WORM REDUCTION GEAR UNITS

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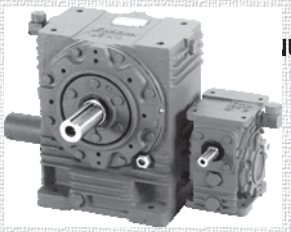
INSTALLATION, OPERATION AND MAINTENANCE MANUAL

/SFV

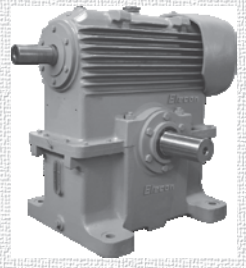
SM/SFU

SMM/SSM

NU/SNU



IU DOUBLE REDUCTION



FIM/SFO

OLING TOWER GEAR UNIT

ELECON

GEARING THE FUTURE

Manual No. : 07/IM/EECL/9/13 R9

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1) INTRODUCTION

Thank you for choosing ELECON gear box, the value leader among reputed gear manufacturers in india. We sincerely request you to go through this operation and maintenance manual, before you start using this product. This manual is designed carefully covering all important aspects and features of the gear box.

To obtain warranty service or paid after sales services for our produt, contact EMTICI Engineering Limited office nearest to you. An address/telephone/fax/e-mail list of EMTICI offices is provided on the back cover of the manual.

The proper working of a gear unit depends on careful installation, correct grade of lubricant and good working conditions. Hence, it is most important to see that the installation of gear unit is done according to the instructions given in this manual to ensure proper working of th gear unit, and to ensure a long and trouble free service.

2) INSTALLATION

ELECON worm reduction gear units are supplied in completely assembled condition without oil. The shaft ends are coated with anti-corrossive agents which are to be removed only by suitable solvents. In no case, shafts should be scraped on field.

2.1) TRANSPORTATION

The gear units should be lifted by making the use of the eyebolts or integrally cast lugs. These are designed for the weight of the gear units only and no accessories should be lifted alongwith the gear units, In no case shaft ends should be used for handling the units. NU/SNU models, vertical gear units should be lifted by using eye bolts fitted on the gear units. The complete method of lifting is shown in the figres a, b and c.Not to lift the gear unit as shown in fig. d & e.

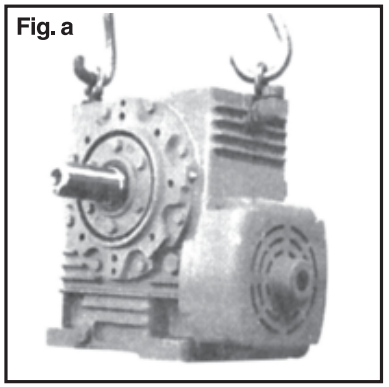


Fig. a

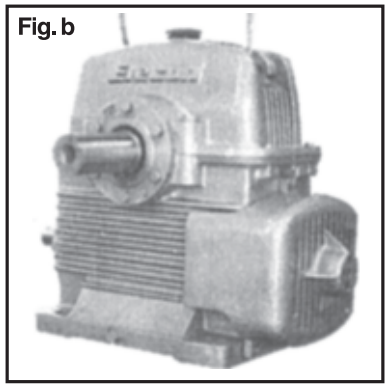


Fig. b

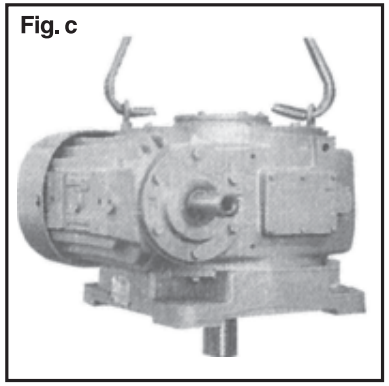


Fig. c

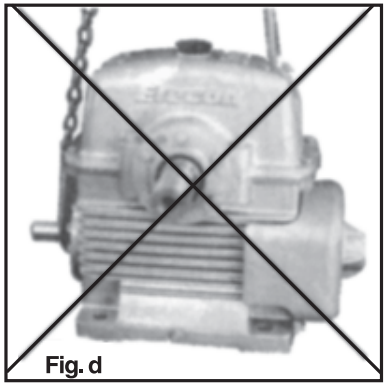


Fig. d

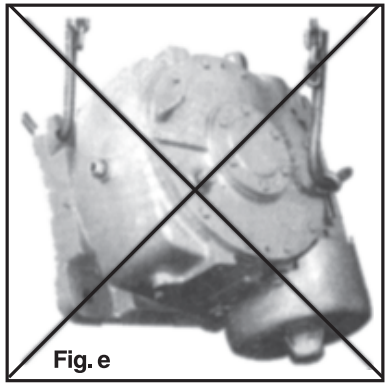


Fig. e

2.2) Hand Changing.

(a) $1\frac{5}{8}$" to 3" NU/SNU

This is achieved easily and quickly by just replacing the cap from one end to the other end of the worm shaft as shown in Fig. 1 & Fug. 2.

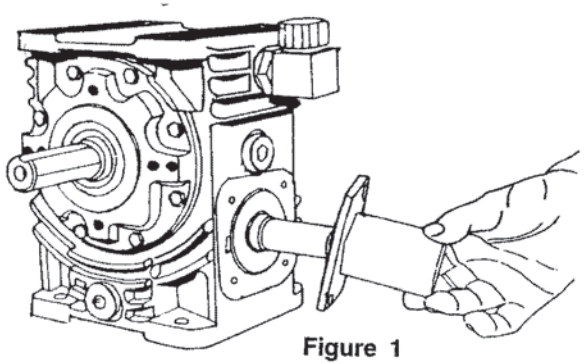


Figure 1

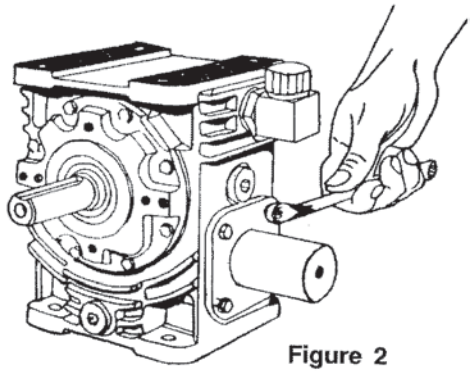


Figure 2

(b) NU/SNU models 3.54" to 10.5" and in all other types of gear units just replace the fan and fancowl from one end and fix on other end. This is shown in Fig. 3 & Fig. 4. **It is not necessary to dismantle the gear unit in any way.**

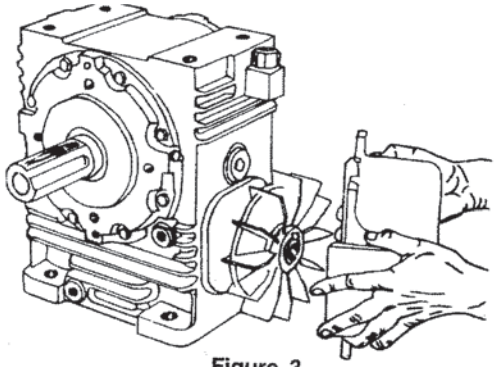


Figure 3

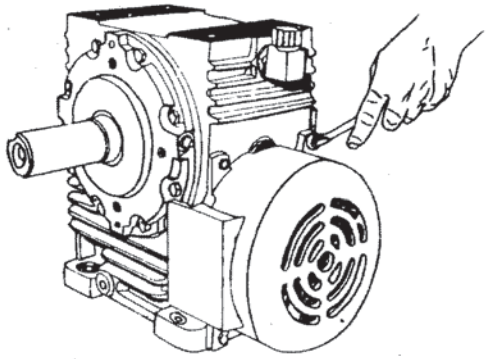


Figure 4

2.3. INSTRUCTION FOR CONVERSION of NU/SNU type gear units in to various mounting positions.

The gear unit is supplied in NU-U / SNU-U assembled condition (i,e. underdriven mounting position) as shown in figures 5a & 5b.

The gear unit can be quickly converted from underdriven mounting position to other mounting positions by re- arranging the interchangeable Breather plug, Oil level indicator, Drain plug and by fixing additional base for vertical mounting.

2.3.1 NU-U --- NU-O / SNU-U --- SNU-O

1. For gear units 1 $\frac{3"}{4}$, 2 $\frac{1"}{4}$ & 3" NU/SNU tilt the unit upside down as shown in figure 6a. Each gear unit From 4" NU/SNU onward is supplied with a kit containing two detachable feet and screws. Fix these feet on top of the gear unit with screws, as shown in figure 6b and the unit can be turned upside down.

2. Replace breather plug (B) and drain plug (D), keeping oil level indicator (L) in the same position

3. Fill oil inside the gear unit upto the mid point of oil level indicator (L).

4. The gear unit is ready for NU-O/SNU-O position as shown in (figure 6a & 6c)

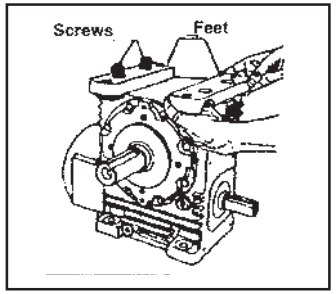
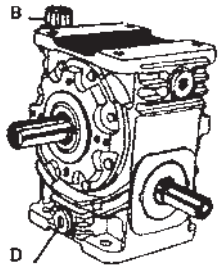
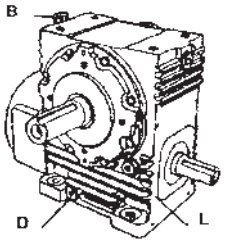


Figure 6b



$2\frac{1}{4}$ NU & 3 NU Figure 5a



4 NU onward Figure 5b

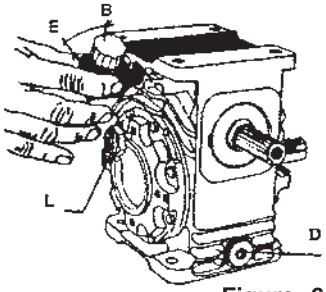


Figure 6a

Fig. 5a और Figure 5b के अनुसार NU-U / SNU-U (नीचे से संचालित स्थिति) प्रकार जुडा हुआ प्रेषित किया जाता है।

नीचे की दिशा से संचालित स्थिति का गियर अलग अलग स्थिति में ब्रीदर प्लग, ओइल लेवल इन्डिकेटर, और ड्रेन प्लग के स्थलांतर से बदला जा सकता है। वर्टिकल प्रस्थान की स्थिति के लिये अतिरिक्त बेस का प्रयोग किया जाता है।

प्रस्थापन स्थिति को बदलने के लिये नीचे दी हुइ विधि का अनुसरण करें

१. गियर एकम के उपर के भाग को नीचे उलटिये।
यह विधि केवल 1 $\frac{3"}{4}$, 2 $\frac{1"}{4}$ और 3" NU/SUN गियर एकम के लिये दी है। (Fig. 6a) प्रत्येक 4" NU/SUN और उपर वाले गियर एकम के साथ एक किट दी जाती है। जिसमें दो पाँव और स्क्र होते है। इन पॉव को (Fig. 6b) में दीखाये हुई तरीके से लगाईये और स्क्र से कस दीजीये। अब गियर के उपरी भाग को नीचे उलटिये।

२. ब्रीदर प्लग (B) और ड्रेन प्लग (D) के स्थल का वैकल्पिक उपयोग करें, और ऑइल लेवल इन्डिकेटर (L)को यथावत रखें।

३. गियर एकम में ऑइल लेवल इन्डिकेटर (L)के मध्य तक तेल भरें।

४. अब गियर एकम NU-O/SNU-O परिस्थिति के लिए तैयार है। (Fig. 6a) और 6c)

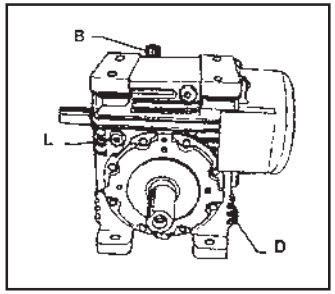


Figure 6c

2.3.2 **NU-U** → **NU-V (X)**
SNU-U → **SNU-V**
NU-V (Y)
SNU-V

X- FOR OUTPUT SHAFT VERTICAL **UPWARD**

Y- FOR OUTPUT SHAFT VERTICAL **DOWNWARD**

1. Till the Gear unit so that the output shaft is vertically upward (X) or downward (Y) as per your requirement.
2. A kit contains a base screws and plug supplied with gear unit Fix this base to the gear unit as shown infigure 7 and tighten the screws as shown in figure 8.The gear unit is now ready with base for NU-V/ SNU-V mounting.
3. Replace the oil level indicator (L), drain plug (D) and the breather plug (B). Remove elbow (E) while replacing the breather plug, as shown in figure 9.
4. Fill oil inside the gear unit upto the mid point of oil level indicator.
5. The gear unit is ready for NU-V (X)/ NU-V (Y) position. Figure 9 shows the gear unit in NU-V (Y) position, Similarly in SNU model.
6. Replace grease nipple by plug on base side as shown in figure 9 to avoid oil leakage from grease nipple (G)

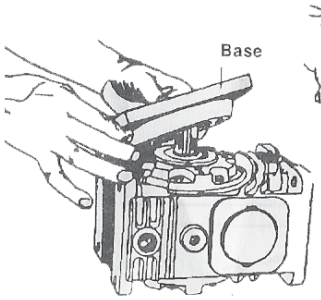


Figure 7

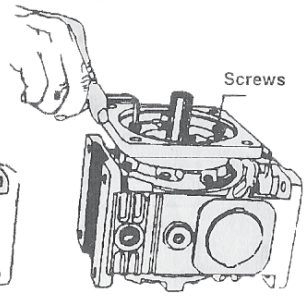


Figure 8

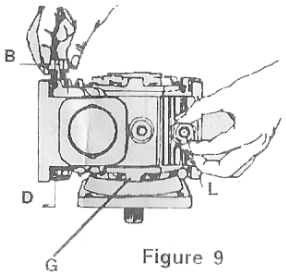


Figure 9

१. अपेक्षित परिस्थिति में गियर एकम को इस तरह पलटिये कि उसका आउटपुट शाफट उपर या नीचे की ओर हो जाय।

२. गियर एकम के साथ ऐक किट दिया गया है जिसमें एक बेस, स्क्र और प्लग है। बेस को Fig.7 के अनुसार लगाइये और स्क्र से कसदीजिये जैसा की Fig. 8 में दिखाया गया है। अब आपका गियर एकम NU-V/SUN-V स्थिति में प्रस्थापित करने के लिये तैयार है

३. ऑइल लेवल इन्डिकेटर और ड्रेन प्लग का स्थलांतर करें। Fig. 9 के अनुसार, ब्रीदर प्लग को बदलते समय एल्बो (E) निकाल दें।

४. गियर ऐकम मं ऑइल लेवल इन्डिकेटर के मध्यतक तेल भर दें।

५. गियर एकम NU-V(X)/NU-V(Y) की परिस्थिति में तैयार है। Fig. 9 मं दर्शित, गियर एकम NUV(Y) की परिस्थिति में है। SNU मोडल में भी इस तरह से प्रयोग करे।

६. बेस साइड की ग्रीसनीपल से ऑइल बाहर न निकले इसलिए बेस साइड की ग्रीसनिपल को निकाल कर प्लग लगाइये। यह Fig.9 में दिखाया गया है

2.3.3 This mounting is possible only for 1 3/4",2", 2 1/4" and 3" NU/SNU

1. Tilt the gear unit so that the input shaft is verticaly upward or downward as per your requirement.
2. Remove all the screws of the output cover and rotate the cover in such a way that the oil level indicator position comes to 45' above the horizontal axis as shown in fig. 10
3. Replace the drain plug (D) and breather plug (B) and fix it to the appropriate position as shown in fig. 10.
4. The gear unit can be mounted horizontally by using additional support which is supplied on request.
5. The gear unit is ready for NU-H (X)/NU-H(Y) position.

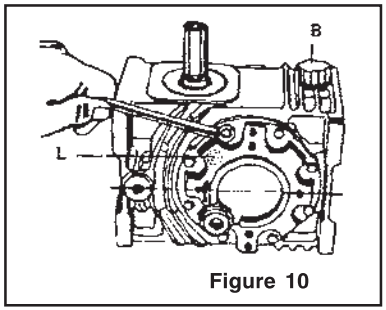


Figure 10

१. अपेक्षित परिस्थिति में गियर एकम को इस तरह पलटिये कि इसका इनपुट शाफट बिलकुल उपर की तरफ या नीचे की तरफ हो जाय ।

२. आउटपुट कवरके सभी स्क्र निकाल दें और कवर को इस तरफ घुमाइये कि वह Fig. 10 के अनुसार ऑइल लेवल इन्डिकेटर की समछितिज दुरी उपर पर 45° आ जाये ।

३. ड्रेन प्लग (D) और ब्रीदर प्लग (B) का स्थलांतर करे । जैसा कि Fig. 10 में दर्शाया गया है , ब्रीदर प्लग को बदलते समय एल्बो (E) निकाल दें और यथाचित स्थिति मे लगाये ।

४. गियर एकम को समछितिज परिस्थिति में अतिरिक्त पॉव के उपर लगाया जा सकता है । ये अतिरिक्त पॉव मागे जाने पर उपलब्ध हैं ।

५. अब गियर एकम NU-H(X)/NU-V(Y) परिस्थिति के लिये तैयार है ।

2.4 FOUNDATION

Correct installation of the gear system is essential to achieve good performance. The gear unit must be rigdly connected to the foundation which must also be rigid and have a flat mounting surface. If the foundation on base plate structure is incorrectly designed or constructed, shaft misalginment, vibration, bearing damage and even shaft or housing breakage can result.

The best practice is to install the gear box on rigid concrete foundations, however, in some applications the gear boxes are required to be mounted on machining structure especially in cement and chemical plants.

While the gear unit is installed on structural foundation, care should be taken that gear unit is mounted on a combined base plate with driving motor and sufficient areas should be there to properly align the input and output couplings. Packing should be placed so that support is given in the plane of coupling face.

2.5 COUPLING AND SYSTEM ALIGNMENT

In order to minimise wear, vibration and coupling problem, it is must that the accurate alignment between coupling hubs on connected shafts is essentially achieved.

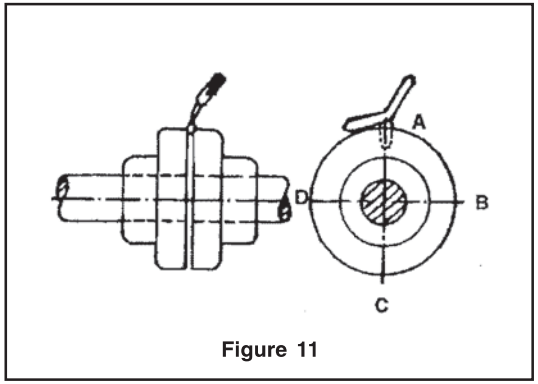


Figure 11

2.5.1. Ensure correct gap between two coupling halves.

2.5.2. Angularity error should be corrected by using feeler gauge shown in figure 11 and arriving at a constant gap measures every 90 deg. of rotation of the coupling halves simultaneously.Difference between clearancesmeasured at opposite positions should be less than 0.25mm/100 mm outside diameter of coupling.

2.5.3. Eccentricity error can be corrected by using srtaight edge. as shown in figure 12 when both coupling halves the same outside diameters.

If not a straight edge, should be used in conjuction with feeler gauge to half the difference in diameter. Here also checking should be done every 90 deg. while mounting both coupling halves simultaneously.

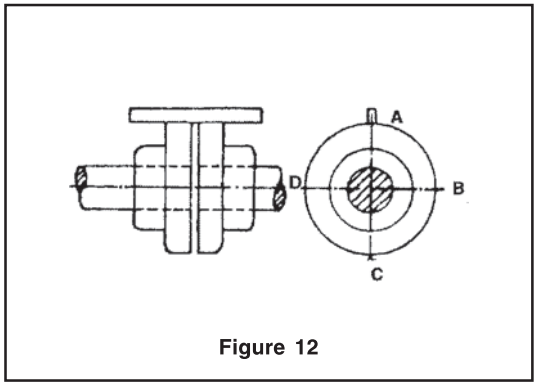


Figure 12

2.5.4 **SAFETY PRECAUTION**

The client should protect the coupling, rotating shaft extensions etc. with safety guards.

3. LUBRICATION

.Gear units are supplied in completely assembled condition **without oil** and must be filled with the correct grade of lubricant to the correct level. Reliability, efficiency and wear free operation mainly depend on lubricant use. Over-filling of lubricant results in over heating and leakage.

RECOMMENDED LUBRICANT - ISO VG 320

MINERAL OIL

BRAND	GRADE
International Brands	
British Petroleum	CS 320 or GR-XP320
Castrol	Alpha Zn 320 or Alpha Sp 320 or Tribol 110/320 IGQA
Caltex	Meropa 320
Esso	Teresso 320 or Spartan 320
fuchs	Renolin CKC 320
Mobil Oil Co.	Mobil DTE Oil AA or Mobilgear 632
Shell Co.	Vitera Oil 320 or Omela 320
Kluber	Kluber oil GEM 1-320
Indian Brands	
Bharat Petroleum	Cabol 320
Fuchs	Renolin CKC 320
Castrol	Alpha Zn 320 or Alpha Sp 320 or Tribo
Gulf	Gulf harmony 320 or Gulf EP 320
Hindustan Petroleum	ENklo 320 or Parthan EP 320
Indian Oil	Servomesh SP 320 or Servosystem 320 or Servomesh EE320
Veedol	Avalon 320
Kluber	Kluber oil GEM 1-320

Recommended Grease : For low speed of operations. Below 50 RPM, splash lubrication is not sufficient and bearings are required to be grease packed.

Brand	Grade
Castrol	EPL 2
Indian Oil	Servogem EP 2
Hindustan Petroleum	HP LITHON EP 2

POLYGLYCOL BASED SYNTHETIC LUBRICANT

USE OF POLYGLYCOL BASED SYNTHETIC LUBRICANT IS ALSO ADVISABLE TO IMPROVE THE TRANSMITTING CAPACITY (RATING) OF GEAR UNTS MIN 20% AS COMPARED WITH USE OF MINERAL OIL AT SAME WORKING TEMPERATURE. THIS GEAR OIL SHOWS EXCELLENT NON AGEING STABILITY WITH FAVOURABLE INFLUENCE ON EFFICIENCY.

Approved Synthetic Lubricants

Brand	Grade
Castrol	Tribol 800-220
Fuchs	Renolin PG 220
Kluber	Klubersynth GH 6-220

Special Note : Synthetic Lubricants must not be mixed with any other type of oil. The gear unit must be flushed while changing to or form this lubricant.

* **First change of oil should be made after 500 hours of operation.**
* **Subsequent oil change must be made after every 3000 hours of operation. The interval should not exceed 12 months.**

Cleanliness of oil is of prime importance and it is imperative to flush the gear unit with flushing oil before refilling. Fluid is to be drained off completely before fillng the fresh oil.

Oil of two different manufacturers should not be mixed in any case even though they may be of equivalent grade.

The unit is ready to be put into operation So it's not needed to make any adjustment in the assembly.

* **Maximum rise in oil temperature 93°C under full load with ambient temperature 35°C**

3.1 OIL LEVEL MONITORING

All units are supplied with a filler plug (which also acts as a breather) at the top of the unit. In most cases, there is an oil level indicator (Knob type) screwed to the gear unit and also oil level indicator (glass tube inserted in the pipe) provided at the side of the gear unit.

1) The oil is to be filled up during stationary position to the centre in case of the knob type oil level indicator / on to the mark given on the glass tube.

2) The oil level should be examined periodically and should not fall below the level.

3) The gear unit is to be stopped before you check the oil level position. If required, the required amount of oil should be filled again.

4) It is essential to ensure that the breather plug hole is kept clear at all times. This may lead to oil leakage and the inhalation of foreign matter through the oil seal, which could cause the inability of the gear unit to ventilate freely.

Especially in lower ratios 5:1 to 10:1, the filler cum breather plug is to be mounted opposite to the direction of rotation to prevent oil leakage from breather.

4. WORM/WORM WHEEL REPLACEMENT INSTRUCTIONS

In order to obtain the best performance from a pair of worm gears, it is essential. when mounting them in the gear unit, they should be adjusted correctly.

Given below are some notes on assembly for all worm gear mounting that will be of particular use to users of ELECON worm gear units.

4.1 METHOD OF ADJUSTMENT.

The Worm wheel should be mounted approximately to the center with the worm and after coating the worm threads with a prussian blue or similar compound, the gear should be turned by hand to produce a tooth marking on the wheel. If the marking is not as desired, the wheel should be adjusted sideways until a correct marking is obtained as shown in fig. 13.

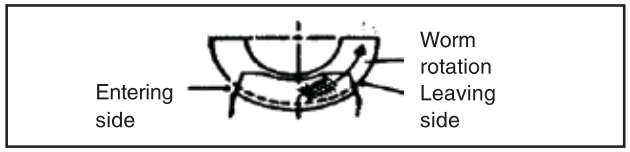


Figure 13
(CORRECT)

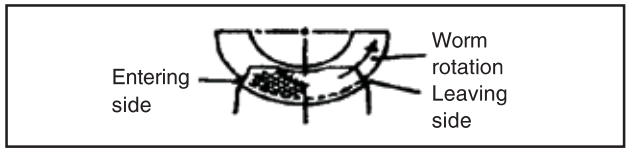
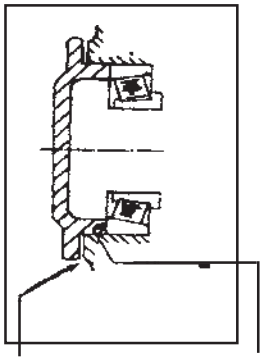


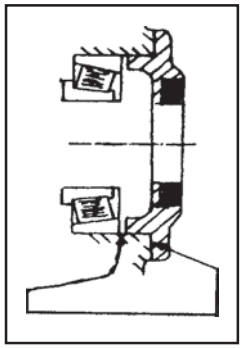
Figure 14
(INCORRECT)



Gap taken up by shims here on removal of metal from spigot face.

This sketch represents a typical shaft assembly after the hand of assembly has been changed, i.e. a gap between flange and case on one side and a gap between gap spigot and bearing on the other side.

Figure 15



Gap taken up by shims here on removal of metal from spigot face.

The gap observed between cover and gear case face is to be covered by using required set of aluminium shims and accordingly the adjustment to be made for correct positioning of the wheel as shown in fig. 15 Moreover rotate the wheel in both direction of rotation and to consider both of the driving faces of the teeth and to get a contact as shown in figure 16.

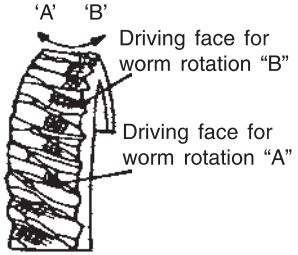


Figure 16

This figure shows that correct leaving side contact on both faces of a worm wheel, which is desirable when the gears are required to run in both direction of rotation.

4.2 ALLOWANCES FOR DEFLECTION AND OIL ENTRY GAP

Elecon worm gears are manufactured in such a manner so as to allow for deflection and to give an entry gap for the lubricants on the entering side on the wheel teeth. This is done by producing the gears with a "leaving side" contact as shown in figure13. This contact obviously leaves an entry gap for the oil and moreover when the wheel deflects under load, the contact tends to become more central which still leaving some entry gap.

A driving face contact as shown in figure 14 is the worst possible condition under which a pair of worm gears can be run. since there is no entry gap for the oil and moreover, any deflection will aggravate the trouble further.

A gear mounted in this manner may cause a temperature rise in the oil as much as 20 percent higher than the correctly mounted gear as shown in figure 13. The remedy is to make the wheel (by means of adjustment provided in the design) to the left until contact similar to that in figure 13.is obtained. This is to be done by trial and error and by movement of wheel to the left will cause the contact to move to the right.

4.3. BEARING ASSEMBLY

All worm gear units where the worm shaft and wheel shaft are supported on taper roller bearings. The covers are provided for location and fitting purpose. This is shown in Fig. 15 and proper adjustment is to be carried out by using shims.

4.4 OIL SEAL MOUNTING

When a gear unit has been dismentled it is advisable to replace the old oil seal to a new oil seal and this should be done carefully to avoid the damage of the sealing lip of seal. If a special fitting accessory is not available it is advisable to use a piece of thin card or a plastic sheet round the shaft to cover keyways and sharp edges, then apply a grease on the lip and slide the seal over it.

5. SHIPPING SPECIFICATION AND OIL CAPACITIES

The approximate oil quantities and weight of the various worm gear unit types and sizes are given in the following tables. However, these are only indicative and actual oil filling should be up to the centre where plug type oil level indicator used and upto maximum marking level for oil level indicator.

			3	4	5	6	7	8	9	10.5	12	14	17
FSM	Net Weight		35	70	90	130	175	210	295	450	640	900	1300
	Gross Weight		50	90	110	165	220	275	365	595	900	1150	1750
	Oil Capacity		2.5	3.5	4.5	6.5	9	11	15	20	25	36	60
FIM	Net weight		32	65	95	135	185	223	320	480	660	940	1380
	Gross weight		50	86	120	170	228	300	390	610	920	1180	1800
	Oil Capacity		3.3	4	5	7	8.5	12	17	22	27	38	95
FVM/FSV	Net Weight		40	55	70	125	170	240	295	440	630	870	1575
	Gross weight		50	75	90	160	210	265	350	560	845	1120	2000
	Oil Capacity		1.5	2.25	3	4.5	5	8	11	20	29	43	105
SMM	Net Weight						145	210	290	430	780	1280	
	Gross weight						195	259	354	500	940	1540	
	Approx. Oil	A					7	10	14	21	24	28	
	Capacity in ltrs	B					7	10	13	18	22	25	
	For Diff. Mounting	C					5	8	11	20	26	28	
	Positions	D/E					8	12	15	21	23	30	

* Weight in Kg.

* Capacity in Ltrs.

5.2 SHIPPING SPECIFICATIONS AND OIL CAPACITIES FOR SNU/SFU/SFV/SSM

AVERAGE WEIGHT IN KILOGRAMS

GEAR SIZE	1 5/8		1 3/4		2		2 1/4		3		3.54		4		5		6		7		8		9		10.5	
GEAR TYPE	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR	NET	GR
SNU-U	7	8.5	8	10.5	12	23	14	25	32	60	40	65	65	95	95	125	152	190	180	230	220	270	319	385	460	585
SNU-O	7	8.5	8	10.5	12	23	14	25	32	60	40	65	72	102	105	135	165	204	195	265	237	305	336	400	480	600
SNU-V	7.3	9	8.5	11.54	14	24	15	25	37	67	43	68	73	103	105	135	166	205	200	270	250	315	348	430	481	610
SNU-SM	...	...	...	...	15	28	16	28	35	65	41	66	64	80	110	140	157	170	200	270	252	316	330	415	465	590

APPROXIMATE OIL CAPACITY FOR SNU GEAR UNIT IN LITRES

SNU-U	0.3	0.4	0.6	0.7	2.2	2.5	2.5	4	5	9.5	11	16	21
SNU-O	1.4	0.5	0.7	0.8	2	3.8	5.1	8	13.5	18	19	41	45
SNU-V	0.3	0.4	0.6	0.7	2	3.5	4.0	5.7	8.5	18	20	25	26

APPROXIMATE OIL CAPACITY FOR SNU-SM GEAR UNIT DIFFERENT MOUNTING POSITION IN LITRES

A	....	.....	0.6	0.7	1.3	4	5	7	10	18	19	41	45
B	....	.....	0.6	0.7	2.1	2.5	2.5	4	6	9.5	11	16	21
C	....	.....	0.6	0.7	1.7	2.5	2.5	4.7	8.8	18	20	25	26
DE	....	.....	0.7	0.8	2.6	3	3	8	11.6	19	20	25	26

			10	12	14	17
SFU	Net Weight		450	580	885	1260
	GrossWeight		595	900	1140	1700
	Oil capacity		20	25	36	60
SFO	Net Weight		480	660	940	1380
	GrossWeight		610	920	1180	1800
	Oil capacity		22	27	38	95
SFV	Net Weight		440	660	870	1575
	GrossWeight		560	845	1120	2000
	Oil capacity		20	29	43	106
SSM	Net Weight		----	780	1280	
	GrossWeight		----	940	1540	
	Approx. Oil	A	---	24	28	
	Capacity	B	---	22	25	
	For Diff. Mounting	C	---	26	28	
	Positions	D/E	----	23	30	

* First change of oil should be made after 500 hrs. of operation.
* Subsequent oil changed must be made after every 3000 hours of operation. The interval should not exceed 12 months.
* Weight in Kg.
* Capacity in Ltrs.

5.3 SHIPPING SPECIFICATIONS AND OIL CAPACITIES FOR DOUBLE REDUCTION WORM GEARS.

SIZE		2 1/4/40	2 1/4/50	3/60	3/70	4/80	4/90	5/105	5/120	6/140
SNU-UD/FSMD										
Net Weight Kg.		79	109	184	200	270	350	530	720	1100
Gross Weight Kg.		110	130	220	240	320	410	615	950	1190
Approx. Oil Capacity Ltrs.	1st Stage	0.7	0.7	2.2	2.5	3.5	3.5	4.5	4.5	6.5
	2nd Stage	2.5	4	5	9	11	15	20	25	36
SNU-OD/FIMD										
Net Weight Kg.		86	119	195	210	290	385	550	745	1070
Gross Weight Kg.		125	150	250	250	340	440	630	958	1220
Approx. Oil Capacity Ltrs.	1st Stage	0.8	0.8	2	2	3.5	3.5	4.5	4.5	6.5
	2nd Stage	4.1	8	13.5	14.5	15.5	17	22	27	38
SNU-VD/FVMD										
Net Weight Kg.		87	119	195	205	300	350	520	720	1000
Gross Weight Kg.		110	150	250	260	360	410	615	950	1090
Approx. Oil Capacity Ltrs.	1st Stage	0.7	0.7	2.2	2.2	3.5	3.5	4.5	4.5	6.5
	2nd Stage	3.10	5.7	8.5	9.9	10	11	20	29	43

ELECON SPEED REDUCERS TROUBLE-SHOOTING GUIDE

Our worm gear units are designed to run satisfactorily for the service life of more than 26.000 hours depending upon their proper installation, operation and maintenance. When malfunction does occur, the source of trouble can be easily traced. Special skills or abilities are not required in case of corrections or repairs is needed. As a guide to continuous good performance the following information will prove useful :

Problem	Cause	Remedy
Reducer is over heated	* Over load	* Check the actual loading
	* Lubricant is more or less than required	* Fill oil to specified level
	* Incorrect grade of lubricant	* Use oil of correct grade
	* Oil seal damaged	* Replace the oil seal
Reducer buzzes	* Gear damaged	* Correct gears
	* Bearing damaged	* Replace the bearing
	* Inadequate lubricant	* Supply with more oil
	* Foreign matter enters the reducer	* Remove it and change the oil
Unusual vibration	* Foreign matter	* Remove it and change the oil
	* Bearings damaged / worn out	* Replace the bearing
	* Bolts loosened	* Tightenthe bolts
Leakage of oil	* Oil seal damaged	* Replace
	* Packing damaged	* Replace
	* Drain plug loosened	* Tighten the drain plug
Input/output shafts do not work	* Bearing damaged	* Replace
	* A solid foreign matter in gearing	* Remove it and clean the inside & fill fresh lubricant

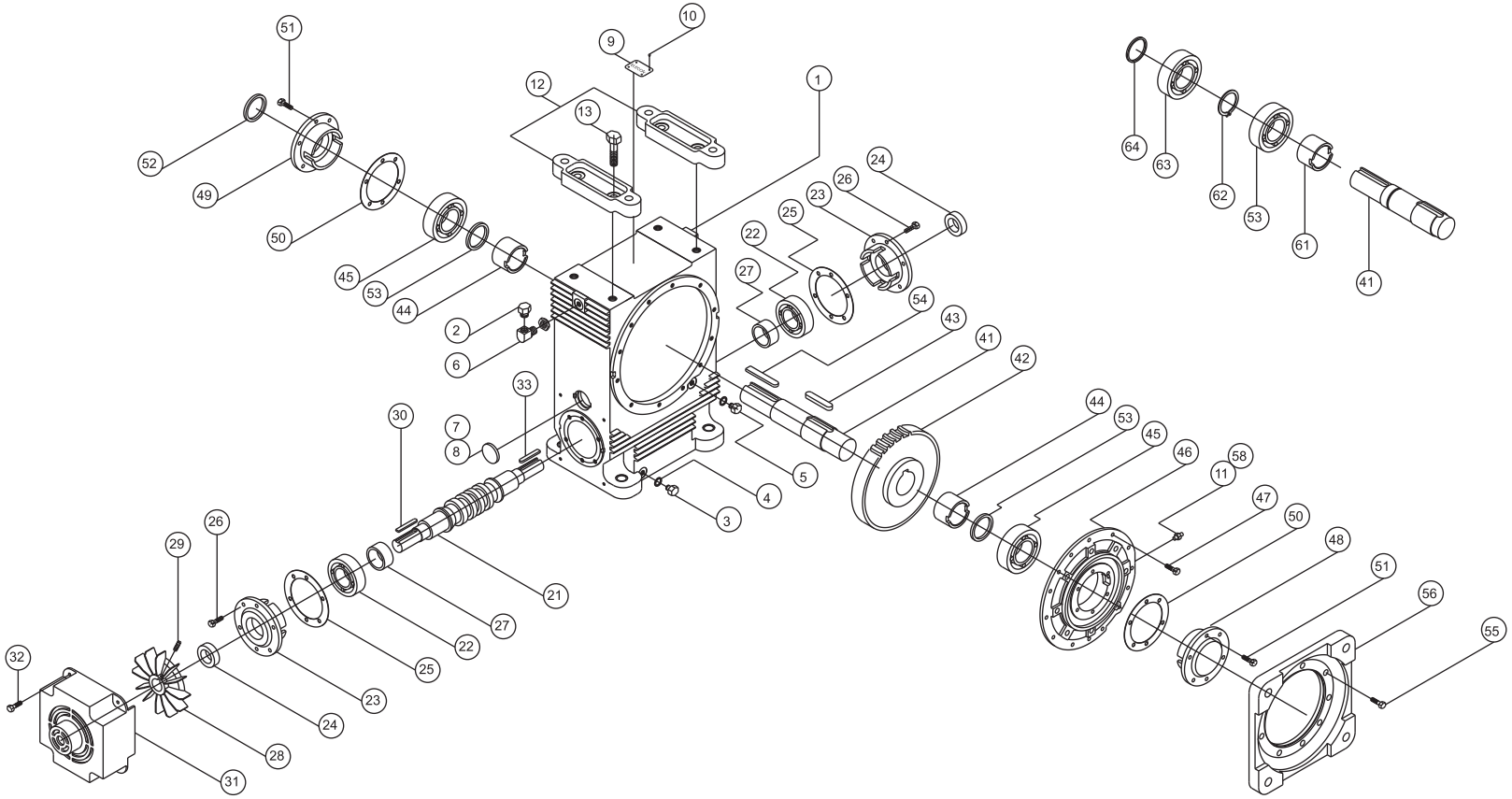
Note : The information given here is for users guidance. It will enable them to obtain satisfactory performance of the gear box.However, in case of doubt, the users are advised not to do any guess-work or take chance but to consult Elecon.

Materials used for construction of Worm gears

No .	DESCRIPTION	MATERIAL USED	No.	DESCRIPTION	MATERIAL USED
1	WORM SHAFT	20MnCr 5	4	OUTPUT SHAFT	070M55 (En-9)/08OM40 (En-8)
2	WORM WHEEL	PHOSPHOR BRONZE (PB)	5	BEARINGS	Taper Roller Bearings
3	GEAR CASE	CAST IRON	6	OIL SEALS	NBR

The material specified above is only for standard worm gear units. For special application depending on criticality of load conditions, Elecon Design office suggests special material and can be offered with additional price.

EXTRA ROLLER BRG. ASSLY.



SECTIONAL ARRGT. FOR SNU GEARS

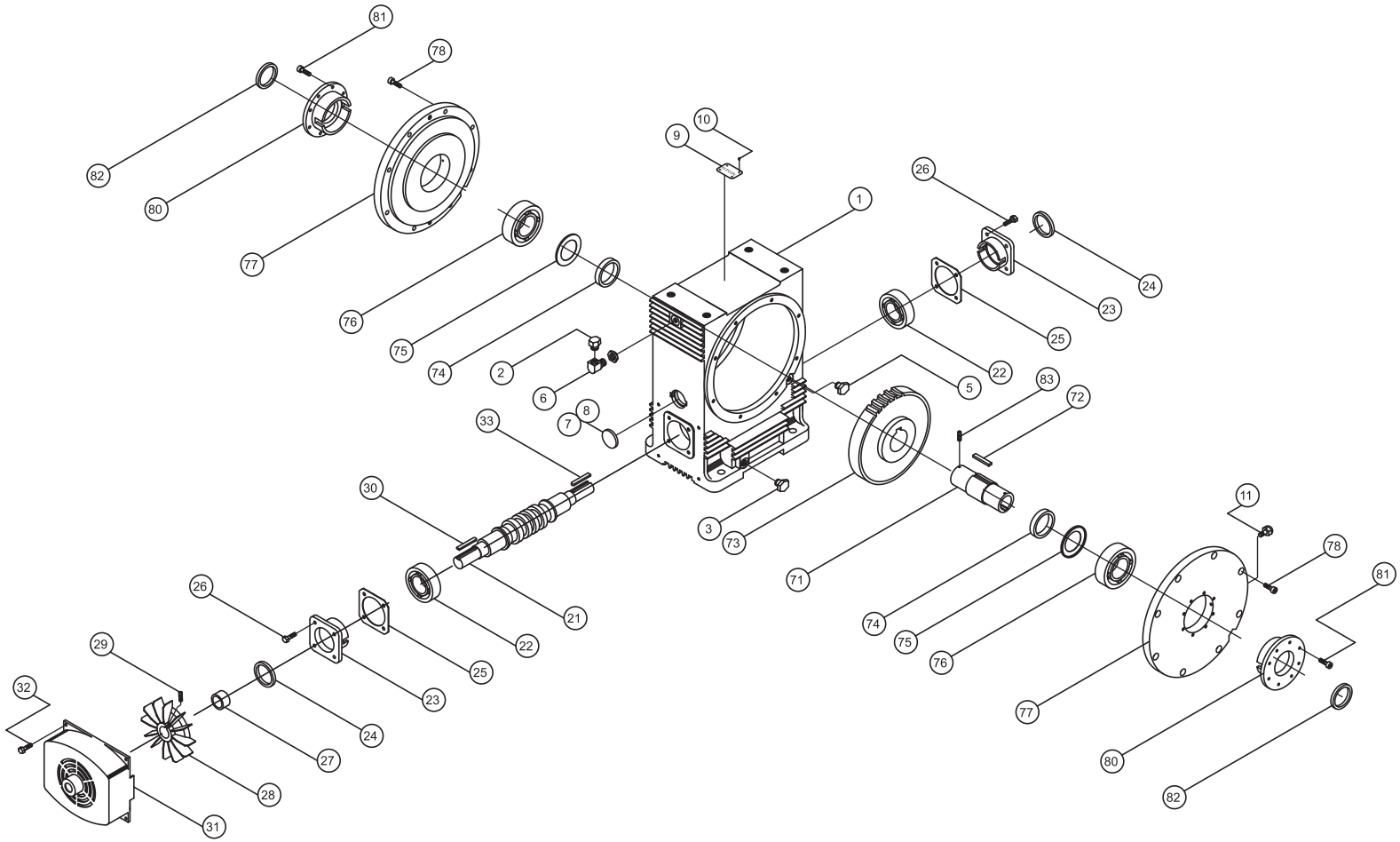
PART NOS. FOR SNU - U, O, V, GEAR UNITS

PART NO.	DESCRIPTION		OTY/GB
1	GEAR CASE		1
2	BREATHER PLUG		1
3	DRAIN PLUG		4
4	NYLON WASHER		1
5	OIL LEVEL INDICATOR		1
6	M/F ELBOW WITH CHECK NUT		1
7	SEALING CAP		1
9	NAME PLATE		1
10	RIVET		4
11	STRAIGHT GREASE NIPPLE		2
12	FEET	FOR “O”	2
13	HEX, HEAD SCREW	MOUNTING	4
21	WORM SHFT		1
22	TAPER ROLLER BRG.		2
23	WORM SHFT OPEN COVER		2
24	OIL SEAL		2
25	SHIMS		1 SET
26	HEX. HEAD SCREW		12
28	FAN		1
29	HEX. SCOKET GRUB SCREW		1
30	KEY FOR FAN		1
31	FAN COWL		1
32	HEX. HEDA SCREW		4
33	KEY ON EXTENSION LENGTH		1
41	SLOW SPEED SHAFT		1
42	WORM WHEEL		1
43	KEY FOR WORM WHEEL		1
44	DISTANCE PIECE		2
45	TAPER ROLLER BEARING		2
46	BEARING HOUSING		1
47	HEX. HEAD SCREW		12
48	BLANK COVER		1
49	OPEN COVER		1
50	SHIMS		1SET
51	HEX. HEAD SCREW		12
52	OIL SEAL		1
53	BAFFLE PLATE		2

PART NO.	DESCRIPTION		OTY/GB
54	KEY ON EXTENSION LENGTH		1
55	HEX. SOCKET SCREW		8
56	BASE		1
58	PLUG	FOR”V”	
	(IN PLACE OF GREASE NIPPLE)	MOUNTING	1

EXTRA ROLLER BRG. ASSLY

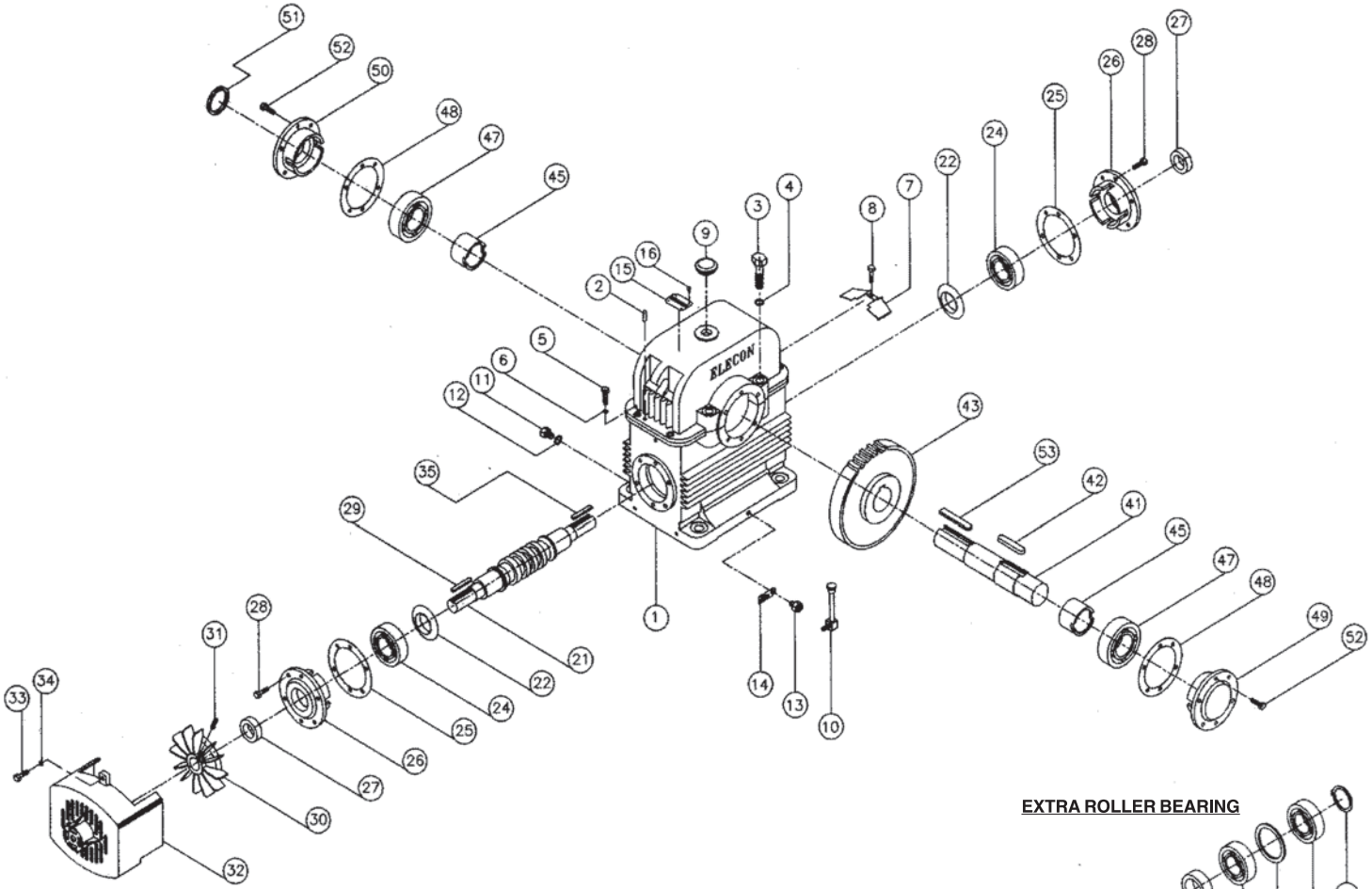
41	SLOW SPEED SHAFT	1
61	DISTANCE PIECE	1
62	DISTANCE RING	1
63	CYLINDRICAL ROLLER BEARING	1
64	EXTERNAL CIRCLIP	1



SECTIONAL ARRGT. FOR SNU-SM GEARS

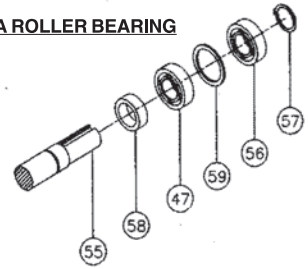
PART NOS. FOR SNU-SM GEAR UNITS

PART NO.	DESCRIPTION	QTY/GB
1	GEAR CASE	1
2	BREATHER PLUG	1
3	DRAIN PLUG	4
5	OIL LEVEL INDICATOR	1
6	M/F ELBOW WITH CHECK NUT	1
7	SEALING CAP	1
9	NAME PLATE	1
10	RIVET	4
11	STRAIGHT GREASE NIPPLE	2
21	WORM SHAFT	1
22	TAPER ROLLER BRG.	2
23	WORM SHAFT OPEN COVER	2
24	OIL SEAL	4
25	SHIMS	1 SET
26	HEX. HEAD SCREW	8
28	FAN	1
29	HEX. SOCKET GRUB SCREW	1
30	KEY FOR FAN	1
31	FAN COWL	1
32	HEX. HEAD SCREW	4
33	KEY ON EXTENSION LENGTH	1
71	HOLLOW OUTPUT SHAFT	1
73	KEY FOR WORM WHEEL	1
72	WORM WHEEL	1
74	DISTANCE PIECE	2
75	BAFFLE PLATE	2
76	TAPER ROLLER BEARING	2
78	BEARING HOUSING	2
79	HEX. HEAD SCREW	16
80	SHIMS	1 SET
81	SLOW SPEED OPEN COVER	2
82	HEX. HEAD SCREW	16
83	OIL SEAL	1
77	HEX. SOCKET GRUB SCREW	4



SECTION AL ARRGT. FOR SFU GEARS

EXTRA ROLLER BEARING



PART NOS, FOR SFU GEAR UNITS
G/B SIZES: 10", 12", 14" & 17"

PART NO.	DESCRIPTION	QTY/GB
1	GEAR CASE	1
2	SPRING DOWEL SLEEVE	2
3	HEXAGON HEDAD BOLT	4
4	SPRING WASHER	4
5	HEXAGON HEAD SCREW	4
6	SPRING WASHER	4
7	OIL SCRAPER	2
8	HEXGON HEAD SCREW	4
9	FILTER PUG	1
10	'L' TYPE OIL LEVEL INDICATOR	1
11	DRAIN PLUG	1
12	NYLON WASHER	1
13	PLUG	1
14	LABEL	1
15	NAME PLATE	1
16	HAMMER DRIVE RIVETS	1
21	WORM SHAFT	4
22	OIL THROWER	1
24	TAPER ROLLER BEARING	2
25	SHIMS	1 SET
26	WORM SHAFT OPEN COVER	2
27	OIL SEAL	2
28	HEXAGON HEAD SCREW	12
29	KEY	1
30	FAN	1
31	HEXAGON SOCKET GRUB SCREW	1
32	FAN COWL	1
33	HEXAGON HEAD SCREW	3
34	SPRING WASHER	3
35	KEY ON EXTN. SIDE	1
41	SLOW SPEED SHAFT	1
42	KEY	1
43	WORM WHEEL	1
45	DISTANCE PIECE	2
47	TAPER ROLLER BEARING	2
48	SHIMS	1 SET
49	S.S. SHAFT BLANK COVER	1
50	S.S. SHAFT OPEN COVER	1
51	OIL SEAL	1

PART NO.	DESCRIPTION	OTY/GB
52	HEXAGON HEAD SCREW	12
53	KEY ON EXTN. SIDE	1

EXTRA ROLLER BEARING

55	SLOW SPEED SHAFT	1
56	CYLIDRICAL ROLLER BEARING	1
57	EXTERNAL CIRCLIP	1
58	DISTANCE RIECE	1
59	DISTANCE RING	1

PRODUCT SAFETY INFORMATION

General **ELECON** gear units will operate safely provided that are selected, installed, used and maintained properly. As with any equipment that consists of rotating shafts and transmitting power, adequate guarding is necessary to eliminate the possibility of physical with rotating shafts or coupling.

Potential Hazards The following points should be noted and brought to attention to persons involved in the installation, use and maintenance of equipment.

1. For lifting of gear unit, eye-bolts or lifting points (on larger units) should be used.

2. Check the grade quantity of lubrication before commisisoning. Read and carry out all instructions on lubricant plate and inthe installation and maintenance manual literature.

3. Installation must be performed in accordance with the manufactuer's instruction and be undertaken by suitably qualified personnel.

4. Ensure the proper maintenance of gear boxes in operation **.USE ONLY ELECON** Spares for gear boxes.

5. The oil level should be examined periodically, if required the oil should be filled again.

6. The operating speeds,transmitting powers, generated torques or the external loads must exceed the design values.

7. The driving and the driven equipment must be selected to ensure that at the complete installation of the machinery will perform satisfactorily e.g. avoising system critiscal speeds, system torsionl vibration etc.

NOTES FROM CLIENT :

CUSTOMER'S FEEDBACK

ELECON CONTACT

HEAD OFFICE

Elecon Engineering Company Ltd.
Anand Sojitra Road
Vallabh Vidyanagar - 388 120
Gujarat,
India.

Phone :
Gear Division : 91-2692-236513, 236516, 236469
MHD Division : 91-2692-237016, 237017, 236521, 236590
Fax : :
Gear Division : 91-2692-236527

E-mail : :
Mhe Division : infomhe@elecon.com
Gear Division : infogear@elecon.com

Name	:	
Designation	:	
Company	:	
Primary Business	:	
Address	:	
Phone	:	
Fax	:	
Web	:	

Safety Instructions

Selection Information

Read ALL instructions prior to operating reducer. Injury to personnel or reducer failure may be caused by improper installation, maintenance or operation.

Written authorization from Elecon Engineering Company Limited is required to operate or use reducers in man lift or people moving devices.

Check to make certain application does not exceed the allowable load capacities published in the current catalog.

Buyer shall be solely responsible for determining the adequacy of the product for any and all uses to which Buyer shall apply the product. The application by Buyer shall not be subject to any implied warranty of fitness for a particular purpose.

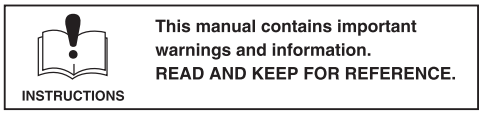
Safety Alert

⚠ WARNING

- For safety, Buyer or User should provide protective guards over all shaft extensions and any moving apparatus mounted thereon. The User is responsible for checking all applicable safety codes in his area and providing suitable guards. Failure to do so may result in bodily injury and/or damage to equipment.
- Hot oil and reducers can cause severe burns. Use extreme care when removing lubrication plugs and vents.
- Make certain that the power supply is disconnected before attempting to service or remove any components. Lock out the power supply and tag it to prevent unexpected application of power.
- Reducers are not to be considered fail safe or self-locking devices. If these features are required, a properly sized, independent holding device should be utilized. Reducers should not be used as a brake.
- Any brakes that are used in conjunction with a reducer must be sized or positioned in such a way so as to not subject the reducer to loads beyond the catalog rating.
- Lifting supports including eyebolts are to be used for vertically lifting the gearbox only and no other associated attachments or motors.
- Overhung loads subject shaft bearings and shafts to stress which may cause premature bearing failure and/or shaft breakage from bending fatigue, if not sized properly. Care to be taken to avoid tensile loads on **bolts due to overhung load.**

⚠ CAUTION

- Test run unit to verify operation. If the unit tested is a prototype, that unit must be of current production.
- If the speed reducer cannot be located in a clear and dry area with access to adequate cooling air supply, then precautions must be taken to avoid the ingestion of contaminants such as water and the reduction in cooling ability due to exterior Contaminants.
- Mounting bolts should be routinely checked to ensure that the unit is firmly anchored for proper operation.
- Keep the breather plug clean to allow vent holes clear all the times. Cloged vents, may cause damage to the gear reducer and its performance.



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