. Be aware that the product interior is slippery from lubrication oil and take sufficient safety precautions. Otherwise there is a risk of accidents.

⚠ CAUTION

(Disassembly/assembly)

・ Repair, disassembly, and assembly should always be performed by a specialist. Otherwise there is a risk of injury and damage to equipment.

(Daily inspection and maintenance)

・ Change the lubrication oil and grease according to the instruction manual. Always use the type of oil recommended by the manufacturer. Otherwise there is a risk of damage to equipment.

・ The surface of the HDR/HDM Series reaches high temperatures, so do not touch it bare hands. Otherwise there is a risk of burns.

・ Do not change the lubrication oil or grease during operation or immediately after stopping. Otherwise there is a risk of burns.

・ Diagnose problems that occur based on the instruction manual. Do not operate the reducer until the cause of the problem has been determined and action has been taken.

(1) Maintenance

・ When performing maintenance, wear suitable clothing and use protection including safety glasses, gloves, safety shoes, etc.
・ To prevent secondary accidents, keep the surrounding area safe and tidy.
・ Always turn the power off and wait for the machine to come to a full stop. Also, use lock-outs to prevent unintentional power supply.
・ The Helical Power Drive reaches extremely high temperatures during operation. Do not touch with your bare hands.
・ Read and follow labor safety codes and standards.

(2) Maintenance items

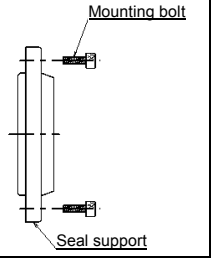
Make daily inspections using appropriate measuring instruments for the following procedures. Take note of operating conditions when performing maintenance.

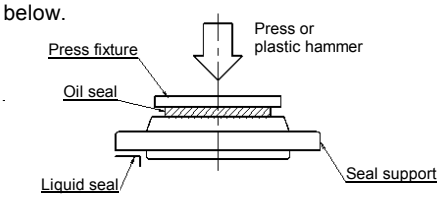
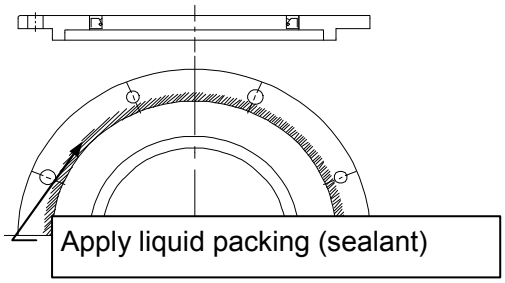
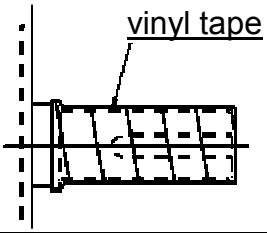
Item	Details
Noise	Is the noise louder than usual? Are there unusual periodic noises?
Vibration	Are there any unusual vibrations?
Temperature rise	Is there an unusual increase in temperature?
Lubrication oil leak	Is oil leaking from the oil seal or couplings?

Note) (1) When a problem occurs, immediately stop operation and perform a detailed inspection.
(2) If the cause is unclear or repairs are not possible, consult the dealer where the reducer was purchased.

(3) Replacement of the oil seal

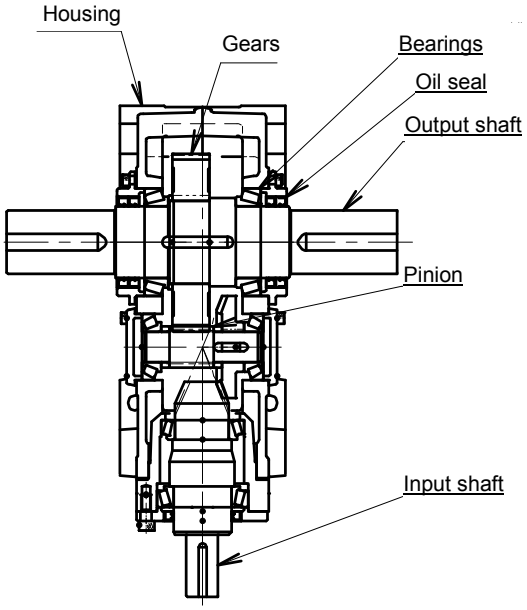
The oil seal also has a service life. The service life may be shorter when used at high temperatures, high rotating speeds, outdoors, or otherwise harsh conditions. Inspect the oil seal at regular intervals, and replace it immediately when oil leaks occur. Replace the oil seal with the following procedure.

Item	Details
Remove the equipment on the outside of the reducer	Remove all parts incorporated on the input and output shafts of the reducer. Prepare a sufficient maintenance space so that the work can be safely done.
Check before removal	Before removing the seal support, check that the lubrication oil in the reducer has been drained. Check that no load is applied to the shafts as they may start moving by removing the seal support when there is a load applied to them, which may result in injury.
Remove the oil seal	Remove the seal support. Remove the old oil seal and clean off the liquid seal residue attached to the seal support and housing. 

Attach the oil seal	Before pressing the oil seal into the seal support, apply grease to the oil seal lip groove. (Approximately 50% of the lip space) Press the oil seal into the seal support. When pressing the oil seal, use a flat press fixture to press in the oil seal so that it is not slanted, as shown in the figure below.  Apply liquid packing (sealant) to the mating portion of the seal support. (See the figure above) 
Protection from the shaft	When incorporating the seal support, the oil seal lip may be damaged by the shoulder edge or slit portion of the shaft. Before incorporating the seal support, wrap the shaft with vinyl tape, and after incorporating it, remove the vinyl tape. 
Attach the seal support	- Attach all coverings (seal support, output bearing support, motor flange) to the reducer housing. When doing so, do not forget to attach the polyester shim. ・ Bolt the bolts and tighten them to the correct torque.
Check seal performance	If the liquid packing was not properly applied when attaching the seal support, oil may leak from the mated surface of the housing and seal support. 24 hours after changing the oil seal, check if any oil is leaking from the mated surface. If any oil is leaking, remove the seal support once again, remove the liquid seal, and re-apply it.

6. Construction (reference diagram)

Right angle shaft-stage type



7. Others

⚠ CAUTION
(Disposal) ・The HDR and HDM Series and its lubrication oil should be treated as general industrial waste. 1) Reducers with motors Refer to the instruction manual for the motor for further disposal instructions. 2) Special specifications Check the drawings and use of the instruction manual.

(1) The content in this instruction manual may be changed at any time without prior notification.

(2) We have taken all precautions regarding the content of this instruction manual so that it contains no mistakes or flaws. However, if you find a mistake or flaw, please contact Tsubaki E&M.

Limited Warranty

Tsubaki E&M 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”

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 machine - whichever comes first.

2. Warranty coverage

Should any damage or problem with the Goods arise within the warranty period, given that the Goods were operated and maintained according to the instructions provided in the manual, Seller will repair and replace at no charge once the Goods are returned to the Seller.
This warranty only covers individual Goods supplied by the Seller to the Buyer and therefore does not include the following:
(1) Any costs related to the removal or re-installation of Goods from the Buyer’s equipment or machine to repair or replace parts.
(2) Cost to transport Buyer’s equipment or machines to repair facility.
(3) Costs to reimburse any profit loss due to any repair or damage and consequential losses caused by the Buyer.

3. Warranty with charge

Seller will charge for any investigation and repair of Goods (even during the warranty period without charge) 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 onto 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 an inappropriate environment not specified in the manual.
(7) Force Majeure or forces beyond the Seller’s control such as a natural disaster and injustices committed by a third party.
(8) Secondary damage or problems incurred by the Buyer’s equipment or machines.
(9) Defective parts supplied or specified by the Buyer.
(10) Wear, tear or deterioration of parts including bearings and oil seals.
(11) Loss or damage not liable to the Seller.

Tsubaki E&M Co.

For inquires related to this instruction manual, please contact customer service.

Customer service Tel: (0120) 251-602, Fax: (0120) 251-603

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URL http://www.tsubakimoto.jp

TSUBAKI REDUCER
China RoHS Instruction

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

GMTA(GMTE)、HMTA(HMTE)、GMMT、HMMT、HDM(HDME)

零部件名称 (Part Name)	有害有毒物质或者元素（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)
电动机 (Motor)	×	○	○	○	○	○
铝制减速机箱体 (AluminumReducer Case)	×	○	○	○	○	○

本表格依据SJ/T 11364 的规定编制
(This document is prepared in conformity with SJ/T11364.)

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(Shows that the concentration of the hazardous substance does not exceed the concentration limits specified in GB/T26572.)
×:表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求
(Shows that the concentration of the hazardous substance exceeds the concentration limits specified in GB/T26572.)

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

CSMA(CSME)、HCMA(HCME)、EWM(EWME)、EWJM(EWJME)、SWM(SWME)、SWJM(SWJME)、TDM(TDME)

零部件名称 (Part Name)	有害有毒物质或者元素（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)
电动机 (Motor)	×	○	○	○	○	○
铝制减速机箱体 (Aluminum Reducer Case)	×	○	○	○	○	○
蜗轮 (Worm Wheel)	×	○	○	○	○	○

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×:表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求
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