

## CRANE BALANCING VALVES

**DM921 & DMG921 DOUBLE REGULATING VALVE (DRV)**

**DM931 & DMG931 DA931 & DAG 931 VARIABLE ORIFICE DOUBLE REGULATING VALVE (VODRV)**

**DM941 & DMG 941 DA941 & DAG941 FIXED ORIFICE DOUBLE REGULATING VALVE (FODRV)**

<b>Pressure/Temperature Rating:</b>	<b>Type 921</b> 16 bar at -10 to 120°C 13.4 bar at 180°C	<b>Type 931 &amp; 941:</b> 16 bar at -10 to 120°C
<b>End connections:</b>	Flanged valves (DM & DA): Flanges to BS EN1092-2 & BS4504-3.1 Grooved valves (DMG & DAG): (for suitable pipe sizes, see installation section)	
<b>Pressure Test Valves: (931 &amp; 941 ranges only)</b>	Crane P84 insertion test valves. P82 test valves, which accept 'Mechseal' manometer adapters, are available as an optional extra for temperatures up to 180°C	
<b>Flow direction:</b>	An arrow is cast on the side of the valve body to indicate the direction of flow	
<b>Jointing Gaskets:</b>	Two flange gaskets are required for flanged end valves. IBC (inside bolt circle) gaskets to BS EN 1514-1 are recommended	
<b>Check List:</b>	<b>Type 921:</b> Instruction leaflet and Hex. Wrench. <b>Types 931 &amp; 941:</b> Instruction leaflet, Hex. Wrench & 2 pressure test valves	

### FITTING PRESSURE TEST VALVES

The pressure test valve with the red tag should be fitted to the body tapping nearest to the inlet end of the valve, and the valve with the blue tag to the tapping nearest to outlet end of the valve.

Use a thread sealant and do not exceed 1.1/2 turns from hand tight.

#### **Type 931:**

Remove two of the square headed plugs fitted to the side tappings of the valve. It is recommended that the pressure test valves are fitted to the valve on the side of the flow direction arrow and I.D. plate. They can be fitted on the opposite side if access is limited without any reduction in accuracy.

#### **Type 941:**

Remove the square headed plugs fitted to the top of the valve and replace with the test valves provided.

## INSTALLATION

### All valves: Valves must not be lifted by the hand wheel

The valves should be installed in a straight run of pipe of the same nominal size with the arrow pointing in the direction of flow. They may be orientated at any angle. The gaskets must be assembled so that they are concentric with the pipe bore and do not intrude into it, or the measurement accuracy may be reduced. When used for end of line service, a blanking flange should be fitted.

A blanking flange is not required for temporary installation or servicing. Crane recommends that the valve is not left unattended in this condition if the system has been filled.

**Type 941:** To ensure maximum flow measurement accuracy, it is essential that the piping is straight for a minimum length equivalent to 5 diameters on the inlet and 2 diameters on the outlet. If it is located on the outlet side of a pump, the equivalent straight length of pipe leading up to the valve must be a minimum of 10 diameters.

The valves are calibrated to give the correct readings when used with BS1387 medium grade pipe for sizes up to DN150 (6"). Larger sizes are calibrated for use with BS3600 or BS EN 10220 pipe, having a wall thickness of 6.3mm (1/4"). Schedule 20 pipe is also satisfactory. Pipes with a significantly different bore will give an altered reading. If in doubt consult Crane Fluid Systems Sales Dept.

## VALVE SETTING INDICATOR

The micrometer style hand wheel uses two scales:

1) A grey plastic sleeve within the hand wheel which has 8, 12 or 18 numbered rings

depending on the size of the valve.

2) A collar snapped into a groove on the outside of the hand wheel boss which is numbered 0 to 9 around the circumference.

As the valve is opened from the fully closed position, each turn of the hand wheel reveals one extra ring on the plastic sleeve. When closed, the zero on the collar lines up with a groove in the sleeve and each number represents 1/10 of a turn.

The fully open position is reached when all rings on the sleeve are visible and the zero again lines up with the groove. A total of 10 settings are available therefore for each turn of the hand wheel.

## REGULATION

**Type 921:** Flow regulation is achieved by adjusting the hand wheel setting until the desired flow rate is obtained. The micrometer type hand wheel will indicate the final setting.

**Type 931:** Flow regulation is achieved in the same way as the Type 921. The flow rate may be derived from the pressure drop signal measured across the pressure test valves. Flow charts are available on request for all valve sizes. They show the flow rate which results for the pressure drop measured, depending on the hand wheel position.

**Type 941:** Flow regulation and measurement is obtained in the same way as with the Type 931. With this valve, a different chart is required and the relationship between pressure drop and flow is not altered by the hand wheel setting.

## SETTING FACILITY

The valve setting at which the required flow rate may be achieved may be retained by loosening the memory stop screws and sliding the memory stop up until it contacts the grey plastic sleeve protruding from the hand wheel. Retighten the screws.

The valve is now set and may be closed and reopened to the set point. A Hex. wrench is provided for this adjustment. Sizes up to DN 150 require a 3mm wrench, and larger sizes a 4mm wrench.

## VALVE ISOLATION

Tight valve shut off at high working pressures will require closing torques which are higher than can be obtained manually with the hand wheel, and will require the use of a closing bar or wrench. Valve sizes of DN200 and larger have a square cast in to the top of the hand wheel for this purpose. A guide to the torques required for a 16 bar pressure drop across the valve are shown in the table. These torques may be applied without risk of damaging the valve.

VALVE SIZE		MAXIMUM CLOSING TORQUE
DN	NPS	NM
65	2.1/2	45
80	3	60
100	4	110
125	5	130
150	6	220
200	8	420
250	10	650
300	12	650

## MAINTENANCE

No routine maintenance is required, however it is possible to tighten the gland packing should a leak occur between stem and gland nut:

Unscrew the hand wheel nut and remove the hand wheel. Mark the hand wheel so that it may be replaced later in the same position relative to the stem.

The gland nut is now revealed and may be tightened as required. For sizes DN65 (2.1/2") to DN100 (4") use a 27mm socket. For sizes DN125 (5") and DN150 (6") use a 32mm socket. Larger sizes have two M8 studs and nuts (13mm spanner).

Only tighten the nut sufficiently to cure the leak. Over tightening may make the valve difficult or impossible to operate. (The balancing valves are not provided with back seats. Under no circumstances should the gland nut be removed without first isolating the valve and relieving any residual pressure.)

Replace the hand wheel and check that the valve may be operated without requiring excessive torque at the hand wheel.

## **PRESSURE EQUIPMENT DIRECTIVE 97/23/EC**

These valves are for use on non hazardous liquids only – Group 2, as defined by the pressure equipment directive 97/23/EC. Valves are classified as SEP (sound engineering practice) and as such can not be CE marked and do not require a declaration of conformity.



FLUID SYSTEMS

Part No. 0A

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