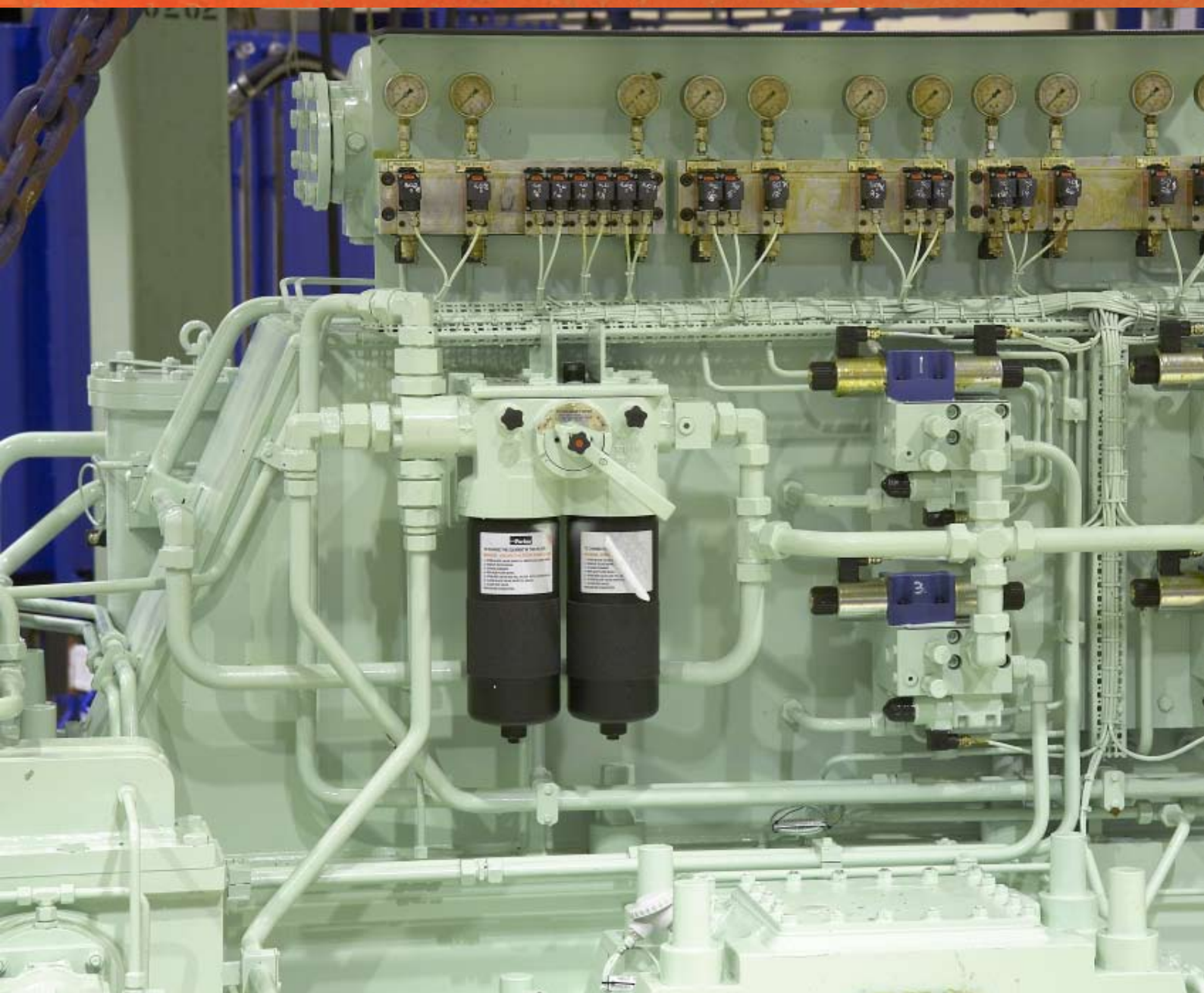


WÄRTSILÄ MARINE REDUCTION GEARS





The cruise ferry Finnmarken is equipped with two Wärtsilä TCH 150V85-S50 gears.



The anchor handling tug supply vessels Fairmount Sherpa and Fairmount Summit are both equipped with two Wärtsilä TCH250-S53 gears.



The product carrier Sten Idun is equipped with one Wärtsilä SCV116-SDCT65 gear.



The anchor handling tug supply vessel Normand Ferking is equipped with two Wärtsilä TCH270-PS58SDC63 gears.

WÄRTSILÄ MARINE REDUCTION GEARS

The marine reduction gear is a key element of the propulsion system, enabling the main engine and the propeller to operate at optimum speeds. Other functions such as a propeller thrust bearing, multiple-disc clutches, power take-off for shaft generators and power take-in for electric motors can also be incorporated in the gear.

WÄRTSILÄ® gears are of modular design, simple, reliable and yet compact for easy installation and maintenance.

Wärtsilä gears are available in three standard models: single reduction gears with vertical or horizontal offsets, and twin input-single output gears in the power range 800–25,000 kW.

STANDARD SHAFT OFFSET FOR WÄRTSILÄ GEARS

Single marine gears

(mm offset between input and output shafts)
380 420 460 500 560 620 680
750 850 950 1050 1100 1160 1280 1420

Twin input-single output gears

(mm offset between engine crankshafts)
1900 2400 2500 2700
3100 3500 3700 3800

WÄRTSILÄ GEAR TYPES AND DESIGNATIONS:

- S** Single marine reduction gears
- T** Twin input-single output marine gears
- C** Multiple-disc clutch
- V** Vertical offset between input and output shafts
- H** Horizontal offset between input and output shafts
- a** Offset between input and output shafts (cm)
- P** Primary driven PTO
- S** Secondary driven PTO
- b** Offset between input and PTO shafts (cm)

EXAMPLE 1: SCV105-P63

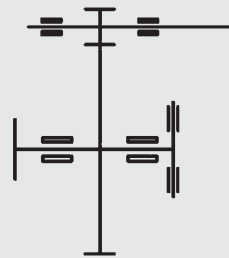
Single reduction gear with clutch, vertical offset 1050 mm, including a primary driven PTO with offset 630 mm.

EXAMPLE 2: SCH95-P58

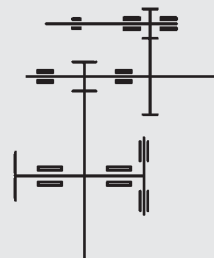
Single reduction gears with clutch, horizontal offset 950 mm, including a primary driven PTO with offset 580 mm.

EXAMPLE 3: TCH350-S53

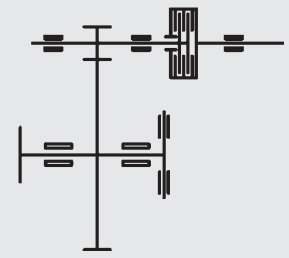
Twin input-single output gear with clutch, horizontal offset 3500 mm between engine crankshafts, including a secondary driven PTO with offset 530 mm.



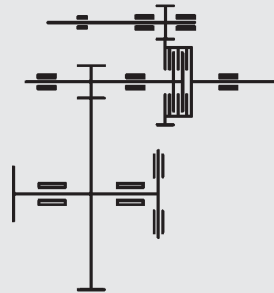
Single reduction marine gear
Type SVa and SHa



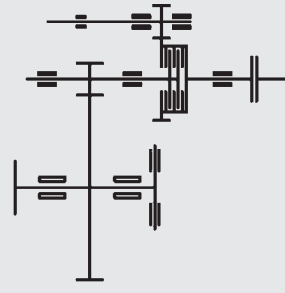
Single reduction marine gear
with PTO
Type SVa-Pb and SHa-Pb



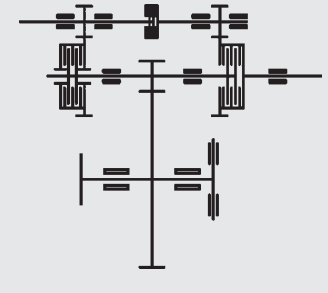
Single reduction marine
gear with clutch
Type SCVa and SCHa



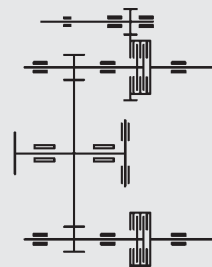
Single reduction marine gear
with clutch and PTO
Type SCVa-Pb and SCHa-Pb



Single reduction marine gear
with clutch, PTO/PTI and
mechanical coupling
Type SCVa-PDMb and
SCHa-PDMb



Single reduction marine gear with
clutch and two speed PTO/PTI
Type SCVa-PDCTb



Twin input-single output gear with
clutch and primary driven PTO
Type TCHa-Pb

Wärtsilä gears standard options.

DESIGN FEATURES OF WÄRTSILÄ GEARS

GEAR WHEELS

The gear wheels have single helical teeth, precision ground with profile correction to ensure both good load distribution and low noise operation. The material is alloyed gas carbonized steel. Double helical gear wheels are also available.

HOUSING

The housing is made of cast iron or fabricated steel in order to make a rigid structure. Extensive FEM calculations ensure limited deformation and low stress levels. Special attention has been paid to minimizing noise and vibration.

BEARINGS

For gear sizes 38-56, plain bearings are used on the output shaft. Otherwise low friction bearings are used.

For gear size 62 and larger, plain bearings are used on both pinion and output shaft. The main thrust bearing is a tilting pad bearing and is rigidly supported. Otherwise low friction bearings are used.

HYDRAULIC SYSTEM

The hydraulic system is designed for lubrication, cooling and clutch control. All bearings are forced lubricated, the gear meshes have additional sprays for cooling and lubrication. The oil filters are designed for full flow and with a high degree of filtration.

CLUTCHES

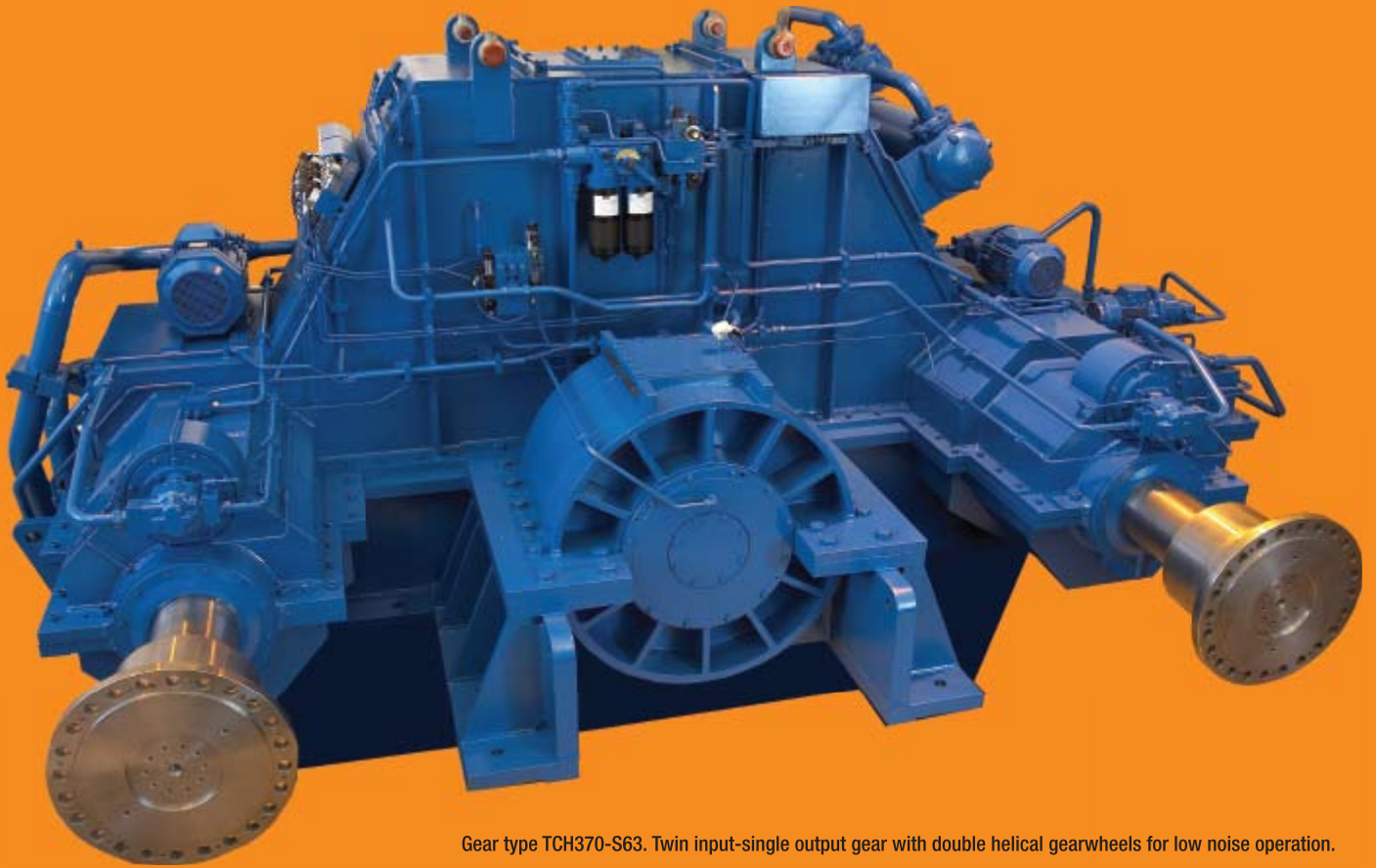
The clutches are high capacity multiple-disc, hydraulically operated and cooled. All clutches have a soft clutch in system, ensuring shock free engagement of main engine.

SHAFTS

The pinion shaft is made of forged alloyed steel. Other shafts are forged carbon steel. The output shaft has an integrated forged flange. The input and PTO shaft ends are cylindrical with keyways.

SHAFT SEALS

All shaft seals are non-contact labyrinth seals and maintenance free.



Gear type TCH370-S63. Twin input-single output gear with double helical gearwheels for low noise operation.

POWER TAKE-OFF (PTO)

All Wärtsilä gears can be supplied with one or more PTOs for driving any rotating device such as shaft alternator, pump and compressor.

For single gears, the standard PTO is primary driven. For twin input-single output gears, the PTO is either primary or secondary driven.

- A primary driven PTO rotates whenever the main engine is rotating.
- A secondary driven PTO rotates whenever the propeller shaft is rotating.

Some PTOs can also be supplied with clutch (controllable PTO).

POWER TAKE-IN (PTI)

Most Wärtsilä gears can be supplied with a combined PTO/PTI or with just a PTI. In PTO mode with a combined PTO/PTI, the shaft alternator is driven by the PTO as it feeds electric power to the main switchboard (MSB). In PTI mode, the shaft alternator acts as an electric motor fed by electric power from the MSB.

The PTI may have different functional modes:

PTI “booster” mode. In this mode the PTI operates in parallel with the main engine.

No clutch is required on the gear, but the propulsion system (gear, shafting and CPP) must be dimensioned for the total power of the main engine and the electric motor.

PTI “take me home” mode. For this mode one clutch or mechanical coupling is needed to isolate the main engine from the gear. In addition a “PTI” clutch is needed to accelerate the propeller from zero to nominal speed. To save electrical power, a two speed PTO/PTI is frequently used for this mode.

PTI combination of “booster” and “take me home” modes. For this mode the propulsion system must be dimensioned for the total power, and the gear must have two clutches.

INTEGRATED HYDRAULIC SYSTEM FOR GEAR AND CP PROPELLER

Wärtsilä gears sizes 50-95 in their vertical or horizontal versions are also available with integrated hydraulic system for gear and CP propeller. This reduces the time needed and simplifies installation for the yards. For safety reasons, the main pump for the CP propeller is always gear driven with an integrated system.

All Wärtsilä gears can of course also be interfaced to a separate hydraulic power unit.

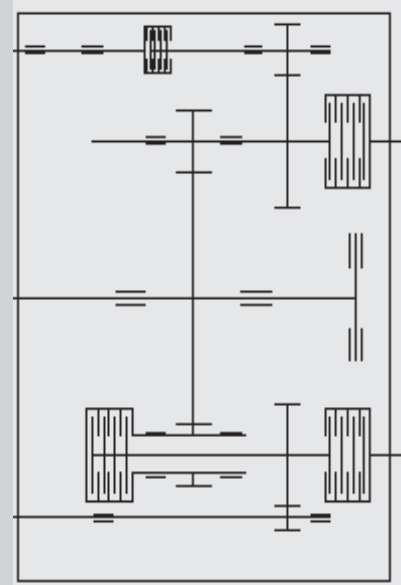
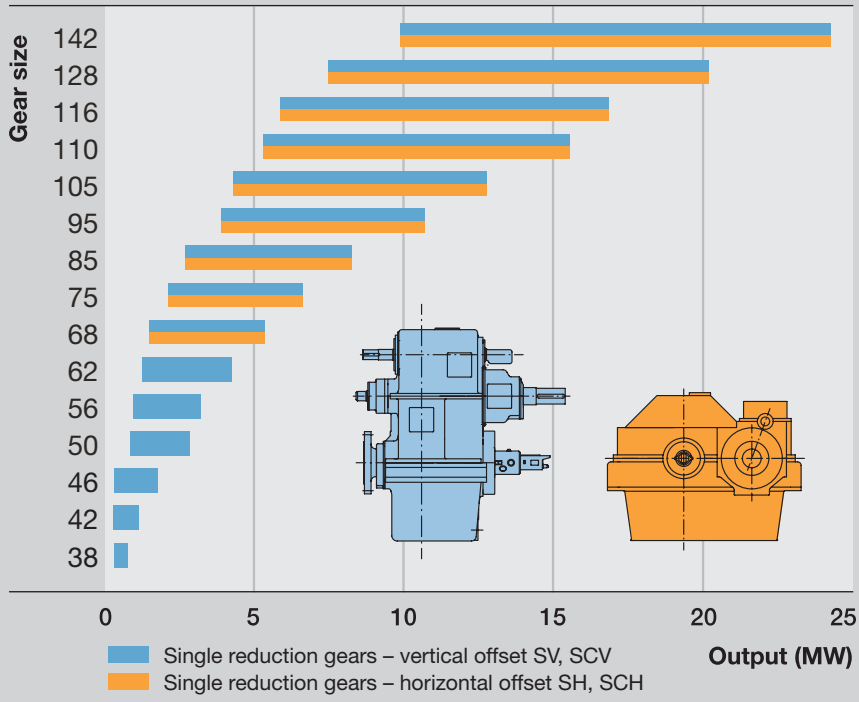
SPECIAL GEARS

Special gears are available on request. Typical examples of special gears are shown on the next page.

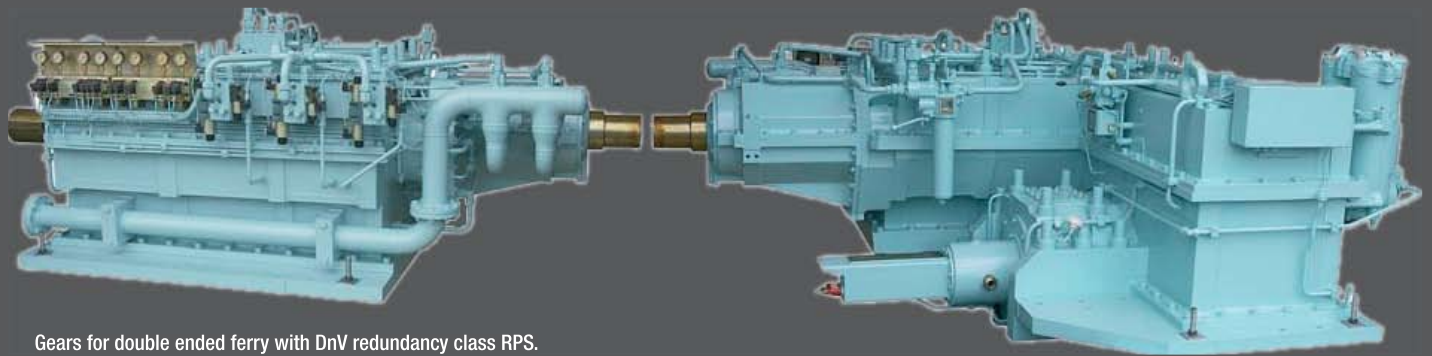
WÄRTSILÄ TCH GEAR RANGE OF TWIN INPUT-SINGLE OUTPUT GEARS

Gear type	Engine offset (mm)	Engine type
TCH190	1900	Wärtsilä 20
TCH240	2400	Electric motors
TCH250	2500	Wärtsilä 26 (L-version), Wärtsilä 32 (R-version), Wärtsilä 6L32
TCH270	2700	Wärtsilä 7L32, Wärtsilä 8L32, Wärtsilä 9L32
TCH310	3100	Wärtsilä 12V26, Wärtsilä 16V26, Wärtsilä 38 (L-version)
TCH350	3500	Wärtsilä 12V32, Wärtsilä 6L46F
TCH370	3700	Wärtsilä 16V32, Wärtsilä 18V32, Wärtsilä 8L46F, Wärtsilä 9L46F
TCH380	3800	Wärtsilä 12V38, Wärtsilä 16V38, Wärtsilä 18V38

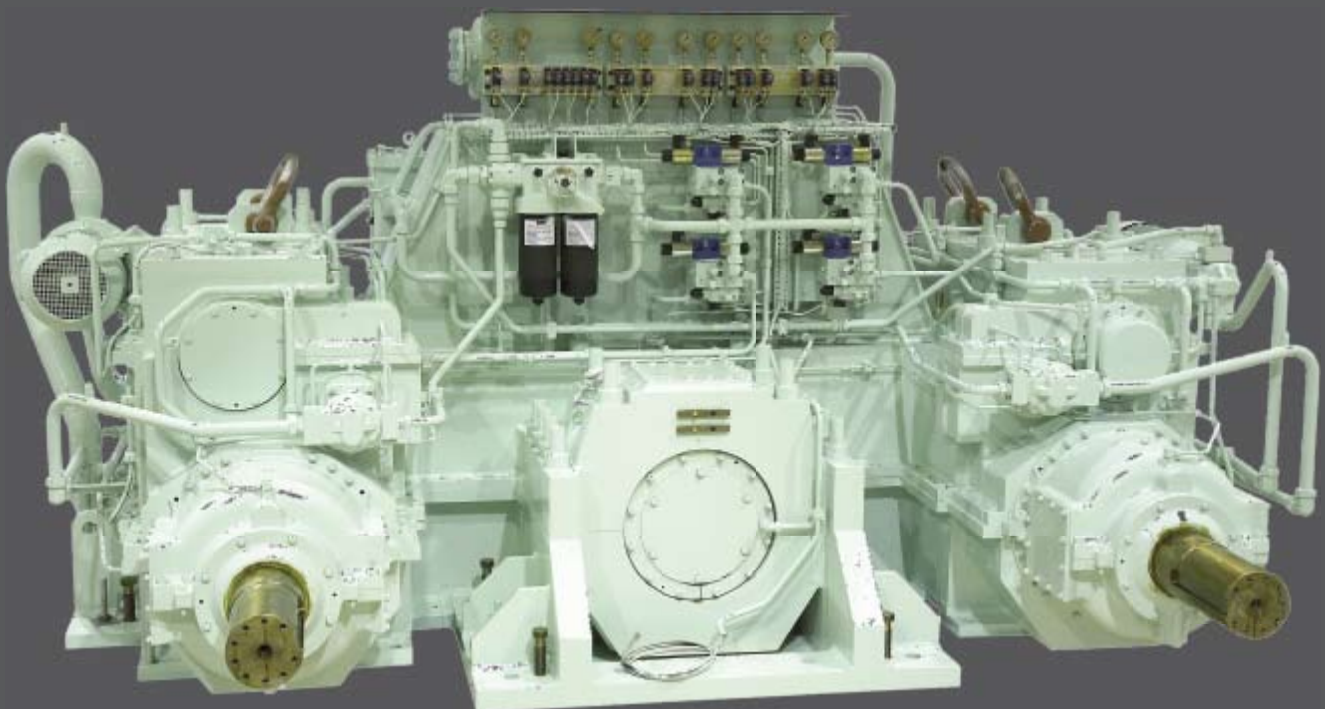
WÄRTSILÄ REDUCTION GEARS – OUTPUT RANGE



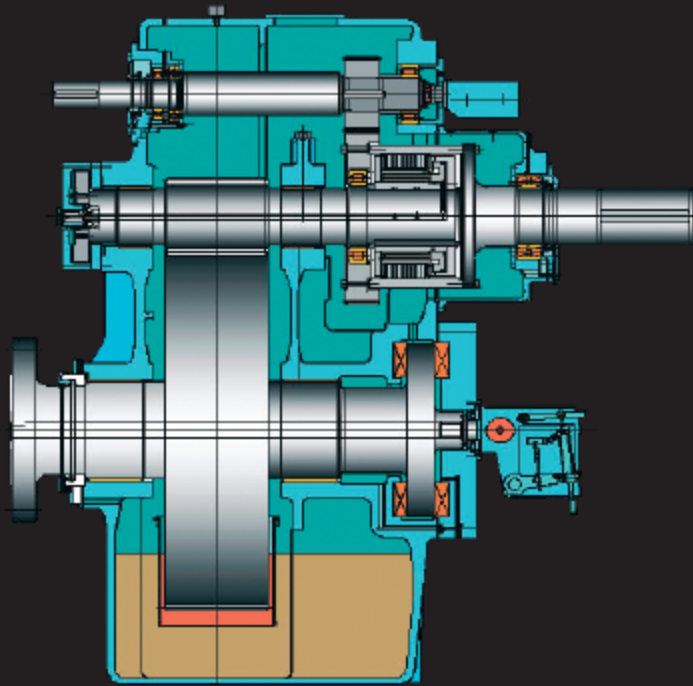
Schematic layout of TCH270-PS58SDC63.



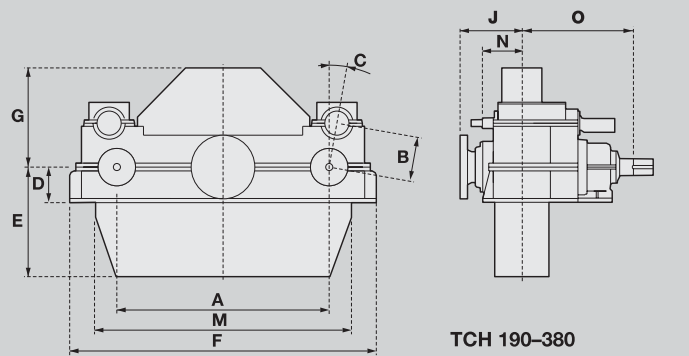
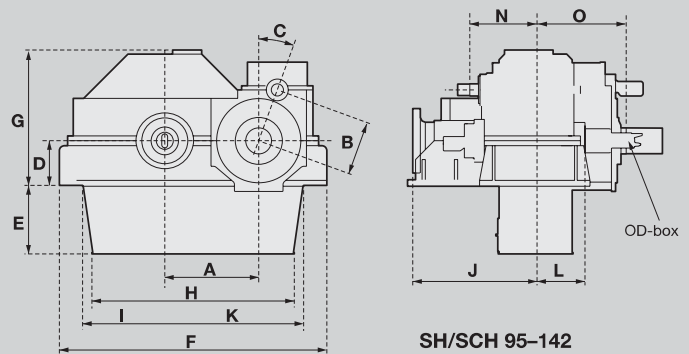
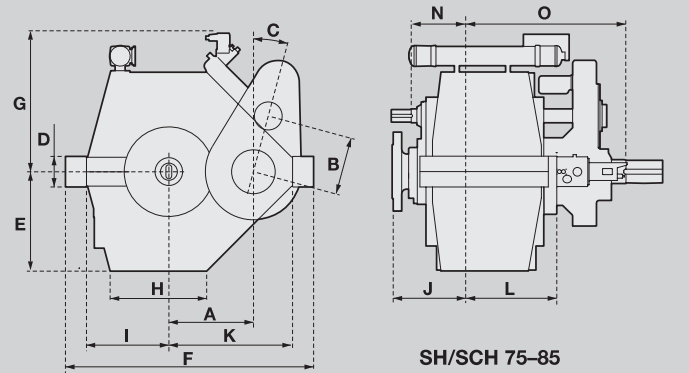
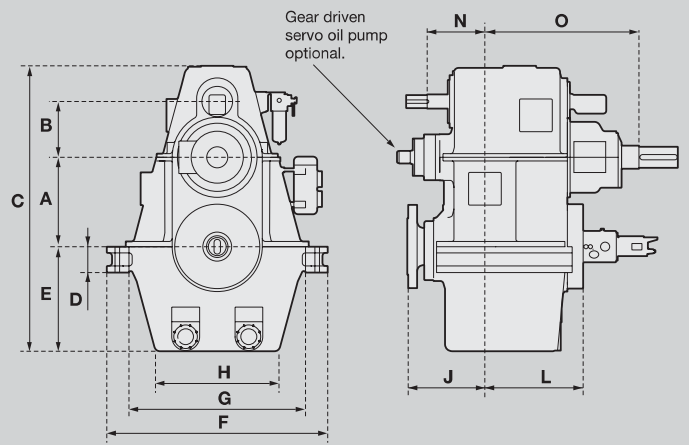
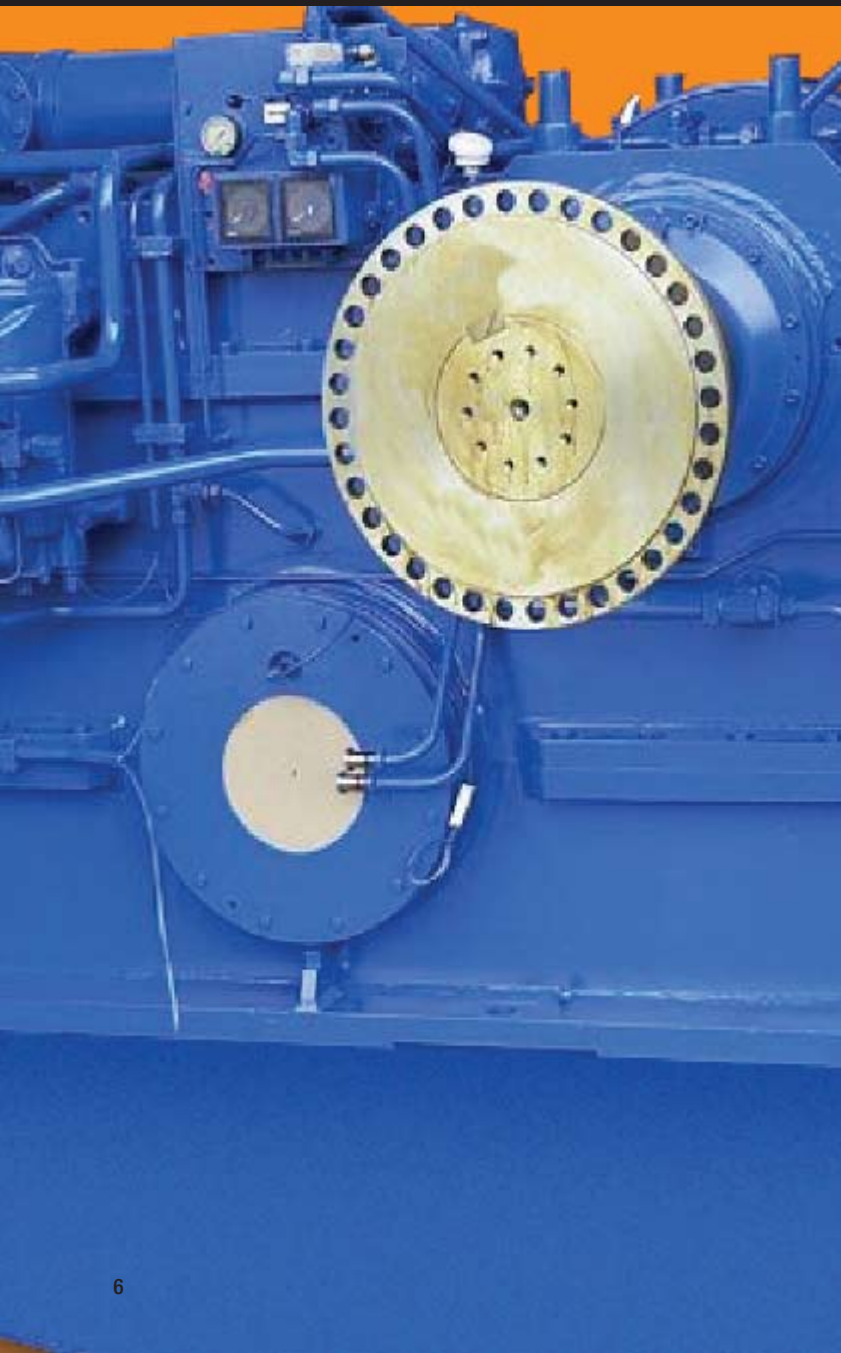
Gears for double ended ferry with DnV redundancy class RPS.



Gear type TCH270-PS58SDC63, twin input-single output gear with one PTO, primary driven from one main engine and secondary driven from the other main engine. PTI for variable speed electric motor, dimensioned for slow steaming.



Cross section of a SCVa-Pb gear.



SINGLE MARINE REDUCTION GEARS

VERTICAL OFFSET GEARS – DIMENSIONS

SV/SCV Size	A	B Std-Max	C	D	E	F	G	H	J	L	N	O SCV/SV
SCV38	380	290	1305	115	465	1000	750	530	340	538	230	650
SCV42	420	320	1435	125	510	1500	830	585	530	558	255	715
SCV46	460	350	1570	140	560	1580	910	640	570	595	280	785
SCV50	500	380	1724	150	590	1340	1024	720	470	592	420	1035
SCV56	560	410	1848	160	645	1500	1110	800	530	650	450	1100
SCV62	620	440-470	2210	180	740	1580	1240	880	570	662	350	1150
SCV68	680	460-510	2370	200	800	1720	1360	960	625	720	370	1250
SCV75	750	480-530	2460	220	880	1850	1480	1040	660	800	450	1300/1095
SCV85	850	510-560	2720	250	1000	2100	1680	1178	730	915	550	1470/1220
SCV95	950	580-630	3025	280	1145	2350	1880	1327	800	1025	450	1640/1350
SCV105	1050	630	3302	300	1265	2600	2100	1487	880	1125	500	1700/1400
SCV110	1010	650	3025	65	1150	2600	2140	1822	1405	550	1100	1615
SCV116	1160	650	3525	150	1400	2580	2300	1800	1535	765	885	1800/1025
SCV128	1280	800	3970	275	1536	3160	2645	1815	1700	840	900	2270/1120
SCV142	1420	1000	4520	305	1704	3505	2645	2012	1885	928	910	2270/1320

HORIZONTAL OFFSET GEARS – DIMENSIONS

SH/SCH Size	A	B	C	D	E	F	G	H	I	J	K	L	N	O SCH/SH
SCH68	680	510	0	100	700	2000	840	650	515	570	1095	730	500	1245
SCH75	750	530	15	280	885	2230	1220	865	735	660	1115	800	515	1670
SCH85	850	580	15	320	1000	2495	1440	970	830	730	1245	915	550	1800
SCH95	950	580	15	450	750	2710	1520	2250	830	1215	1420	540	700	1640
SCH105	1050	630	20	500	771	2995	1658	2195	910	1405	1545	560	750	1510/1700
SCH110	1100	670	20	500	810	3150	1850	2320	950	1450	1630	610	790	1750
SCH116	1160	670	20	550	850	3300	2240	2500	1015	1535	1715	725	830	1800/1100
SCH128	1280	740	20	590	1550	3640	1960	2675	1090	1600	1870		915	1915
SCH142	1420	820	20	620	1720	4040	2180	2970	1380	1700	2240		1015	2100

TWIN INPUT-SINGLE OUTPUT REDUCTION GEARS

DIMENSIONS

TCH Size	A	B	C	D	E	F	G	J	M	N	O
TCH190	1900	460	10	320	980	2750	890	555	2300	360	995
TCH240	2400	490	20	450	1315	3580	1455	730	3135	570	1220
TCH250	2500	530	12.5	450	1400	3700	1150	800	3230	570	1290
TCH270	2700	580	10	500	1330	3900	1690	880	3410	600	1560
TCH310	3100	630	10	500	1600	4500	1450	880	3750	680	1570
TCH350	3500	850	10	700	1855	5370	1630	1270	4380	790	2140
TCH370	3700	880	10	700	1855	5565	1645	1270	4580	880	2140
TCH380	3800	960	10	760	2015	5800	1760	1380	4770	860	2300

Wärtsilä enhances the business of its customers by providing them with complete lifecycle power solutions. When creating better and environmentally compatible technologies, Wärtsilä focuses on the marine and energy markets with products and solutions as well as services. Through innovative products and services, Wärtsilä sets out to be the most valued business partner of all its customers. This is achieved by the dedication of more than 17,000 professionals manning 160 Wärtsilä locations in 70 countries around the world. Wärtsilä is listed on The Nordic Exchange in Helsinki, Finland.

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