

Rateau 9-stage with reduction gear CONDENSING GENERATOR TURBINES

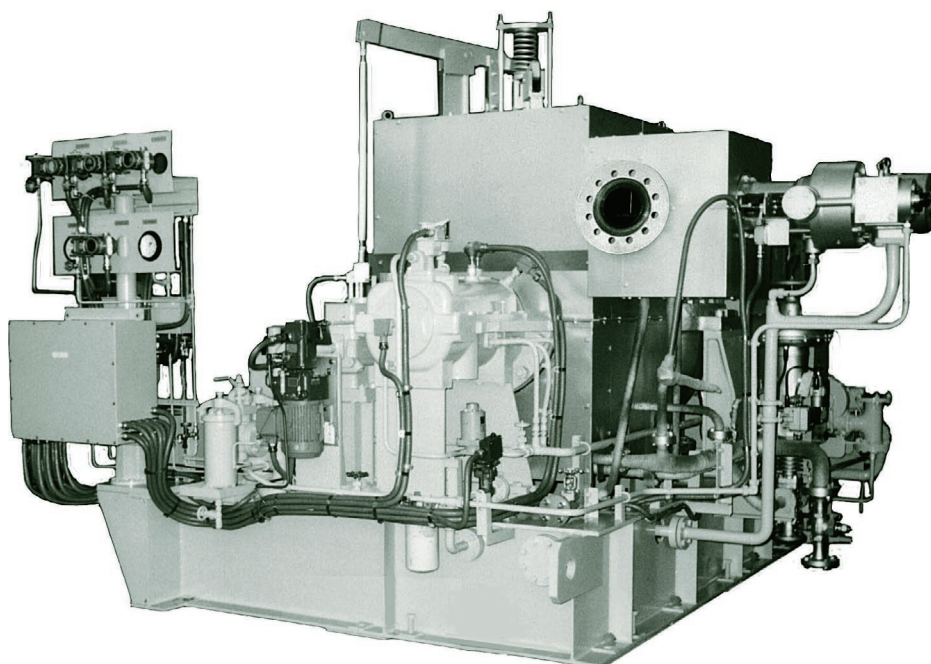
SHINKO DNG90

■ 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

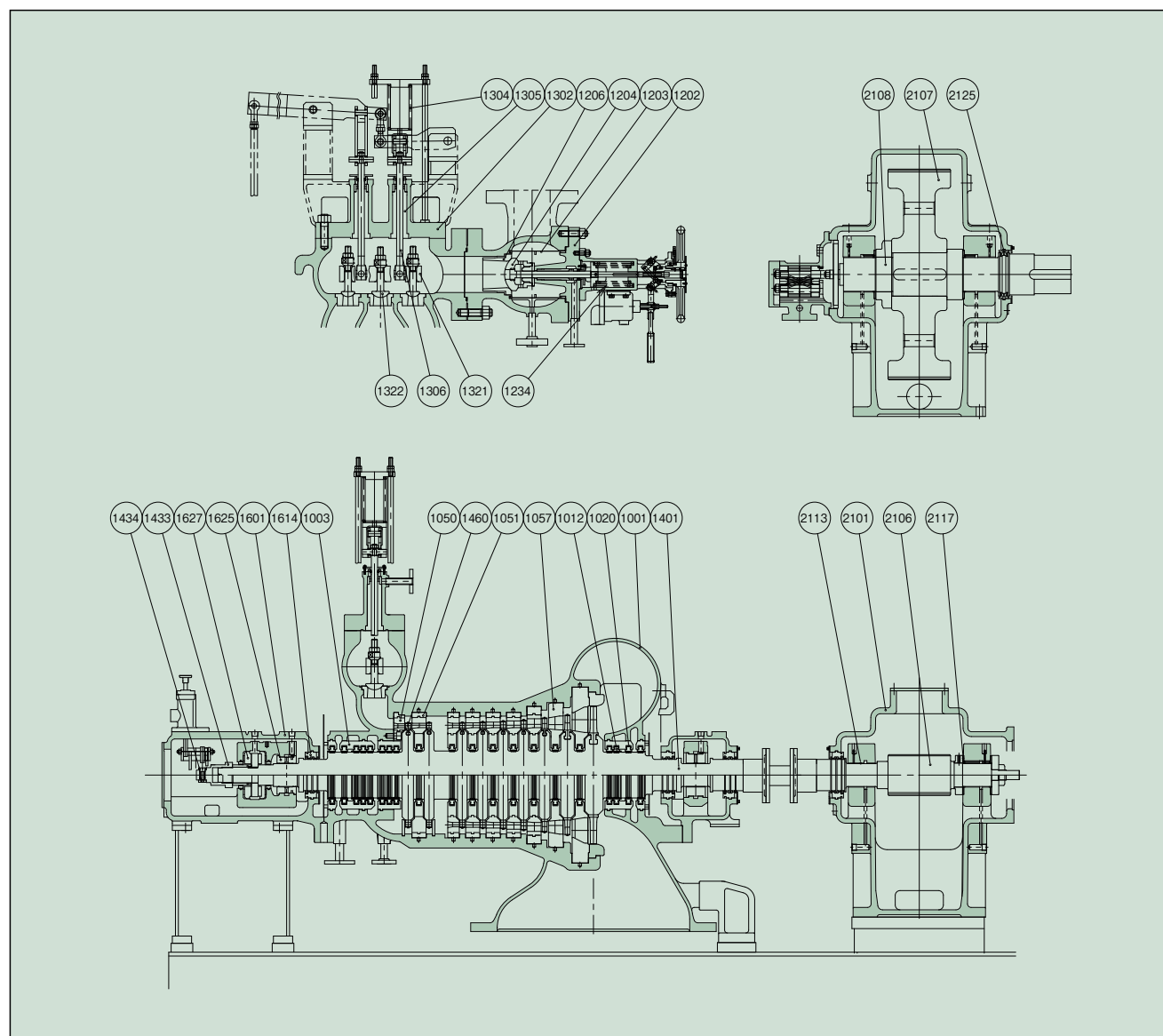


■ GENERAL CHARACTERISTICS

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 ϕ -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	

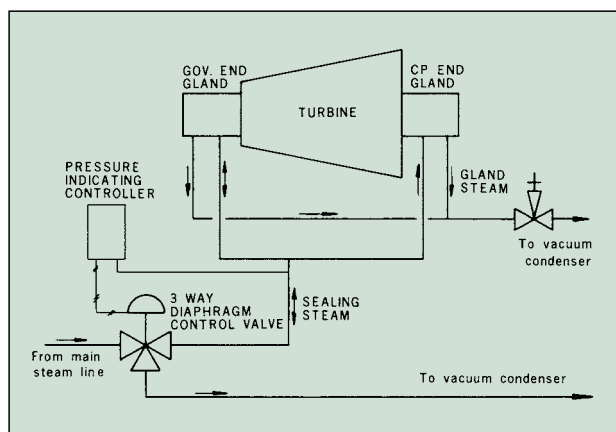
● Governor

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.

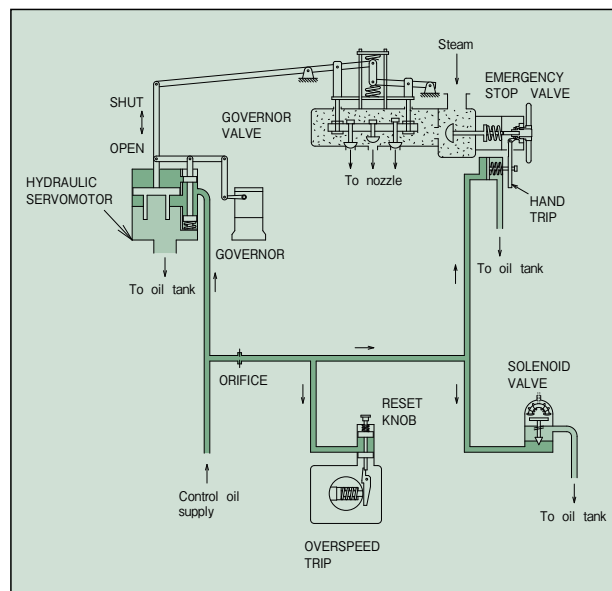


● Emergency Trip Device

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

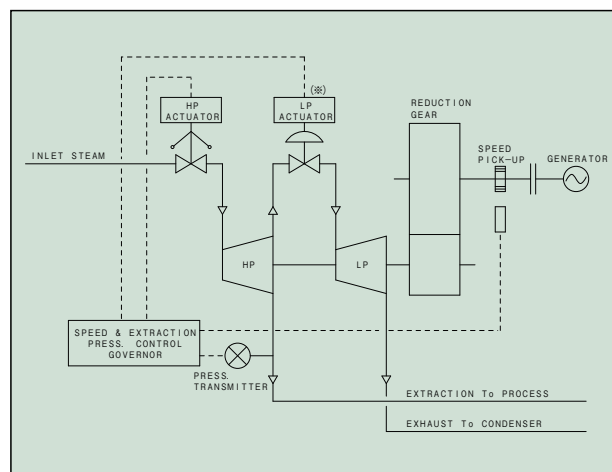
Actuation of low LO press. trip : Below 0.05 MPaG



● 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.

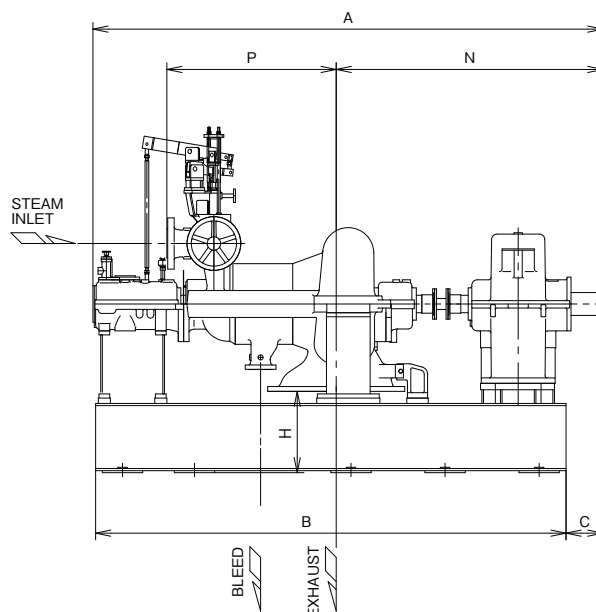
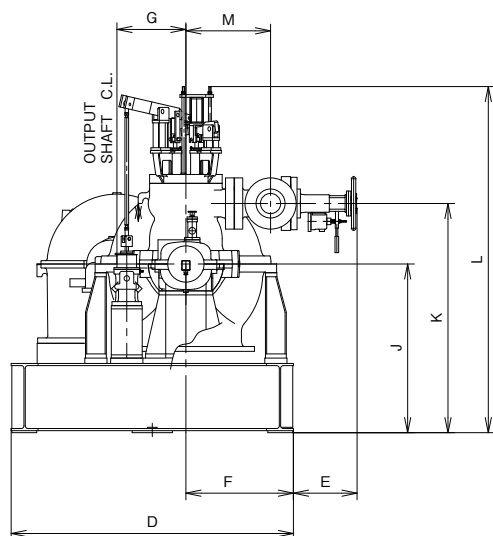
If the extraction pressure should be controlled at turbine side, the actuator shall be provided.



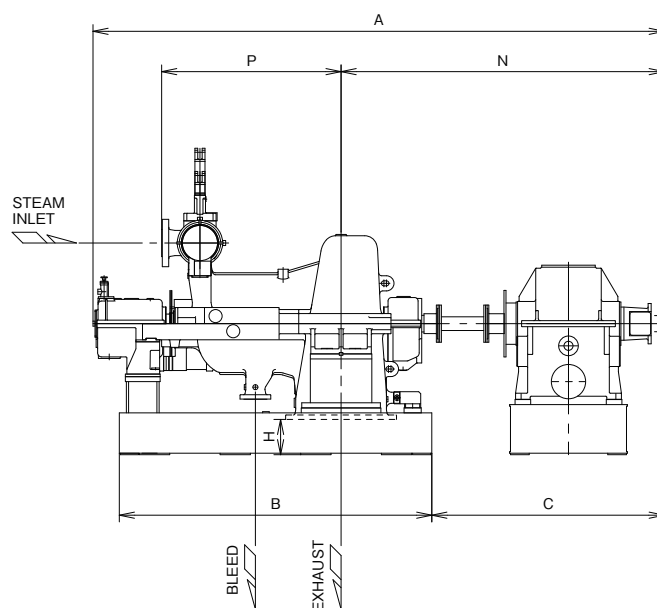
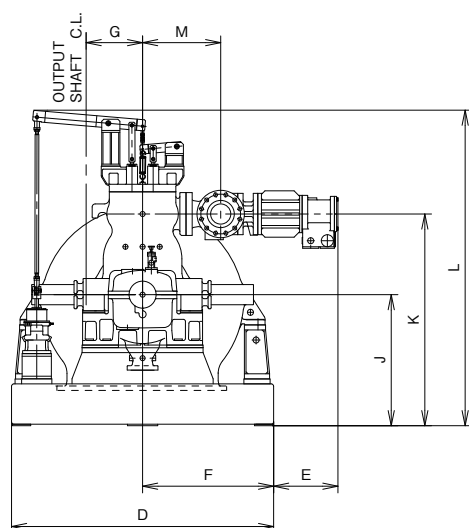
(※) : LP actuator is not provided when the bleeding steam pressure is controlled by the process side.

■ 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.