

6.09 Scavenge Air System

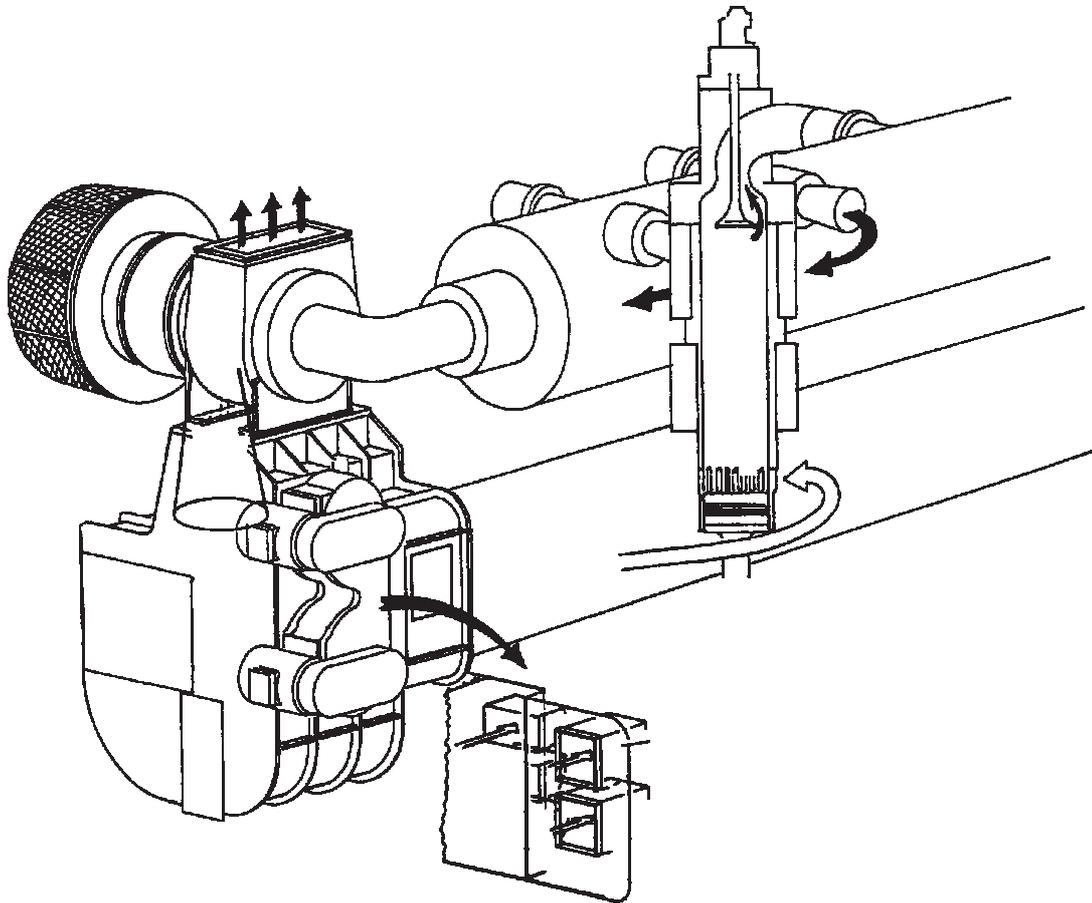


Fig. 6.09.01a: Scavenge air system, running on turbocharger

The engine is supplied with scavenge air from one turbocharger located on the aft end, for 4-9 cylinder engines or from two turbochargers for 10-12 cylinder engines located on the exhaust side.

The compressor of the turbocharger sucks air from the engine room, through an air filter, and the compressed air is cooled by the scavenge air cooler, one per turbocharger. The scavenge air cooler is provided with a water mist catcher, which prevents condensed water from being carried with the air

into the scavenge air receiver and to the combustion chamber.

The scavenge air system, (see Figs. 6.09.01 and 6.09.02) is an integrated part of the main engine.

The heat dissipation and cooling water quantities are based on MCR at tropical conditions, i.e. a SW temperature of 32 °C, or a FW temperature of 36 °C, and an ambient air inlet temperature of 45 °C.

Auxiliary Blowers

The engine is provided with two electrically driven auxiliary blowers. Between the scavenge air cooler and the scavenge air receiver, non-return valves are fitted which close automatically when the auxiliary blowers start supplying the scavenge air.

Both auxiliary blowers start operating consecutively before the engine is started and will ensure complete scavenging of the cylinders in the starting phase, thus providing the best conditions for a safe start.

During operation of the engine, the auxiliary blowers will start automatically whenever the engine load is reduced to about 30-40% and will continue operating until the load again exceeds approximately 40-50%.

Emergency running

If one of the auxiliary blowers is out of action, the other auxiliary blower will function in the system, without any manual readjustment of the valves being

necessary. This is achieved by automatically working non-return valves.

Electrical panel for two auxiliary blowers

The auxiliary blowers are, as standard, fitted onto the main engine, and the control system for the auxiliary blowers can be delivered separately as an option: 4 55 650.

The layout of the control system for the auxiliary blowers is shown in Figs. 6.09.03a and 6.09.03b "Electrical panel for two auxiliary blowers", and the data for the electric motors fitted onto the main engine is found in Fig. 6.09.04 "Electric motor for auxiliary blower".

The data for the scavenge air cooler is specified in the description of the cooling water system chosen.

For further information please refer to our publication:

P.311 Influence of Ambient Temperature Conditions on Main Engine Operation

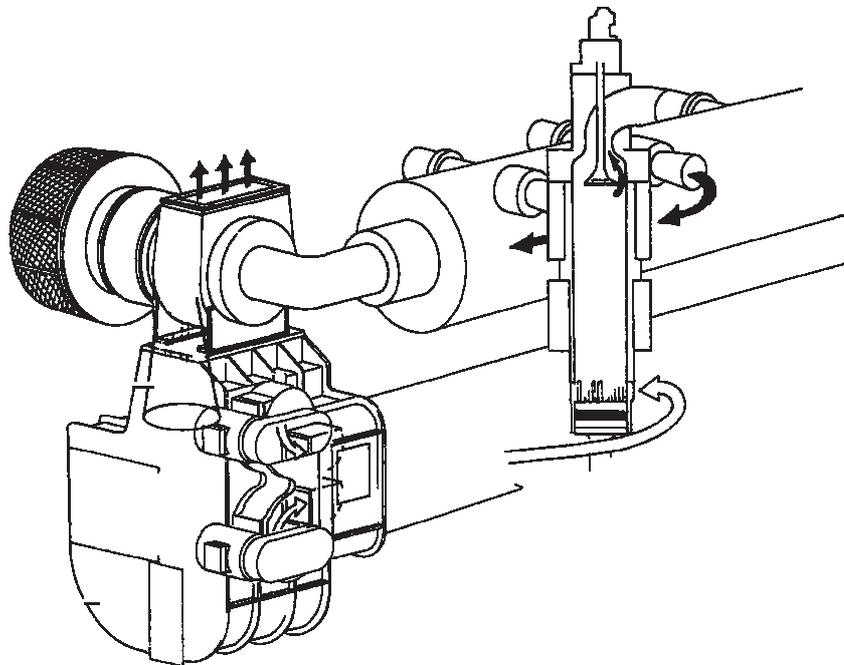
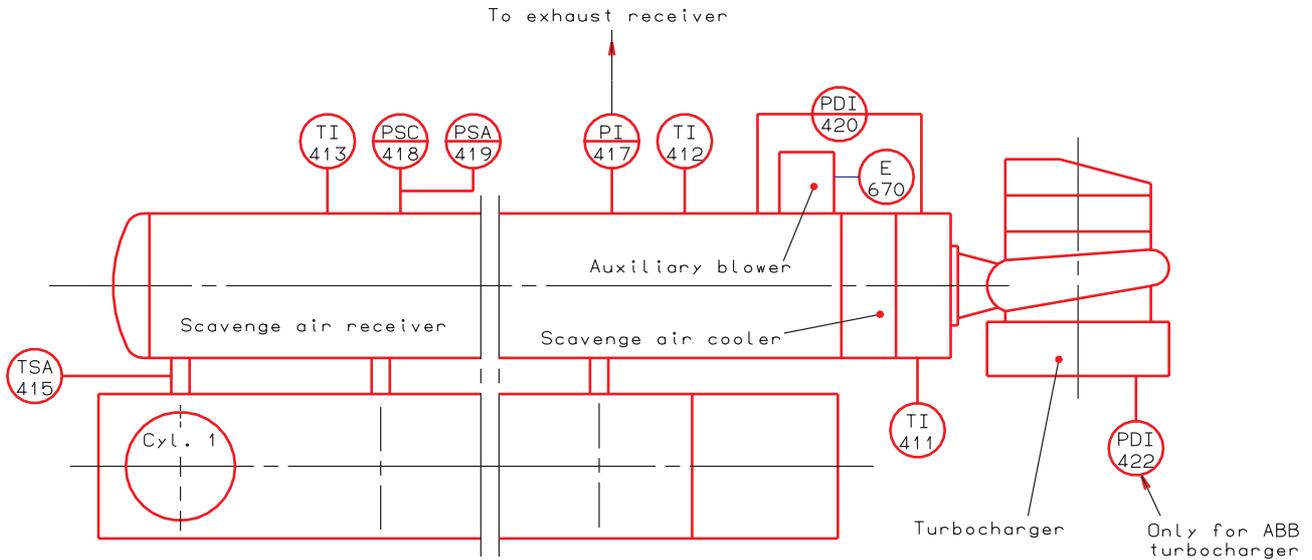


Fig. 6.09.01b: Scavenge air system, running on auxiliary blower



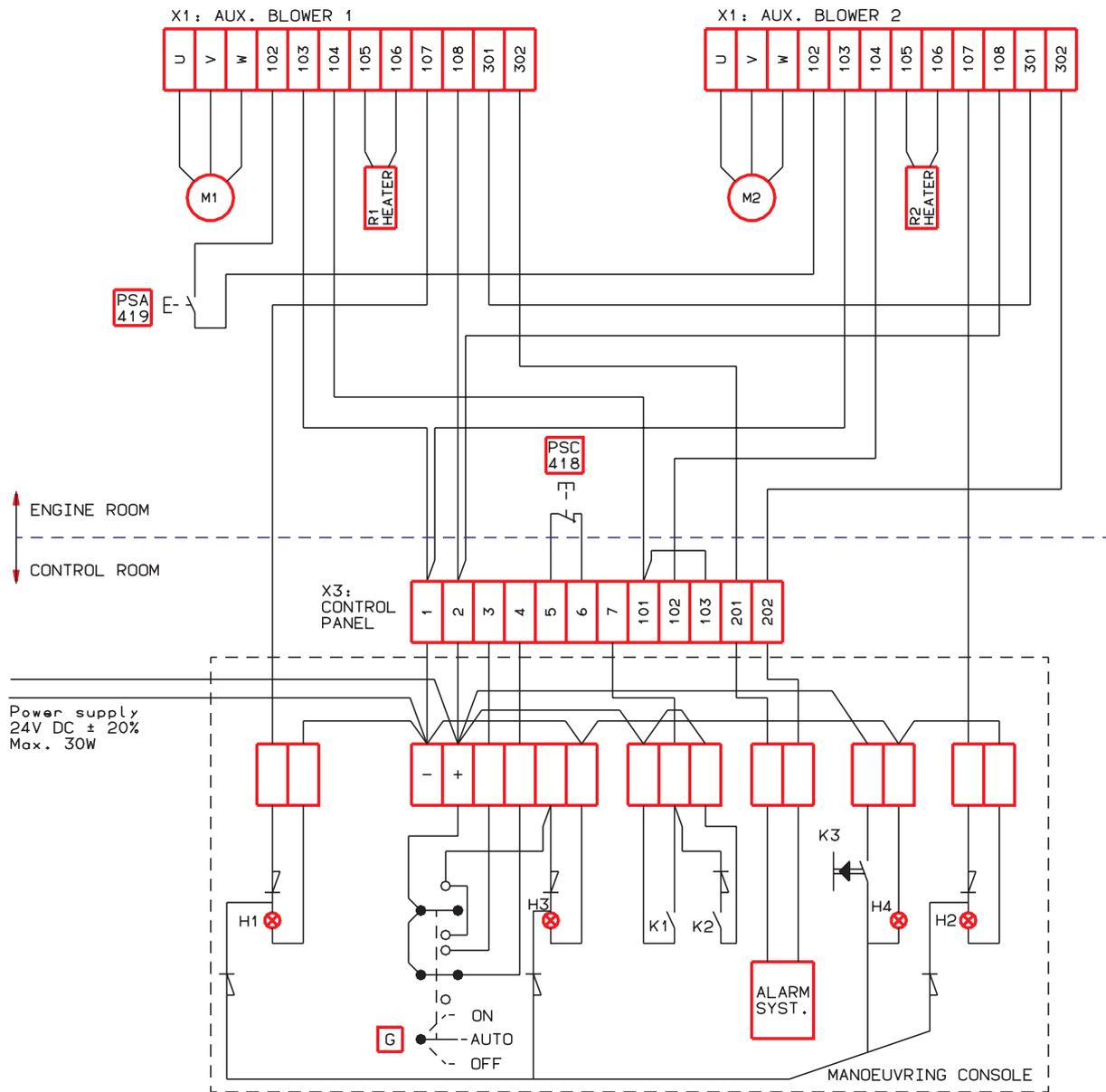
178 39 76-9.0

Fig. 6.09.02: Scavenge air pipes, for engine with one turbocharger on aft end

Electric motor size		Dimensions of control panel for two auxiliary blowers			Dimensions of electric panel			Maximum stand-by heating element
3 x 440 V 60 Hz	3 x 380 V 50 Hz	W mm	H mm	D mm	W mm	H mm	D mm	
18 - 80 A 11 - 45 kW	18 - 80 A 9 - 40 kW	300	460	150	400	600	300	100 W
63 - 250 A 67 - 155 kW	80 - 250 A 40 - 132 kW	300	460	150	600	600	350	250 W

178 31 47-8.0

Fig. 6.09.03a: Electrical panel for two auxiliary blowers including starters, option 4 55 650



PSC 418: Pressure switch for control of scavenge air auxiliary blowers. Start at 0.55 bar. Stop at 0.7 bar

PSA 419: Low scavenge air pressure switch for alarm. Upper switch point 0.56 bar. Alarm at 0.45 bar

G: Mode selector switch. The OFF and ON modes are independent of K1, K2 and PSC 418

K1: Switch in telegraph system. Closed at "finished with engine"

K2: Switch in safety system. Closed at "shut down"

K3: Lamp test

178 31 44-2.0

Fig. 6.09.03b: Control panel for two auxiliary blowers inclusive starters, option 4 55 650

Number of cylinders	Make: ASEA, or similar 3 x 440V-60Hz-2p Type	Power kW	Current		Mass kg
			Start Amp.	Nominal Amp.	
4	2 x MBT-160MA	2 x 16	1 x 158	2 x 27	2 x 76
5	2 x MBT-160MA	2 x 16	1 x 158	2 x 27	2 x 76
6	2 x MBT-160M	2 x 20	1 x 210	2 x 32	2 x 85
7	2 x MBT-160M	2 x 20	1 x 210	2 x 32	2 x 85
8	2 x MBT-160M	2 x 20	1 x 210	2 x 32	2 x 85
9	2 x MBT-200LA	2 x 37	1 x 370	2 x 59	2 x 170
10					
11					
12					

Number of cylinders	Make: ABB, or similar 3 x 380V-50Hz-2p Type	Power kW	Current		Mass kg
			Start Amp.	Nominal Amp.	
4	2 x MBT-160MA	2 x 14	1 x 158	2 x 27	2 x 76
5	2 x MBT-160MA	2 x 14	1 x 158	2 x 27	2 x 76
6	2 x MTB-160M	2 x 17	1 x 210	2 x 32	2 x 85
7	2 x MTB-160L	2 x 20	1 x 250	2 x 37	2 x 95
8	2 x MTB-180L	2 x 22.5	1 x 280	2 x 42	2 x 120
9	2 x MTB-200LA	2 x 32	1 x 370	2 x 59	2 x 170
10					
11					
12					

Enclosure IP44
 Insulation class: minimum B
 Speed of fan: about 2940 and 3540 r/min for 50Hz and 60Hz respectively
 The electric motors are delivered with and fitted onto the engine

178 39 80-4.0

Fig. 6.09.04: Electric motor for auxiliary blower

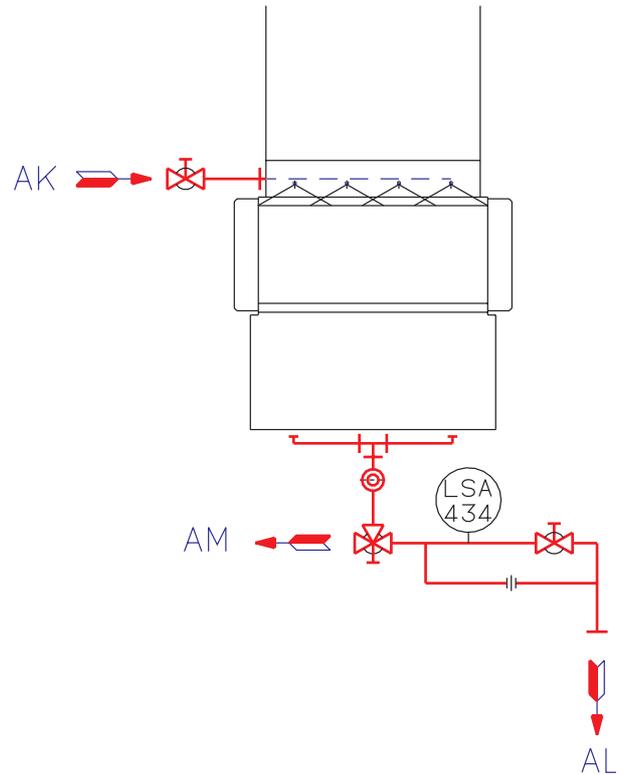
Air cooler cleaning

The air side of the scavenge air cooler can be cleaned by injecting a grease dissolvent through "AK" (see Figs. 6.09.05 and 6.09.06) to a spray pipe arrangement fitted to the air chamber above the air cooler element.

Sludge is drained through "AL" to the bilge tank, and the polluted grease dissolvent returns from "AM", through a filter, to the chemical cleaning tank. The cleaning must be carried out while the engine is at standstill.

Drain from water mist catcher

The drain line for the air cooler system is, during running, used as a permanent drain from the air cooler water mist catcher. The water is led through an orifice to prevent major losses of scavenge air. The system is equipped with a drain box, where a level switch LSA 434 is mounted, indicating any excessive water level, see Fig. 6.09.05.

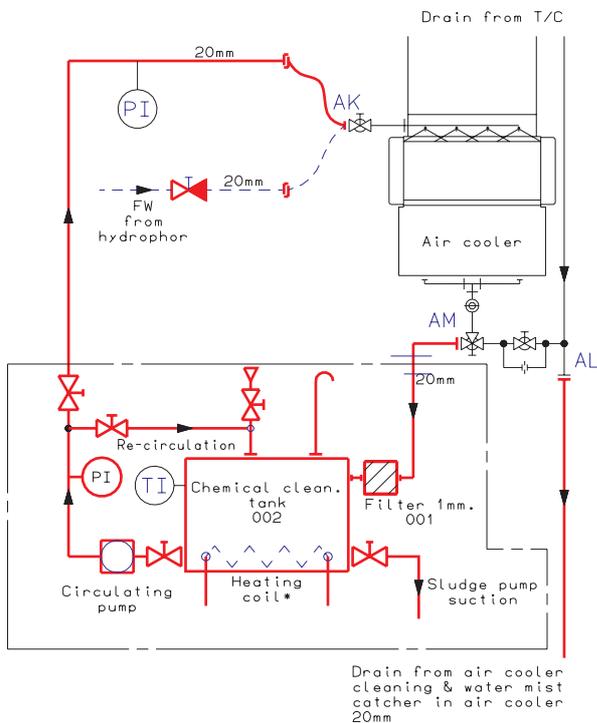


The letters refer to "List of flanges"
The piping is delivered with and fitted onto the engine

178 38 57-2.0

Fig. 6.09.05: Air cooler cleaning pipes

* To suit the chemical requirement



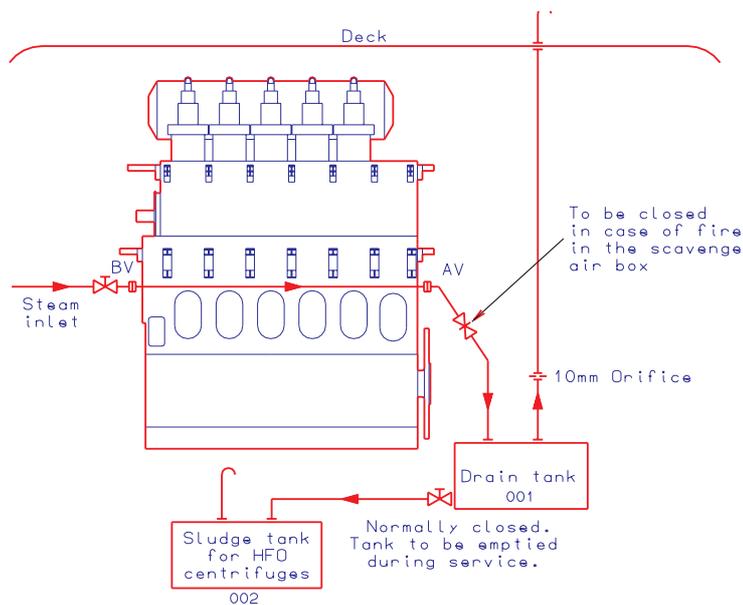
178 10 65-1.2

178 89 84-1.0

The letters refer to "List of flanges"

Fig. 6.09.06: Air cooler cleaning system, option: 4 55 655

Number of cylinders	4-9	10-12
Chemical tank capacity	0.3 m ³	0.6 m ³
Circulating pump capacity at 3 bar	1 m ³ /h	2 m ³ /h
d: Nominal diameter	25 mm	32 mm

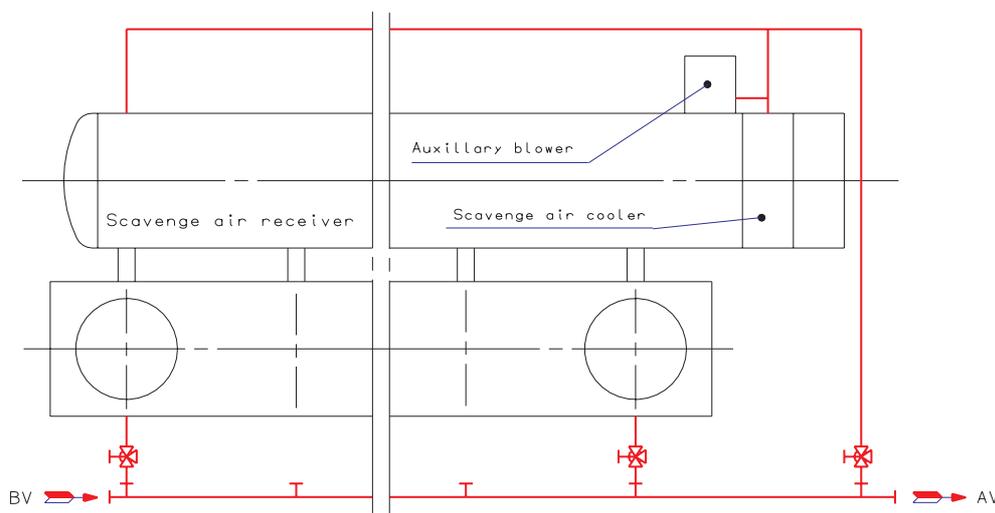


No. of cylinders	Capacity of drain tank
4-6	0.4 m ³
7-9	0.7 m ³
10-12	1.0 m ³

The letters refer to "List of flanges"

178 06 61-0.0

Fig. 6.09.07: Scavenge box drain system



The letters refer to "List of flanges"
The piping is delivered with and fitted onto the engine

178 06 16-0.0

Fig. 6.09.08: Scavenge air space, drain pipes

Fire Extinguishing System for Scavenge Air Space

Fire in the scavenge air space can be extinguished by steam, being the standard version, or, optionally, by water mist or CO₂.

The alternative external systems are shown in Fig. 6.09.10:

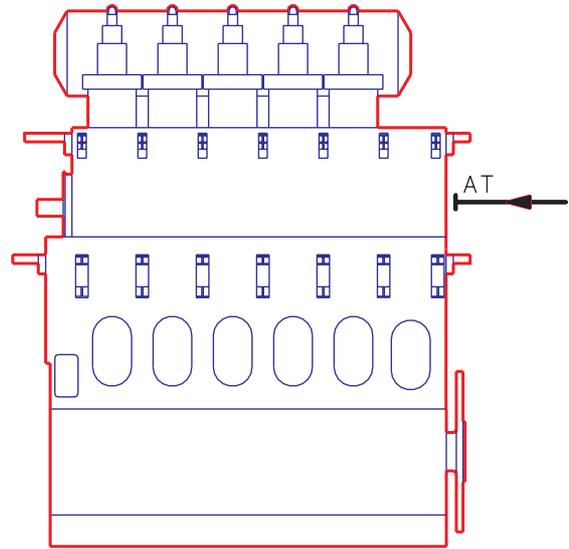
- “Fire extinguishing system for scavenge air space” standard: 4 55 140 Steam
- or option: 4 55 142 Water mist
- or option: 4 55 143 CO₂

The corresponding internal systems fitted on the engine are shown in Figs. 6.09.11a and 6.09.11b:

- “Fire extinguishing in scavenge air space (steam)”
- “Fire extinguishing in scavenge air space (water mist)”
- “Fire extinguishing in scavenge air space (CO₂)”

Steam pressure: 3-10 bar
 Steam approx.: 0.8 kg/cyl.

Freshwater pressure: min. 3.5 bar
 Freshwater approx.: 0.6 kg/cyl.

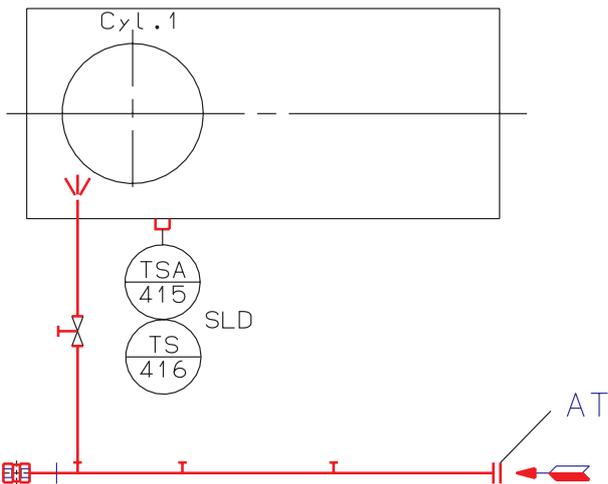


178 06 17-2.0

The letters refer to “List of flanges”

Fig. 6.09.09 Fire extinguishing system for scavenge air space

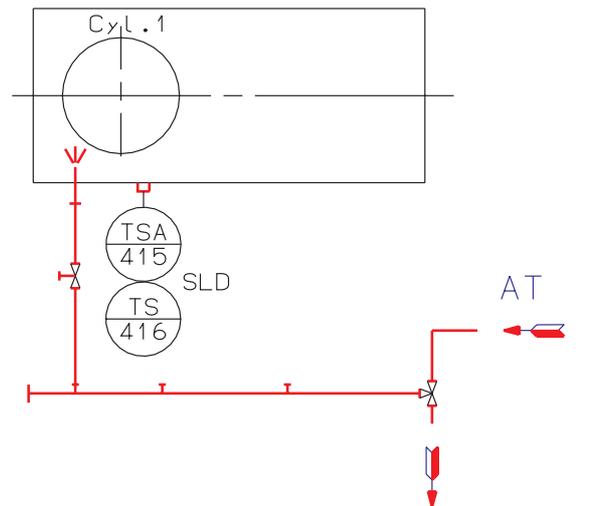
CO₂ test pressure: 150 bar
 CO₂ approx.: 1.5 kg/cyl.



The letters refer to “List of flanges”
 The piping is delivered with and fitted onto the engine

178 38 65-5.0

Fig. 6.09.10a: Fire extinguishing pipes in scavenge air space steam: 4 55 140, water mist, option: 4 55 142



To bedplate drain

178 35 21-6.0

Fig. 6.09.10b: Fire extinguishing pipes in scavenge air space CO₂, option: 4 55 143