

**SEISA**



ISO9001-2000

# High Speed Gear



**Quality Driven High Speed Gear  
To The World**

**SEISA Gear, Ltd.**

Subsidiary of Sumitomo Heavy Industries, Ltd.

# N-Series High Speed Gear Units

The N-series high-speed gear units are new products developed by Seisa and based on extensive experience and state-of-the-art technology.

## Technical advantages

- Casing optimally designed using FEA analysis for maximum rigidity and low noise
- Optimally designed for every application
- Cast-iron casing integrated with a bearing housing for excellent vibration damping characteristics and high rigidity
- Enhanced load capacity achieved through adoption of three kind of casings with the same center distance but different bearing spans
- Compatible with installation of any monitoring systems
- The turning device is a fully automatic ON/OFF system incorporating a Buddy box and an SSS clutch.

## High load capacity

- Tooth profile optimization and tooth trace correction
- Highly accurate bearing calculation using an FEM-based plain bearing calculation program based on extensive knowledge and expertise acquired over many years
- Adoption of newly developed multi-lobe bearings with excellent stability and load capacity
- Designed with optimum bearing spans to minimize shaft deformation
- Experience in manufacturing more than 5,000 high-speed gear units

## Design technology

The strength of our gear units can be evaluated according to ISO, DIN, API, AGMA, BS, and other domestic and international standards. The casing and many other parts are standardized to reduce manufacturing lead-time.

The N-series high-speed gear units are available in three different types of casings for applicability to a wide range of specifications, from low to high gear speed ratios.

We have developed new bearings with excellent vibration damping features and established a reliable method of analyzing stability to completely solve shaft and bearing vibration problems.

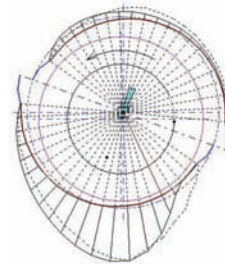
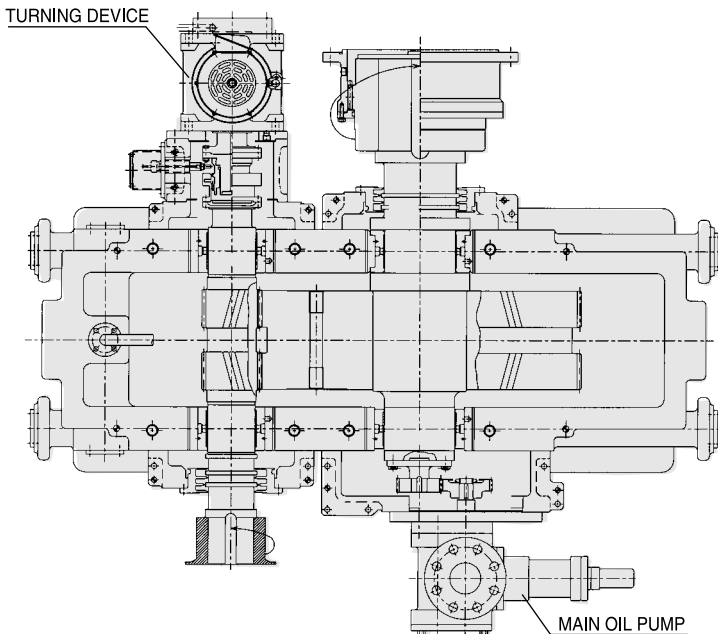
The single side cover design results in easier maintenance of the seals, pump-driven gears, and SSS clutch.



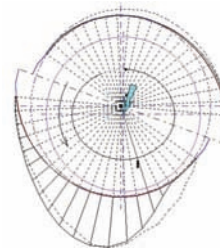
# New Series Now Available with Low Noise, Low Vibration, and High Efficiency!

## N series

New high-speed gear units for power generators and compressors



Newly developed offset cylindrical bearing



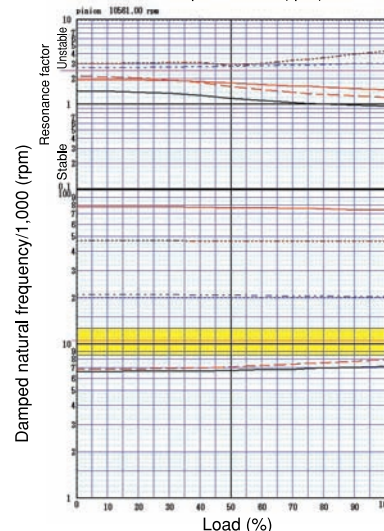
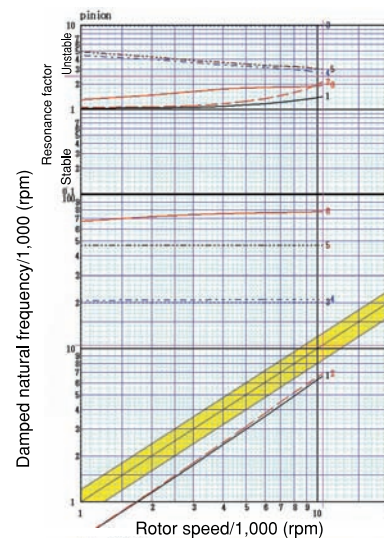
Newly developed four-lobe bearing

### Structural advantages

1. Bearing cap-integrated casing with high rigidity and high-stability bearings with low noise  
Noise ▶ Approx. 83 to 88 dB (A),  
reduced by approx. 5 dB (A) compared to conventional models
2. Optimum bearing spans for higher transmitting horsepower
3. Structural simplification for better maintainability of all measurement instruments

### Enhanced load capacity

1. Development of optimum strength calculation method (for gears and bearings)
2. Form grinding for tooth profile optimization and tooth trace correction
3. Newly developed bearing calculation method for optimum bearing designs
4. Use of optimum bearings matching the specifications
5. Optimum bearing spans for minimum shaft deflection
6. Completely free of vibration problems thanks to the newly developed rotor stability method of analysis
7. Selective use of different types of gears (helical or double helical gears) for higher efficiency
8. As the result,  
efficiency is increased by approx. 0.5% up to 98.5% to 99.0%



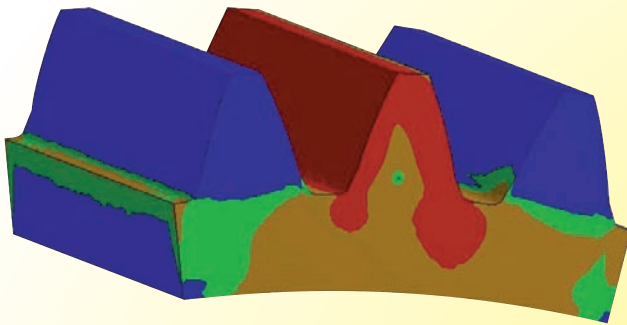
New development of analysis or rotor stability

# Single reduction Parallel shaft

**Compact, High efficiency, Low vibration and experience and state-of-the-art technology**

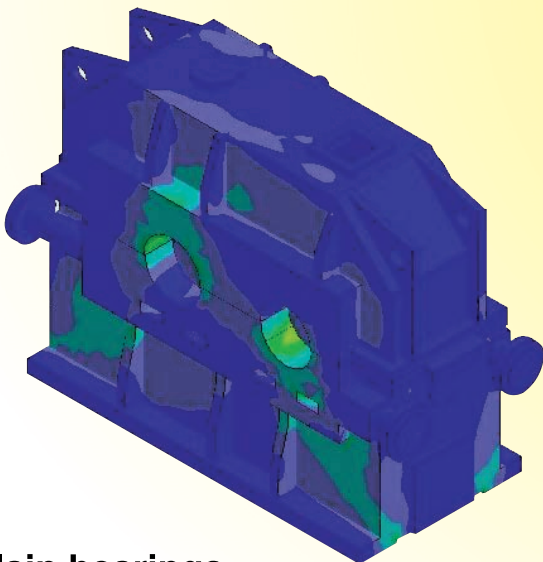
## Turning device

Compact sized with high efficiency.  
Turning device is driven by a Buddy box reducer with automatically controlled SSS clutch



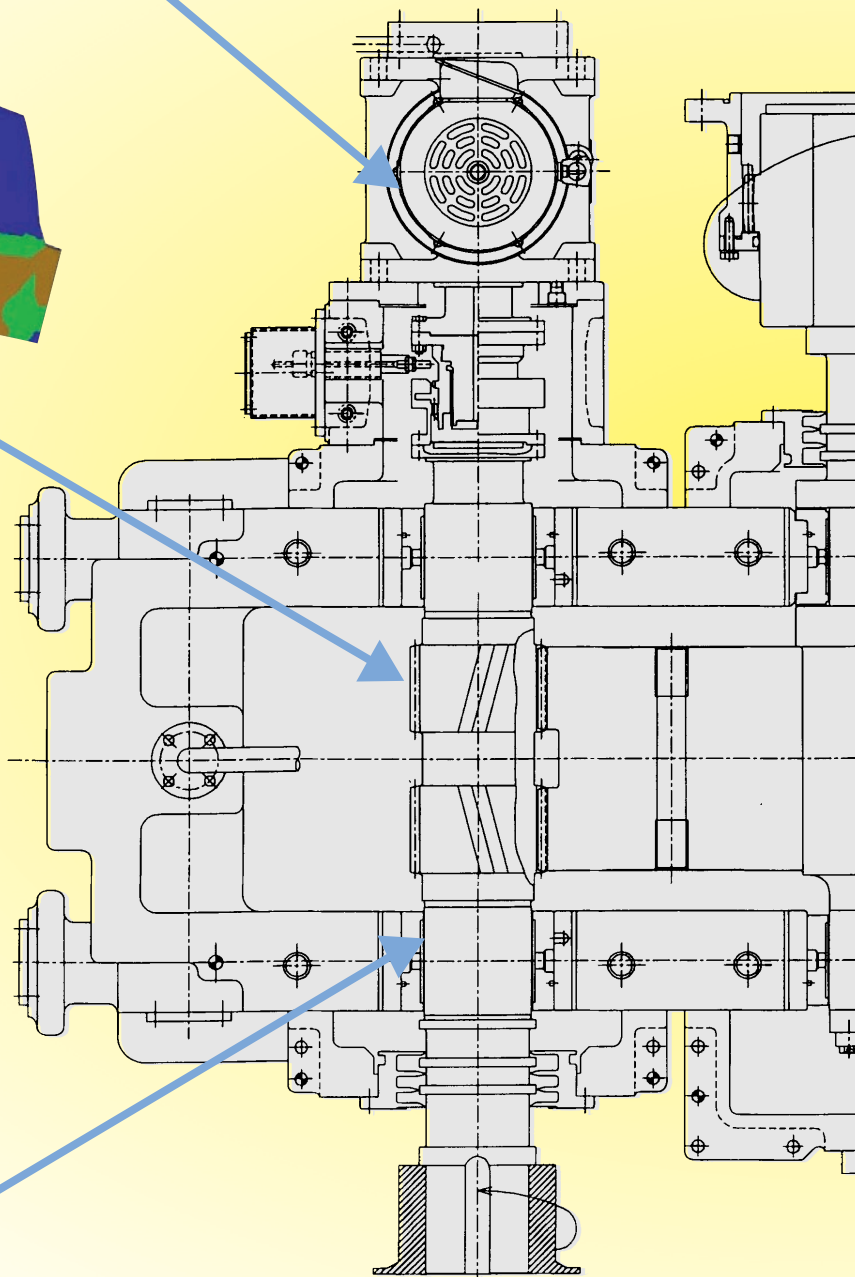
## Pinion

Made of forged special alloy steel.  
The pinion with integrated shaft is dynamically balanced with tooth profile modification and trace correction for optimum performance at high speed



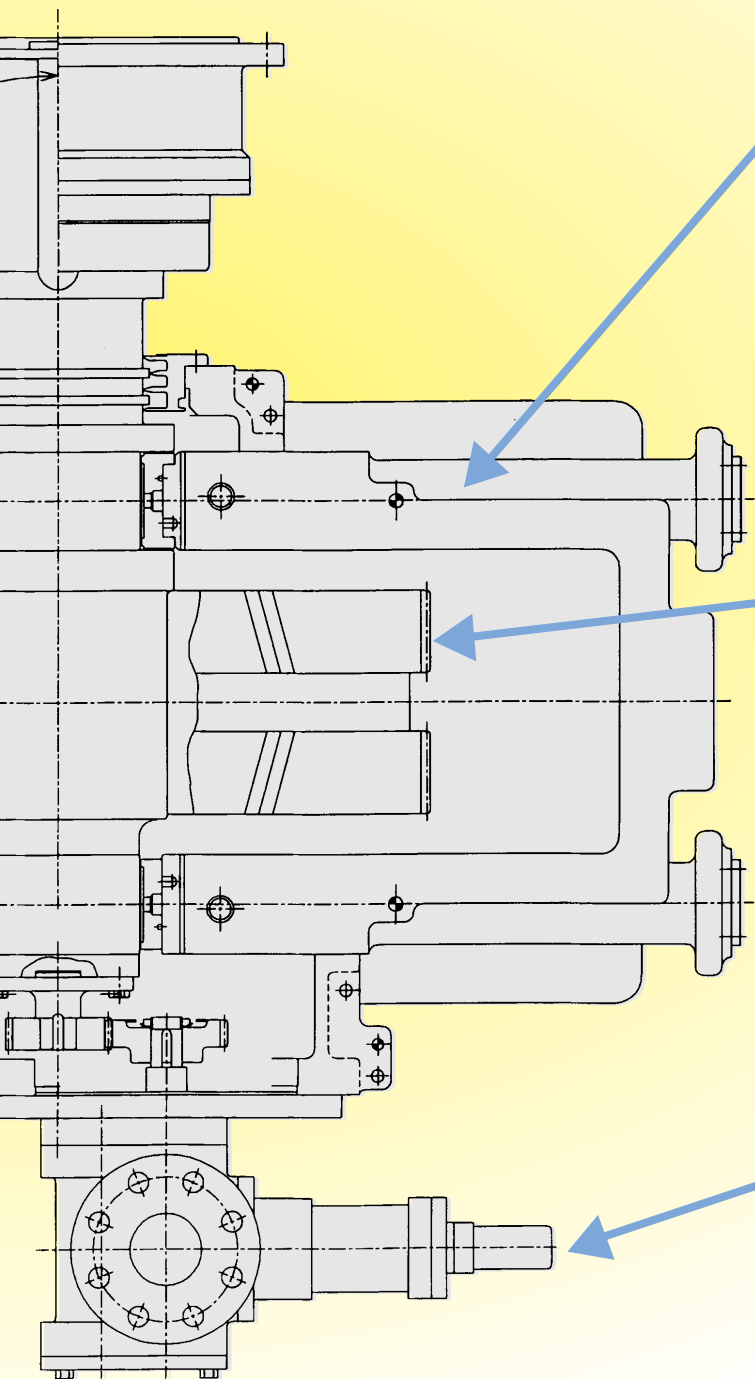
## Plain bearings

Shafts are supported on plain journal bearings with pressurized oil supply.  
Bearing design is newly developed four lobe bearing for stable and high efficiency operation.  
Taper-land thrust bearing with integrated journal bearing



# Cast type High Speed Gearbox

## and noise achieved by our accumulated



### Casing

Rigid structural cast iron casing for reduced noise level.  
Horizontally split casing machined with high accuracy after appropriate stress relief  
The rigidity of the casing is studied with FEM analysis to minimize deformation under stress.

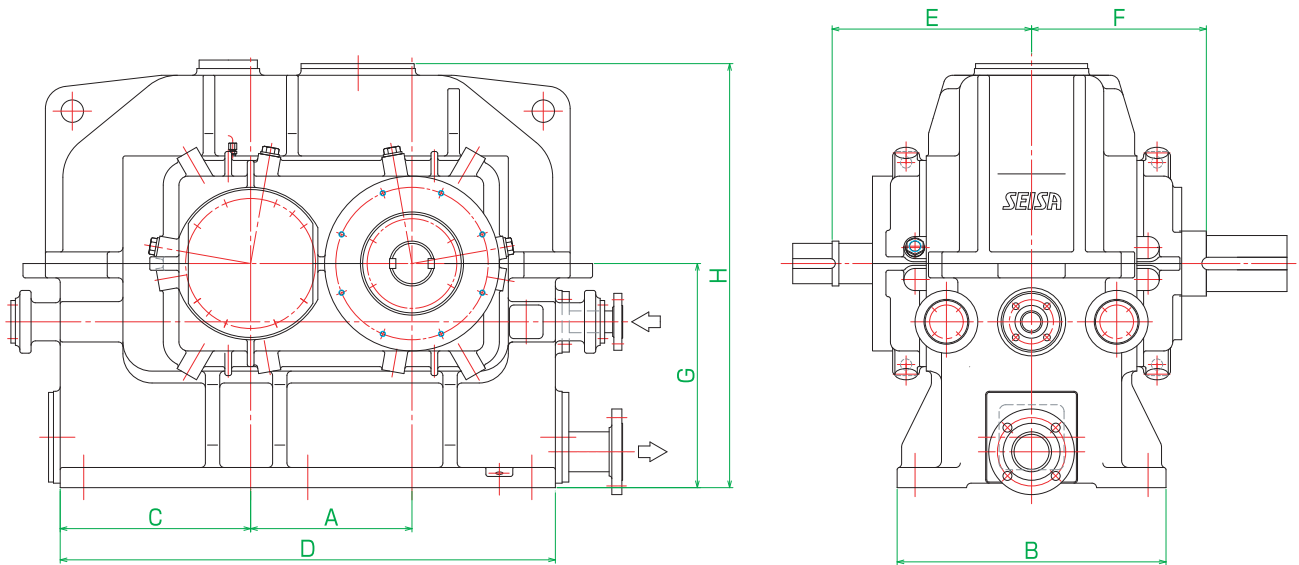
### Low speed gear

Made of forged special alloy steel and fixed to the low speed shaft by interference fitting (keyless) to minimize unbalance.  
Tooth surfaces is carburized and finished by highly accurate grinding.  
Dynamic balancing is also performed after assembling the gear to the shaft.

### Lubrication oil pump

Lubrication oil pump driven by the gear fitted on the low speed shaft

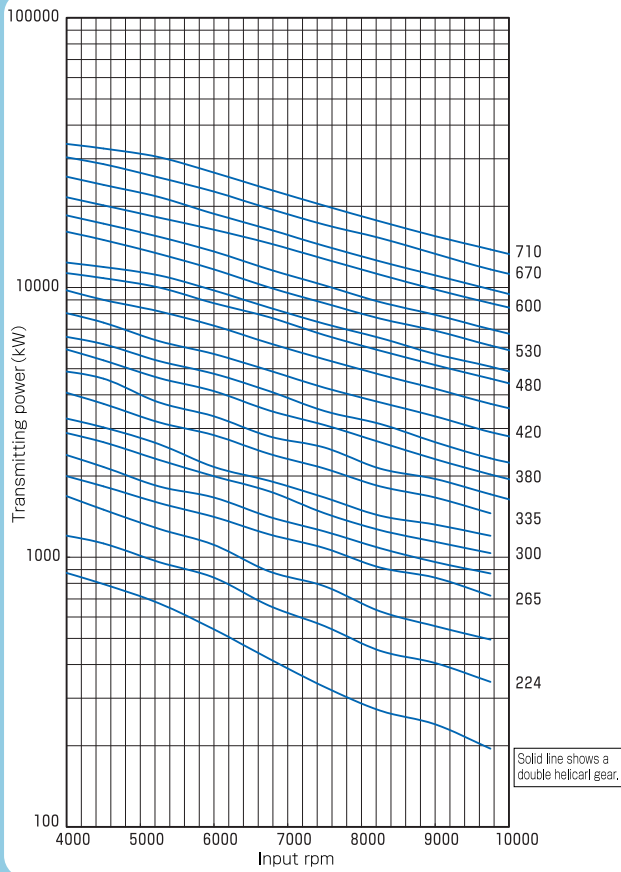
Dimension (mm)



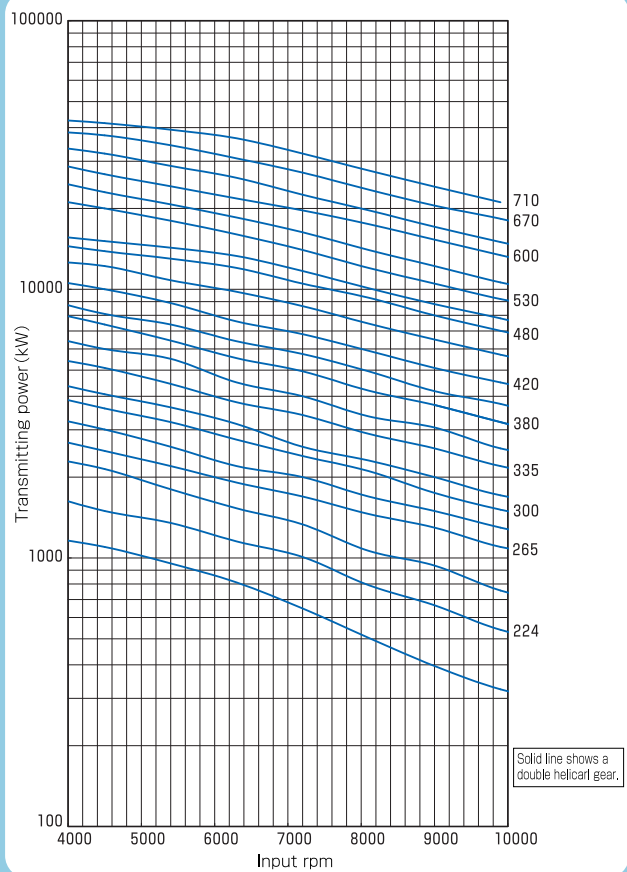
size	A		B	C	D	E	F	G	H	Mass kgs
S 1822	200		425	265	715	290	310	315	600	560
M 1822			500			330	350			620
S 2226	250		470	300	815	325	340	375	710	820
M 2226			550			365	380		690	950
L 2226			620			420	430		615	1180
S 2630	280		475	335	895	340	370	400	775	1020
M 2630			600			390	420		760	1470
L 2630			670			450	460		690	1490
S 3033	320		530	375	995	370	390	450	855	1400
M 3033			630			430	445		825	1790
L 3033			710			485	500		790	1980
S 3338	360		600	425	1105	385	415	500	950	1770
M 3338			710			450	475		925	2210
L 3338			800			510	525		855	2570
S 3842	400	420	630	500	1230	410	440	560	1040	2230
M 3842			730			490	505		1020	2590
L 3842			850			540	555		950	3040
S 4248	450	480	670	550	1350	430	455	630	1160	2820
M 4248			750			510	535		1100	3500
L 4248			900			585	605		1055	4100
S 4853	500	530	710	630	1475	450	480	670	1250	3465
M 4853			850			560	585		1235	4600
L 4853			950			645	665		1160	5270
S 5360	560	600	750	720	1680	490	505	750	1420	4570
M 5360			900			585	605		1380	5860
L 5360			1060			690	710		1310	6820
S 6067	630	670	800	785	1835	510	530	850	1600	6240
M 6067			950			620	650		1560	7690
L 6067			1120			720	745		1470	8930
M 6775	710	750	1060	810	2050	675	700	950	1700	10100
L 6775			1250			775	805		1610	11700
M 7585	800	850	1120	900	2300	710	735	1060	1915	13000
L 7585			1320			865	890		1820	15800



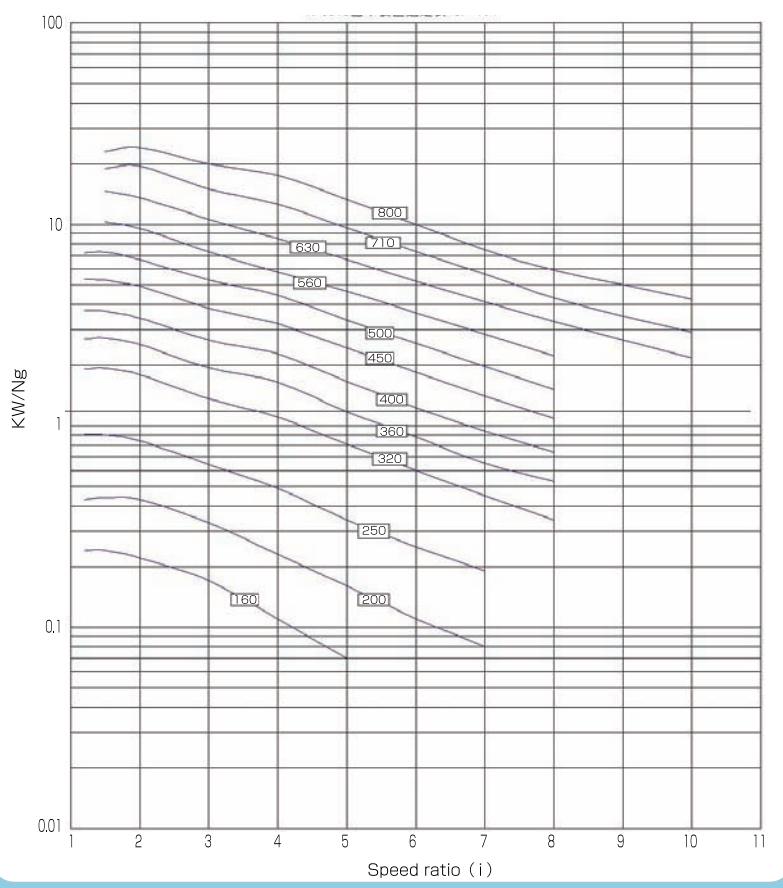
**Transmitting power table for generator at 1500rpm sf=1.1**

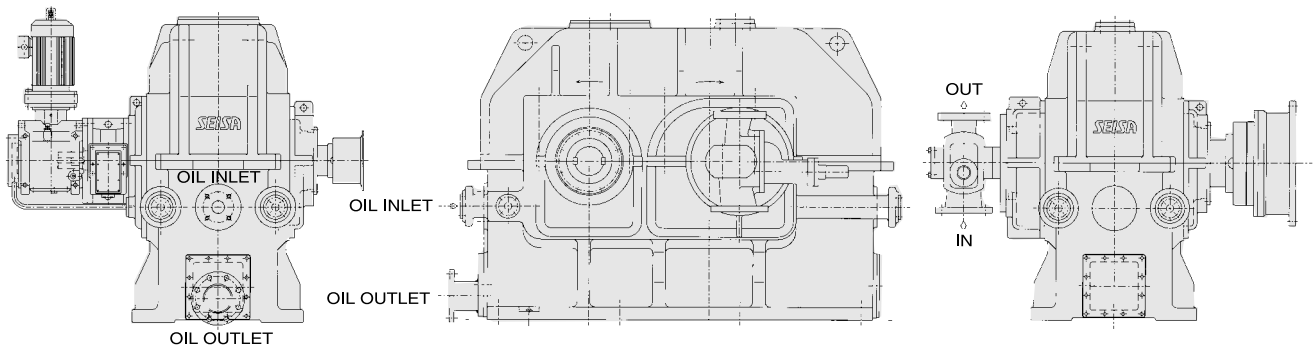


**Transmitting power table for generator at 1800rpm sf=1.1**



**Model selection Diagram with service factor of 1.4 for AP1613 applied**



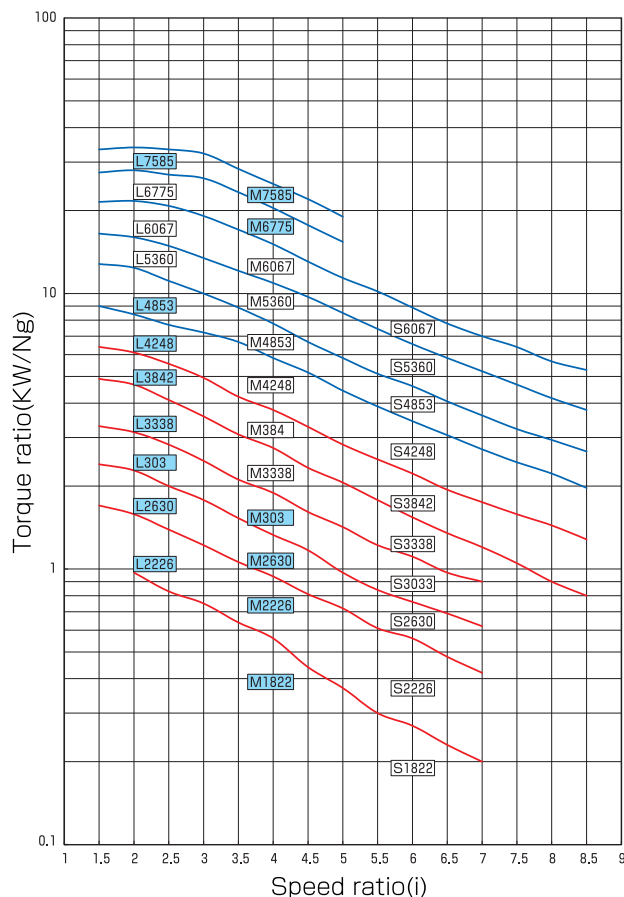


## Nomenclature

**N** **D** **M** **4248** **T**

T : Turning device driven by a motor  
 4248 : Fame size  
 S, M, L : Casing type  
 D: Double Helical  
 H: Single Helical

## Model Selection Diagram with service factor of 1.1



SF=Service factor  
 Torque ratio=KW/Ng  
 KW=Transmitting power kW  
 Ng=Low speed shaft rpm  
 Np=High speed shaft rpm  
 Speed ratio  $i=Np/Ng$

《Example》

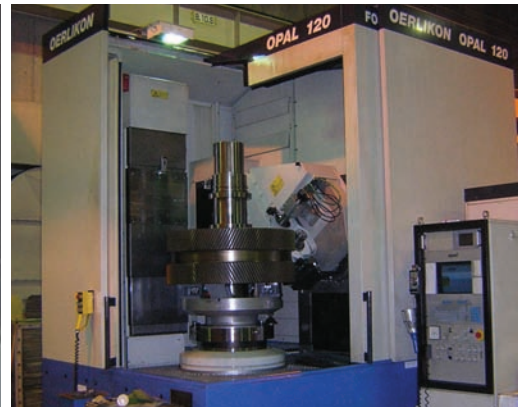
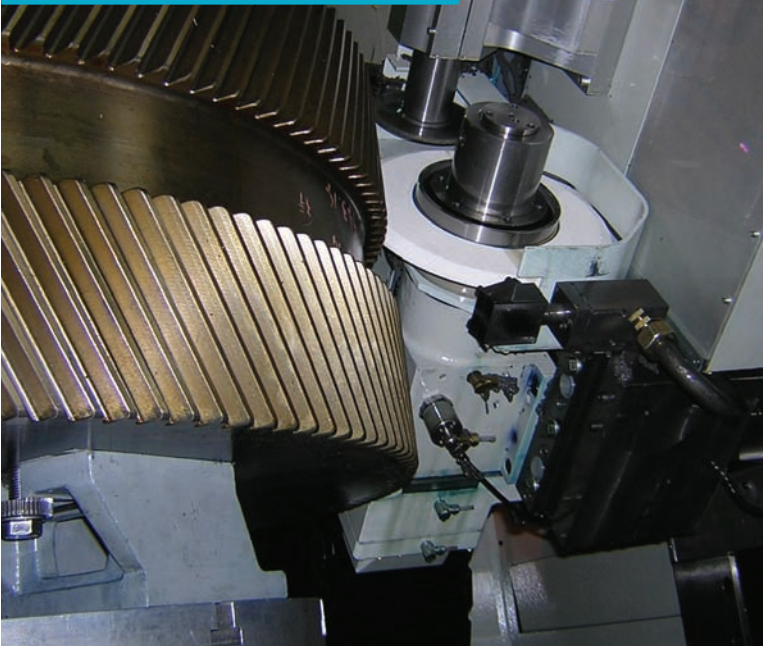
KW=7600 kW  
 SF=1.1  
 Np=7750 rpm  
 Ng=1800 rpm  
 Torque ratio=7600/1800  
 =4.22  
 Speed ratio=7750/1800  
 =4.3  
 Selected model=NDM4248

In case service factor of over 1.1 is required, select the model after calculating the torque ratio by  $KW/Ng \times \text{Service factor} / 1.1$

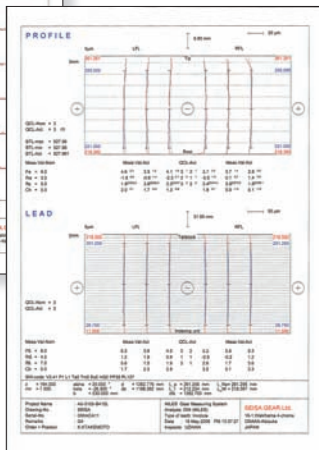
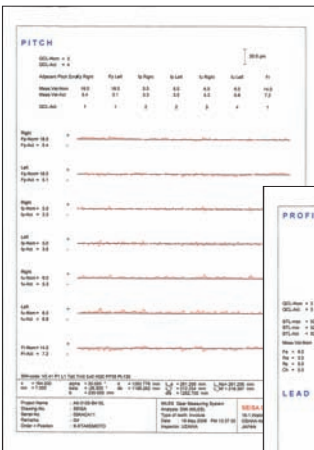


# State-of-the-Art Gear Form Grinding Machines

**OERLIKON/OPAL 120**  
started operation in Feb. 1999.



**NILES/ZP20**  
started operation in May 2006.

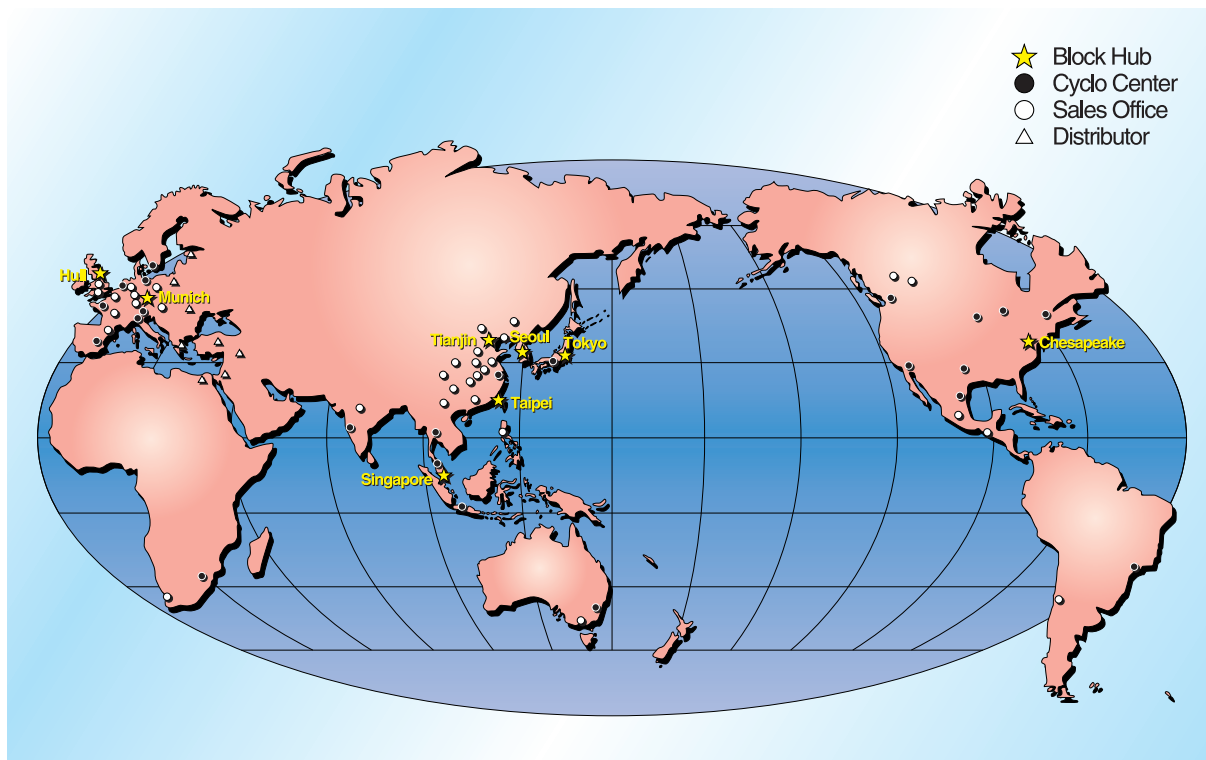


Machining accuracy  
More than half of our gears  
achieved JIS grade 0  
(equivalent to DIN class 1).  
\*Manufacturer's guaranteed  
accuracy = DIN class 3

Machine capacity table	Unit	OPAL 120	NPG-1X500	NPG-2X1000	ZP20
Max. outside diameter	mm	φ1200	φ500	φ1060	φ2000
Minimum root circle diameter	mm	φ50	φ50	φ50	φ320
Max./min. module	mm	MP16/1	MP8/1	MP18/1	MP32/1
Max. facewidth	mm	630	350	500	980
Max. gear weight	kg	3500	-	3000	16000

## Global Net-Work

Please contact your local international sales office for detail information. The Global Net-Work of Sumitomo Heavy Industries is at your service for Seisa gears and other products.



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### Sumitomo (SHI) Cyclo Drive Europe, Ltd. (SCE)

Address: Marfleet, Kingston upon Hull HU9 5RA, United Kingdom Tel: (44)-1482-788022 Fax: (44)-1482-713205

### Sumitomo (SHI) Cyclo Drive Asia Pacific Pte. Ltd. (SCA)

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### Sumitomo (SHI) Cyclo Drive China, Ltd. (SCT)

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