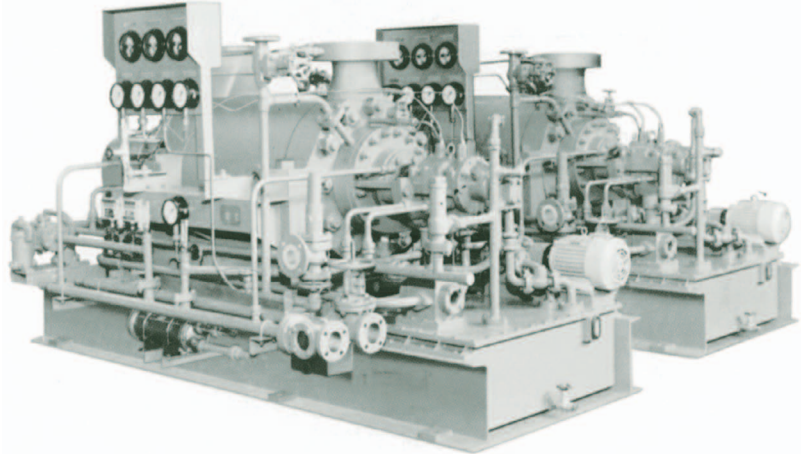


# Horizontal multi-stage ring section BOILER FEED PUMPS

# SHINKO DKR

Shinko DKR pumps have been designed as boiler feed pumps for private power plants for various industries. The pumps are manufactured with attention to strict material selection, quality design, and workmanship based on our many years of experience, and also have many special features that are unsurpassed by any other manufacturers.



### High Efficiency in a Wide Range

The impeller is designed to have a smooth and perfect lowering head curve. The water passage in the casing has a smooth finish ensuring safe operation and efficiency in a wide range.

### High Reliability & Durability

The thrust bearing is installed to prevent contact between the balance disk and sheet ensuring safe operation even when there are sudden changes in load.

### Low NPSH Operation

In order to improve the NPSH of the pump, special attention has been paid to the design and manufacture of first-stage impeller.

### Replacement Capability

All components can be replaced easily because they were machined with computer-controlled equipment.

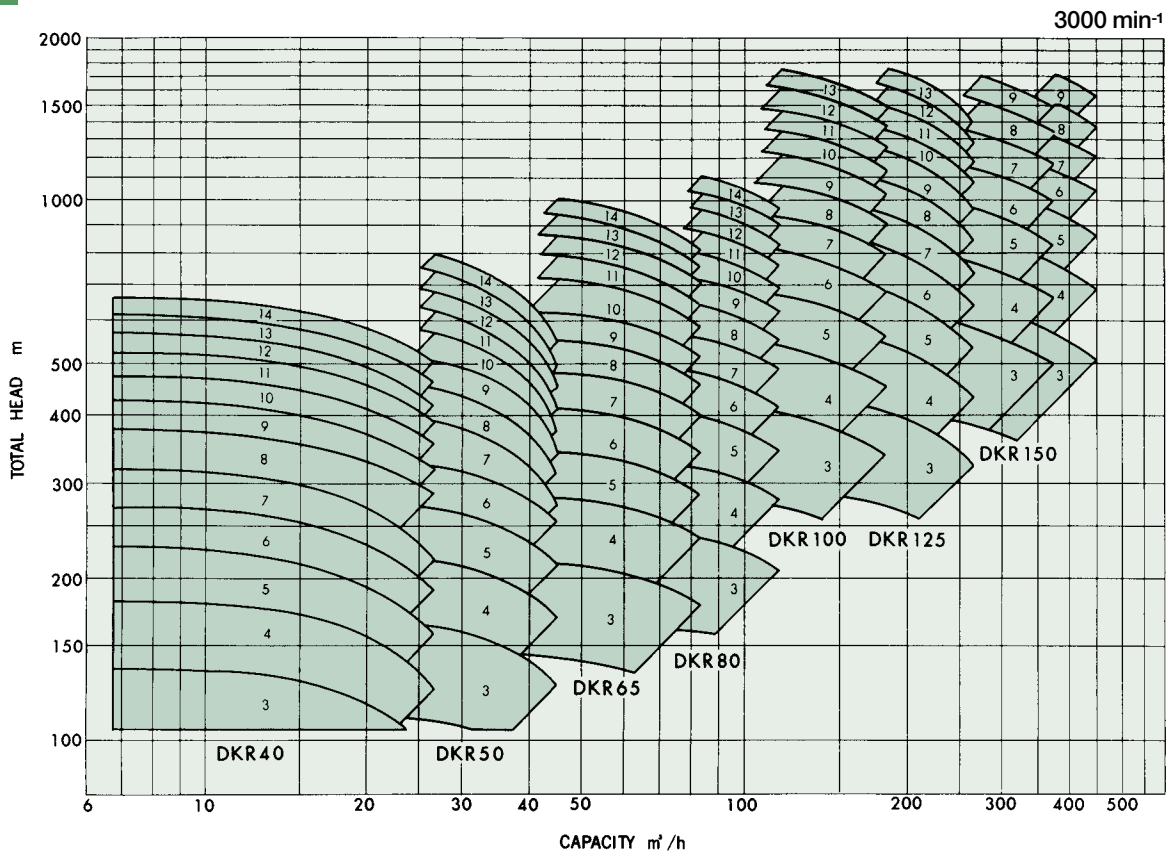
## ■ GENERAL CHARACTERISTICS

Item	Model	DKR 40	DKR 50	DKR 65	DKR 80	DKR 100	DKR 125	DKR 150
Number of stages		3~14	3~14	3~14	3~14	3~13	3~13	3~9
Max. suction temperature	(°C)	200						
Direction of rotation		Clockwise when viewed from the driver						
Suction bore	(mm)	50	65	80	100	125	150	200
Discharge bore	(mm)	40	50	65	80	100	125	150
Main bearing		Ball bearings or journal type						
Thrust bearing		Ball bearings or Michell type bearing						
Lubrication system		Oil ring or forced lubrication						
Lube oil for bearing housing	(ℓ)	0.6~1.0	0.6~1.3	1.0~1.6	1.2~1.8	1.3~2.0	1.6~2.0	—
※ Main & aux. LO pump	(m <sup>3</sup> /h×MPaG)	—	—	—	2×0.15	2×0.15	2×0.15	2×0.15
※ Oil tank	(ℓ)	—	—	—	120	120	120	120~180
※ Oil cooler	(m <sup>2</sup> )	—	—	—	1.1	1.1	1.5	1.5~2.0
※ Cooling water required	(m <sup>3</sup> /h)	1~2	1~2	2~3	3~4	3~4	4~5	5~7
Weight with baseplate	(kg)	400~1000	600~1200	800~1400	1000~1800	1200~2500	1400~3000	1700~3500

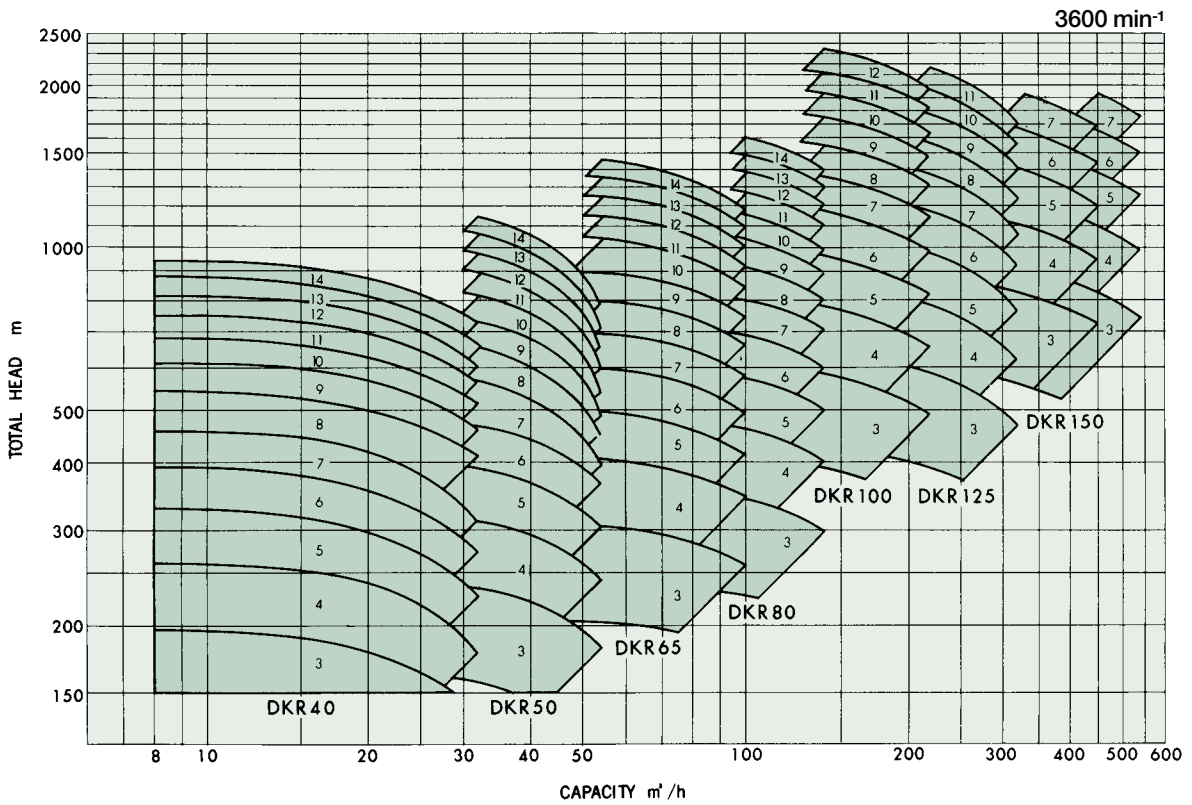
Note : "Lube oil for bearing housing" refers to the required lube oil quantity for oil-ring lubrication systems.

※If the lube oil is supplied to the motor, these values will change. (Forced lubrication)

50Hz

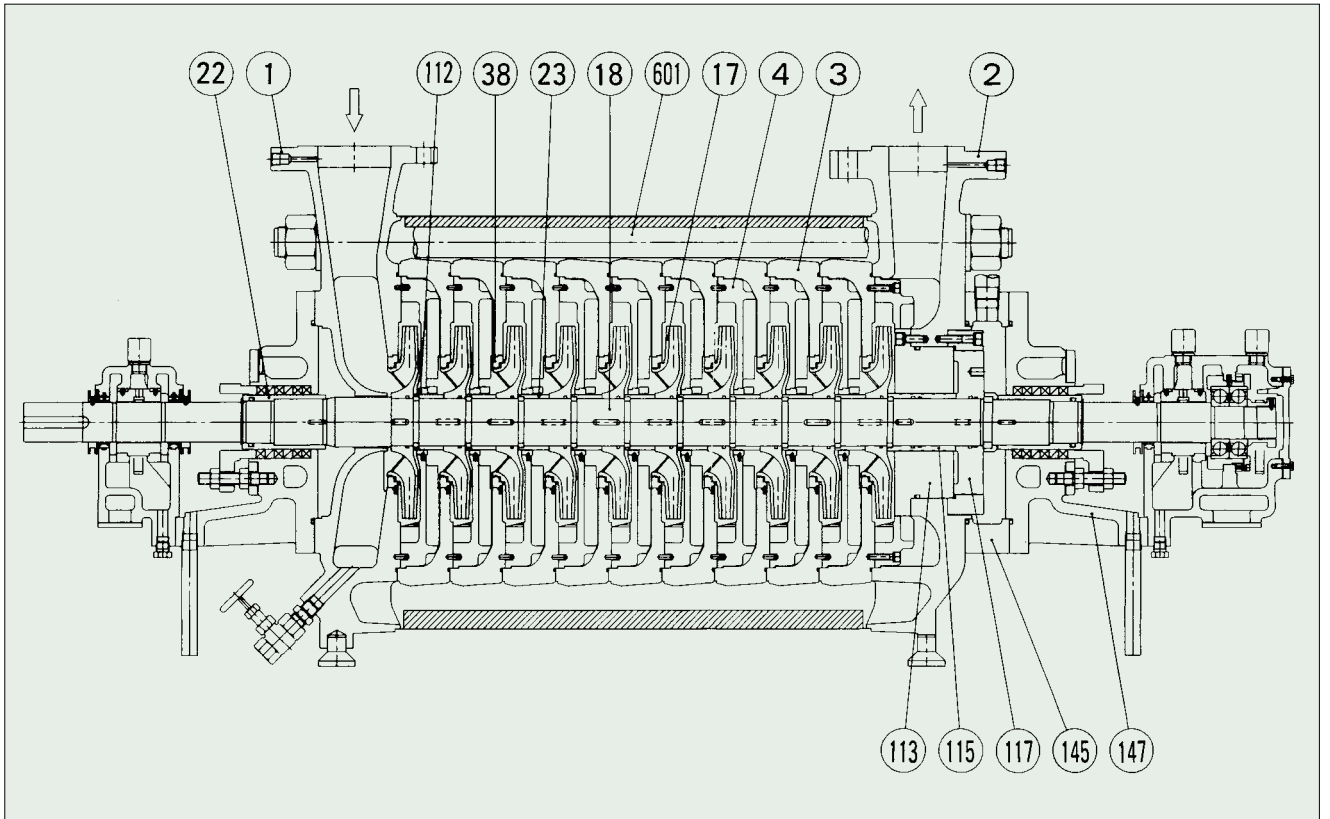


60Hz



Note : The numbers in the charts refers to the number of pump stage.

■ DESIGN & STANDARD MATERIALS



The material of the parts can be changed in accordance with the operating conditions.

PART NO.	NAME OF PART	MATERIAL		
		NAME	JIS	ASTM
* 1	SUCTION CASING	DUCTILE CAST IRON	FCD700	A536-77 100-70-03
* 2	DISCHARGE CASING	"	"	"
* 3	STAGE CASING	CARBON STEEL	S45C	AISI 1045
* 4	VOLUTE	DUCTILE CAST IRON	FCD700	A536-77 100-70-03
17	IMPELLER	STAINLESS STEEL	SCS1	A743 CA15
18	IMPELLER SHAFT	"	SUS403	AISI 403
22	SLEEVE	"	"	"
23	STAGE SLEEVE	"	"	"
38	MOUTH RING	"	SCS1	A743 CA15
112	STAGE PIECE	"	"	"
113	BALANCE BUSH	"	SUS403	AISI 403
115	BALANCE SLEEVE	"	"	"
117	BALANCE DISK	"	"	"
145	BALANCE CHAMBER	CAST IRON	FC200	A48-75 36
147	STUFFING BOX	"	"	"
* 601	STAY BOLT	CARBON STEEL	S45C	AISI 1045

The materials for the main parts shown on the left are used under the following conditions:

Discharge pressure : Below 5MPaG  
 Water Temperatures : Below 175°C  
 pH of water handled : 7~9.5

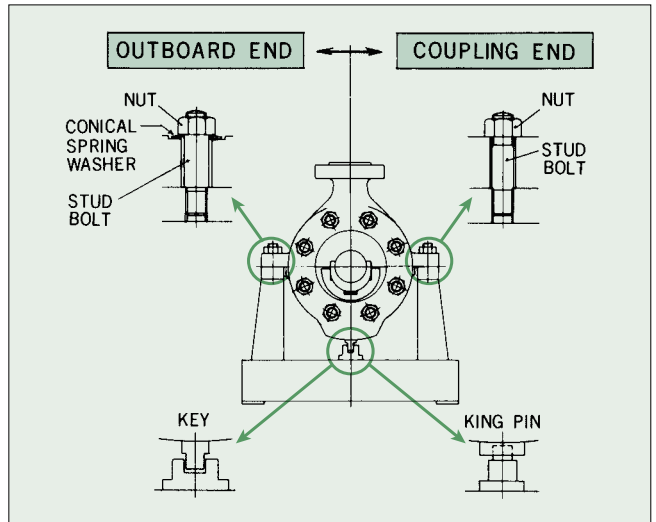
However, when exceeding these values, the most suitable materials for the parts marked with an \* are selected in relation to the operating conditions.

## Casing

The stage casings are positioned between the suction and discharge casings and tightened using strong stay bolts to form a single unit to prevent water leakage in the connection faces of the casing.

Since the casing is externally supported on both sides in the center of the pump, high water temperatures do not affect the alignment thanks to the thermal expansion. Also, the suction casing is firmly secured to the pedestal with a king pin and bolts so that axial movement is possible on the discharge side.

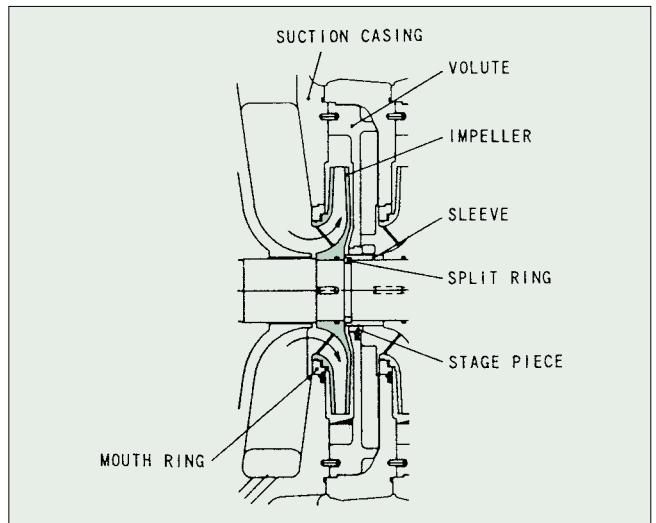
Therefore, casing expansion from high water temperatures can be absorbed.



## Impeller

The impeller is designed and finished to maintain stability and high efficiency throughout the capacity range, and it is perfectly balanced both dynamically and statically.

Since the impeller is located on the shaft and firmly secured with a key and split ring, the shaft does not bend and can expand freely in the axial direction with even high water temperatures.



## Main Bearing

On both side of the casing, there are bearing housings split upper and lower parts.

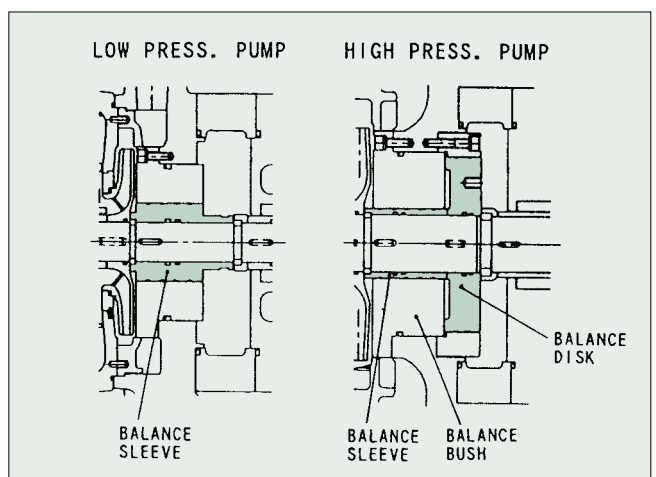
In order to support the radial load, ball bearings or a horizontally split journal bearing is used. On the opposite side from the coupling, ball bearings are equipped as thrust bearings to protect against unexpected axial thrust.



## Thrust Balance

In order to offset axial thrust caused by changes in the discharge pressure, high pressure pumps are equipped with a balance sleeve and a disk. Whereas, low pressure pumps are only equipped with a balance sleeve.

A thrust bearing has been installed in the bearing housing on the outboard end to prevent metallic contact between the balance disk and balance bush.

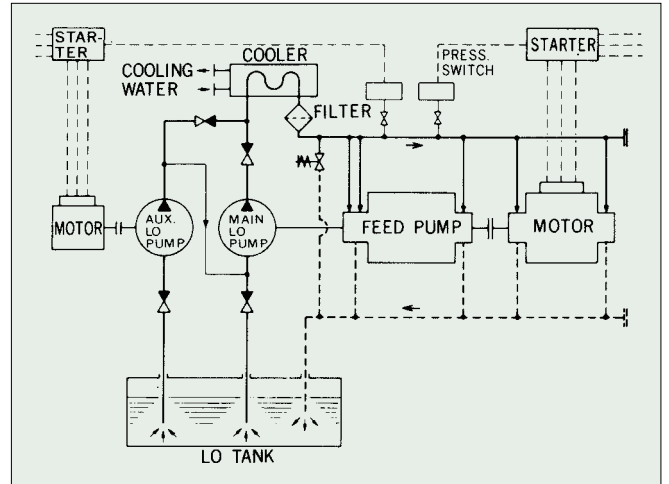
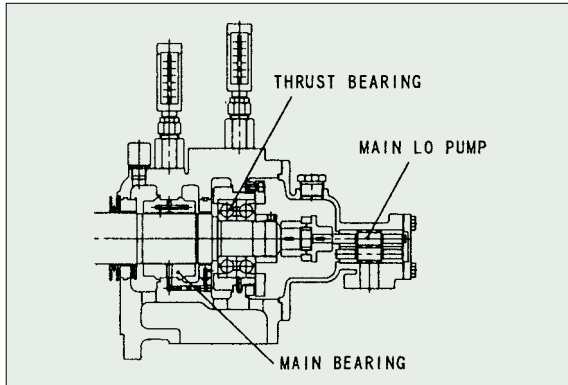


## Lubrication

Either an oil ring or forced lubrication system is used for the bearings.

A water jacket has been installed on the bearing housing to supply the cooling water for oil ring systems.

For forced lubrication systems, lube oil is supplied either by a steam turbine (when the driver is a steam turbine) or by a main lube oil pump located at the outboard shaft end of the pump (when the driver is a motor). In the case of the latter, a motor driven auxiliary lube oil pump is used to supply oil at startup and shutdown or when there is trouble with the main lube oil pump.

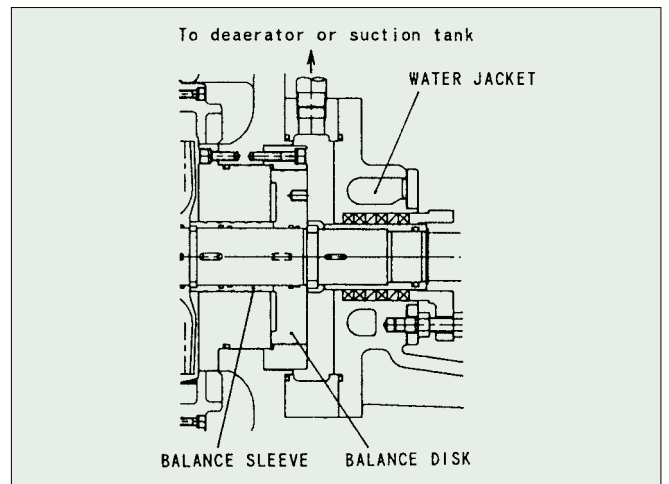


## Stuffing Box

Both ends of the pump casing, which the impeller shaft passes through, are equipped with stuffing boxes with gland packing inside.

The stuffing box is provided with a water jacket for cooling water.

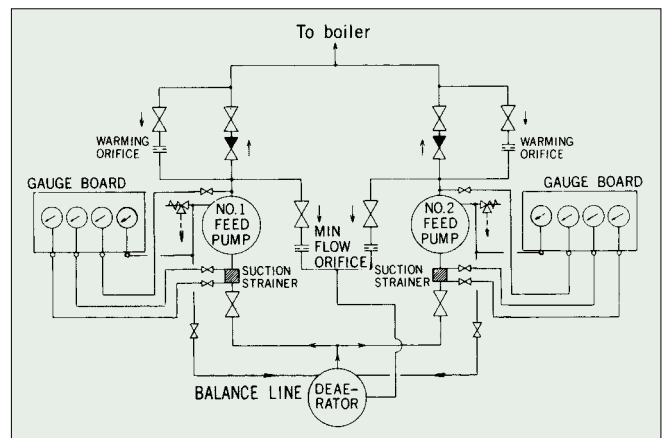
The water leaked from the balance disk is led to the deaerator or pump suction side to balance the axial thrust force, and at the same time, to reduce the pressure acting on the gland packing to improve the service life.

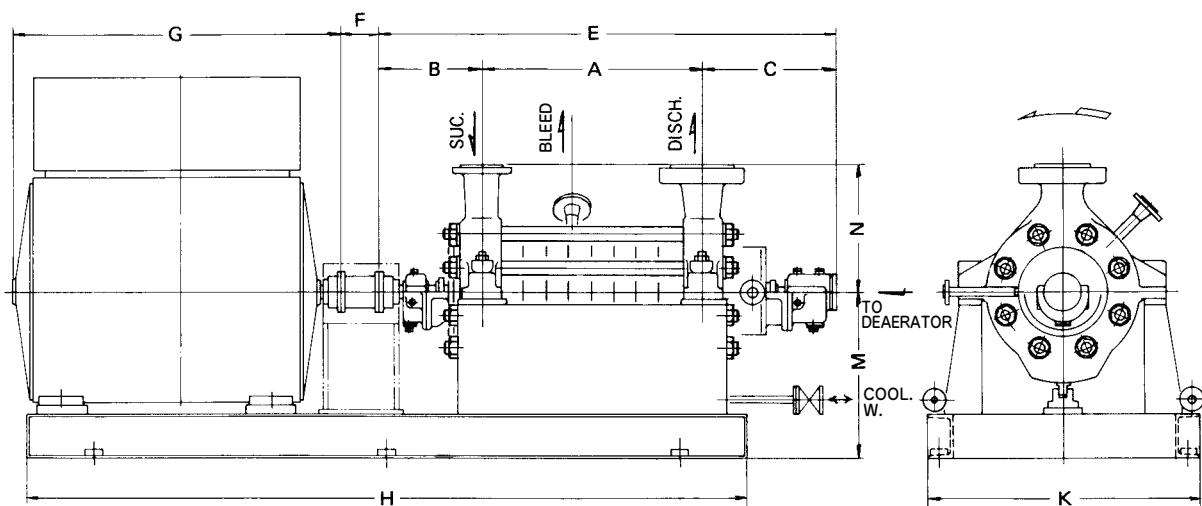


## Sleeve & Gland Packing

The sleeve is made of stainless steel and the surface is hardened and ground so that it can stand severe usage.

Gland packing is either metallic or semi-metallic, which have a long service life.





mm

Model	Bore		Stage	A	B	C	E	F	G	H	K	M	N
	Suc.	Disch.											
DKR 40	50	40	5	290	385	400	1075	127	800	1400	580	420	300
			8	455	430	488	1373	127	800	1600	630	440	300
			11	620	430	488	1538	127	1000	1800	630	440	300
			14	785	430	488	1703	127	1000	2000	630	440	300
DKR 50	65	50	5	325	395	490	1210	127	1000	1500	660	500	300
			8	505	395	490	1390	127	1100	1800	660	500	300
			11	685	433	490	1608	127	1200	2200	740	500	300
			14	865	433	490	1788	127	1300	2700	740	500	300
DKR 65	80	65	5	375	455	500	1330	127	1200	2400	730	600	350
			8	570	455	500	1525	127	1400	2600	730	600	350
			11	765	455	510	1730	127	1600	2800	860	600	350
			14	960	455	510	1925	127	2000	3000	860	600	350
DKR 80	100	80	6	483	450	510	1443	127	1600	2600	870	600	380
			8	627	450	510	1587	127	1600	2700	870	600	380
			10	771	510	560	1841	127	1600	2900	870	600	380
			12	915	510	560	1985	127	1900	3000	870	600	380
			14	1059	510	560	2129	127	1900	3200	870	600	380
DKR 100	125	100	4	395	510	711	1616	140	1600	4200	1100	800	450
			6	565	510	711	1786	140	2200	4400	1100	800	450
			8	735	510	711	1956	140	2400	4600	1100	800	450
			10	905	520	755	2180	140	2600	4800	1100	800	450
			12	1075	520	755	2350	140	2700	5000	1100	800	450
DKR 125	150	125	4	430	580	800	1810	140	2600	4400	1100	850	580
			6	610	580	837	2027	140	2800	4600	1100	850	580
			8	790	580	837	2207	140	3000	4800	1100	850	580
			10	970	580	837	2387	140	3100	5000	1100	850	580
DKR 150	200	150	3	355	650	850	1855	200	2500	4200	1200	1000	700
			4	450	650	850	1950	200	2700	4300	1200	1000	700
			5	545	650	850	2045	200	2900	4500	1200	1000	700
			6	640	650	850	2145	200	3100	4700	1200	1000	700
			7	735	650	850	2235	200	3300	4900	1200	1000	700

Note : The table above shows approximate dimensions.

Motor dimensions are in accordance with IEC frames.

**SHINKO IND. LTD.**