



THRUSTERS

Advanced Technology of Thruster Seal

Isao Sasada

Kobelco Marine Engineering

Session Chair – Dietmar Deter, Nautex

September 16-17, 2003
Houston, Texas



DYNAMIC POSITIONING CONFERENCE

Advanced Technology of Thruster Seal

KOBELCO MARINE ENG. CO., LTD.

$$P_{s.t.} = P_{s.w.} + (0.03 \sim 0.05) \text{MPa}$$

$$P_{s.w.} \geq P_{2/3} + 0.03 \text{MPa}$$

$P_{s.t.}$: Oil pressure in stern tube

$P_{s.w.}$: Seawater pressure

$P_{2/3}$: Pressure in #2/#3 chamber

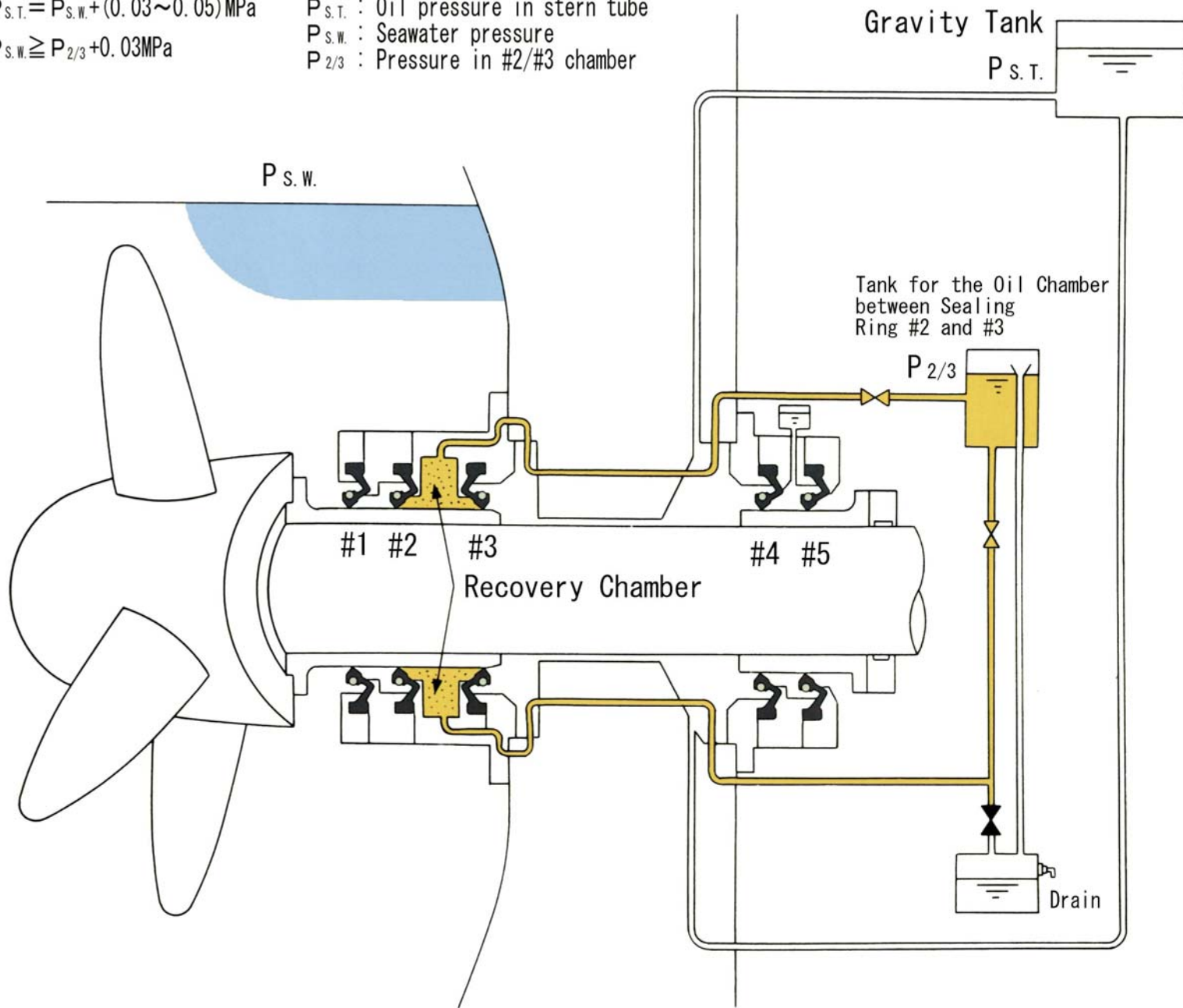


Fig 1 Structure of lip type stern tube seal

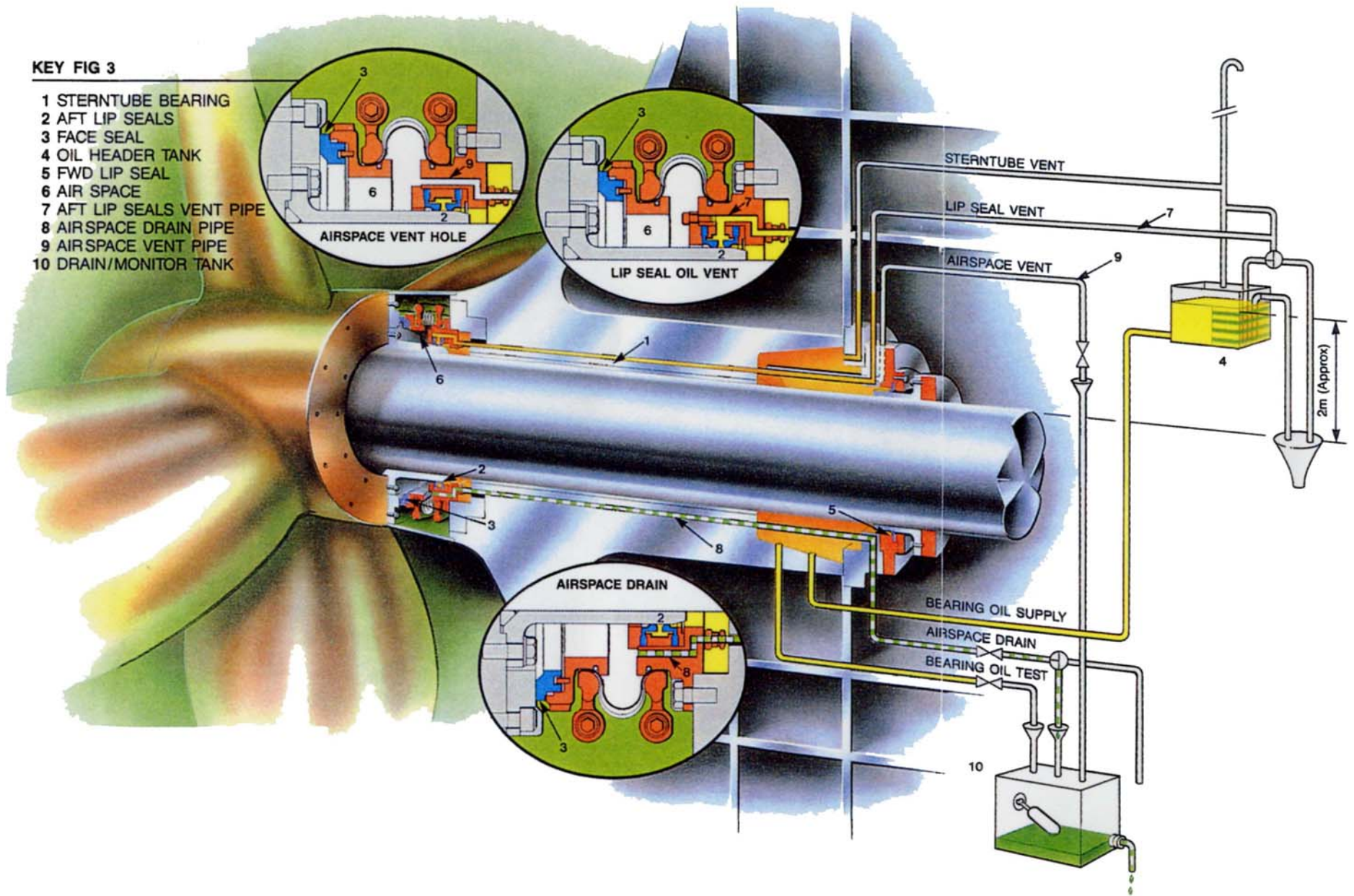


Fig 2 Coastguard Sternseal System

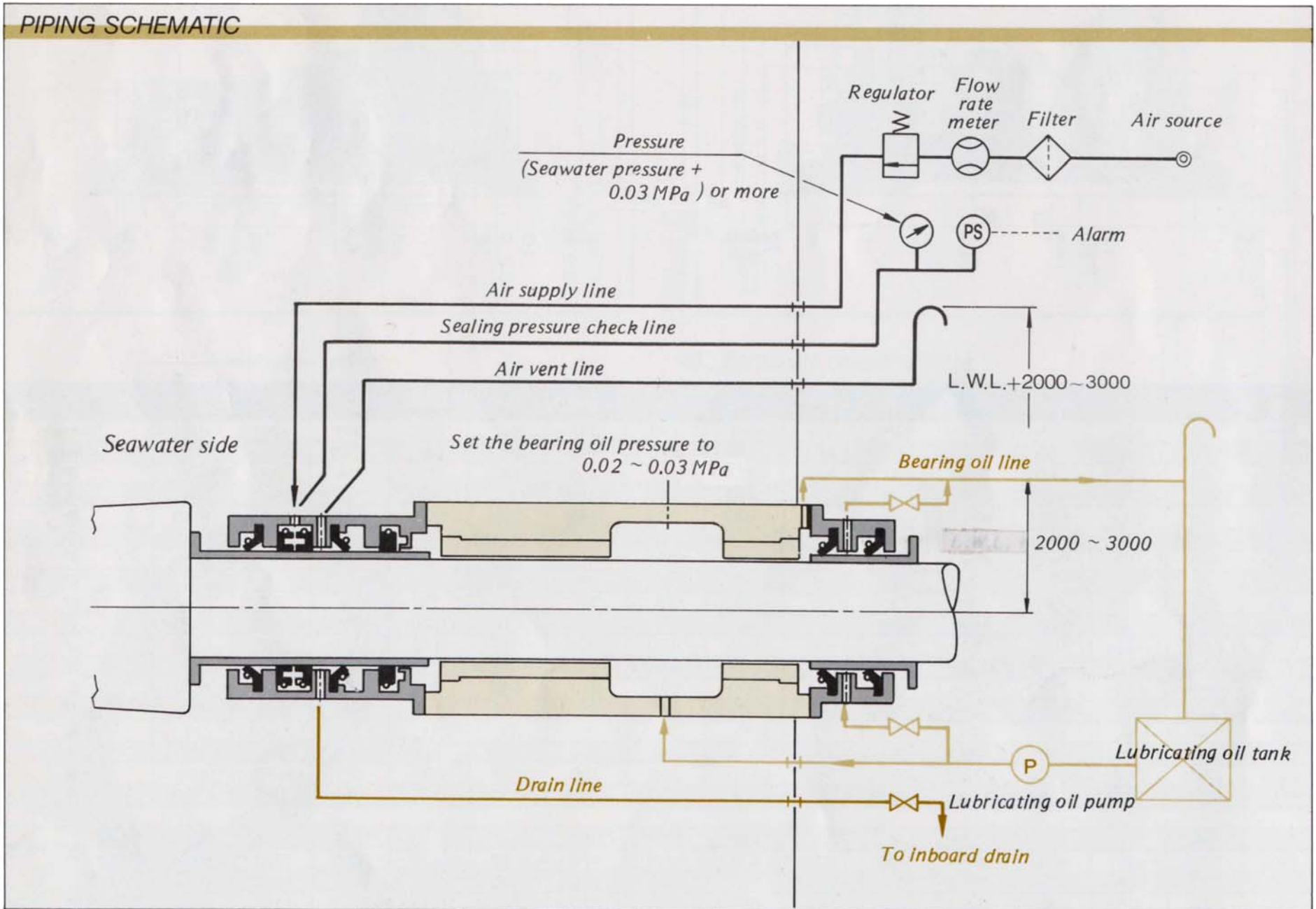


Fig 3 Stern Dry Seal EVS-1

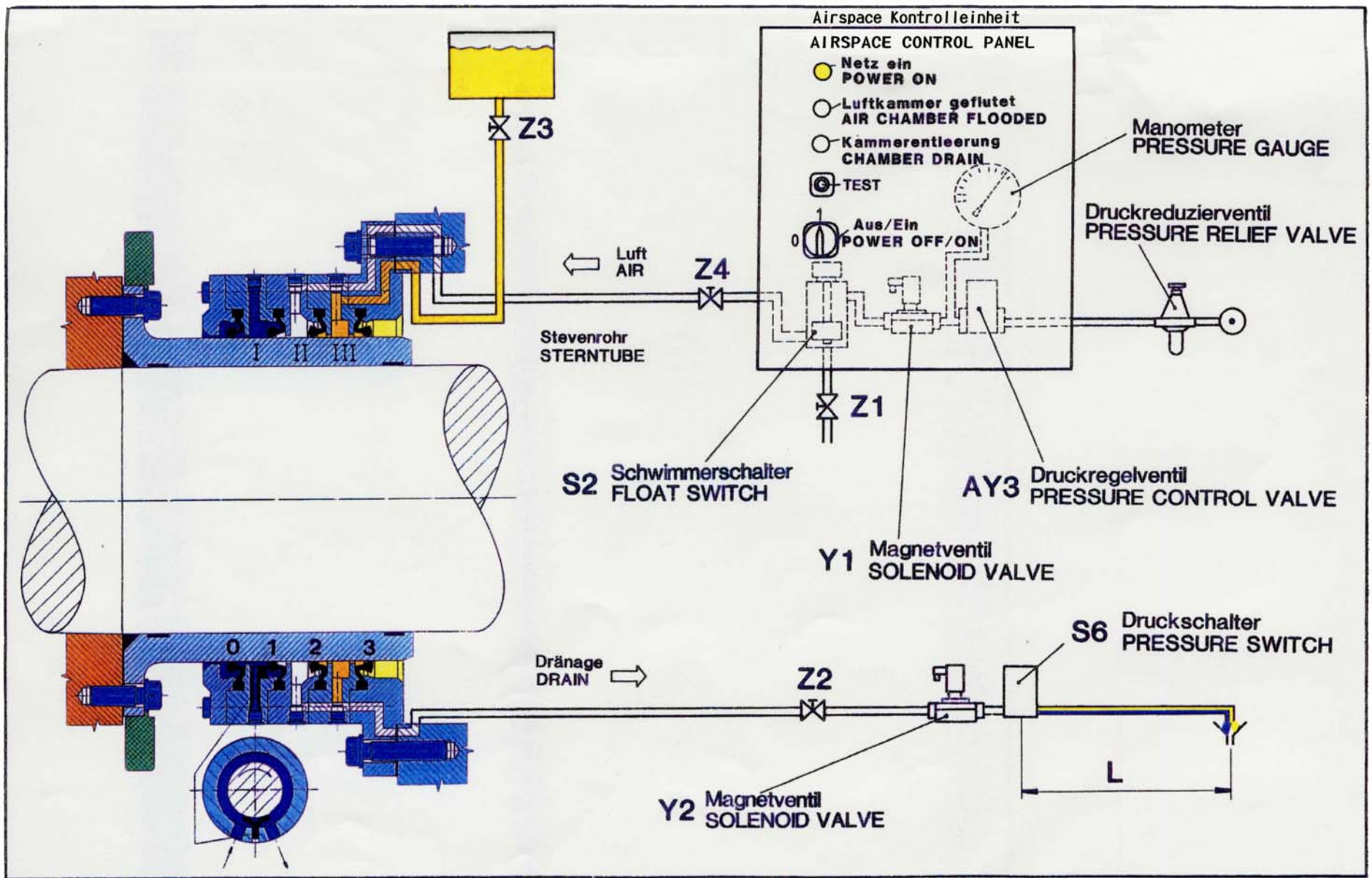


Fig 4 Airspace 1

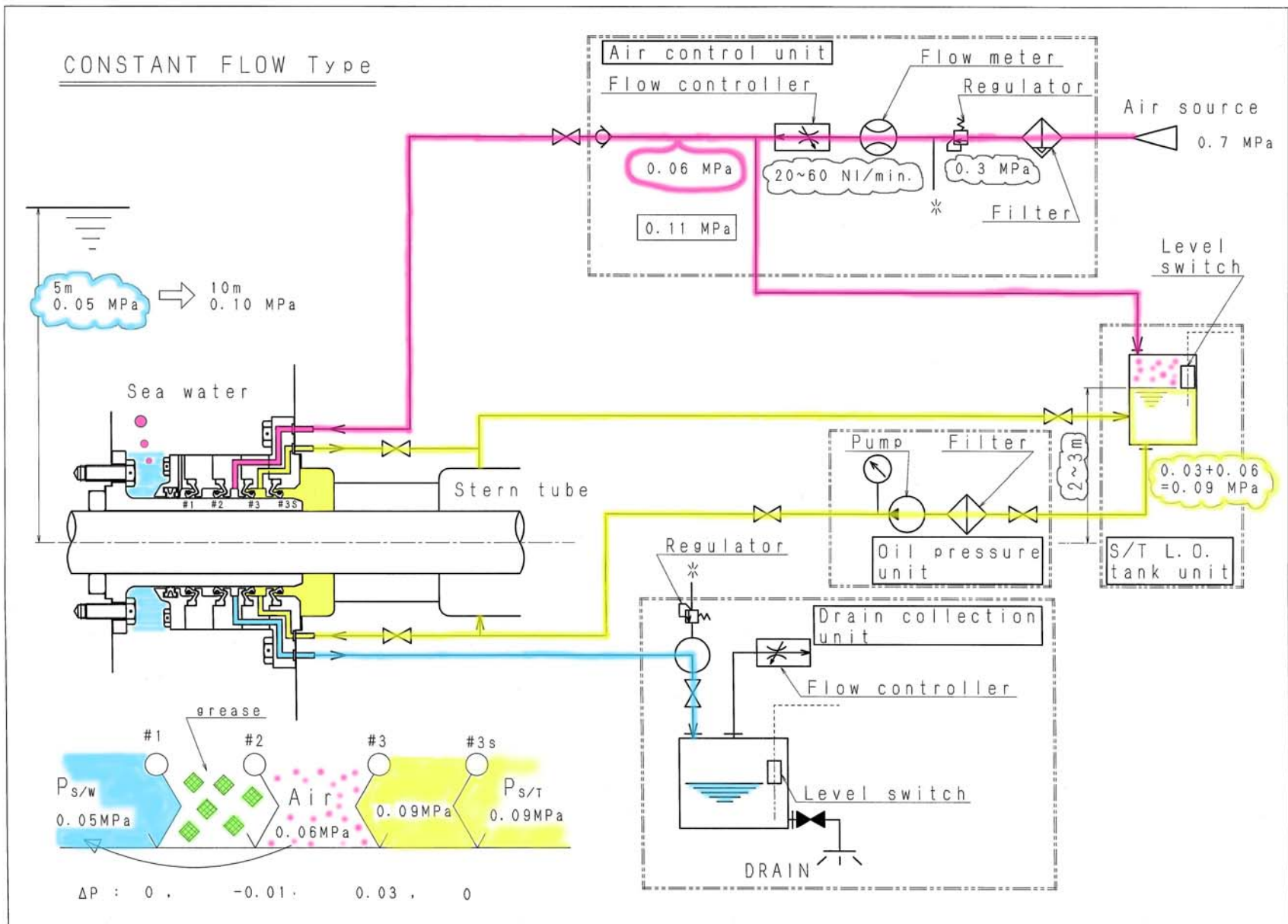


Fig 5 KOBELCO Air Seal

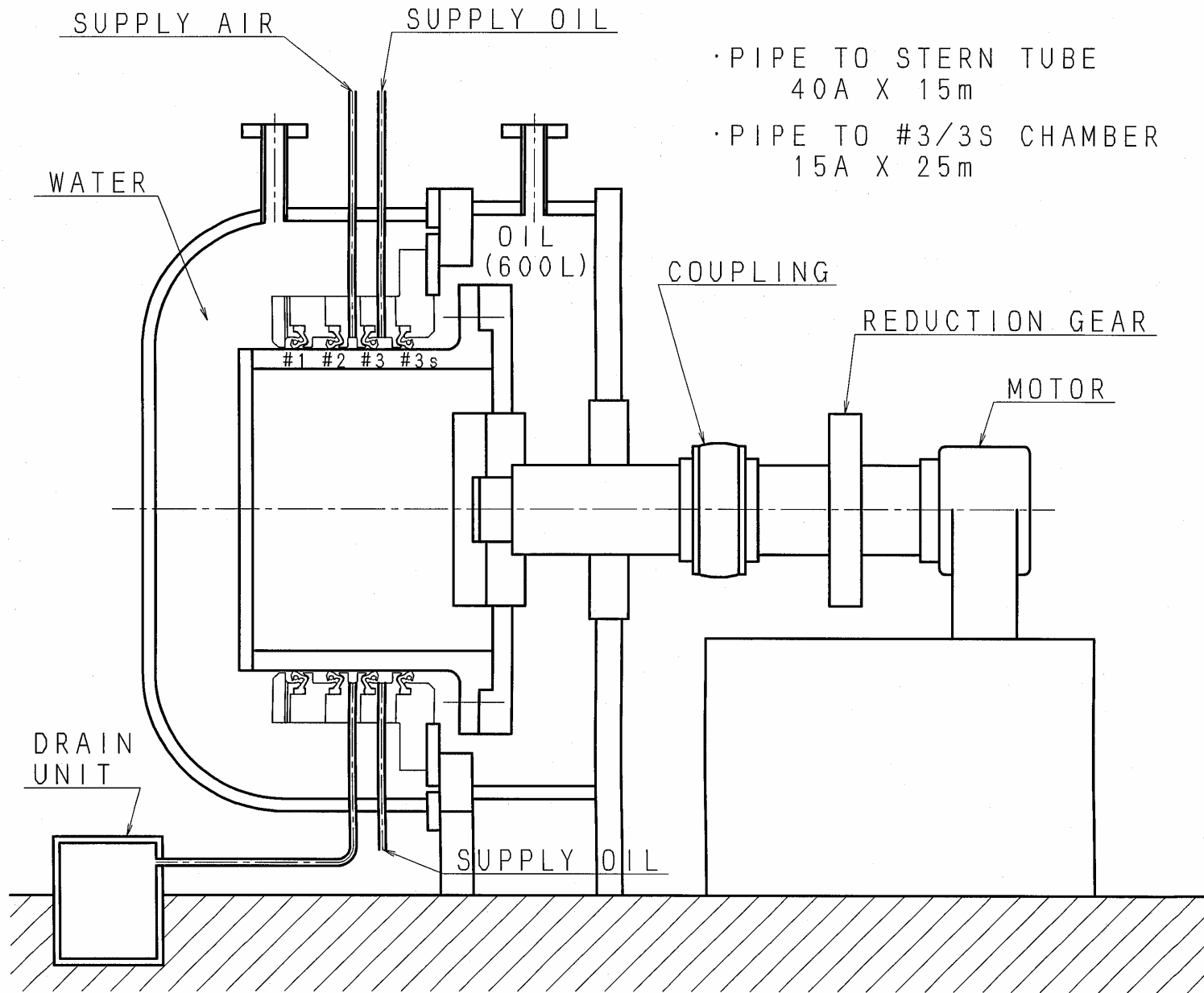


Fig 9 Size 670 test equipment

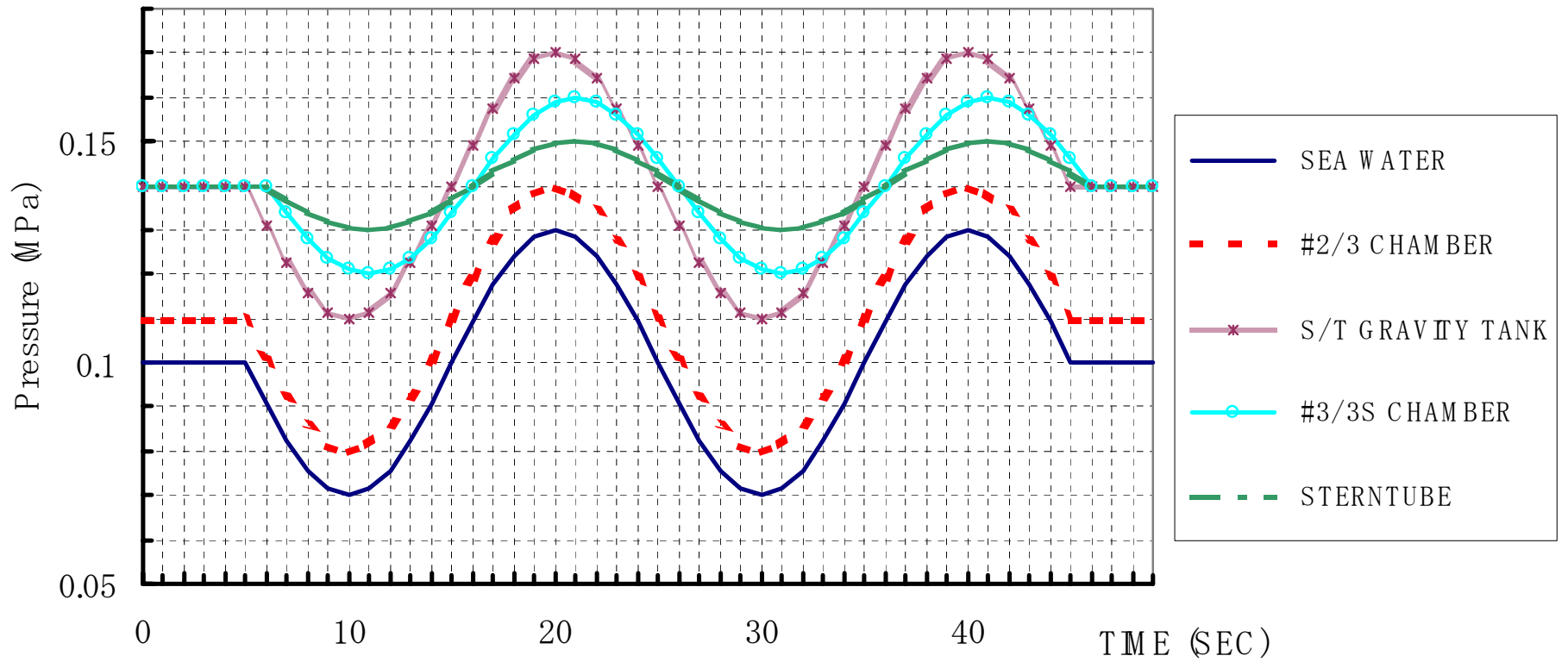


Fig 10 Pressure wave

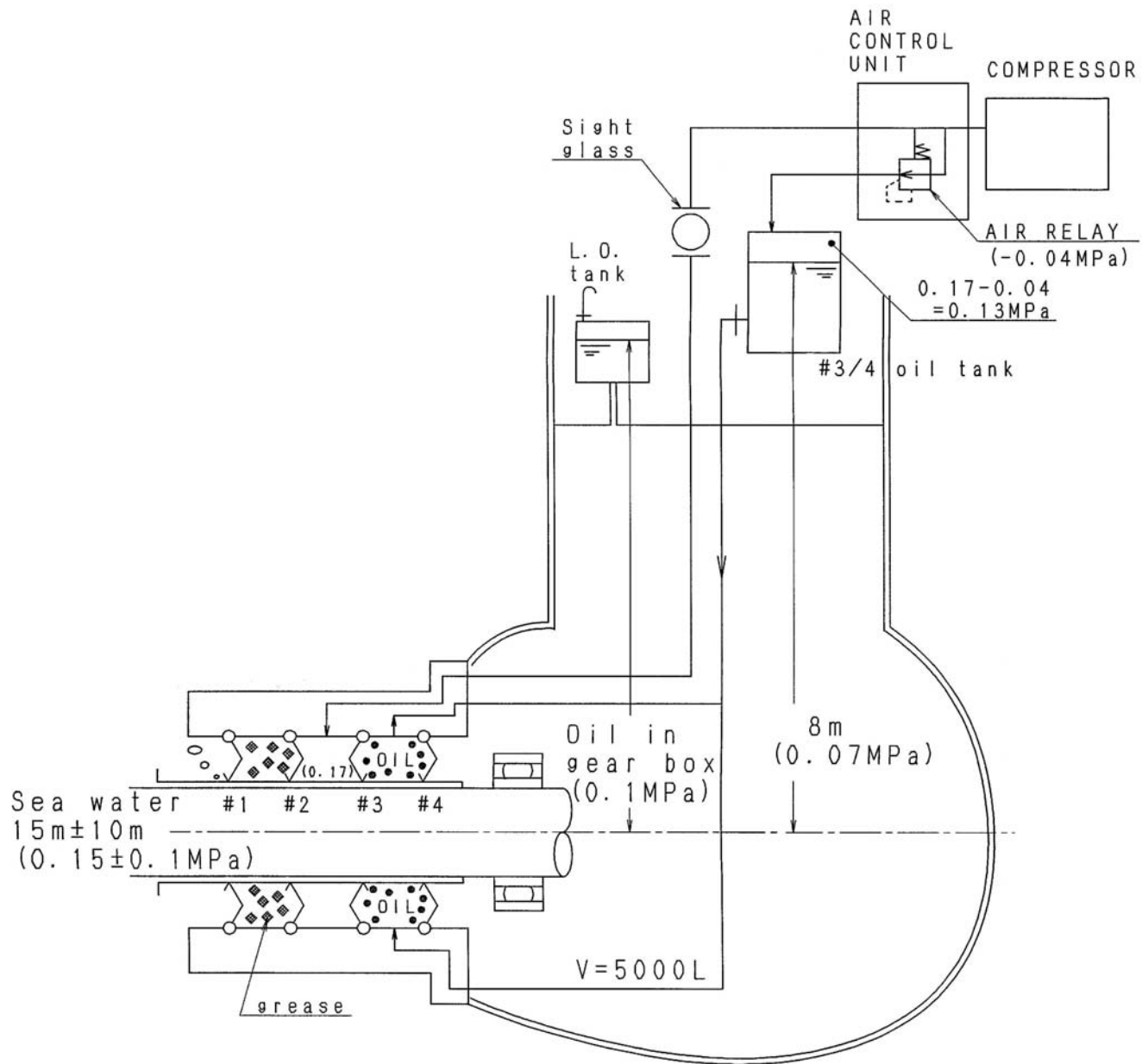
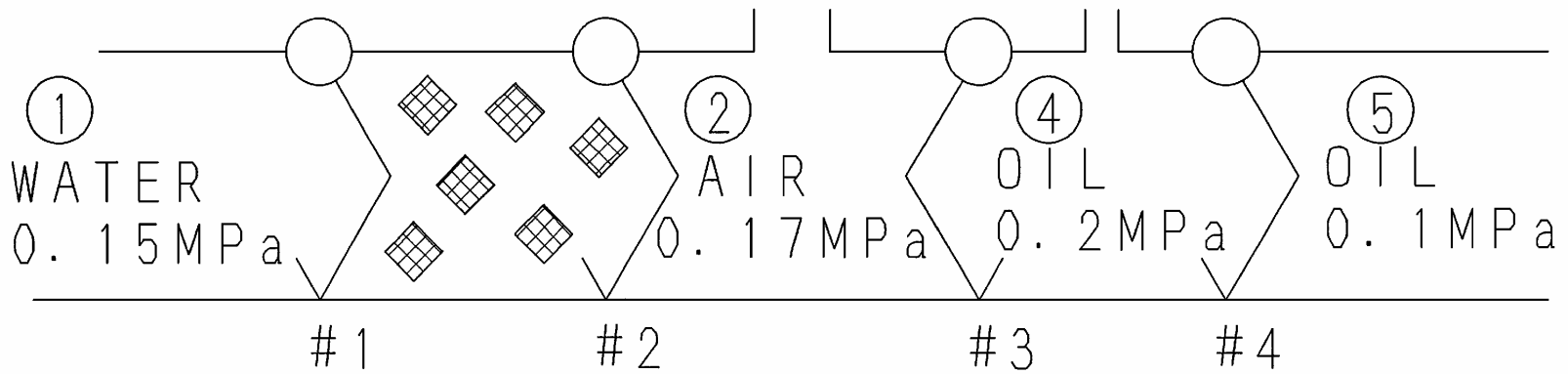


Fig 13 Seal model of mechanical thruster



ΔP : -0.01MPa , -0.01MPa , 0.03MPa , 0.1MPa

PRESSURE DIFFERENCE

Fig 14 Pressure balance of mechanical thruster seal

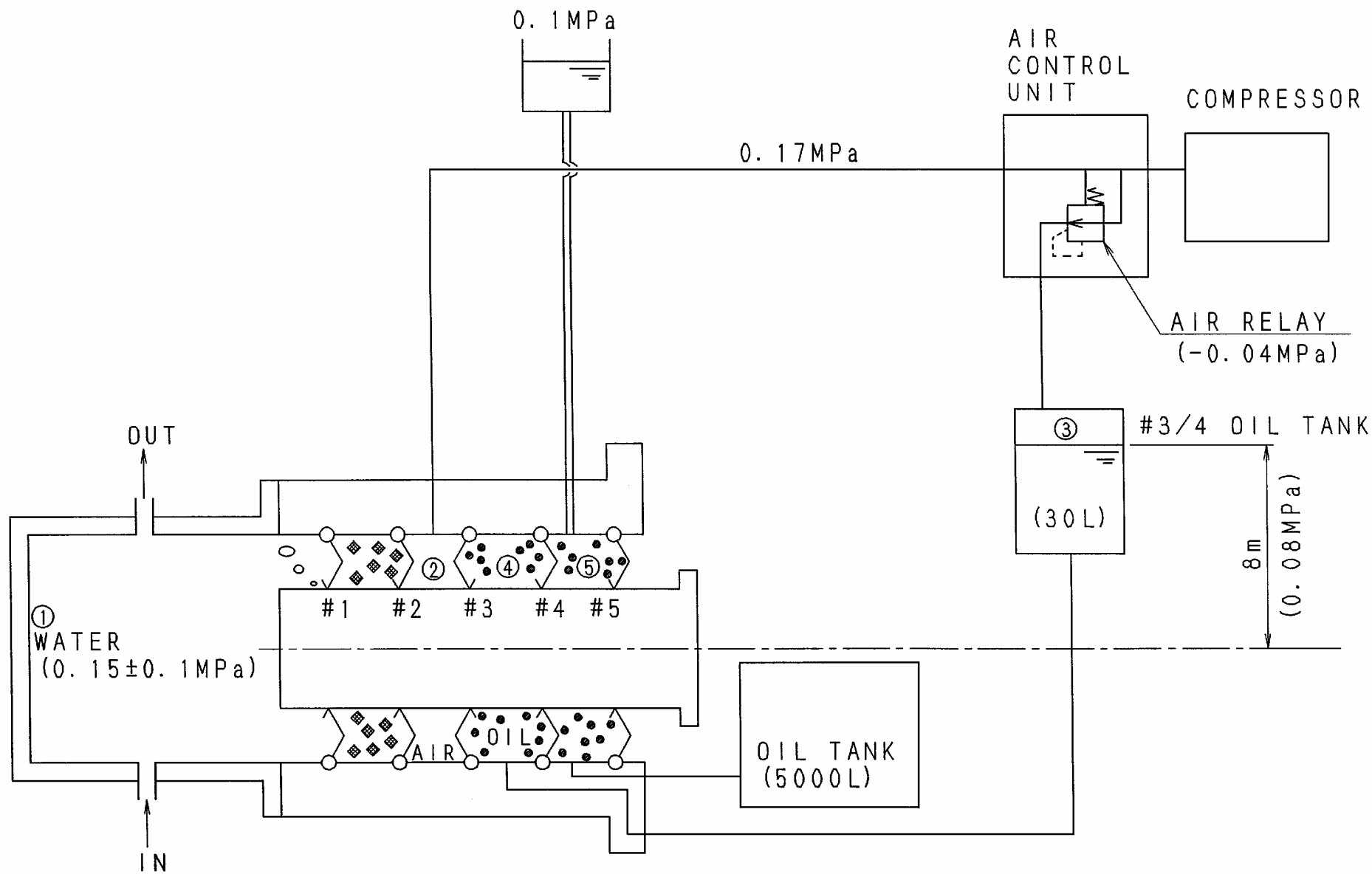


Fig 15 Test equipment of mechanical thruster seal

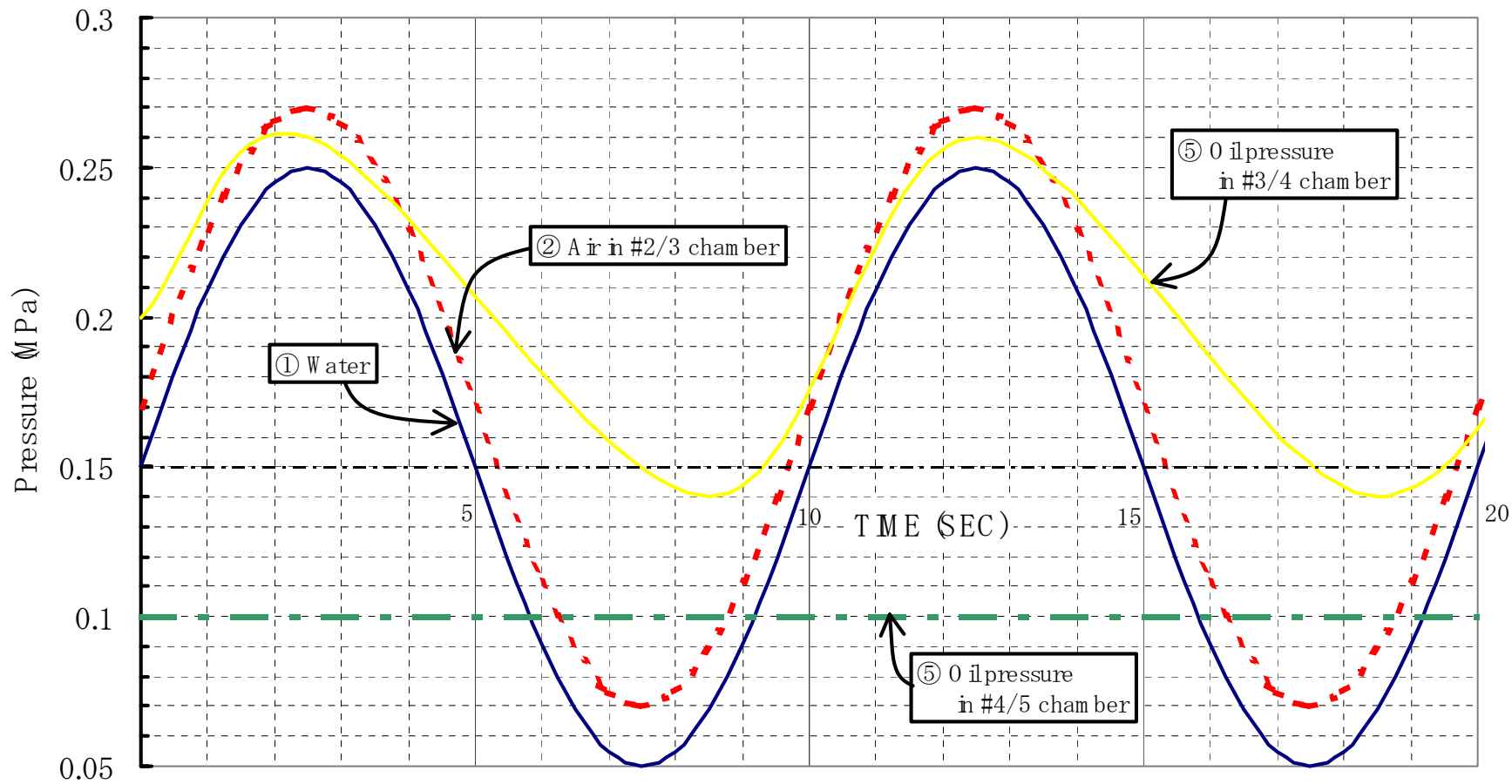


Fig 17 Pressure wave of mechanical thruster seal

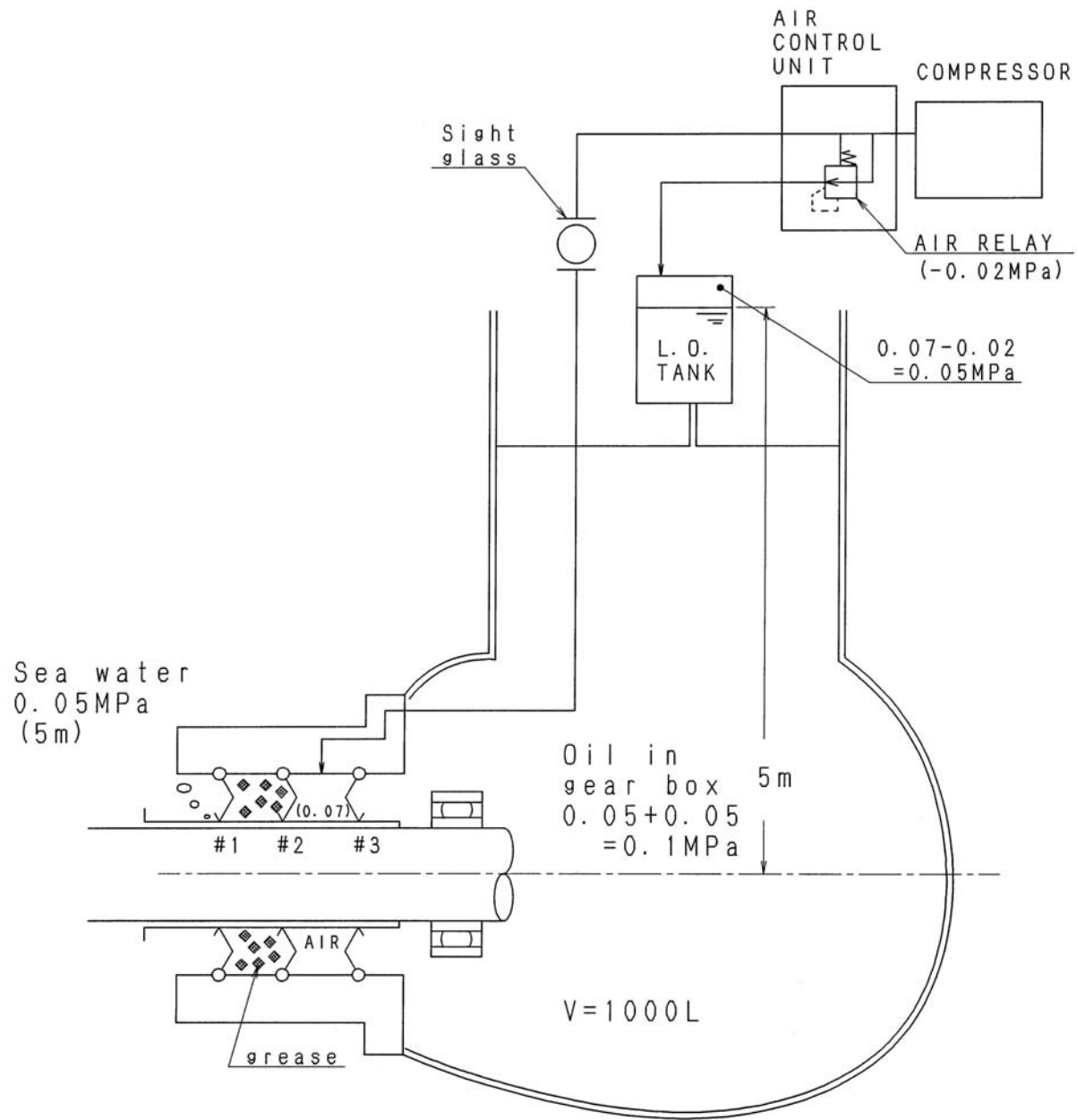


Fig 18 Simplified seal model of mechanical thruster

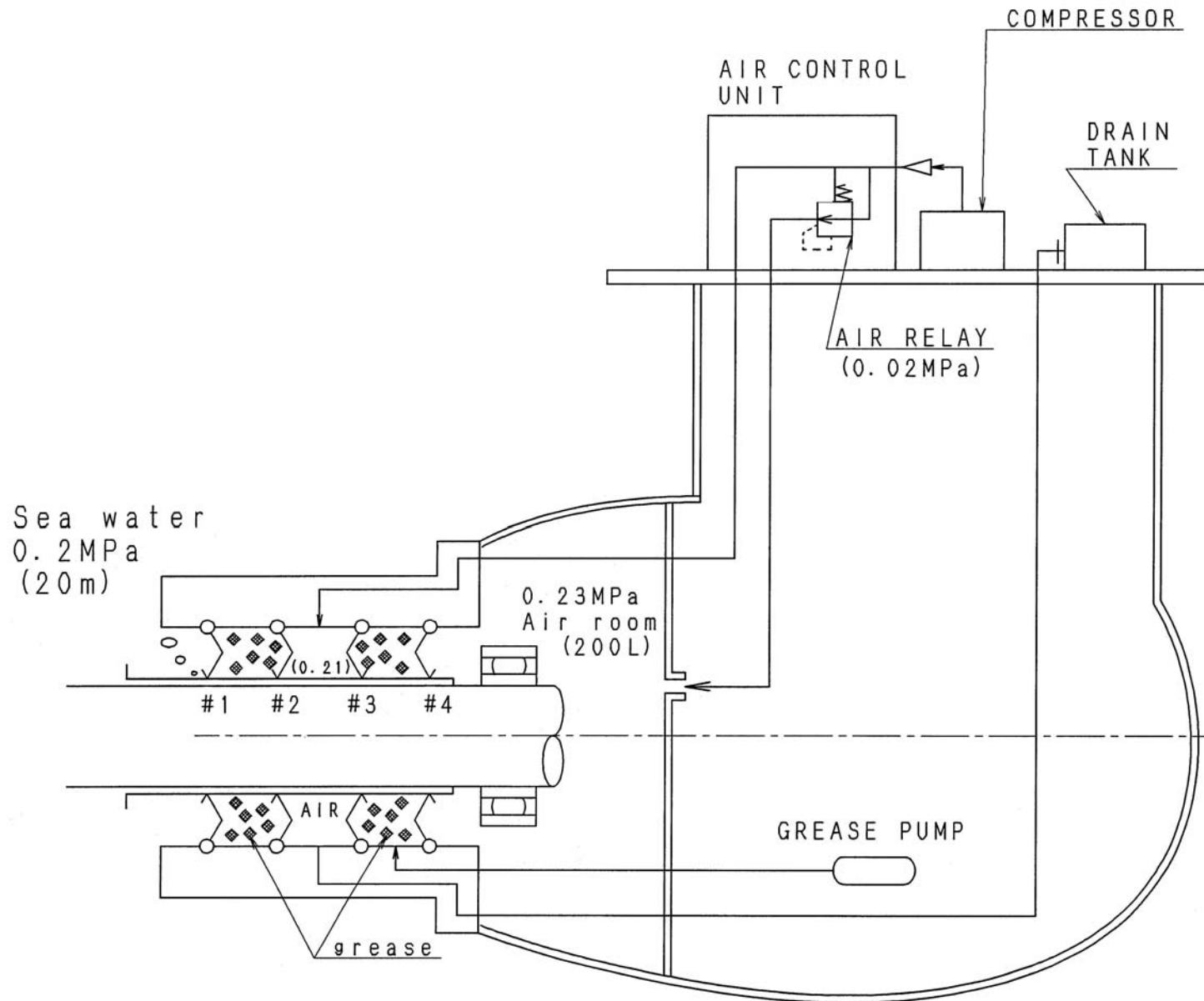


Fig 19 Grease seal model of electric thruster

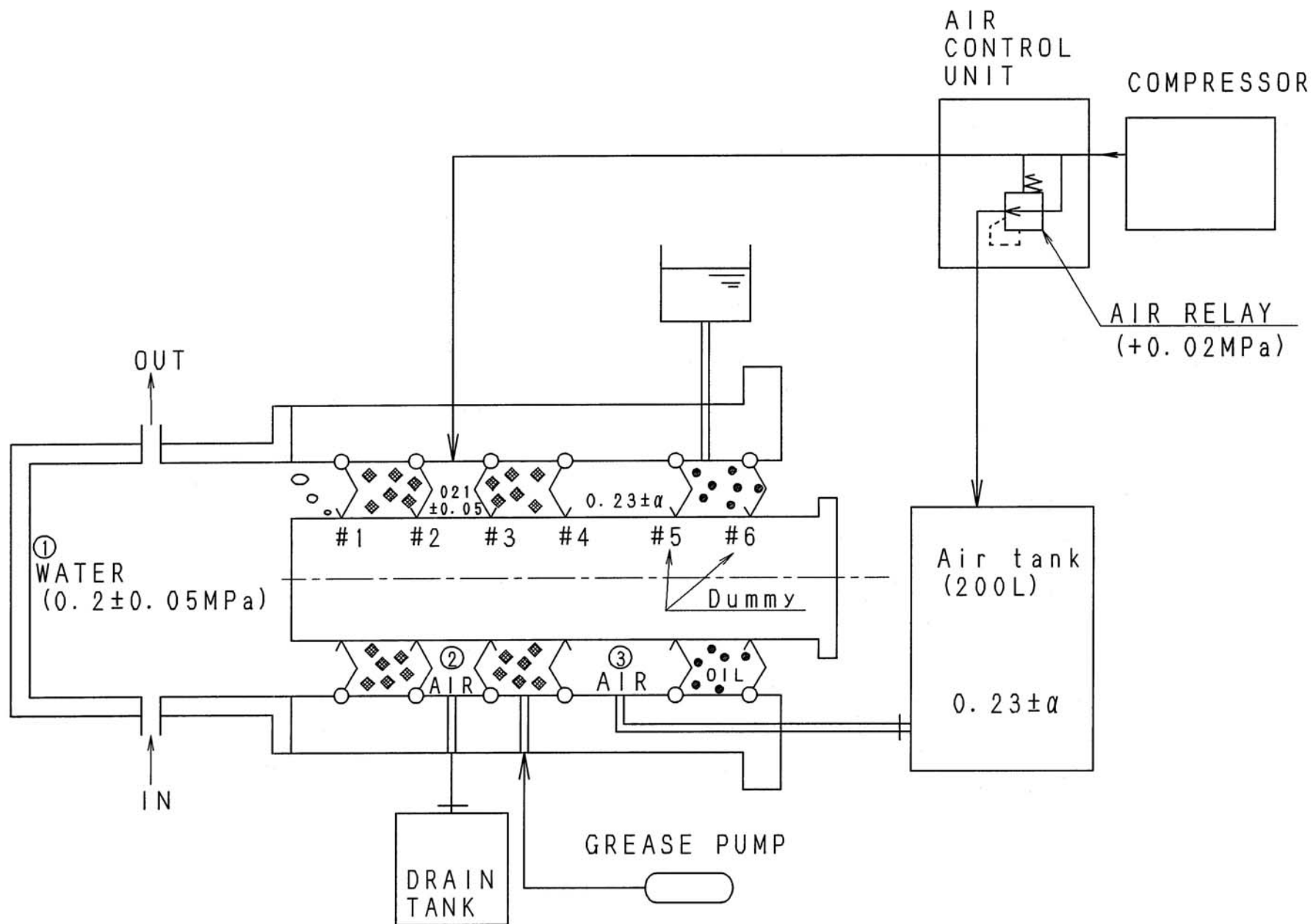


Fig 20 Test equipment of grease seal

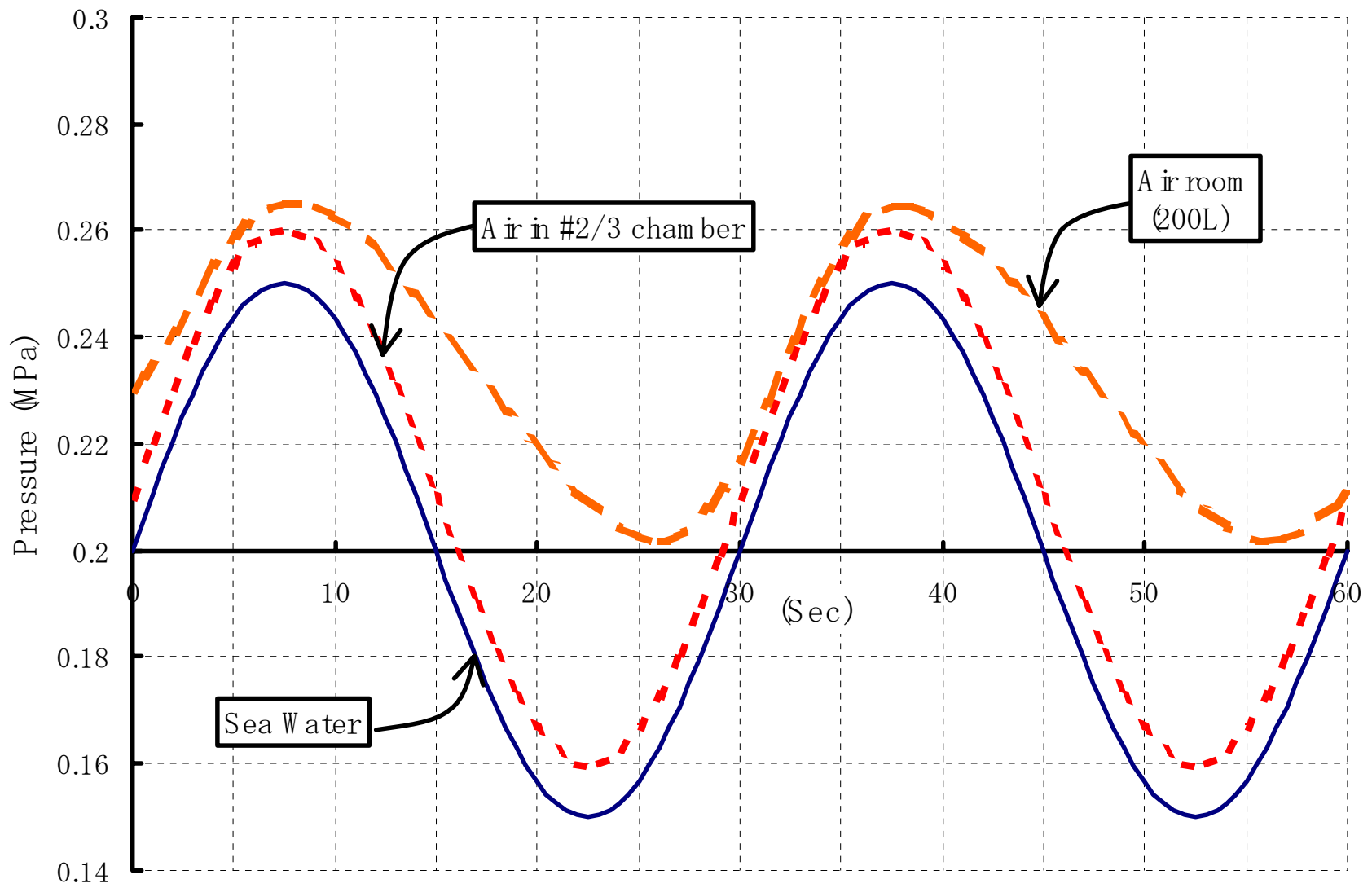


Fig 21 Pressure wave of electric thruster

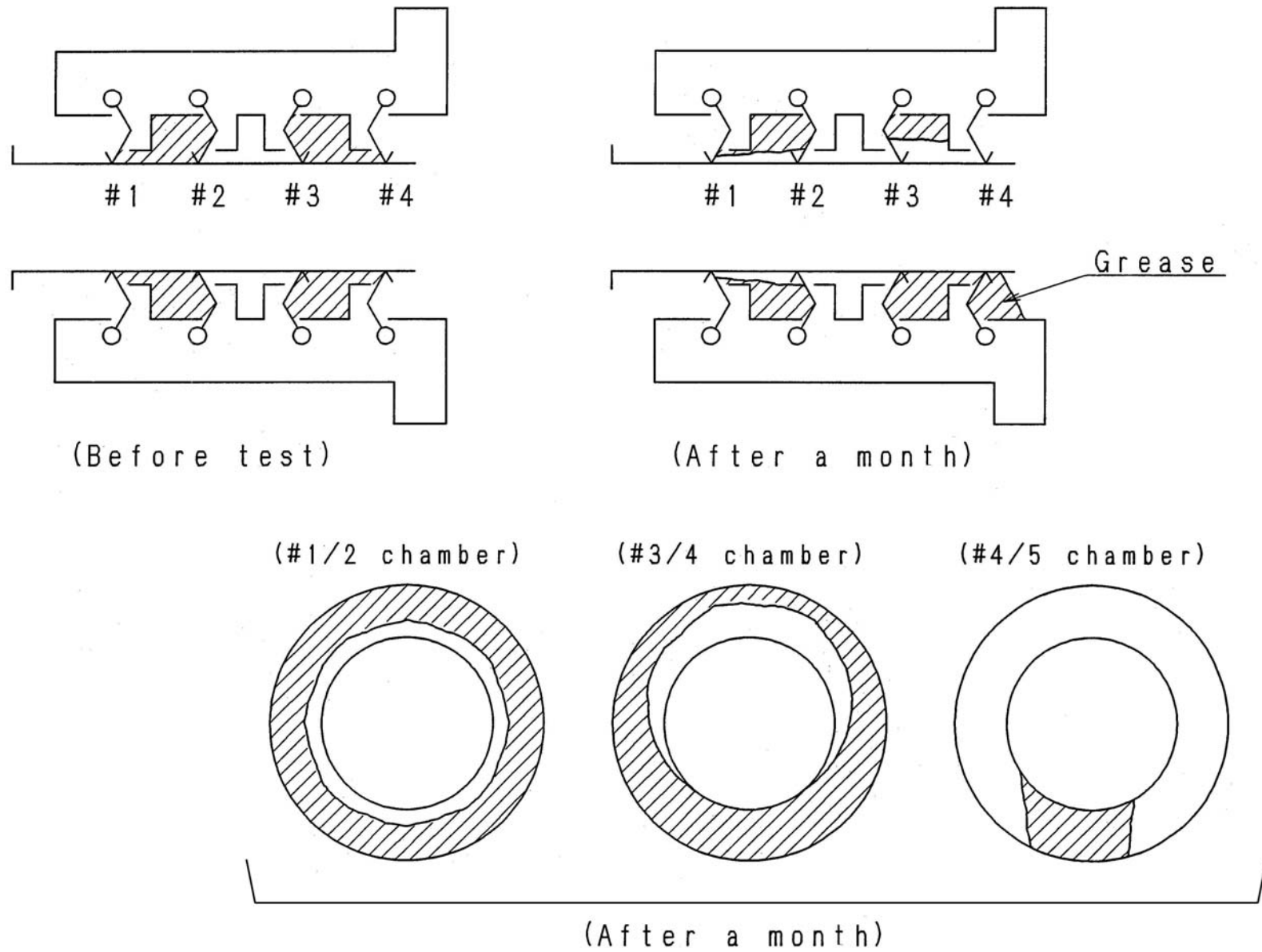
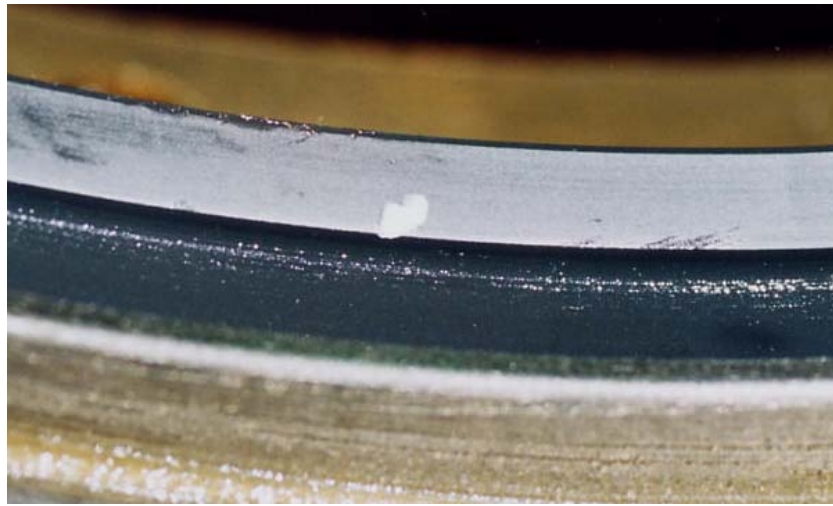
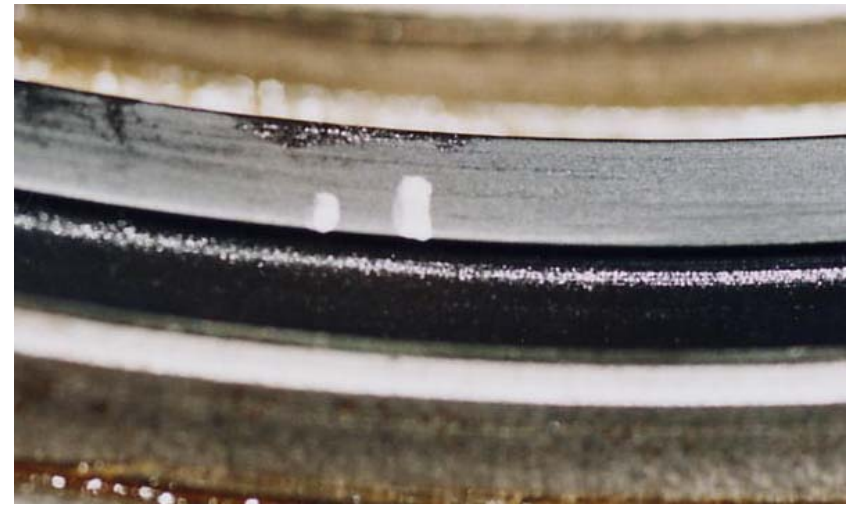


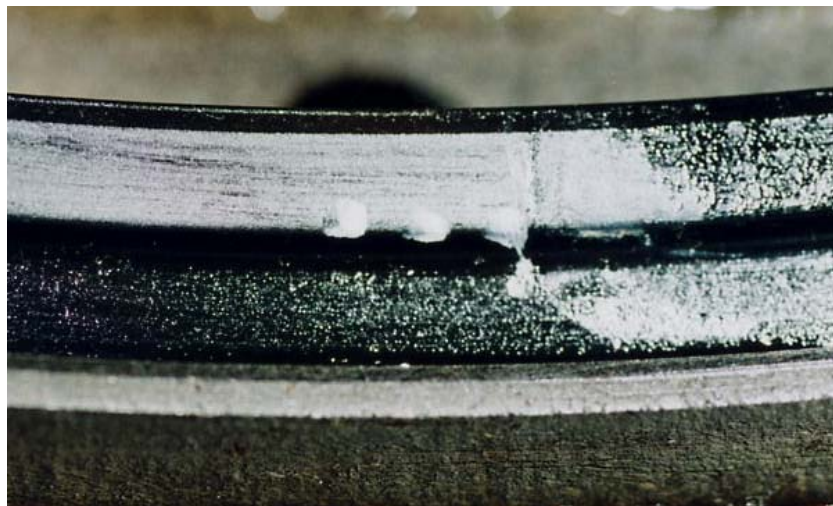
Fig 22 Grease in sealing chambers



#1 ring



#2 ring



#3 ring



#4 ring

Fig 24 Outlook of sealing ring

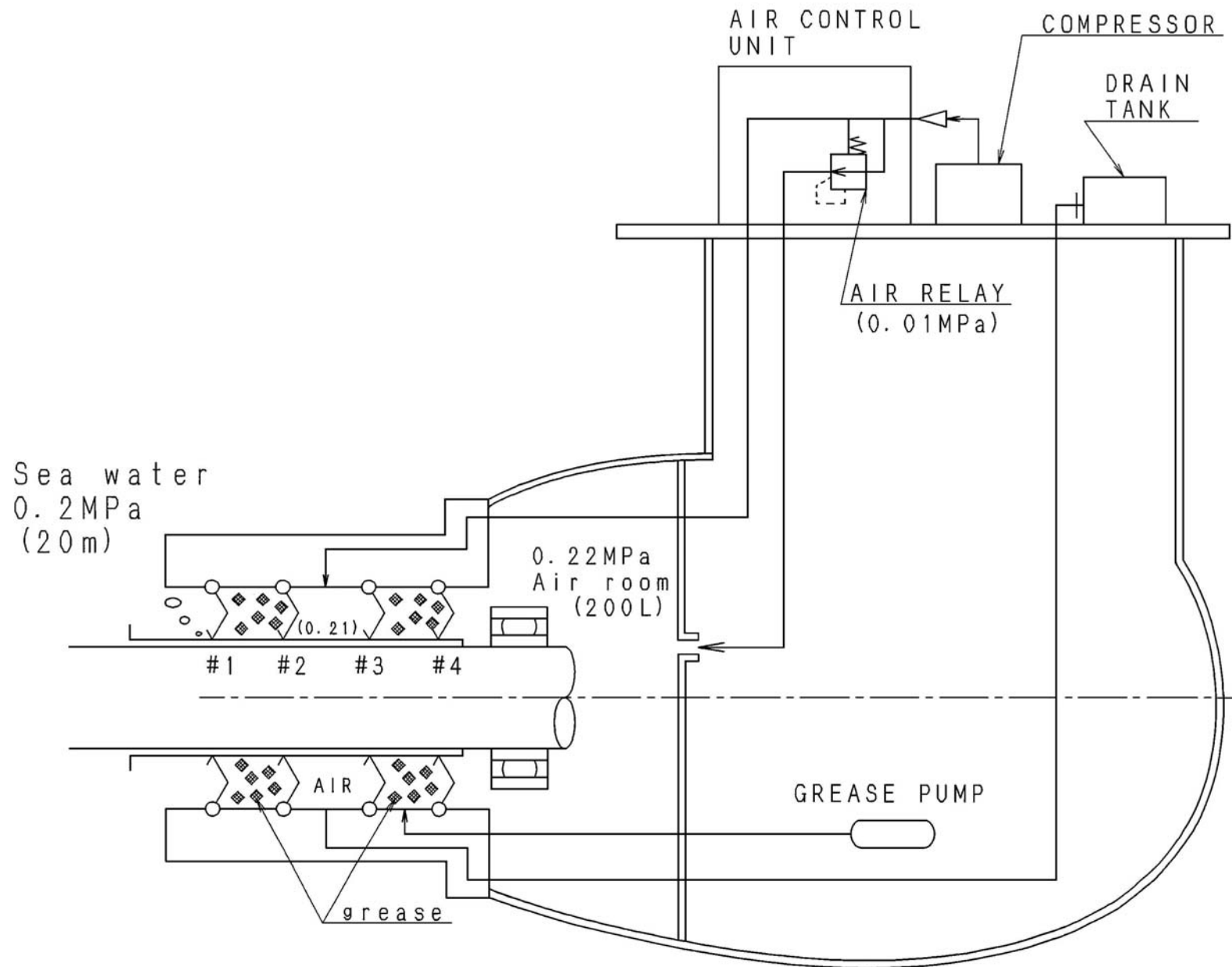


Fig 25 Another grease seal model for electric thruster

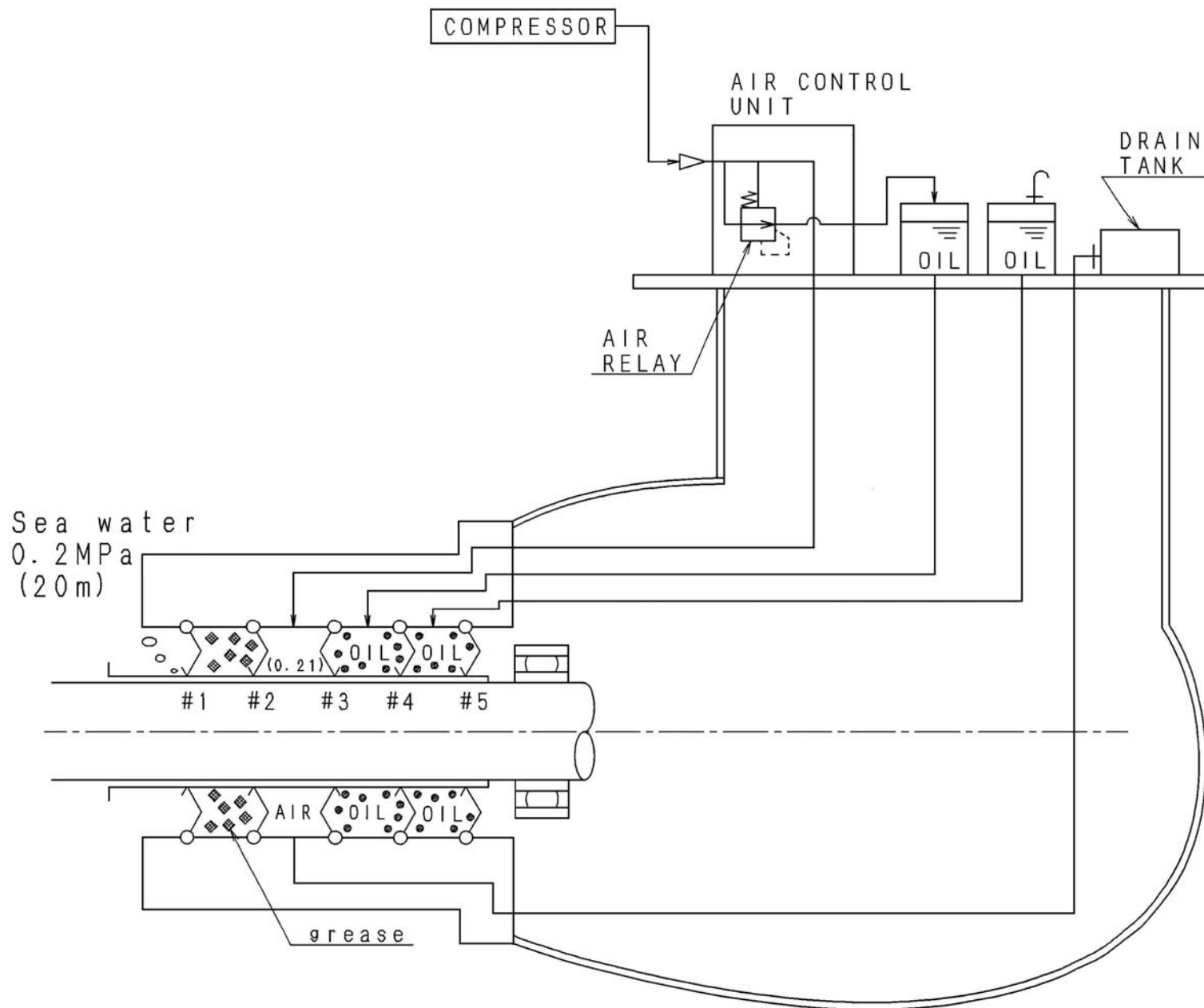


Fig 26 Oil seal model of electric thruster