

# Rateau 4-stage with reduction gear BACK PRESSURE GENERATOR TURBINES

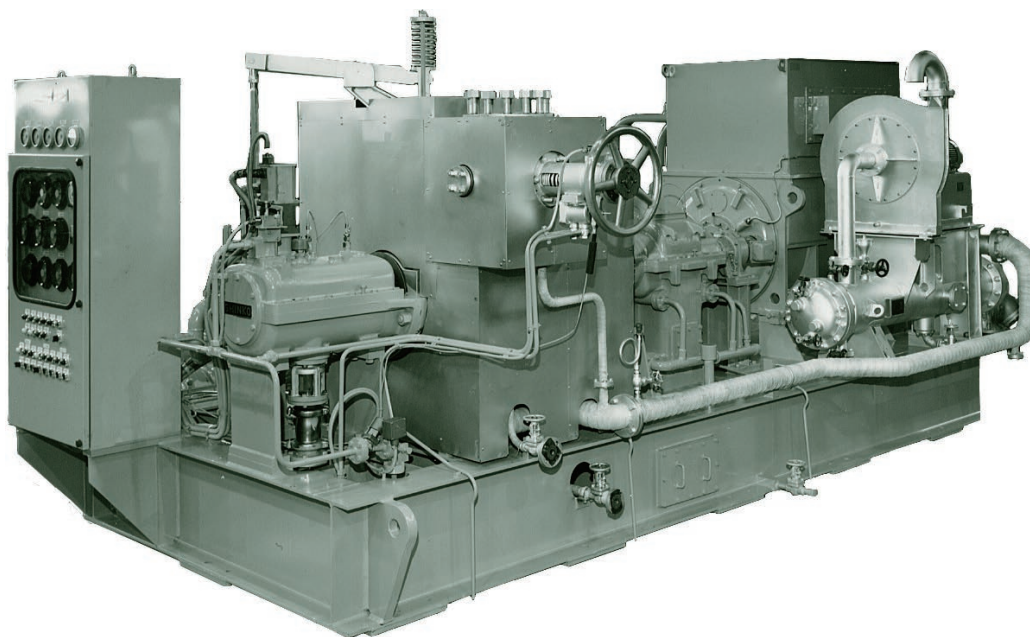
# SHINKO DNG40

## ■ APPLICATIONS

Generators  
Shredders  
Pumps  
Others

## ■ SPECIFICATIONS

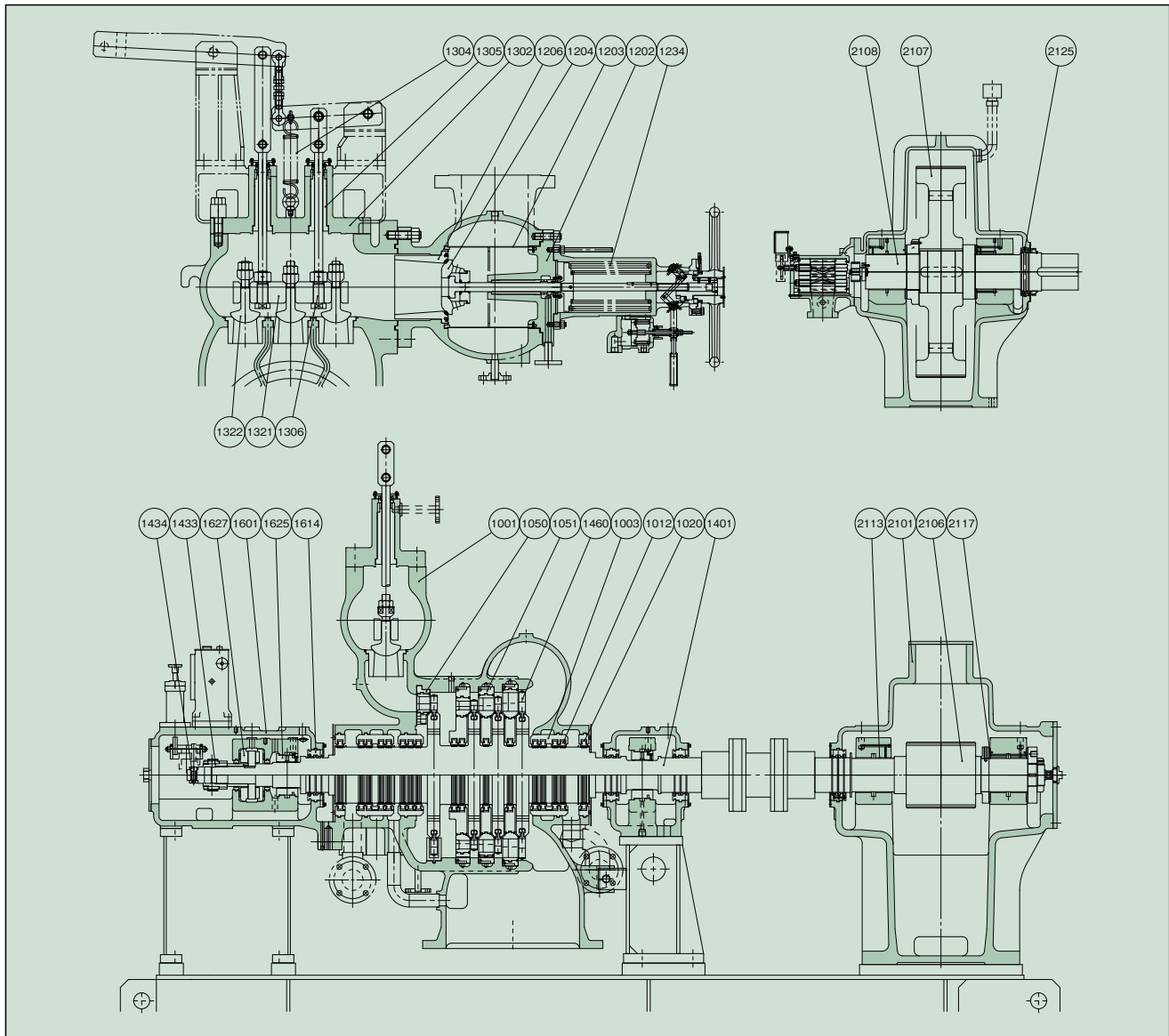
Max. output ..... 10000 kW  
Max. exhaust steam pressure .. 2.5 MPaG  
Gland seal ..... Labyrinth packing  
Lubrication system ..... Forced lubrication  
Control system ..... 3 or 4 valve nozzle control



## ■ 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 <sup>3</sup> /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 <sup>3</sup> /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	A $\alpha$ -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	A $\alpha$ -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.

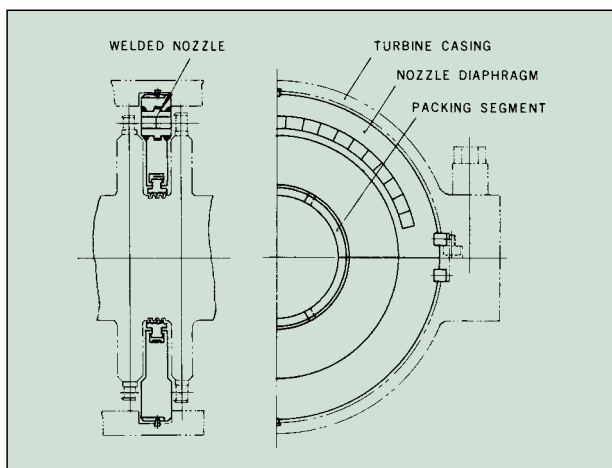
Max. speed regulation	0 ~ 4 %
Max. speed variation	± 0.25%
Max. speed rise	7%
Speed range	± 5%
NEMA class	D

### ● 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

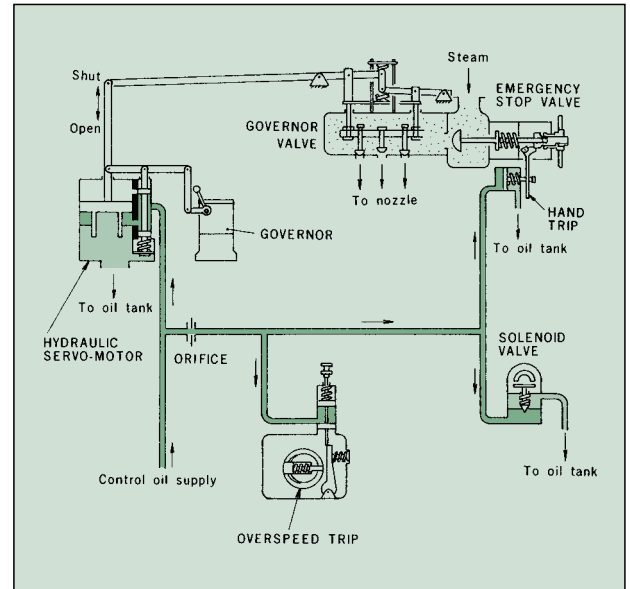


### ● Emergency Trip Device

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.

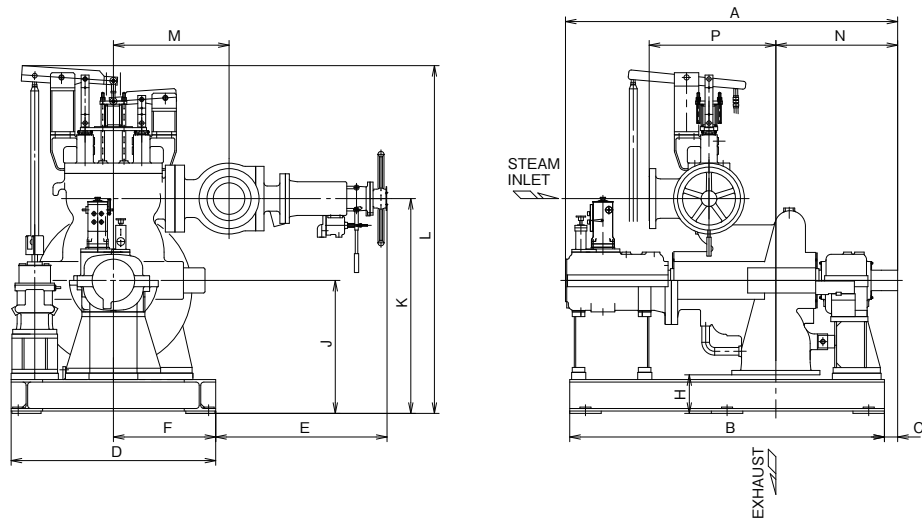
Actuation of overspeed trip : 110% of rated speed

Actuation of low LO press. trip : Below 0.05 MPaG



## OUTLINE DIMENSIONS

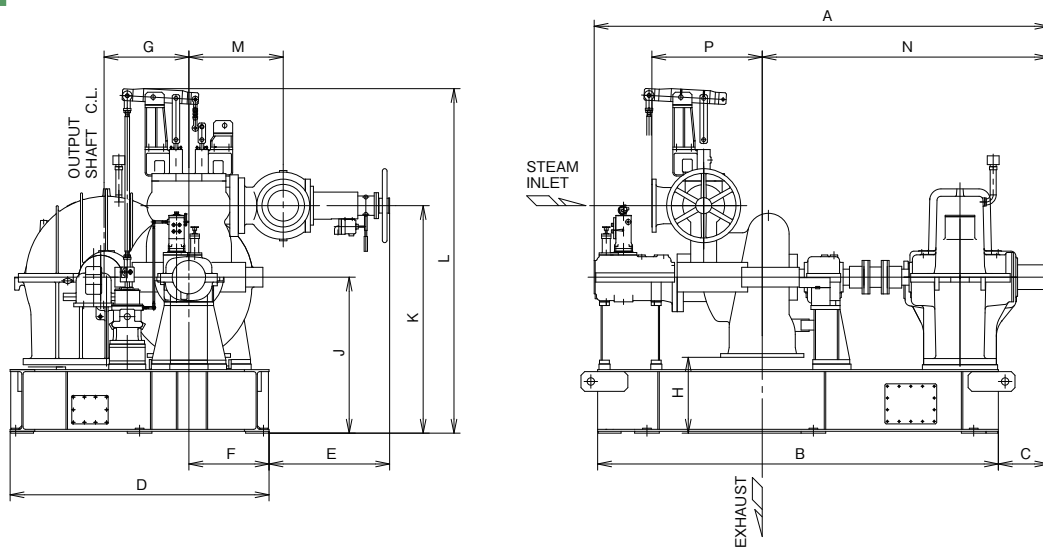
### DN(A)



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

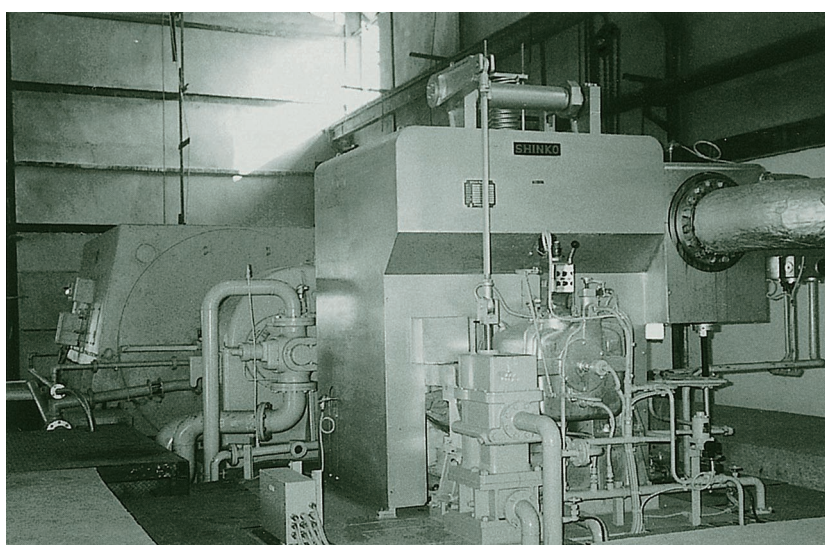
# SHINKO DNG50

## ■ APPLICATIONS

Generators

## ■ SPECIFICATIONS

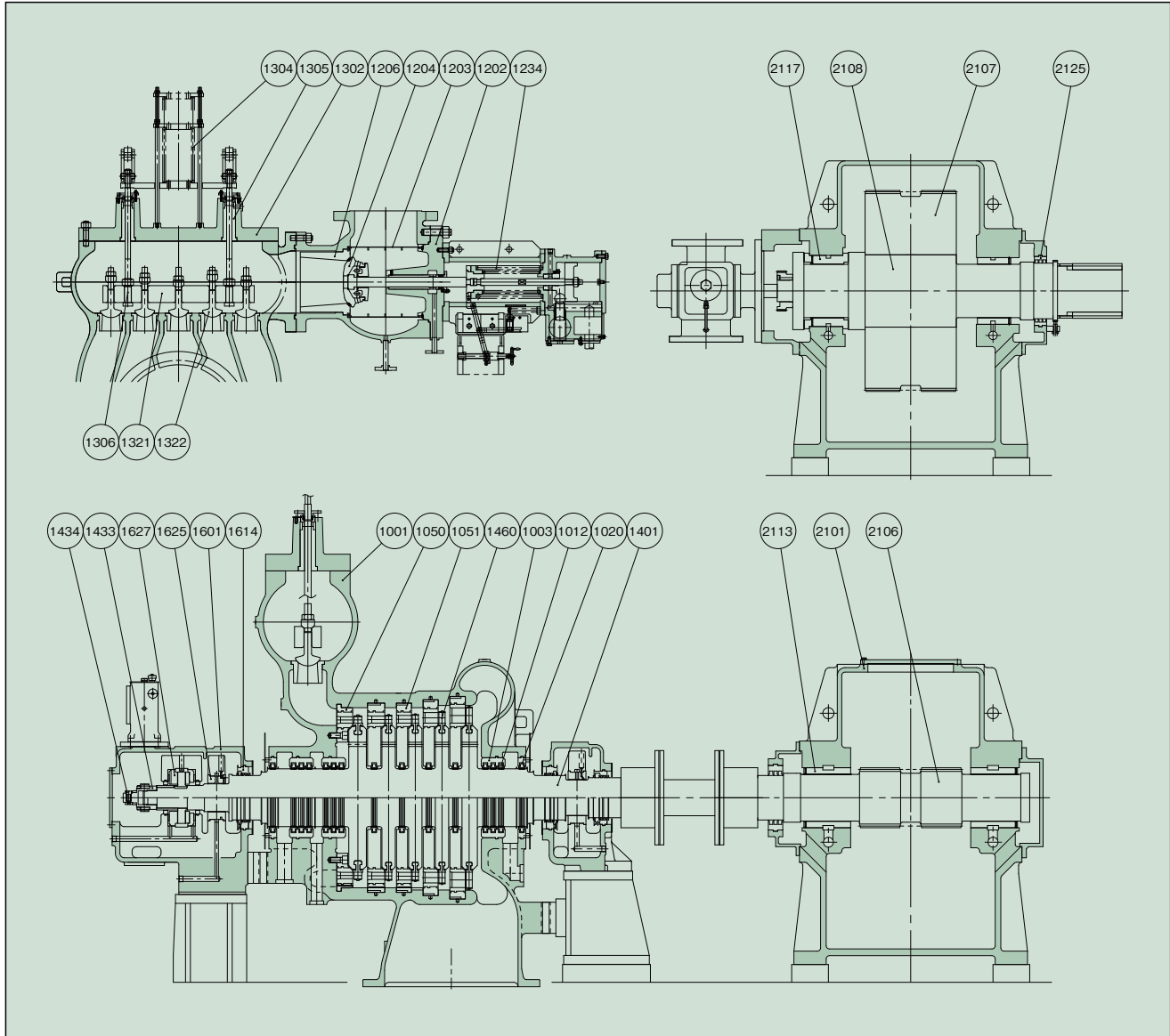
Max. output ..... 16000 kW  
 Max. exhaust steam pressure .. 0.5 MPaG  
 Gland seal ..... Labyrinth packing  
 Lubrication system ..... Forced lubrication  
 Control system ..... 5 valve nozzle control



## ■ 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 <sup>3</sup> /hxMPaG)	40 x 1.0	45 x 1.0
Aux. LO pump	(m <sup>3</sup> /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**

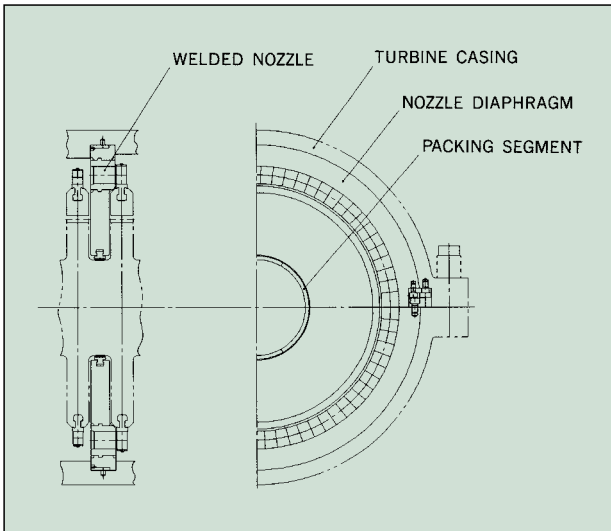
A mechanical-hydraulic or an electrical-hydraulic type is employed.

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**

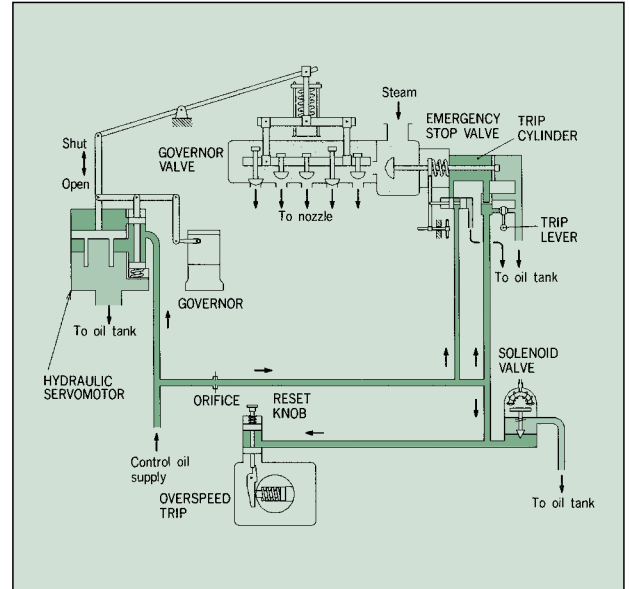


● **Emergency Trip Device**

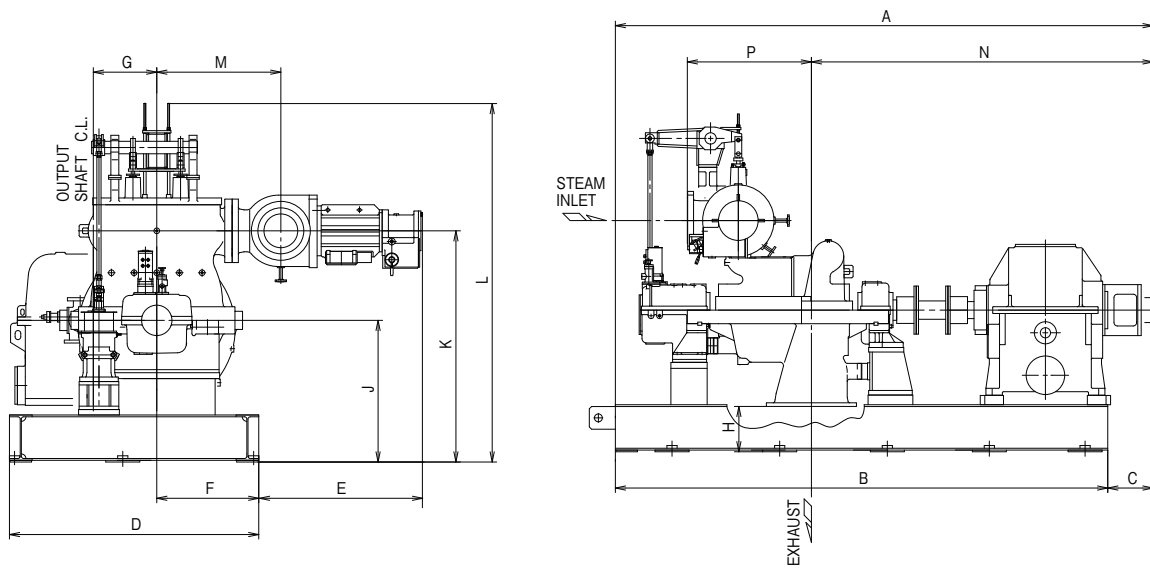
For the purpose of safe turbine operation, an over speed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

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

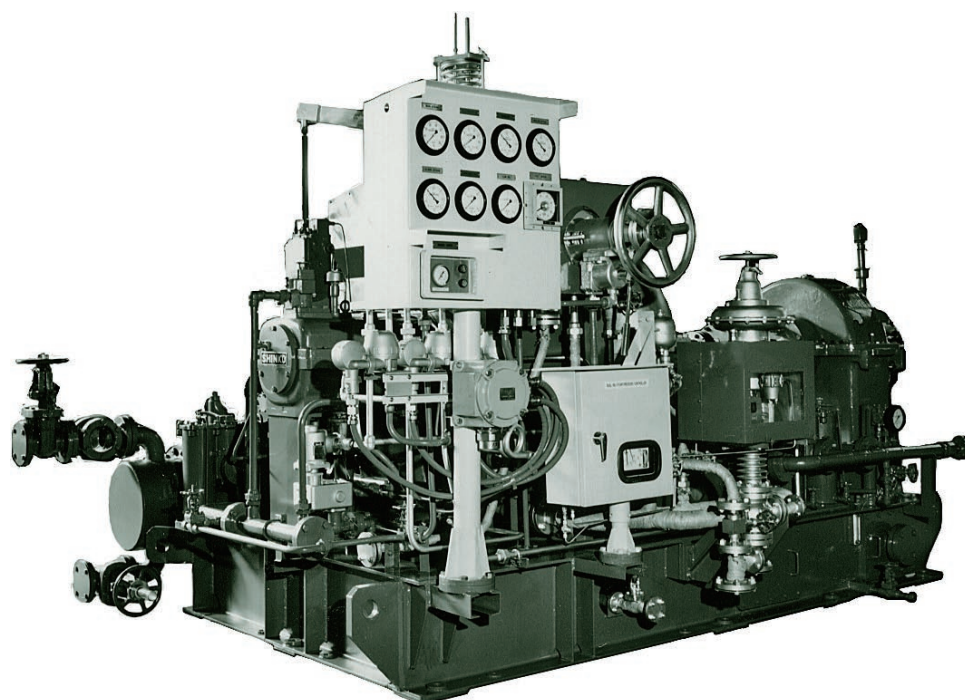
# SHINKO DNG60

## ■ APPLICATIONS

Generators

## ■ SPECIFICATIONS

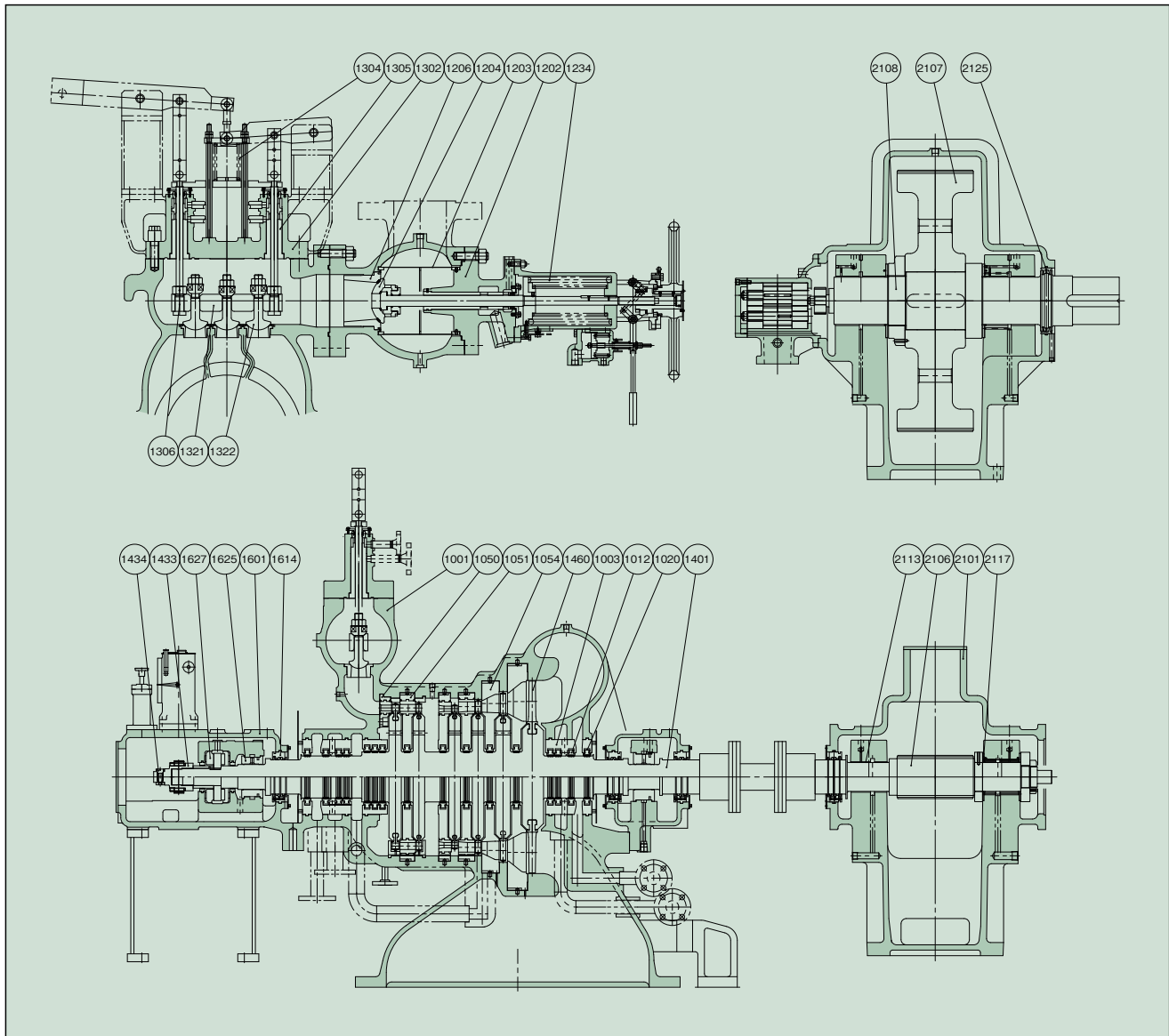
Max. output ..... 10000 kW  
 Max. exhaust vacuum ..... 710 mmHg  
 Gland seal ..... Labyrinth packing  
 Lubrication system ..... Forced lubrication  
 Control system ..... 3 valve nozzle control



## ■ 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 <sup>3</sup> /h x MPaG)	20 x 0.8	25 x 0.8	30 x 0.8
Aux. LO pump	(m <sup>3</sup> /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 $\alpha$ -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	

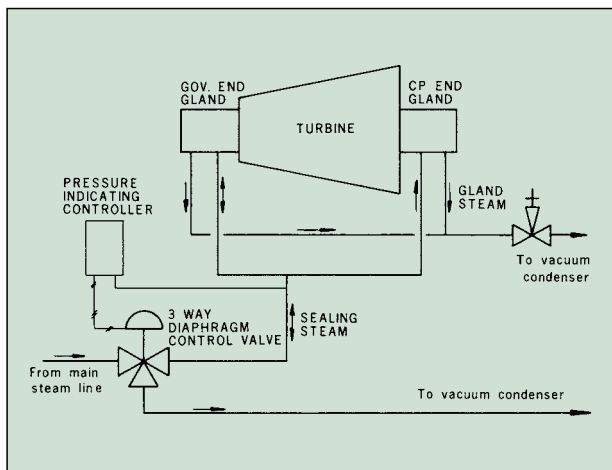
## ● Governor

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.

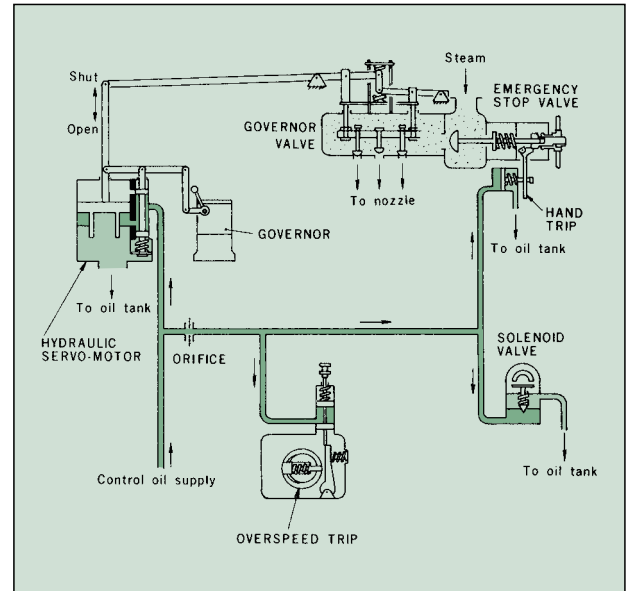


## ● Emergency Trip Device

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

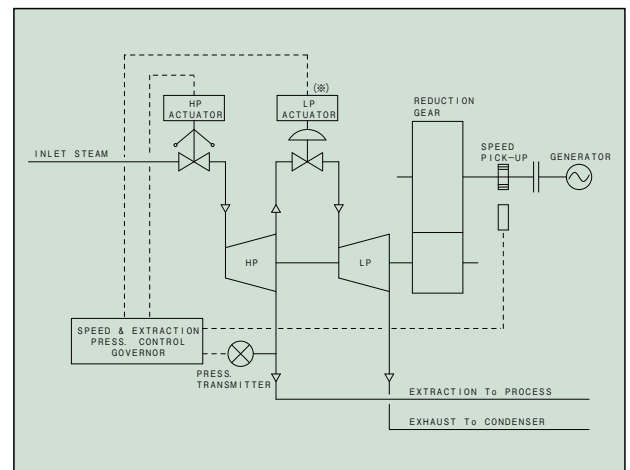
Actuation of low LO press. trip : Below 0.05 MPaG



## ● 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.

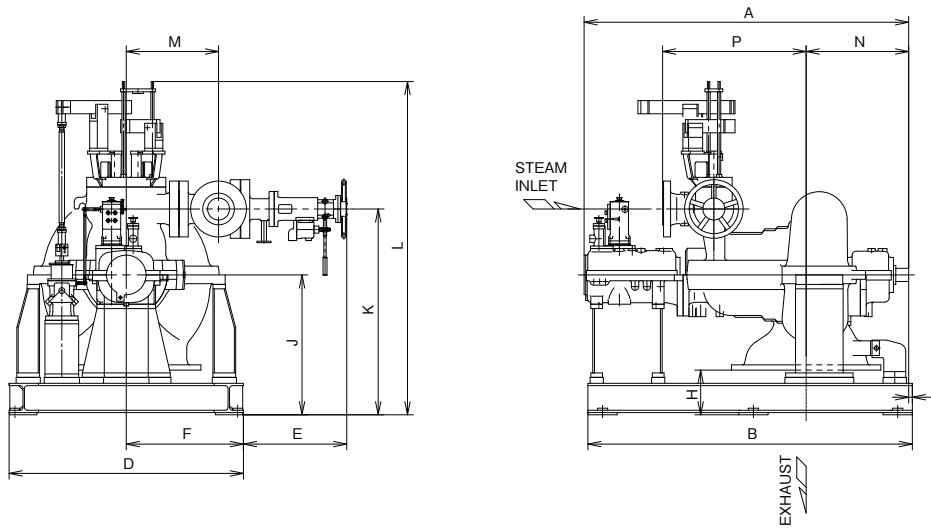
If the extraction pressure should be controlled at turbine side, the actuator shall be provided.



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

## OUTLINE DIMENSIONS

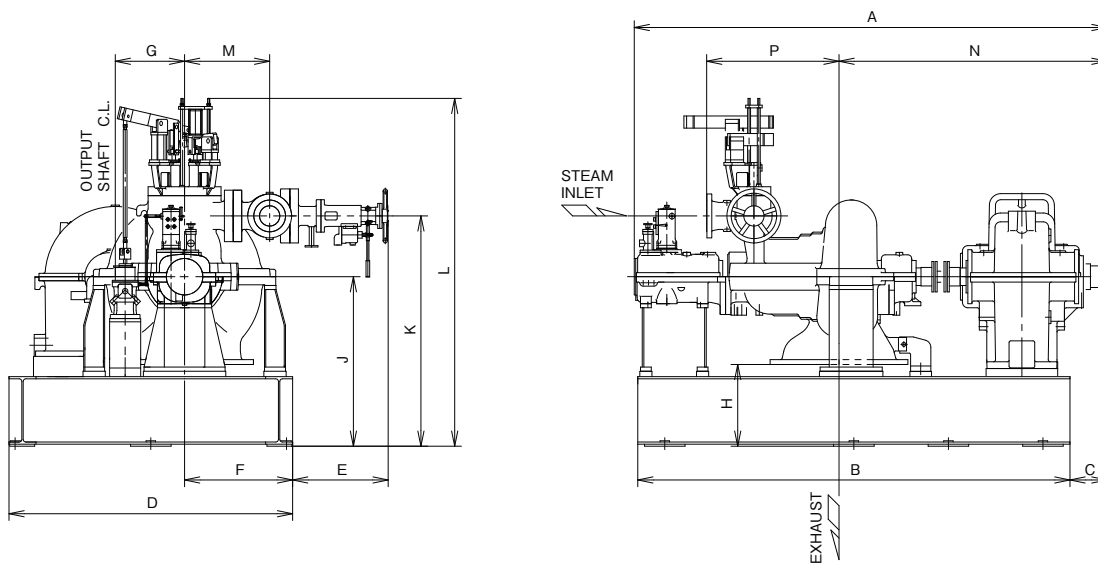
### DN



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

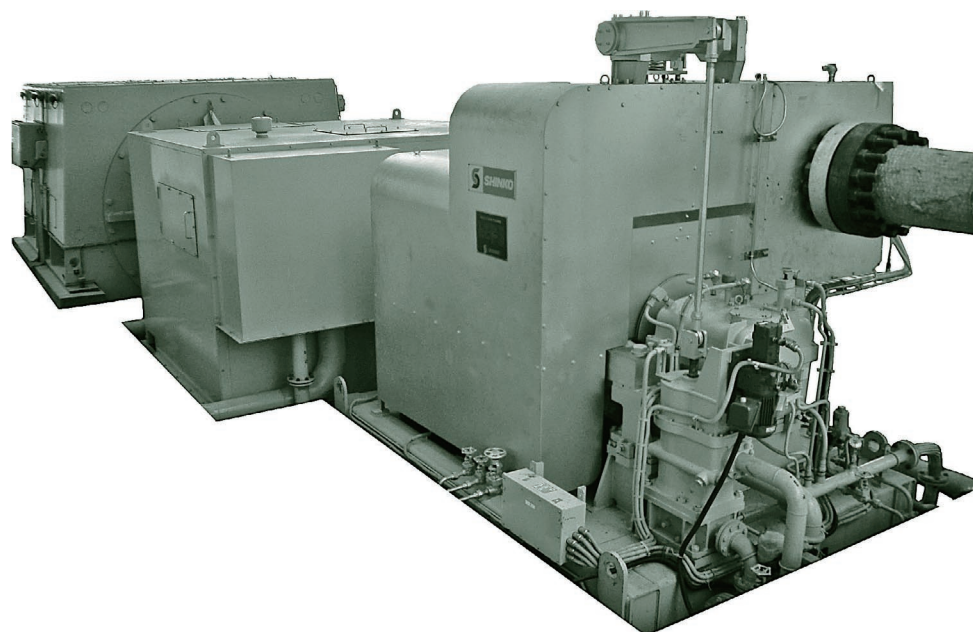
# SHINKO DNG70

## ■ APPLICATIONS

Generators

## ■ SPECIFICATIONS

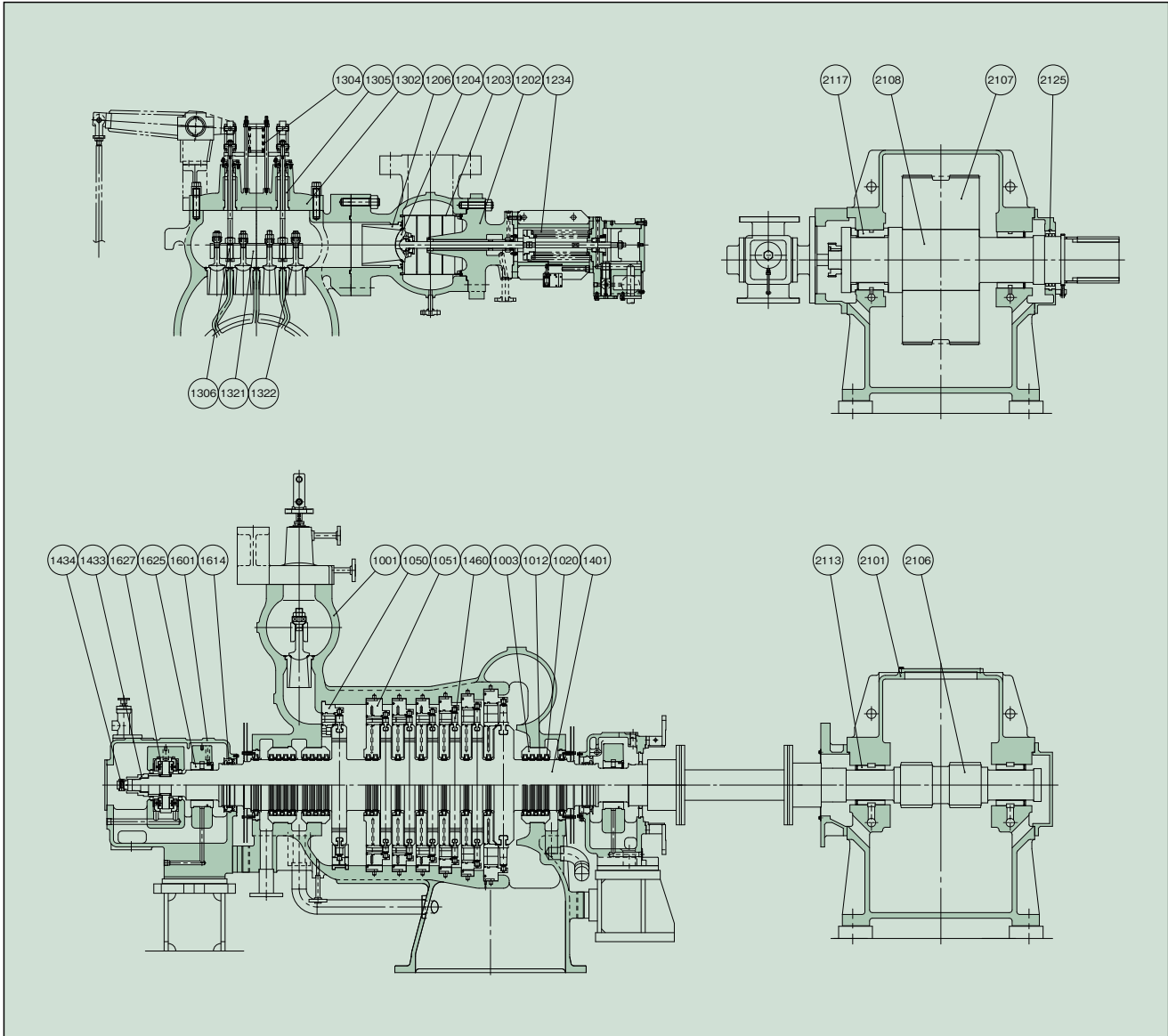
Max. output ..... 30000 kW  
 Max. exhaust steam pressure .. 0.5 MPaG  
 Gland seal ..... Labyrinth packing  
 Lubrication system ..... Forced lubrication  
 Control system ..... 4 valve nozzle control



## ■ 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 <sup>3</sup> /h x MPaG)	55 x 1.0	60 x 1.0
Aux. LO pump	(m <sup>3</sup> /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

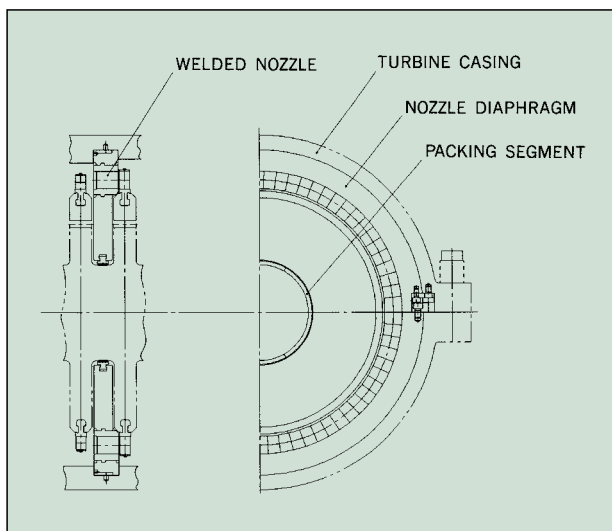
A mechanical-hydraulic or an electrical-hydraulic type is employed.

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

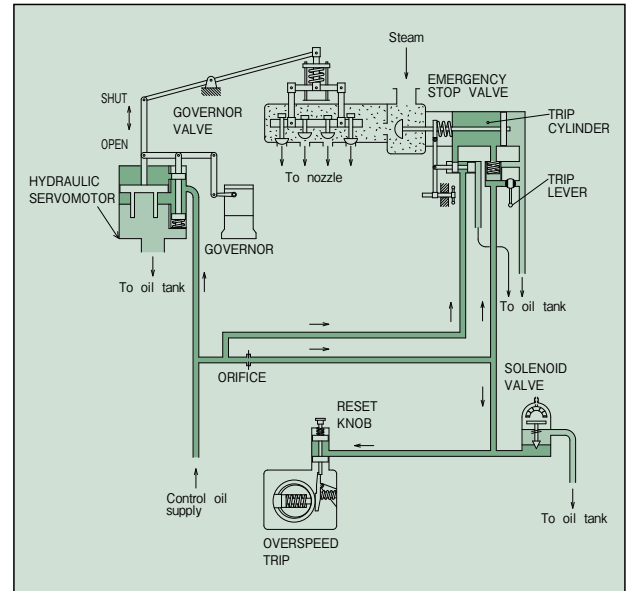


## ● Emergency Trip Device

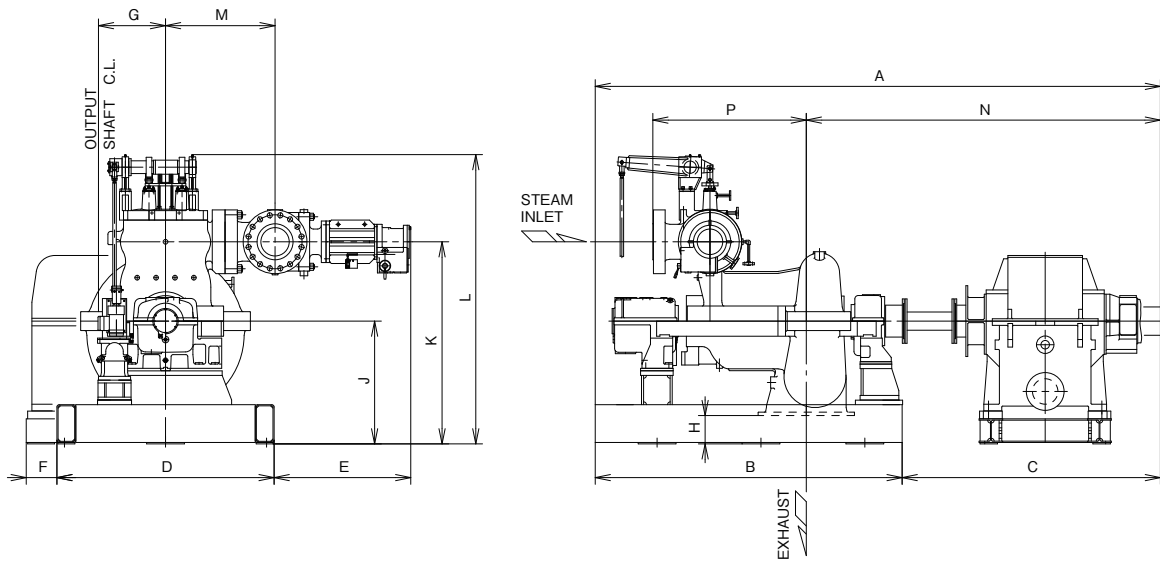
For the purpose of safe turbine operation, an overspeed trip and a low pressure LO trip devices are equipped to close the emergency stop valve positioned independently at the steam inlet to stop the turbine automatically.

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

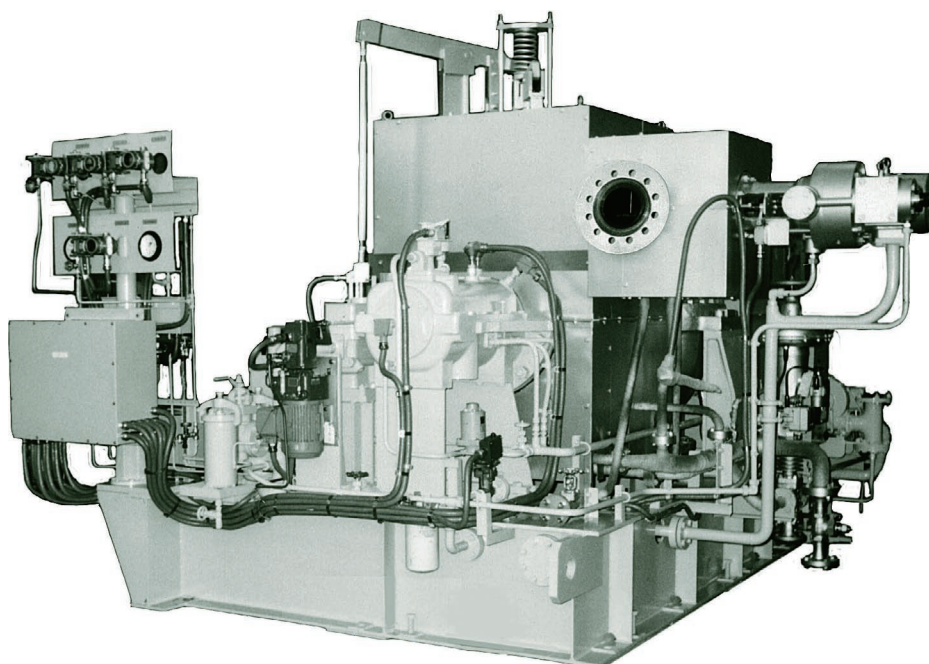
# SHINKO DNG90

## ■ 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

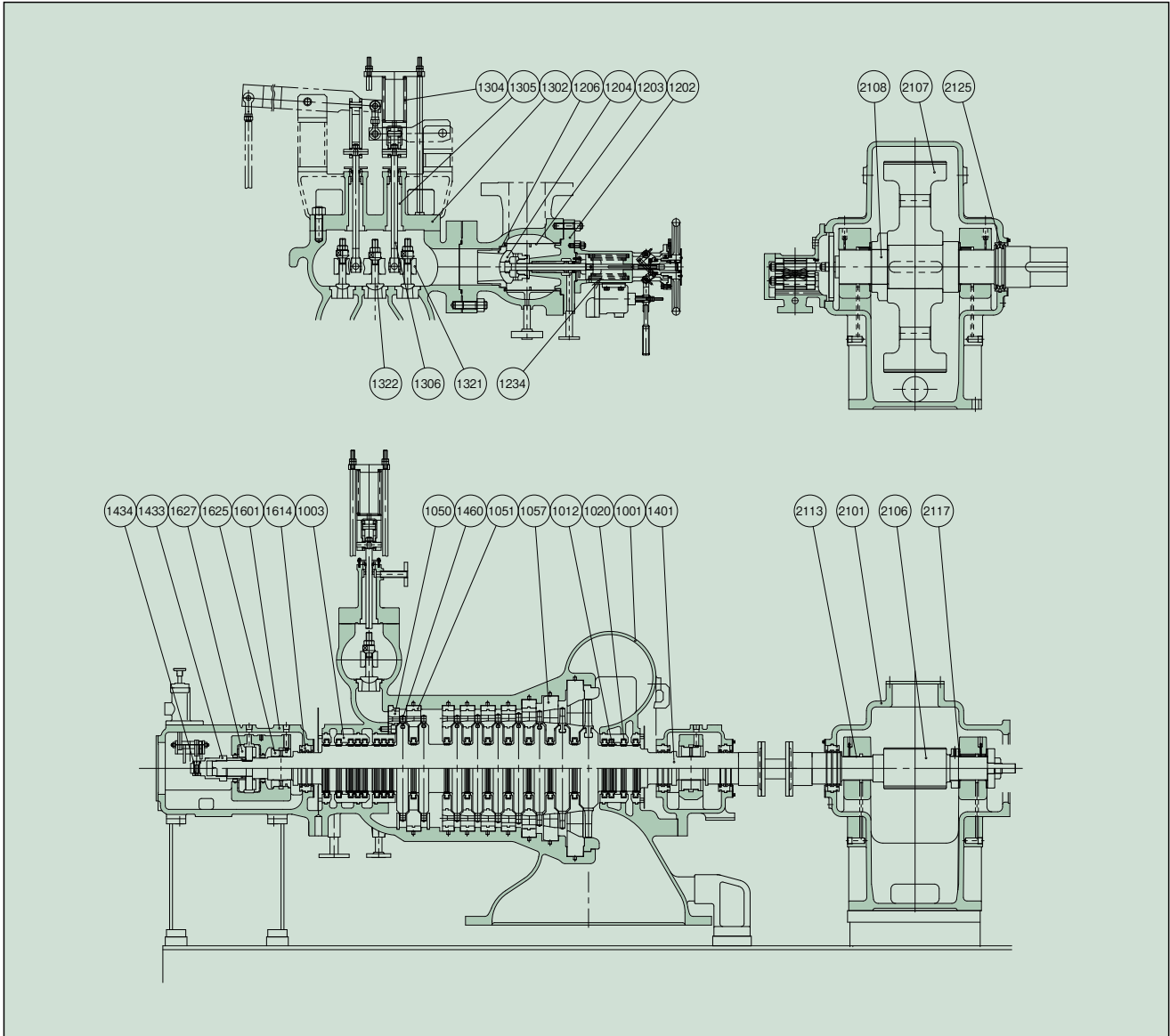


## ■ GENERAL CHARACTERISTICS

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 <sup>3</sup> /h x MPaG)	20 x 0.8	25 x 0.8	35 x 0.8
Aux. LO pump	(m <sup>3</sup> /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 $\delta$ -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	

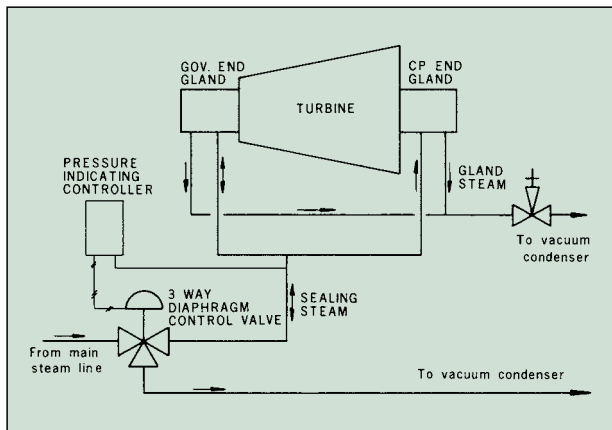
## ● Governor

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.

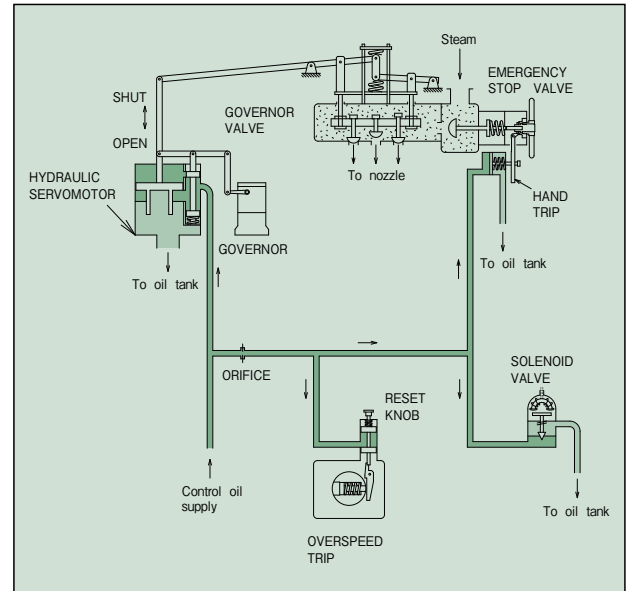


## ● Emergency Trip Device

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

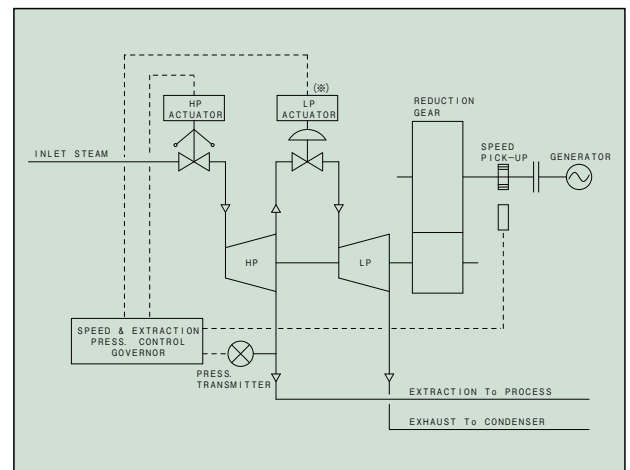
Actuation of low LO press. trip : Below 0.05 MPaG



## ● 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.

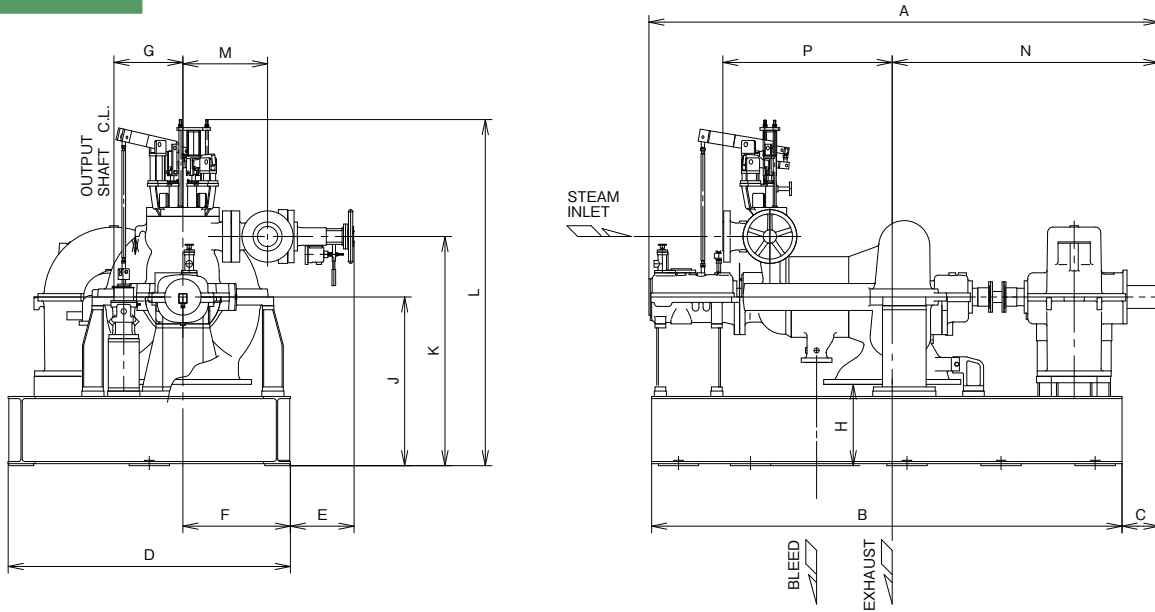
If the extraction pressure should be controlled at turbine side, the actuator shall be provided.



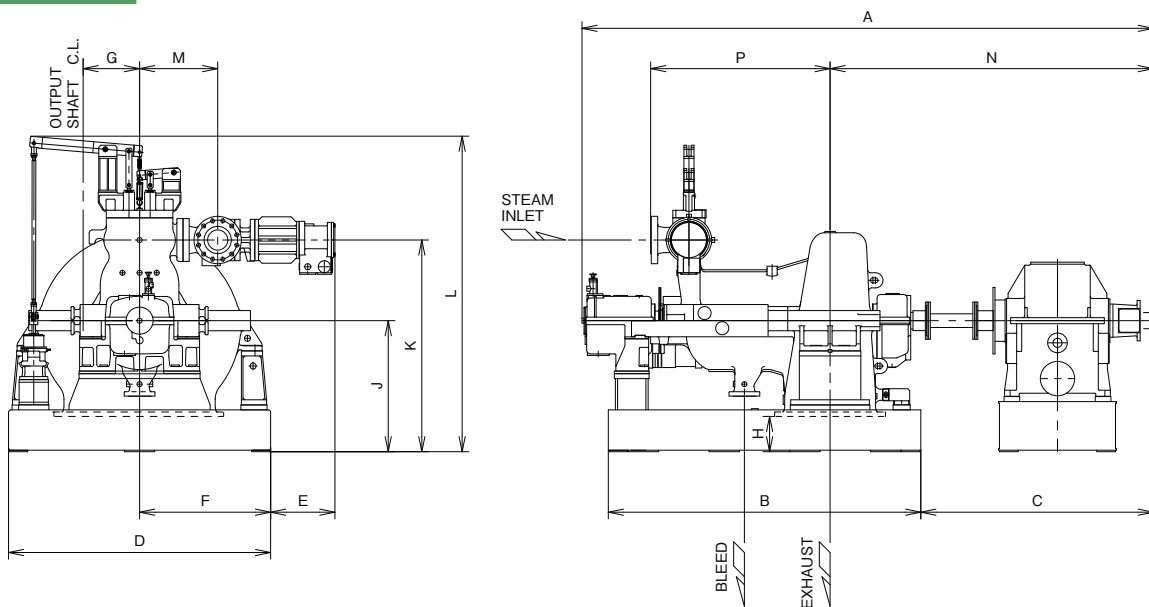
(※) : LP actuator is not provided when the bleeding steam pressure is controlled by the process side.

## 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

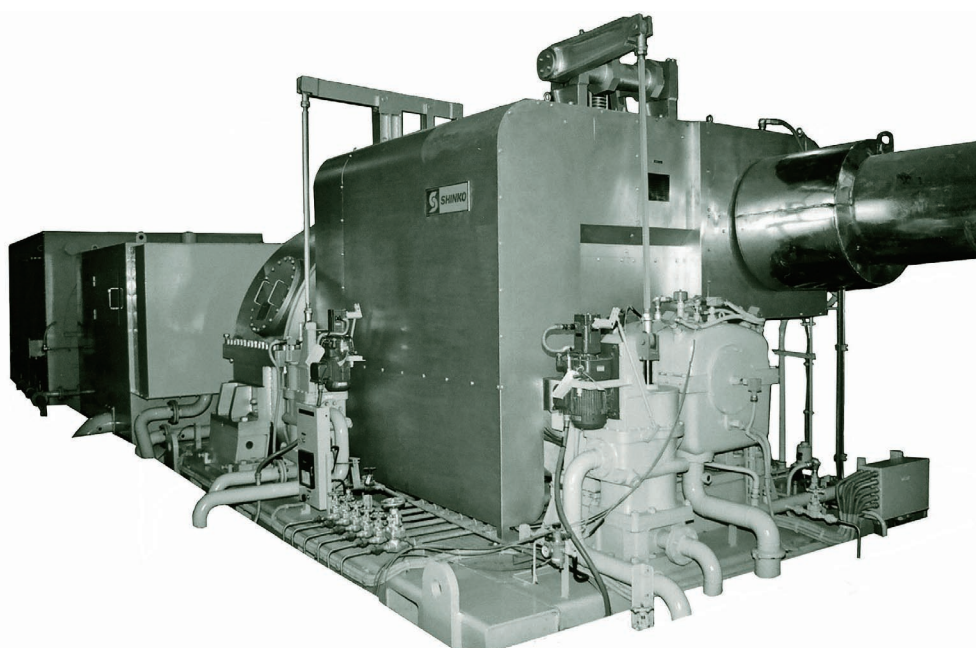
# SHINKO DNG120

## ■ 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

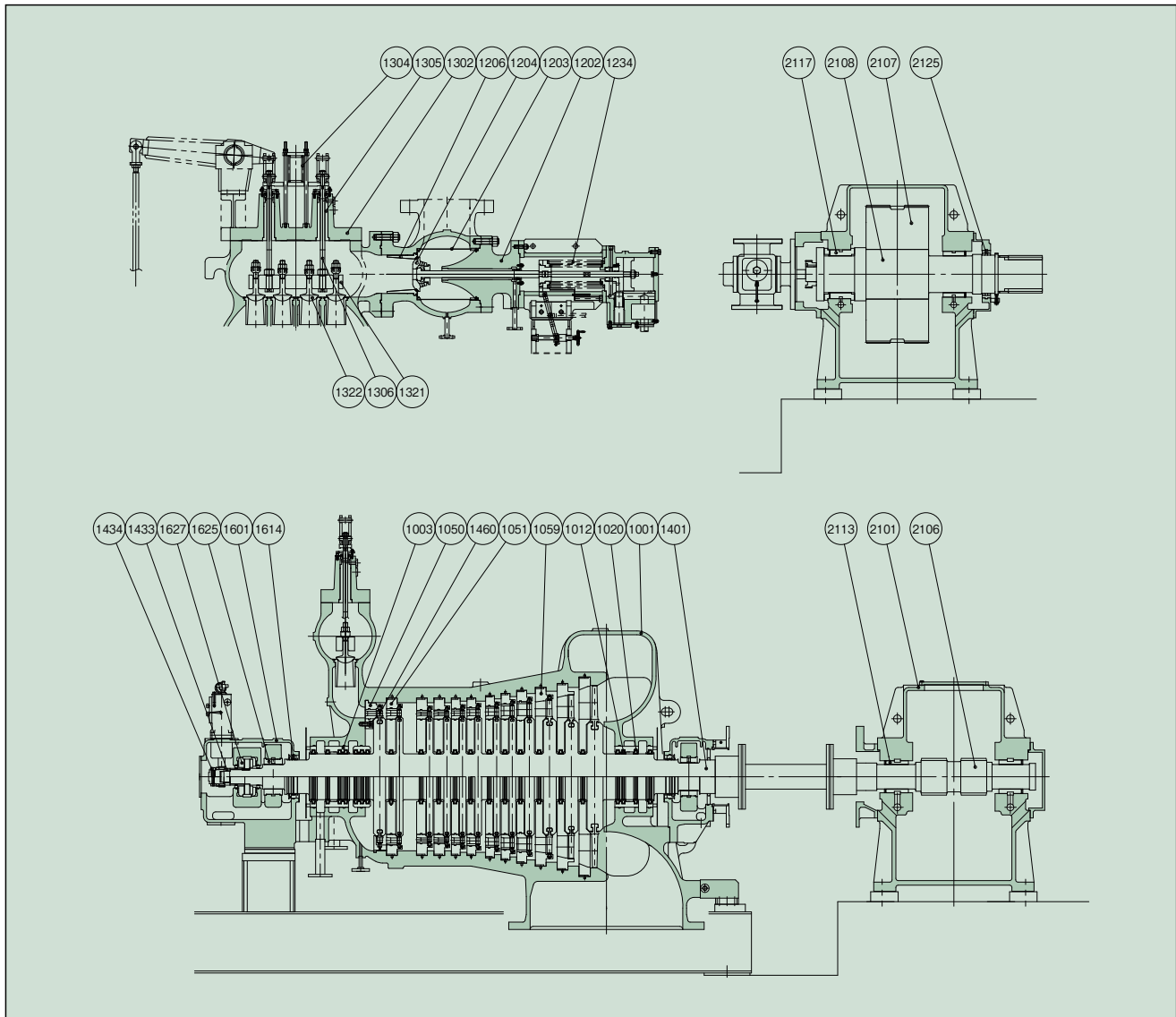


## ■ GENERAL CHARACTERISTICS

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 <sup>3</sup> /h × MPaG)	40 × 1.0	45 × 1.0	55 × 1.0	60 × 1.0
Aux. LO pump	(m <sup>3</sup> /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 $\alpha$ -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 $\alpha$ -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	

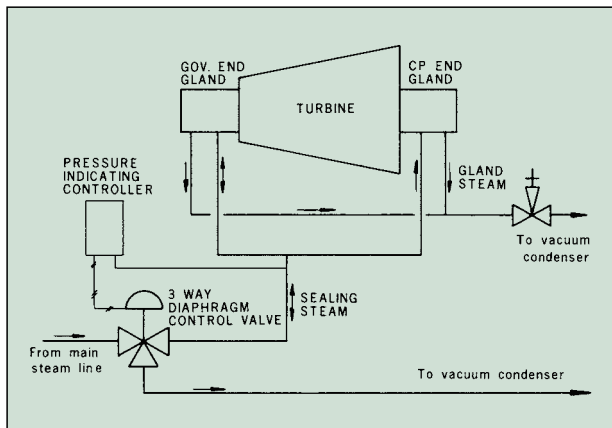
## ● Governor

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.

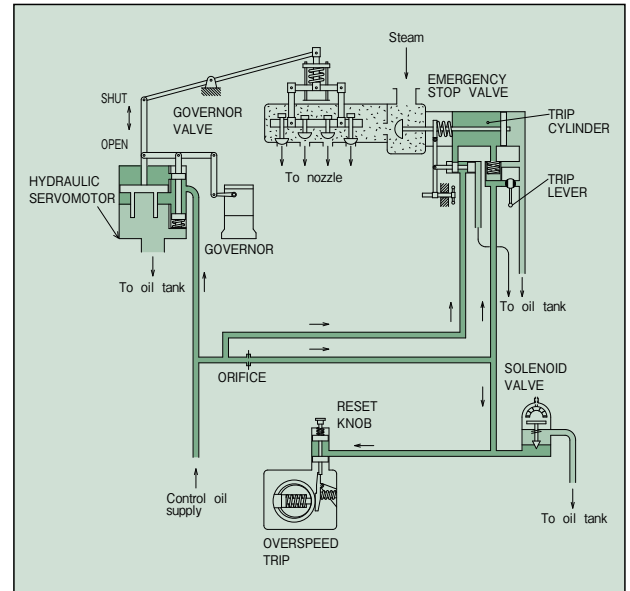


## ● Emergency Trip Device

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

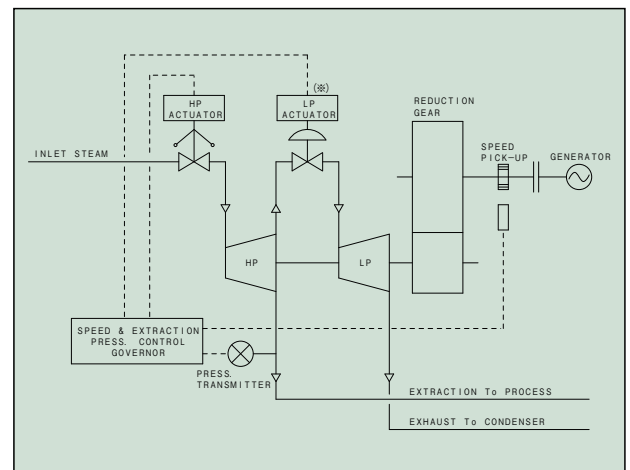
Actuation of low LO press. trip : Below 0.05 MPaG



## ● 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.

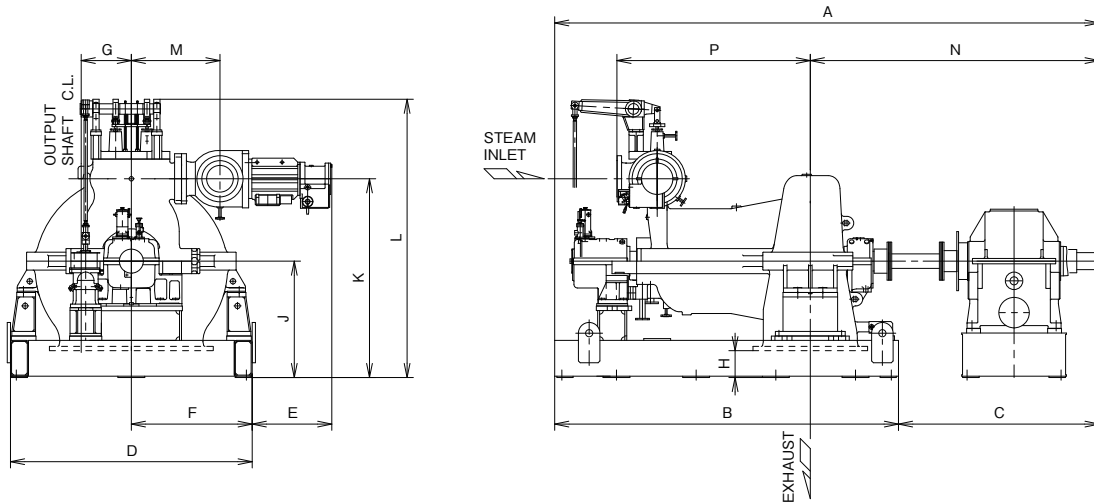
If the extraction pressure should be controlled at turbine side, the actuator shall be provided.



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

## OUTLINE DIMENSIONS

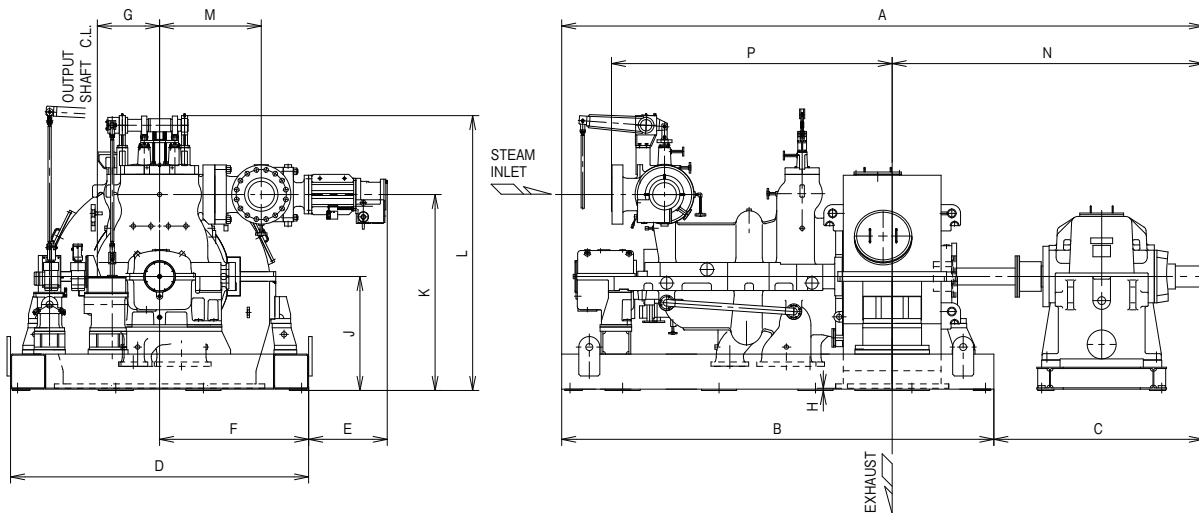
### DNG 124,125



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