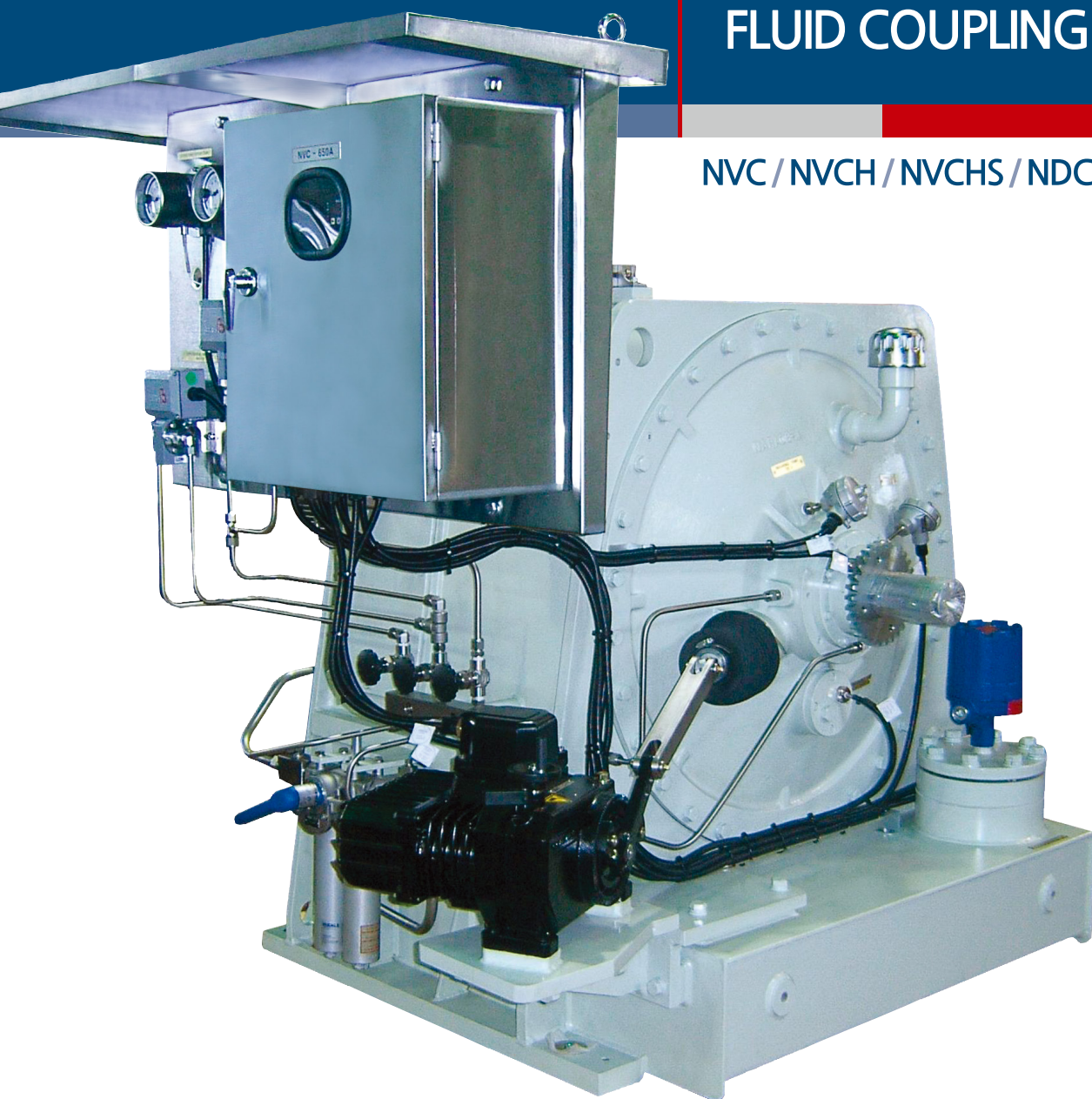


NARA

VARIABLE SPEED FLUID COUPLING

NVC / NVCH / NVCHS / NDC / NTC / NGC



HISTORY

- 2019. Developed Variable Speed Fluid Coupling
integrated with two stage Step-up Gear(Over10,000rpm)
- 2015. Moved New Factory(Headquarters)
- 2014. Certificate the API Q1
- 2011. Certified Worm, Chain Type Reducer by DIESEL & TURBO
- 2010. Certified HS Coupling for Wind Turbine by Windtec
- 2009. Developed, Geared Variable Speed Fluid Coupling
- 2007. Developed High Speed, Variable Speed Fluid Coupling
- 2005. Certified ISO 9001:2008
- 2001. Developed High Speed Fluid Coupling for K9 Cannon.
Developed Hydraulic Control Valve for K1 Tank.
- 2000. Supplied Gear Coupling for Rail Car
- 1997. Supplied Planetary Reducer for Marine Engine
- 1986. Developed Fluid Coupling
- 1979. Produced, Shaft Coupling for Power Transmission
"NARA Transmission Company" established



Characteristics

Basic Concept

Most of centrifugal machines are oversized when designed and run at low load condition. And many of them are needed frequently speed regulations by the purposes of the process. Therefore low efficiency devices as damper or control valve are needed.

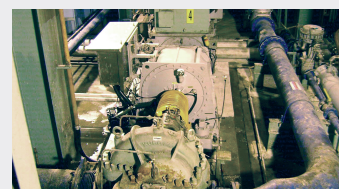
The Variable Speed Fluid Coupling provide best solution of energy saving by speed regulation controlled the fuel consumption and long term of life time for relevant machines.

The Advantage

- Energy saving
- Provide no load start system
- Protection from vibration and shock
- Variable speed control
- Automatic or Manual control
- Minimize driven machine maintenance

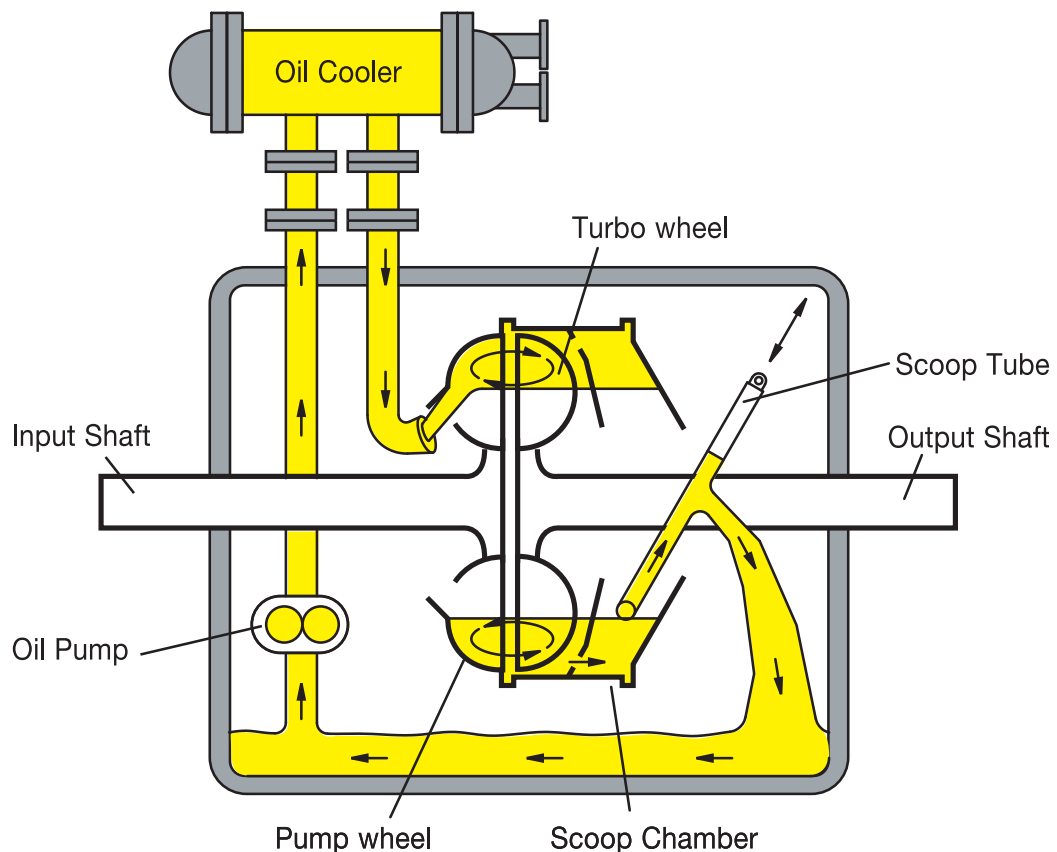
Application

- Power Plant
 - BFW Pump, Fan
- District Heating Plant
 - Circulating Pump
- Steel Mill Plant
 - Crusher, Pump, Fan
- Material Handling
 - Belt conveyor, Slurry pump
- Chemical Industry
 - Centrifuge, Pump, Mixer
- Cement Plant
 - Conveyor, Fan



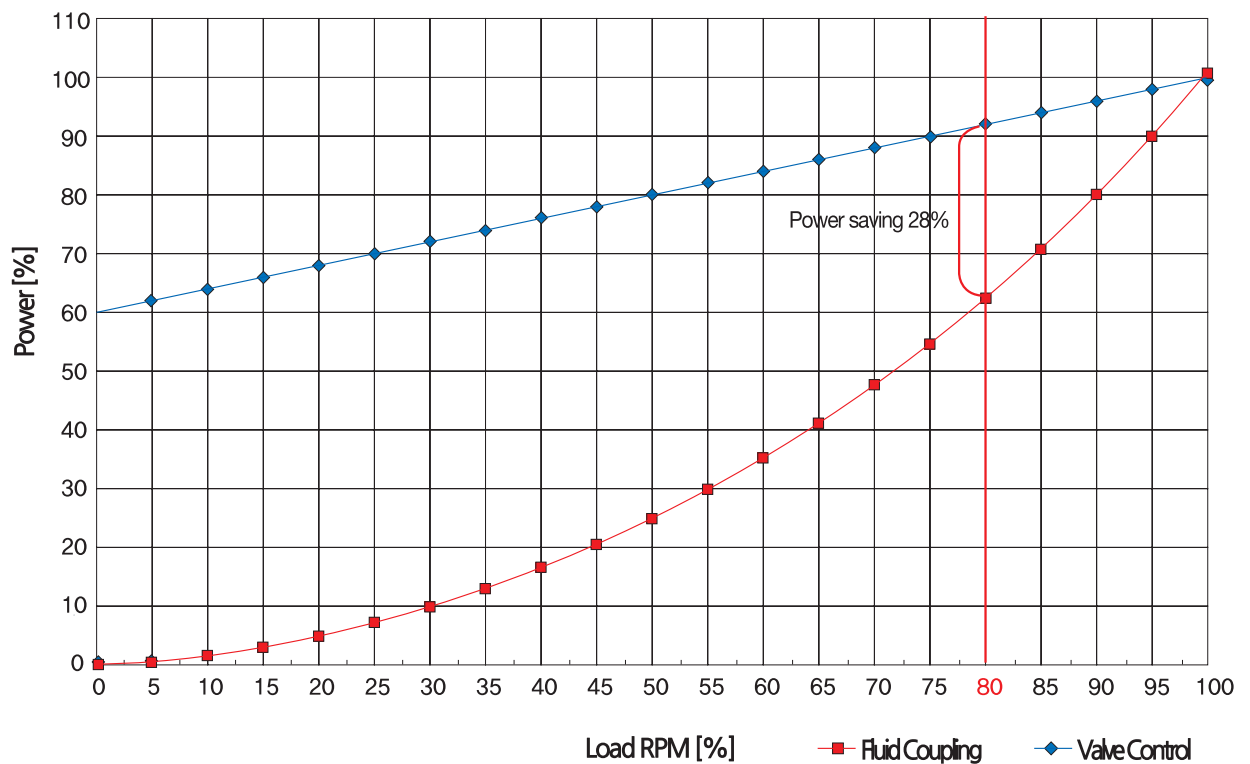
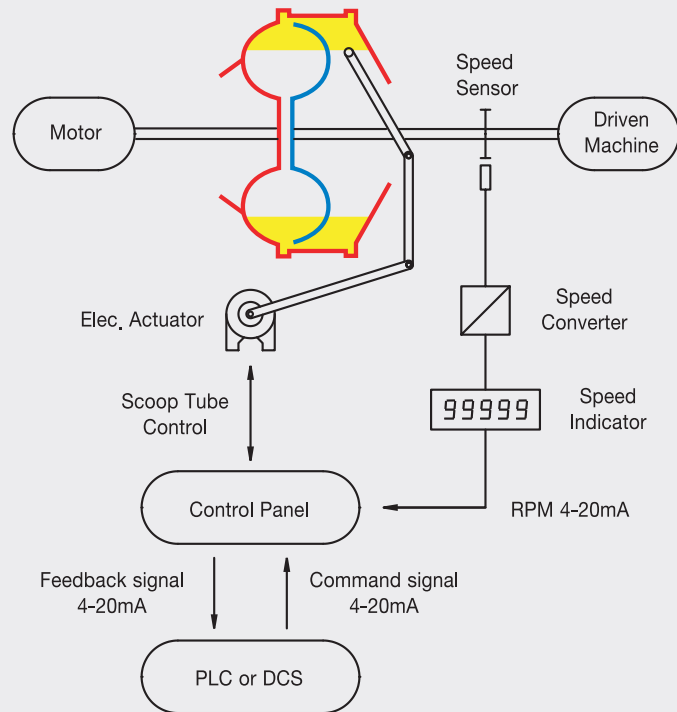
The Principle of Operation

The Variable Speed Fluid Coupling is a hydraulic power transmission equipment. The Pump Wheel is operated by motor and Turbo Wheel perform as a turbine. With an input drive as motor or engine, the kinetic energy is imparted to the oil in the coupling and the oil moves by centrifugal force from inner impeller to outer impeller. The transmitting power and speed is depending upon the amount of oil in the coupling. The scoop tube, which locate in rotating chamber can control the oil amount. And it can be controlled by rotary actuator with remote PLC control automatically. The heat exchanger provides oil cooling system.



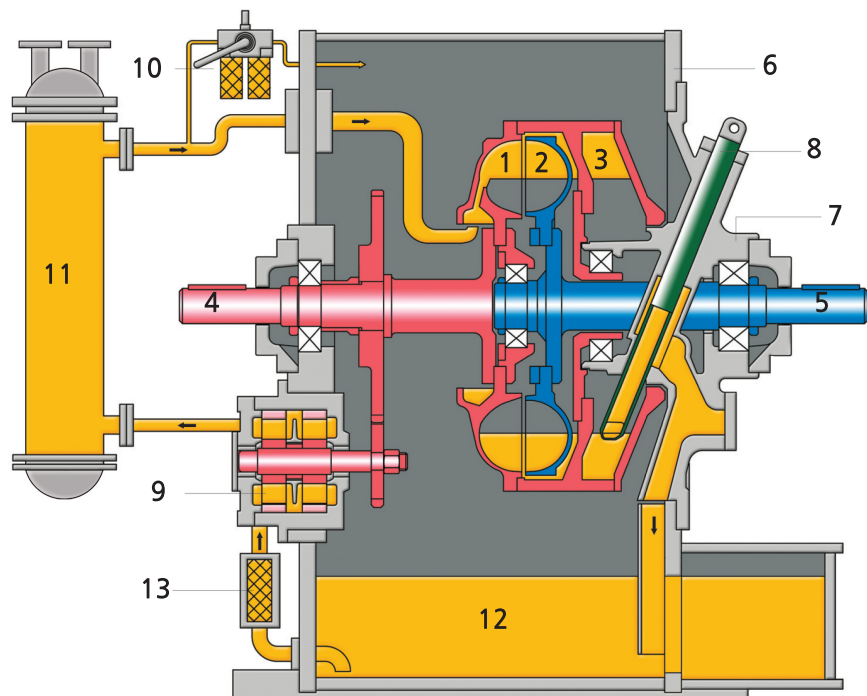
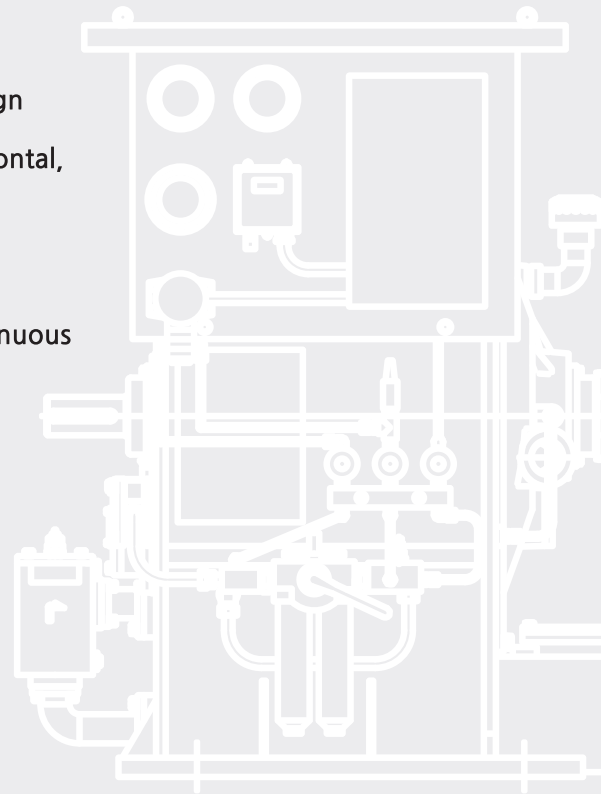
Operation system

Remote Control by PLC



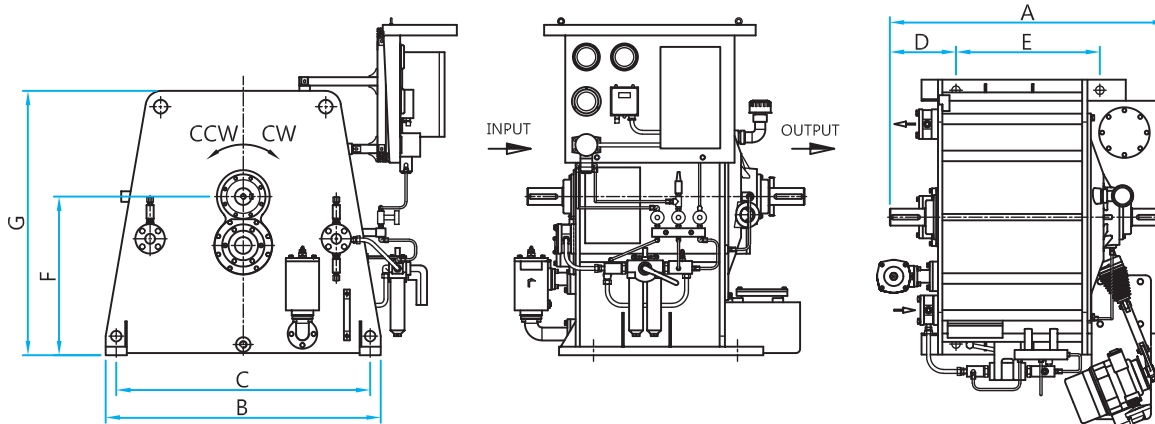
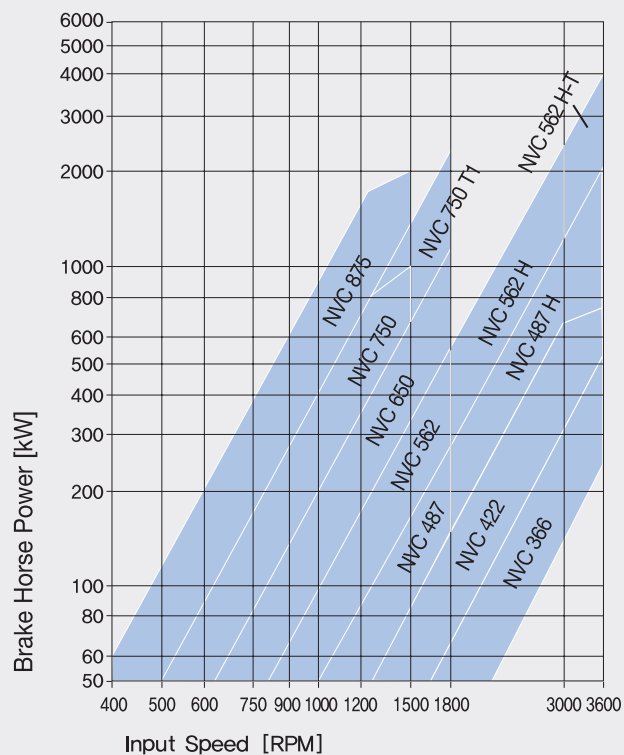
Type NVC

- Simplified and Economical Design
- Tunnel Type Housing and Horizontal, self-supporting
- Internal Oil Pump
- Antifriction Bearings with Continuous Lubrication
- Oil Cooling system
- Remote and Auto. Control.
- Speed Control of 25%~100%



- | | | | |
|--------------------|-------------------|----------------|----------------|
| 1. Pump Wheel | 2. Turbo Wheel | 3. Shell | 4. Input Shaft |
| 5. Output Shaft | 6. Housing | 7. Scoop Case | 8. Scoop Tube |
| 9. Oil Pump | 10. Duplex Filter | 11. Oil Cooler | 12. Oil Tank |
| 13. Suction Filter | | | |

Selection



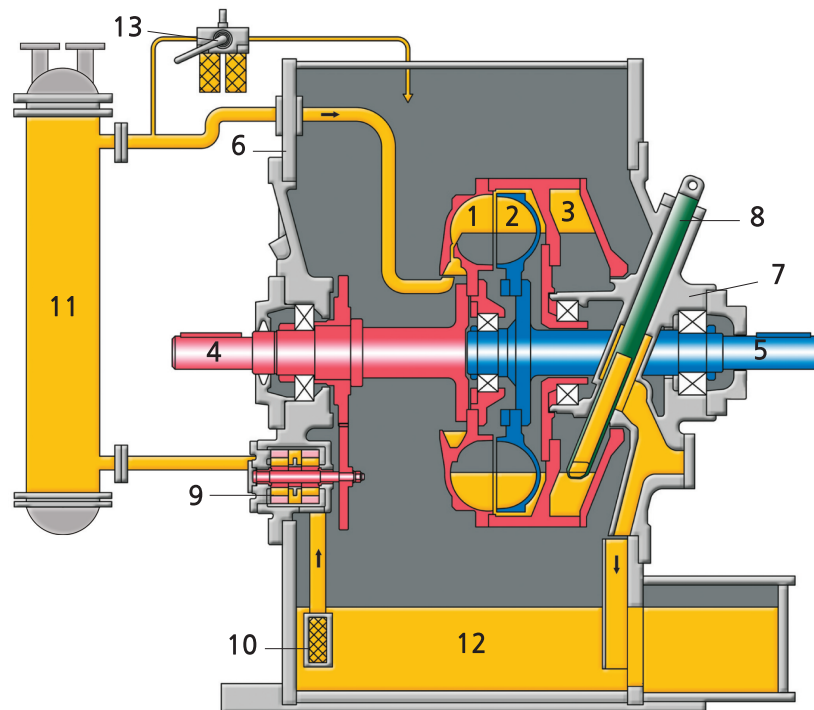
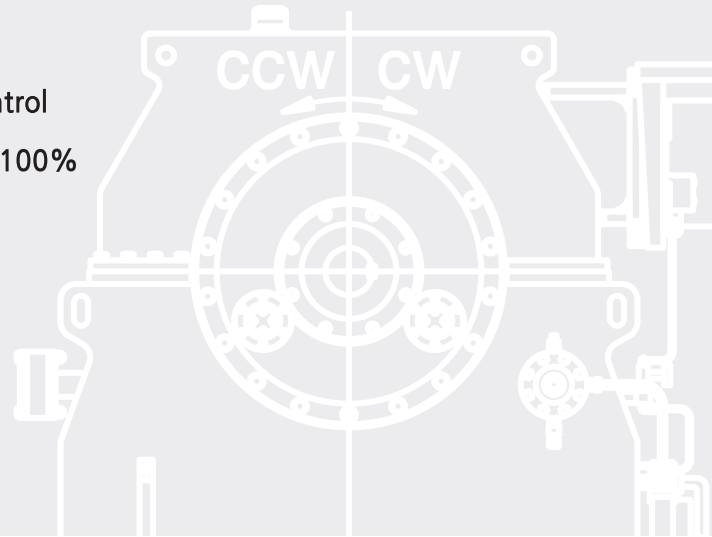
(Unit: mm)

SIZE	A	B	C	D	E	F	G	Oil (Liters)	Weight (kgf)
NVC366	1000	980	900	220	560	500	825	120	630
NVC422	1000	980	900	220	560	500	825	130	650
NVC487	1148	1060	1000	260	620	630	1030	220	1100
NVC487H	1255	1780	1000	131	860	800	1230	510	1700
NVC562	1148	1060	1000	260	620	630	1030	220	1200
NVC562H	1255	1780	1000	131	860	800	1230	510	1850
NVC562H-T	1358	1350	1210	85	1200	800	1270	460	2480
NVC650	1310	1310	1200	313	680	750	1275	310	1600
NVC750	1310	1310	1200	313	680	750	1275	320	1800
NVC750T1	1469	1400	1300	350	760	725	1280	420	2200
NVC875	1470	1475	1350	370	780	850	1475	370	2300

- Dimensions are subject to alteration without notice.
- The oil quantity is only for oil tank in the variable speed fluid coupling. (The quantity of oil for oil cooler and oil in the pipings are excluded.)

Type NVCH

- Self-Supporting Design with Horizontally Split Housing
- Easy for Inspection and Maintenance
- Internal Oil Pump
- Antifriction Bearing with Continuous Lubrication
- Oil Cooling System
- Remote and Auto control
- Speed Control of 25~100%



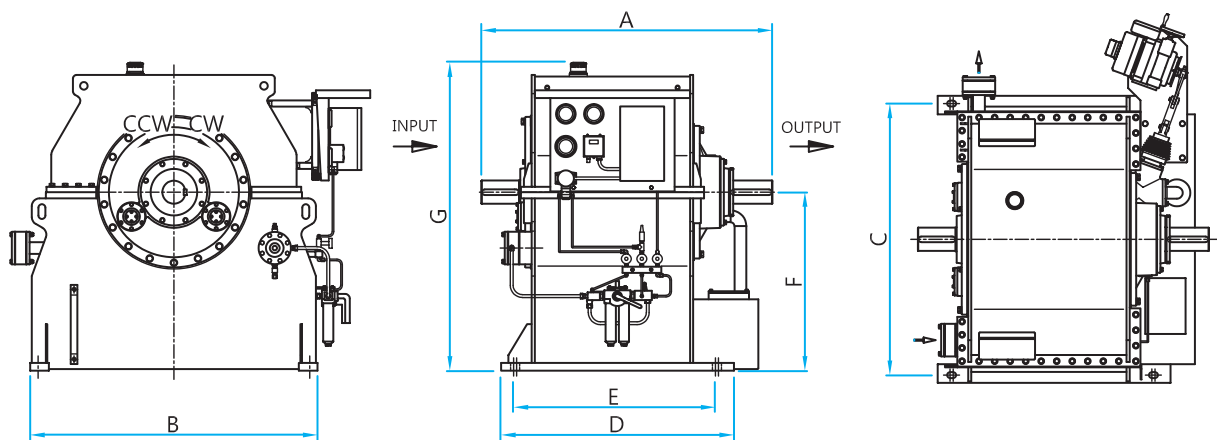
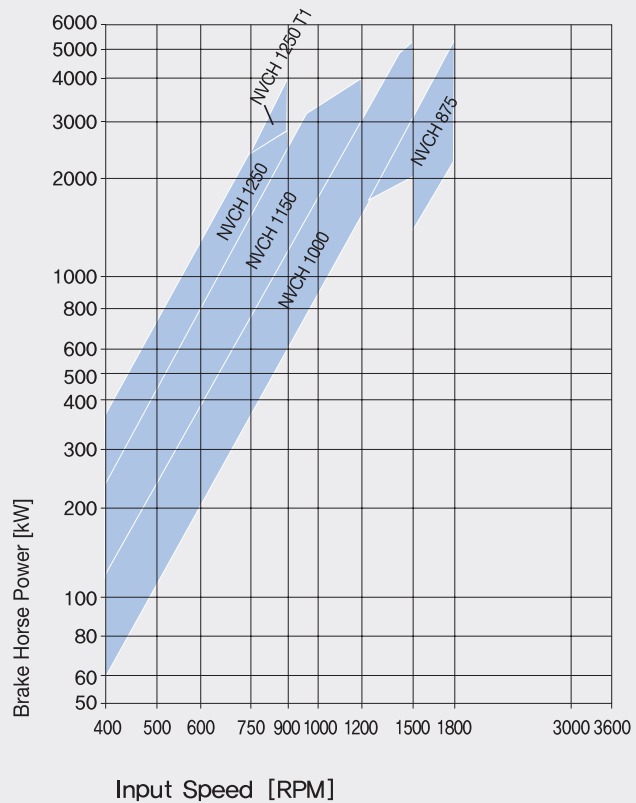
1. Pump Wheel
5. Output Shaft
9. Oil Pump
13. Duplex Filter

2. Turbo Wheel
6. Housing
10. Suction Filter

3. Shell
7. Scoop Case
11. Oil Cooler

4. Input Shaft
8. Scoop Tube
12. Oil Tank

Selection



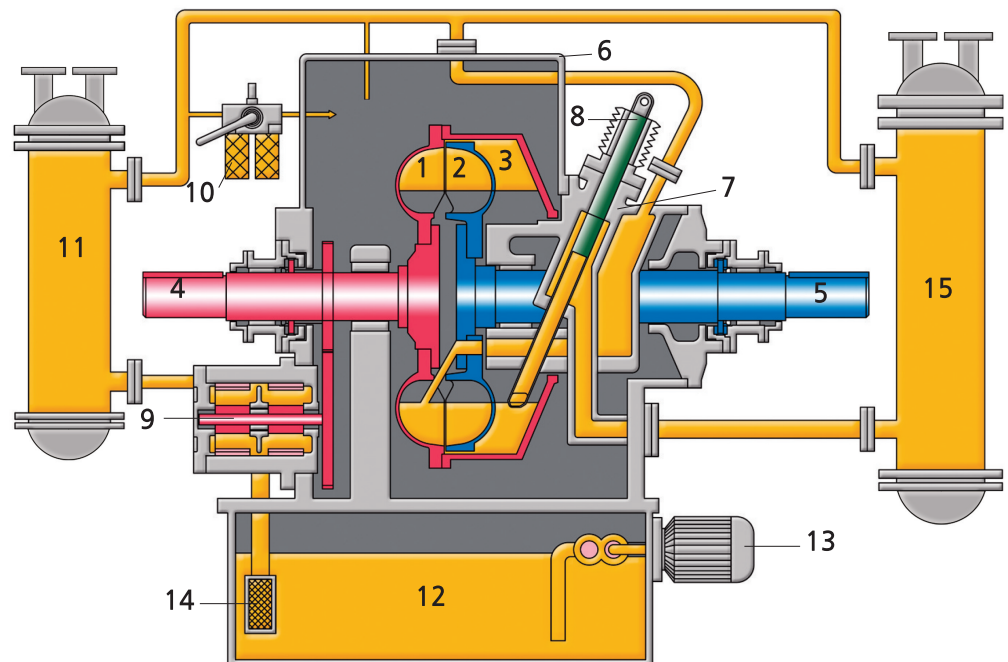
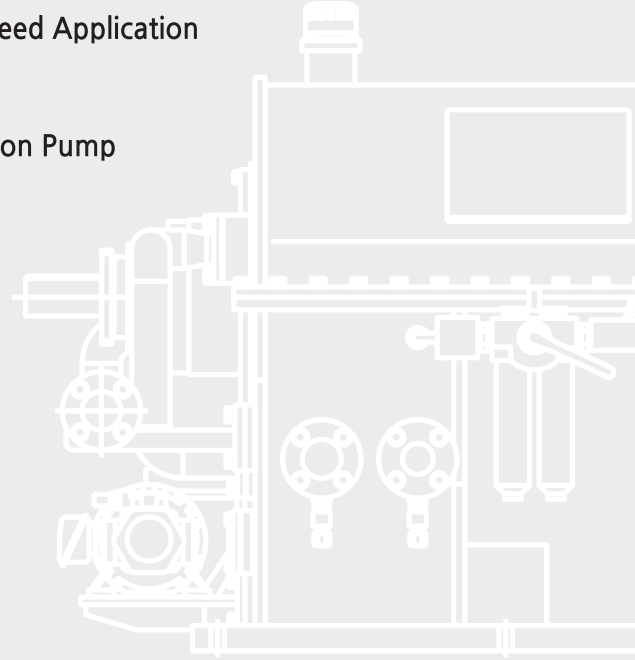
(Unit:mm)

SIZE	A	B	C	D	E	F	G	Oil (Liters)	Weight (kgf)
NVCH875	1750	1500	1400	1140	930	850	1400	550	2700
NVCH1000	1880	1855	1750	1500	1300	1150	1986	950	4600
NVCH1150	1880	1855	1750	1500	1300	1150	1986	950	5000
NVCH1250	2250	2160	1600	2100	1950	1170	2131	1250	7600
NVCH1250T1	2250	2160	1600	2100	1950	1170	2131	1250	9500

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- The oil quantity is only for oil tank in the variable speed fluid coupling.(The quantity of oil for oil cooler and oil in the pipings are excluded.)

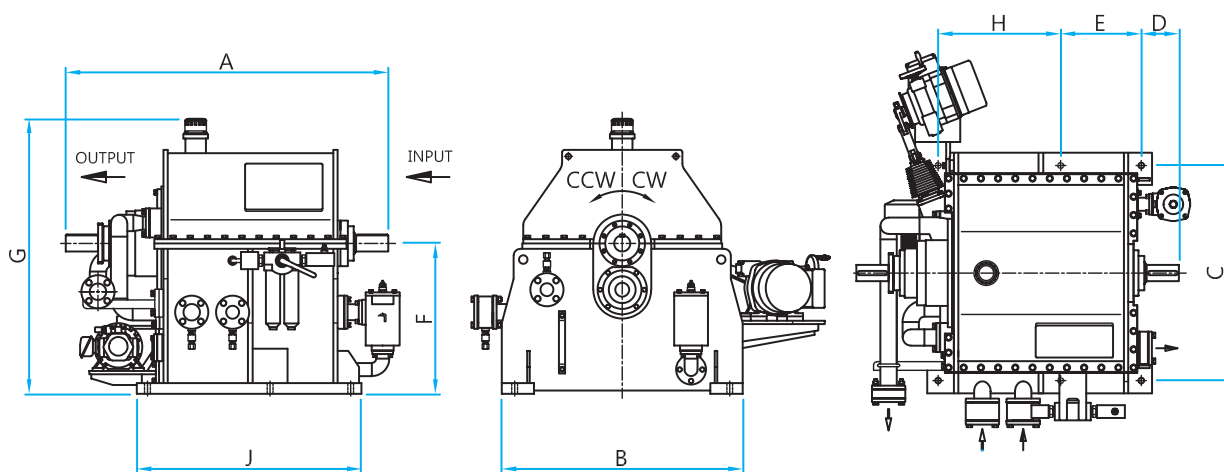
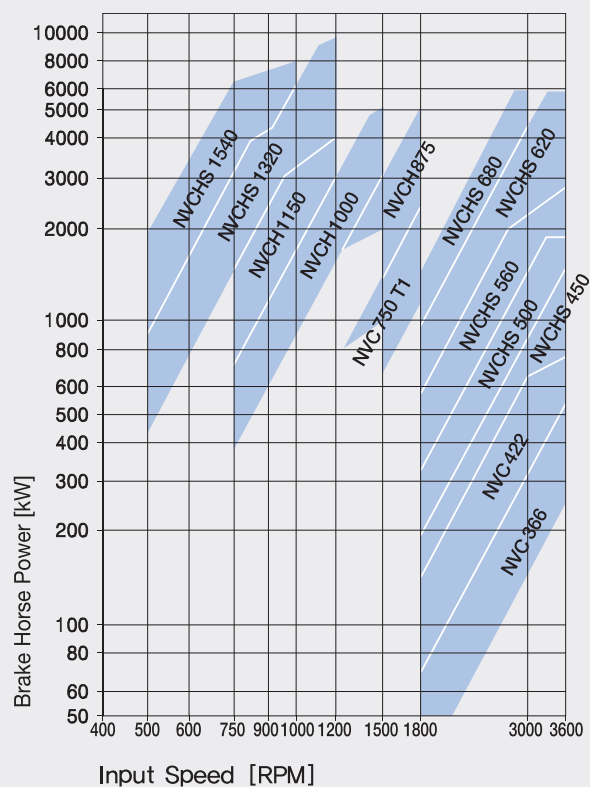
Type NVCHS

- Self-Supporting Design with Horizontally Split Housing
- Sleeve Bearings for High-Speed Application
- Internal Oil Pump
- Motor Driven Aux. Lubrication Pump
- Oil Cooling System
- Speed Control of 25~100%



- | | | | |
|------------------------|--------------------|--------------------------------|----------------|
| 1. Pump Wheel | 2. Turbo Wheel | 3. Shell | 4. Input Shaft |
| 5. Output Shaft | 6. Housing | 7. Scoop Case | 8. Scoop Tube |
| 9. Oil Pump | 10. Duplex Filter | 11. Oil Cooler for Lub Oil | 12. Oil Tank |
| 13. Aux. Lub. Oil Pump | 14. Suction Filter | 15. Oil Cooler for Working Oil | |

Selection



(Unit:mm)

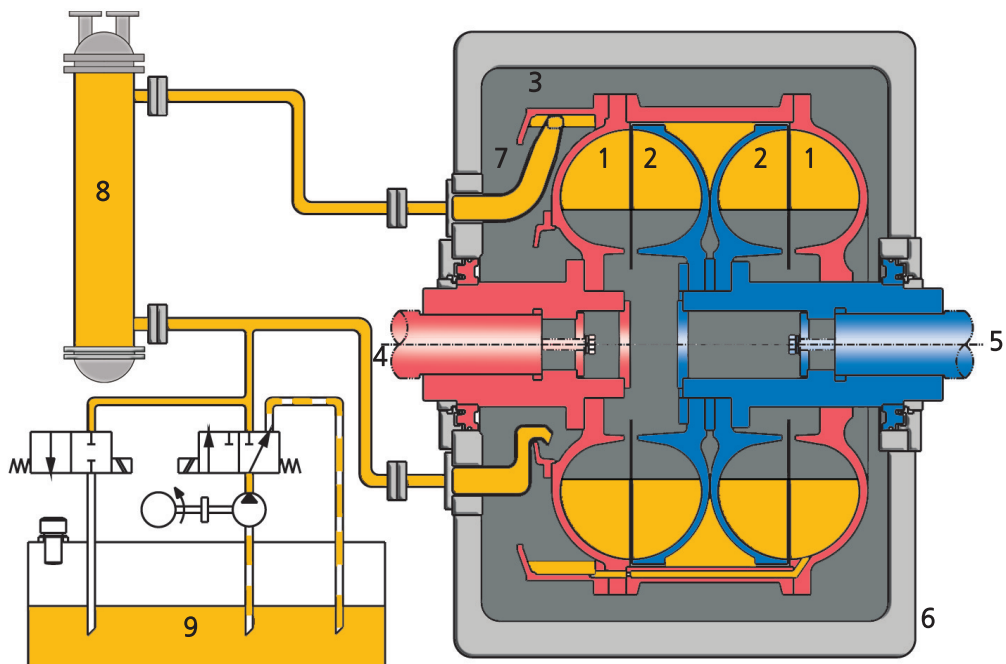
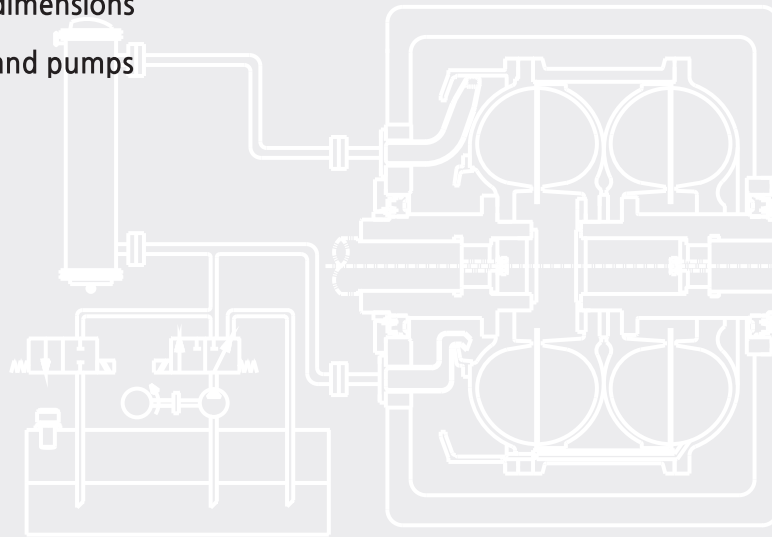
SIZE	A	B	C	D	E	F	G	H	J	Oil (Liters)	Weight (kgf)
NVCHS450	1350	1010	900	155	340	630	1155	510	940	250	1700
NVCHS500	1500	1120	1000	175	375	700	1281	570	1045	300	1950
NVCHS560	1750	1350	1200	200	485	810	1450	615	1200	450	2450
NVCHS620	2050	1450	1300	235	560	900	1600	780	1800	510	3840
NVCHS680	2200	1500	1350	250	575	900	1600	845	1850	560	4700
NVCHS1320	3250	2050	1925	325	-	1170	2250	850x3	2750	1500	14000
NVCHS1540	3250	2050	1925	325	-	1170	2250	850x3	2750	1500	15000

• Dimensions are subject to alteration without notice.

• The oil quantity is only for oil tank in the variable speed fluid coupling.(The quantity of oil for oil cooler and oil in the pipings are excluded.)

Type NDC

- Non Self-Supporting Design with Horizontally Split Housing
- External Oil pump unit
- Speed Control of 25~100%
- Low installation dimensions
- Retrofits in fans and pumps

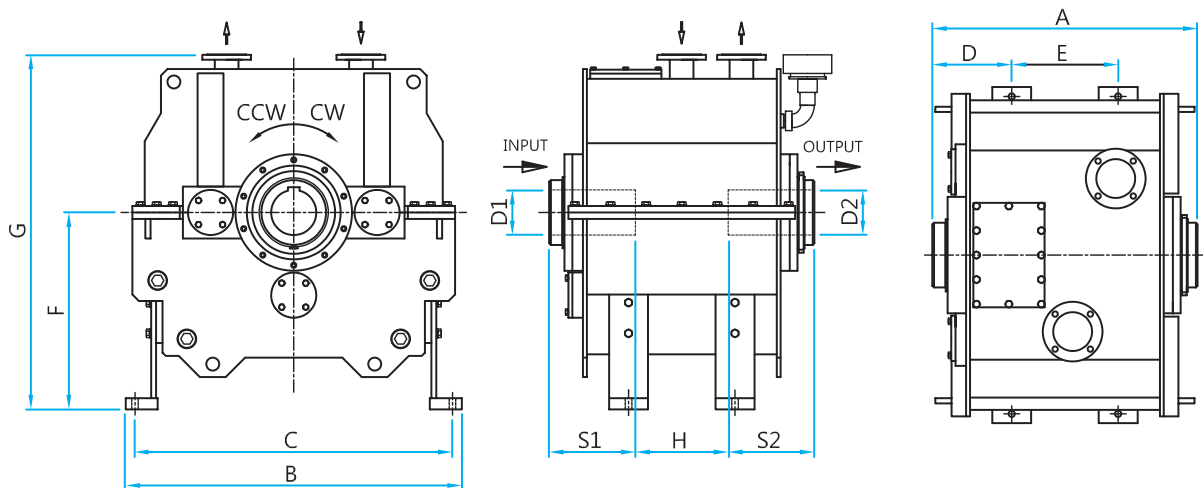
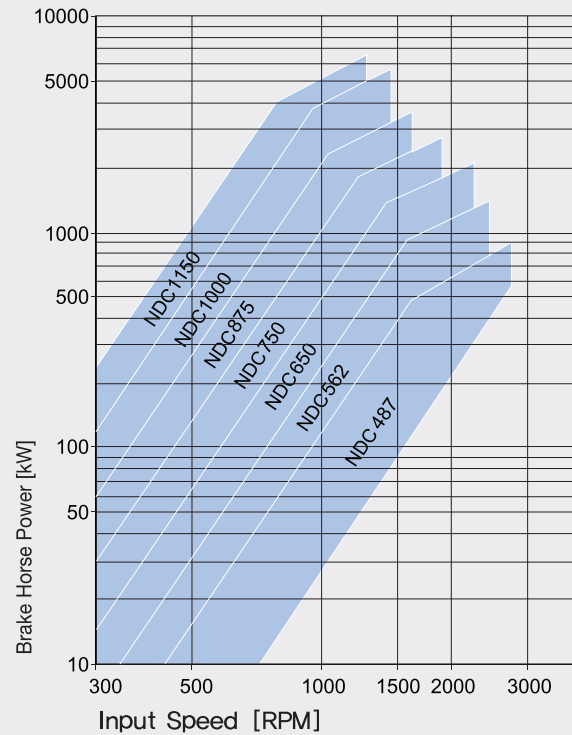


1. Pump Wheel
4. Input Shaft
7. Scoop Tube

2. Turbo Wheel
5. Output Shaft
8. Oil Cooler

3. Shell
6. Housing
9. Oil Tank

Selection



(Unit:mm)

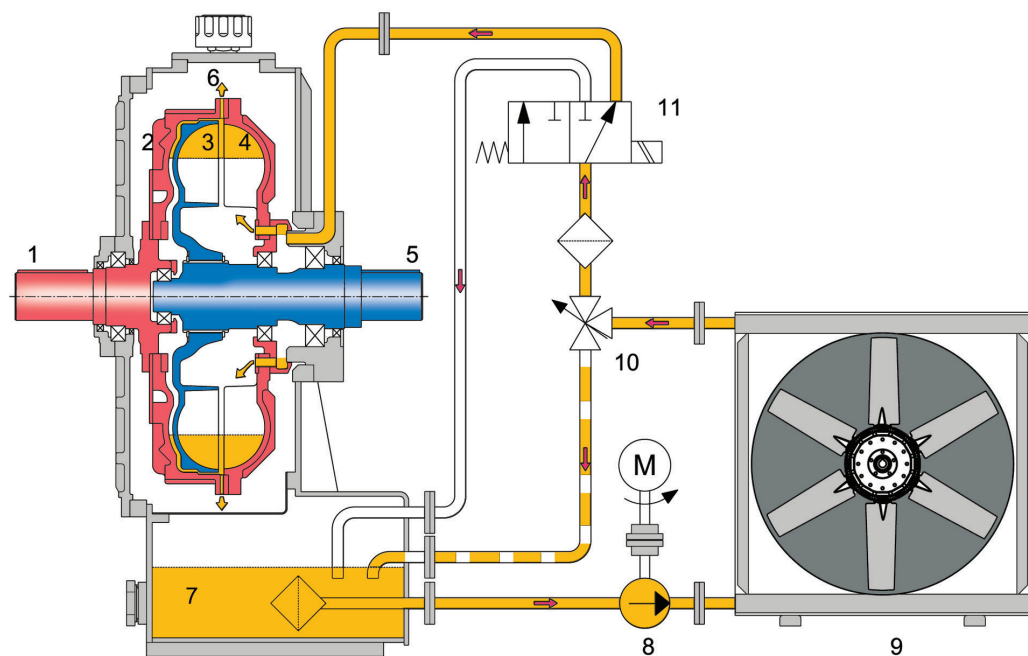
SIZE	A	B	C	D	E	F	G	H	D1 (Max)	S1 (Max)	D2 (Max)	S2 (Max)	Oil (Liters)	Weight (kgf)
NDC487	670	816	766	205	280	500	950	L-(S1+S2)	110	210	110	210	250	600
NDC562	713	860	806	190	340	550	1070		120	210	120	210	250	700
NDC650	800	1030	980	235	360	625	1170		140	240	140	240	350	900
NDC750	970	1140	1020	253	510	675	1300		170	300	170	300	350	1300
NDC875	1125	1325	1220	372	450	800	1520		200	350	200	350	550	1700
NDC1000	1250	1600	1500	355	500	920	1700		200	350	200	350	950	3100
NDC1150	1420	1800	1700	425	570	1055	1900		225	350	225	350	1200	4400

• Dimensions are subject to alteration without notice.

• The oil quantity is only for oil tank in the variable speed fluid coupling.(The quantity of oil for oil cooler and oil in the pipings are excluded.)

Type NTC

- Drain type Variable Speed Fluid Coupling
- CW and CCW Operating Direction available
- Suitable for Belt Conveyor Operation and Inspection Speed control
- Self Supporting Tunnel type Housing
- Externally Motor driven Oil feeding Pump
- Variable Output speed achieved by Oil Flow Rate control through Flow Control Valve
- Remote and Auto. Control
- Antifriction Bearings with Continuous Lubrication

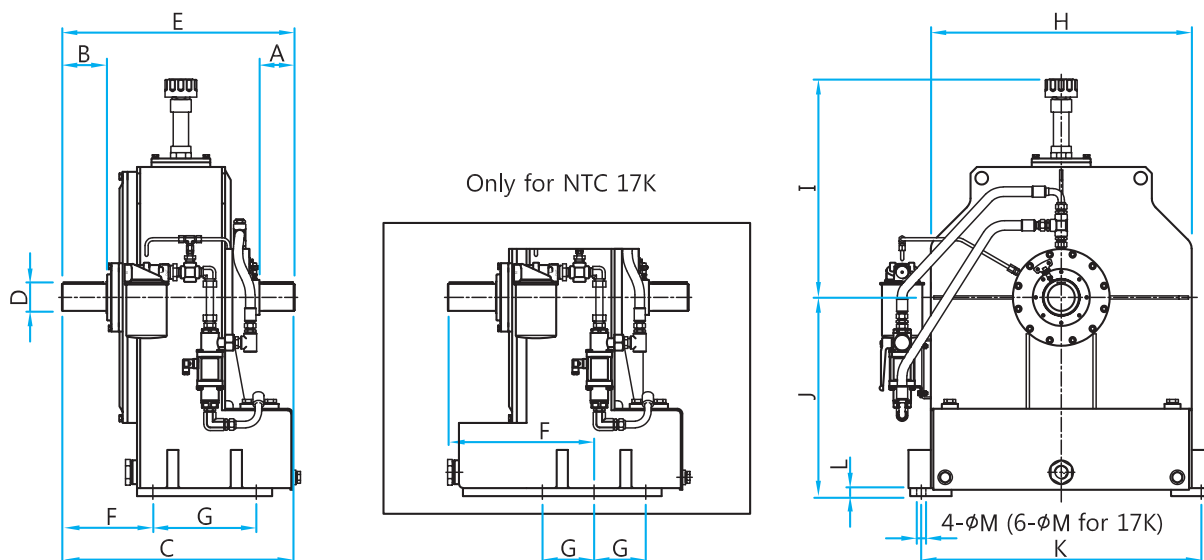


- | | | |
|--------------------------|----------------------|-----------------|
| 1. Outer Wheel shaft | 2. Impeller Cover | 3. Inner Wheel |
| 4. Outer Wheel | 5. Inner Wheel Shaft | 6. Drain Nozzle |
| 7. Housing With Oil Tank | 8. Oil Pump | 9. Oil Cooler |
| 10. Flow Control Valve | 11. Solenoid Valve | |

Selection

(Unit: kW)

Model No. \ Input Speed [rpm]	1000	1200	1500	1800	3000	3600
NTC 15K	-	-	-	-	~320	~455
NTC 17K	-	-	-	-	~575	~610
NTC 19K	~75	~100	~165	~280	-	-
NTC 21K	~110	~160	~240	~410	-	-
NTC 24K	~160	~230	~320	~550	-	-
NTC 27K	~230	~310	~580	~1020	-	-
NTC 29K	~370	~530	~1050	~1720	-	-



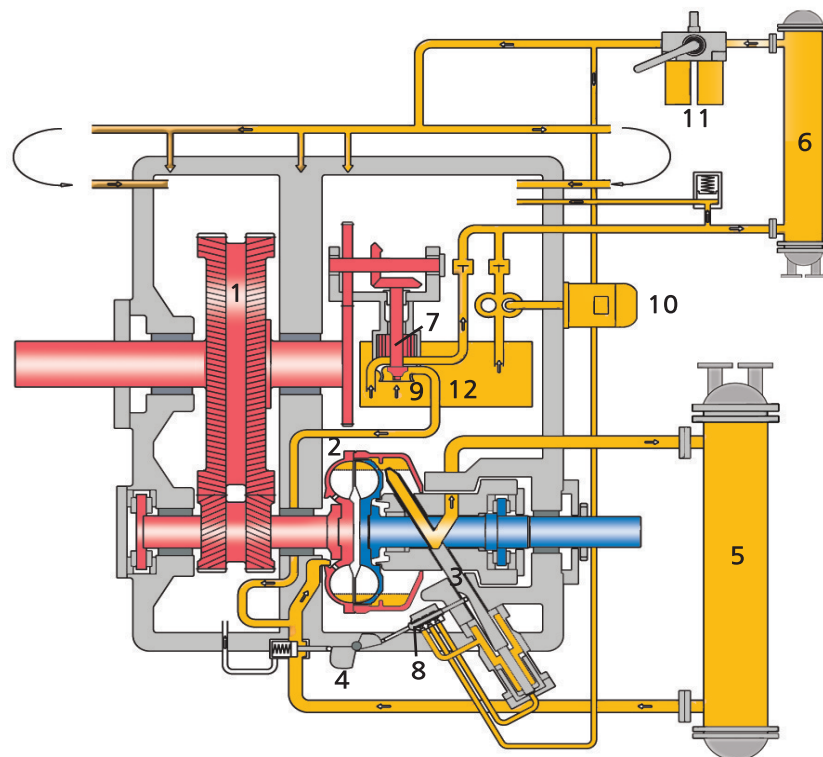
(Unit: mm)

SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	OIL (Liter)	Weight (kgf)
NTC15K	110	110	610	65	610	247	280	672	620	520	730	20	22	43	305
NTC17K	120	120	630	75	636	330	211	672	620	580	730	20	22	90	530
NTC19K	120	120	630	75	636	261	280	672	620	520	730	20	22	45	330
NTC21K	140	140	730	85	731	286	325	825	690	625	880	25	26	85	510
NTC24K	140	140	730	85	731	286	325	825	690	625	880	25	26	85	530
NTC27K	180	180	870	100	920	364	390	895	720	700	960	25	29	120	830
NTC29K	180	180	920	120	970	364	440	975	760	750	1040	25	29	145	1020

- Dimensions are subject to alteration without notice.
- The oil quantity is only for oil tank in the variable speed fluid coupling. (The quantity of oil for oil cooler and oil in the pipings are excluded.)

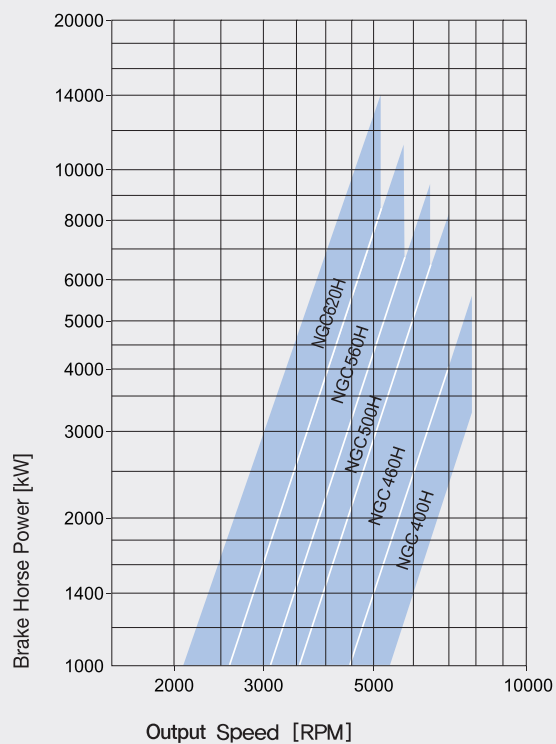
Type NGC-H

- Variable Speed Fluid Coupling integrated with Step-up Gear
- Particularly for Higher Out Speed control by Step-up gear both at the input and the output side
- Self-Supporting design with Horizontally Split Housing
- Sleeve bearing for high-speed application
- Internal gear driven oil pump
- Space optimized by Combination of Integrated Step-up Gear and Fluid Coupling
- Vibration damping
- Relieved motor start-up and smooth acceleration of heavy load

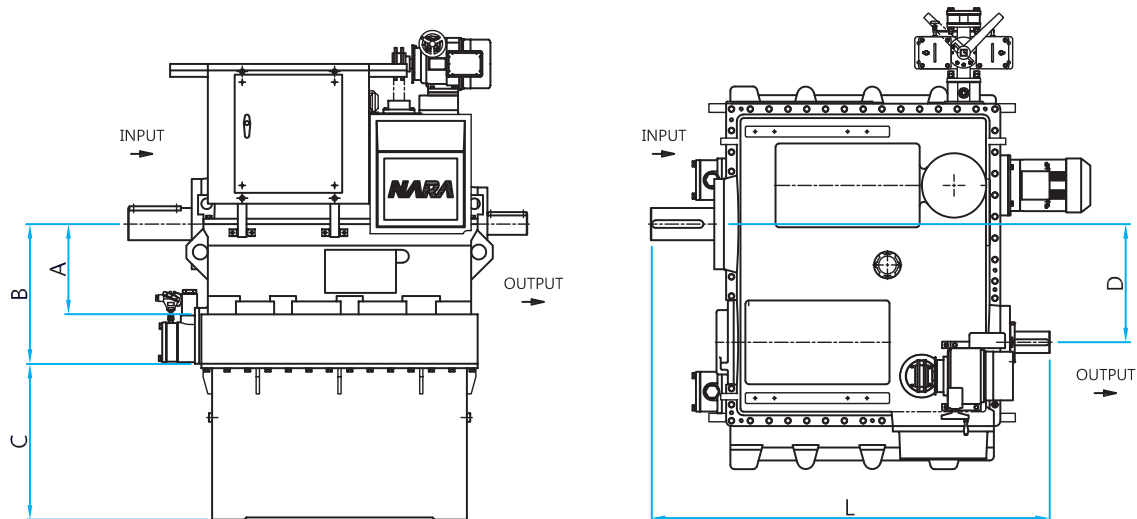


- | | | | |
|-----------------------|--------------------|---------------------|---------------------|
| 1. Helical Gear | 2. Fluid Coupling | 3. Scoop Tube | 4. Actuator |
| 5. Working Oil Cooler | 6. Lub. Oil Cooler | 7. Lub. Oil Pump | 8. Control Valve |
| 9. Working Oil Pump | 10. Aux. Oil Pump | 11. Lub. Oil Filter | 12. Inside Oil Tank |

Selection



• This table can be applied for 50Hz and 60Hz facility.



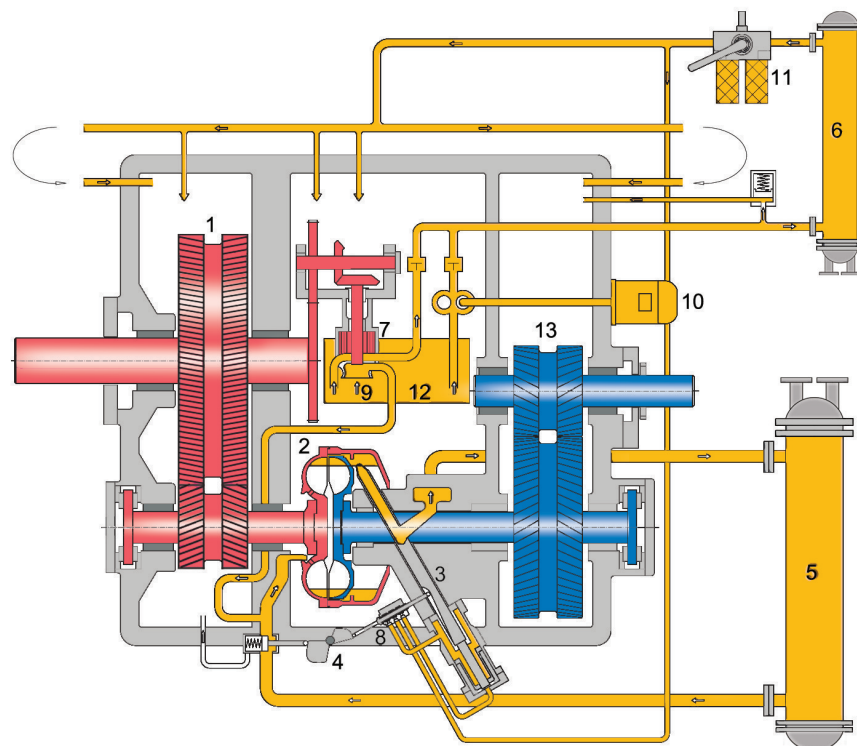
(Unit:mm)

SIZE	A	B	C	D	L	Weight (kgf)
NGC400H	370	550	700	530	1550	3900
NGC460H	420	650	925	550	1855	4900
NGC500H	420	650	1025	550	1855	5600
NGC560H	520	750	1125	550	2200	8500
NGC620H	520	750	1125	550	2200	9100

• Dimensions are subject to alteration without notice.

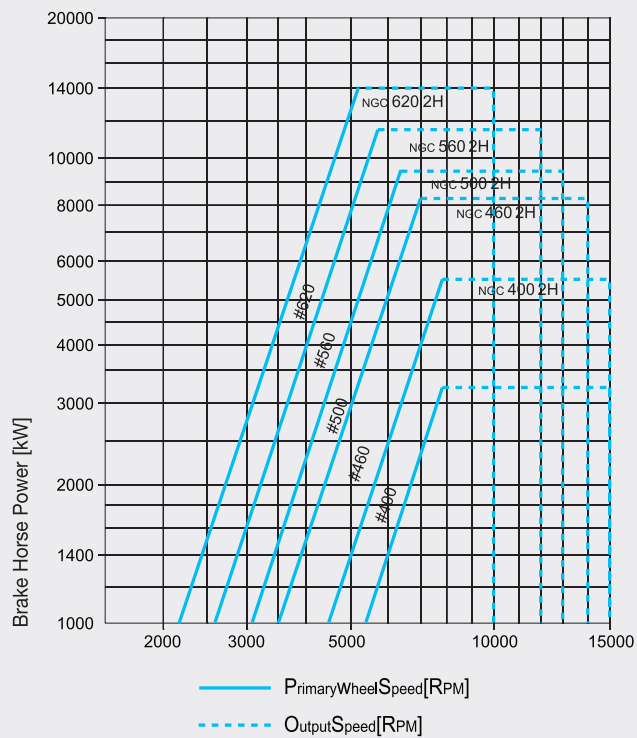
Type NGC-2H

- Variable Speed Fluid Coupling integrated with Two stage Step-up Gear
- Particularly for Higher Out Speed control by Step-up gear both at the input and the output side
- Self-Supporting Design with Horizontally Split Housing
- Sleeve bearing for high-speed application
- Internal gear driven oil pump
- Space optimized by Combination of Integrated Step-up Gear and Fluid Coupling
- Vibration damping
- Relieved motor start-up and smooth acceleration of heavy load

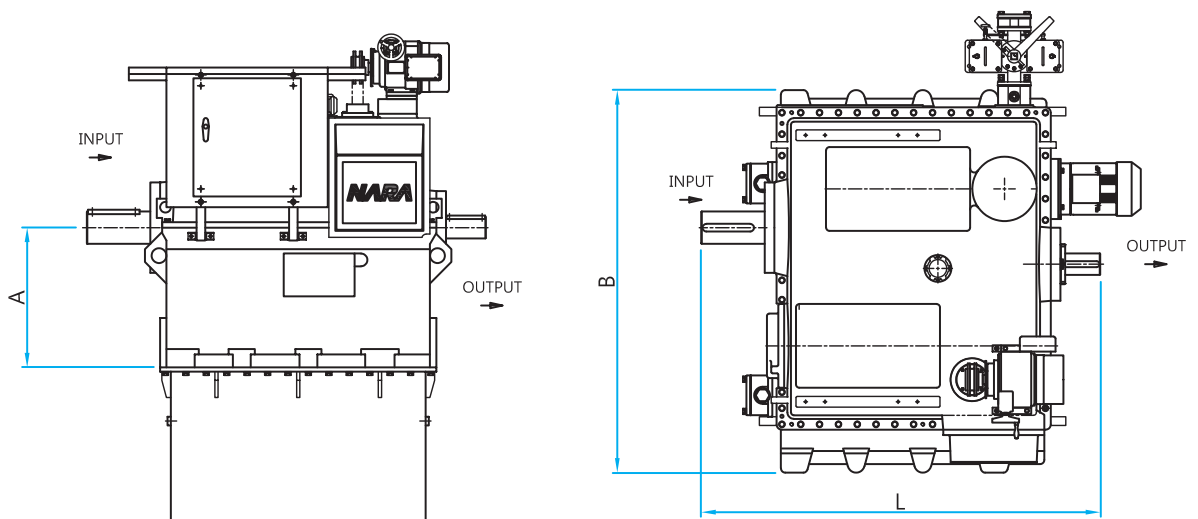


- | | | | |
|-----------------------|--------------------|---------------------|---------------------|
| 1. 1st Step-up Gear | 2. Fluid coupling | 3. Scoop tube | 4. Actuator |
| 5. Working Oil Cooler | 6. Lub. Oil Cooler | 7. Lub. Oil Pump | 8. Control Valve |
| 9. Working Oil Pump | 10. Aux. Oil Pump | 11. Lub. Oil Filter | 12. Inside Oil Tank |
| 13. 2nd Step-up Gear | | | |

Selection



• This table can be applied for 50Hz and 60Hz facility.



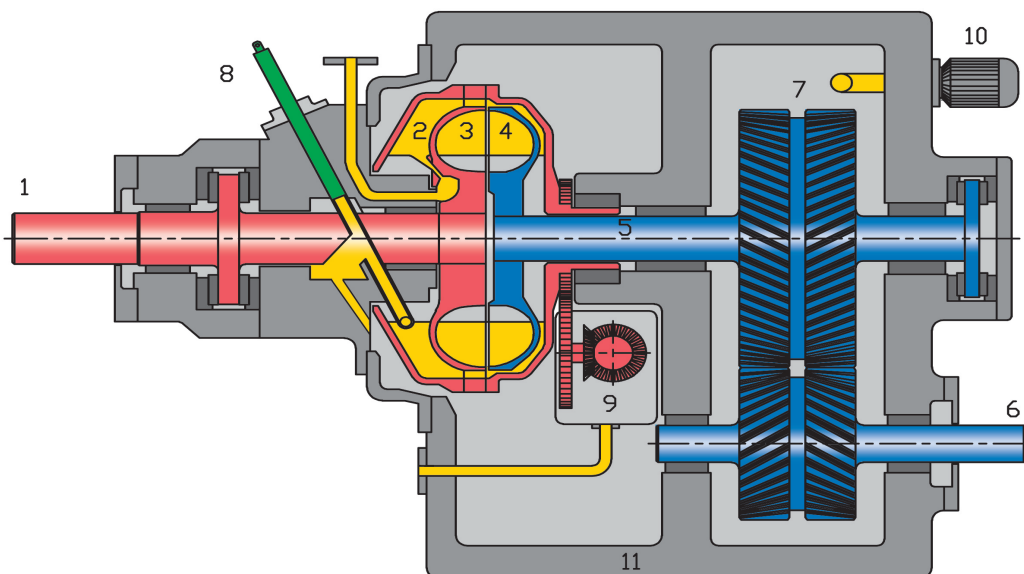
(Unit: mm)

SIZE	A	B	L	Weight (kgf)
NGC400 2H	700	1640	2000	7000
NGC460 2H	750	1820	2250	8000
NGC500 2H	750	1820	2250	8500
NGC560 2H	790	1940	2531	10000
NGC620 2H	790	1940	2531	11000

• Dimensions are subject to alteration without notice.

Type NGC-L

- Variable speed Fluid coupling with integrated Step-up gearing
- Step-up gear located at Output side of Fluid coupling
- Suitable for High power and high speed facilities, e.g. high speed compressor
- Self-supporting design with Horizontal Split Housing
- Sleeve bearing for high-speed application
- Integrated Gear pump for oil circulation and external Auxiliary lubrication oil pump
- Space optimized by combination of integrated Step-up Gear and Fluid coupling
- Vibration damping
- Relieved motor start-up and smooth acceleration of heavy load



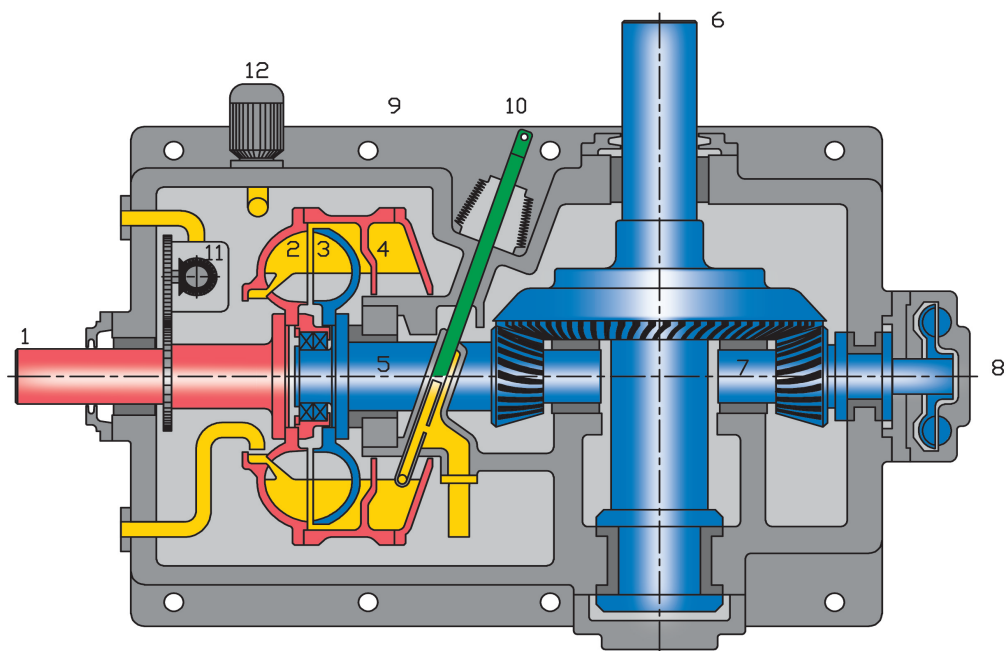
- 1. Input Shaft
- 4. Turbo Wheel
- 7. Step-up Gear (Helical Gear)
- 10. Aux. Lub. Oil Pump

- 2. Shell
- 5. Turbo wheel Shaft
- 8. Scoop Tube
- 11. Housing with Oil Tank

- 3. Pump Wheel
- 6. Output Shaft
- 9. Oil Pump

Type NGC-R

- Variable speed Fluid coupling with integrated Reduction gearing
- Reduction gear located at Output side of Fluid coupling, Bevel gear or Helical gear available.
- Suitable for large Inertia machinery, e.g. Crusher, Coal mill, Beater wheel mill, Low speed pump and Low speed Fan etc.
- With hydrodynamic brake (optional), heavy mass driven machine can be rapidly decelerated.
- Self-supporting Design with Horizontal Split Housing
- Integrated Gear pump for oil circulation and external Auxiliary lubrication oil pump
- Space optimized by combination of integrated Step-up Gear and Fluid coupling



1. Input Shaft

4. Shell

7. Brake Shaft with Bevel Pinion

10. Scoop Tube

2. Pump Wheel

5. Turbo wheel Shaft with Bevel Pinion

8. Hydro Dynamic Brake

11. Oil Pump

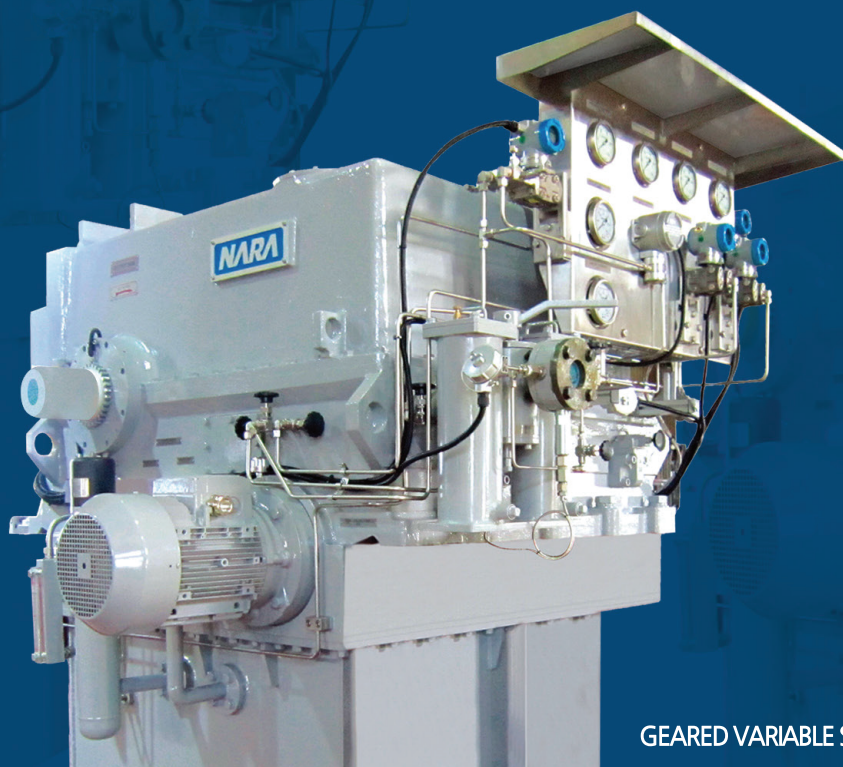
3. Turbo Wheel

6. Output Shaft with Bevel Gear

9. Housing with Oil Tank

12. Aux. Lub. Oil Pump

MEMO



GEARED VARIABLE SPEED FLUID COUPLING



Disc Coupling



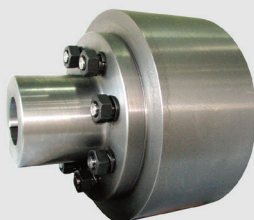
Fluid Coupling



Gear Coupling



Jaw Coupling



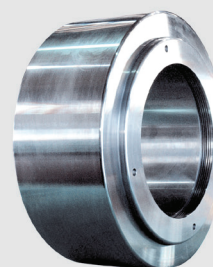
Brake Drum Coupling



Wire Drum Coupling



HS Coupling



LS Coupling

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