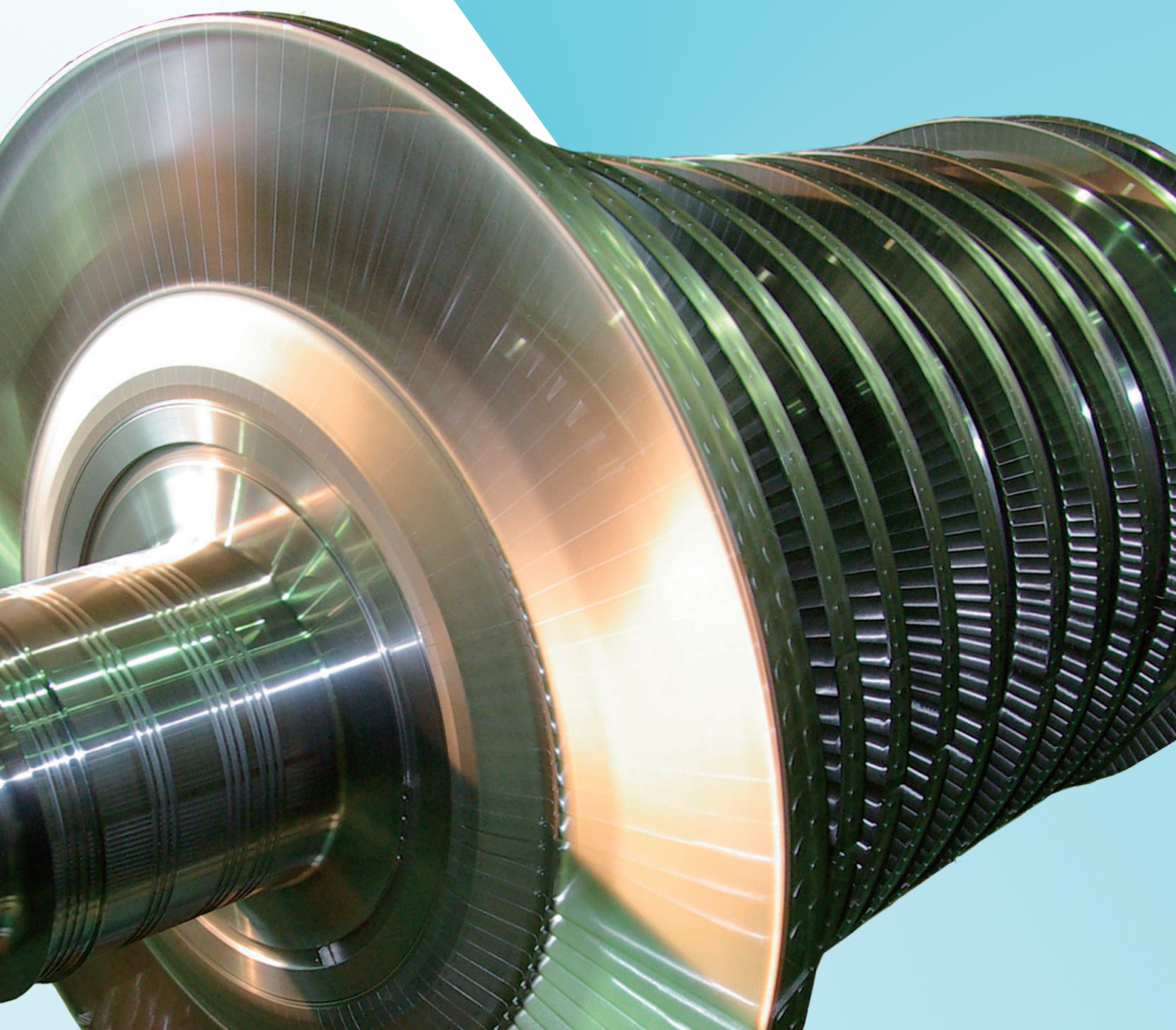


SHINKO

**INDUSTRIAL
STEAM
TURBINES**



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STEAM TURBINES FOR INDUSTRIES

Shinko has designed and manufactured more than 17,000 sets of steam turbines using our company's own technology since we developed our first steam turbine in 1956. We have been supplying our steam turbines to various industries such as petrochemical industries, fertilizer factories, paper mills, sugar factories, incineration plants, commercial ships, and many more.

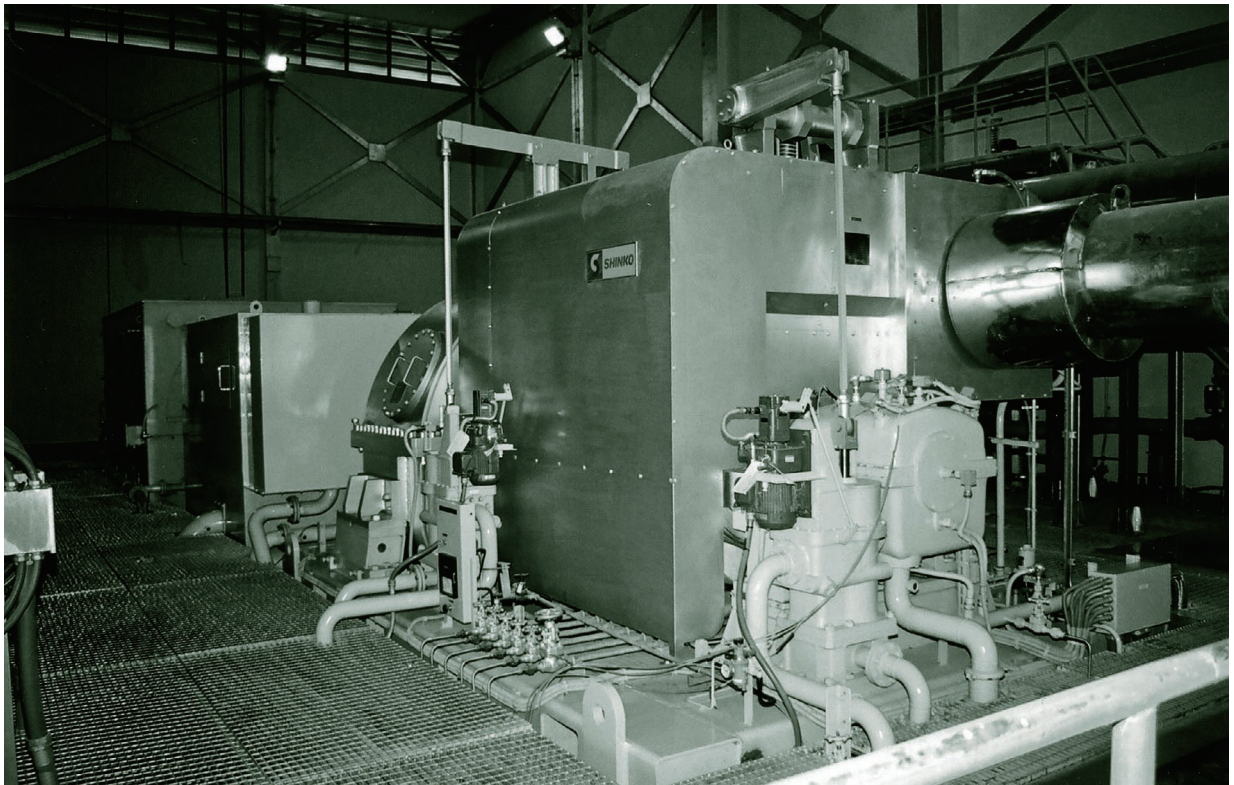
Our design and manufacturing criteria for steam turbines has been focused on high performance and reliability of our products and consequently our customers have come to appreciate the ease of maintenance, the trouble-free operation of our products, as well as economical advantages brought about by our products to our customers.

We have many standardized models of steam turbines having maximum capacity of 30,000 kW output and 12 stages.

In addition to these standard models, the following steam turbines will be available on demand:

- High inlet steam pressure operation
- High exhaust steam pressure operation
- In compliance with API 611 where applicable

All steam turbines manufactured shall be shop-tested under the rated operating conditions to insure performance and running quality of the products.



Generator turbine Rateau 12-stage Extraction-Condensing
Generator 30000 kW Steam $68 \text{ kg/cm}^2\text{G} \times 505^\circ\text{C} \times 0.085 \text{ kg/cm}^2\text{A}$ Speed 4453/1500 rpm

■ PRODUCTION MODELS

The following steam turbines are manufactured as our standard products.
For other specifications, suitable turbines can be designed and manufactured on demand.

● Steam Turbines (a Direct Connection)

MODEL	TYPE	MAX. OUTPUT kW	MAX. SPEED rpm	MAX. EXHAUST MPaG	GLAND SEAL	LUBRICATION SYSTEM	CATALOGUE PAGE
DC	H-Curtis 1-stage	1000	3600	0.7	Carbon P.	OR	7
DD	“	“	“	“	“	“	9
DER	“	“	“	2.5	Labyrinth P.	“	13
DE	“	5000	7500	2.5(600mmHg)	“	FL	15
DL	H-Curtis 2-stage	“	7000	1.0	“	“	17
DL-K	“	3000	“	680mmHg	“	“	19
DV	V-Curtis 1-stage	250	3600	0.5	Carbon P.	SL	21

H : Horizontal OR : Oil ring lubrication FL : Forced lubrication SL : Splash lubrication
V : Vertical

● Steam Turbines with an Independent Reduction Gear

MODEL	TYPE	MAX. OUTPUT kW	MAX. SPEED rpm	MAX. EXHAUST MPaG	GLAND SEAL	LUBRICATION SYSTEM	CATALOGUE PAGE
DDG	H-Curtis 1-stage	1000	2000	0.7	Carbon P.	FL	11
DEG	“	5000	3600	2.5(600mmHg)	Labyrinth P.	“	15
DLG	H-Curtis 2-stage	“	2000	1.0	“	“	17
DLG-K	“	3000	3600	680mmHg	“	“	19
DNG 40	H-Rateau 4-stage	10000	“	2.5	“	“	23
DNG 50	H-Rateau 5-stage	16000	1800	0.5	“	“	27
DNG 60 DNG 60B DNG 60F	H-Rateau 6-stage	10000	3600	710mmHg	“	“	31
DNG 70	H-Rateau 7-stage	30000	1800	0.5	“	“	35
DNG 90 DNG 90B DNG 90F	H-Rateau 9-stage	10000	3600	710mmHg	“	“	39
DNG 120 DNG 120B DNG 120F	H-Rateau 12-stage	30000	1800	“	“	“	43

B : Extraction with external control valve Max. speed shows speed of output shaft.
F : Extraction with internal control valve

● Steam Turbines with an Integral Reduction Gear

MODEL	TYPE	MAX. OUTPUT kW	MAX. SPEED rpm	MAX. EXHAUST MPaG	GLAND SEAL	LUBRICATION SYSTEM	CATALOGUE PAGE
RB	H-Curtis 1-stage	2000	2000	0.5	Labyrinth P.	FL	47
RK	“	3000	“	“	“	“	49
RKR	H-Rateau 3-stage	“	“	0.05-680(mmHg)	“	“	51

INDEPENDENT REDUCTION GEARS

The following reduction gears are manufactured as standard products according to the output and the speed. And, each reduction gear is connected with a turbine on a common base plate.

Item \ Model	TG 35	TG 45	TG 50	TG 55	TG 65
Max. reduction ratio	5.24	7.78	6.96	7.84	8.59
Min. reduction ratio	1.96	1.89	1.97	1.87	1.85
Lubrication system	Forced lubrication				

An LO pump provided on the reduction gear casing is driven through a driving gear from the output shaft so as to supply LO to the turbine, the reduction gear and the driven machine.

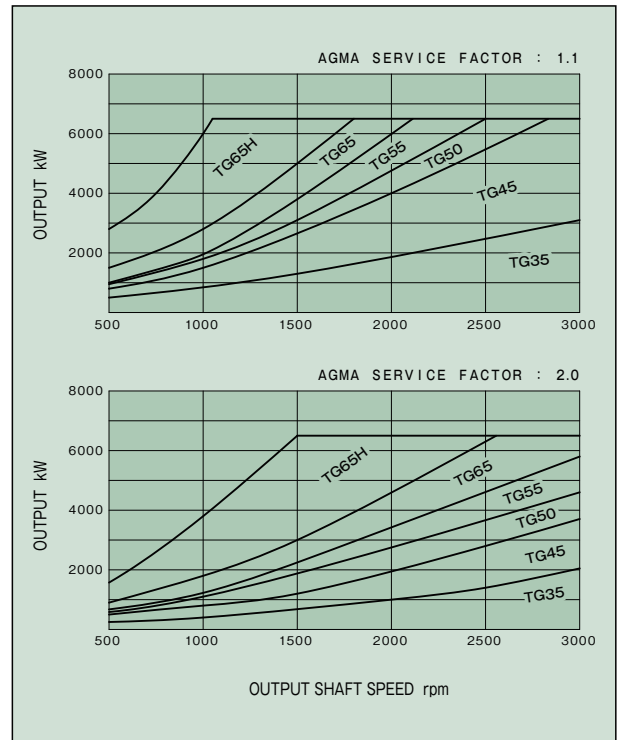
Applications

The service factor is specified according to the different requirements of the plant and driven unit used, for example.

F.D.F.	1.6	Cane cutter	1.6
I.D.F.	2.0	Suger mill	1.7
C.W. pump	1.7	Compressor (max.)	2.0
B.F.W. pump	2.0	Generator(continuous)	1.1
General pump	1.5		

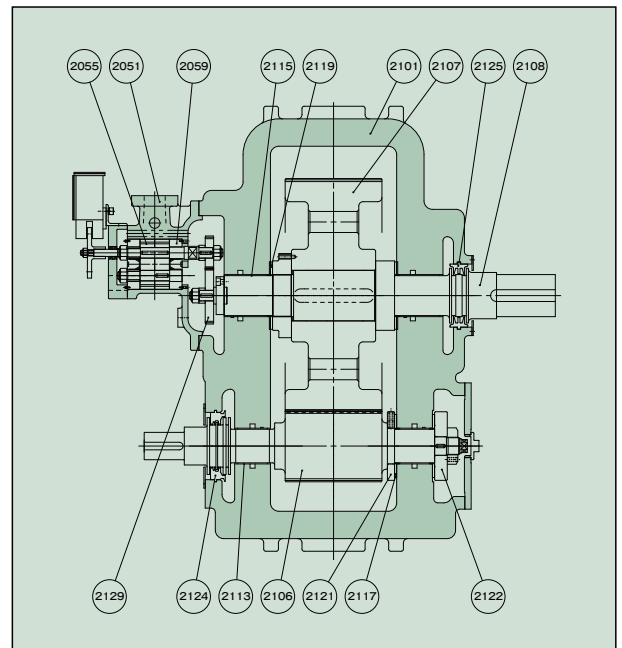
The figure on the right shows the relationship between the output shaft speed and maximum kW transmitted in the case that the service factors are 1.1 and 2.0.

In case the service factor is different, the real value is in the inverse proportion to the value obtained from the figure on the right.



Design & Materials

PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1UNIT
		NAME	JIS	
2051	LO PUMP CASING	CAST IRON	FC200	1
2055	PUMPING GEAR	CARBON STEEL	S45C	1SET
2059	BEARING METAL	LEAD BRONZE	CAC604	1SET
2101	REDUCTION GEAR CASING	CAST IRON	FC200	1
2106	PINION	Ni-Cr-Mo STEEL	SNCM 439	1
2107	WHEEL	FORGED STEEL	SF640B	1
2108	OUTPUT SHAFT	"	SF450A	1
2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
2115	BEARING METAL	"	"	1SET
2117	THRUST BEARING METAL	"	"	1SET
2119	THRUST BEARING METAL	"	"	1SET
2121	THRUST COLLAR	CARBON STEEL	S35C	1
2122	THRUST COLLAR	"	"	1
2124	OIL GUARD	CAST IRON or BRONZE	FC200 or CAC406	1
2125	OIL GUARD	CAST IRON	FC200	1
2129	DRIVING GEAR	CARBON STEEL	S35C	1SET



■ LUBRICATION SYSTEMS

● Oil Ring

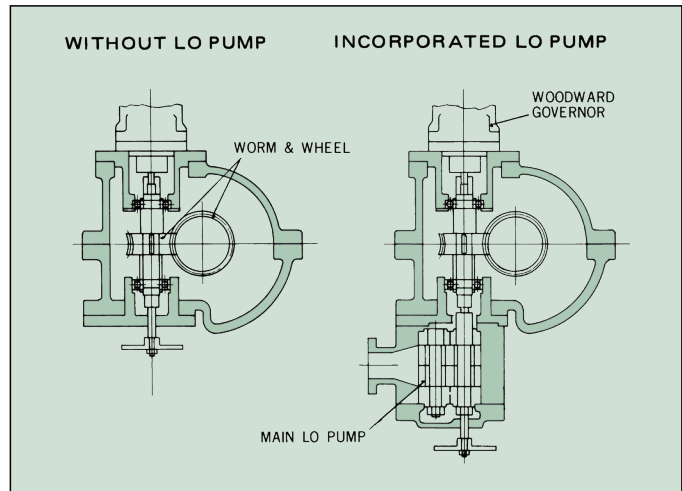
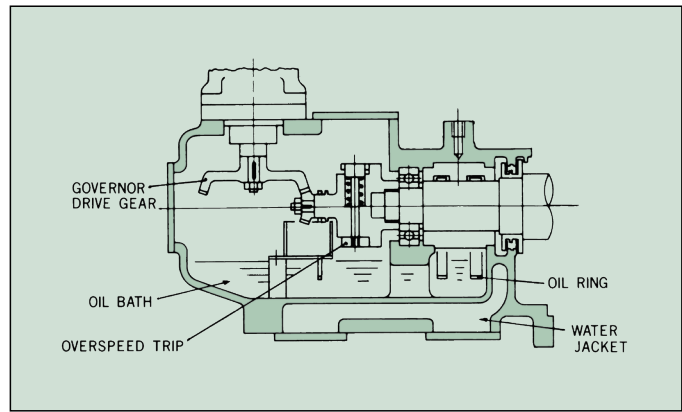
Bearings for the DC or DD turbines are lubricated by oil rings rotating in the oil bath employed inside the bearing housing where a water jacket leading cooling water to cool the LO is built in.

● Splash Lubrication

For the DV turbines, the upper bearings are lubricated by oil supplied by the oil pump which is incorporated in the governor. And, the lower bearings are lubricated by the oil splasher which rotates in the LO sump with a water jacket built in.

● Forced Lubrication System

The other turbines are provided with a forced lubrication system having the main LO pump driven through both the worm and the worm wheel from the turbine shaft. However, in the case that turbine is equipped with a reduction gear, the main LO pump is positioned on the reduction gear casing, but is not incorporated into the turbine shaft.



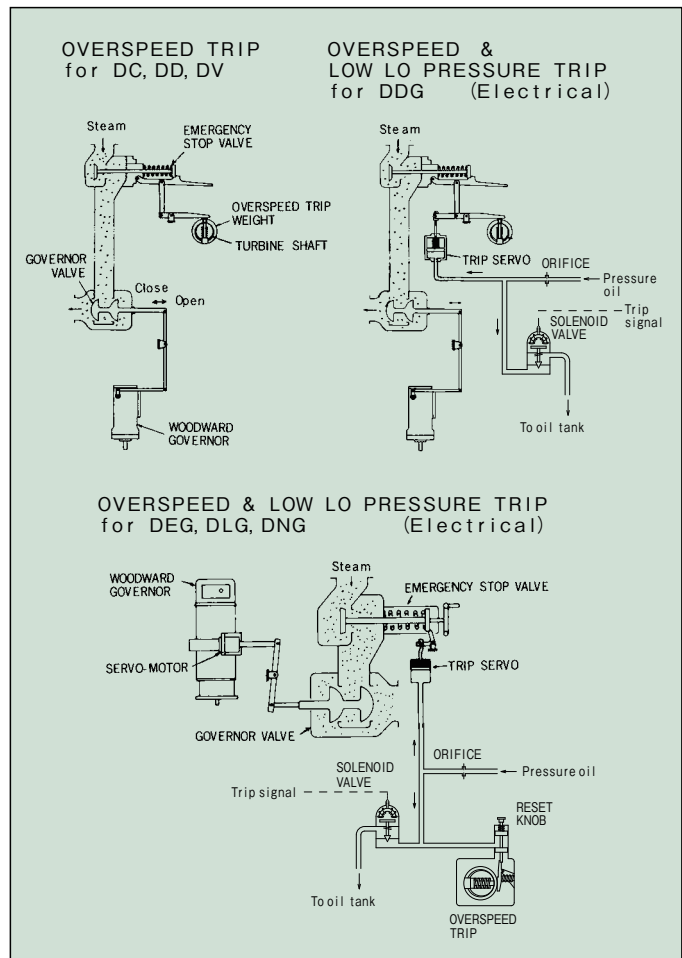
■ EMERGENCY TRIP DEVICES

● Over Speed Trip

An oversepeed trip is located at the end of the turbine shaft. When the turbine speed reaches a preset speed, the over speed weight comes out and hits the trip lever, and the latch is disconnected. In consequence, the emergency fire stop valve is closed to stop the turbine.

● Low LO Pressure Trip

For turbines with a force lubrication system, a low LO pressure trip is installed. When the LO pressure decreases to a preset pressure, the solenoid valve is actuated by the trip signal and the oil is released to force the trip servo to disconnect the latch. In consequence, the emergency stop valve is closed to stop the turbine.



GOVERNORS

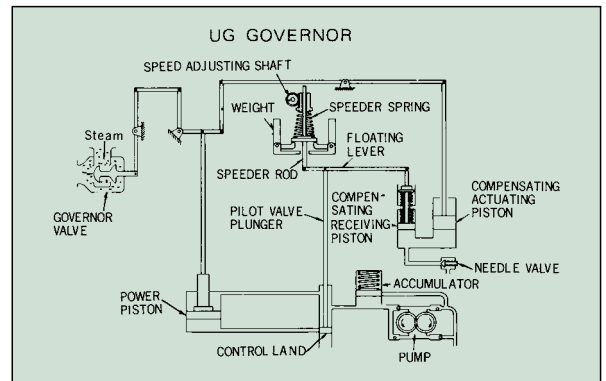
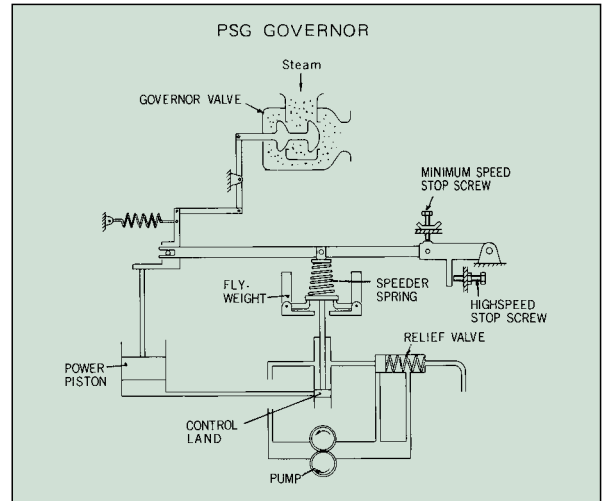
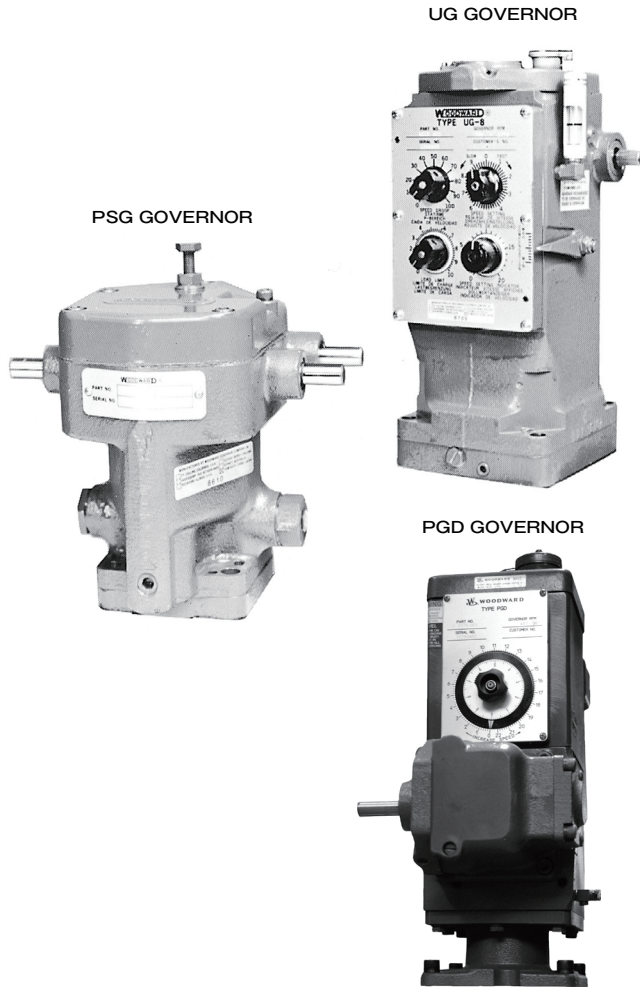
The SHINKO turbine is fitted with a mechanical hydraulic governor (Woodward SG, PSG, UG or PG) or an electrical-hydraulic governor (Woodward DG). Every turbine in compliance with API standard is fitted with NEMA class A or D for 611.

NEMA SM-23 STANDARD

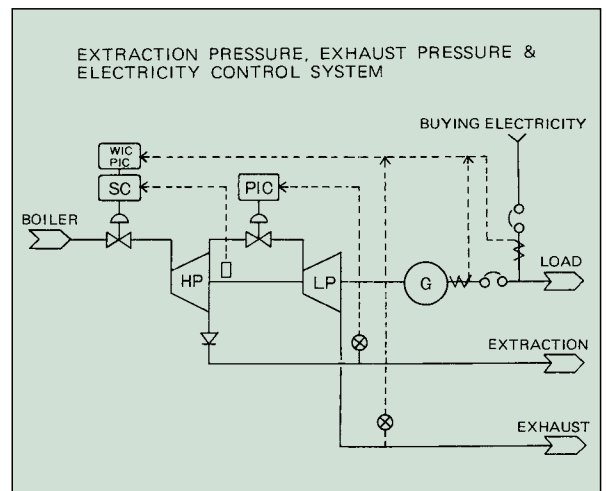
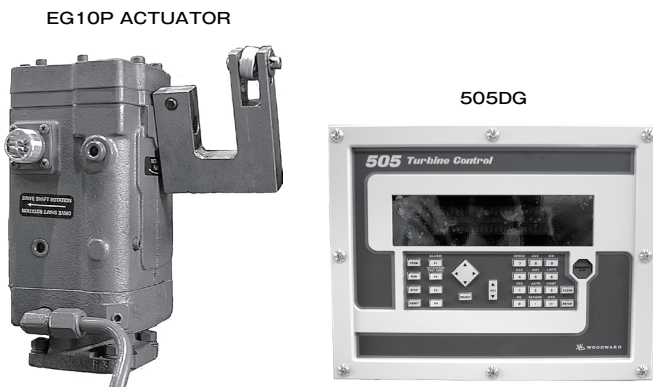
Unit %

CLASS	MAX.SPEED REGULATION	MAX.SPEED VARIATION	MAX.SPEED RISE	W.W GOVERNOR APPLICABLE
A	10	±0.75	13	SG
B	6	±0.5	7	
C	4	±0.25	7	
D	0.5	±0.25	7	PSG, UG, PG

Mechanical-Hydraulic Governor



Electrical-Hydraulic Governor



■ LUBRICANTS

Several kinds of lubricants are used for the turbines as follows:

Lubricating oil for turbine bearing	:	ISO (International Standard Organization)	VG32 or 68
Lubricating oil for reduction gear	:	〃	〃
Operating oil for Woodward governor	:	〃	VG68
Gear oil for gear coupling	:	〃	VG680

Manufacturer's lubricant brand names are shown in the following table:

NAME OF COMPANY	LUBRICATING OIL (VG32)	LUBRICATING OIL (VG68)	GEAR OIL (VG680)
IDEMITSU KOSAN	DAPHNE TURBINE OIL NO.32	DAPHNE TURBINE OIL NO.68	DAPHNE SUPER GEAR OIL 680
EXXONMOBIL	MOBILDTE OIL LIGHT	MOBILDTE OIL HEAVY MEDIUM	MOBIL GEAR 600XP680 MOBIL SHC 636
JXTG NIPPON OIL & ENERGY	FBK TURBINE 32	FBK TURBINE 68	BONNOC M 680
CALTEX OIL(FAMM)	REGAL R&O 32	REGAL R&O 68	MEROPA LUBRICANT 680
KYGNUS SEKIYU	KYGNUS TURBINE OIL S32	KYGNUS TURBINE OIL S68	—
GULF OIL	GULF HARMONY 32	GULFSEA TURBINE OIL 68	GULFSEA GEAR OIL 680
BP OIL	PERFECTO T32	PERFECTO T68	GR-XP 680
TEXACO OIL (FAMM)	REGAL R&O 32	REGAL R&O 68	MEROPA LUBRICANT 680
CASTROL	PERFECTO T32	PERFECTO T68	CASTROL ALPHA SP 680
COSMO OIL	COSMO TURBINE SUPER 32	COSMO TURBINE SUPER 68	COSMO GEAR SE 680
SHOWA SHELL OIL SHELL OIL	TURBO OIL T32	TURBO OIL T68	Omala S2G 680
TOTAL	PRESLIA 32	PRESLIA 68	CARTER EP 680
CHEVRON(FAMM)	REGAL R&O 32	REGAL R&O 68	MEROPA LUBRICANT 680
AGIP	AGIP OTE 32	AGIP OTE 68	AGIP BLASIA 680
LUKOIL MARINE	RENOLIN ETERNA 32	RENOLIN ETERNA 68	RENOLIN CLP 680

■ STANDARD ACCESSORIES

Speed regulating governor
 Emergency stop valve (except the model R turbines)
 Steam strainer
 Overspeed trip
 Low LO pressure trip
 Exhaust sentinel valve
 Drain valve
 Pressure gauge with gauge board
 Root valve for pressure gauge
 Thermometer for bearing
 Insulation and lagging

Curtis single-stage STEAM TURBINES

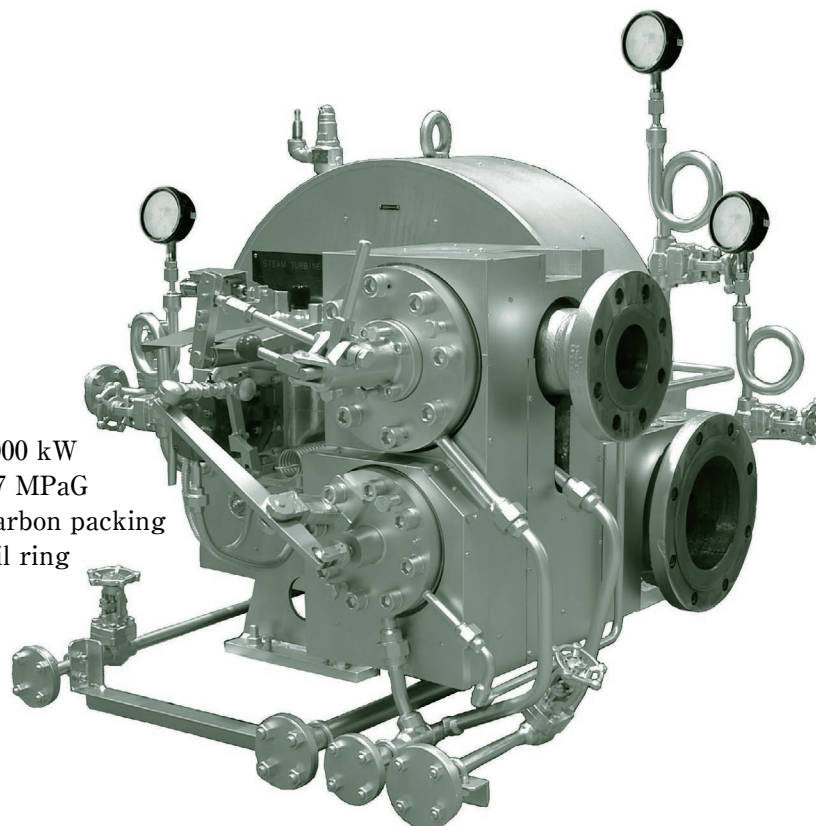
SHINKO DC

■ APPLICATIONS

Boiler feed pumps
Forced draft fans
Induced draft fans
Pumps and others

■ SPECIFICATIONS

Max. output 1000 kW
Max. exhaust steam pressure .. 0.7 MPaG
Gland seal Carbon packing
Lubrication system Oil ring



■ GENERAL CHARACTERISTICS

Item	Model	DC 42	DC 61	DC 81	DC 42A	DC 61A	DC 81A
Max. output	(kW)	350	600	1000	350	600	1000
Max. speed	(rpm)	3600					
Direction of rotation		CW facing turbine toward driven machine					
Max. inlet steam pressure	(MPaG)	6.2					
Max. inlet steam temperature	(°C)	410					
Max. exhaust steam pressure	(MPaG)	0.5			0.7		
Steam inlet bore	(mm)	80	100	150	80	100	150
Steam exhaust bore	(mm)	150	200	300	150	200	300
Lubrication system		Oil ring					
LO required	(ℓ)	2.1	2.1	3.3	2.1	2.1	3.3
Cooling water required	(m ³ /h)	1					
Governor		Woodward SG or PSG					
Hand nozzle valve		Available according to requirement					
Weight (turbine proper)	(kg)	540	1000	1250	550	1010	1300

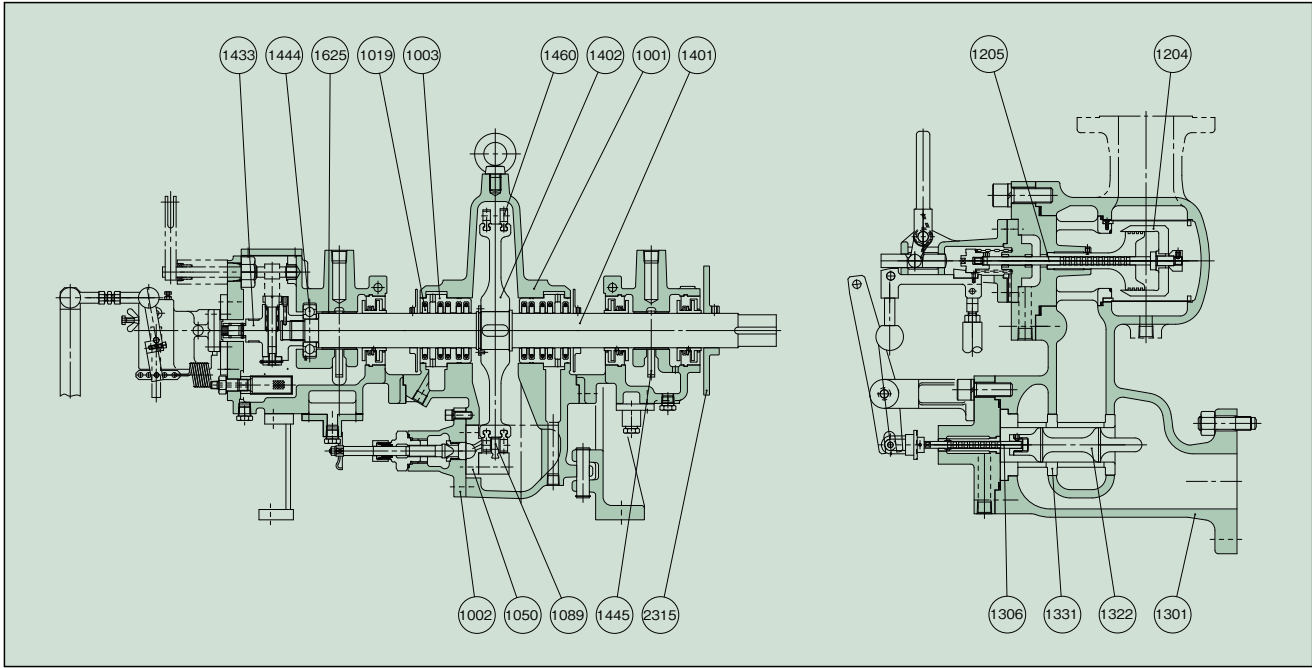
● Governor

Max. speed regulation 2.5%(SG), 0.5%(PSG)
Max. speed variation ±0.75%(SG), ±0.25%(PSG)
Max. speed rise 13%(SG), 7%(PSG)
Speed range +5 ~ -25%
NEMA class A(SG), D(PSG)

● Emergency Trip Device

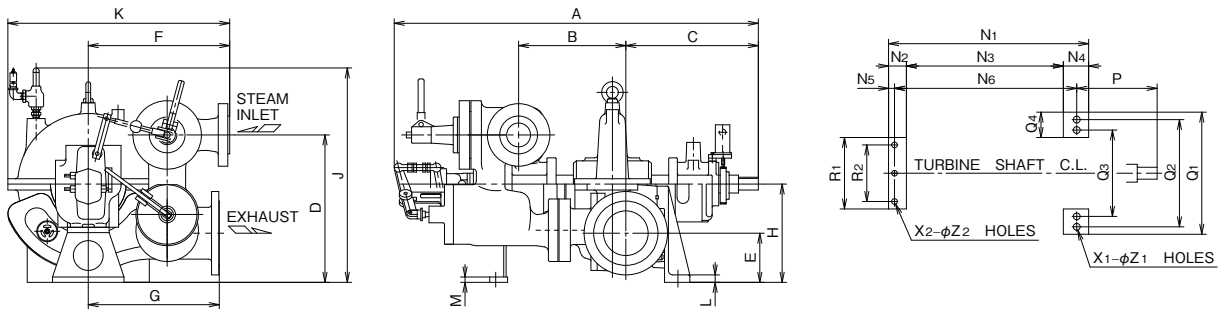
Actuation of overspeed trip ... 115% of rated speed

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1
1002	STEAM CHEST	"	"	1	1331	LINER	"	"	1
1003	PACKING CASE	BRONZE	CAC407	1SET	1401	TURBINE SHAFT	CARBON STEEL (With Cr-PLATING)	S45C	1
1019	CARBON PACKING	SPECIAL CARBON		10SETS	1402	DISC ROTOR	CARBON STEEL	"	1
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1433	OVERSPEED TRIP SHAFT	"	S35C	1
1089	STATIONARY BLADE	"	"	1SET	1444	BALL BEARING	SPECIAL STEEL	SUJ2	1
1204	EMERGENCY VALVE	"	SUS420J2	1	1445	OIL RING	BRONZE	CAC407	2
1205	VALVE STEM	STELLITE		1	1460	MOVING BLADE	STAINLESS STEEL	SUS403	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1306	VALVE STEM	STELLITE		1	2315	TACHOMETER ROTOR	STEEL WITH MAGNETS	SS400	1SET

OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	P	Q ₁	Q ₂	Q ₃	Q ₄	R ₁	R ₂	X ₁	X ₂	Z ₁	Z ₂
DC 42(A)	1230	360	445	495	165	475	440	330	720	745	25	18	672	60	527	85	20	612	270	410	360	—	65	240	190	2	2	23	19
DC 61(A)	1265	395	455	575	260	620	560	460	960	1010	30	18	778	60	588	130	20	690	210	610	540	—	100	300	200	2	2	25	19
DC 81(A)	1420	440	520	850	300	670	725	650	1297	1220	40	30	892.5	75	617.5	200	37.5	780	225	850	760	520	200	560	460	4	3	27	23

SHINKO IND.LTD.

Curtis single-stage STEAM TURBINES

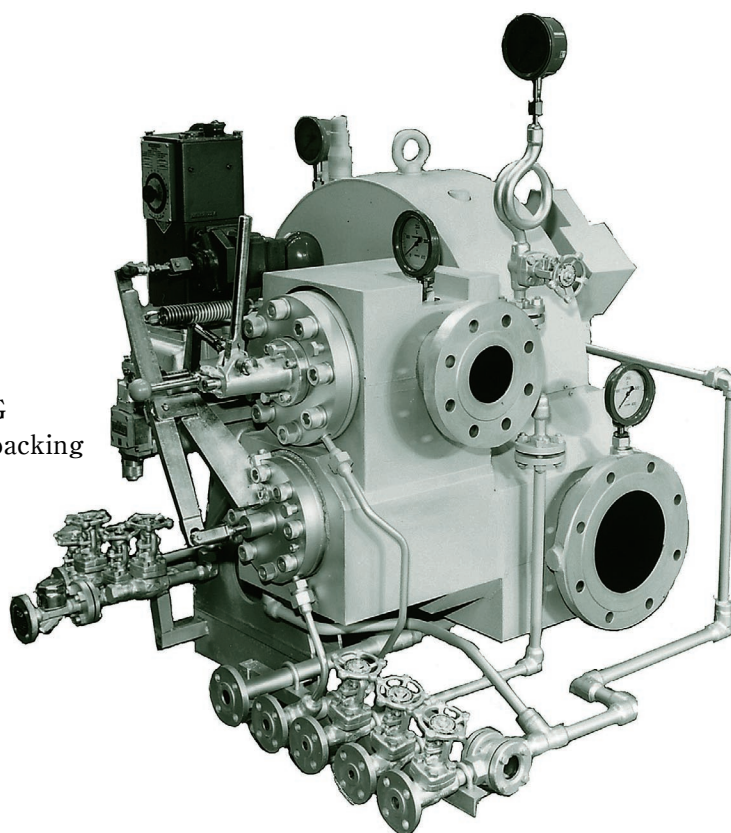
SHINKO DD

■ APPLICATIONS

Boiler feed pumps
Forced draft fans
Induced draft fans
Pumps and others

■ SPECIFICATIONS

Max. output 1000 kW
Max. exhaust steam pressure .. 0.7 MPaG
Gland seal Carbon packing
Lubrication system Oil ring



■ GENERAL CHARACTERISTICS

Item	Model	DD 42	DD 61	DD 81	DD 42A	DD 61A	DD 81A
Max. output	(kW)	350	600	1000	350	600	1000
Max. speed	(rpm)	3600					
Direction of rotation		CW facing turbine toward driven machine					
Max. inlet steam pressure	(MPaG)	6.2					
Max. inlet steam temperature	(°C)	410					
Max. exhaust steam pressure	(MPaG)	0.5			0.7		
Steam inlet bore	(mm)	80	100	150	80	100	150
Steam exhaust bore	(mm)	150	200	300	150	200	300
Lubrication system		Oil ring					
LO required	(ℓ)	2.7	2.7	3.6	2.7	2.7	3.6
Cooling water required	(m ³ /h)	1					
Governor		Woodward UG or PG					
Hand nozzle valve		Available according to requirement					
Weight (turbine proper)	(kg)	620	1100	1350	630	1110	1400

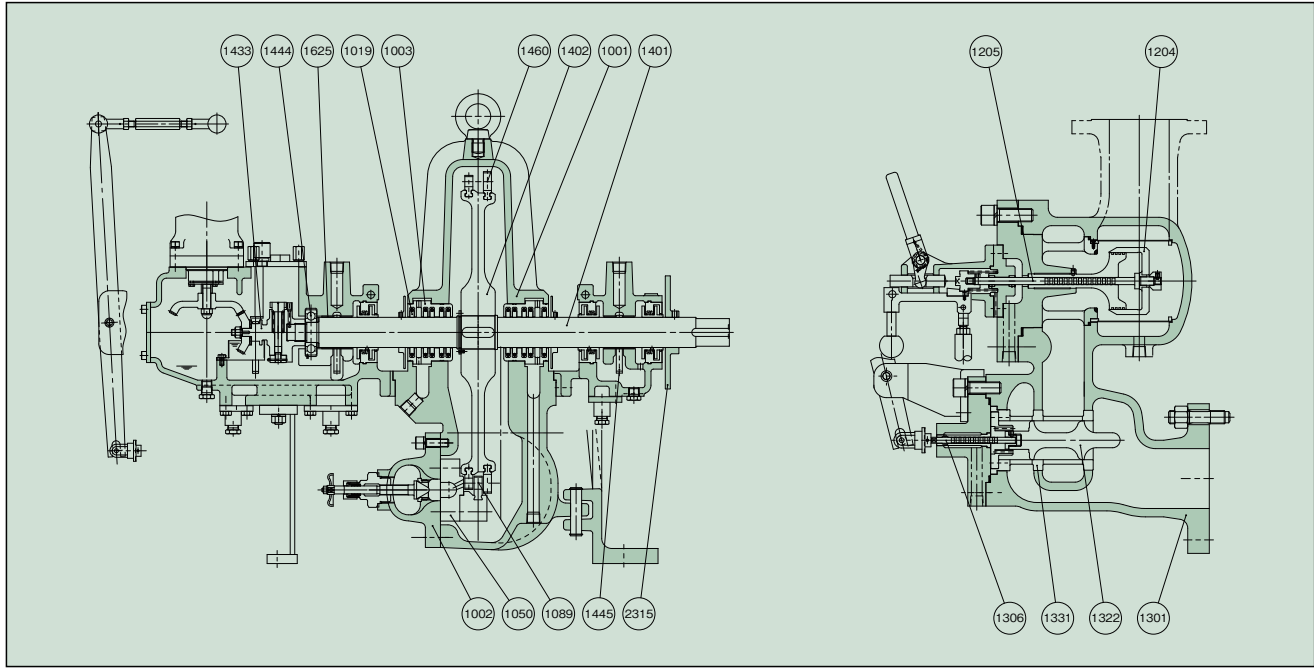
● Governor

Max. speed regulation 0.5%
Max. speed variation ±0.25%
Max. speed rise 7%
Speed range +5 ~ -30%
NEMA class D

● Emergency Trip Device

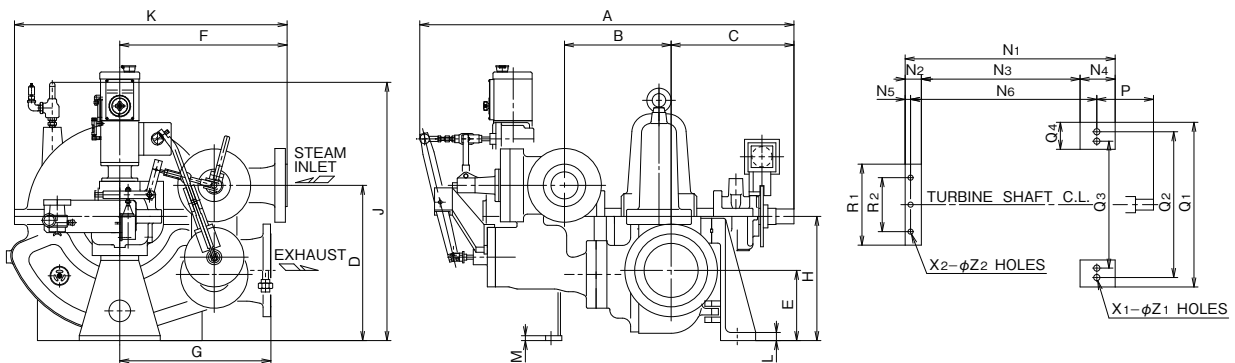
Actuation of overspeed trip 115% of rated speed

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1
1002	STEAM CHEST	"	"	1	1331	LINER	"	"	1
1003	PACKING CASE	BRONZE	CAC407	1SET	1401	TURBINE SHAFT	CARBON STEEL (With Cr-PLATING)	S45C	1
1019	CARBON PACKING	SPECIAL CARBON		10SETS	1402	DISC ROTOR	CARBON STEEL	"	1
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1433	OVERSPEED TRIP SHAFT	"	S35C	1
1089	STATIONARY BLADE	"	"	1SET	1444	BALL BEARING	SPECIAL STEEL	SUJ2	1
1204	EMERGENCY VALVE	"	SUS420J2	1	1445	OIL RING	BRONZE	CAC407	2
1205	VALVE STEM	STELLITE		1	1460	MOVING BLADE	STAINLESS STEEL	SUS403	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1306	VALVE STEM	STELLITE		1	2315	TACHOMETER ROTOR	STEEL WITH MAGNETS	SS400	1SET

OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	P	Q ₁	Q ₂	Q ₃	Q ₄	R ₁	R ₂	X ₁	X ₂	Z ₁	Z ₂
DD 42(A)	1213	360	445	495	165	475	440	330	720	745	25	18	672	60	527	85	20	612	270	410	360	—	65	240	190	2	2	23	19
DD 61(A)	1390	395	455	575	260	620	560	460	957	1010	30	18	778	60	588	130	20	690	210	610	540	—	100	300	200	2	2	25	19
DD 81(A)	1420	440	520	850	300	670	725	650	1300	1220	40	30	892.5	75	617.5	200	37.5	780	225	850	760	520	200	560	460	4	3	27	23

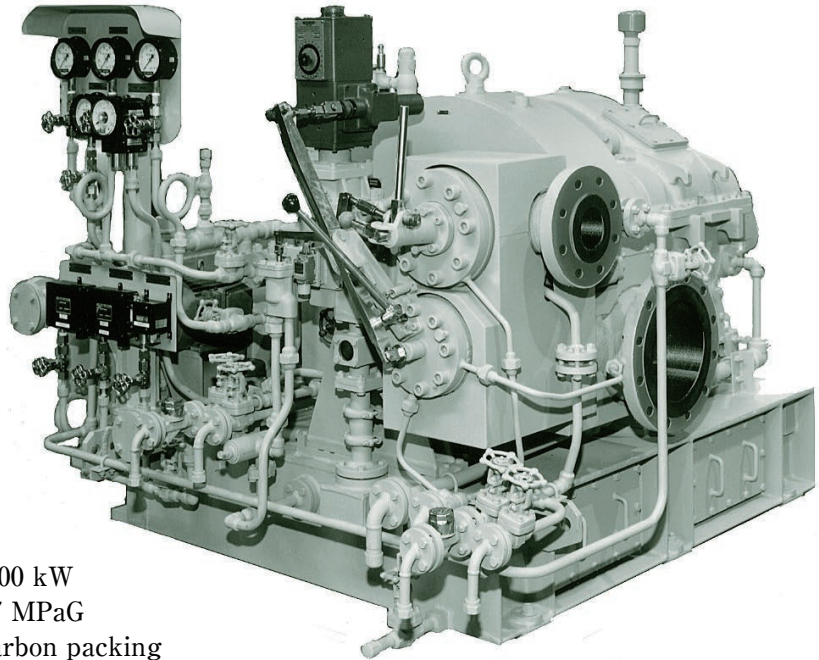
SHINKO IND.LTD.

Curtis single-stage with reduction gear STEAM TURBINES



■ APPLICATIONS

- Sugar mills
- Cane knives
- Small generators
- Pumps
- Force draft fans
- Induced draft fans
- Others



■ SPECIFICATIONS

- Max. output 1000 kW
- Max. exhaust steam pressure .. 0.7 MPaG
- Gland seal Carbon packing
- Lubrication system Forced lubrication

■ GENERAL CHARACTERISTICS

Item	Model	DDG 42	DDG 61	DDG 81	DDG 42A	DDG 61A	DDG 81A
Max. output	(kW)	350	600	1000	350	600	1000
Max. speed (turbine shaft)	(rpm)	5000	5000	4200	5000	5000	4200
Direction of rotation (output shaft)		CCW facing turbine toward driven machine					
Max. inlet steam pressure	(MPaG)	6.2					
Max. inlet steam temperature	(°C)	510					
Max. exhaust steam pressure	(MPaG)	0.5			0.7		
Steam inlet bore	(mm)	80	100	150	80	100	150
Steam exhaust bore	(mm)	150	200	300	150	200	300
Lubrication system		Forced lubrication					
Main LO pump	(m ³ /h x MPaG)	6.0 ~ 9.0 x 0.2					
Aux. LO pump	(m ³ /h x MPaG)	6.0 ~ 9.0 x 0.2					
Governor		Woodward UG or PG					
Hand nozzle valve		Available according to requirement					
Min. weight (with baseplate)	(kg)	2800	3450	4600	2810	3460	4650

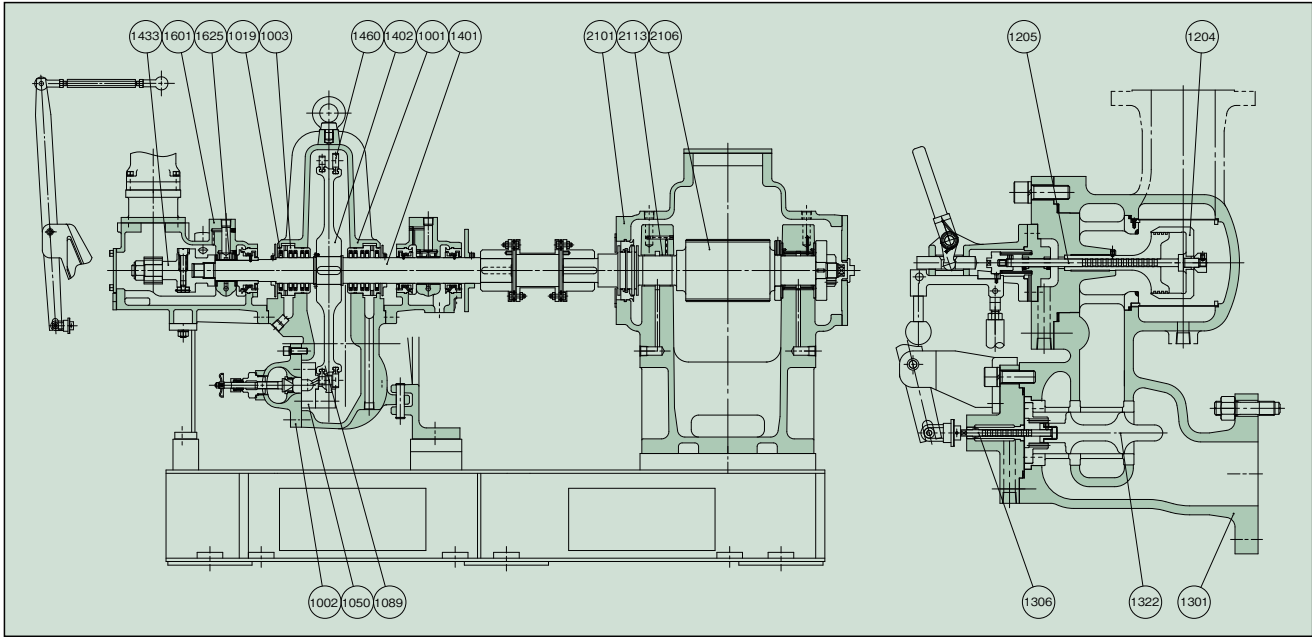
● Governor

- Max. speed regulation 0.5%
- Max. speed variation ±0.25%
- Max. speed rise 7%
- Speed range +5 ~ -30%
- NEMA class D

● Emergency Trip Device

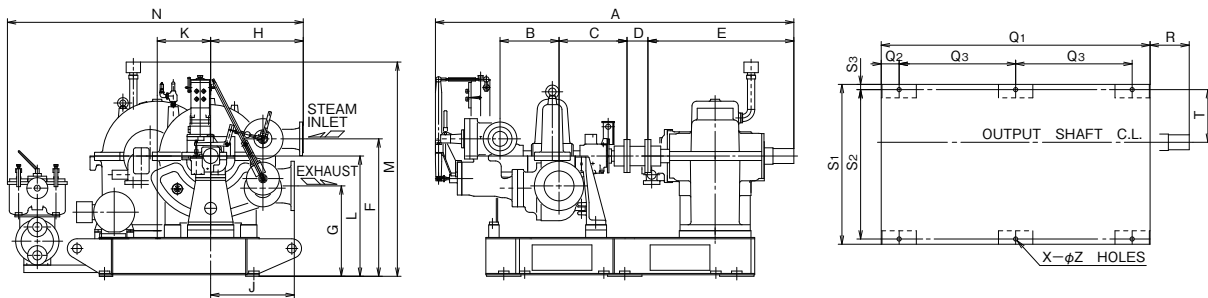
- Actuation of overspeed trip 115% of rated speed
- Actuation of low LO pressure trip Below 0.05 MPaG

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1
1002	STEAM CHEST	"	"	1	1401	TURBINE SHAFT	CARBON STEEL (With Cr-PLATING)	S45C	1
1003	PACKING CASE	BRONZE	CAC407	1SET	1402	DISC ROTOR	CARBON STEEL	"	1
1019	CARBON PACKING	SPECIAL CARBON		10SETS	1433	OVERSPEED TRIP SHAFT	"	S35C	1
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1460	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1089	STATIONARY BLADE	"	"	1SET	1601	BEARING HOUSING	CAST IRON	FC200	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1205	VALVE STEM	STELLITE		1	2101	REDUCTION GEAR CASING	CAST IRON	FC200	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	2106	PINION	Ni-Cr-Mo STEEL	SNCM439	1
1306	VALVE STEM	STELLITE		1	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET

OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	Q ₁	Q ₂	Q ₃	R	S ₁	S ₂	S ₃	T	X	Z
DDG 42(A)-35	2115	360	445	100	815	820	490	475	440	342	655	1215	1490	1600	100	700	235	930	870	30	343	6	28
DDG 61(A)-35	2400	395	455	140	977	920	605	620	560	357	805	1434	1980	1800	120	780	262	1070	1000	35	353	6	28
-45	2435	395	455	152	1000	935	620	620	560	489	820	1555	2230	1810	120	785	287	1330	1260	35	481	6	28
DDG 81(A)-35	2600	440	520	178	977	1150	600	670	725	357	950	1600	2390	1950	120	855	275	1450	1380	35	623	6	28
-50	2740	440	520	152	1145	1150	600	670	725	513	950	1720	2630	2030	120	895	335	1620	1550	35	637	6	28

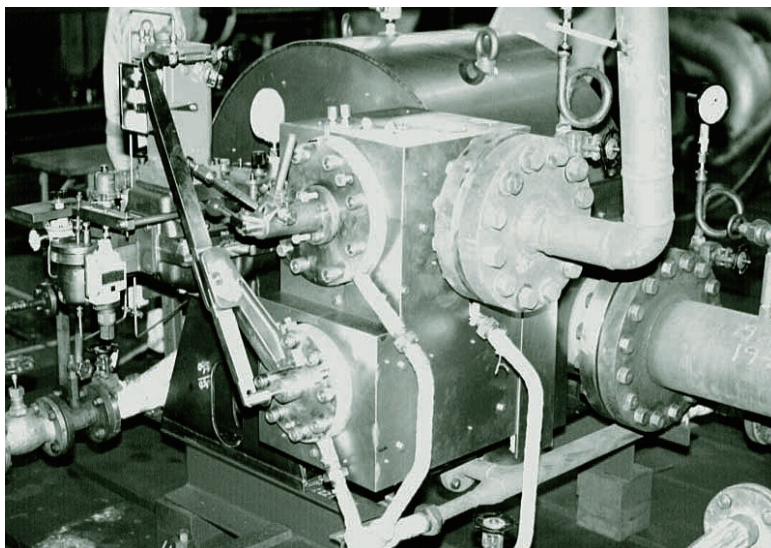
SHINKO IND.LTD.

Curtis single-stage STEAM TURBINES

SHINKO DER

■ APPLICATIONS

Boiler feed pumps
Forced draft fans
Induced draft fans
Pumps and others



■ SPECIFICATIONS

Max. output 1000 kW
Max. exhaust steam pressure .. 2.5 MPaG
Gland seal Labyrinth packing
Lubrication system Oil ring

■ GENERAL CHARACTERISTICS

Item	Model	DER 61A
Max. output	(kW)	1000
Max. speed	(rpm)	3600
Direction of rotation		CW facing turbine toward driven machine
Max. inlet steam pressure	(MPaG)	6.2
Max. inlet steam temperature	(°C)	510
Max. exhaust steam pressure	(MPaG)	2.5
Steam inlet bore	(mm)	150
Steam exhaust bore	(mm)	250
Lubrication system		Oil ring
LO required	(ℓ)	3.5
Cooling water required	(m ³ /h)	1
Governor		Woodward UG or PG
Hand nozzle valve		Available according to requirement
Weight (turbine proper)	(kg)	1700

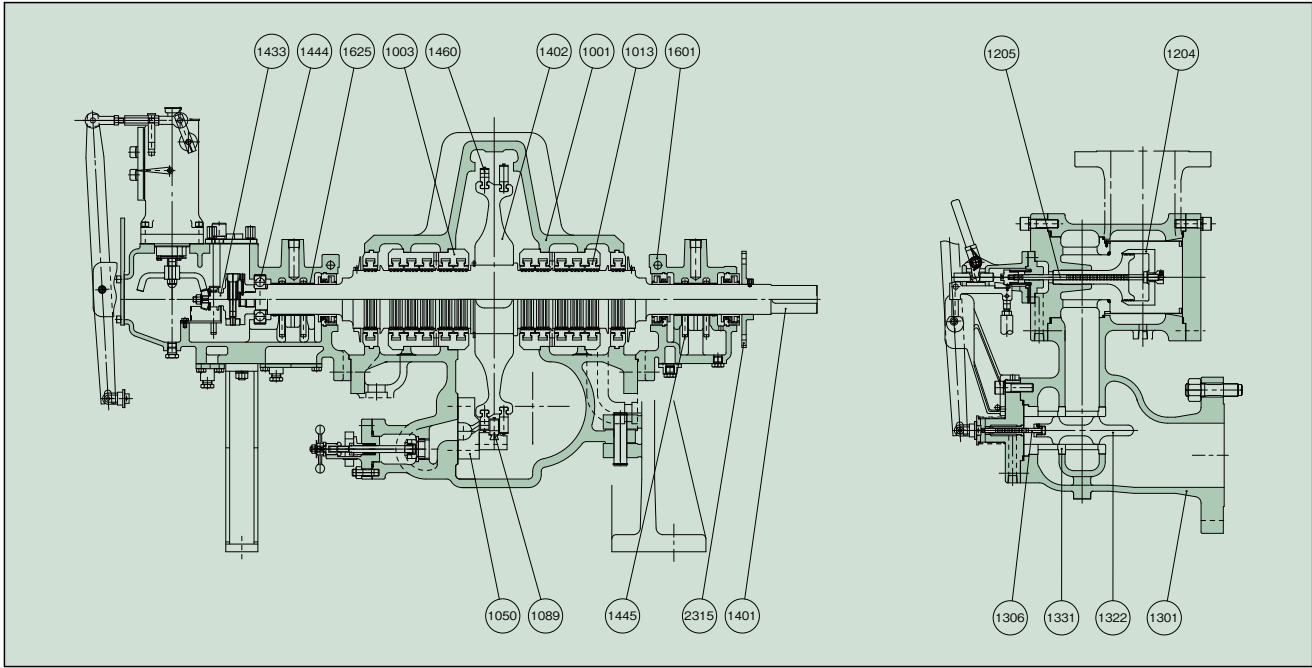
● Governor

Max. speed regulation 0.5%
Max. speed variation ±0.25%
Max. speed rise 7%
Speed range +5 ~ -30%
NEMA class D

● Emergency Trip Device

Actuation of overspeed trip 115% of rated speed

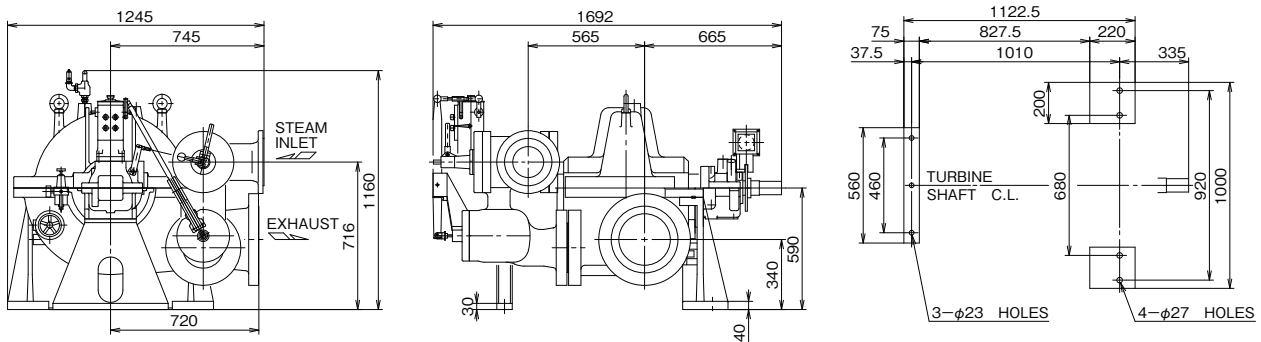
DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1331	LINER	STAINLESS STEEL	SUS420J2	1
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1401	TURBINE SHAFT	FORGED STEEL	SF540A	1
1013	LABYRINTH PACKING	Ni-Br CASTING		12SETS	1402	DISC ROTOR	"	"	1
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1089	STATIONARY BLADE	"	"	1SET	1444	BALL BEARING	SPECIAL STEEL	SUJ2	1
1204	EMERGENCY VALVE	"	SUS420J2	1	1445	OIL RING	BRONZE	CAC407	4
1205	VALVE STEM	STELLITE		1	1460	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	1601	BEARING HAUSING	NI CAST IRON		1SET
1306	VALVE STEM	STELLITE		1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1	2315	TACHOMETER ROTOR	STEEL WITH MAGNETS	SS400	1SET

OUTLINE DIMENSIONS

Dimensions : mm



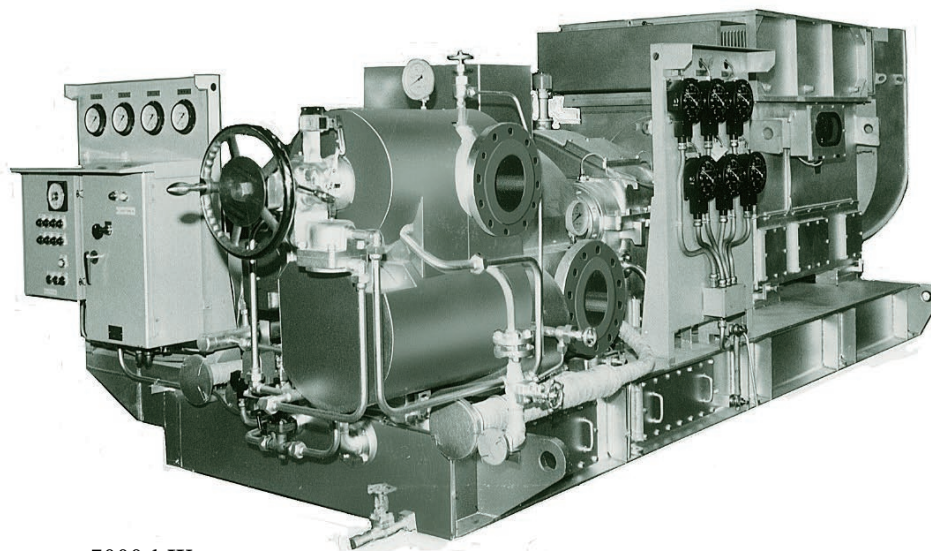
SHINKO IND.LTD.

Curtis single-stage (with reduction gear) STEAM TURBINES

SHINKO DE.DEG

■ APPLICATIONS

Boiler feed pumps
Cooling water pumps
Compressors
Generators
Sugar mills
Cane knives
Others



■ SPECIFICATIONS

Max. output 5000 kW
Max. exhaust steam pressure .. 2.5 MPaG
Gland seal Labyrinth packing
Lubrication system Forced lubrication

■ GENERAL CHARACTERISTICS

Item	Model	DE 41	DE 61	DE 62	DE 81	DE 41A	DE 61A	DE 62A	DE 61K	DE 62K
Max. output	(kW)	2000	3000	5000	3000	2000	3000	5000	3000	5000
Max. speed	(rpm)	7500	7200	7200	5400	7500	7200	7200	7200	7200
Direction of rotation		CW facing turbine toward driven machine								
Max. inlet steam pressure	(MPaG)	6.2								
Max. inlet steam temperature	(°C)	510								
Max. exhaust steam pressure	(MPaG)	0.5			2.5			600mmHg		
Steam inlet bore	(mm)	150	150	200	150	150	150	200	150	200
Steam exhaust bore	(mm)	200	300	350	300	200	250	350	600	600
Lubrication system		Forced lubrication								
Main LO pump	(m ³ /h)	3.7	5	5	5	3.7	5	5	5	5
Aux. LO pump	(m ³ /h)	3.7	5	5	5	3.7	5	5	5	5
Governor		Woodward UG or PG								
Hand nozzle valve		Available according to requirement								
Weight (turbine proper)	(kg)	1350	2200	2900	2450	1400	2300	2950	2400	2700

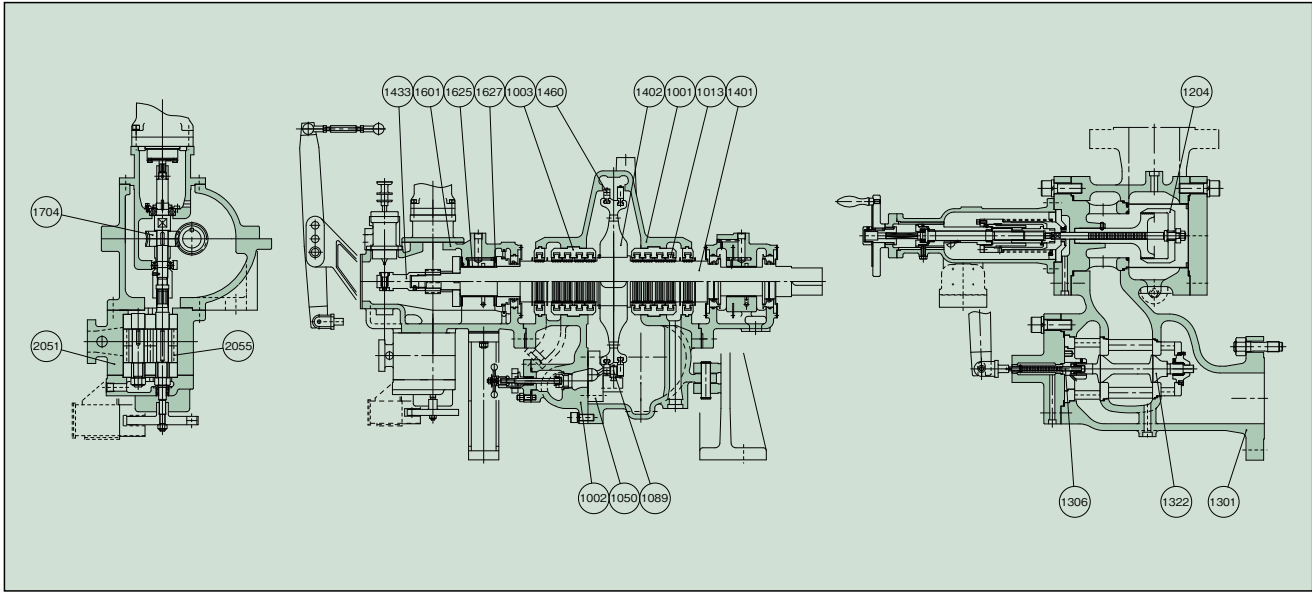
● Governor

Max. speed regulation 0.5%, 0 ~ 4%
Max. speed variation ±0.25%
Max. speed rise 7%
Speed range +5 ~ -30%
NEMA class D

● Emergency Trip Device

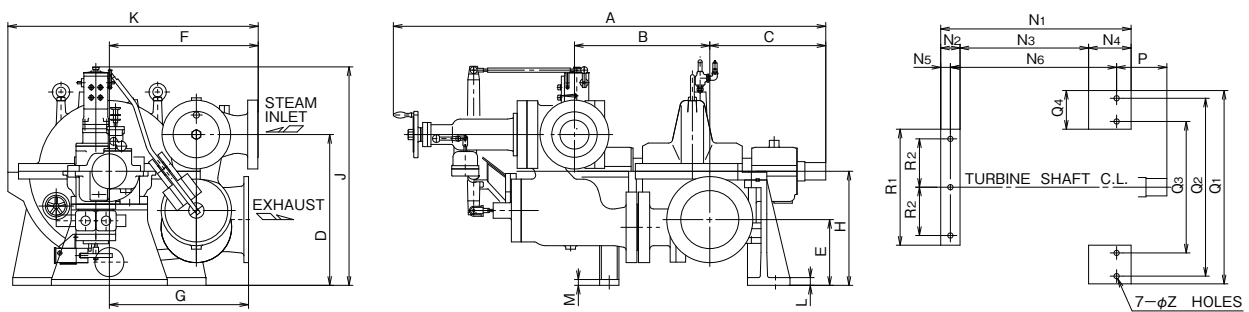
Actuation of overspeed trip 115% of rated speed
Actuation of low LO pressure trip Below 0.05 MPaG

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1401	TURBINE SHAFT	FORGED STEEL	SF540A	1
1002	STEAM CHEST	"	"	1	1402	DISC ROTOR	NI-CR STEEL	SNC836	1
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1013	LABYRINTH PACKING	Ni-Br CASTING		10SETS	1460	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1601	BEARING HOUSING	CAST IRON	FC200	1SET
1089	STATIONARY BLADE	"	"	1SET	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	1627	THRUST BEARING METAL	"	"	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	1704	WORM WHEEL	PHOSPHOR BRONZE	PBC3	1
1306	VALVE STEM	STELLITE		1	2051	LO PUMP CASING	CAST IRON	FC200	1
1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1	2055	PUMPING GEAR	CARBON STEEL	S45C	1SET

OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	P	Q ₁	Q ₂	Q ₃	Q ₄	R ₁	R ₂	Z
DE 41	2259	702	620	720	290	740	570	470	1180	1115	40	30	975	100	655	220	50	850	340	880	800	560	200	500	200	27
DE 61	2250	700	600	780	340	770	720	590	1300	1295	40	30	985	100	665	220	50	860	260	1000	920	680	200	600	250	27
DE 62	2370	685	650	840	290	870	800	590	1300	1380	40	30	1070	100	750	220	50	945	270	1000	920	680	200	600	250	27
DE 81	2250	700	600	840	400	770	720	650	1360	1395	40	30	985	100	665	220	50	860	260	1150	1060	800	220	700	300	27
DE 41A	2259	702	620	720	290	740	570	470	1180	1115	40	30	975	100	655	220	50	850	340	880	800	560	200	500	200	27
DE 61A	2300	700	650	780	340	770	720	590	1300	1240	40	30	1020	100	700	220	50	895	320	1000	920	680	200	600	250	27
DE 62A	2370	685	650	840	290	870	800	590	1300	1380	40	30	1070	100	750	220	50	945	270	1000	920	680	200	600	250	27
DE 61K	2250	765	535	840	330	770	750	650	1360	1300	40	30	1095	100	775	220	50	970	150	1100	1020	780	200	600	250	27
DE 62K	2345	750	560	900	330	870	800	650	1360	1400	40	30	1095	100	775	220	50	970	175	1100	1020	780	200	600	250	27

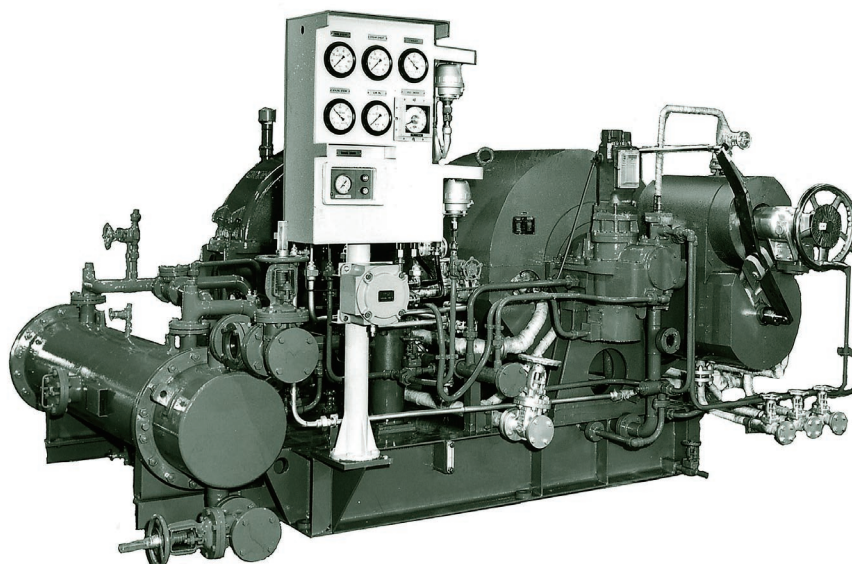
SHINKO IND.LTD.

Curtis two-stage (with reduction gear) STEAM TURBINES

SHINKO DL.DLG

■ APPLICATIONS

Generators
Compressors
Pumps
Others



■ SPECIFICATIONS

Max. output 5000 kW
Max. exhaust steam pressure .. 1.0 MPaG
Gland seal Labyrinth packing
Lubrication system Forced lubrication

■ GENERAL CHARACTERISTICS

Item	Model	DL 61	DL 62	DL 61A	DL 62A
Max. output	(kW)	3000	5000	3000	5000
Max. speed	(rpm)	7000			
Direction of rotation		CW facing turbine toward driven machine			
Max. inlet steam pressure	(MPaG)	6.2			
Max. inlet steam temperature	(°C)	510			
Max. exhaust steam pressure	(MPaG)	0.5		1.0	
Steam inlet bore	(mm)	150	250	150	250
Steam exhaust bore	(mm)	300	400	300	400
Lubrication system		Forced lubrication			
Main LO pump	(m ³ /h)	5			
Aux. LO pump	(m ³ /h)	5			
Governor		Woodward UG or PG			
Hand nozzle valve		Available according to requirement			
Weight (turbine proper)	(kg)	2600	4000	2700	4000

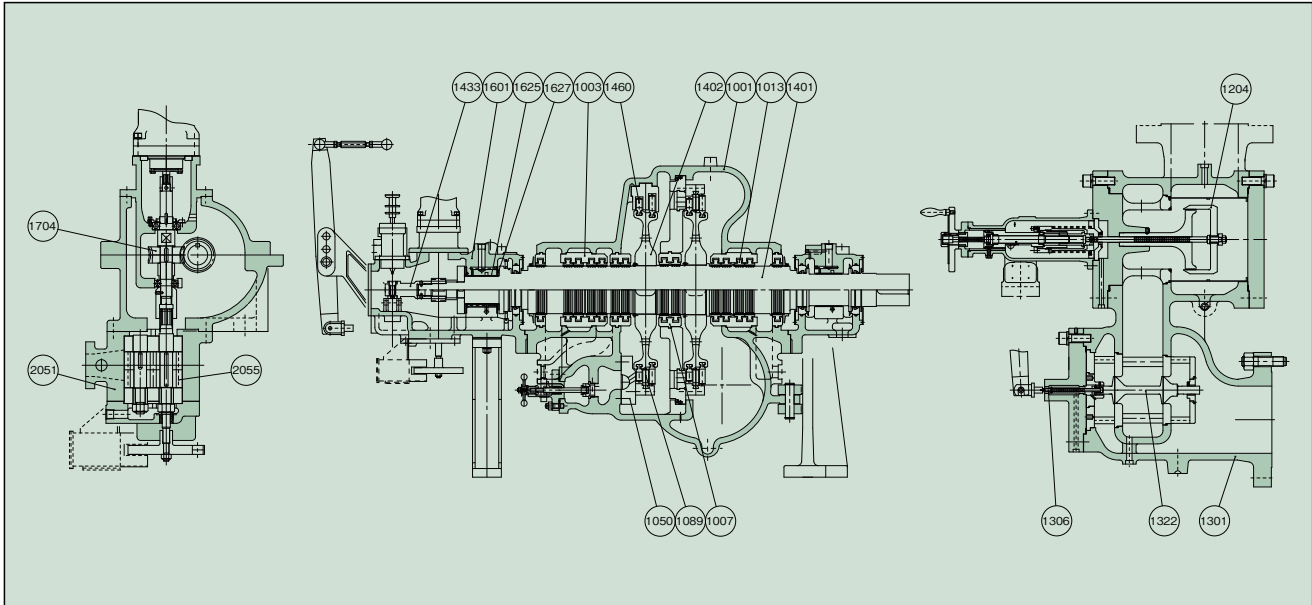
● Governor

Max. speed regulation 0.5%, 0 ~ 4 %
Max. speed variation ±0.25%
Max. speed rise 7%
Speed range +5 ~ -30%
NEMA class D

● Emergency Trip Device

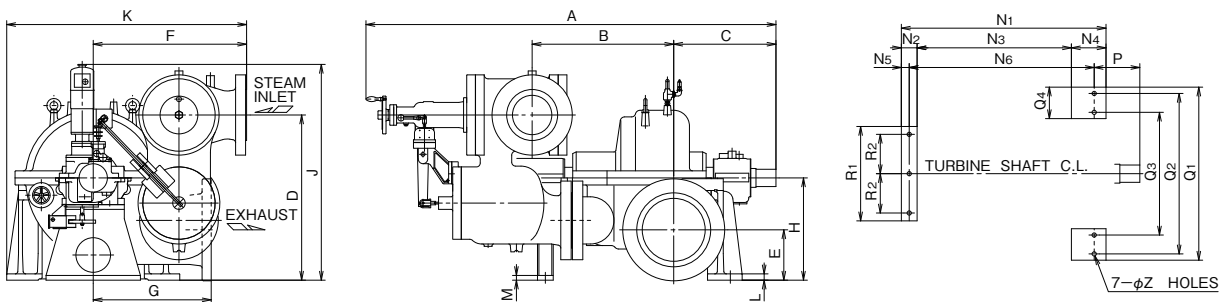
Actuation of overspeed trip 115% of rated speed
Actuation of low LO pressure trip Below 0.05 MPaG

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1401	TURBINE SHAFT	FORGED STEEL	SF540A	1
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1402	DISC ROTOR	Ni-Cr STEEL	SNC836	1
1007	PACKING CASE	"	"	1SET	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1013	LABYRINTH PACKING	Ni-Br CASTING		14SETS	1460	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1601	BEARING HOUSING	CAST IRON	FC200	1SET
1089	STATIONARY BLADE	"	"	1SET	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	1627	THRUST BEARING METAL	"	"	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	1704	WORM WHEEL	PHOSPHOR BRONZE	PBC3	1
1306	VALVE STEM	STELLITE		1	2051	LO PUMP CASING	CAST IRON	FC200	1
1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1	2055	PUMPING GEAR	CARBON STEEL	S45C	1SET

OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	P	Q ₁	Q ₂	Q ₃	Q ₄	R ₁	R ₂	Z
DL 61	2392	875	580	840	365	770	720	650	1360	1320	40	30	1233	100	913	220	50	1108	230	1100	1020	780	200	600	250	27
DL 62	2607	900	650	1050	320	980	750	650	1360	1530	40	30	1301	100	981	220	50	1176	290	1100	1020	780	200	600	250	27
DL 61A	2442	875	630	840	365	770	720	650	1360	1320	40	30	1283	100	963	220	50	1158	280	1100	1020	780	200	600	250	27
DL 62A	2607	900	650	1050	320	980	750	650	1360	1530	40	30	1301	100	981	220	50	1176	290	1100	1020	780	200	600	250	27

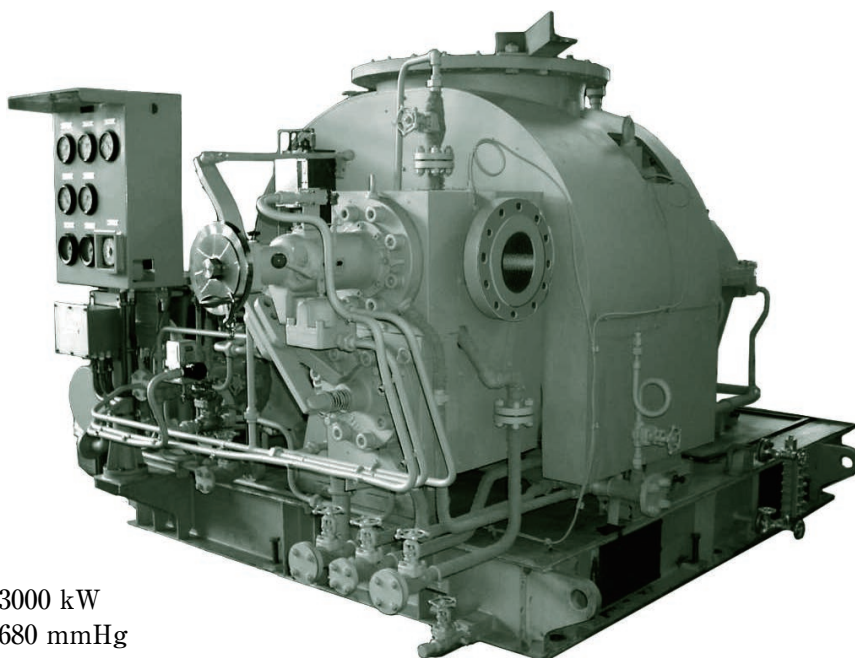
SHINKO IND.LTD.

Curtis two-stage (with reduction gear) STEAM TURBINES

SHINKO DL-K,DLG-K

■ APPLICATIONS

Generators
Compressors
Pumps
Others



■ SPECIFICATIONS

Max. output 3000 kW
Max. exhaust vacuum 680 mmHg
Gland seal Labyrinth packing
Lubrication system Forced lubrication

■ GENERAL CHARACTERISTICS

Item	Model	DL 61K
Max. output	(kW)	3000
Max. speed	(rpm)	7000
Direction of rotation		CW facing turbine toward driven machine
Max. inlet steam pressure	(MPaG)	6.2
Max. inlet steam temperature	(°C)	510
Max. exhaust vacuum	(mmHg)	680
Steam inlet bore	(mm)	150
Steam exhaust bore	(mm)	750
Lubrication system		Forced lubrication
Main LO pump	(m ³ /h)	5
Aux. LO pump	(m ³ /h)	5
Governor		Woodward UG or PG
Hand nozzle valve		Available according to requirement
Weight (turbine proper)	(kg)	3300

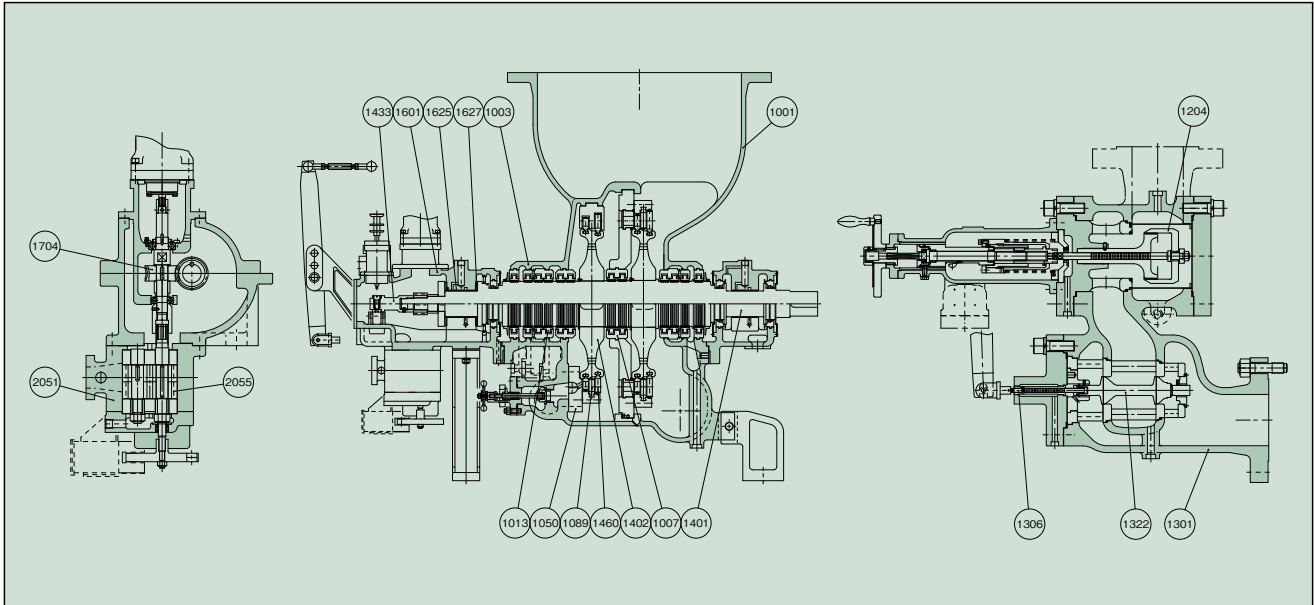
● Governor

Max. speed regulation 0.5%, 0 ~ 4%
Max. speed variation ±0.25%
Max. speed rise 7%
Speed range +5 ~ -30%
NEMA class D

● Emergency Trip Device

Actuation of overspeed trip 115% of rated speed
Actuation of low LO pressure trip Below 0.05 MPaG

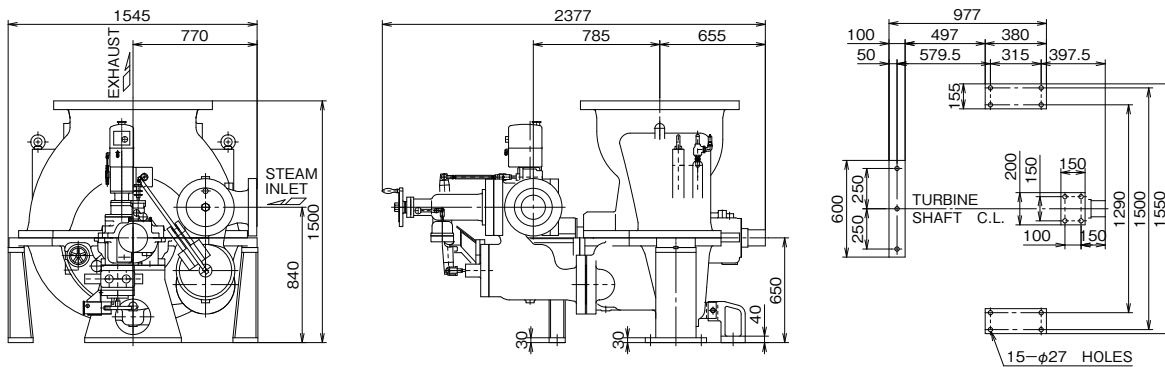
DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1401	TURBINE SHAFT	FORGED STEEL	SF540A	1
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1402	DISC ROTOR	Ni-Cr STEEL	SNC836	2
1007	PACKING CASE	"/	"/	1SET	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1013	LABYRINTH PACKING	Ni-Br CASTING		12SETS	1460	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1601	BEARING HOUSING	CAST IRON	FC200	1SET
1089	STATIONARY BLADE	"/	"/	1SET	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1204	EMERGENCY VALVE	"/	SUS420J2	1	1627	THRUST BEARING METAL	"/	"/	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	1704	WORM WHEEL	PHOSPHOR BRONZE	PBC3	1
1306	VALVE STEM	STELLITE		1	2051	LO PUMP CASING	CAST IRON	FC200	1
1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1	2055	PUMPING GEAR	CARBON STEEL	S45C	1SET

OUTLINE DIMENSIONS

Dimensions : mm



SHINKO IND.LTD.

Vertical Curtis single-stage STEAM TURBINES

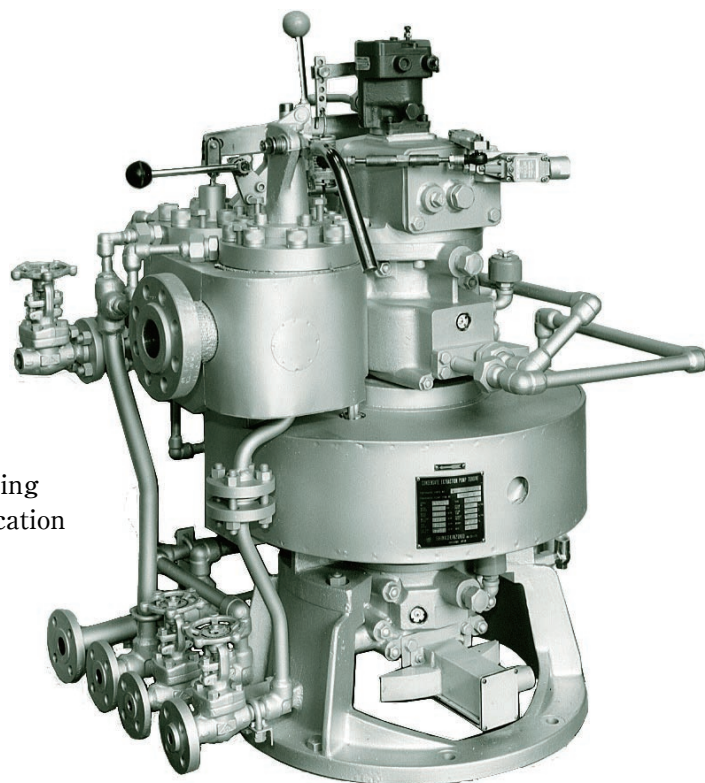
SHINKO DV

■ APPLICATIONS

Vertical LO pumps
Vertical seal oil pumps for compressors
Vertical condensate pumps
Others

■ SPECIFICATIONS

Max. output 250 kW
Max. exhaust steam pressure .. 0.5 MPaG
Gland seal Carbon packing
Lubrication system Splash lubrication



■ GENERAL CHARACTERISTICS

Item	Model	DV 42
Max. output	(kW)	250
Max. speed	(rpm)	3600
Direction of rotation		CW facing turbine toward driven machine
Max. inlet steam pressure	(MPaG)	6.2
Max. inlet steam temperature	(°C)	410
Max. exhaust steam pressure	(MPaG)	0.5
Steam inlet bore	(mm)	80
Steam exhaust bore	(mm)	200
Lubrication system		Splash
LO required	(ℓ)	1.4
Cooling water required	(m ³ /h)	1
Governor		Woodward SG or PSG
Hand nozzle valve		Available according to requirement
Weight (turbine proper)	(kg)	650

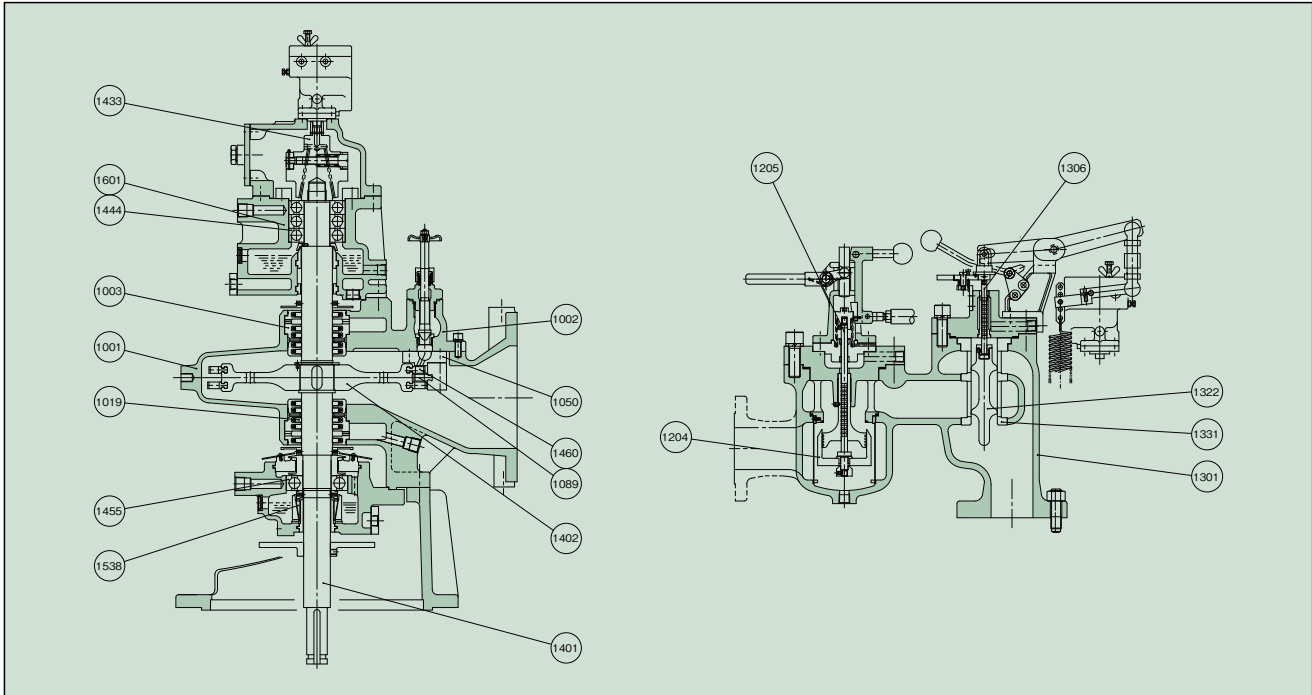
● Governor

Max. speed regulation 2.5%(SG), 0.5%(PSG)
Max. speed variation ±0.75%(SG), ±0.25%(PSG)
Max. speed rise 13%(SG), 7%(PSG)
Speed range +5 ~ -25%
NEMA class A(SG), D(PSG)

● Emergency Trip Device

Actuation of overspeed trip 115% of rated speed

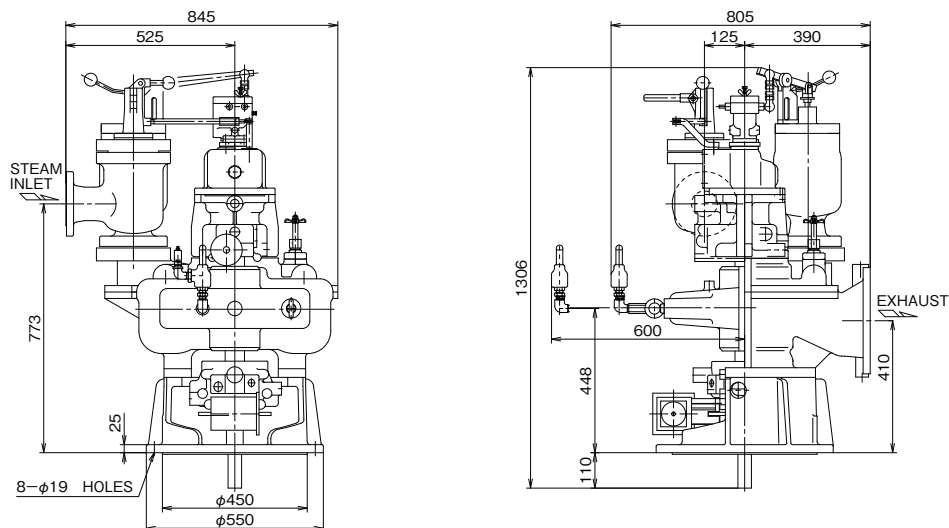
DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1
1002	STEAM CHEST	"	"	1	1331	LINER	"	"	1
1003	PACKING CASE	BRONZE	CAC407	1SET	1401	TURBINE SHAFT	CARBON STEEL (With Cr-PLATING)	S45C	1
1019	CARBON PACKING	SPECIAL CARBON		10SETS	1402	DISC ROTOR	CARBON STEEL	"	1
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1433	OVERSPEED TRIP SHAFT	"	S35C	1
1089	STATIONARY BLADE	"	"	1SET	1444	BALL BEARING	SPECIAL STEEL	SUJ2	3
1204	EMERGENCY VALVE	"	SUS420J2	1	1455	BALL BEARING	"	"	1
1205	VALVE STEM	STELLITE		1	1460	MOVING BLADE	STAINLESS STEEL	SUS403	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	1538	OIL SPLASHER	CARBON STEEL	S35C	1
1306	VALVE STEM	STELLITE		1	1601	BEARING HOUSING	Ni CAST IRON		1SET

OUTLINE DIMENSIONS

Dimensions : mm



SHINKO IND.LTD.

Rateau 4-stage with reduction gear BACK PRESSURE GENERATOR TURBINES

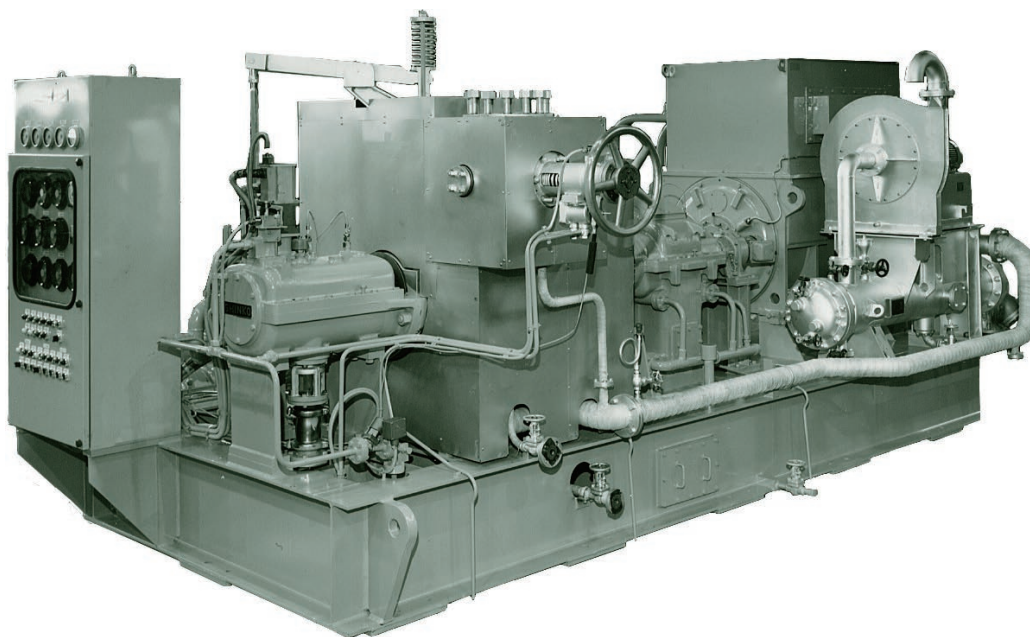
SHINKO DNG40

■ APPLICATIONS

Generators
Shredders
Pumps
Others

■ SPECIFICATIONS

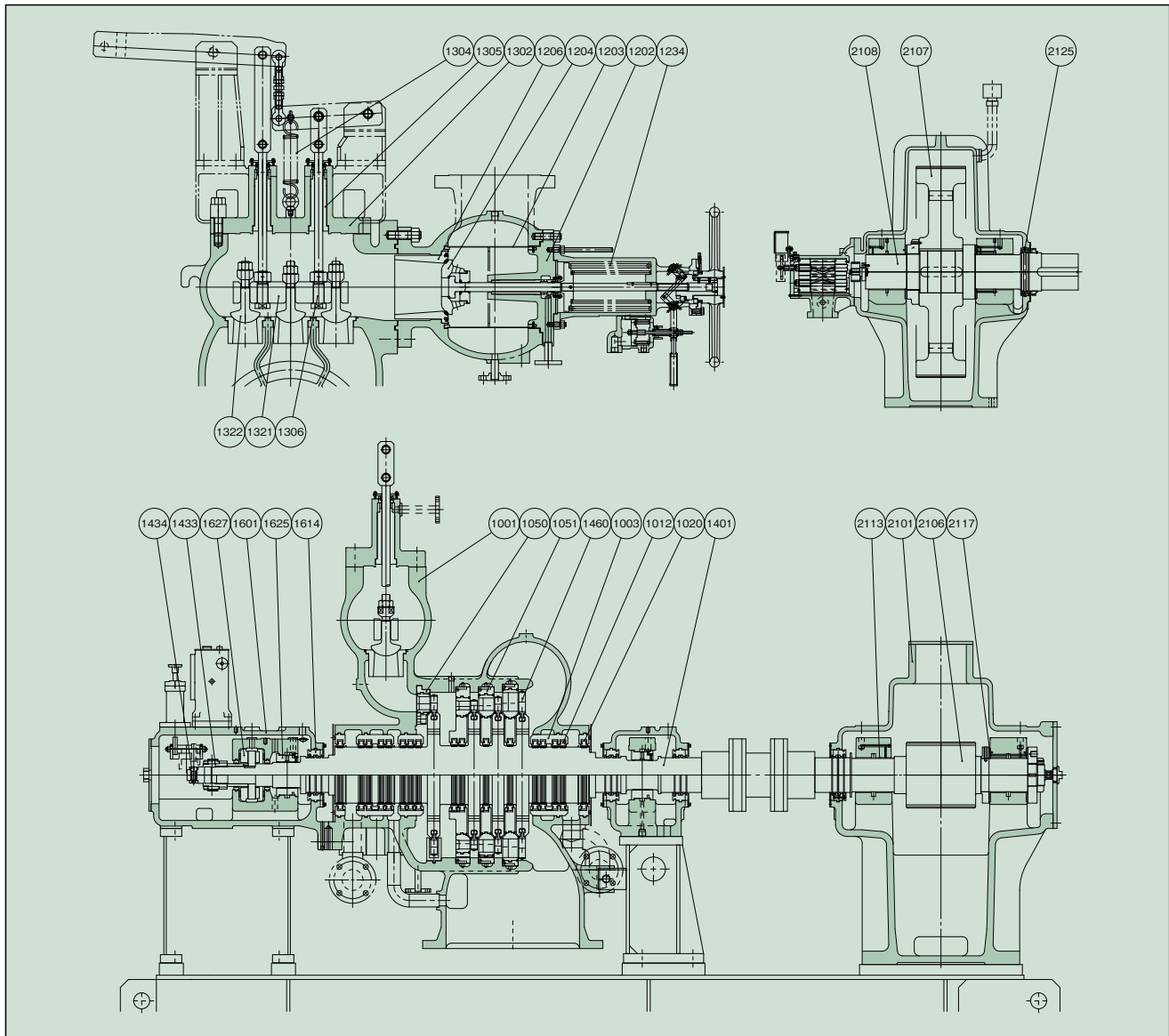
Max. output 10000 kW
Max. exhaust steam pressure .. 2.5 MPaG
Gland seal Labyrinth packing
Lubrication system Forced lubrication
Control system 3 or 4 valve nozzle control



■ GENERAL CHARACTERISTICS

Item	Model	DNG 41	DNG 42	DNG 43	DNG 41A	DNG 42A	DNG 43A
Max. output	(kW)	4000	6000	10000	4000	6000	10000
Speed (turbine shaft)	(rpm)	10000	9000	7000	10000	9000	7000
Speed (output shaft)	(rpm)	900 ~ 3600					
Rotation of output shaft		CCW facing turbine toward driven machine					
Max. inlet steam pressure	(MPaG)	6.2					
Max. inlet steam temperature	(°C)	510					
Max. exhaust steam pressure	(MPaG)	0.5			2.5		
Steam inlet bore	(mm)	200	250	300	200	250	300
Steam exhaust bore	(mm)	400	500	600	400	500	600
Lubrication system		Forced lubrication					
Main LO pump	(m ³ /h x MPaG)	20 x 0.8	25 x 0.8	35 x 1.0	20 x 0.8	25 x 0.8	35 x 1.0
Aux. LO pump	(m ³ /h x MPaG)	20 x 0.8	25 x 0.8	30 x 1.0	20 x 0.8	25 x 0.8	30 x 1.0
Governor		Mechanical-hydraulic or electrical-hydraulic type					
AGMA service factor of gear		1.1 ~ 2.0					
Min. weight (with baseplate)	(kg)	12000	14200	25000	12000	14200	25000

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	3 or 4
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1401	TURBINE ROTOR	Cr-Mo STEEL		1
1012	LABYRINTH PACKING	Ni-Br CASTING		17SETS	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1020	SPRING	STAINLESS STEEL	SUS304	17SETS	1434	TRIP WEIGHT	Al-Cr-Mo STEEL	SACM645	1SET
1050	NOZZLE PLATE	STAINLESS STEEL WITH CARBON STEEL	SUS403 S25C	1SET	1460	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1051	NOZZLE DIAPHRAGM	"	"	1SET	1601	BEARING HOUSING	CAST IRON	FC200	1SET
1202	EMERGENCY VALVE COVER	CAST STEEL	SCPH2	1	1614	OIL GUARD	BRONZE	CAC407	1SET
1203	STEAM STRAINER	STAINLESS STEEL	SUS410	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	1627	THRUST BEARING METAL	"	"	1SET
1206	VALVE SEAT	"	"	1	2101	REDUCTION GEAR CASING	CAST IRON	FC200	1SET
1234	SPRING	Si-Cr SPRING STEEL	SWOSC-V	1SET	2106	PINION	Ni-Cr-Mo STEEL	SNM439	1
1302	GOVERNOR VALVE CASING COVER	CAST STEEL	SCPH2	1	2107	WHEEL	FORGED STEEL	SF640B	1
1304	SPRING	Si-Cr SPRING STEEL	SWOSC-V	1	2108	WHEEL SHAFT	"	SF540A	1
1305	BUSH	Al-Cr-Mo STEEL	SACM645	2	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1306	VALVE STEM	"	"	2	2117	THRUST BEARING METAL	"	"	1SET
1321	GOVERNOR VALVE LIFTING BEAM	CARBON STEEL	S45C	1	2125	OIL GUARD	BRONZE	CAC407	1SET

● Steam Temperature & Materials

Standard materials are shown on the table. However, in the case the steam temperature is more than 425°C, the materials are partially different from the table below:

PART NO.	NAME OF PART	MATERIAL	
		NAME	JIS
1001	TURBINE CASING	Cr-Mo CAST STEEL	SCPH21
1020	SPRING	INCONEL-X	
1050	NOZZLE PLATE	STAINLESS STEEL WITH ALLOY STEEL FORGING	SUS410J1 SFVAF12
1202	EMERGENCY VALVE COVER	Cr-Mo CAST STEEL	SCPH21
1204	EMERGENCY VALVE	ALLOY STEEL FORGING	SFVAF12
1206	EMERGENCY VALVE SEAT	"	"
1302	GOVERNOR VALVE CASING COVER	Cr-Mo CAST STEEL	SCPH21
1306	VALVE STEM	HEAT-RESISTING STEEL	SUH616
1321	GOVERNOR VALVE LIFTING BEAM	ALLOY STEEL FORGING	SFVAF12
1322	GOVERNOR VALVE	"	"
1401	TURBINE ROTOR	Cr-Mo-V STEEL	

● Governor

A mechanical-hydraulic or an electrical-hydraulic type is employed.

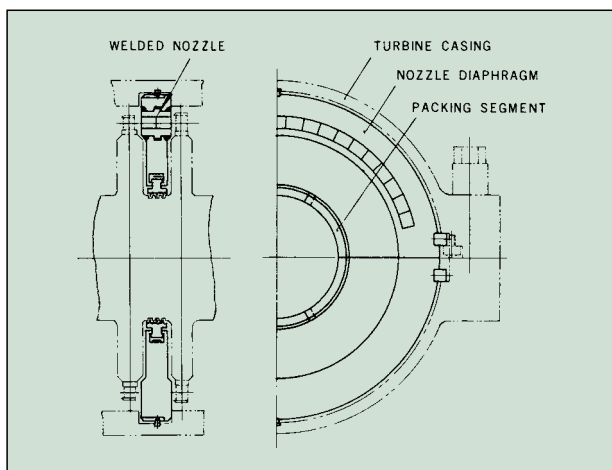
Max. speed regulation	0 ~ 4 %
Max. speed variation	± 0.25%
Max. speed rise	7%
Speed range	± 5%
NEMA class	D

● Gland Seal

As shown below, the turbine gland is equipped with several sets of labyrinth packing. And, the leaking steam is led to the gland condenser.

MODEL	LABYRINTH PACKING	
	GOVERNOR SIDE	COUPLING SIDE
DNG	8 Sets	5 Sets
DNG-A	9 Sets	6 Sets

● Nozzle and Diaphragm

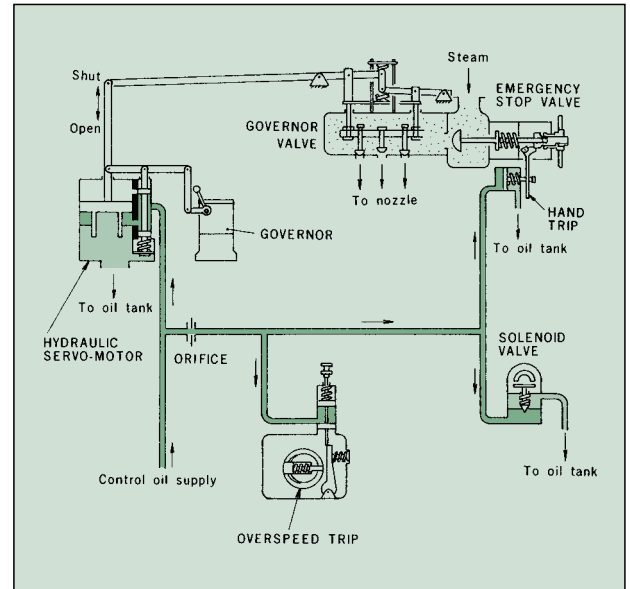


● Emergency Trip Device

For the purpose of safe turbine operation, an over speed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

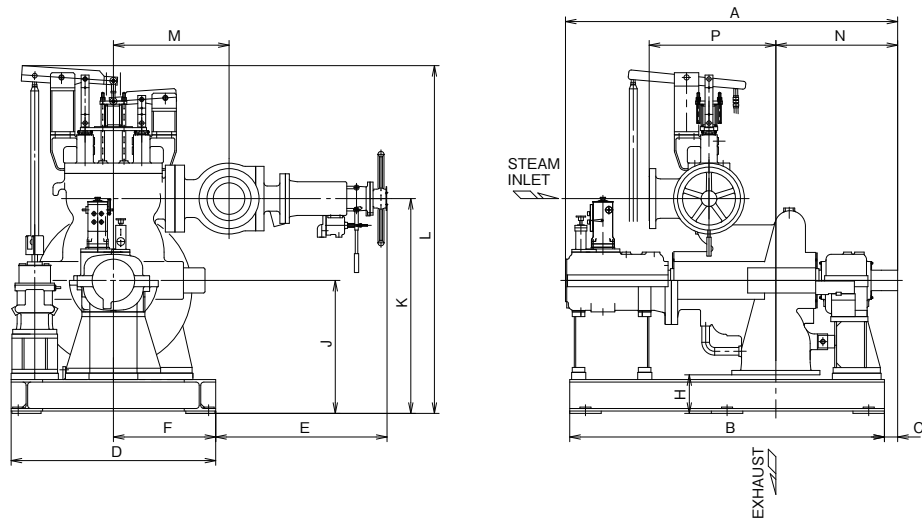
Actuation of overspeed trip : 110% of rated speed

Actuation of low LO press. trip : Below 0.05 MPaG



OUTLINE DIMENSIONS

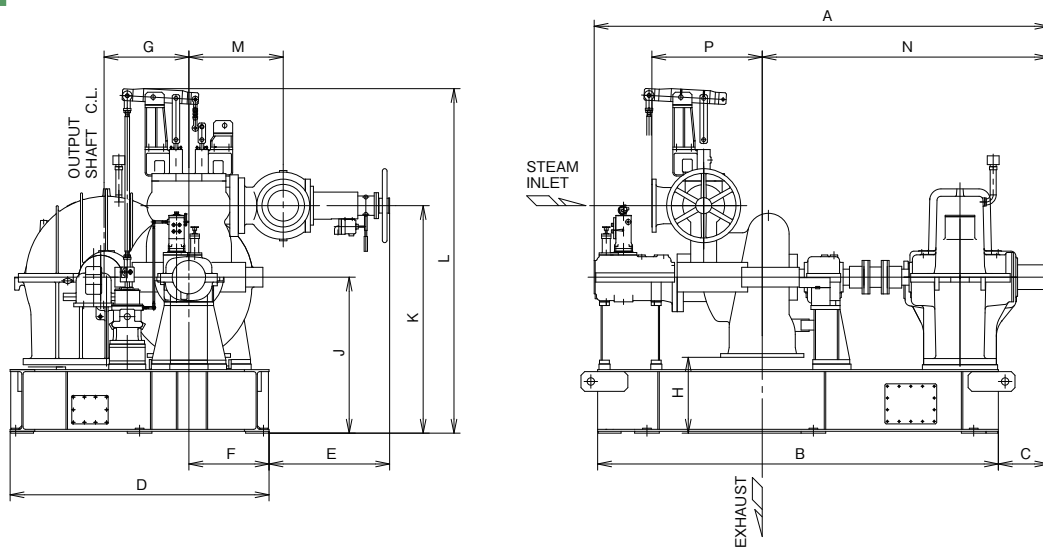
DN(A)



Dimensions : mm

Model	A	B	C	D	E	F	H	J	K	L	M	N	P
DN 41(A)	2111	2000	84	1300	1090	650	245	845	1365	2210	735	774	805
DN 42(A)	2188	2060	100	1300	1100	650	315	965	1545	2494	745	825	875
DN 43(A)	2415	2220	(-10)	1600	1260	800	185	985	1685	2670	950	875	1080

DNG(A)



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
DNG 41(A)-50	3434	3200	207	2100	1090	650	513	545	1145	1665	2510	735	2097	805
55	3570	3200	343	2100	1090	650	570	635	1235	1755	2600	735	2233	805
65	3610	3200	383	2100	1090	650	668	665	1265	1785	2630	735	2273	805
DNG 42(A)-55	3662	3250	384	2100	1100	650	570	615	1265	1845	2794	765	2299	895
65	3687	3250	409	2100	1100	650	668	615	1265	1845	2794	765	2324	895
DNG 43(A)-70	4730	3900	405	2400	1260	800	560	625	1425	2125	3110	950	2975	1080

Rateau 5-stage with reduction gear BACK PRESSURE GENERATOR TURBINES

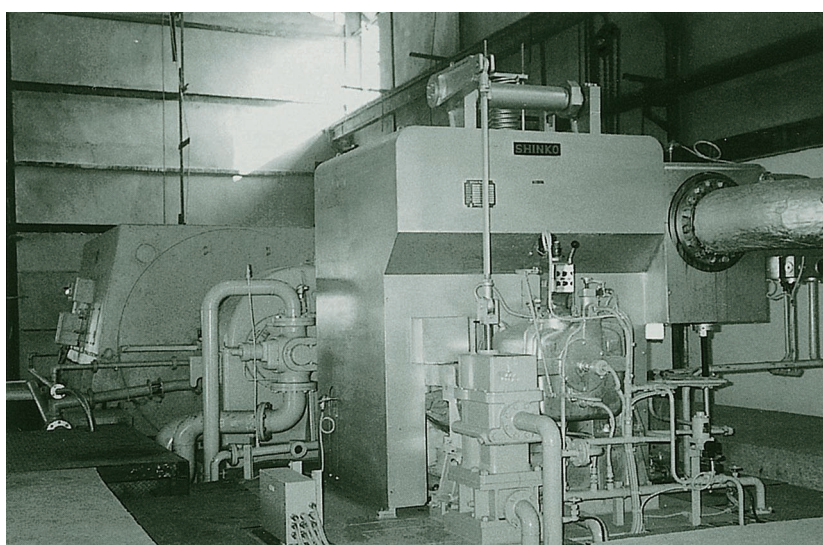
SHINKO DNG50

■ APPLICATIONS

Generators

■ SPECIFICATIONS

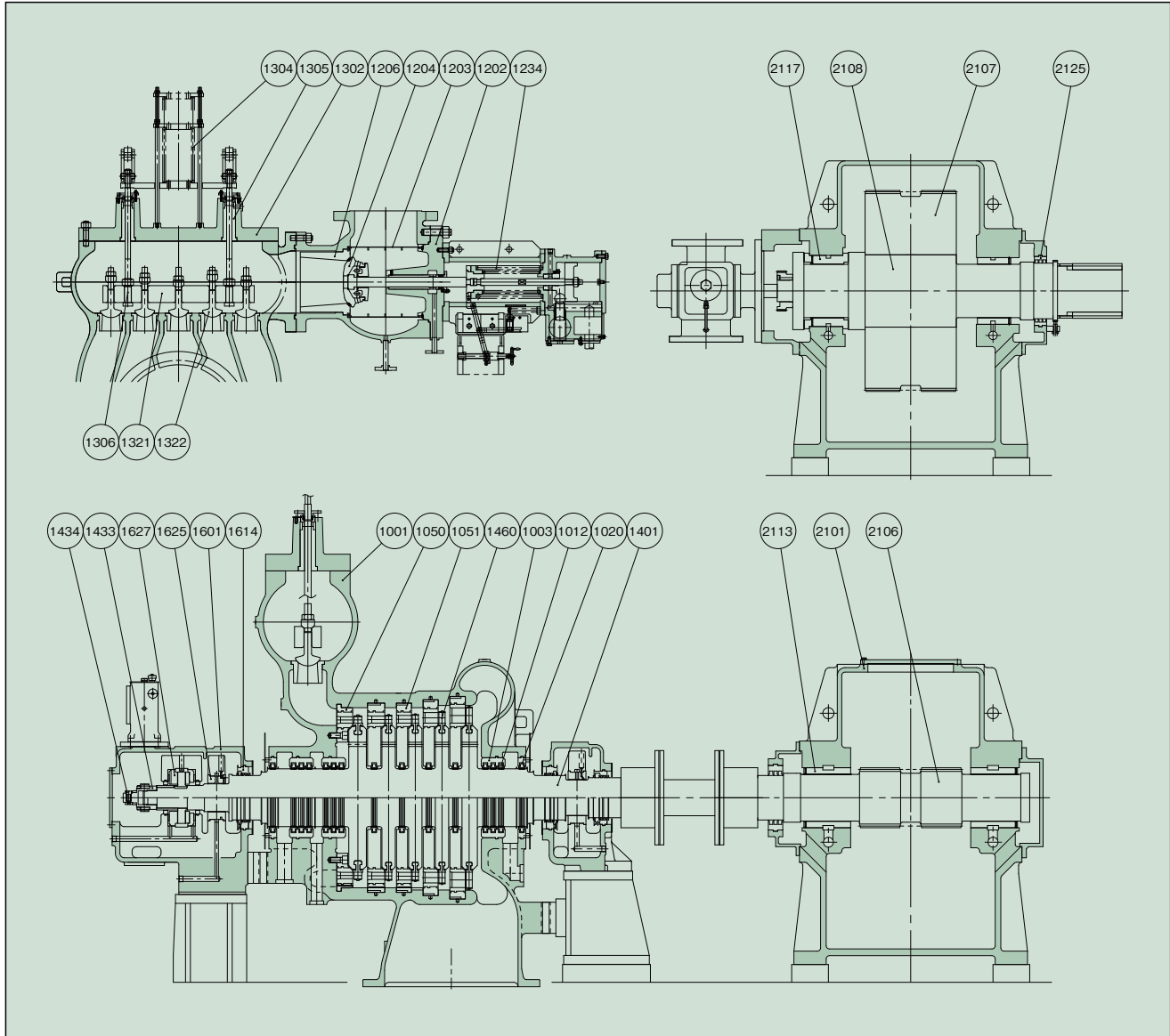
Max. output 16000 kW
 Max. exhaust steam pressure .. 0.5 MPaG
 Gland seal Labyrinth packing
 Lubrication system Forced lubrication
 Control system 5 valve nozzle control



■ GENERAL CHARACTERISTICS

Item	Model	DNG 54	DNG 55
Max. output	(kW)	12000	16000
Speed (turbine shaft)	(rpm)	6000	
Speed (output shaft)	(rpm)	1500, 1800	
Rotation of output shaft		CCW facing turbine toward driven machine	
Max. inlet steam pressure	(MPaG)	3.3	
Max. inlet steam temperature	(°C)	425	
Max. exhaust steam pressure	(MPaG)	0.5	
Steam inlet bore	(mm)	300	350
Steam exhaust bore	(mm)	600	700
Lubrication system		Forced lubrication	
Main LO pump	(m ³ /hxMPaG)	40 x 1.0	45 x 1.0
Aux. LO pump	(m ³ /hxMPaG)	30 x 1.0	35 x 1.0
Governor		Mechanical-hydraulic or electrical-hydraulic type	
AGMA service factor of gear		1.1	
Min. weight (with baseplate)	(kg)	25000	27700

■ DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	5
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1401	TURBINE ROTOR	Cr-Mo STEEL		1
1012	LABYRINTH PACKING	Ni-Br CASTING		15SETS	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1020	SPRING	STAINLESS STEEL	SUS304	15SETS	1434	TRIP WEIGHT	Al-Cr-Mo STEEL	SACM645	1SET
1050	NOZZLE PLATE	STAINLESS STEEL WITH CARBON STEEL	SUS403 S25C	1SET	1460	MOVING BLADE	HEAT-RESISTING STEEL	SUH616	1SET
1051	NOZZLE DIAPHRAGM	"	"	1SET	1601	BEARING HOUSING	DUCTILE CAST IRON	FCD400	1SET
1202	EMERGENCY VALVE COVER	CAST STEEL	SCPH2	1	1614	OIL GUARD	BRONZE	CAC407	1SET
1203	STEAM STRAINER	STAINLESS STEEL	SUS410	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	1627	THRUST BEARING METAL	"	"	1SET
1206	VALVE SEAT	"	"	1	2101	REDUCTION GEAR CASING	CAST IRON	FC250	1SET
1234	SPRING	SPRING STEEL	SUP10	1SET	2106	PINION	Ni-Cr-Mo STEEL	SNCM420	1
1302	GOVERNOR VALVE CASING COVER	CAST STEEL	SCPH2	1	2107	WHEEL	Cr-Mo STEEL	SCM420	1
1304	SPRING	SPRING STEEL	SUP10	1	2108	WHEEL SHAFT	CARBON STEEL	S45C	1
1305	BUSH	Al-Cr-Mo STEEL	SACM645	2	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1306	VALVE STEM	HEAT-RESISTING STEEL	SUH616	2	2117	COMBINED BEARING METAL	"	"	1SET
1321	GOVERNOR VALVE LIFTING BEAM	CARBON STEEL	S45C	1	2125	OIL GUARD	ALUMINIUM	A5052	1SET

● **Governor**

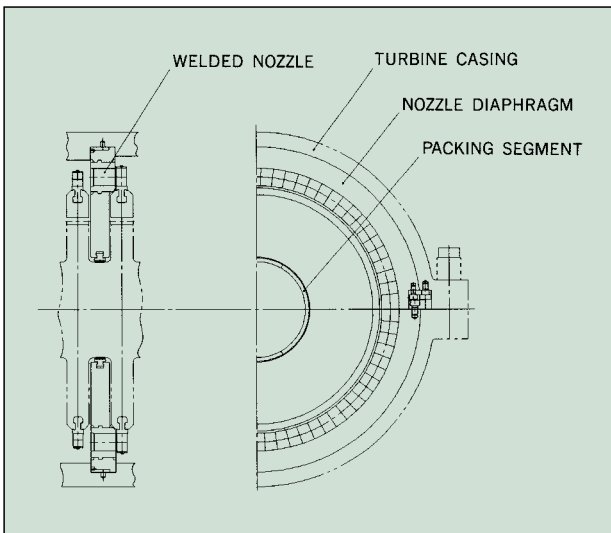
A mechanical-hydraulic or an electrical-hydraulic type is employed.

Max. speed regulation	0 ~ 4 %
Max. speed variation	± 0.25%
Max. speed rise	7%
Speed range	± 5%
NEMA class	D

● **Gland Seal**

The turbine gland is equipped with several sets of labyrinth packing. And, the leaking steam is led to the gland condenser.

● **Nozzle and Diaphragm**

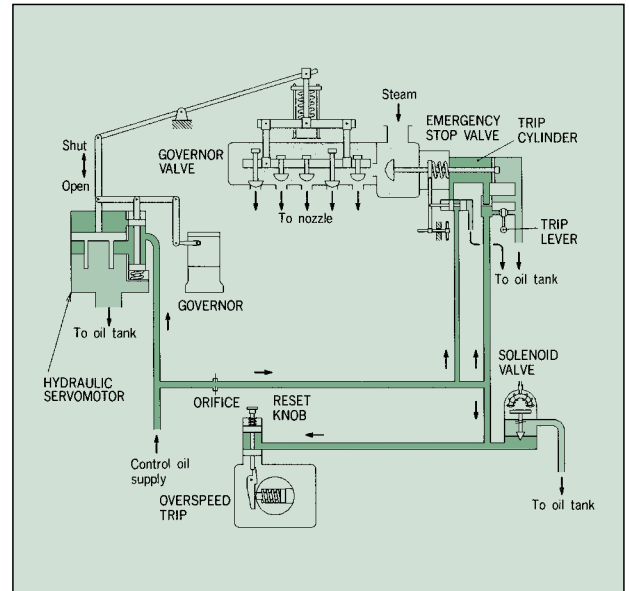


● **Emergency Trip Device**

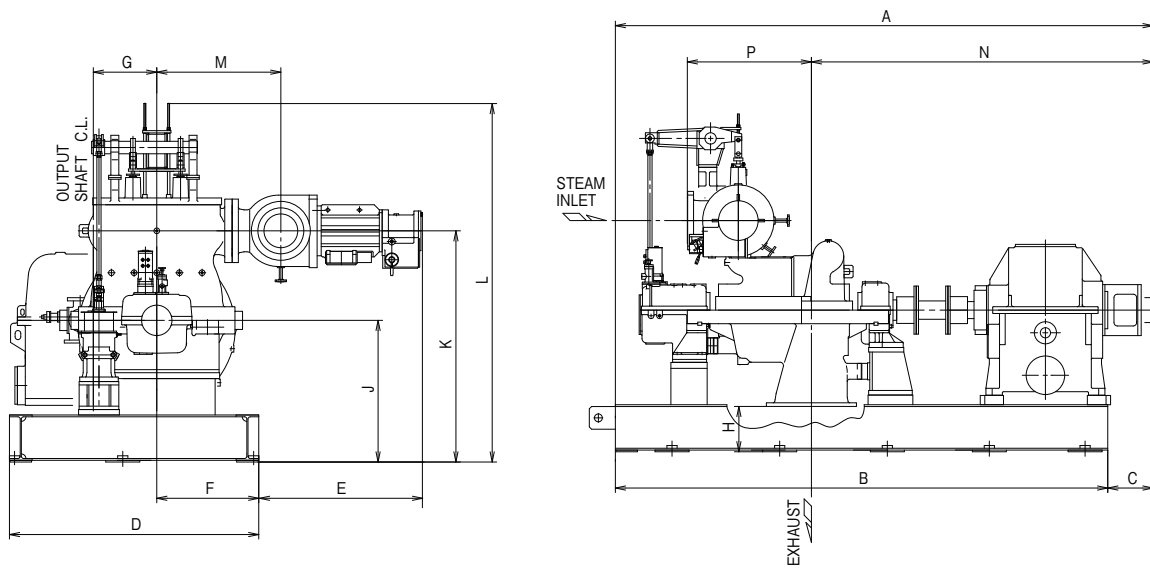
For the purpose of safe turbine operation, an over speed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

Actuation of overspeed trip : 110% of rated speed

Actuation of low LO press. trip : Below 0.05 MPaG



■ OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
DNG 54	4745	4345	400	2200	1444	900	560	400	1250	2040	3165	1095	3015	1095
DNG 55	4900	4500	400	2200	1585	900	560	350	1250	2100	3230	1250	3100	1065

Rateau 6-stage with reduction gear CONDENSING GENERATOR TURBINES

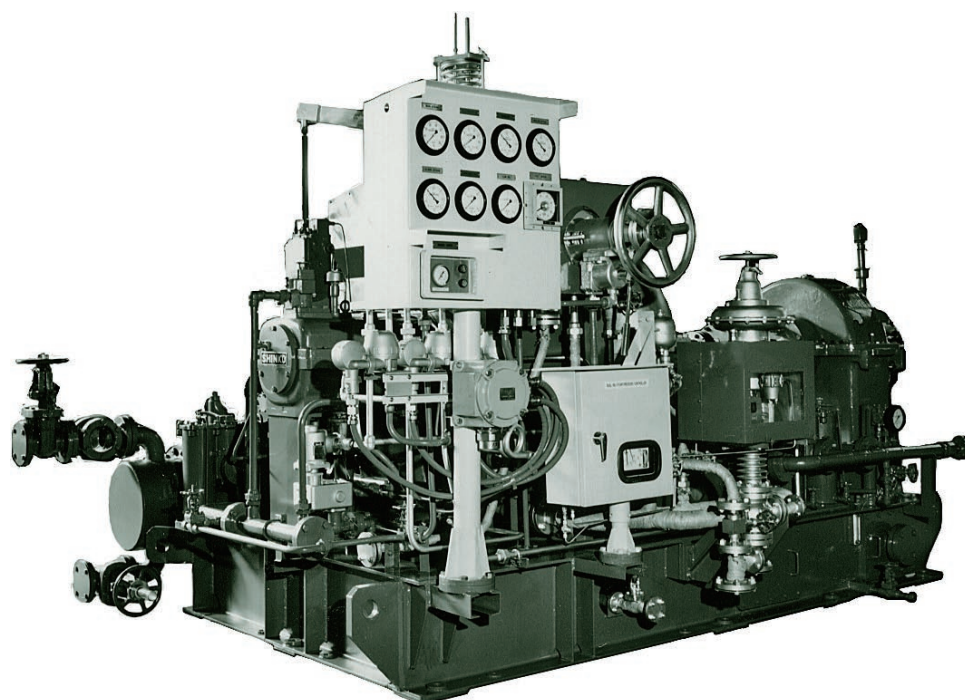
SHINKO DNG60

■ APPLICATIONS

Generators

■ SPECIFICATIONS

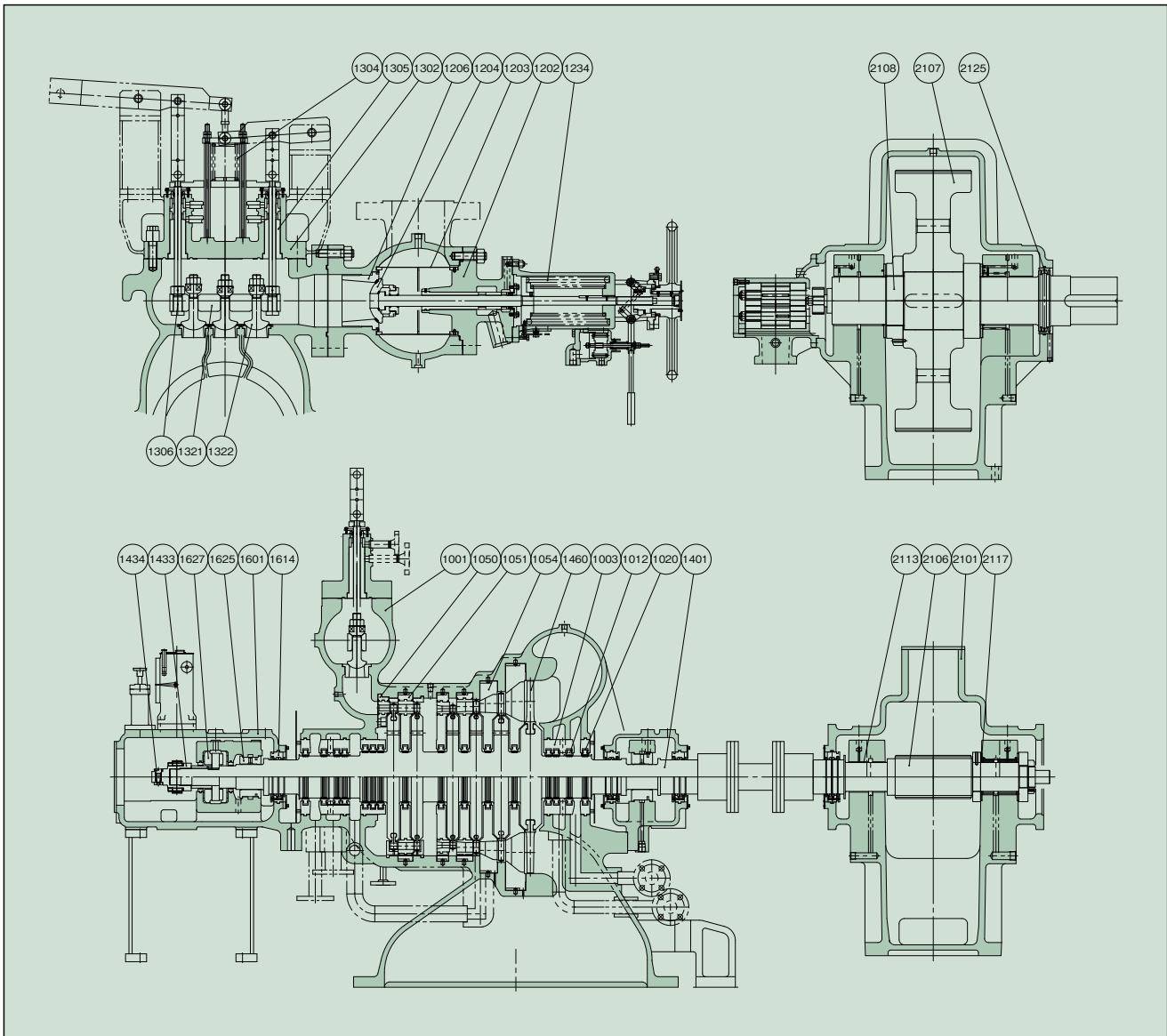
Max. output 10000 kW
 Max. exhaust vacuum 710 mmHg
 Gland seal Labyrinth packing
 Lubrication system Forced lubrication
 Control system 3 valve nozzle control



■ GENERAL CHARACTERISTICS

Item	Model	DNG 61(B)(F)	DNG 62(B)(F)	DNG 63(B)(F)
Max. output	(kW)	3000	6000	10000
Speed (turbine shaft)	(rpm)	10000		7000
Speed (output shaft)	(rpm)	900 ~ 3600		
Rotation of output shaft		CCW facing turbine toward driven machine		
Max. inlet steam pressure	(MPaG)	6.2		3.3
Max. inlet steam temperature	(°C)	510		400
Max. exhaust vacuum	(mmHg)	710		
Steam inlet bore	(mm)	150	200	250
Steam exhaust bore	(mm)	800	1000	750 x 1270
Lubrication system		Forced lubrication		
Main LO pump	(m ³ /h x MPaG)	20 x 0.8	25 x 0.8	30 x 0.8
Aux. LO pump	(m ³ /h x MPaG)	20 x 0.8	25 x 0.8	30 x 0.8
Governor		Mechanical-hydraulic or electrical-hydraulic type		
AGMA service factor of gear		1.1 ~ 2.0		
Min. weight (with baseplate)	(kg)	14500	16000	28000

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	3
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1401	TURBINE ROTOR	Cr-Mo STEEL		1
1012	LABYRINTH PACKING	Ni-Br CASTING		16SETS	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1020	SPRING	STAINLESS STEEL	SUS304	16SETS	1434	TRIP WEIGHT	TITANIUM		1SET
1050	NOZZLE PLATE	STAINLESS STEEL WITH CARBON STEEL	SUS403 S25C	1SET	1460	MOVING BLADE	STAINLESS STEEL HEAT-RESISTING STEEL	SUS410J1 SUH616	1SET
1051	NOZZLE DIAPHRAGM	"	"	1SET	1601	BEARING HOUSING	CAST IRON	FC200	1SET
1054	NOZZLE DIAPHRAGM	STAINLESS STEEL WITH DUCTILE CAST IRON	SUS430 FCD400	1SET	1614	OIL GUARD	BRONZE	CAC407	1SET
1202	EMERGENCY VALVE COVER	CAST STEEL	SCPH2	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1203	STEAM STRAINER	STAINLESS STEEL	SUS410	1	1627	THRUST BEARING METAL	"	"	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	2101	REDUCTION GEAR CASING	CAST IRON	FC200	1SET
1206	VALVE SEAT	"	"	1	2106	PINION	Ni-Cr-Mo STEEL	SNM439	1
1234	SPRING	SPRING STEEL	SUP10	1 SET	2107	WHEEL	FORGED STEEL	SF640B	1
1302	GOVERNOR VALVE CASING COVER	CAST STEEL	SCPH2	1	2108	WHEEL SHAFT	"	SF540A	1
1304	SPRING	Cr-V SPRING STEEL	SWOCV-V	1	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1305	BUSH	A α -Cr-Mo STEEL	SACM645	2	2117	THRUST BEARING METAL	"	"	1SET
1306	VALVE STEM	"	"	2	2125	OIL GUARD	CAST IRON	FC200	1SET
1321	GOVERNOR VALVE LIFTING BEAM	CARBON STEEL	S45C	1					

● Steam Temperature & Materials

Standard materials are shown on the table. However, in the case the steam temperature is more than 425°C, the materials are partially different from the table below:

PART NO.	NAME OF PART	MATERIAL	
		NAME	JIS
1001	TURBINE CASING	Cr-Mo CAST STEEL	SCPH21
1020	SPRING	INCONEL-X	
1050	NOZZLE PLATE	STAINLESS STEEL WITH ALLOY STEEL FORGING	SUS410J1 SFVAF12
1202	EMERGENCY VALVE COVER	Cr-Mo CAST STEEL	SCPH21
1204	EMERGENCY VALVE	ALLOY STEEL FORGING	SFVAF12
1206	EMERGENCY VALVE SEAT	"	"
1302	GOVERNOR VALVE CASING COVER	Cr-Mo CAST STEEL	SCPH21
1306	VALVE STEM	HEAT-RESISTING STEEL	SUH616
1321	GOVERNOR VALVE LIFTING BEAM	ALLOY STEEL FORGING	SFVAF12
1322	GOVERNOR VALVE	"	"
1401	TURBINE ROTOR	Cr-Mo-V STEEL	

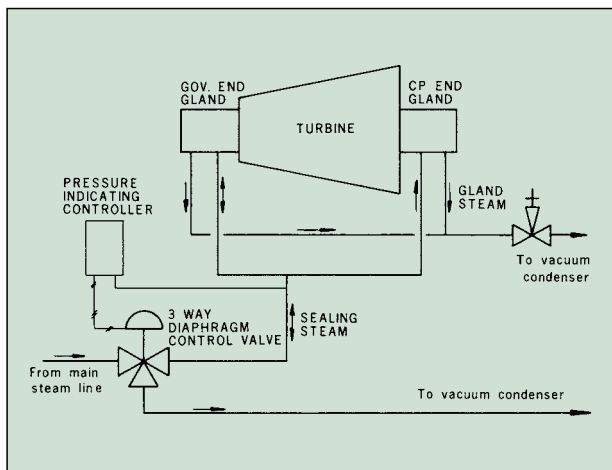
● Governor

A mechanical-hydraulic or an electrical-hydraulic type is employed.

Max. speed regulation	0 ~ 4 %
Max. speed variation	± 0.25%
Max. speed rise	7%
Speed range	± 5%
NEMA class	D

● Gland Seal

The turbine gland is equipped with several sets of labyrinth packing. Since the exhaust steam is led to the vacuum condenser, the coupling end creates a vacuum at all times. And, the governor end is usually under positive pressure, but at times forms a vacuum during a low load of the turbine. Therefore, consideration has been given to prevent air from entering the turbine at any operating conditions using a sealing steam pressure controlling device.

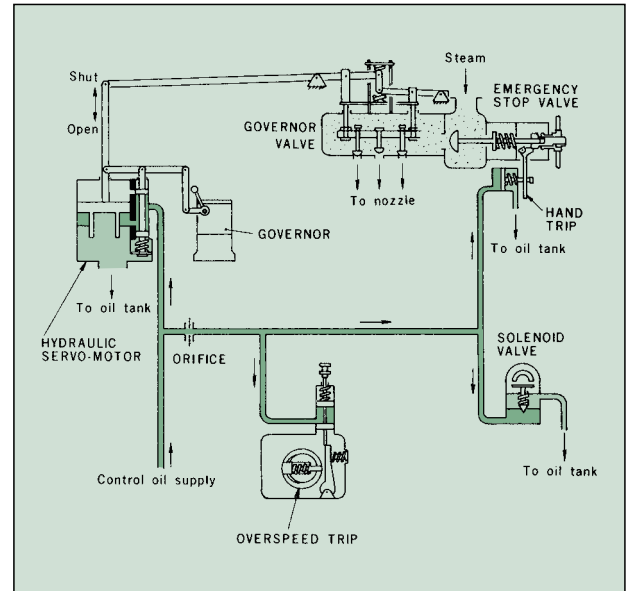


● Emergency Trip Device

For the purpose of safe turbine operation, an overspeed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

Actuation of overspeed trip : 110% of rated speed

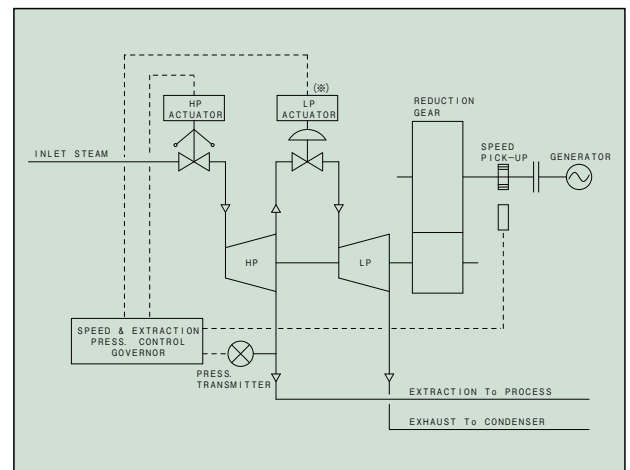
Actuation of low LO press. trip : Below 0.05 MPaG



● Extraction System

An extraction nozzle is provided at suitable intermediate stage of the turbine where a required steam pressure of the extraction steam can be obtained for process lines, feed heaters, and etc.

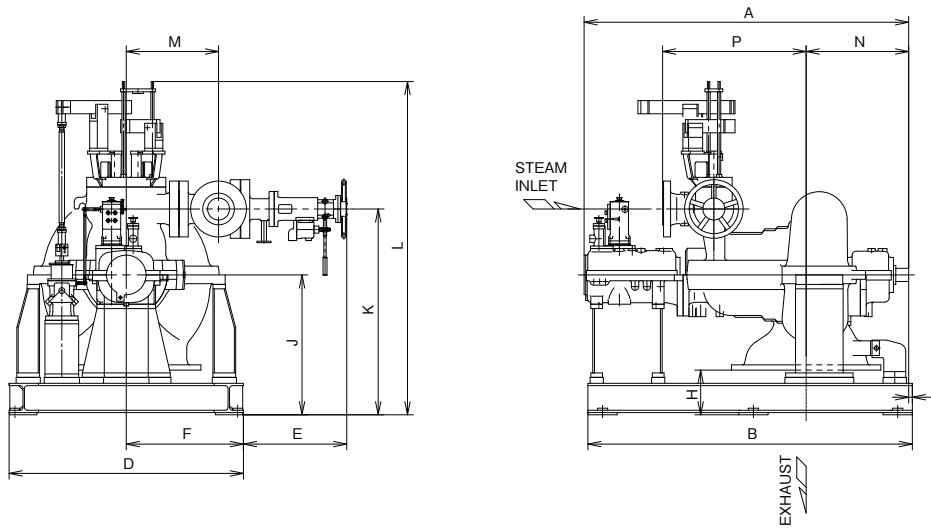
If the extraction pressure should be controlled at turbine side, the actuator shall be provided.



(※) : LP actuator is not provided when the bleeding steam pressure is controlled by the process side.

OUTLINE DIMENSIONS

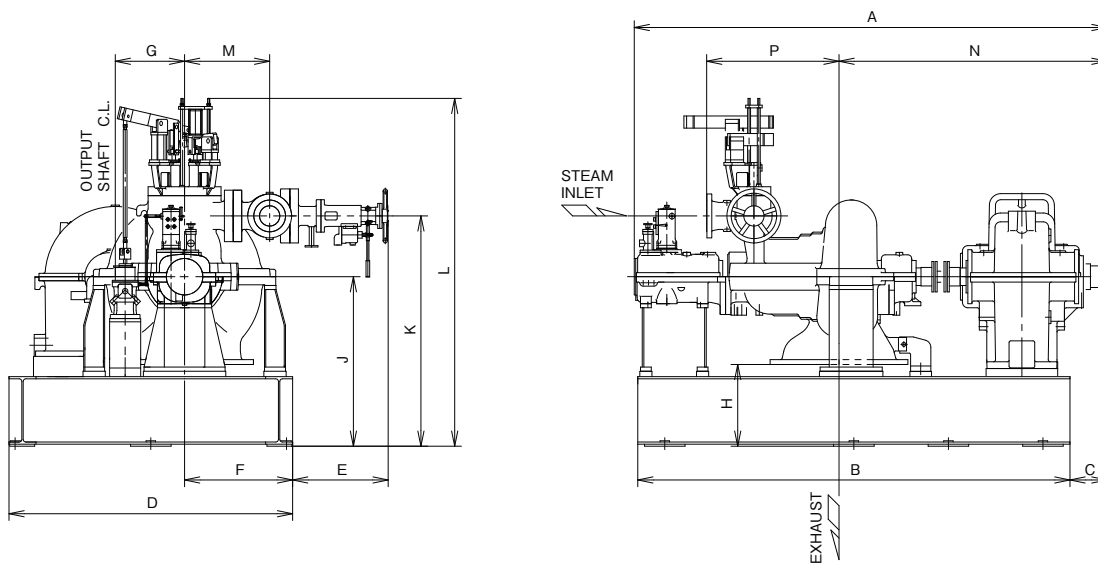
DN



Dimensions : mm

Model	A	B	C	D	E	F	H	J	K	L	M	N	P
DN 61	2213	2215	25	1600	710	800	305	955	1405	2275	630	700	980
DN 62	2313	2380	95	2000	740	1000	265	1065	1585	2470	735	785	985

DNG



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
DNG 61(B)(F)-50	3497	3200	274	2100	710	800	513	605	1255	1705	2575	630	1984	980
55	3697	3400	274	2400	710	800	570	605	1255	1705	2575	630	2184	980
DNG 62(B)(F)-55	3812	3400	384	2500	740	1000	570	565	1365	1885	2770	735	2284	985
65	3837	3400	409	2500	740	1000	668	565	1365	1885	2770	735	2309	985
DNG 63(B)(F)-70	4765	4300	375	3000	540	1100	560	565	1365	2065	3095	775	2775	1440

Rateau 7-stage with reduction gear BACK PRESSURE GENERATOR TURBINES

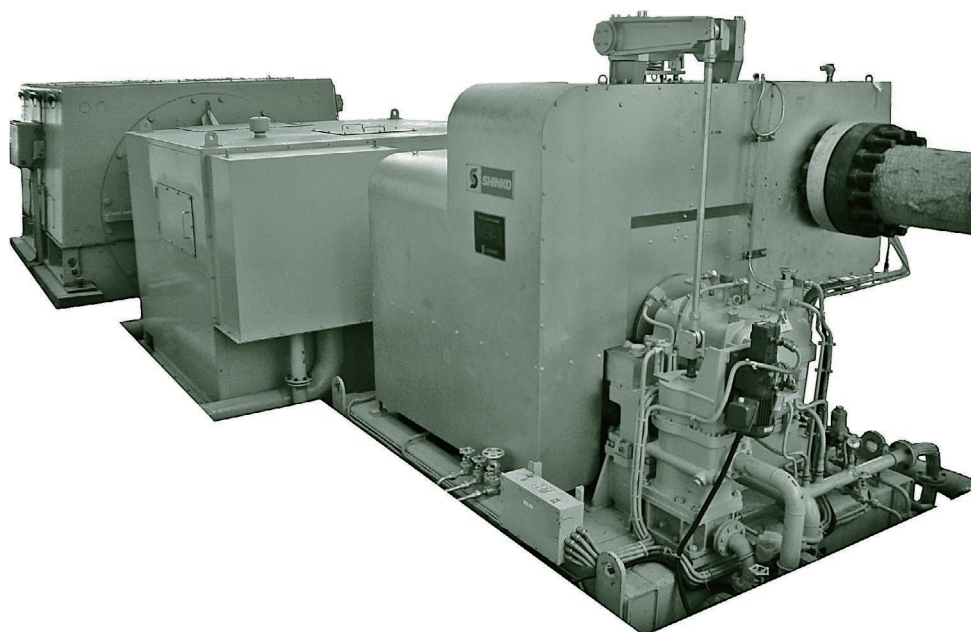
SHINKO DNG70

■ APPLICATIONS

Generators

■ SPECIFICATIONS

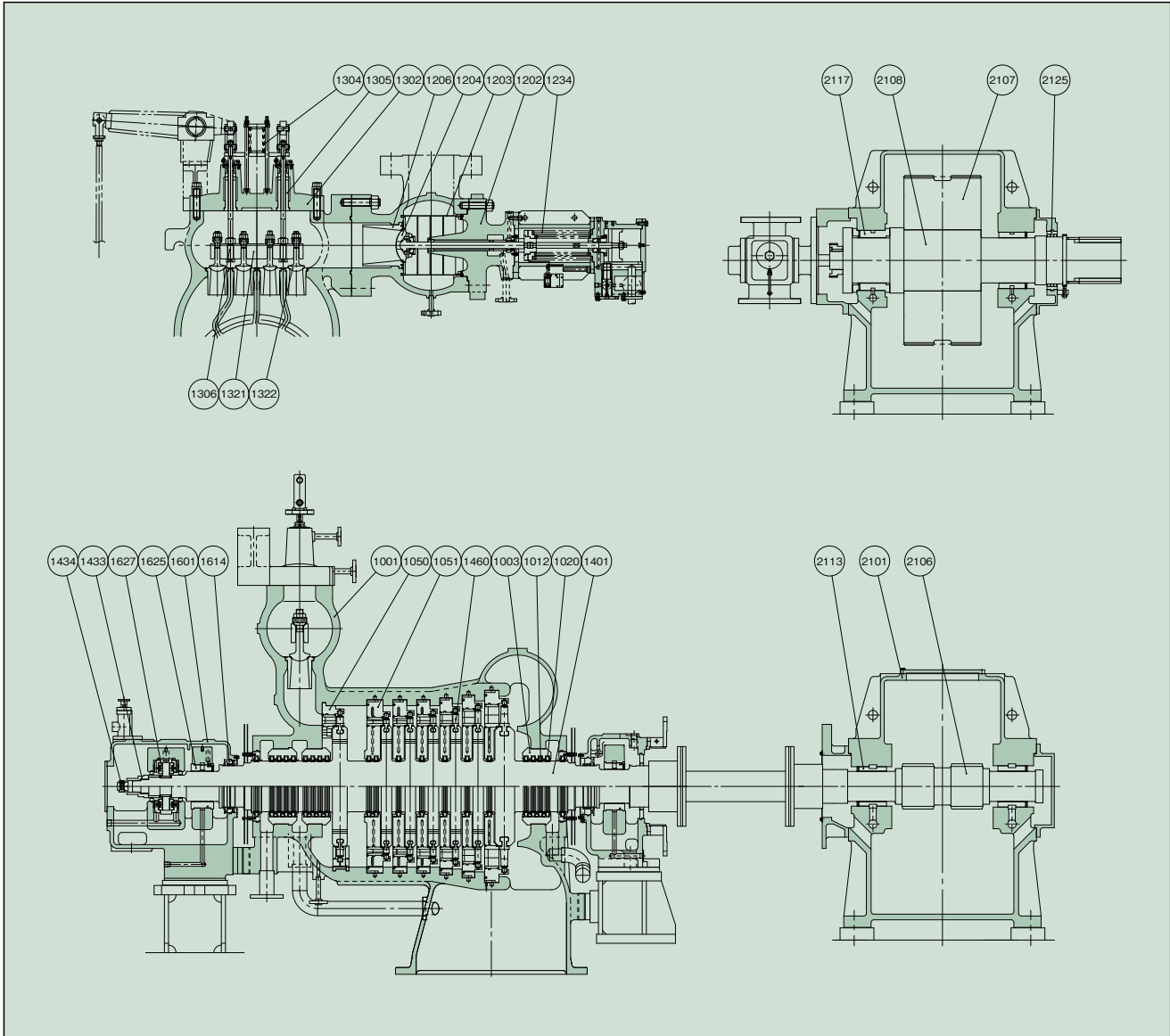
Max. output 30000 kW
 Max. exhaust steam pressure .. 0.5 MPaG
 Gland seal Labyrinth packing
 Lubrication system Forced lubrication
 Control system 4 valve nozzle control



■ GENERAL CHARACTERISTICS

Item	Model	DNG 76	DNG 77
Max. output	(kW)	20000	30000
Speed (turbine shaft)	(rpm)	6000	
Speed (output shaft)	(rpm)	1500, 1800	
Rotation of output shaft		CCW facing turbine toward driven machine	
Max. inlet steam pressure	(MPaG)	7.2	
Max. inlet steam temperature	(°C)	520	
Max. exhaust steam pressure	(MPaG)	0.5	
Steam inlet bore	(mm)	300	
Steam exhaust bore	(mm)	800	
Lubrication system		Forced lubrication	
Main LO pump	(m ³ /h x MPaG)	55 x 1.0	60 x 1.0
Aux. LO pump	(m ³ /h x MPaG)	45 x 1.0	50 x 1.0
Governor		Mechanical-hydraulic or electrical-hydraulic type	
AGMA service factor of gear		1.1	
Min. weight (with baseplate)	(kg)	21000	21000

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	4
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1401	TURBINE ROTOR	Cr-Mo STEEL		1
1012	LABYRINTH PACKING	Ni-Br CASTING		21SETS	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1020	SPRING	STAINLESS STEEL	SUS304	21SETS	1434	TRIP WEIGHT	Al-Cr-Mo STEEL	SACM645	1SET
1050	NOZZLE PLATE	STAINLESS STEEL WITH CARBON STEEL	SUS403 S25C	1SET	1460	MOVING BLADE	HEAT-RESISTING STEEL	SUH616	1SET
1051	NOZZLE DIAPHRAGM	"	"	1SET	1601	BEARING HOUSING	DUCTILE CAST IRON	FCD400	1SET
1202	EMERGENCY VALVE COVER	CAST STEEL	SCPH2	1	1614	OIL GUARD	BRONZE	CAC407	1SET
1203	STEAM STRAINER	STAINLESS STEEL	SUS410	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	1627	THRUST BEARING METAL	"	"	1SET
1206	VALVE SEAT	"	"	1	2101	REDUCTION GEAR CASING	CAST IRON	FC250	1SET
1234	SPRING	SPRING STEEL	SUP10	1SET	2106	PINION	Ni-Cr-Mo STEEL	SNCM420	1
1302	GOVERNOR VALVE CASING COVER	CAST STEEL	SCPH2	1	2107	WHEEL	Cr-Mo STEEL	SCM420	1
1304	SPRING	Si-Cr SPRING STEEL	SW03C-V	1	2108	WHEEL SHAFT	CARBON STEEL	S45C	1
1305	BUSH	Al-Cr-Mo STEEL	SACM645	2	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1306	VALVE STEM	"	"	2	2117	COMBINED BEARING METAL	"	"	1SET
1321	GOVERNOR VALVE LIFTING BEAM	CARBON STEEL	S45C	1	2125	OIL GUARD	ALUMINIUM	A5052	1SET

● Steam Temperature & Materials

Standard materials are shown on the table. However, in the case the steam temperature is more than 425°C, the materials are partially different from the table below:

PART NO.	NAME OF PART	MATERIAL	
		NAME	JIS
1001	TURBINE CASING	Cr-Mo CAST STEEL	SCPH21
1020	SPRING	INCONEL-X	
1050	NOZZLE PLATE	STAINLESS STEEL WITH ALLOY STEEL FORGING	SUS410J1 SFVAF12
1051	NOZZLE DIAPHRAGM	"	"
1202	EMERGENCY VALVE COVER	Cr-Mo CAST STEEL	SCPH21
1204	EMERGENCY VALVE	ALLOY STEEL FORGING	SFVAF12
1206	EMERGENCY VALVE SEAT	"	"
1302	GOVERNOR VALVE CASING COVER	Cr-Mo CAST STEEL	SCPH21
1306	VALVE STEM	HEAT-RESISTING STEEL	SUH616
1321	GOVERNOR VALVE LIFTING BEAM	ALLOY STEEL FORGING	SFVAF12
1322	GOVERNOR VALVE	"	"
1401	TURBINE ROTOR	Cr-Mo-V STEEL	

● Governor

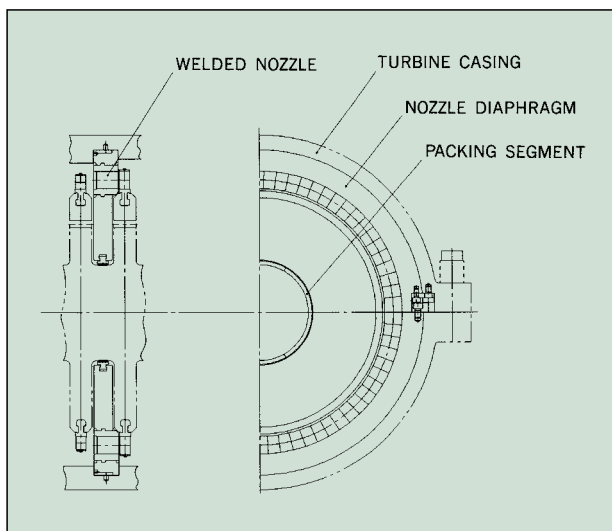
A mechanical-hydraulic or an electrical-hydraulic type is employed.

Max. speed regulation	0 ~ 4 %
Max. speed variation	± 0.25 %
Max. speed rise	7 %
Speed range	± 5 %
NEMA class	D

● Gland Seal

The turbine gland is equipped with several sets of labyrinth packing. And, the leaking steam is led to the gland condenser.

● Nozzle and Diaphragm

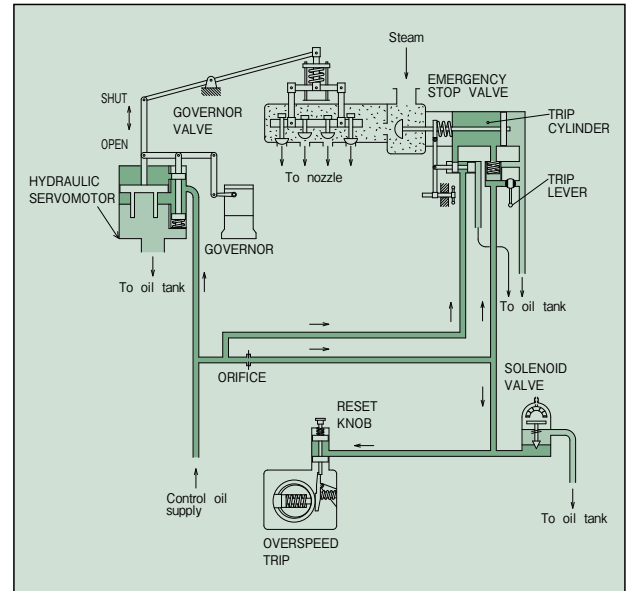


● Emergency Trip Device

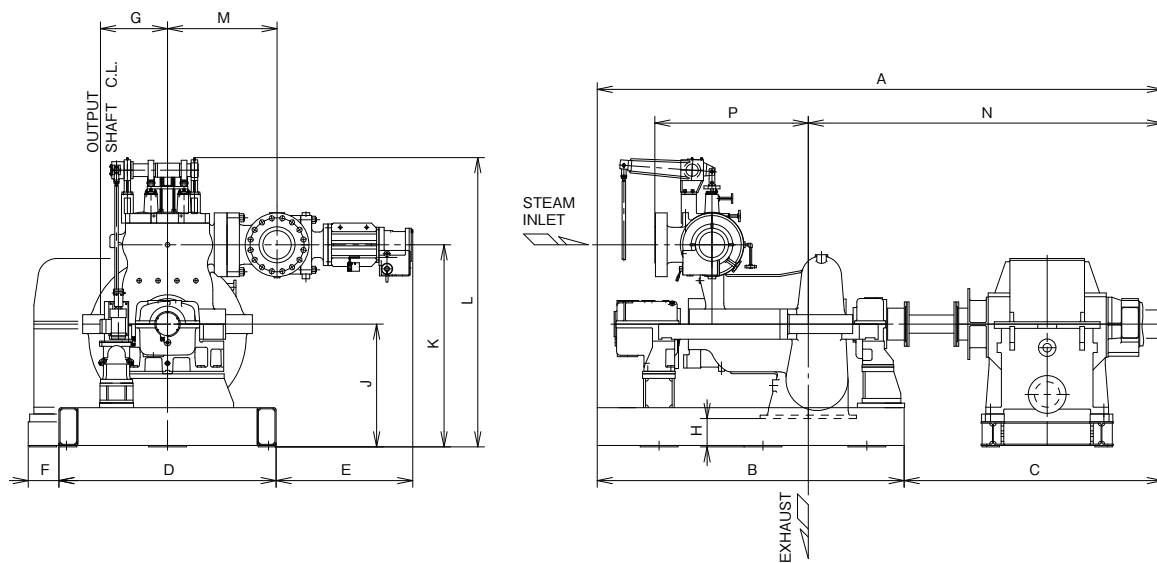
For the purpose of safe turbine operation, an overspeed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

Actuation of overspeed trip : 110% of rated speed

Actuation of low LO press. trip : Below 0.05 MPaG



■ OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
DNG 76	5866	3250	2616	2300	1447	175	630	300	1300	2140	3060	1160	3631	1625
DNG 77	5986	3250	2736	2300	1447	325	710	300	1300	2140	3060	1160	3751	1625

Note : P is a value of 1500Lb

Rateau 9-stage with reduction gear CONDENSING GENERATOR TURBINES

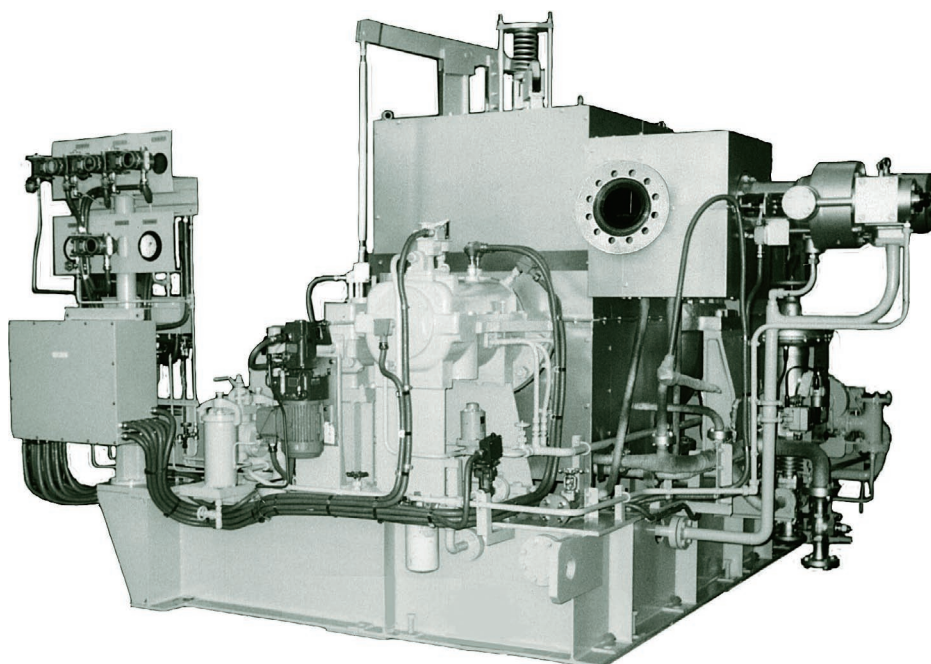
SHINKO DNG90

■ APPLICATIONS

Generators

■ SPECIFICATIONS

Max. output 10000 kW
 Max. exhaust vacuum 710 mmHg
 Gland seal Labyrinth packing
 Lubrication system Forced lubrication
 Control system 3 valve nozzle control

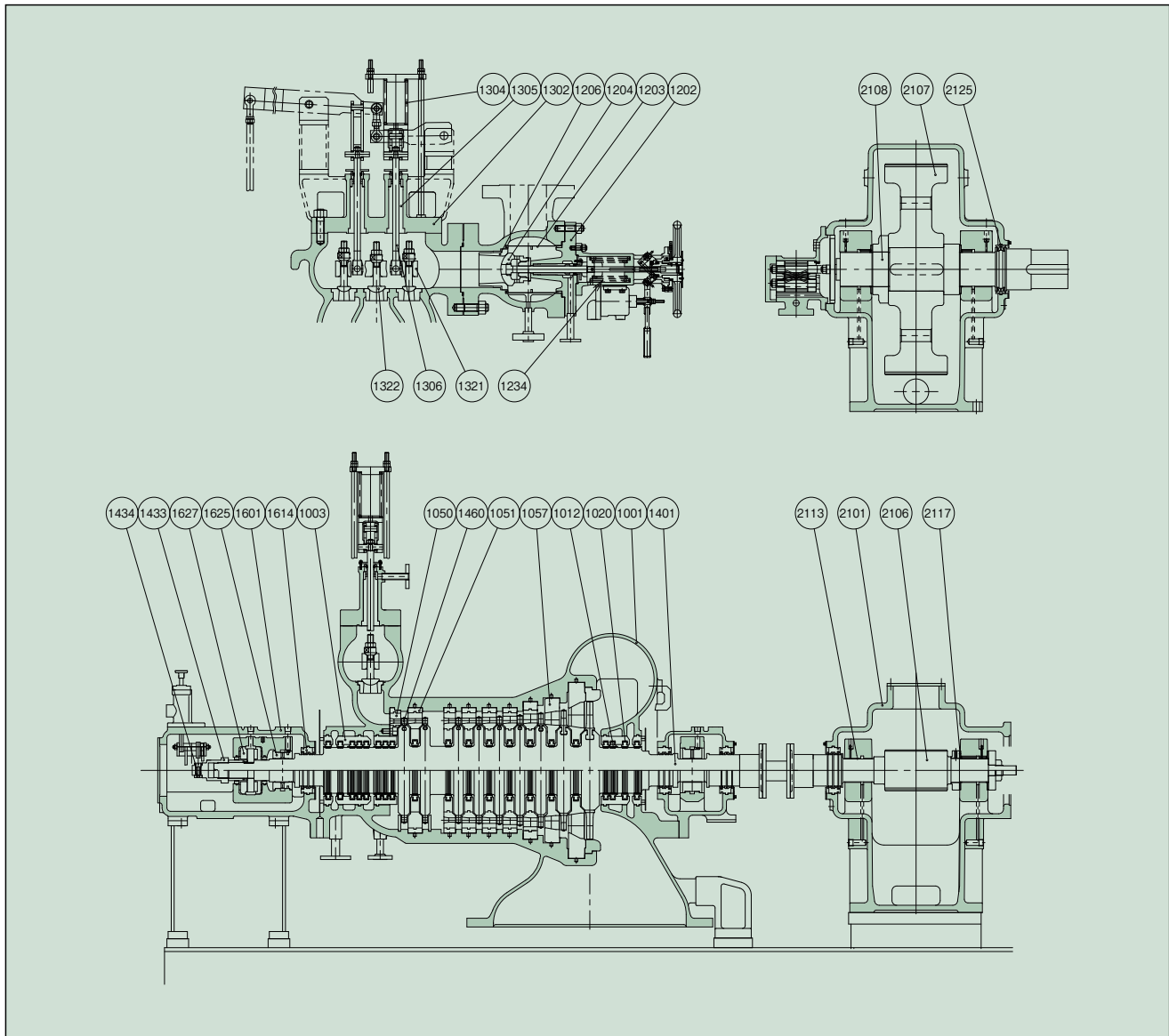


■ GENERAL CHARACTERISTICS

Item	Model	DNG 91 (B) (F)	DNG 92 (B) (F)	DNG 93 (B) (F)
Max. output	(kW)	3000	6000	10000
Speed (turbine shaft)	(rpm)	10000		7000
Speed (output shaft)	(rpm)	900 ~ 3600		
Rotation of output shaft		CCW facing turbine toward driven machine		
Max. inlet steam pressure	(MPaG)	6.2		
Max. inlet steam temperature	(°C)	510		
Max. exhaust vacuum	(mmHg)	710		
Steam inlet bore	(mm)	150	200	
Steam exhaust bore	(mm)	800	1000	850 x 1450
Lubrication system		Forced lubrication		
Main LO pump	(m ³ /h x MPaG)	20 x 0.8	25 x 0.8	35 x 0.8
Aux. LO pump	(m ³ /h x MPaG)	20 x 0.8	25 x 0.8	30 x 0.8
Governor		Mechanical-hydraulic or electrical-hydraulic type		
AGMA service factor of gear		1.1 ~ 2.0		
Min. weight (with baseplate)	(kg)	18000	20000	33000

Note : The Lub. Oil Unit for model DNG93 is of separate type.

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	3
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1401	TURBINE ROTOR	Cr-Mo STEEL		1
1012	LABYRINTH PACKING	Ni-Br CASTING		20SETS	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1020	SPRING	STAINLESS STEEL	SUS304	20SETS	1434	TRIP WEIGHT	TITANIUM		1SET
1050	NOZZLE PLATE	STAINLESS STEEL WITH CARBON STEEL	SUS403 S25C	1SET	1460	MOVING BLADE	STAINLESS STEEL HEAT-RESISTING STEEL	SUS410J1 SUH616	1SET
1051	NOZZLE DIAPHRAGM	"	"	1SET	1601	BEARING HOUSING	CAST IRON	FC200	1SET
1057	NOZZLE DIAPHRAGM	STAINLESS STEEL WITH DUCTILE CAST IRON	SUS430 FCD400	1SET	1614	OIL GUARD	BRONZE	CAC407	1SET
1202	EMERGENCY VALVE COVER	CAST STEEL	SCPH2	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1203	STEAM STRAINER	STAINLESS STEEL	SUS410	1	1627	THRUST BEARING METAL	"	"	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	2101	REDUCTION GEAR CASING	CAST IRON	FC200	1SET
1206	VALVE SEAT	"	"	1	2106	PINION	Ni-Cr-Mo STEEL	SNM439	1
1234	SPRING	SPRING STEEL	SUP10	1 SET	2107	WHEEL	FORGED STEEL	SF640B	1
1302	GOVERNOR VALVE CASING COVER	CAST STEEL	SCPH2	1	2108	WHEEL SHAFT	"	SF540A	1
1304	SPRING	Cr-V SPRING STEEL	SWOCV-V	1	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1305	BUSH	A δ -Cr-Mo STEEL	SACM645	2	2117	THRUST BEARING METAL	"	"	1SET
1306	VALVE STEM	"	"	2	2125	OIL GUARD	CAST IRON	FC200	1SET
1321	GOVERNOR VALVE LIFTING BEAM	CARBON STEEL	S45C	1					

● Steam Temperature & Materials

Standard materials are shown on the table. However, in the case the steam temperature is more than 425°C, the materials are partially different from the table below:

PART NO.	NAME OF PART	MATERIAL	
		NAME	JIS
1001	TURBINE CASING	Cr-Mo CAST STEEL	SCPH21
1020	SPRING	INCONEL-X	
1050	NOZZLE PLATE	STAINLESS STEEL WITH ALLOY STEEL FORGING	SUS410J1 SFVAF12
1051	NOZZLE DIAPHRAGM	"	"
1202	EMERGENCY VALVE COVER	Cr-Mo CAST STEEL	SCPH21
1204	EMERGENCY VALVE	ALLOY STEEL FORGING	SFVAF12
1206	EMERGENCY VALVE SEAT	"	"
1302	GOVERNOR VALVE CASING COVER	Cr-Mo CAST STEEL	SCPH21
1306	VALVE STEM	HEAT-RESISTING STEEL	SUH616
1321	GOVERNOR VALVE LIFTING BEAM	ALLOY STEEL FORGING	SFVAF12
1322	GOVERNOR VALVE	"	"
1401	TURBINE ROTOR	Cr-Mo-V STEEL	

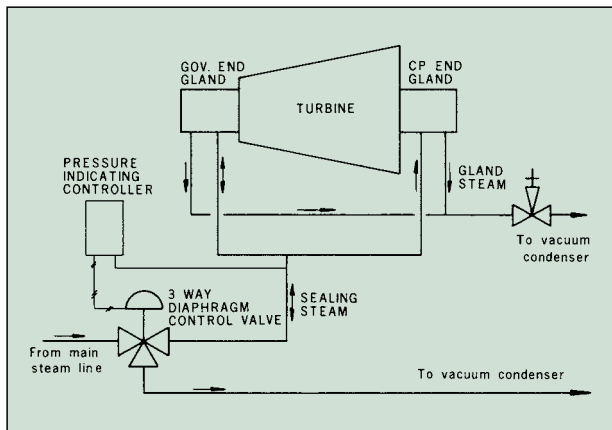
● Governor

A mechanical-hydraulic or an electrical-hydraulic type is employed.

Max. speed regulation	0 ~ 4 %
Max. speed variation	± 0.25 %
Max. speed rise	7 %
Speed range	± 5 %
NEMA class	D

● Gland Seal

The turbine gland is equipped with several sets of labyrinth packing. Since the exhaust steam is led to the vacuum condenser, the coupling end creates a vacuum at all times. And, the governor end is usually under positive pressure, but at times forms a vacuum during a low load of the turbine. Therefore, consideration has been given to prevent air from entering the turbine at any operating conditions using a sealing steam pressure controlling device.

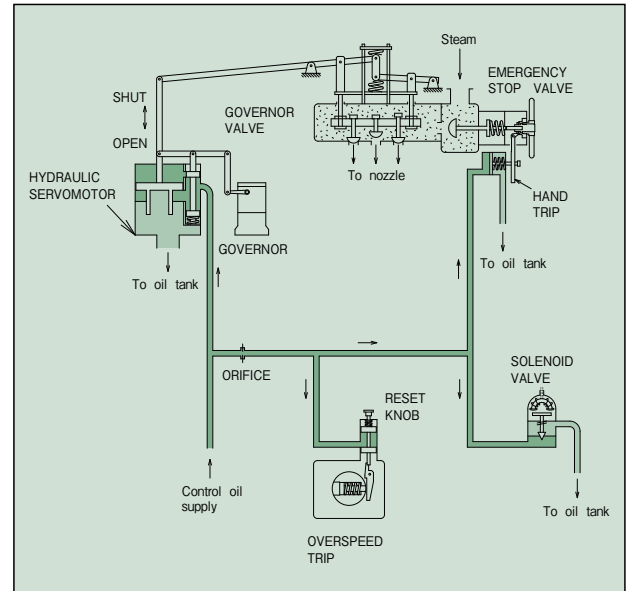


● Emergency Trip Device

For the purpose of safe turbine operation, an overspeed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

Actuation of overspeed trip : 110% of rated speed

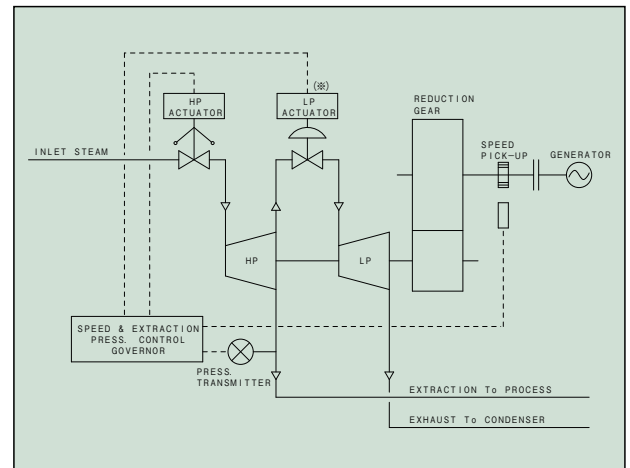
Actuation of low LO press. trip : Below 0.05 MPaG



● Extraction System

An extraction nozzle is provided at suitable intermediate stage of the turbine where a required steam pressure of the extraction steam can be obtained for process lines, feed heaters, and etc.

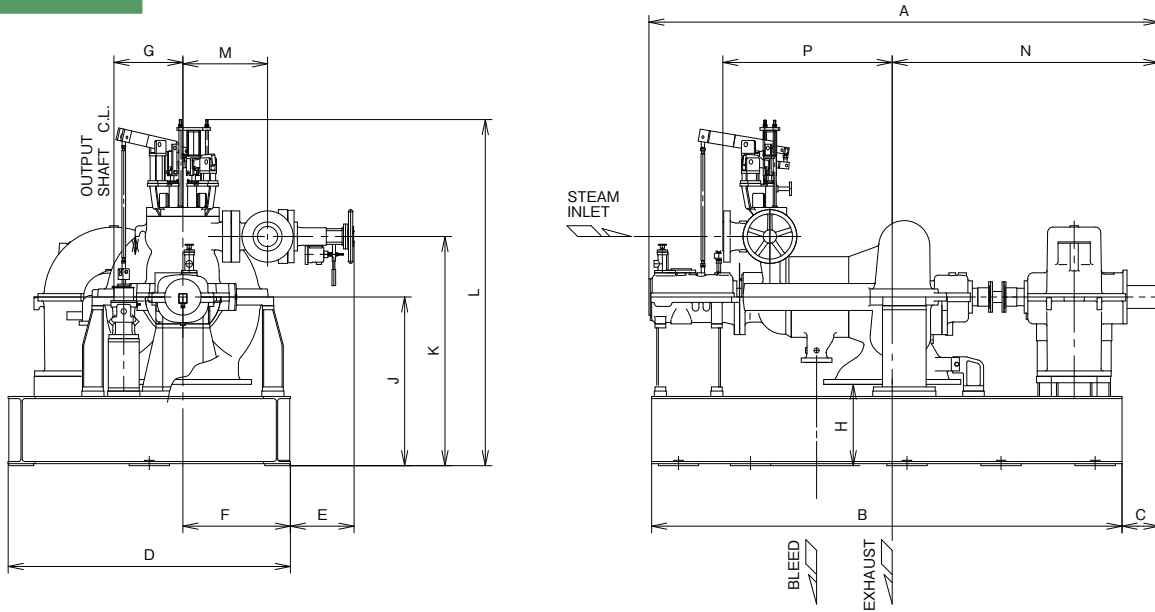
If the extraction pressure should be controlled at turbine side, the actuator shall be provided.



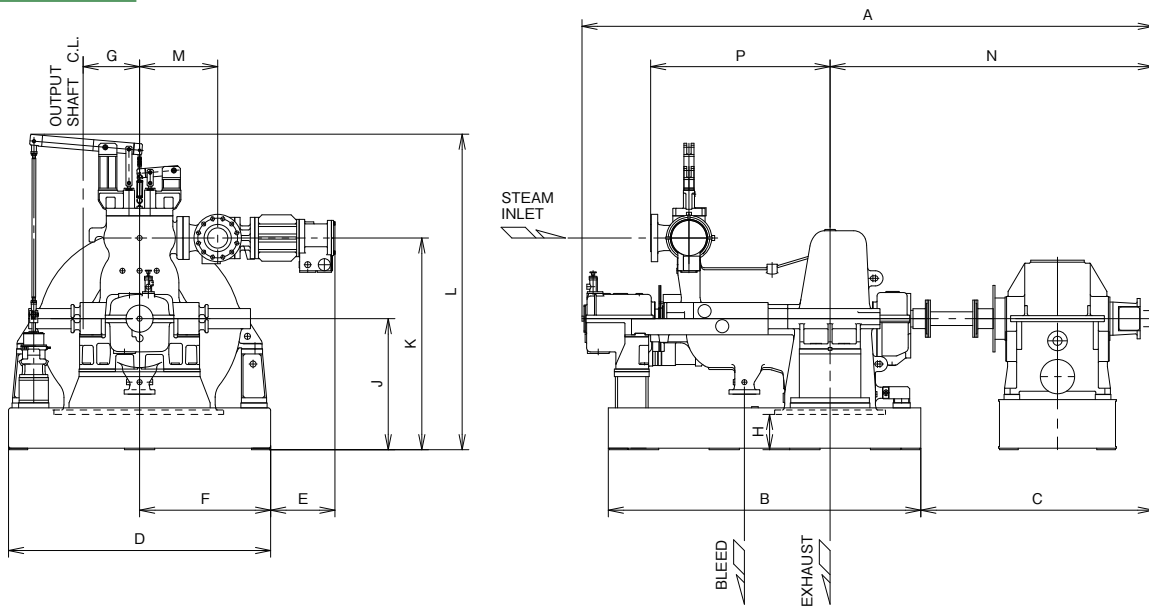
(※) : LP actuator is not provided when the bleeding steam pressure is controlled by the process side.

OUTLINE DIMENSIONS

DNG 91 (B) (F)
92(B) (F)
93(F)



DNG 93(B)



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
DNG 91 (B) (F)-50	3794	3500	274	2100	710	800	513	605	1255	1705	2575	630	1984	1260
55	3981	3600	349	2400	710	800	570	605	1255	1705	2575	630	2184	1260
DNG 92(B) (F)-65	4478	4100	375	2800	740	1000	668	565	1365	2005	2905	735	2315	1620
DNG 93(F) -70	5711	5150	400	2700	838	1100	500(50Hz) 560(60Hz)	565	1365	2115	3150	775	3050	2020
DNG 93(B) -70	5667	3100	2306	2600	638	1300	500(50Hz) 560(60Hz)	350	1300	2100	3130	775	3206	1780

Note : For model DNG 93(B)-70, the reduction gear is of separate type due to the limitation of transportation.

Rateau 12-stage with reduction gear CONDENSING GENERATOR TURBINES

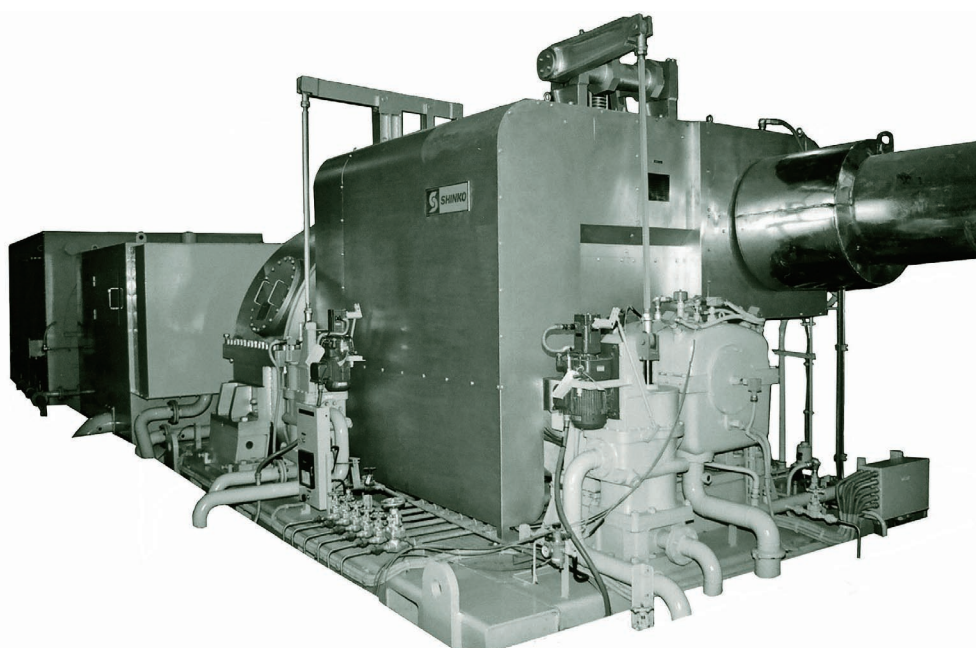
SHINKO DNG120

■ APPLICATIONS

Generators

■ SPECIFICATIONS

Max. output 30000 kW
 Max. exhaust vacuum 710 mmHg
 Gland seal Labyrinth packing
 Lubrication system Forced lubrication
 Control system 4 valve nozzle control

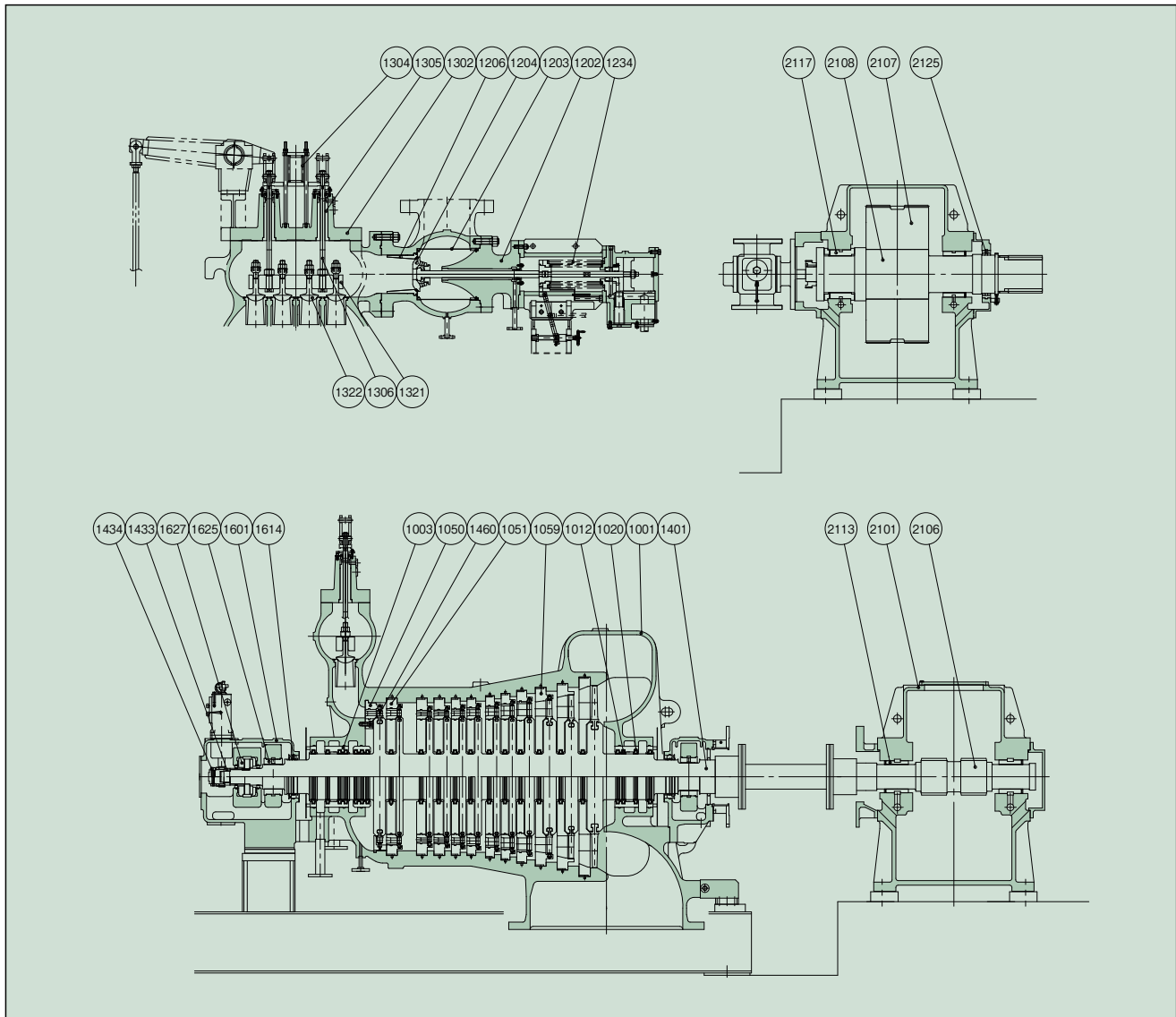


■ GENERAL CHARACTERISTICS

Item	Model	DNG 124(B) (F)	DNG 125(B) (F)	DNG 126(B) (F)	DNG 127(B) (F)
Max. output	(kW)	12000	16000	20000	30000
Speed (turbine shaft)	(rpm)	6000			
Speed (output shaft)	(rpm)	1500, 1800			
Rotation of output shaft		CCW facing turbine toward driven machine			
Max. inlet steam pressure	(MPaG)	7.2			
Max. inlet steam temperature	(°C)	520			
Max. exhaust vacuum	(mmHg)	710			
Steam inlet bore (※)	(mm)	300			
Steam exhaust bore (※)	(mm)	1000 × 1550	1080 × 1590	1020 × 2130	
Lubrication system		Forced lubrication			
Main LO pump	(m ³ /h × MPaG)	40 × 1.0	45 × 1.0	55 × 1.0	60 × 1.0
Aux. LO pump	(m ³ /h × MPaG)	30 × 1.0	35 × 1.0	45 × 1.0	50 × 1.0
Governor		Mechanical-hydraulic or electrical-hydraulic type			
AGMA service factor of gear		1.1			
Min. weight(with baseplate) (※) (kg)		32000	34000	38000	40000

(※) : The inlet bore, exhaust bore and weight differs depending on its steam condition and flow.

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	4
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1401	TURBINE ROTOR	Cr-Mo STEEL		1
1012	LABYRINTH PACKING	Ni-Br CASTING		22SETS	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1020	SPRING	STAINLESS STEEL	SUS304	22SETS	1434	TRIP WEIGHT	A α -Cr-Mo STEEL	SACM645	1SET
1050	NOZZLE PLATE	STAINLESS STEEL WITH CARBON STEEL	SUS403 S25C	1SET	1460	MOVING BLADE	STAINLESS STEEL HEAT-RESISTING STEEL	SUS410J1 SUH616	1SET
1051	NOZZLE DIAPHRAGM	"	"	1SET	1601	BEARING HOUSING	DUCTILE CAST IRON	FCD400	1SET
1059	NOZZLE DIAPHRAGM	STAINLESS STEEL WITH DUCTILE CAST IRON	SUS430 FCD400	1SET	1614	OIL GUARD	BRONZE	CAC407	1SET
1202	EMERGENCY VALVE COVER	CAST STEEL	SCPH2	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1203	STEAM STRAINER	STAINLESS STEEL	SUS410	1	1627	THRUST BEARING METAL	"	"	1SET
1204	EMERGENCY VALVE	"	SUS420J2	1	2101	REDUCTION GEAR CASING	CAST IRON	FC250	1SET
1206	VALVE SEAT	"	"	1	2106	PINION	Ni-Cr-Mo STEEL	SNCM420	1
1234	SPRING	SPRING STEEL	SUP10	1 SET	2107	WHEEL	Cr-Mo STEEL	SCM420	1
1302	GOVERNOR VALVE CASING COVER	CAST STEEL	SCPH2	1	2108	WHEEL SHAFT	CARBON STEEL	S45C	1
1304	SPRING	SPRING STEEL	SUP10	1	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1305	BUSH	A α -Cr-Mo STEEL	SACM645	2	2117	COMBINED BEARING METAL	"	"	1SET
1306	VALVE STEM	"	"	2	2125	OIL GUARD	ALUMINIUM	A5052	1SET
1321	GOVERNOR VALVE LIFTING BEAM	CARBON STEEL	S45C	1					

● Steam Temperature & Materials

Standard materials are shown on the table. However, in the case the steam temperature is more than 425°C, the materials are partially different from the table below:

PART NO.	NAME OF PART	MATERIAL	
		NAME	JIS
1001	TURBINE CASING	Cr-Mo CAST STEEL	SCPH21
1020	SPRING	INCONEL-X	
1050	NOZZLE PLATE	STAINLESS STEEL WITH ALLOY STEEL FORGING	SUS410J1 SFVAF12
1051	NOZZLE DIAPHRAGM	"	"
1202	EMERGENCY VALVE COVER	Cr-Mo CAST STEEL	SCPH21
1204	EMERGENCY VALVE	ALLOY STEEL FORGING	SFVAF12
1206	EMERGENCY VALVE SEAT	"	"
1302	GOVERNOR VALVE CASING COVER	Cr-Mo CAST STEEL	SCPH21
1306	VALVE STEM	HEAT-RESISTING STEEL	SUH616
1321	GOVERNOR VALVE LIFTING BEAM	ALLOY STEEL FORGING	SFVAF12
1322	GOVERNOR VALVE	"	"
1401	TURBINE ROTOR	Cr-Mo-V STEEL	

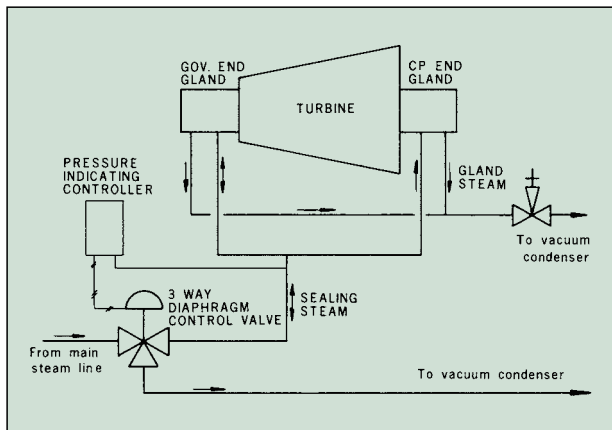
● Governor

A mechanical-hydraulic or an electrical-hydraulic type is employed.

Max. speed regulation	0 ~ 4 %
Max. speed variation	± 0.25 %
Max. speed rise	7 %
Speed range	± 5 %
NEMA class	D

● Gland Seal

The turbine gland is equipped with several sets of labyrinth packing. Since the exhaust steam is led to the vacuum condenser, the coupling end creates a vacuum at all times. And, the governor end is usually under positive pressure, but at times forms a vacuum during a low load of the turbine. Therefore, consideration has been given to prevent air from entering the turbine at any operating conditions using a sealing steam pressure controlling device.

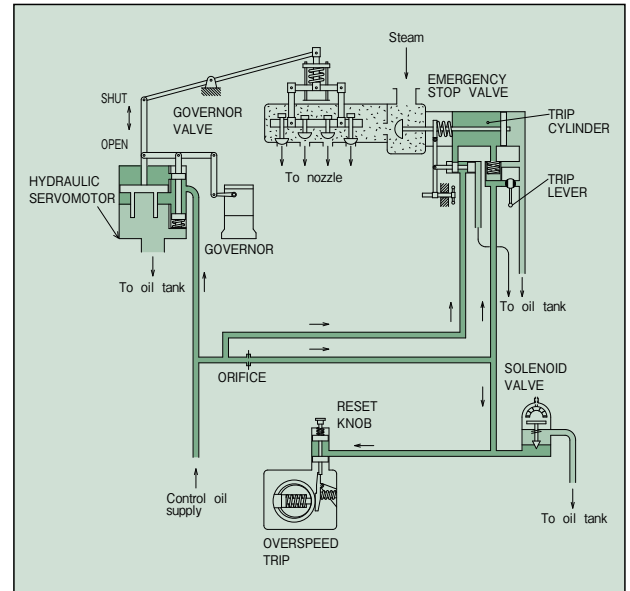


● Emergency Trip Device

For the purpose of safe turbine operation, an overspeed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

Actuation of overspeed trip : 110% of rated speed

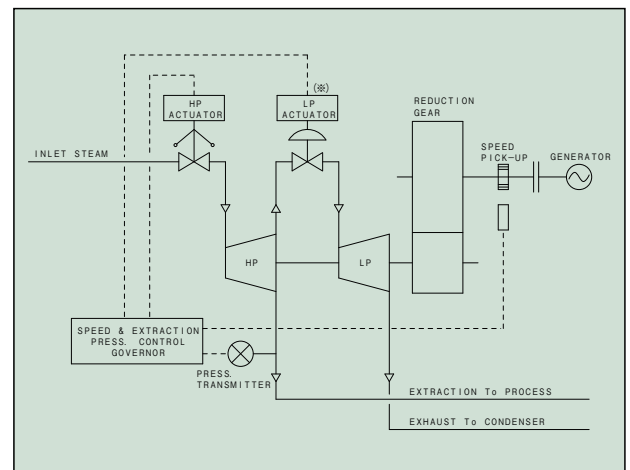
Actuation of low LO press. trip : Below 0.05 MPaG



● Extraction System

An extraction nozzle is provided at suitable intermediate stage of the turbine where a required steam pressure of the extraction steam can be obtained for process lines, feed heaters, and etc.

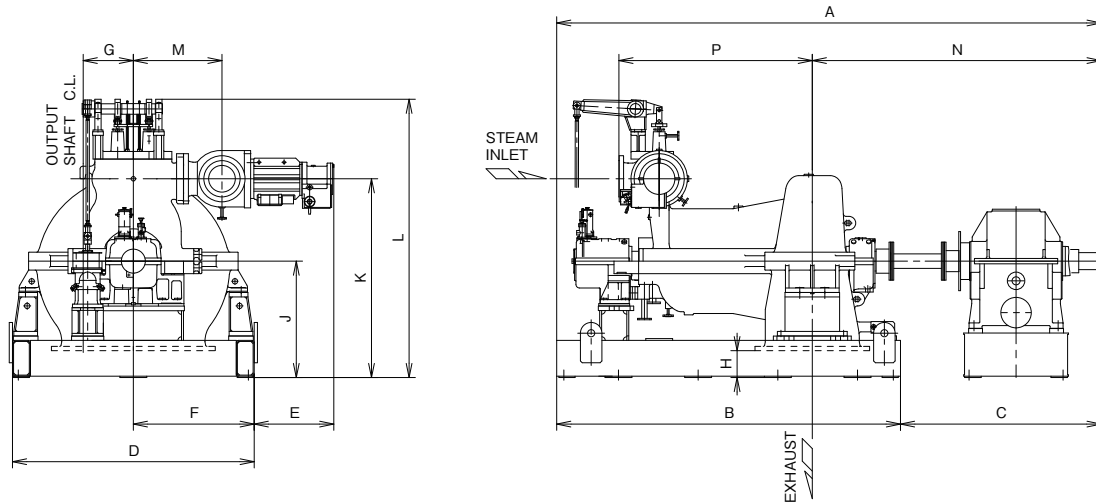
If the extraction pressure should be controlled at turbine side, the actuator shall be provided.



(※) : LP actuator is not provided when the bleeding steam pressure is controlled by the process side.

OUTLINE DIMENSIONS

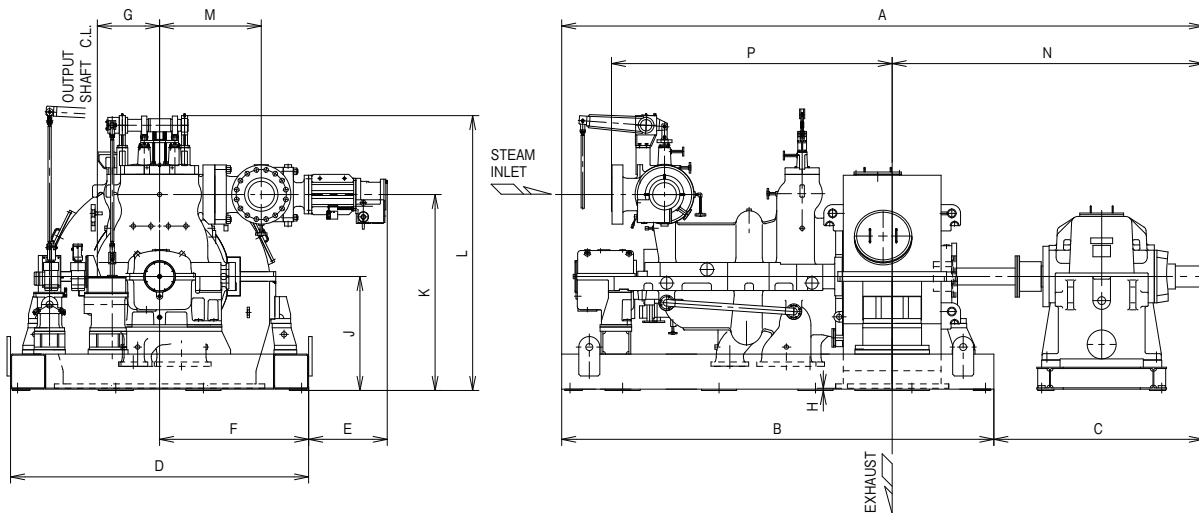
DNG 124,125



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
DNG 124	6081	3840	2241	2700	889	1350	560	300	1300	2220	3110	990	3226	2160
DNG 125	6191	3900	2291	2800	990	1400	560	275	1300	2220	3110	990	3291	2200

DNG 126,127



Dimensions : mm

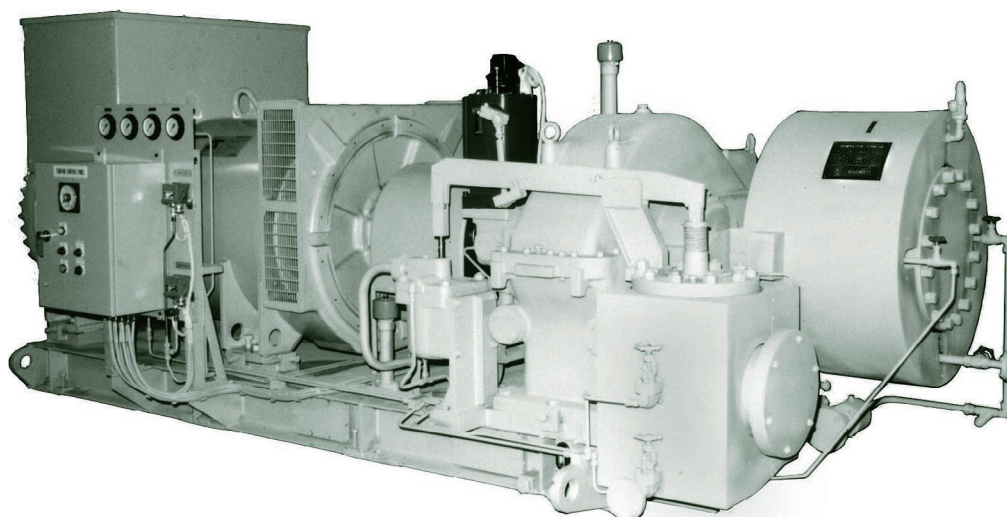
Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
DNG 126	7261	4930	2331	3400	900	1700	630	25	1300	2235	3150	1160	3491	3202
DNG 127	7321	4930	2391	3400	900	1700	710	25	1300	2235	3150	1160	3551	3202

Curtis single-stage with integral reduction gear STEAM TURBINES

SHINKO RB

■ APPLICATIONS

Generators
Pumps
Others



■ SPECIFICATIONS

Max. output 2000 kW
 Max. exhaust steam pressure .. 0.5 MPaG
 Gland seal Labyrinth packing
 Lubrication system Forced lubrication

■ GENERAL CHARACTERISTICS

Item	Model	RB 4	RB 5
Max. output	(kW)	1200	2000
Max. speed (turbine shaft)	(rpm)	7000	
Speed (output shaft)	(rpm)	870 ~ 2000	
Rotation of output shaft		CCW facing turbine toward driven machine	
Max. inlet steam pressure	(MPaG)	3.3	
Max. inlet steam temperature	(°C)	425	
Max. exhaust steam pressure	(MPaG)	0.5	
Steam inlet bore	(mm)	150	200
Steam exhaust bore	(mm)	400	400
Lubrication system		Forced lubrication	
Main LO pump	(m ³ /h x MPaG)	6 x 0.2	6 x 0.2
Prim. LO pump	(m ³ /h x MPaG)	6 x 0.04	6 x 0.04
Governor		Woodward UG	
Weight (without generator)	(kg)	3700	4600

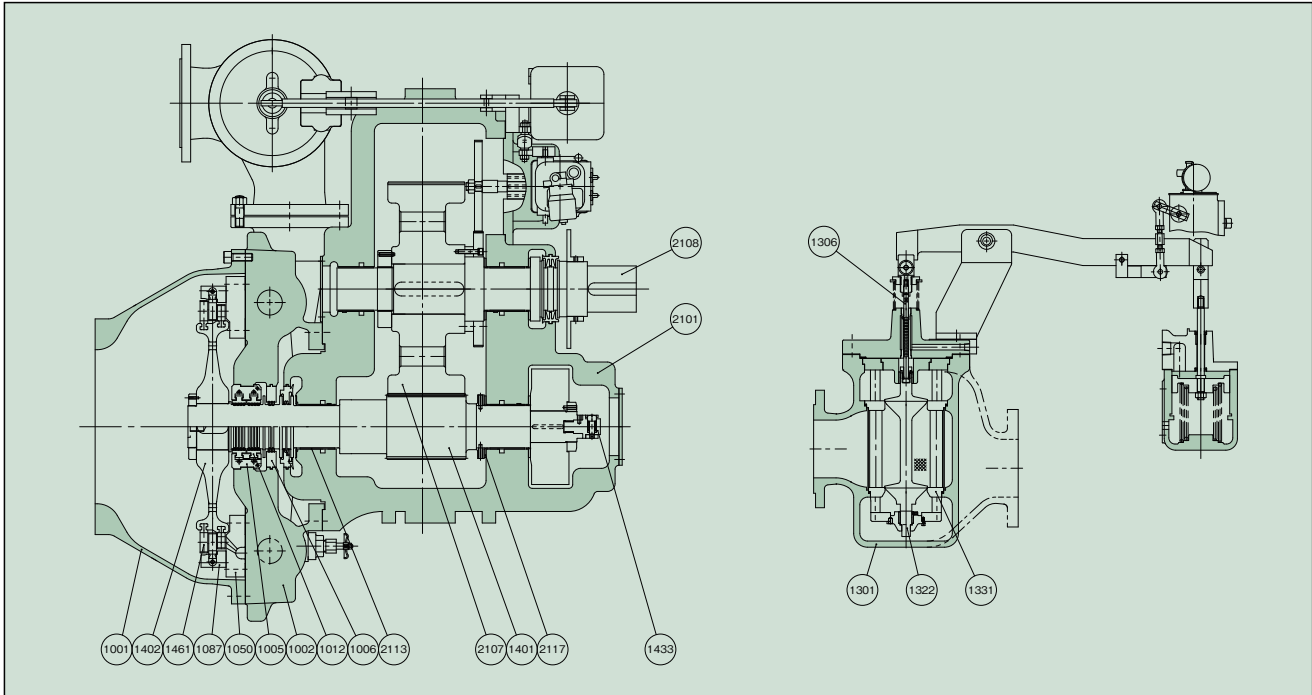
● Governor

Max. speed regulation 0.5%, 0 ~ 4 %
 Max. speed variation ±0.25%
 Max. speed rise 7%
 Speed range +5 ~ -50%
 NEMA class D

● Emergency Trip Device

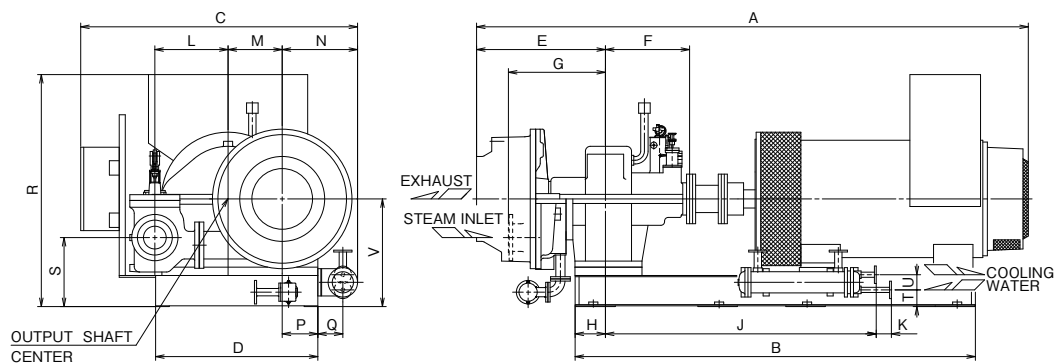
Overspeed trip 115% of rated speed
 Low LO pressure trip Below 0.05 MPaG

DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	EXHAUST CASING	DUCTILE CAST IRON	FCD400	1SET	1331	GOVERNOR VALVE LINER	STAINLESS STEEL	SUS403	1
1002	STEAM CHEST	CAST STEEL	SCPH2	1SET	1401	TURBINE SHAFT	Ni-Cr-Mo STEEL	SNCM439	1
1005	PACKING CASE	CARBON STEEL	S35C	1SET	1402	DISC ROTOR	Ni-Cr STEEL	SNC836	1
1006	STEAM GUARD	BRASS PLATE WITH STEEL	C7521P S35C	1SET	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1012	LABYRINTH PACKING	Ni-Br CASTING		4SETS	1461	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1050	NOZZLE	STAINLESS STEEL	SUS403	1	2101	REDUCTION GEAR CASING	CAST IRON	FC200	1SET
1087	STATIONARY BLADE SEAT	STEEL	SS400	1	2107	WHEEL	Cr-Mo STEEL	SCM440	1
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	2108	OUTPUT SHAFT	FORGED STEEL	SF540A	1
1306	GOVERNOR VALVE STEM	STELLITE		1	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1	2117	THRUST BEARING METAL	"	"	1SET

OUTLINE DIMENSIONS



Dimensions : mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
RB 4	3430	2250	1826	1070	850	555	640	200	1786	100	483	357	497	235	165	1540	455	110	100	710
RB 5	4209	3080	2211	1420	915	630	775	240	1890	100	455	489	522	260	165	1800	490	110	100	830

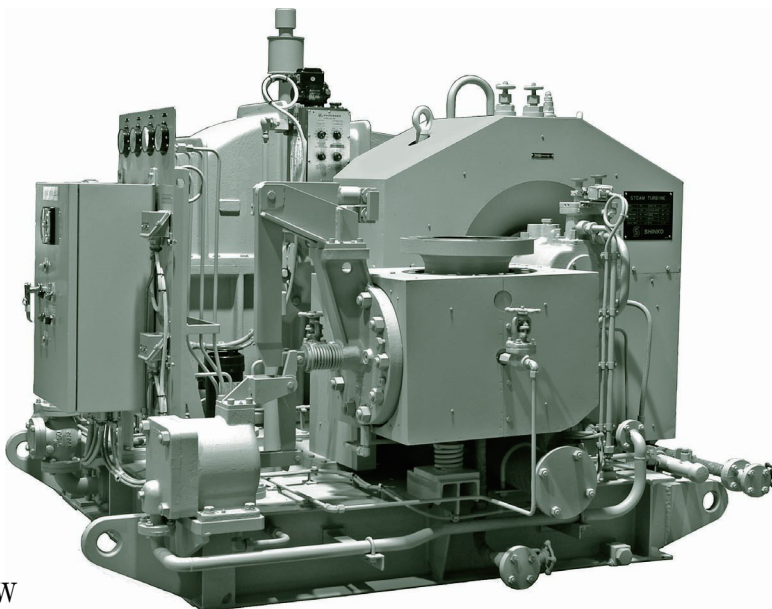
SHINKO IND.LTD.

Curtis single-stage with integral reduction gear STEAM TURBINES

SHINKO RK

■ APPLICATIONS

Generators
Pumps
Others



■ SPECIFICATIONS

Max. output 3000 kW
Max. exhaust steam pressure .. 0.5 MPaG
Gland seal Labyrinth packing
Lubrication system Forced lubrication

■ GENERAL CHARACTERISTICS

Item	Model	RK 2
Max. output	(kW)	3000
Max. speed (turbine shaft)	(rpm)	7000
Speed (output shaft)	(rpm)	870 ~ 2000
Rotation of output shaft		CCW facing turbine toward driven machine
Max. inlet steam pressure	(MPaG)	3.3
Max. inlet steam temperature	(°C)	425
Max. exhaust steam pressure	(MPaG)	0.5
Steam inlet bore	(mm)	200
Steam exhaust bore	(mm)	500
Lubrication system		Forced lubrication
Main LO pump	(m ³ /h x MPaG)	10 x 0.2
Prim. LO pump	(m ³ /h x MPaG)	6 x 0.04
Governor		Woodward UG or PG
Weight (with baseplate)	(kg)	4700

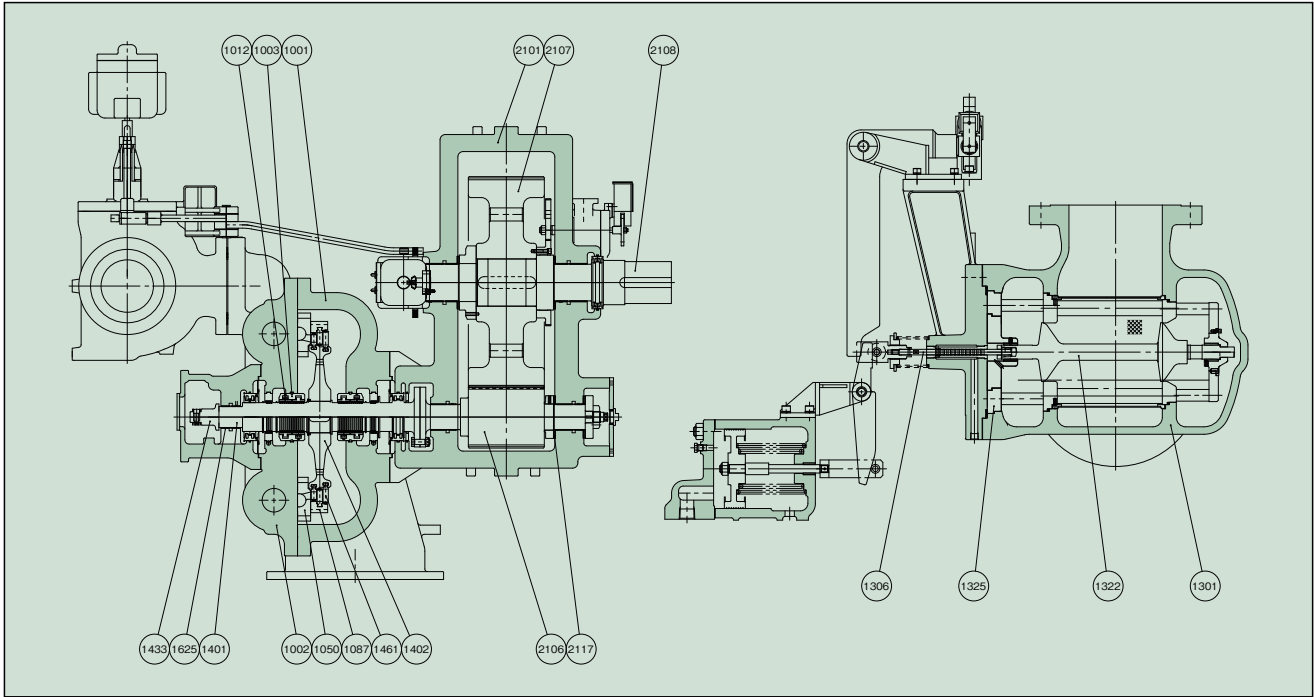
● Governor

Max. speed regulation 0.5%, 0 ~ 4 %
Max. speed variation ±0.25%
Max. speed rise 7%
Speed range +5 ~ -50%
NEMA class D

● Emergency Trip Device

Overspeed trip 115% of rated speed
Low LO pressure trip Below 0.05 MPaG

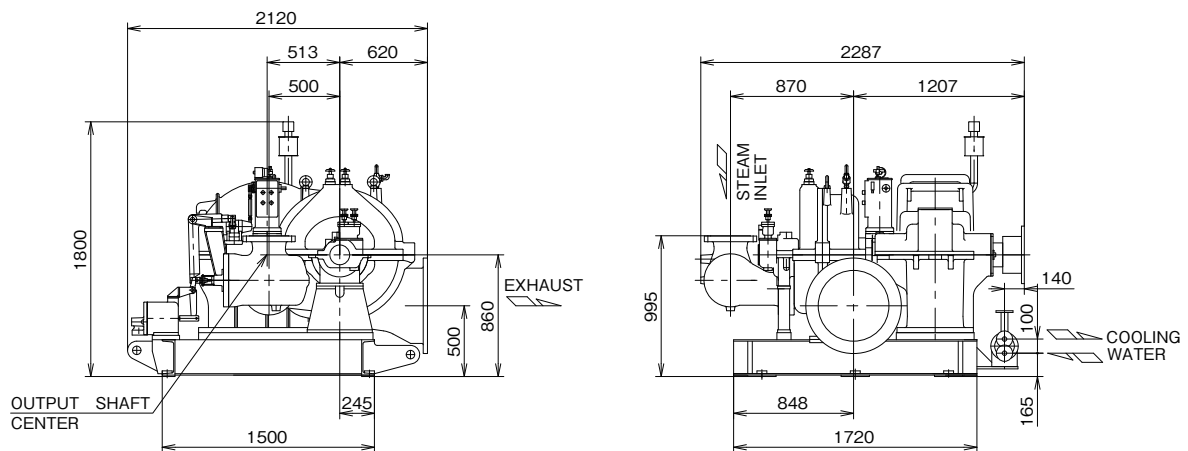
DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ.NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1401	TURBINE SHAFT	FORGED STEEL	SF540A	1
1002	STEAM CHEST	〃	〃	1SET	1402	DISC ROTOR	Ni-Cr STEEL	SNC836	1
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1012	LABYRINTH PACKING	Ni-Br CASTING		4SETS	1461	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1050	NOZZLE	STAINLESS STEEL	SUS403	1	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1087	STATIONARY BLADE SEAT	STEEL	SS400	1	2101	REDUCTION GEAR CASING	CAST IRON	FC200	1SET
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	2106	PINION & SHAFT	Ni-Cr-Mo STEEL	SNCM439	1
1306	GOVERNOR VALVE STEM	STELLITE		1	2107	WHEEL	Cr-Mo STEEL	SCM440	1
1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1	2108	OUTPUT SHAFT	FORGED STEEL	SF540A	1
1325	GOVERNOR VALVE LINER	〃	SUS403	1	2117	THRUST BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET

OUTLINE DIMENSIONS

Dimensions : mm



SHINKO IND.LTD.

Rateau 3-stage with integral reduction gear STEAM TURBINES

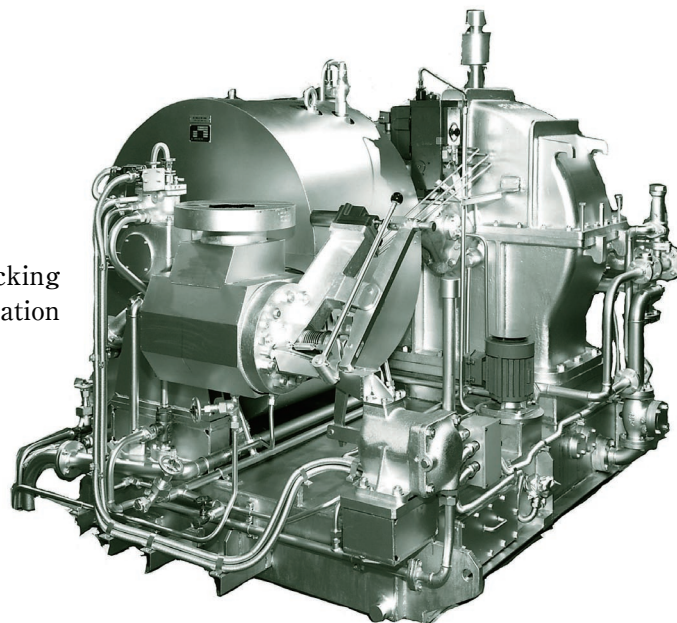
SHINKO RKR

■ APPLICATIONS

Generators
Pumps
Others

■ SPECIFICATIONS

Max. output 3000 kW
Max. exhaust steam pressure .. 0.05 MPaG
Gland seal Labyrinth packing
Lubrication system Forced lubrication



■ GENERAL CHARACTERISTICS

Item	Model	RKR
Max. output	(kW)	3000
Max. speed (turbine shaft)	(rpm)	7200
Speed (output shaft)	(rpm)	870 ~ 2000
Rotation of output shaft		CCW facing turbine toward driven machine
Max. inlet steam pressure	(MPaG)	3.3
Max. inlet steam temperature	(°C)	425
Max. exhaust steam pressure	(MPaG)	0.05
Steam inlet bore	(mm)	150
Steam exhaust bore	(mm)	600
Lubrication system		Forced lubrication
Main LO pump	(m ³ /h x MPaG)	9 x 0.2
Aux. LO pump	(m ³ /h x MPaG)	9 x 0.2
Governor		Woodward UG or PG
Weight (with baseplate)	(kg)	5300

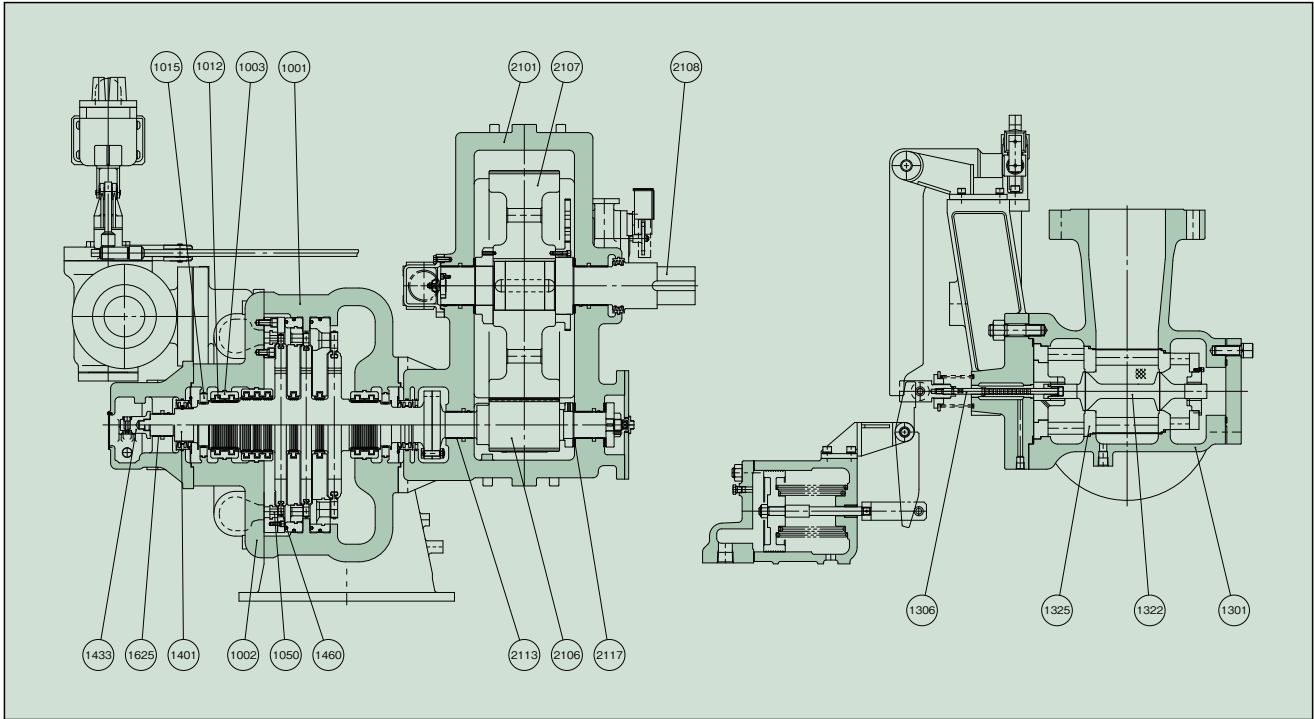
● Governor

Max. speed regulation 0.5%, 0 ~ 4 %
Max. speed variation ±0.25%
Max. speed rise 7%
Speed range +5 ~ -50%
NEMA class D

● Emergency Trip Device

Overspeed trip 115% of rated speed
Low LO pressure trip Below 0.05 MPaG

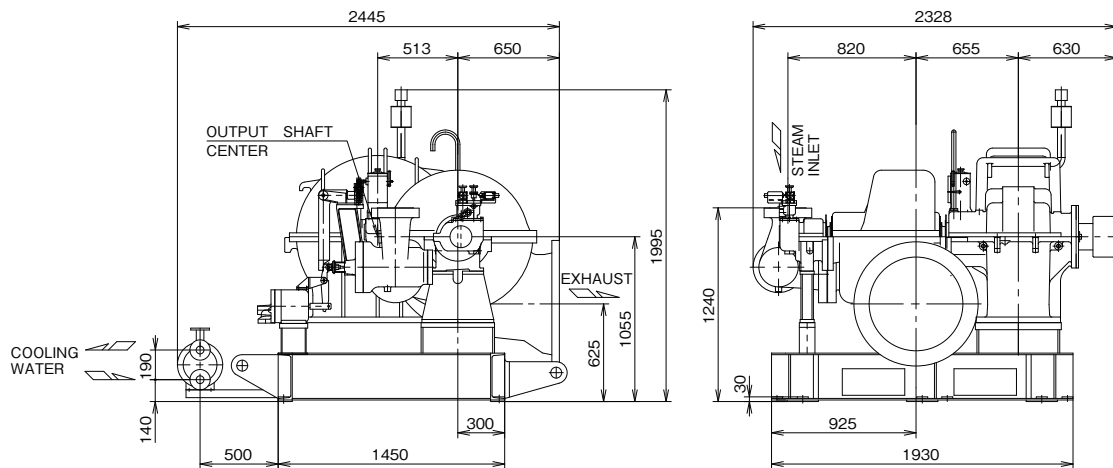
DESIGN & MATERIALS



PART NO.	NAME OF PART	MATERIAL		REQ. NO. FOR 1 TURBINE	PART NO.	NAME OF PART	MATERIAL		REQ. NO. FOR 1 TURBINE
		NAME	JIS				NAME	JIS	
1001	TURBINE CASING	CAST STEEL	SCPH2	1SET	1401	TURBINE ROTOR	Cr-Mo STEEL		1
1002	STEAM CHEST	"	"	1SET	1433	OVERSPEED TRIP SHAFT	CARBON STEEL	S35C	1
1003	PACKING CASE	CARBON STEEL	S35C	1SET	1460	MOVING BLADE	STAINLESS STEEL	SUS410J1	1SET
1012	LABYRINTH PACKING	Ni-Br CASTING		9SETS	1625	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1015	STEAM GUARD	BRASS PLATE WITH STEEL	C7521P S35C	1SET	2101	REDUCTION GEAR CASING	CAST IRON	FC200	1SET
1050	NOZZLE	STAINLESS STEEL	SUS403	1SET	2106	PINION & SHAFT	Ni-Cr-Mo STEEL	SNCM439	1
1301	GOVERNOR VALVE CASING	CAST STEEL	SCPH2	1	2107	WHEEL	FORGED STEEL	SF640B	1
1306	GOVERNOR VALVE STEM	STELLITE		1	2108	OUTPUT SHAFT	"	SF540A	1
1322	GOVERNOR VALVE	STAINLESS STEEL	SUS420J2	1	2113	BEARING METAL	WHITE METAL WITH STEEL	WJ2 S25C	1SET
1325	GOVERNOR VALVE LINER	"	SUS403	1	2117	THRUST BEARING METAL	"	"	1SET

OUTLINE DIMENSIONS

Dimensions : mm



SHINKO IND.LTD.



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