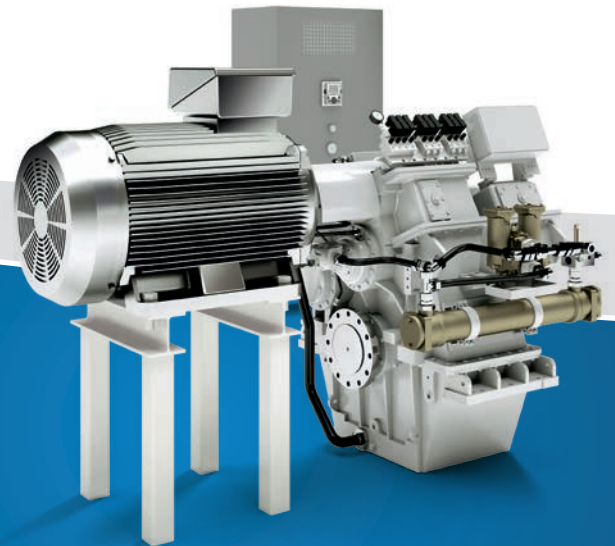




REINTJES
POWER TRAIN SOLUTIONS

REINTJES Hybrid System

RHS | 60 – 630 kWe



REINTJES Hybrid System

Approved quality

For more than 20 years REINTJES has supplied hybrid ready gearboxes with special PTO/PTI function for various applications. 2011 the well-known power train specialist did a step forward with the design of its complete Hybrid System including the gearbox, the electric motor and generator, the frequency converter as well as the couplings.



Operation Modes

- PTI mode – electric motor only
- PTO mode – diesel engine for propulsion and shaft generator
- Boost mode – electric motor and diesel engine in combination for higher speed and higher thrust
- Diesel mode – diesel engine only
- Optimum design point of electric motor and diesel engine for propulsion power



Low Speed

- Easy dynamic positioning mode (DP) especially with FPP
- Patrolling at low and very low speed (below idle engine speed) with excellent fuel economy and without limitation in time



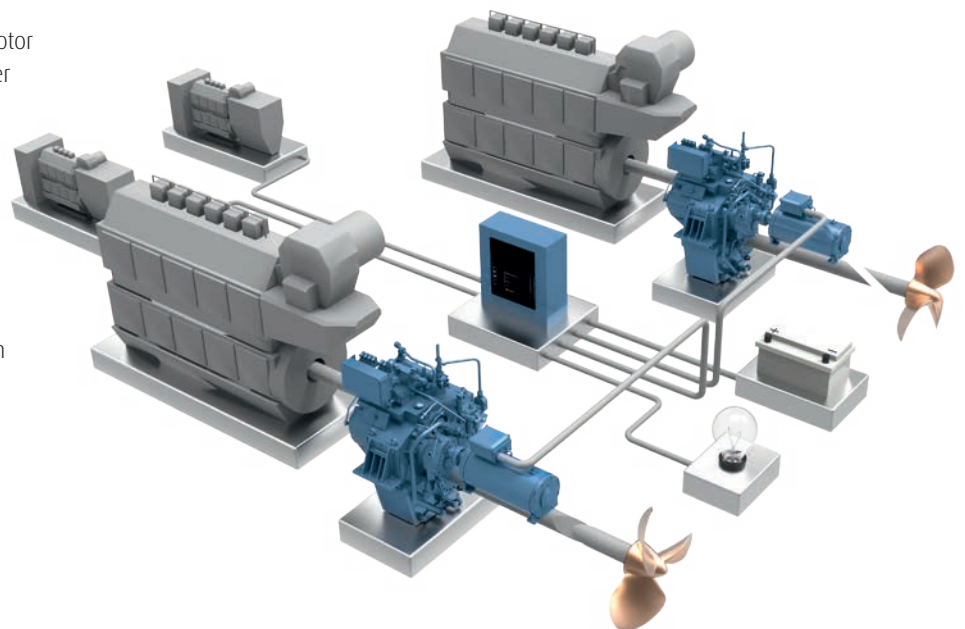
Comfort

- Low noise and vibrations at low electrical speed
- Night cruising in full comfort, energy from battery or high performance sound shield genset



Emission

- Significant CO₂, SO_x and NO_x reduction due to high performance genset (IMO TIER III and EPA TIER 4)
- Maneuvering in harbors without emissions by energy from battery



Maintenance

- Better combustion in the main engine, no more used for very low speed. This results in less maintenance and longer working periods
- Worldwide service

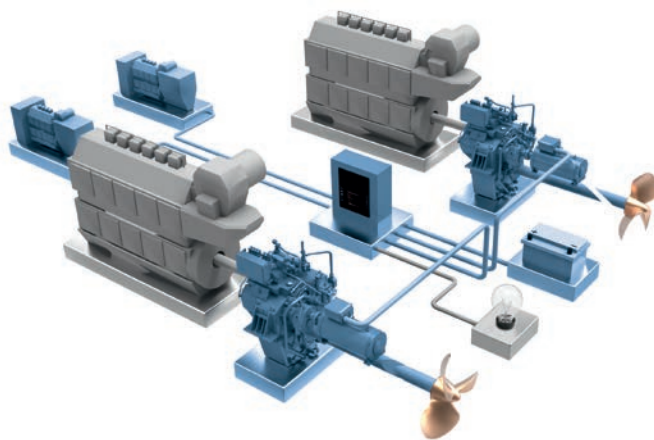
The REINTJES Hybrid System includes

- REINTJES gearbox
- integrated electric motor / generator
- frequency converter 60 – 630 kWe
- coupling
- the system is compatible with various electric grids and configurable for different applications

RHS | 60 – 630 kW_e

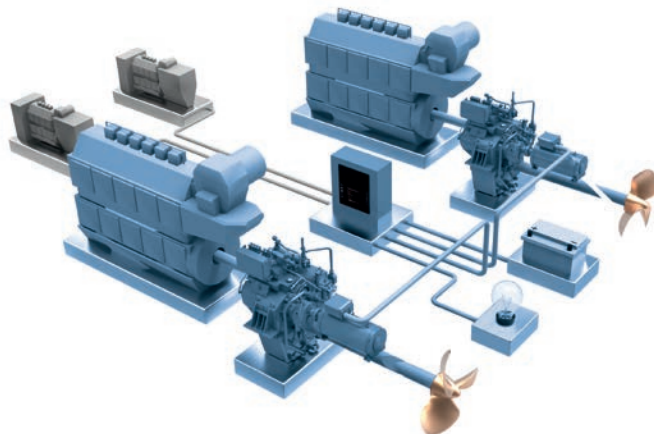
Operation Modes

In order to achieve maximum performance the REINTJES Hybrid System offers different operation modes. Easy switching between the electric motor / generator, using the main engine, the genset, or both by means of the hydraulically operated clutches, enables the ship to optimally use its power and take full advantage of the gearbox and the entire power train.



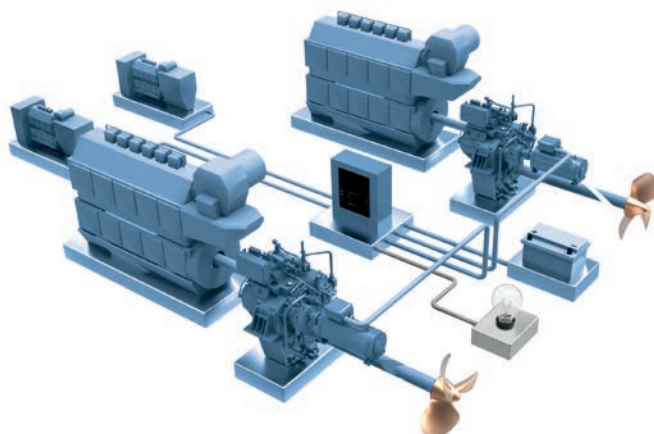
PTI mode – Electric Motor only

The **PTI** (Power Take In) mode provides maximum comfort at slow speed. With the diesel engine not operating, the electric motor of the REINTJES hybrid system drives the ship and enables normal cruising, maneuvering and reversing. The noise level and the energy consumption of the power train are reduced to a minimum and efficient operation is achieved with power coming from the genset or any other electric power source onboard.



PTO mode – Diesel Engine for Propulsion and Shaft Generation

In the **PTO** (Power Take Off) mode the electric motor of the REINTJES hybrid system can be operated as a generator. It then feeds electric power into the ship's grid and, hence, assists existing generator sets. Optionally, the remaining energy can be fed into batteries and used later.



Boost mode – Electric Motor and Diesel Engine in Combination for Higher Speed and Higher Thrust

The **Boost** mode offers an additional operating mode in PTI operation. Using all the power of both the diesel engine and the electric motor in combination to drive the propeller to provide maximum propeller thrust and /or support the diesel engine in different load conditions.

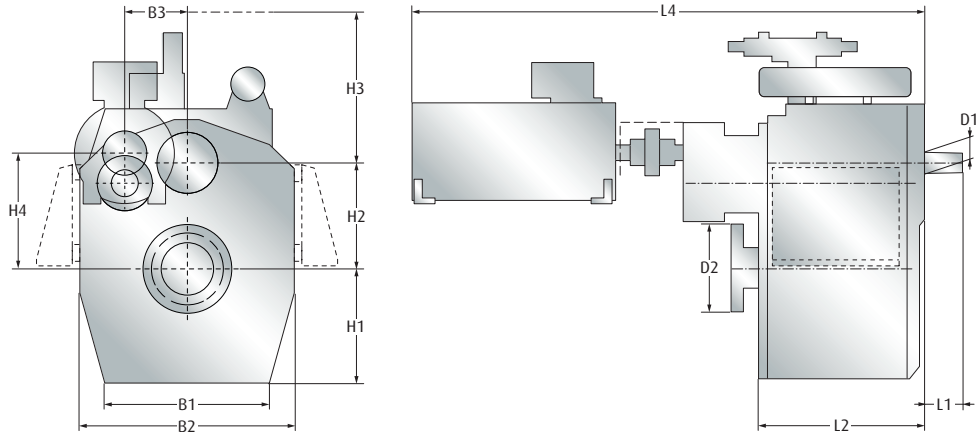
REINTJES Hybrid System

WAF-RHS 344 – 573 | 60 – 100 kWe

Hybrid System

Reverse-reduction gearbox with controllable PTO/PTI, hydraulically operated clutches, electric motor, elastic couplings and frequency converter.

Vertically offset



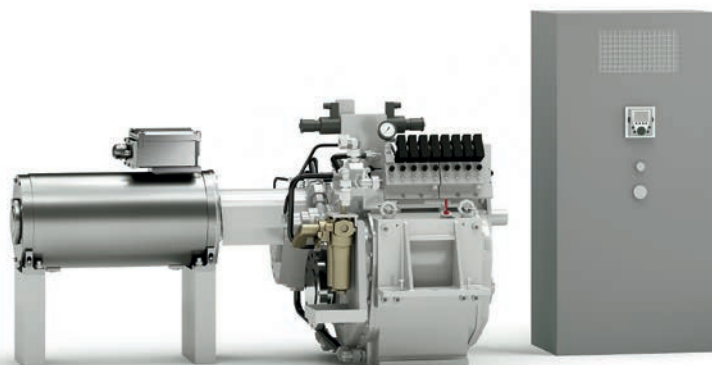
WAF-RHS with different Electric Motor Types

Gearbox WAF-RHS	B1	B2	B3	D1	D2	Main Dimensions (mm) ¹⁾			H4	L1	L2	L4		Weight kg ¹⁾	
						H1	H2	H3 max.				60 kWe	100 kWe	60 kW	100 kW
344	570	720	201	60	285	265	250	590	249	80	644	1492	1712	1160	1280
364	580	750	213	60	325	380	345	590	372	80	667	1509	1729	1310	1430
374	800	930	216	60	325	460	410	590	448	80	667	1509	1729	1570	1690
444	493	804	208	75	300	285	270	670	272	97	721	1630	1850	1240	1360
464	575	800	219	75	325	400	375	670	405	97	723	1630	1850	1435	1550
474	760	1040	223	75	350	510	460	580	503	97	745	1630	1850	1910	2030
543	535	840	229	75	325	380	310	735	309	97	776	1748	1968	1560	1680
563	570	920	238	75	350	475	410	700	434	97	822	1748	1968	1850	1970
573	690	1080	242	75	375	575	505	590	543	97	836	1748	1968	2350	2470

1) Gearbox standard design (dry). Dimensions and weights not strictly binding. Weights include gearbox and electric motor.

Frequency Converter

Electric Motor (kWe)	Frequency Converter 1 (PTI/Boost)				Frequency Converter 2 (PTO/PTI/Boost)			
	Width	Height (mm)	Depth	Weight (kg)	Width	Height (mm)	Depth	Weight (kg)
60	400	1200	500	130	800	1400	500	300
100	400	1600	500	180	800	1600	600	400
200	600	2000	600	300	1200	2000	600	800
315	800	2000	600	380	1600	2000	600	1000
400	1000	2000	600	530	2000	2000	600	1250
500	1000	2000	600	550	2800	2000	600	1500
630	1200	2000	600	700	3200	2000	600	1800

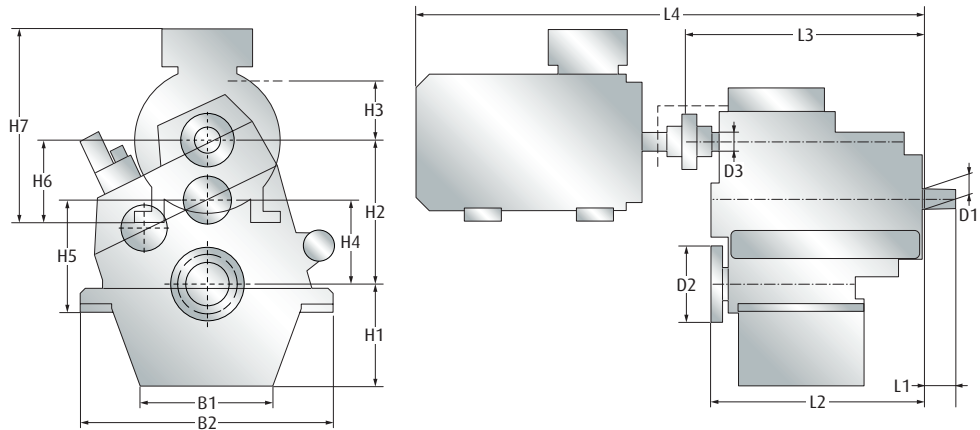


WAF-RHS 665 – 873 | 200 – 630 kWe

Hybrid System

Reverse-reduction gearbox with controllable PTO/PTI, hydraulically operated clutches, electric motor, elastic couplings and frequency converter.

Vertically offset



WAF-RHS | 200 – 630 kWe

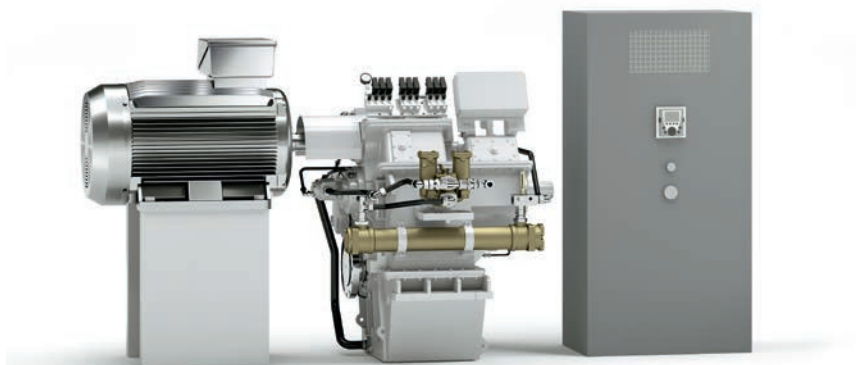
Gearbox WAF-RHS	B1	B2	D1	D2	D3	Main Dimensions (mm) ¹⁾					H4	H5	L1	L2	L3	Weight kg ¹⁾
665	430	1160	85	420	80	490	680	250	430	560	101	979	1085	2400		
675	650	1480	85	420	80	610	800	250	550	680	101	990	1085	3000		
743	610	1160	92	350	100	490	680	300	380	510	107	1046	1186	2300		
763	680	1300	92	375	100	530	790	300	490	630	107	1047	1187	2800		
773	790	1670	92	420	100	680	920	300	620	760	107	1064	1204	3700		
843	680	1300	107	375	100	530	725	350	425	565	142	1090	1224	2900		
863	705	1400	107	420	100	590	840	350	540	690	142	1120	1254	3600		
873	860	1650	107	480	100	750	970	350	670	710	142	1150	1284	4600		

WAF-RHS with different Electric Motor Types

Gearbox WAF-RHS	200 kWe				315 kWe				400 kWe				500 kWe				630 kWe			
	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾
665	315	765	2390	3600	315	800	2555	4050	355	990	2680	4500	-	-	-	-	-	-	-	-
675	315	765	2390	4200	315	800	2555	4650	355	990	2680	5100	-	-	-	-	-	-	-	-
743	315	765	2490	3500	315	800	2655	3950	355	990	2785	4400	355	940	2895	4870	400	970	3125	5610
763	315	765	2490	4000	315	800	2655	4450	355	990	2785	4900	355	940	2893	5370	400	970	3125	6110
773	315	765	2510	4900	315	800	2670	5350	355	990	2800	5800	355	940	2910	6270	400	970	3140	7010
843	315	765	2530	4100	315	800	2690	4550	355	990	2820	5000	355	940	2930	5470	400	970	3160	6210
863	315	765	2560	4800	315	800	2720	5250	355	990	2850	5700	355	940	2960	6170	400	970	3190	6910
873	315	765	2590	5800	315	800	2750	6250	355	990	2880	6700	355	940	2990	7170	400	970	3220	7910

1) Gearbox standard design (dry). Dimensions and weights not strictly binding

2) ±10% (Depending on model of electric motor)

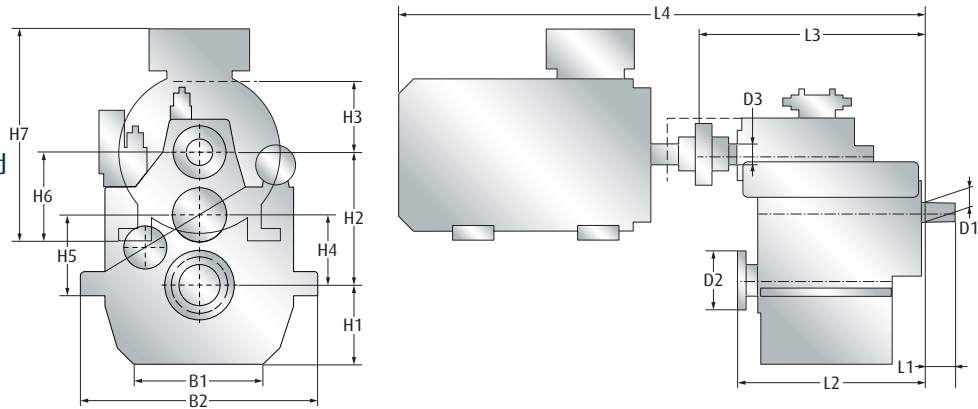


WVS-RHS 730 – 1540 | 200 – 630 kWe

Hybrid System

Light weight gearbox with controllable PTO/PTI, hydraulically operated clutches, electric motor, elastic couplings and frequency converter.

Vertically offset



WVS-RHS | 200 – 630 kWe

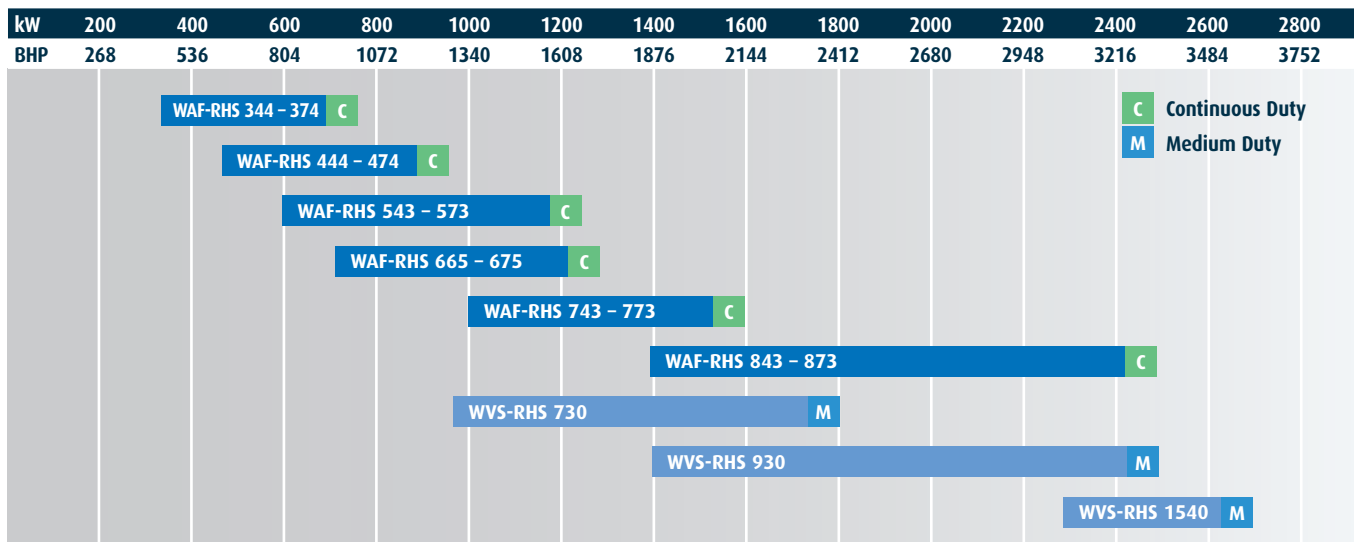
Gearbox WVS-RHS	Main Dimensions (mm) ¹⁾													Weight kg ¹⁾
	B1	B2	D1	D2	D3	H1	H2	H3	H4	H5	L1	L2	L3	
730	650	1036	92	260	80	373	560	250	310	340	110	893	1075	1000
930	750	1166	102	280	100	398	620	250	340	385	120	961	1152	1300
1540	650	1300	107	330	100	440	690	300	390	405	142	1065	1179	1800

WVS-RHS with different Electric Motor Types

Gearbox WVS-RHS	200 kWe			315 kWe			400 kWe			500 kWe			630 kWe							
	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾	H6	H7 ²⁾	L4 ²⁾	Weight kg ¹⁾²⁾				
730	315	765	2380	2200	315	800	2545	2650	355	990	2670	3100	-	-	-	-	-	-	-	
930	315	765	2455	2500	315	800	2620	2950	355	990	2750	3400	355	940	2860	3870	400	970	3090	4610
1540	315	765	2485	3000	315	800	2645	3450	355	990	2775	3900	355	940	2885	4370	400	970	3115	5110

1) Gearbox standard design (dry). Dimensions and weights not strictly binding.
2) ±10% (Depending on model of electric motor)

System Power



O P T I O N S A N D F E A T U R E S



Options

SHAFT BRAKE

The gearboxes can be fitted with a hydraulically operated multiple disk brake built in to assist for reversing manoeuvres or serving as fixing/stopping brake on twin-screw vessels.

TRAILING PUMP

Fitting the gearbox with an additional mechanical or electric trailing pump permits a regular and unlimited trailing operation. The trailing pump is driven directly by the propeller shaft. It allows the lubrication oil system to lubricate the discs and the bearings even if the input shaft isn't rotating.

DIFFERENT OFFSET CONFIGURATIONS

Gearboxes of type WAF-RHS and WVS-RHS are available in vertical as well as horizontal offset configuration.

POWER TAKE OFF (PTO)

If required, the gearboxes can be fitted with additional Power Take Off (application: hydraulic pumps).

Duty cycle classification



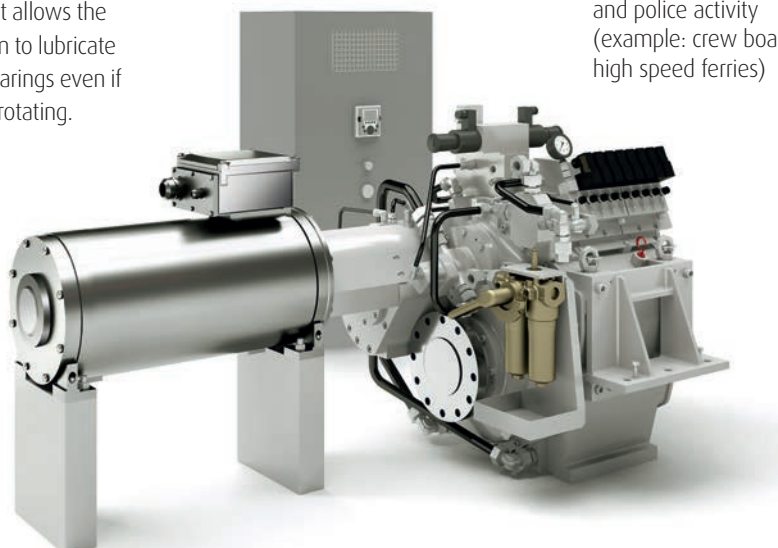
MEDIUM DUTY

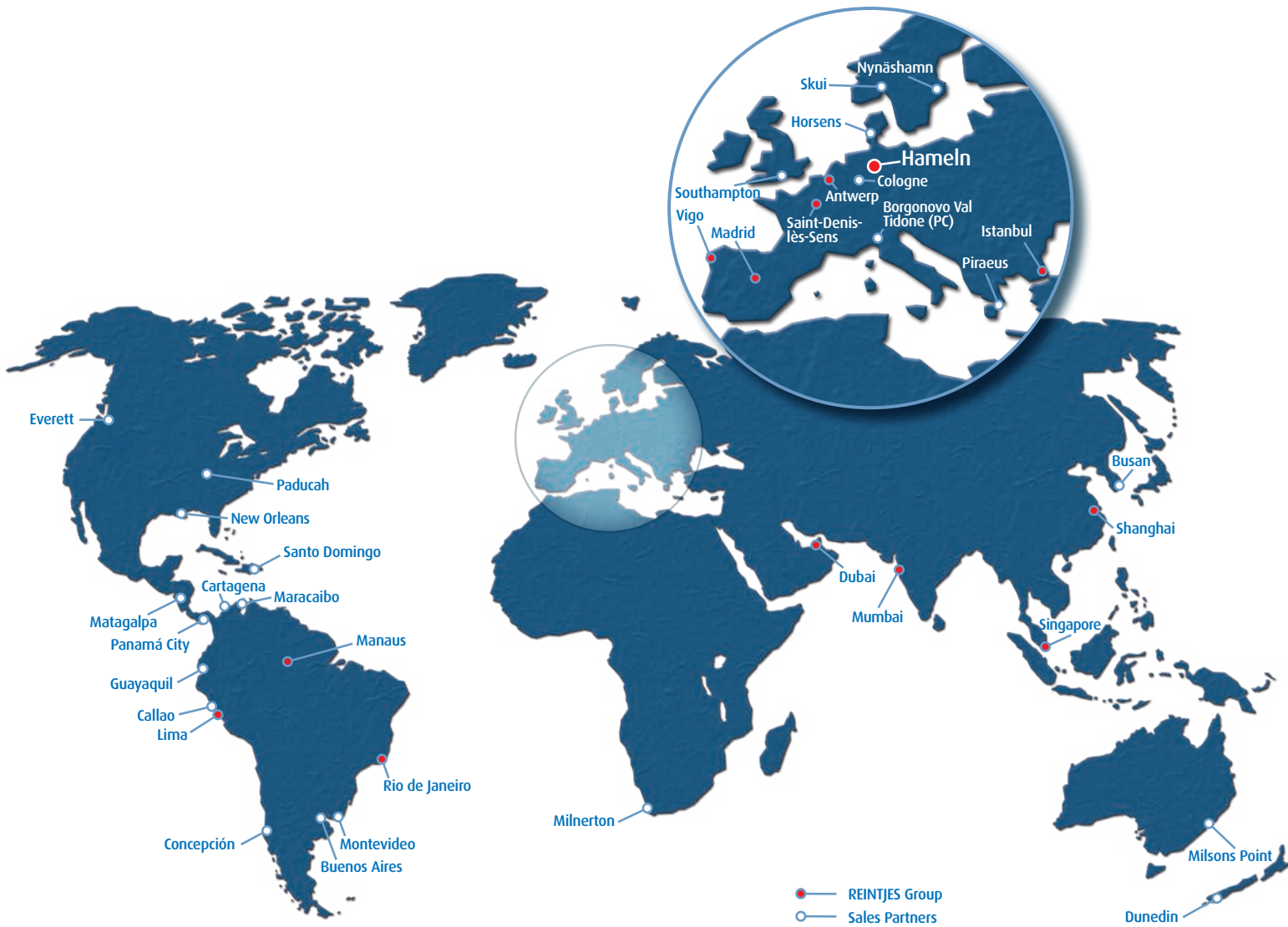
- Intermittent operation with some variations in engine speed and power
- Average engine operating hours limit: 4,000 hours/year
- Allowable hull forms: planing, semi-planing, catamaran
- Allowable applications: private, charter and commercial craft, navy and police activity (example: crew boats, high speed ferries)



CONTINUOUS DUTY

- Continuous operation with little or no variations in engine speed and power
- Average engine operating hours: unlimited
- Allowable hull forms: semi-displacement, displacement
- Allowable applications: commercial vessels





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