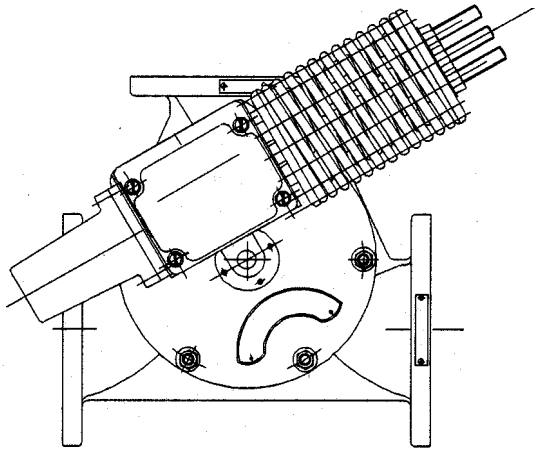
walton

TEMPERATURE CONTROL SYSTEMS

Gas Operated (Rotary)



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The following Walton Instruction Manuals are available:

Direct Operated (Rotary)	MANUAL\DIRECT01
Direct Operated (25mm Linear)	MANUAL\DIRECT02
Direct Operated (Twin)	MANUAL\DIRECT03
Direct Operated (Rotary) Fail - Safe	MANUAL\DIRECT04
Direct Operated (15-25mm Linear)	MANUAL\DIRECT05
Pneumatically Operated	MANUAL\PNEU01
Electrically Operated (Series 500 Actuator)	MANUAL\ELEC01
Electrically Operated (Series 3000 Actuator)	MANUAL\ELEC02
Electrically Operated (Special Integral Function)	MANUAL\ELEC03
Gas Operated (Rotary)	MANUAL\GAS01
Gas Operated (Linear)	MANUAL\GAS02

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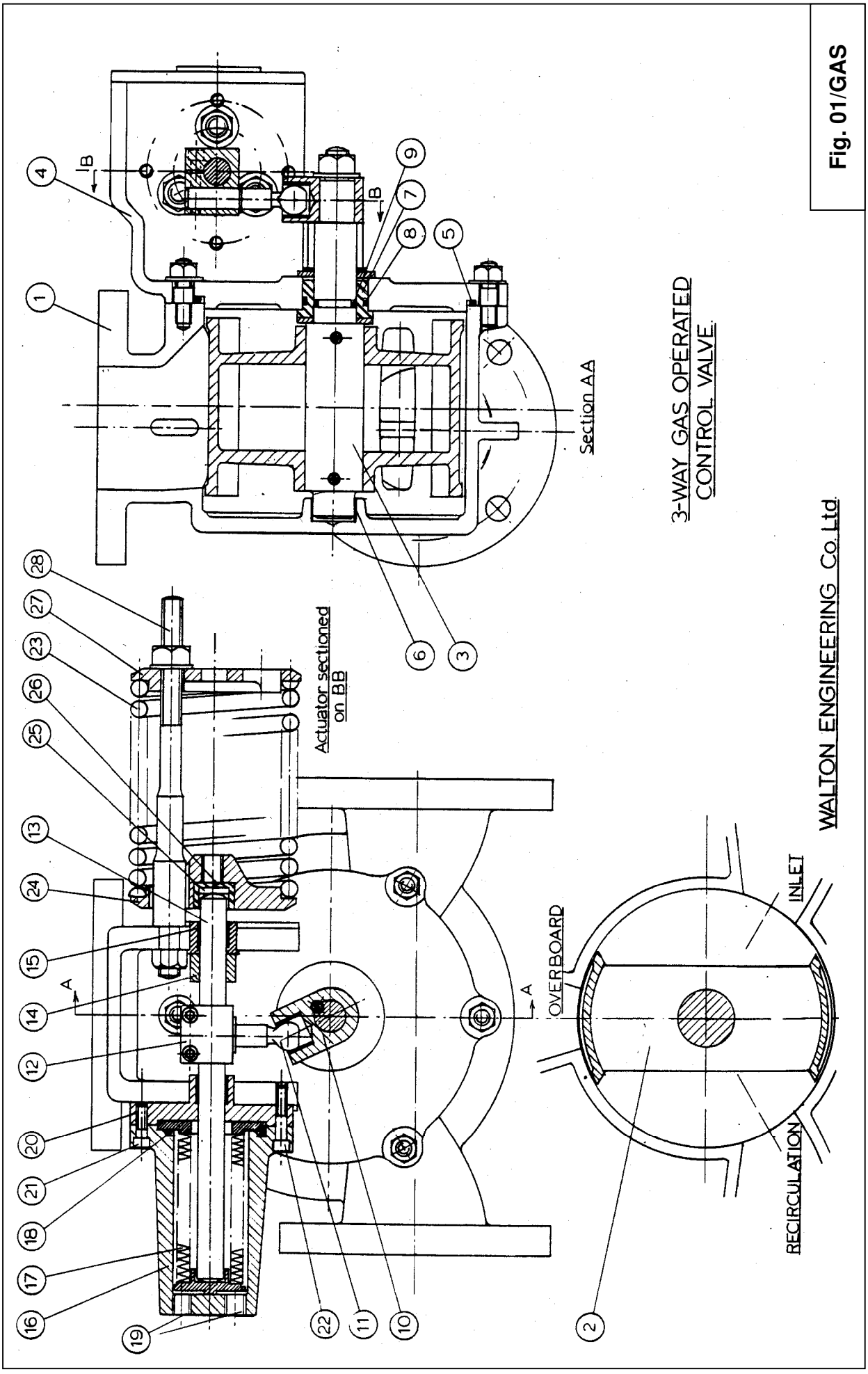
Fig. 01/GAS
WALTON ENGINEERING Co. Ltd.
3-WAY GAS OPERATED
CONTROL VALVE
Section AA
Actuator sectioned
on BB
OVERBOARD
INLET
RECIRCULATION
A
B
1
2
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General Description

The Walton gas operated control valve has been specifically designed to control the refrigerant gas pressures in marine a/c systems in which the condenser is cooled by sea water. The valve is independent of any outside power source and externally requires only a small bore pipe connection to the refrigerant condenser.

Bore sizes available in this range are 25mm–250mm.

Refer to Fig. 01/GAS.

The valve body (1) is provided with 3 equip-spaced ports extending to flanged connections. A rotor (2) operates over two of the ports to provide flows varying from 'full re-circulation/no overboard flow' to 'full overboard flow/no re-circulation'.The rotor is mounted upon a shaft (3) which extends through the front cover (4) of the valve. This cover also carries the valve actuator on an integral bracket. The front cover is sealed by a nitrile seals (5). The shaft is carried in non-metallic low friction bearings (6 and 7). The front cover bearing (7) is sealed by nitrile seals (8) and the shaft by nitrile seals (9).

A lever (10) secured to the shaft engages via a non-metallic bush with a spherically ended drive pin (11). The drive pin position by 'E' ring and cirlip is clamped into the control block (12) and onto control rod (13).

Movement of the control rod is limited in one direction by the gas cylinder end wall and in the other by a stop sleeve (14). The control rod is carried in non-metallic anti-friction bearings (15).

On one side of the bracket (formed on the front cover) is mounted a gas cylinder (16) which contains a stainless steel edge welded bellows (17). The bellows with welded end fittings together with nitrile seals (18) forms a 100% gas seal.

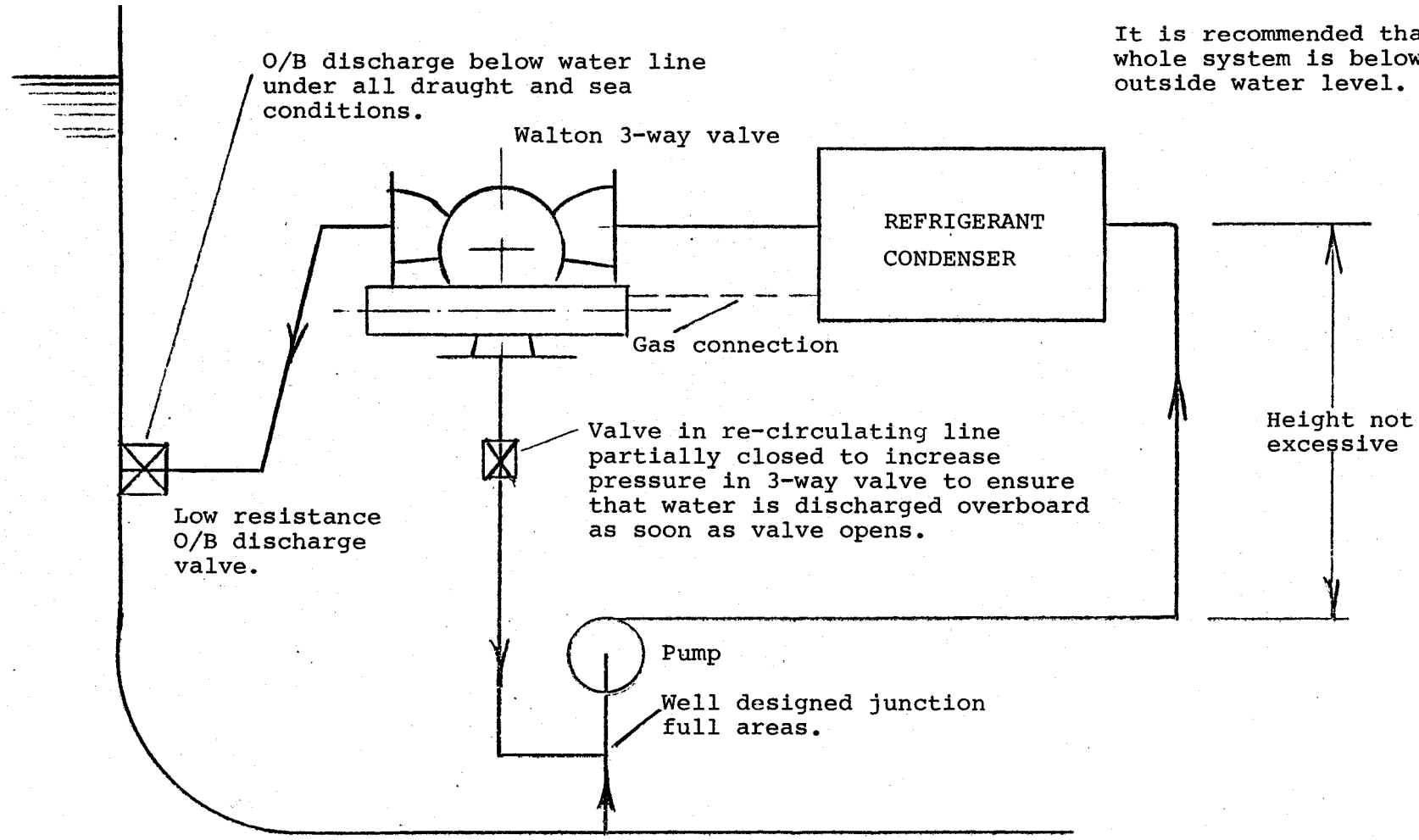
Note:

Valve bore sizes 150mm – 250mm are fitted with tandem gas cylinders

Two tapped holes (19) are provided in the end of the gas cylinder, one for connection to the refrigerant condenser and one to connect to tandem gas cylinder for bleeding purposes or pressure gauge if required.

The flanged end fitting of the bellows forms a location between the gas cylinder and its end plate (20) which is secured to the cylinder by four screws (21). An additional four screws (22) secure the assembly to the front cover bracket.

At the opposite end of the control rod is mounted control spring or springs (23). The inner end of the spring is supported on spring plate (24) which fits over the end of the control rod. A non-metallic insulating sleeve (26) is fitted for corrosion protection, and a stainless steel pad (25) forms the rod abutment. The outer end of the spring is supported by spring plate (27) secured to the front cover bracket by 3 tie bolts (28).



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Sea Water Control System for Refrigerant Condenser Gas Operated Valve

Fig. 02/GAS

Installation

The valves are designed for installation in the sea water circuit of the refrigerant condenser downstream of the condenser. The piping may be arranged so that the valve can either discharge water overboard, or re-circulate water to the pump suction, or proportion the incoming flow of water to both the overboard and re-circulation branches in accordance with the gas pressure in the refrigerant condenser.

A typical installation with notes on the systems design is shown on Fig. 02/GAS.

In installing the 3-way valve, care must be taken that the associated piping is accurately positioned and that the final bolting up on the flanges does not distort the valve body.

The mounting of the valve should be such that it is not subject to excessive vibrations under running conditions. In positioning the valve, it should be noted that a clear space approximately equal to the valve body length is required to withdraw the internal assembly and a clear linear space of approximately 500mm (20") is required from the end of the spring to allow this unit to be dismantled. **See servicing**

The connection between the gas cylinder and the refrigerant condenser need be no greater than 1/8" (3mm) bore diameter.

Operation

In operation and before the refrigerant gas has reached its working temperature, the valve will re-circulate the full volume of sea water back to the pump suction. As the refigerant temperature increases and the gas pressure rises into the control range, the gas load acting on the bellows will overcome the initial spring load and move the control rod which will turn the valve rotor through the ball and sleeve connection, opening the flow to overboard and reducing the amount of water being re-circulated. A further rise in gas pressure will increase the overboard flow and reduce the re-circulation until at some gas pressure within the overall control range, an equilibrium condition will be obtained with constant gas pressure and overboard discharge volume.

Any change of load on the machinery or sea water temperature will be compensated for by an adjustment in the volume discharged overboard, maintaining the gas pressure within the desired control range.

A degree of adjustment to the control pressure may be made by adjusting the fitted length of the spring by means of the nuts on the three tie bolts.

Servicing:

To aid dismantling, a spring compression stud with nut is available. To remove the spring assembly, then the end of the stud with the short thread should be fully screwed into the tapped hole in the centre of the inner spring plate (24) and the nut secured against the outer spring plate (27) *(see Fig.01/GAS)*. The three nuts on the tie bolts can then be removed and the complete spring assembly with end plates withdrawn in one piece.

Replacement of the spring assembly is made in the opposite manner.

When removing the gas cylinder, remove only the four long screws (22). The gas cylinder can then be removed as a complete sealed assembly, preventing accidental damage to the bellows.
The whole internal assembly, actuator, etc. can be withdrawn by removing the front cover nuts and without disturbing the main pipe connections.