ELECON
SUPER SERIES IN WORM GEAR UNITS

Super NU Series
Ever since Elecon's inception 48 years ago, they have strived to reach new frontiers of technical excellence. From a modest start in manufacturing material handling equipment namely ELEVATORS & CONVEYORS in 1951, Elecon graduated to the manufacture of gear boxes (initially for captive use) in 1963. Today, Elecon's name become synonymous with high quality gear and material handling equipment in India.

Elecon had set up a separate Gear Division in 1976. This division has a capacity of producing more than 25,000 gear unit yearly, out of which 90% share for worm speed reduction gear units and remaining share in helical speed reduction gear unit. The gear units are working satisfactorily in cement, chemical, plastic, paper, power generation, sugar, textile, thermal plant industries.

Elecon have a wide range of worm, parallel shaft and right angle helical – spiral bevel speed reduction gear units.

Elecon have many firsts to their credit. In the eighties, they were the first to introduce case-hardened and ground gear technology in India and the modular design concept for gear manufacture in India, as a result of which economical mass production and comprehensive maintenance of component stocks were made possible.

The latest additions to their production line are planetary gear boxes for marine and other applications which have already been delivered for use on the off-shore patrol vessels of the Indian Coast Guard. These are very compact, high precision gear boxes, capable of transmitting up to 23,000 KW of power.

For a forward-looking organisation like Elecon, modernisation is the watchword. That is precisely why they continuously update their production technology through frequent capital and infrastructural investments. Elecon have geared themselves for tomorrow by setting up one of the largest EDP centres in the Indian Engineering Industry. More than 85% of their machinery is computer controlled, ensuring a high degree of precision in the manufacture, design and testing of gear components. Apart from a large concentration of computerised numerically controlled (CNC) machines, they have flexible machining systems, a battery of modern quality control equipments for checking gear component's various parameters and geometry, on-line computerised inventory control, production planning and execution programmes. All this has resulted in Elecon's Gear Division being the most modern in the country – a fact that is unanimously acknowledged throughout the industry. Just as it is acknowledged by clients that Elecon, despite their stature and focus on modernisation, have not lost sight of their primary goal - customer satisfaction.

**ISO – 9001 for Elecon Gear Division**

In November 1994, the RW – TUV Germany has accredited that Elecon Gear Division Quality Management System confirms to the internationally accepted ISO 9001 standards. This certificate covers Quality Assurance in Design and Development, Production, Installation and Service of mechanical transmission products like Worm, Helical and special gear units, Fluid, Geared and Flexible couplings and Accessories.
WORM REDUCTION GEAR UNIT IN THE RANGE

Worm speed reduction gear unit is the result of more than thirty years of continuous efforts in development and refinement by ELECON ENGINEERING CO., the India’s most experienced organisation in gear transmission engineering.

◆ MODEL & TYPE : SNU – MODULAR UNIVERSAL MOUNTING – (SUPER NU SERIES)

- Underdriven (SNU-U)
- Overdriven (SNU-O)
- Vertical output shaft up/down (SNU-V)
- Hollow output shaft (SNU-SM)

SIZES : 1 5/8, 1 3/4, 2, 2 1/4, 3, 3 1/2, 4, 5, 6, 7, 8, 9, 10.5

RATIO : Min. 5 : 1 to Max. 70 : 1

Power capacity to 139 KW
SUPER SERIES IN WORM GEAR UNITS

SPECIFICATIONS

GENERAL
Elecon single reduction gear units are the result of many years of experience. Completely re-designed gear case with liberal ribbing increases heat dissipating area, streamlined sump carrying more oil and larger capacity of fan enhance the thermal rating of the gearbox. All this means that the continuous load carrying capacity is increased without substantial rise in temperature.

No more opening of gearbox for hand changing, just replace the fan and fancowl from one end to other end of worm shaft.

DESIGN STANDARDS
Wherever applicable, British as well as Indian standards are used. Worm conforms to casehardening alloy steel, worm wheel conforms to phosphor-bronze PB2-C as per British Standard B.S. 1400, while gear case conforms to C. I. grade FG 220 and for heavy duty FG 250, Indian Standard I.S. 210.

GEAR CASE
Gear case is of streamlined design, rugged in construction, made of close-grain cast iron. It is completely oil-tight, dust-proof and capable of being installed in the open without a separate cover. The faces and bores are accurately bored and machined on latest precision machines to ensure perfect alignment and interchangeability.

WORM/WORM WHEEL
The worm is made of case-hardening alloy steel, carburised, ground and polished and is integral with the shaft. Bearing journals are accurately ground. Worm wheel is made of centrifugally cast phosphor-bronze rims, shrink fitted and brazed with C.I. centres.

Worms are generated on special-purpose worm milling machines, gas carburised and ground on automatic work grinders.

Worm wheels are hobbed on precision hobbing machines with high accuracy hobs. Each and every wheel is checked to match with the master worms to ensure complete interchangeability.

Right-hand threads are provided, unless otherwise specified.

BEARINGS
The worms and worm wheels are supported on ball or roller anti-friction bearings of ample margin of safety to allow adequate journal as well as thrust loads. Overhung loads arising out of sprocket or pinion drive are generally permissible because the gear case and bearings are designed for this duty. However, complete details should be given to us for confirmation. In cases of heavy overhung loads, an extra roller bearing can be provided.

WHEEL SHAFT
The wheel shaft is made of high tensile carbon steel. It is of large diameter to carry the torsional as well as bending loads which may be induced by overhung drives.

LUBRICATION
Lubrication to gears and bearings is by splash of oil from the sump. Thus, no special care is required except for the occasional topping up of the oil to the required level. A large oil filler-cum-breather and inspection cover is provided together with a drain plug and ventilator. Neoprene lip-type oil seals are fitted on input and output shaft.

For very low input speed below 50 rpm. and heavy loads in sizes larger than 14" size forced lubrication is required. In such cases Elecon must be consulted.

COOLING
Air cooling is effected by means of standard polypropylene or metal fans which direct a continuous flow of air over the ribbed surface of the gear unit. The fan is designed to operate in both direction of rotation, and is so arranged in conjunction with the ribbing on the gear unit as to allow maximum heat dissipation.

HOLDBACK
Elecon Sprag type holdback can be fitted on all sizes of gears to prevent reverse rotation. In cases where holdback is required, the direction of rotation of the shaft should be mentioned.

POWER RATINGS
The ratings indicated in the catalogue holds good for 12 hours of continuous running under uniform load being driven by electric motor. They give minimum gear life of 26,000 hours, subject to limitation of maximum oil temperature of 100°C under full load, 20°C ambient.

OVERLOADS
All the components of the reduction gears are so designed that they can withstand.
* 100 per cent overload for 15 seconds
* 50 per cent overload for one minute
* 40 per cent overload for 30 minutes and
* 25 per cent overload for two hours.
Super NU Series MODULAR WORM GEAR
UNIVERSAL MOUNTING

Further to successful launching of ELECON 'NU' Modular worm gearboxes, "SUPER NU" series is one step ahead in WORM GEAR TECHNOLOGY.

A combination of present-day concepts, analytical calculations with the help of CAD (Computer Aided Design) carried out on single part use of very latest CNC machine tools plus systematic checks on materials and workmanship, give this series of gearboxes a marked degree of reliability.

Single piece universal casing having flanges top and bottom side and also provision for a supporting flange make it possible to have the universal mounting positions for gearboxes such as underdriven, overdriven and vertical. The internal components are, therefore, interchangeable for all the mounting positions.

Quick change of mounting positions from underdriven to overdriven and vice versa merely by putting the unit upside down and replacing the positions of drain plug, breather plug and oil level indicator.

Comprehensive maintenance of stock and faster delivery can be achieved due to adoption of interchangeably principle. Robust compact and streamlined design with ample thermal capacities.

- Universal case, internally ribbed to ensure sufficient strength and rigidity for all applications.
- Centrifugally cast phosphor bronze rims.
- Bearings and oilseals are to ISO proportions - replacements are available world-wide.
- Hold Back can be fitted integrally on worm shaft.
- Identical double input shaft extensions.
- Worm threads are profile ground and super finished.

FILL AND FORGET Concept

The low and medium power gearunit sizes \( \frac{5}{8}, \frac{3}{4}, 2, \frac{1}{4} \) and 3 are supplied with factory filled SYNTHETIC LUBRICANT and require no lubricant maintenance. User has not to fill any grade of lubricant.

Change or shaft handling

This is achieved easily and quickly by just replacing the cap from one end of the worm shaft only in the case of \( \frac{5}{8}, \frac{3}{4}, 2, \frac{1}{4} \) and 3 SNU gear units. It is not necessary to dismantle the complete gear unit. While in 4 SNU onwards, just replace the fan and fancowl from one end to other end of the worm shaft.
### TABLE NO. 1 LOAD CLASSIFICATION BY APPLICATIONS

<table>
<thead>
<tr>
<th>Driven Machine</th>
<th>Type of Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agitators &amp; mixers</td>
<td>Pure Liquids, semi-liquids</td>
</tr>
<tr>
<td></td>
<td>Liquids and solids variable density</td>
</tr>
<tr>
<td></td>
<td>Liquids with variable density</td>
</tr>
<tr>
<td>Blowers</td>
<td>Centrifugal, vane</td>
</tr>
<tr>
<td></td>
<td>Lobe</td>
</tr>
<tr>
<td>Brewing &amp; distilling</td>
<td>Bottle machinery</td>
</tr>
<tr>
<td></td>
<td>Brew kettle continuous duty</td>
</tr>
<tr>
<td></td>
<td>Cookers, scale hopper</td>
</tr>
<tr>
<td>(frequent starts)</td>
<td>Cane filling Machinery</td>
</tr>
<tr>
<td></td>
<td>Cane knives</td>
</tr>
<tr>
<td></td>
<td>Clarifiers</td>
</tr>
<tr>
<td></td>
<td>Classifiers</td>
</tr>
<tr>
<td>Clay-working machinery</td>
<td>Brick press, briquette machine</td>
</tr>
<tr>
<td></td>
<td>Pug mill, clay-working machinery</td>
</tr>
<tr>
<td>Compressors</td>
<td>Centrifugal</td>
</tr>
<tr>
<td></td>
<td>Lobe</td>
</tr>
<tr>
<td></td>
<td>Reciprocating multi-cylinder</td>
</tr>
<tr>
<td></td>
<td>Reciprocating single-cylinder</td>
</tr>
<tr>
<td>Conveyors - Uniformly loaded or fed</td>
<td>Apron, Belt, Bucket, Screw</td>
</tr>
<tr>
<td>Conveyors - Heavy Duty - Not Uniformly fed</td>
<td>Apron, Belt, Bucket, Screw</td>
</tr>
<tr>
<td>Reciprocating and shaker</td>
<td>M</td>
</tr>
<tr>
<td>Cranes</td>
<td>Main Hoist</td>
</tr>
<tr>
<td></td>
<td>Bridge Travel</td>
</tr>
<tr>
<td>Crushers</td>
<td>Ore, Stone</td>
</tr>
<tr>
<td></td>
<td>Sugar</td>
</tr>
<tr>
<td>Elevators</td>
<td>Bucket-uniform load</td>
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<tr>
<td></td>
<td>Bucket-heavy load</td>
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<tr>
<td></td>
<td>Bucket-continuous load</td>
</tr>
<tr>
<td></td>
<td>Centrifugal discharge</td>
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<tr>
<td></td>
<td>Gravity discharge</td>
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<tr>
<td></td>
<td>Passenger lifts</td>
</tr>
<tr>
<td>Fans</td>
<td>Centrifugal</td>
</tr>
<tr>
<td></td>
<td>Induced draft</td>
</tr>
<tr>
<td></td>
<td>Large (mine, industrial, etc.)</td>
</tr>
<tr>
<td></td>
<td>Light (small diameter)</td>
</tr>
<tr>
<td></td>
<td>Cooling Towers</td>
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<tr>
<td></td>
<td>Induced draft</td>
</tr>
<tr>
<td></td>
<td>Forced draft</td>
</tr>
<tr>
<td>Feeders</td>
<td>Apron</td>
</tr>
<tr>
<td></td>
<td>Belt</td>
</tr>
<tr>
<td></td>
<td>Disc.</td>
</tr>
<tr>
<td>Driven Machine</td>
<td>Type of Load</td>
</tr>
<tr>
<td>Reciprocating</td>
<td>H</td>
</tr>
<tr>
<td>Screw</td>
<td>M</td>
</tr>
<tr>
<td>Food Industry</td>
<td>Beef slicer</td>
</tr>
<tr>
<td></td>
<td>Cereal cooker</td>
</tr>
<tr>
<td>Laundry machines</td>
<td>Washers, tumblers</td>
</tr>
<tr>
<td>Line shaft</td>
<td>M</td>
</tr>
<tr>
<td>Mills</td>
<td>Hammers</td>
</tr>
<tr>
<td></td>
<td>Ball kilns, pebbles</td>
</tr>
<tr>
<td></td>
<td>Rod tumbling barrels</td>
</tr>
<tr>
<td></td>
<td>Cement kilns</td>
</tr>
<tr>
<td></td>
<td>Dryers and coolers</td>
</tr>
<tr>
<td>Mixers</td>
<td>Concrete mixers</td>
</tr>
<tr>
<td>Sugar industry</td>
<td>Cane knives</td>
</tr>
<tr>
<td></td>
<td>Crushers</td>
</tr>
<tr>
<td></td>
<td>Mills</td>
</tr>
<tr>
<td>Oil industry</td>
<td>Chillers</td>
</tr>
<tr>
<td></td>
<td>Rotary kilns</td>
</tr>
<tr>
<td>Paper mill</td>
<td>Bleacher conveyor press, winder</td>
</tr>
<tr>
<td></td>
<td>Calendars, agitators, beater and pulper</td>
</tr>
<tr>
<td>Pumps</td>
<td>Centrifugal</td>
</tr>
<tr>
<td></td>
<td>Reciprocating (three or more cylinders)</td>
</tr>
<tr>
<td></td>
<td>Gear, lobe type</td>
</tr>
<tr>
<td>Rubber &amp; plastic industry</td>
<td>Crackers</td>
</tr>
<tr>
<td></td>
<td>Fixing mills</td>
</tr>
<tr>
<td></td>
<td>Laboratory equipment</td>
</tr>
<tr>
<td></td>
<td>Refiners</td>
</tr>
<tr>
<td></td>
<td>Sheeters</td>
</tr>
<tr>
<td></td>
<td>Tubers and strainers</td>
</tr>
<tr>
<td></td>
<td>Warming mills</td>
</tr>
<tr>
<td></td>
<td>Tyre and Tube press</td>
</tr>
<tr>
<td>Sand Mullers</td>
<td>M</td>
</tr>
<tr>
<td>Screens</td>
<td>Air washing</td>
</tr>
<tr>
<td></td>
<td>Rotary-stone / gravel</td>
</tr>
<tr>
<td>Textile industry</td>
<td>Batches</td>
</tr>
<tr>
<td></td>
<td>Calendars</td>
</tr>
<tr>
<td></td>
<td>Dyeing machinery</td>
</tr>
<tr>
<td></td>
<td>Spinners</td>
</tr>
<tr>
<td></td>
<td>Washers</td>
</tr>
<tr>
<td></td>
<td>Winders</td>
</tr>
<tr>
<td>Wire-drawing, Flattening machine</td>
<td>M</td>
</tr>
<tr>
<td>Wire Winding machine</td>
<td>M</td>
</tr>
</tbody>
</table>

### ENQUIRY

1. Type of prime mover, KW rating, speed R.P.M.
2. Required reduction ratio & Handing.
3. Type of driven machine, actual power required, designed speed R.P.M., peak and shock (give magnitude and duration where possible).
4. Type of drive employed between
   (i) Prime mover and reducer.
   (ii) Reducer and driven machine
5. No. of hours / day the gear unit will be in operation.
6. Ambient conditions, i.e., temperature, humidity.
7. Whether holdback required? Specify direction of rotation, if holdback is to be fitted.
8. Details of any external loads imposed on gear unit.
9. Give sketch of available space.
Explanation and use of ratings and service factors.

Gear unit selection is made by comparing actual loads with catalogue ratings. Catalogue ratings are based on a standard set of loading conditions whereas actual load conditions vary according to type of application. Service factors are therefore used to calculate an equivalent load to compare with catalogue ratings.

**Mechanical ratings and service factor ($F_M$)**

Mechanical ratings measure capacity in terms of life and/or strength assuming 12 hr/day continuous running under uniform load conditions. Catalogue ratings allow 100% overload at starting, breaking or momentarily during operations up to 12 hours per day.

**TABLE NO.2 Mechanical service factor ($F_M$)**

<table>
<thead>
<tr>
<th>Prime mover</th>
<th>Duration of service hrs per day</th>
<th>Load classification - driven machine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Uniform</td>
</tr>
<tr>
<td>Electric motor, steam turbine or hydraulic motor</td>
<td>Under : 3 to 10</td>
<td>0.80</td>
</tr>
<tr>
<td>Multi-cylinder internal, combustion engine</td>
<td>Under : 3 to 10</td>
<td>1.00</td>
</tr>
<tr>
<td>Single cylinder internal, combustion engine</td>
<td>Under : 3 to 10</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Over 10 to 24</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>Over 10 to 24</td>
<td>1.50</td>
</tr>
</tbody>
</table>

- For Units subject to frequent starts/stops and overloads, also applications where high inertia loads are involved e.g. crane travel drives, slewing motion etc. consult Elecon.

**Thermal ratings and Thermal service factor ($F_T$)**

Thermal ratings measure a unit's ability to dissipate heat, if they are not exceeded, the lubricant may overheat and break down resulting in failure of gear unit.

Thermal ratings are affected by ambient temperature and not by mechanical considerations such as increased running time and shock loads.

Catalogue ratings are given on 20°C ambient temperature allowing for a lubricant temperature rise to 100°C during operation as the unit transmit power and generate heat.

Thermal ratings calculated with unit fan cooling.

Thermal service factor $F_T$ (Table No. 3) is used to modify the actual load according to prevailing ambient temperature.

**TABLE NO. 3**

<table>
<thead>
<tr>
<th>THERMAL SERVICE FACTOR ($F_T$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temp. °C</td>
</tr>
<tr>
<td>Factor</td>
</tr>
</tbody>
</table>

If the ambient temperature is other than 20°C, divide the catalogue thermal rating by the factor from Table No. 3
EXAMPLE - 1

Worm reduction gear having input (worm) above the wheel required for belt conveyor where non-uniform material is fed on conveyor belt, operating for 8 hours per day. Speed required at conveyor shaft is 50 rpm. The gear unit is driven directly using coupling by 7.5 KW, 1500 rpm electric motor.

SOLUTION

STEP : 1  
Ratio required = \( \frac{\text{Input speed}}{\text{Output speed}} = \frac{1500}{50} = 30:1 \)

STEP : 2  
From Table No.1
Drive m/c - Belt conveyor  
Material - Non uniform fed  
Type of Load - Moderate shock (M)

∴ From Table No.2  
Mechanical service factor (Fm) = 1.25 for 8 hr/day operation

STEP : 3  
Input power = Motor Power x Fm  
= 7.5 x 1.25  
= 9.375 KW

∴ From catalogue  
Rating at Input 1500 rpm, Ratio - 30:1  
Gear unit size : 6 Ratio - 30:1  
Input Power = 12.2 KW

∴ Gear unit type/size : 6 SNU-O, Ratio - 30:1

EXAMPLE - 2

Worm reduction gear unit underdriven type is required to drive a bucket elevator heavily loaded, operating 24 hours per day at 29 rpm, transmitting 30 KW. The gear unit is directly driven using coupling by 1500 rpm of an electric motor. The ambient temperature is around 30°C on plant.

SOLUTION :

STEP : 1  
Ratio required = \( \frac{\text{Input speed}}{\text{Output speed}} = \frac{1500}{29} = 51.7:1 \)

Nearest standard ratio available is 50:1

STEP : 2  
From Table No. 1
Driven m/c - Bucket Elevator (Heavily Loaded)  
Type of Load - Moderate shock (M),

From Table No. 2  
Mechanical service factor (Fm) = 1.50 for 24 running hrs/day continuous

STEP : 3  
Equivalent output power (Mechanical) = 30 x 1.5 = 45 KW

∴ Equivalent output torque (Mechanical) = \( \frac{9550 \times 45}{29} = 14818.96 \) Nm

From catalogue.  
Refer rating at input speed 1500 rpm, Ratio - 50:1

∴ Gear unit size 14, ratio 50:1 having output torque (Mechanical) = 16457.4 Nm  
Input power (Mechanical) = 62 KW

STEP : 4  
From Table No. 3 Thermal service factor (Ft) = 1.16  
For an ambient temp. of 30°C

∴ Equivalent output power (Thermal) = 30 KW x 1.16 = 34.8 KW

∴ Equivalent output torque (Thermal) = \( \frac{9550 \times 34.8}{29} = 11460 \) Nm.
STEP : 5
From catalogue, rating at input 1500 rpm Ratio - 50:1, for 14 size
Output torque (Thermal) = 10486.9 Nm, which is less than calculated equivalent
Output torque (Thermal) = 11460 Nm
∴ Higher gear unit size 17 SFU, Ratio - 50:1 is to be selected where at input 1500 rpm
Where, Output torque (Mechanical) = 29064 Nm and
Input power (Mechanical) = 110 KW
∴ Required Input power
\[
\frac{\text{Calculated equivalent output torque (Mech.)} \times \text{Rated power (Mech.)}}{\text{Rated output torque (Mech.)} \times \text{Fm}} = \frac{14818.96 \times 110}{29064 \times 1.5} = 37.39 \text{ KW}
\]
∴ Nearest standard motor having 37 KW at 1500 rpm can be selected for the application.

EXAMPLE - 3
Worm reduction gear (underdriven type) required to drive a clay-working machine for continuous 10 hours/day. The power required at clay-working machine is 5 KW at 50 rpm, ambient temperature is 40°C. Also suggest an electric motor power at 1500 rpm to drive the gear unit.

SOLUTION :

STEP : 1
Ratio required = \frac{\text{Input speed}}{\text{Output speed}} = \frac{1500}{50} = 30:1

STEP : 2
From Table No.1
Driven m/c - Clay-working machinery, Type of Load - Moderate shock (M),
∴ From Table No.2
Mechanical service factor (Fm) = 1.25 for 10 running hrs/day continuous
∴ From Table No.3
Thermal service factor (Ft) = 1.35 at 40°C ambient temp.
∴ The higher of the above two service factor i.e. 1.35 is to be considered as a service factor.

STEP : 3
Equivalent output power = 5 KW x 1.35 = 6.75 KW
∴ Equivalent output torque = \frac{9550 \times 6.75}{50} = 1289.25 \text{ Nm}

STEP : 4
From catalogue, Refer rating at Input speed 1500 rpm, Ratio - 30:1
Gear unfit size 6 SNU-U, Ratio 50:1 having
Input power = 12.2 KW
Output torque = 1980.7 Nm

STEP : 5
Required Input power
\[
\frac{\text{Calculated equivalent output torque} \times \text{Rated input power}}{\text{Rated output torque} \times \text{Service factor}} = \frac{1289.25 \times 12.2}{1980.7 \times 1.35} = 5.88 \text{ KW}
\]
∴ Suggest nearest standard A.C. electric motor having 7.5 KW at 1500 rpm to drive gear unit size 6 SNU-U, Ratio 30:1.
### RATINGS AT INPUT SPEED 1500 R.P.M.

<table>
<thead>
<tr>
<th>GEAR RATIO</th>
<th>OUTPUT SPEED R.P.M.</th>
<th>CAPACITY</th>
<th>SIZE OF UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>300</td>
<td>INPUT POWER KW</td>
<td>1.46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT TORQUE Nm</td>
<td>44.2</td>
</tr>
<tr>
<td>7.5</td>
<td>200</td>
<td>INPUT POWER KW</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT TORQUE Nm</td>
<td>54.6</td>
</tr>
<tr>
<td>10</td>
<td>150</td>
<td>INPUT POWER KW</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT TORQUE</td>
<td>69.5</td>
</tr>
<tr>
<td>15</td>
<td>100</td>
<td>INPUT POWER KW</td>
<td>1.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT TORQUE Nm</td>
<td>90.36</td>
</tr>
<tr>
<td>20</td>
<td>75</td>
<td>INPUT POWER KW</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT TORQUE Nm</td>
<td>86.6</td>
</tr>
<tr>
<td>25</td>
<td>60</td>
<td>INPUT POWER KW</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT TORQUE Nm</td>
<td>79.1</td>
</tr>
<tr>
<td>30</td>
<td>50</td>
<td>INPUT POWER KW</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT TORQUE Nm</td>
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### RATINGS AT INPUT SPEED 1500 R.P.M.

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- The Ratings are based on service factor of 1, continuously transmitted for 12 hours/day with normal overload of 100% momentarily for 15 seconds, 40% for 30 minutes, 25% for 2 hours.
- See Page No. 9 for actual service factor to nature of load and duration of operation.
- Ratios and output speeds are nominal. Exact ratios are listed on Page No. 30
- Higher rating can be obtained by using SYNTHETIC OIL, details on Page No. 32
### RATINGS AT INPUT SPEED 1500 R.P.M.

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- The Ratings are based on service factor of 1, continuously transmitted for 12 hours/day with normal overload of 100% momentarily for 15 seconds, 40% for 30 minutes, 25% for 2 hours.
- See Page No. 9 for actual service factor to nature of load and duration of operation.
- Ratios and output speeds are nominal. Exact ratios are listed on Page No. 30
- For rating marked * consult ELECON
- Higher rating can be obtained by using SYNTHETIC OIL, details on Page No. 32.
## RATINGS AT INPUT SPEED 1000 R.P.M.

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### RATINGS AT INPUT SPEED 1000 R.P.M.

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<td>6685</td>
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- The Ratings are based on service factor of 1, continuously transmitted for 12 hours/day with normal overload of 100% momentarily for 15 seconds, 40% for 30 minutes, 25% for 2 hours.
- Ratios and output speeds are nominal. Exact ratios are listed on Page No. 30
- Higher rating can be obtained by using SYNTHETIC OIL, details on Page No. 32
## RATINGS AT INPUT SPEED 750 R.P.M.

<table>
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<tr>
<th>GEAR RATIO</th>
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<td>54.7</td>
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<td>INPUT POWER KW</td>
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<td>OUTPUT TORQUE Nm</td>
<td>75.7</td>
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- The Ratings are based on service factor of 1, continuously transmitted for 12 hours/day with normal overload of 100% momentarily for 15 seconds, 40% for 30 minutes, 25% for 2 hours.
- See Page No. 9 for actual service factor to nature of load and duration of operation.
- Ratios and output speeds are nominal. Exact ratios are listed on Page No. 30.
- Higher rating can be obtained by using SYNTHETIC OIL. Details on Page No. 32.
### RATINGS AT INPUT SPEED 750 R.P.M.

<table>
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<tr>
<th>GEAR RATIO</th>
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<th>CAPACITY</th>
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<td>OUTPUT MECH. TORQUE (Nm)</td>
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<td>OUTPUT THERMAL TORQUE (Nm)</td>
<td>7088.4</td>
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- The Ratings are based on service factor of 1, continuously transmitted for 12 hours/day with normal overload of 100% momentarily for 15 seconds, 40% for 30 minutes, 25% for 2 hours.
- See Page No. 9 for actual service factor to nature of load and duration of operation.
- Ratios and output speeds are nominal. Exact ratios are listed on Page No. 30
- For rating marked * consult ELECON
- Higher rating can be obtained by using SYNTHETIC OIL, details on Page No. 32
### RATINGS AT INPUT SPEED 500 R.P.M.

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The Ratings are based on service factor of 1, continuously transmitted for 12 hours/day with normal overload of 100% momentarily for 15 seconds, 40% for 30 minutes, 25% for 2 hours.

See Page No. 9 for actual service factor to nature of load and duration of operation.

Ratios and output speeds are nominal. Exact ratios are listed on Page No. 30.

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### RATINGS AT INPUT SPEED 500 R.P.M.

<table>
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The Ratings are based on service factor of 1, continuously transmitted for 12 hours/day with normal overload of 100% momentarily for 15 seconds, 40% for 30 minutes, 25% for 2 hours.

See Page No. 9 for actual service factor to nature of load and duration of operation.

Ratios and output speeds are nominal. Exact ratios are listed on Page No. 30 For rating marked * consult ELECON

Higher rating can be obtained by using SYNTHETIC OIL, details on Page No. 32
1 5/8 SNU

MOUNTING POSITIONS USING
FOOT NO. 1 FOR NU-U
FOOT NO. 2 FOR NU-O
FOOT NO. 3 FOR NU-V
FOOT NO. 4 FOR NU-H

INPUT SHAFT KEYWAY DETAIL
OUTPUT SHAFT KEYWAY DETAIL

1 3/4 SNU

MOUNTING POSITIONS USING
FOOT NO. 3 FOR NU-V
FOOT NO. 4 FOR NU-H

Key & Keyways as per IS 2048. Shaft limits up to 58dia.-k6 and above 58 dia.-m6
2 TO 3 SNU-U, O, V

Key & Keyways as per IS 2048. Shaft limits up to 58dia.-k6 and above 58 dia.-m6
3.54 SNU-O

3.54 SNU-V

Key & Keyways as per IS 2048. Shaft limits up to 58 dia.-k6 and above 58 dia.-m6
# 4 TO 10.5 SNU

## SNU-U

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</tr>
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</table>

Key & Keyways as per IS 2048. Shaft limits up to 58dia.-k6 and above 58 dia.-m6

---

## SNU-O

| SIZE  | A   | AO | B   | BO   | CO | φ5 | HO | EO | P | D1 | L1 | V1 | M1 | T1 | W1 | K1 | K2 | D2 | L2 | V2 | M2 | T2 | W2 | K3 | k4 |
|-------|-----|----|-----|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 4 SNU-O | 250 | 180 | 240 | 200  | 25 | 18 | 241.6 | 140 | 350 | 32 | 65 | 60 | M12 | 27 | 10 | 215 | 440 | 40 | 90 | 65 | M16 | 39.5 | 14 | 215 | 115 |
| 5 SNU-O | 300 | 220 | 270 | 230  | 25 | 18 | 292 | 165 | 410 | 35 | 70 | 65 | M12 | 30 | 10 | 242 | 492 | 50 | 100 | 95 | M16 | 44.5 | 14 | 235 | 130 |
| 6 SNU-O | 354 | 266 | 310 | 250  | 30 | 23 | 352.4 | 200 | 479.4 | 38 | 75 | 70 | M12 | 33 | 10 | 279 | 580 | 58 | 114 | 111 | M20 | 52 | 16 | 274 | 155 |
| 7 SNU-O | 400 | 306 | 340 | 266  | 44 | 23 | 421.8 | 244 | 568 | 40 | 82 | 79 | M16 | 35 | 12 | 311 | 656 | 65 | 130 | 127 | M20 | 58 | 18 | 287 | 160 |
| 8 SNU-O | 440 | 343 | 340 | 266  | 44 | 27 | 472.2 | 269 | 618 | 45 | 88 | 85 | M16 | 39.5 | 14 | 342 | 710 | 70 | 140 | 137 | M20 | 62.5 | 20 | 312 | 175 |
| 9 SNU-O | 490 | 390 | 414 | 340  | 44 | 27 | 524.6 | 296 | 679 | 50 | 95 | 92 | M16 | 44.5 | 14 | 375 | 776 | 75 | 145 | 140 | M20 | 67.5 | 20 | 325 | 180 |
| 10.5 SNU-O | 590 | 432 | 484 | 400  | 50 | 33 | 597.7 | 331 | 770 | 60 | 115 | 110 | M20 | 53 | 18 | 450 | 925 | 80 | 150 | 147 | M20 | 71 | 22 | 352 | 200 |

Key & Keyways as per IS 2048. Shaft limits up to 58dia.-k6 and above 58 dia.-m6
### SNU-V

| Size   | A     | AV   | CV   | φS | HV | H | K | P   | D1 | L1 | V1 | M1 | T1 | W1 | K1 | K2 | D2 | L2 | V2 | M2 | T2 | W2 | K3 | E | F | M3 |
|--------|-------|------|------|----|----|---|---|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 4 SNU-V | 280   | 235  | 20   | 18 | 140 | 108 | 101.6 | 325 | 32 | 65 | 60 | 12 | 10 | 215 | 440 | 45 | 90 | 85 | M16 | 39.5 | 14 | 215 | 200 | 100 | M16 |
| 5 SNU-V | 320   | 260  | 22   | 18 | 185 | 118 | 127   | 365 | 35 | 70 | 65 | 12 | 10 | 242 | 492 | 50 | 100 | 95 | M16 | 44.5 | 14 | 235 | 240 | 130 | M16 |
| 6 SNU-V | 340   | 270  | 25   | 23 | 180 | 127 | 152.4 | 450 | 38 | 75 | 70 | 12 | 10 | 279 | 580 | 58 | 114 | 111 | M20 | 52  | 16 | 274 | 280 | 150 | M20 |
| 7 SNU-V | 400   | 320  | 40   | 27 | 200 | 146 | 177.8 | 524 | 40 | 82 | 79 | 16 | 12 | 311 | 658 | 65 | 130 | 127 | M20 | 58  | 18 | 267 | 320 | 150 | M20 |
| 8 SNU-V | 440   | 360  | 40   | 27 | 220 | 146 | 203.2 | 574 | 45 | 88 | 85 | 16 | 12 | 342 | 710 | 70 | 140 | 137 | M20 | 62.5 | 18 | 312 | 340 | 180 | M24 |
| 9 SNU-V | 490   | 410  | 40   | 27 | 240 | 154 | 228.6 | 635 | 50 | 95 | 92 | 16 | 12 | 375 | 776 | 75 | 145 | 140 | M20 | 67.5 | 20 | 325 | 386 | 180 | M24 |
| 10.5 SNU-V | 560 | 480  | 40   | 33 | 260 | 172 | 266.7 | 720 | 60 | 110 | 110 | 20 | 14 | 450 | 925 | 80 | 150 | 147 | M20 | 71  | 22 | 352 | 440 | 220 | M30 |

### SNU-SM

**SHAFT MOUNTED WORM GEAR UNIT**

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Key & Keyways as per IS 2048. Shaft limits up to 58dia.-k6 and above 58 dia.-m6
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OVERHUNG LOADS:
Whenever a sprocket, gear, sheave or pulley is mounted on the output shaft, a calculation should be made to determine the overhung load in Newtons on the shaft, using the formula:

\[
P = \frac{KW \times 9550 \times K}{N \times R}
\]

Where, P = equivalent overhung load in Newtons
KW = power carried by shaft in Kilo Watts
N = r.p.m. of the shaft
R = pitch radius of sprocket, pinion, sheave or pulley in meter
K = factor

The calculated equivalent overhung load should be compared with the permissible values given in the table.

Maximum permissible overhung loads (Newtons) at centre of wheel shaft extension at 1500 r.p.m. Input Speed.

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* SPECIAL HEAT - TREATED SHAFT IS SUPPLIED

TRB = TAPER ROLLER BEARING
CRB = CYLINDRICAL ROLLER BEARING

23
### Average Weight in Kilograms

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<td>125</td>
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<td>8.5</td>
<td>11.5</td>
<td>14</td>
<td>24</td>
<td>15</td>
<td>25</td>
<td>37</td>
<td>67</td>
<td>43</td>
<td>68</td>
<td>73</td>
</tr>
<tr>
<td>SNU-SM</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td>28</td>
<td>16</td>
<td>28</td>
<td>35</td>
<td>65</td>
<td>41</td>
<td>66</td>
<td>64</td>
<td>80</td>
</tr>
</tbody>
</table>

### Approximate Oil Capacity for SNU Gear Unit in Litres

<table>
<thead>
<tr>
<th>Gear</th>
<th>FILL AND FORGET</th>
<th>2.5</th>
<th>2.5</th>
<th>4</th>
<th>5</th>
<th>9.5</th>
<th>11</th>
<th>16</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNU-U</td>
<td></td>
<td>2.5</td>
<td>2.5</td>
<td>4</td>
<td>5</td>
<td>9.5</td>
<td>11</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>SNU-O</td>
<td></td>
<td>3.8</td>
<td>5.1</td>
<td>8</td>
<td>13.5</td>
<td>18</td>
<td>19</td>
<td>41</td>
<td>45</td>
</tr>
<tr>
<td>SNU-V</td>
<td></td>
<td>3.5</td>
<td>4.0</td>
<td>5.7</td>
<td>8.5</td>
<td>18</td>
<td>20</td>
<td>25</td>
<td>26</td>
</tr>
</tbody>
</table>

### Approximate Oil Capacity for SNU-SM Gear Unit for Different Mounting Positions in Litres

<table>
<thead>
<tr>
<th>Mounting</th>
<th>FILL AND FORGET</th>
<th>4</th>
<th>5</th>
<th>7</th>
<th>10</th>
<th>18</th>
<th>19</th>
<th>41</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>2.5</td>
<td>2.5</td>
<td>4</td>
<td>6</td>
<td>9.5</td>
<td>11</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>2.5</td>
<td>2.5</td>
<td>4</td>
<td>6</td>
<td>9.5</td>
<td>11</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>2.5</td>
<td>2.5</td>
<td>4</td>
<td>6</td>
<td>9.5</td>
<td>11</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>D/E</td>
<td></td>
<td>2.5</td>
<td>2.5</td>
<td>4</td>
<td>6</td>
<td>9.5</td>
<td>11</td>
<td>16</td>
<td>21</td>
</tr>
</tbody>
</table>

* Size 1 3/8 to 3 under ‘FILL and FORGET’ concept. i.e., Factory filled synthetic lubricant for lifetime lubrication
* For higher sizes 3.54 to 17 first filling of oil is not supplied with the gear unit.
* First change of oil should be made after 500 hrs. of operation.
* Subsequent oil change must be made after every 3000 hours of operation. The interval should not exceed 12 months.
RECOMMENDED LUBRICANTS

I MINERAL OIL:

<table>
<thead>
<tr>
<th>Brand</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International Brands</strong></td>
<td></td>
</tr>
<tr>
<td>British Petroleum</td>
<td>CS 320 or GR-XP320</td>
</tr>
<tr>
<td>Castrol</td>
<td>Alpha Zn 320 or Alpha Sp-320 or Tribol 1100/320 TGQA</td>
</tr>
<tr>
<td>Caltex</td>
<td>Meropa 320</td>
</tr>
<tr>
<td>Esso Petroleum</td>
<td>Teresso 320 or Spartan 320</td>
</tr>
<tr>
<td>Fuchs</td>
<td>Renolin CKC 320</td>
</tr>
<tr>
<td>Mobil Oil Co.</td>
<td>Mobil DTE Oil AA or Mobilgear 632</td>
</tr>
<tr>
<td>Shell Co.</td>
<td>Vitera Oil 320 or Omela 320</td>
</tr>
<tr>
<td><strong>Indian Brands</strong></td>
<td></td>
</tr>
<tr>
<td>Bharat Petroleum</td>
<td>Cabol 320</td>
</tr>
<tr>
<td>Balmer Lawrie Fuchs</td>
<td>Renolin CKC 320</td>
</tr>
<tr>
<td>Castrol</td>
<td>Alpha Zn 320 or Alpha Sp-320 or Tribol 1100/320 TGQA</td>
</tr>
<tr>
<td>Gulf</td>
<td>Gulf harmony 320 or Gulf EP 320</td>
</tr>
<tr>
<td>Hindustan Petroleum</td>
<td>Enklo 320 or Parthan EP 320</td>
</tr>
<tr>
<td>Indian Oil</td>
<td>Servomesh SP 320 or Servosystem 320</td>
</tr>
<tr>
<td>Veedol</td>
<td>Avalon 320</td>
</tr>
</tbody>
</table>

Recommended Grease: For low speed of operations.

<table>
<thead>
<tr>
<th>Brand</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castrol</td>
<td>EPL 2</td>
</tr>
<tr>
<td>Indian Oil</td>
<td>SERVOGEM EP 2</td>
</tr>
</tbody>
</table>

II POLYGLYCOL BASED SYNTHETIC LUBRICANT

* USE OF POLYGLYCOL BASED SYNTHETIC LUBRICANT IS ALSO ADVISABLE TO IMPROVE THE TRANSMITTING CAPACITY (RATING) OF GEAR UNITS 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

<table>
<thead>
<tr>
<th>Brand</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castrol</td>
<td>Tribol 800-220</td>
</tr>
<tr>
<td>Fuchs</td>
<td>Renolin PG 220</td>
</tr>
</tbody>
</table>

Special Note: Synthetic Lubricants must not be mixed with any other type of oil. The gear unit must be flushed while changing to or from this lubricant.
MOUNTING POSITIONS AND SHAFT HANDLING:

B – Breather plug
D – Drain plug
L – Oil Level indicator
G – Grease Nipple

Replace (5) by plug for NU-V(X), V(Y) in bottom side
OPTIONAL STANDARD FEATURES

1. **SPRAG Holdbacks for Non-reversible Drives**
   ELECON gear unit can be supplied, fitted with sprag holdback for non-reversible drives it is essential that the load or driven mechanism is prevented from running backwards after the driving motor is stripped e.g. inclined conveyors, elevator, winches etc.

   The sprag holdback is incorporated on the fan end side of the high speed shaft. Visually and dimensionally the ELECON unit is unchanged. The hold back can be provided for either direction of rotation and the same should be specified when ordering.

2. **Base Frame**
   Fabricated steel base frames are also supplied when requires.

3. **Steel Gearcases**
   ELECON gear unit can be supplied with cast or fabricated steel cases for heavy duty application when loadings on the housings are in excess of the capacities of standard cast iron cases.

4. **Wormwheel construction**
   Standard worm wheel comprise phosphorous bronze rims continuous welded to cast iron centres, where the duties demand rims are welded to steel centres.

5. **Slow speed shafts**
   ELECON gear unit can be supplied with special slow speed shafts where required. These include units with special single extension, double extended shafts to the standard dimensions listed in this catalogue or special double ended extension. Additionally single or double ended shaft can be supplied in high tensile steel to heavy duty applications.
PRODUCT SAFETY INFORMATION

General

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

Potential Hazards

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

1. For lifting of gearunit eye-bolts or lifting points (on larger units) should be used.
2. Check the grade and quantity of lubrication before commissioning. Read and carry out all instructions on lubricant plate and in the installation and maintenance manual literature.
3. Installation must be performed in accordance with the manufacturer's instruction and be undertaken by suitably qualified personnel.
4. Ensure the proper maintenance of gearboxes in operation. USE ONLY ELECON SPARES FOR GEARBOXES.
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 not exceed the design values.
7. The driving and the driven equipment must be correctly selected to ensure that the complete installation of the machinery will perform satisfactorily e.g. avoiding system critical speeds, system torsional vibration etc.

ELECON ENGINEERING CO. LTD.
POST BOX # 6, VALLABH VIDYANAGAR 388 120, GUJARAT, INDIA

As improvement in designing are continuously being made, the details and dimensions are subject to alteration without notice.