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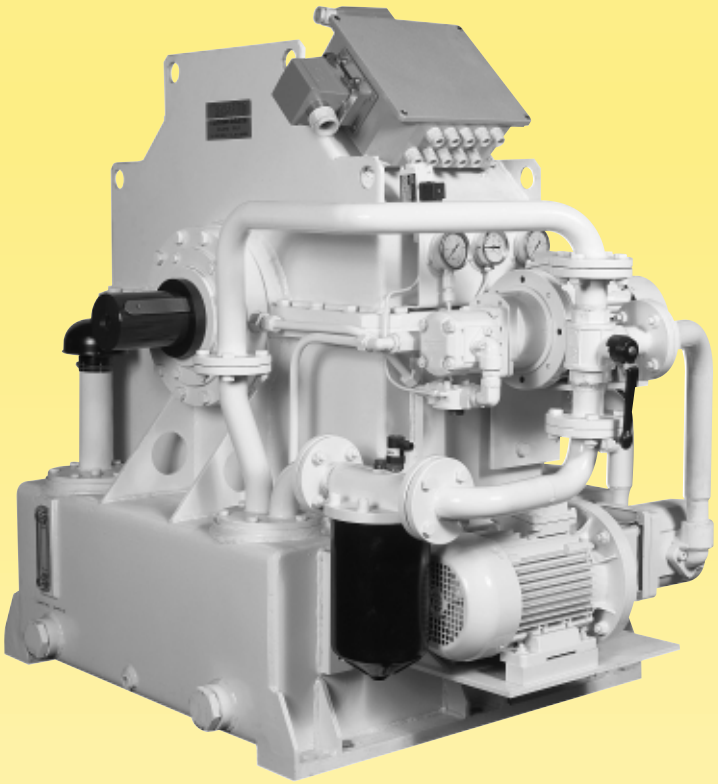


drive with us

KSL
VARIABLE FILL FLUID COUPLINGS

INTRODUCTION

Transfluid designed the **KSL** series variable fill fluid coupling to overcome difficulties experienced during 'start up' and 'speed variation' operation for medium or high powered machines, driven by electric motors or internal combustion engines.

WORKING OPERATION

Extremely efficient performance is achieved utilizing the KSL's very simple and effective principle. Oil, as the power medium, is pumped from a sump to the hydrodynamic coupling circuit, where it is finally 'drained-off' through a series of orifice plugs, back into the sump.

The variable fill principle:
By controlling the coupling's feed pump oil flow to the working circuit by an hydraulic speed variator, changes occur inside the coupling's working circuit which alter the coupling's slip characteristics dramatically softening the 'start up'.

Torque limiting function:
Having all the same advantages of fluid couplings, variable fill-drain type fluid couplings build up torque gradually.

Disconnect
Interrupting the oil flow into the coupling empties the working circuit and disconnects the input from the output.
This disconnect can be accelerated by using the quick release valves.

In summary, it is possibile to:
- have a long start up acceleration, up to several minutes, for high inertia machines.
- position of the driven machine for loading, unloading and maintenance.
- obtain sequential starting for more than one drive motor.
- adjust or limit the torque
- disconnect the load even with the motor running
- use for conveyors, for the reduction of the tension to a minimum level or the possibility of running at an inspection speed.
- vary the speed within a 5:1 range for centrifugal machines.

CHARACTERISTICS

Soft starter
The KSL working circuit is gradually filled by oil from an empty condition to a fully filled one. Such behaviour provides an extremely soft controlled start up, especially with high inertia machinery. The KSL variable oil feed system is controlled by a hydraulic variator during the ramp up, producing ideal soft starting.

Accurate speed variation:
By operating either manually, by hand-wheel, or by remote signal, the KSL always guarantees output speed accuracy, as required by the operator or control system.

Vibration Dampening:
One of the most important characteristics of KSL fluid coupling is its torsional vibration dampening effect, protecting both the driven gear box, fan, or pump machinery, as well as the motor or engine.

Overload Protection:
This is a fluid coupling advantage and a big benefit to users. Even more protection can be achieved by installing "quick release valves" which discharge oil from the working circuit in a few seconds, limiting any prolonged overload completely.

High Efficency
The KSL is an extremely efficient device compared to the constant filled type fluid coupling, because the working circuit volume is controlled at the fullest possible level to maintain a very small slip rate.

Shaft Labyrinth Sealing:
This type of seal helps the KSL series to be a low maintenance machine.

Auxiliary Start up drive:
In the case of an electric motor drive, instead of using a traditional system like a star-delta starting device, it is possible to connect an auxiliary electric motor to the KSL input shaft through a belt transmission, allowing the main motor to be accelerated to full speed before supplying voltage; this avoids any undesired current peaks.

Ease of Maintenance:
Thanks to its split casing design, it is possible to remove the complete fluid coupling impeller assembly without having to move either the motor/engine or driven machinery, saving the need for realignment and costly down time.

APPLICATIONS

Mills, crushers, conveyors, fans, blowers, pumps, compressors, centrifuges, mixers, generators, marine propulsion drives.

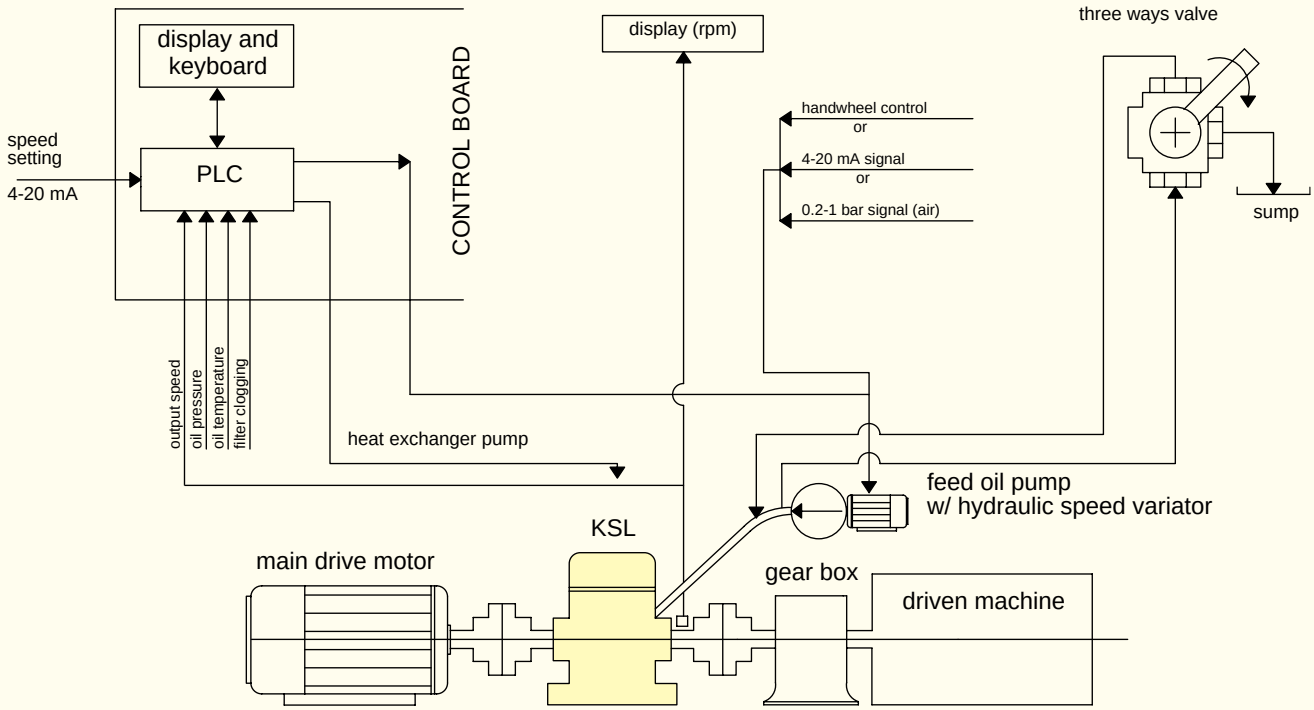
SELECTION

To correctly select the KSL, Transfluid needs to know the following data:
- motor/engine type, power and speed
- driven machinery type, power, speed and inertia
- output speed range
- environmental conditions
- cooling water/air characteristics
- assembly configuration (on page 6)
- drive and driven shaft dimensions and tolerances
- available voltage for motors and instruments

WORKING SCHEME

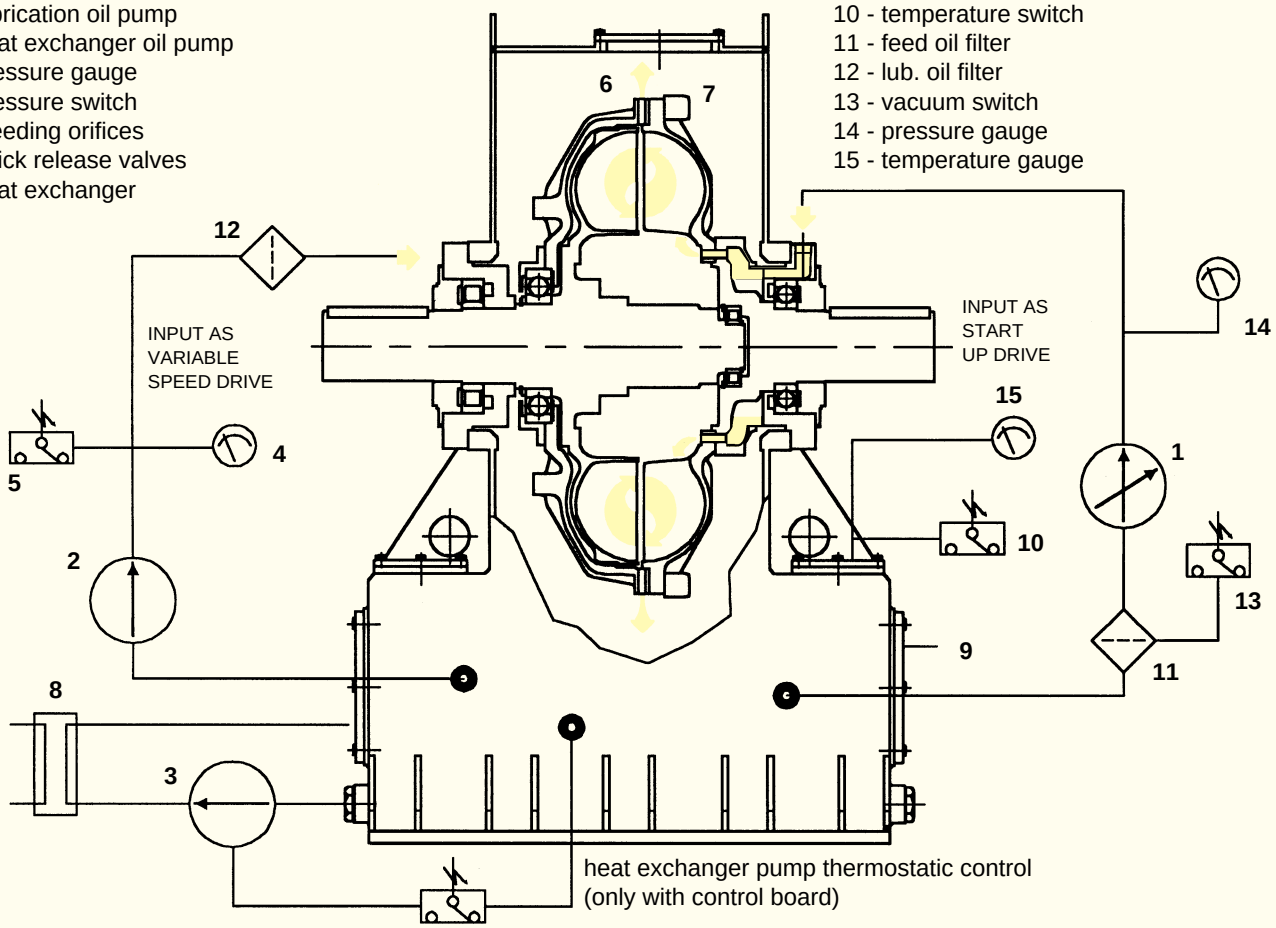
AUTOMATIC or **SEMIAUTOMATIC / MANUAL** or **MANUAL**

All parameters under control such as:
output speed, pump speed, start up modulation, motors overload, oil pressure, oil temperature, filter clogging, heat exchanger pump thermostatic control



1 - feed oil pump
2 - lubrication oil pump
3 - heat exchanger oil pump
4 - pressure gauge
5 - pressure switch
6 - bleeding orifices
7 - quick release valves
8 - heat exchanger

9 - oil level
10 - temperature switch
11 - feed oil filter
12 - lub. oil filter
13 - vacuum switch
14 - pressure gauge
15 - temperature gauge



PERFORMANCES

MOTOR POWER - kW

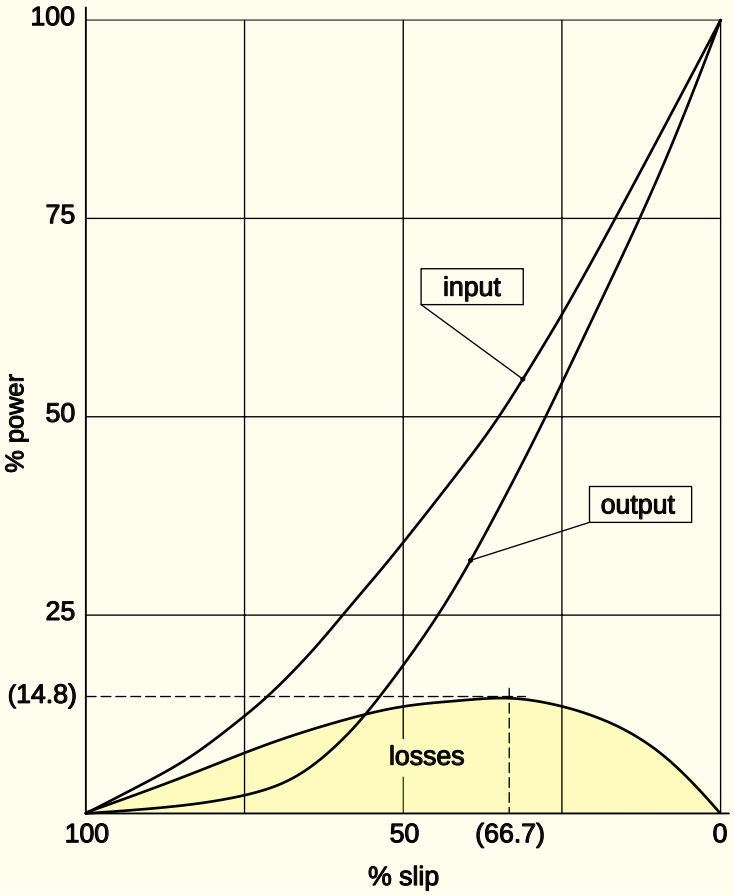
Size / rpm

Slip %

Slip %	21			24			27			29			34			D34		
	1000 1200	1500	1800	1000 1200	1500	1800	1000 1200	1500	1800	1000 1200	1500	1800	1000	1200	1500	1000	1200	1500
2	45 75	150	250	55 110	200	330	110 180	360	630	200 330	650	1150	430	700	1350	650	1100	2200
3	55 110	280	360	90 150	280	500	150 260	520	900	280 480	930	1600	600	1100	2000	1050	2000	3300
4	75 132	260	460	110 180	360	630	200 360	700	1200	360 630	1250	–	750	1300	–	1300	2300	–

NOTE: Standard squirrel cage motors should NOT be derated.
Efficency of electric motor is NOT affected by KSL application.
Value of electric motor efficency can be found in manufacturer's catalogue.
Slip can vary ±10% according to driven machine characteristics.

CENTRIFUGAL APPLICATION



LOSSES %	OUTPUT SPEED %
0	100
8.10	90
12.8	80
14.8	70
14.4	60
12.5	50
9.6	40
6.3	30
3.2	20

average value = 9.6

input = $K\ n_2^3 + K\ (n_1 - n_2)\ n_2^2$

output = $K\ n_2^3$

losses = $K\ (n_1 - n_2)\ n_2^2$

K = max input power / n_1^3

n_1 = input speed

n_2 = output speed

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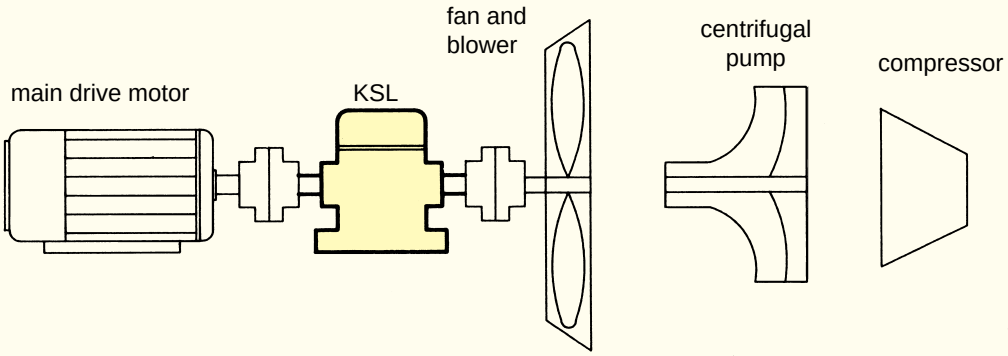
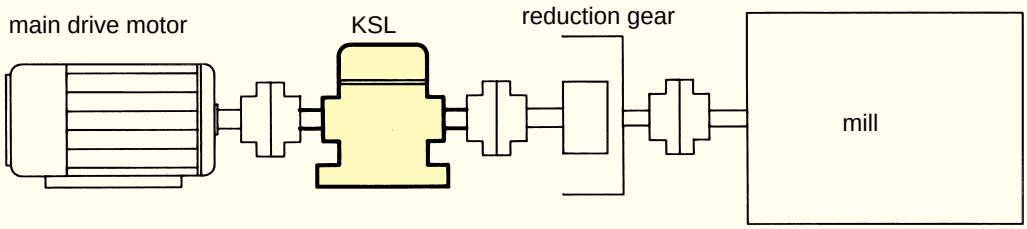
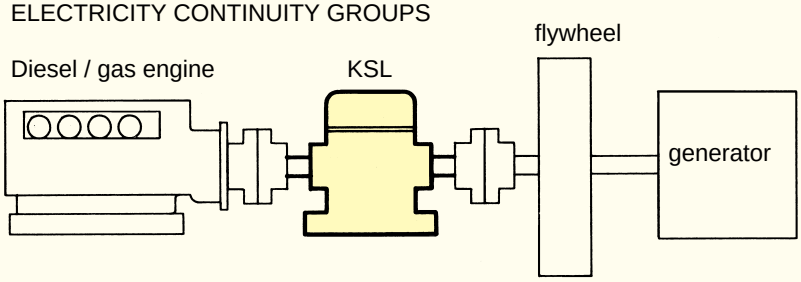
BOILER FEED WATER PUMPS, PIPE LINE PUMPS, CENTRIFUGAL GAS COMPRESSORS, CITY FEED WATER PUMPS, RECYCLING PUMPS, ALL FANS AND BLOWERS



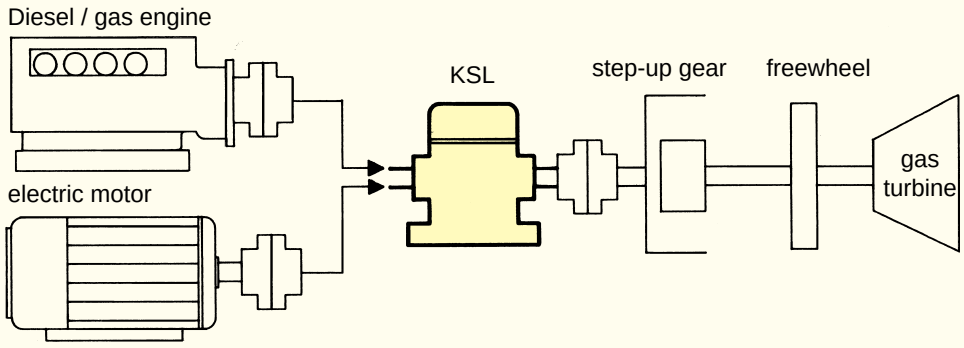
HAMMER MILLS, BALL MILLS, STONE CRUSHERS, SCRAP IRON SHREDDERS, WOOD CHIPPERS



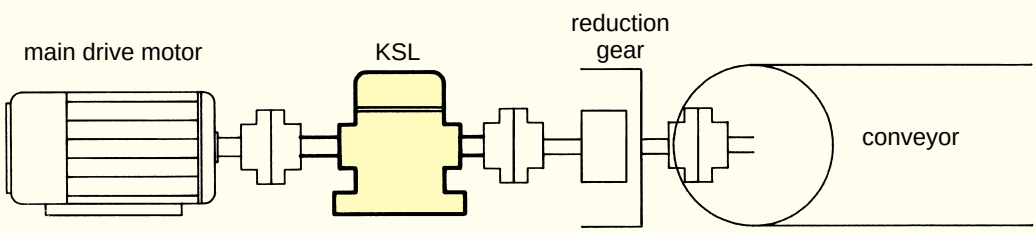
ELECTRICITY CONTINUITY GROUPS



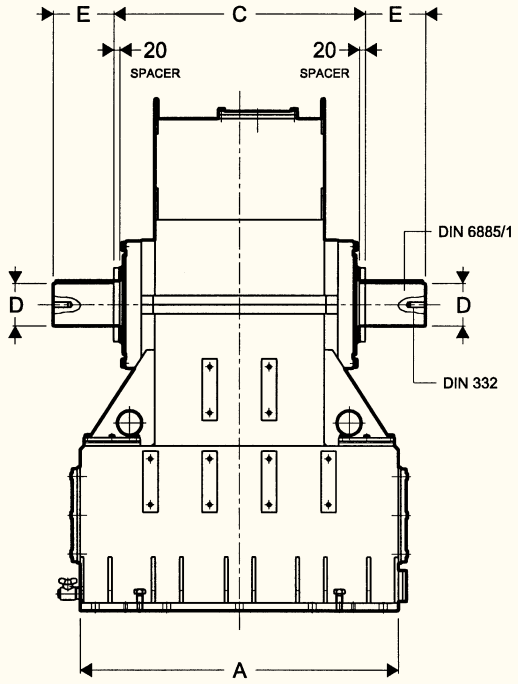
GAS TURBINE STARTING DRIVES

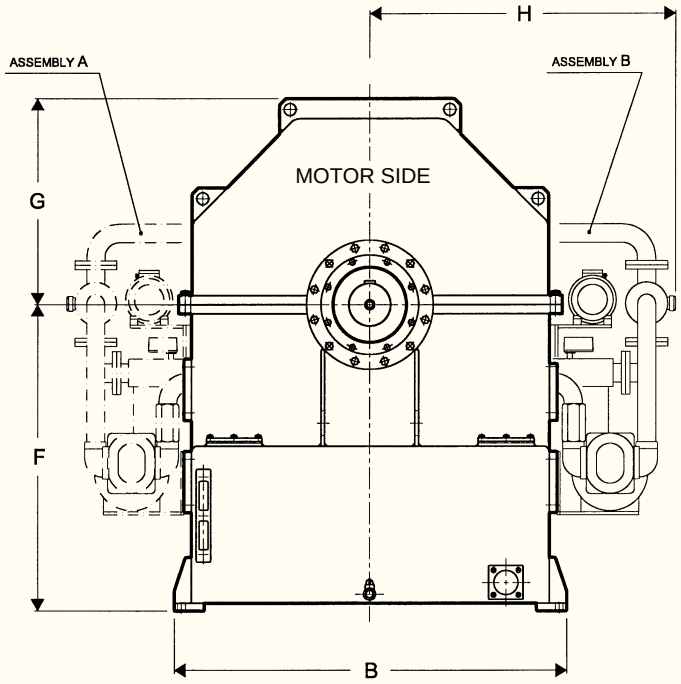


BELT CONVEYORS



DIMENSIONS

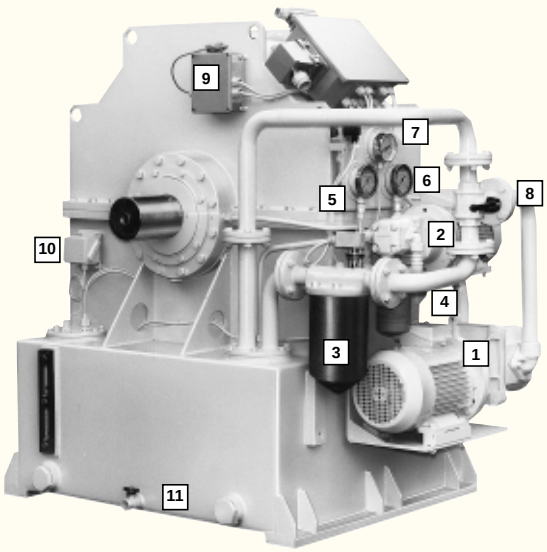




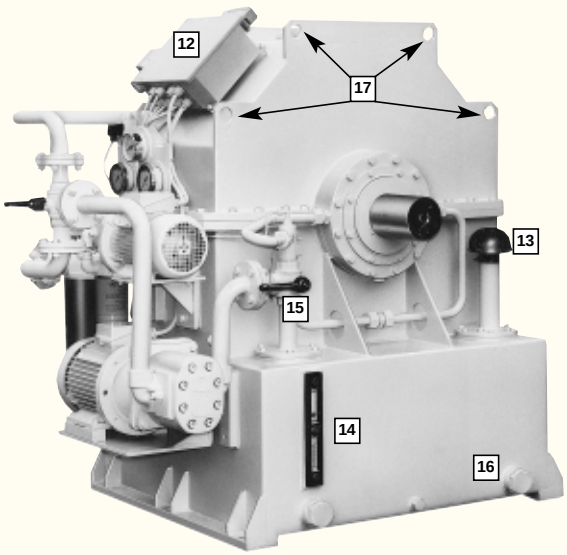
Size ⇨ Dimensions (mm)

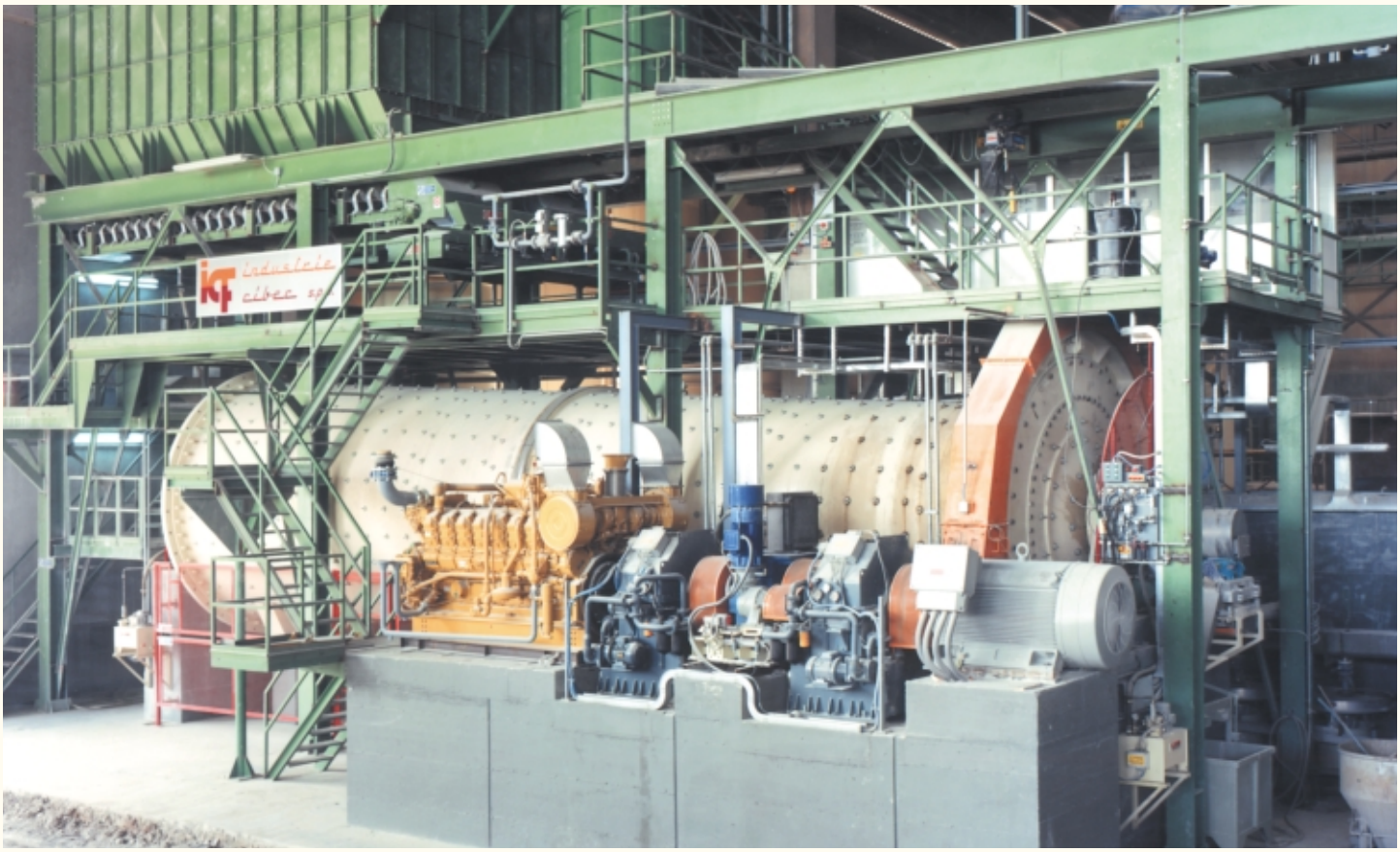
Size	A	B	C	D	E	F	G	H	Weight Kg (without oil)	Oil lt
21 / 24	840	950	620	100	150	700	490	850	900 / 1000	180
27 / 29	900	1100	700	120	150	850	575	1000	1200 / 1300	300
34	1050	1300	830	140	200	1000	670	1050	2100	450
D34	1400	1300	1080	160	230	1100	670	1050	3000	850

WEIGHT ACCORDING TO STANDARD VERSIONS
DIMENSIONS ARE SUBJECT TO ALTERATION WITHOUT NOTICE



1 - Feed pump
2 - Lubrication pump
3 - Filter (feed)
4 - Filter (lub.)
5 - Feed pressure gauge
6 - Lub. pressure gauge
7 - Temperature gauge
8 - Filter by-pass valve
9 - Speed controller
10 - Temperature switch
11 - Drain tap
12 - Electric wiring box
13 - Breather
14 - Level gauge
15 - Feed control valve
16 - Cooler pipe unions
17 - Lifting ears





2x34 KSL, 630 kW - 1000 rpm, ceramic mill (Italy)

34 KSL, variable speed drive 700 kW - 1200 rpm, fan (Brasil)

SALES NETWORK

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