DS001.00TSE-1

TSUBAKI DISCO GENERAL INSTRUCTIONS FOR OPERATION AND SERVICE

TSUBAKI EMERSON CO.

DISCO was first manufactured in West Germany and its use has spread rapidly to many other countries.
DISCO essentially consists of a driving inner sun and pair of stationary outer reactions rings with disc shaped planets rolling in orbit between them.

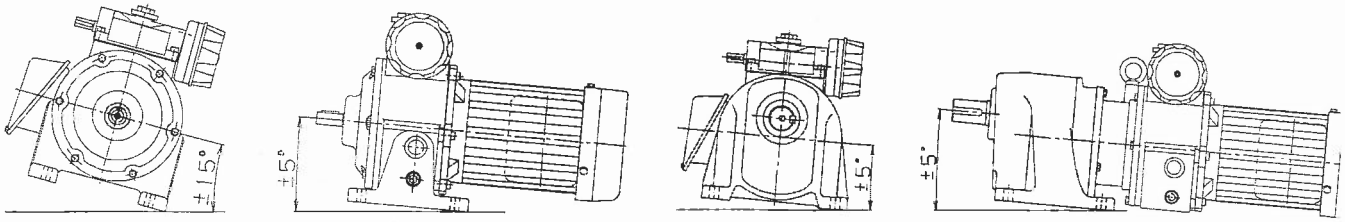
TSUBAKI DISCO variable-speed drives will satisfy even the most demanding customers due to its high efficiency.
This manual contains the necessary instructions for installing and operating the TSUBAKI DISCO without/with a gear reducer.
To assure long life and reliable operation, please carefully read the following instructions before installation.

Contents

1. INSTALLATION

(1) Install on a level surface.

Allowable inclines are as shown below.



DISCO without Gear Box　　DISCO with Gear Box

(2)Ambient temperatures should not exceed 40℃.

(3)When using the DISCO in wet or dusty conditions, use a cover to protect the DISCO.

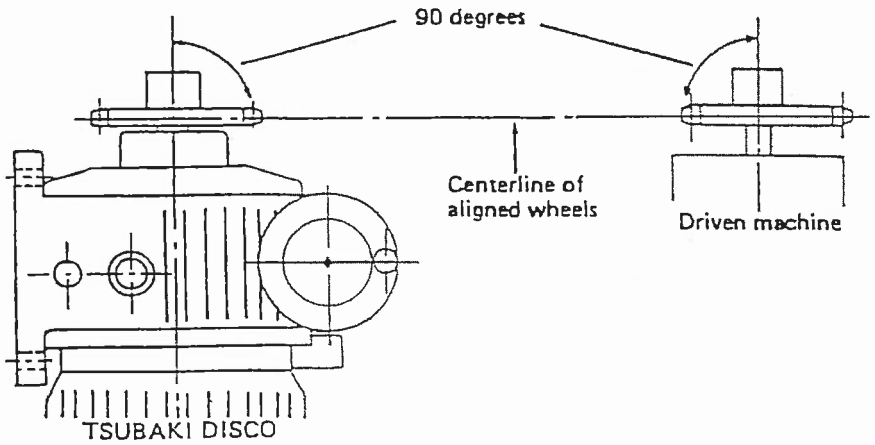
(4)The input and output shafts are coated for rust prevention. Remove the coating prior to fitting the sprocket, coupling, pulley, etc., onto the shafts.

a) Direct Coupling

For flange coupling, make sure shafts are concentric as misalignment will cause damage to the bearings.

b) When coupling by means of a roller chain, flat belt, V-belt, or gears, the input and output shafts of the DISCO and the shaft of the driven machine must be parallel, and the line joining the centers of the two wheels must be at right angles to the shaft.

If a flat belt or V-belt is used, avoid excessive tension that can cause bearing failure.



(5)Install with care so that no excessive shock load, thrust load, or vibration from the equipment, will be transmitted to the DISCO.
Use stopper bolts for an accurate installation.

(6)When fixing the coupling, pulley, sprocket, gear, etc., on the input and output shafts, insert the bolt in the screw hole at the end of the shaft and tighten. Do not use a hammer or excessive force.

2. LUBRICATION

Long-life oil is used in the DISCO variable speed drive, thus virtually eliminating the need for oil changing (except for certain types). The drive is oiled sufficiently before being shipped, thereby allowing it to be used as it is on delivery. As mixing oils and incorrect oiling can have a considerable effect on the characteristics and life of the infinitely variable speed drive and speed reducers, great care should be taken with regard to lubrication.

■Infinitely variable speed drive

Make sure to use to the long-life oil specified by Tsubaki in the DISCO variable speed drive.

Specified lubrication oil: Daphne Alpha Drive P32 (Manufactured by Idemitsu Kosan)

This oil can be purchased from Tsubaki sales office, shops, or the sales office of Idemitsu Kosan CO. Ltd.

1. Oil change

Model	Oil change cycle
DK001 – DK037 DZ002 – DZ037 DB004 – DB022	20,000 hours or every 4 to 5 years (*1)
DK055 – DK075 DB037 – DB055	5,000 hours or every year

(Note) *1. The oil change cycle is based on less than 12 hours of operation per day.
Change oil every 10,000 hours for operating times longer than this.

2. Lubrication should be performed with the drive stopped and oil should be poured until it reaches the center of the oil gauge.

3. When oil whose viscosity is ISO VG32 is used, please change the oil after the First 500 hours and then every 2000 hours thereafter.
(MOBIL:DTE OIL 32 , SHELL:TELLUS OIL 32 , ESSO:TER ESSO 32
GULF:HARMONY 44)

2. Amount of lubricant

Amount of oil(ℓ) in the K-series infinitely-variable speed drive(including those with adapter)

model	Amount of oil	
	Horizontally mounted	VD mounted
DK001	0.15	
DK002	0.15	0.4
DK004	0.30	0.5
DK007	0.40	1.0
DK015	0.50	1.4
DK022	1.0	2.5
DK037	1.0	2.5
DK055	2.2	4.5
DK075	2.2	4.5
DK110	3.5	
DK150	3.5	
DK220	5.0	

Amount of oil(ℓ) in the Z-series infinitely-variable speed drive.

Model	Amount of oil
DZ002	0.2
DZ004	0.4
DZ007	0.55
DZ015	0.65
DZ022	1.3
DZ037	1.3

Amount of oil(ℓ) in the Z-series infinitely-variable speed drive.

Model	Amount of oil	
	Horizontally mounted	VD mounted
DB004	0.40	1.0
DB007	0.50	1.4
DB015	1.0	2.5
DB022	1.0	2.5
DB037	2.2	4.5
DB055	2.2	4.5
DB075	3.5	
DB110	3.5	

■Speed reducer component

1. Recommended oil and grease

●Helical-gear speed reducer

Part to lubricate	Ambient temperature	viscosity	Oil name	
R-type speed reducer (DK055 and above)	−10~ 40℃	ISO VG150	○Showa Shell Oil	Tellus Oil C150
			Idemitsu Kosan	Daphne Mechanic Oil 150
			Nippon Oil	Bonnock M150
			Mobil Oil	Mobil Gear 600XP-150
T-type Speed reducer		Lithium type high grade grease NLGI No.000	Nippon Grease	Nigtight lms No.000
R-type Speed reducer (DK03 and under)				

●WT-type Worm-gear speed reducer

Ratio 1/10 ~ 1/60	−10 ~ 5℃	ISO VG150	Showa Shell Oil	Omala Oil 150
			Idemitsu Kosan	Daphne Mechanic Oil 150
			Nippon Oil	Bonnock M150
			Mobil Oil	Mobil Gear 600XP-150
	0 ~ 32℃	ISO VG320	○Showa Shell Oil	Omala Oil 320
			Idemitsu Kosan	Daphne Mechanic Oil 320
			Nippon Oil	Bonnock M320
			Mobil Oil	Mobil Gear 600XP-320
	32 ~ 40℃	ISO VG460	Showa Shell Oil	Omala Oil 460
			Idemitsu Kosan	Daphne Mechanic Oil 460
			Nippon Oil	Bonnock M460
			Mobil Oil	Mobil Gear 600XP-460
1/100 ~ 1/3600	−10~ 40℃	ISO VG320	NOK Kluber	HT320

●WE-type Worm-gear speed reducer

Ratio 1/10 ~ 1/3600	−10 ~ 40℃	ISO VG260	Idemitsu Kosan	Daphne Alfa Oil TE150
		ISO VG360	Mobil Oil	Mobil SHC320

2. Oil and grease change

Oil and grease should be changed according to the following table.

Make sure to periodically grease the grease nipple on the bearings.

Helical-gear speed reducer		Oil	1st change: After 500 hours. 2nd changes onwards: every 2000 hours.
		Grease	Change every 20000 hours.
WT-type Worm-gear speed reducer	1/10～1/60	Oil	1st change: After 500 hours. 2nd changes onwards: every 2000 hours.
	1/100～1/3600	Oil	1st change: After 2000 hours. 2nd changes onwards: every 5000～8000 hours.
WE-type Worm-gear speed reducer	1/10～1/3600	Oil	1st change: After 1000 hours. 2nd changes onwards: every 5000 hours.

3. Amount of oil and grease

● Amount of grease(kg) for the K-series with R and T-series speed reducers

	Speed reduction ratio					
Model	1/2.5・1/5	1/10・1/20	1/30	1/50	1/60・1/75	1/100・1/120・1/165・1/200
DK002	0.11	0.35	0.55			1.2
DK004	0.13	0.55		1.2		1.9
DK007	0.32	1.4		1.9		3.5
DK015	0.48	1.3		3.5		5.5
DK022	0.62	3.2		4.0		
DK037	0.62	4.0				
DK055	1.6*					
DK075	1.6*					

NOTE) *denotes the amount of oil(ℓ) for oil lubrication.

●Amount of oil(ℓ) for WT-type Worm-gear speed reducers(1/10～1/60)

Model		Speed reduction ratio				
		1/10	1/20 1/30	1/40	1/50	1/60
DK002	B type	0.35				
	V type	0.47				
DK004	B type	0.8			13.	
	V type	0.64			1.1	
DK007	B type	0.8	1.3	1.75		
	V type	0.64	1.1	1.3		
DK015	B type	1.75		2.3	3.5	
	V type	1.4		2.0	3.5	
DK022	B type	2.3		6.8		
	V type	2.0		5.7		
DK037	B type	2.3	6.8			
	V type	2.0	5.7			

●Amount of oil(ℓ) for WE-type Worm-gear speed reducers (1/10～1/60)

Model		Speed reduction ratio					
		1/10	1/20	1/30	1/40	1/50	1/60
DK002	T type	0.5					
	V type	0.5					
DK004	T type	0.5				0.9	
	V type	0.5				0.9	
DK007	T type	0.5	0.9		1.0		1.2
	V type	0.5	0.9		1.0		1.7
DK015	T type	1.0		1.2	1.7		
	V type	1.0		1.7	2.8		
DK022	T type	1.7				3.1	
	V type	2.8				4.8	
DK037	T type	1.7		3.1			
	V type	2.8		4.8			

●Amount of oil(ℓ) for WE-type Worm-gear speed reducers (1/100～1/3600)

Model		Speed reduction ratio							
		1/100・1/150 1/200	1/250・1/300 1/400・1/500	1/600	1/800 1/1000	1/1200	1/1500	1/1800 1/2400	1/3000 1/3600
DK002	B type	1.2			1.5			2.4	
	V type	1.2			2.2			2.9	
DK004	B type	1.5			2.4		3.7		7.0
	V type	2.2			2.9		5.7		10
DK007	B type	1.5	2.4		3.7	7.0		11	
	V type	2.2	2.9		5.7	10		13	
DK015	B type	7.0			11				
	V type	10			13				

● Amount of grease(kg) for the B-series with R and T-series speed reducers

	Speed reduction ratio		
Model	1/2.5・1/5	1/10・1/20・1/30	1/50
DB004	0.32	1.4	1.9
DB007	0.48	1.3	3.5
DB015	0.62	3.2	4.0
DB022	0.62	4.0	
DB037	1.6*		
DB055	1.6*		

NOTE) *denotes the amount of oil(ℓ)for oil lubrication.

● Amount of grease(kg) for the Z-series with R-series speed reducers

	Speed reduction ratio
Model	1/1.8・1/2.5・1/5
DZ002	0.11
DZ004	0.13
DZ007	0.32
DZ015	0.48
DZ022	0.62
DZ037	0.62

3. OPERATION

(1)Do not turn the knob (hand wheel) when the drive is stopped. Note however, that as long as it is not done frequently it is possible to change to the low speed side when the drive is stopped with models DK001 through DK037, DZ002 through DZ037 and DB004 through DB022.

(2) Make certain that the amount of oil is correct before operation.

(3)If the DISCO will be operated under fully loaded conditions, start it as slowly as possible.

(4)Make certain that no overload is applied prior to starting. The overload will lead to slippage and excessive noise.

(5)Use with the input shaft speed under 1800r/min.

(6)Even under normal operating conditions, the temperature on the side of the DISCO case may rise to the level of the ambient temperature plus 50℃.

(7)If the following occurs, stop the DISCO.

① Sudden rise in temperature.
② Sudden excessive noise.
③ Sudden increase of slippage.
④ Other abnormal conditions.

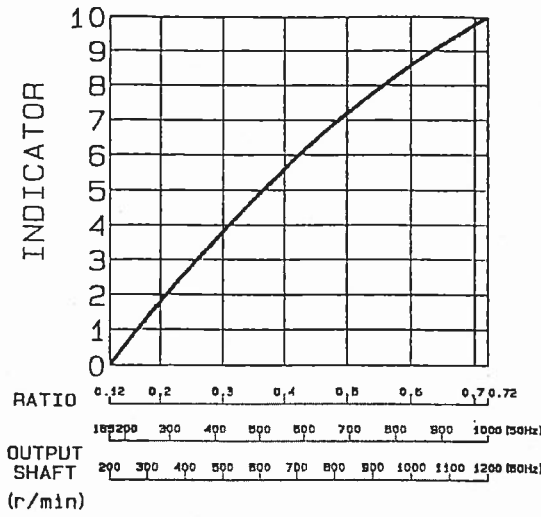
The following may be possible causes for the above motioned troubles, and should be remedied at once.

① Poor installation or alignment.
② Over load.
③ Insufficient amount of lubricant/grease.
④ Lubricant/grease is deteriorating, or is of incorrect type or viscosity.
⑤ Others.

(8)Should a break down occur, please contact the suppliers.

(9)A speed indicating scale is attached to the hand wheel. The relationship between the scale position and the speed of output shaft is as shown below.

< K Series DK001～DK075 >



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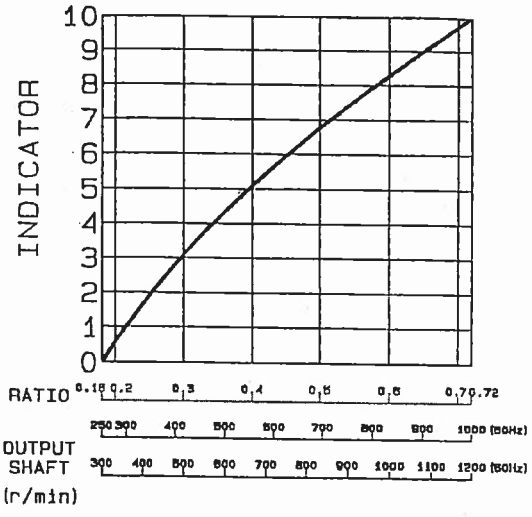

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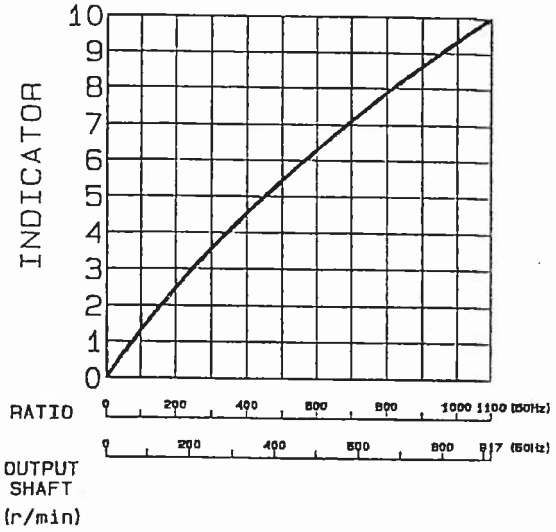

Output speed of the gear reducer is obtained from multiplying the DISCO output speed by the gear ratio.

4. Warranty

Tsubaki Emerson 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 does not include the following:

   1) Any cost related to 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 replace or repair.
   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 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 machine.
   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 natural disaster and injustice done by a 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) Wear, tear or deterioration of parts including bearings and oil seal.
   11) The end of life cycle of the Goods under normal usage.

4.Dispatch service

Service to dispatch a Seller's engineer to investigate, adjust or trial test Seller's Goods is at the Buyer's expense.

5. Disclaimer

1) In our constant efforts to improve, Tsubaki Emerson may make changes to this document or the product described herein, without notice.

Considerable effort has been made to ensure that the contents of this document are free from technical inaccuracies and errors. However, any such inaccuracies or errors reported will be gladly examined and amended as necessary.

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