CRANE FLUID SYSTEMS

FLOW MEASUREMENT & REGULATING VALVES

WATER | HEATING | VENTILATION | AIR CON | GAS

OUR GENIUS IS VALVES

Contents

Introduction

Crane Fluid Systems

Crane Fluid Systems is a leading UK manufacturer of Valves, Pipe Fittings and Engineered Products for fluid handling applications in building services and general industrial markets. We aim to be our customers' preferred supplier by offering products which provide best value together with service levels that exceed our customers expectations.

Customer Service

The satisfaction of customer requirements is the defining philosophy of Crane Fluid Systems. The position we hold in our markets is built on the foundations of product availability from our network of Distributors and providing expert technical support to users of valves and pipe fittings.

Customers' orders are received via EDI, fax or telephone by our Customer Service Administrators. Using our state-of-the-art computer-based Enterprise Resource Planning System, we are able to immediately confirm product availability and price. Our computers ensure orders are seamlessly transmitted to our Production Managers who regularly review factory plans to ensure customer requirements are satisfied on time.

Comprehensive product selection and application advice is just a phone call away. Our Internal Sales Engineers are equipped to deal with complex valve application needs, receiving customers' schematic drawings and producing comprehensive valve schedules that will satisfy the design parameters of the heating and ventilating system. Our customers have come to regard this team as one of the most reliable sources of technical support.

Quality Assurance

Rigid quality control and inspection at all stages of manufacture ensure that Crane products are fully suitable for their intended application and will give reliable service. Every valve is individually tested in accordance with the relevant product standard.

Crane Fluid Systems is an approved manufacturer under various independent quality schemes including the British Standards Institution (BSI) Kitemark and is ISO9001 accredited. In addition, the company has been approved and/or listed by various user organisations including United Kingdom Water Fittings Bye-Laws Scheme (WRAS approved).

Health and Safety at Work Act

Every effort is made to ensure that when properly used in accordance with stated recommendations, goods supplied are safe and without risk to health.

Should the purchaser be uncertain as to the suitability for uses other than those stated, he/she should check with the supplier or Crane Fluid Systems.

Control of Substances Hazardous to Health

Material supplied by Crane Fluid Systems does not constitute "substances" as defined in the Approved Code of Practice of COSHH but complies with the requirements of the Health and Safety at Work Act 1974.

Material supplied by Crane may be handled and stored in complete safety.

Crane products are safe to use provided they are utilised for their intended function and used within the limitations specified by Crane.

Note: Material is defined as equipment, supplies and spares that form the subject of a contract (ref. BS 4778).

Flow Measurement and Regulating Valves

Established H & V practice recommends that wherever possible within heating and chilled water systems, hydraulic losses should be minimal. Thus flow measurement and regulating valves serving such systems should function with pressure losses as low as efficient operation and high accuracy will permit.

However, in circumstances where flow velocities are low as a result of system design, it is equally important that adequate differential pressures are available for accurate flow measurement. This requirement is achieved on the basis of a realistic compromise between the need for accuracy and low hydraulic loss.

The Crane flow measurement and regulating valves described in this catalogue enable system design engineers to specify standard production valves which will conform to the various system design options arising from current H & V technology, energy conservation considerations, and standards legislation. The latter includes the DOE/PSA Standard Specifications (M & E) Nos. 3 and 100, the CIBSE Commissioning Code W, and BSRIA Application Guide 2/89, The Commissioning of Water Systems in Buildings.

Definitions

To assist users the following definitions apply to terms given in this catalogue. These definitions align with those given in BS 7350.

Double Regulating Globe Valve: A globe valve for the regulation of flowrate having an established valve characteristic and provided with indicated positions of the valve opening and an adjustable stop device to limit the opening movement such that the valve can be closed for isolation purposes and re-opened to the previously determined set position.

Flow Measurement Device: A device in which a difference in pressure is induced across an orifice, fixed or variable, the measurement of which enables the corresponding flowrate to be established by reference to a calibration chart.

Fixed Orifice: That part of the flow measurement device which induces a difference in pressure for flow measurement purposes and which is of fixed dimensions and geometry.

Variable Orifice: That part of the flow measurement device which induces a difference in pressure for flow measurement purposes and which is of variable dimensions and geometry.

Pressure Tapping Point: A hole in the wall of the flow measurement device, the internal end of which is flush with the internal surface of the flow measurement device and which can be connected to pressure measuring equipment through a suitable adaptor or pressure test valve (PTV). Normally two pressure tapping points are provided on a flow measurement device either side of a fixed or variable orifice to enable the pressure differential to be measured.

Differential Pressure or Signal: The difference in pressure existing between the upstream and downstream pressure tapping points. The term SIGNAL is often used in relation to differential pressure measuring equipment. Normally measured in kPa or mm H_2O.

Headloss/Pressure Loss: Loss in total pressure to a pipework system, attributable to the valve or device as installed within that system.

Headloss or Resistance Coefficient (K): A non-dimensional coefficient which, when multiplied by the velocity head ($v^2/2g$), indicates the headloss (m H_2O) attributable to the product.

Flow Coefficients

- K_V: The flow of water through a flow measurement device or double regulating valve at a temperature between 5 and 40˚C and measured in cubic metres per hour, that will induce a pressure loss of 1 bar.
- K_{VS}: The flow of water through a flow measurement device, of either fixed or variable orifice types, at a temperature between 5 and 40˚C and measured in cubic metres per hour, that will induce a differential pressure, or signal, of 1 bar across the pressure tapping points.

Valve Characteristic: The relationship between flow and valve lift resulting from the application of a constant pressure difference across the valve.

Valve Lift: The total displacement of the valve disk from the fully closed position to the fully open position.

Valve Authority: The ratio of the pressure drop across the valve when fully open to that across the circuit including the valve.

Headloss/Pressure Loss Calculation

The Headloss Coefficients (K) and Flow Coefficients (K_V) provided in this catalogue have been determined in relation to BS 1387: 1985 medium tubes and BS 3600: 1976 tubes according to size. For valve products the coefficients relate to the fully open position of the valve.

Headloss or pressure loss may be calculated using either coefficient as follows:

(a) Based on K

$$H_L = K \frac{v^2}{2g}$$

or $h_L = 51\ K\ v^2$

(b) Based on K_V

$$h_L = \left[\frac{363.5\ Q}{K_V}\right]^2$$

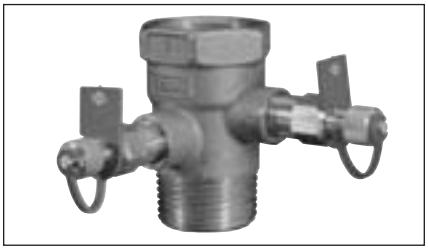
or $$\Delta p = \left[\frac{36\ Q}{K_V}\right]^2$$

Where
H_L = headloss (m H_2O)
h_L = headloss (mm H_2O)
Δp = pressure loss (kPa)
v = flow velocity (m/s)
Q = flowrate (l/s)
g = gravitational constant (9.81 m/s^2)

Bronze Range Overview

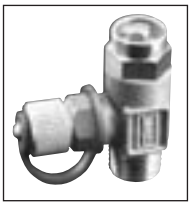
Flow measurement device D901/D902

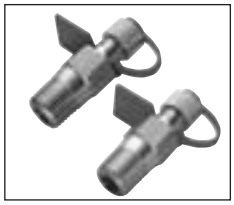
- Low flow option (D902)
- Free compression adaptors for size 1/2 (DN15)
- PN25 pressure rating
- P84 insertion test points
- Accurate flow measurement



Pressure test valve P82

- Suitable for LTHW and MTHW systems
- Double sealing offers maximum operational safety





Insertion test point P84

- Industry standard style
- PN25 rated
- Extension tube P83 available

Double regulating valve D921

- Positive flow control at all hand wheel settings
- PN25 pressure rating
- Copper compression adaptors in sizes 1/2 (DN15) and 3/4 (DN20)
- Low flow option - D923
- Adaptor kits for use with copper tube also available.

Fixed orifice double regulating valve D931/D933/D934

- Fixed orifice performance - accurate at any hand wheel setting
- Cost effective replacement for commissioning sets and variable orifice valves
- Positive flow control at all hand wheel settings
- Hand wheel and pressure tappings oriented for maximum convenience
- Insertion test points for quick connection
- PN25 pressure rating
- Low and ultra low flow options
- Adaptor kits for use with copper tube also available.

Flow management system for fan coil units Dominator® Z3000

The Dominator® Z3000 has been designed to dramatically improve the efficiency of flow management systems for fan coil units. The improved efficiency provides benefits to system designers, installers and end customers alike.

For design engineers the Z3000 allows simple specification of just one factory guaranteed and tested component. For the installer there are the considerable savings in on-site time and costs associated with fast track assembly. For the end customer, much improved value for money on the whole project.

PN16 pressure rating.

Double regulating valve DM921 (Flanged)

A Y-pattern globe valve with a characterised throttling disk with sufficient authority to regulate flow in a circuit incorporating a flow measurement device.

- Sizes: DN65 to 300. (2½ to 12”)
- Rating: 16 bar at -10 to 120˚C.

Variable orifice double regulating valve DM931/DA931(Flanged)

Double regulating valves converted to a variable orifice valve by the addition of two insertion test points (P84). For flow measurement in circuits requiring a double regulating valve for systems balancing.

- Sizes: DN65 to 300 (2½ to 12”).
- Rating: 16 bar at -10 to 120˚C.

Fixed integral orifice double regulating valve DM941/DA941 (Flanged)

Incorporating integral orifice plates to form a fixed orifice flow measurement unit with regulation and isolation capacity.

- Sizes: DN65 to 300 (2½ to 12”).
- Rating: 16 bar at -10 to 120˚C.

Double flow measurement device DM900

A one piece stainless steel plate with integral square edge orifice to fit between flanges to BS EN1092-2 PN10 to PN25. Can be used individually or close coupled to regulating or isolating valves. Fitted with two P84 insertion test points and P83 extensions.

- Sizes: DN65 to 600.
- Rating: 25 bar at -10 to 120ºC.

DM925G
Gearbox operated double regulating valve

The DM925 has sufficient authority to give effective regulation over the range of flows covered by matching flow measurement devices/valves.

- Sizes: DN50 to DN 300
- PN16

DM950G
Gearbox operated flow measurement and regulating valve

Based on the close coupled balancing valve concept, the DM950 series is a combination of a double regulating Crane DM925G close coupled to a fixed orifice flow measurement device using a spool piece connector.

- Size: DN50 to DN300
- PN16

DM975G
Gearbox operated double regulating valve

The DM975G is a fully lugged butterfly valve for use with the PN25 flanges. High temperature EPDM iner for applications up to 120ºC.

- Size: DN50 to DN300
- PN25

Selection

The following procedure is a general guide to the selection of products. For a more precise approach specifiers are strongly advised to make use of the Crane software package entitled 'Flow 2005'.
The procedure involves the following three stages:

A. DEFINING THE PRODUCT CATALOGUE NUMBER

Table 1 is a summary of the Cat. Nos. available in this catalogue. **Select the product Cat. No. which meets the application criteria.**

Abbreviations used in Table 1:

FMD	Flow Measurement Device
FMV	Flow Measurement Valve
DRV	Double Regulating Valve
FODRV	'Fixed Orifice' Device
VODRV	'Viable Orifice' Device

B. CHOOSING THE PRODUCT SIZE

As a general guide the appropriate product size may be selected on the basis that the design flow requirement falls within the typical flow rate ranges listed in Table 2.

Guidelines:

Fixed Orifice Products

Products selected for design flows within the flow rate ranges indicated will ensure a differential pressure 'signal' equal to or greater than 1 kPa. Where more than one size is indicated it is usual to select the product which has the same nominal size as the pipe. If a smaller size is necessary then the device must be installed in a straight run of pipe of the same nominal size.

Regulating Valves (FODRV & VODRV)

Where the pressure loss to be imposed by a regulating valve on the system is known, it is desirable that a check is made on the handwheel setting at which this loss occurs. An approximation can be made by reference to the DM931 graph for the size selected. Valve openings of less than 40% should be avoided if possible. In many cases this requirement can be met by selecting a valve of a nominal size less than pipe size.

Where the pressure loss to be imposed is not known a general guide to valve size may be obtained by matching design flow to the min/max flow rate ranges. It should be noted that the maximum flows quoted in Table 2 may result in high pressure losses, even with the regulating valve in the fully open position. Care must be taken to ensure that the system design can accommodate these losses.

C. OPERATIONAL/INSTALLATION CRITERIA

For satisfactory operation ensure that the products selected perform, and are installed, within the limits indicated in Table 3.

Guidelines:

Signal

The maximum signal requirement represents the full scale reading for a fluorocarbon manometer. Larger signals are acceptable but will require measurement by mercury or electronic manometers.

% Valve Opening

For DRV and FODRV products it is desirable that the valve will operate within the range indicated. Valve openings down to 30% and up to 100% are acceptable in practice.

Installation

To achieve quoted levels of flow measurement accuracy the guidelines indicated must be regarded as minimum requirements. For VODRV valves the tolerance on flow measurement accuracy is ±5% fully open, ±10% when 40% open.

Product Selection

Table 1

Function	Figure No.	Size Range	Type	Flow Measurement Accuracy
Flow Measurement	D901 D902 DM900	1/2 to 2 1/2 15mm DN20 to 300	FMD FMD FMD	±3% ±3% ±3%
Regulation	D921 D923 DM921 DM925G DM975G	1/2 to 2 1/2 15mm DN65 to 300 DN65 to 300 DN50 to 300	DRV DRV DRV DRV DRV	- - - - -
System Balancing Two unit	DM900 & DM921	DN65 to 300	FMV + DRV	±3%
Single unit (Fixed orifice)	D931 D933 & D934 DM941 DM950G	1/2 to 2 1/2 15mm DN65 to 300 DN65 to 300	FODRV FODRV FODRV FODRV	±5% ±5% ±5% ±5%
Single unit (Variable orifice)	DM931	DN65 to 300	VODRV	±5% (Fully open)

Note: The fixed and variable orifice DRV's listed for system balancing may also be used for regulation if the flow measurement facility is required.

Table 2 Fixed Orifice Valves

Nominal Size			Flow Rate (l/s)	
Flanged (DN)	Threaded	Compression	Min	Max
-	1/2 D934	-	0.016	0.04
-	1/2 D933	15	0.015*	0.062*
-	1/2	15	0.061	0.132
20	3/4	-	0.131	0.289
25	1	-	0.239	0.537
32	1 1/4	-	0.461	1.120
40	1 1/2	-	0.681	1.680
50	2	-	1.281	3.120
65	-	-	2.500	11.000
80	-	-	3.300	15.000
100	-	-	6.100	26.000
125	-	-	9.500	40.000
150	-	-	13.000	57.000
200	-	-	22.000	100.000
250	-	-	34.000	157.000
300	-	-	50.000	226.000

Note: Sizes 1/2 to 2 – The min and max flow rates correspond to pressure losses per unit length of pipe in the range 100 to 400 Pa/m.

Sizes DN65 to DN300 – The minimum flow rates within the ranges shown correspond to the generation of a 1 kPa 'signal' across the pressure test valves. N.B. These flow rates may be insufficient to displace air accumulations in horizontal runs of pipe.

The maximum flow rates correspond to flow velocities of 3m/s recommended as maximum by CIBSE 1986 Section B1-13.

For DM931/DA931 versions see flow charts.

* Applicable to D902 and D933 only.

Table 3

Product Type	Figure No.	Operational Requirements				Installation Requirements	
		Signal (kPa)		% Valve Opening		Min length of straight pipe (pipe diameters)	
		Min	Max	Min	Max	Upstream (min)	Downstream (min)
FMD	D901, D902, DM900	1	4.5	-	-	5	2
DRV	D921, D923, DM921, DM925G DM975G	-	-	40	90	-	-
FODRV	D931, D933, D934, DM941, DM950G	1	4.5	40	90	10† or 5	2
VODRV	DM931	1	4.5	50	90	10† or 5	2

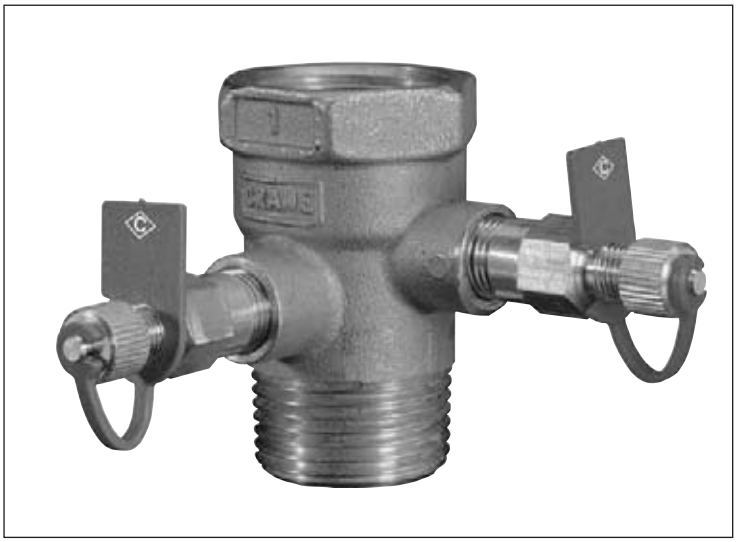
† 10 diameters required if the valve is installed on pump delivery

FUNCTION	TYPE			BODY MATERIAL	THREADED	FLANGED
REGULATION	DRV		DOUBLE REGULATING VALVE	BRONZE	D921/D923*	-
				CAST IRON	-	DM925G DM975G
				DUCTILE IRON	-	DM921
FLOW MEASUREMENT	FMD		FLOW MEASUREMENT DEVICE	DZR	D901 D902*	-
				STAINLESS STEEL	-	DM900
CIRCUIT BALANCING	TWO UNIT	DRV + FMD	DOUBLE REGULATING VALVE + FLOW MEASUREMENT DEVICE	BRONZE	D921 DRV + D901 FMD	-
					D923* DRV + D902* FMD	
				DUCTILE IRON	-	DM921 DRV DM900 FMD
				CAST IRON	-	DM925G DM975G DRV DM900 FMD
	SINGLE UNIT	FODRV	FIXED ORIFICE DOUBLE REGULATING VALVE	BRONZE	D931 D981† D933* D983*† D934** D984**†	-
				CAST IRON	-	DM950G
				DUCTILE IRON	-	DM941/DA941
		VODRV	VARIABLE ORIFICE DOUBLE REGULATING VALVE	DUCTILE IRON	-	DM931 DA931

* LOW FLOW APPLICATIONS
**ULTRA LOW FLOW APPLICATIONS
† FOR USE WITH ACTUATOR

Flow Measurement Device (FMD) D901/D902 PN25

Threaded BS21 (ISO 7)
Conforms to BS7350*



Specification

D901 & D902 flow measurement devices have square edged entrance orifice plates with P84 test points. Flow measurement accuracy of ±3%.

D901 - Sizes 3/4" to 2", DN20 to DN50

Inlet - BS EN 10266 (ISO 7) taper female
Outlet - BS EN 10266 (ISO 7) taper male

D901/D902 - Sizes 1/2" DN15

Inlet - BS 2779 (ISO 228) parallel female supplied with compression adaptor to suit 15mm BS EN 1057 copper tube.
Outlet - BS 21 (ISO 7) taper male
Discard adaptor if connecting to steel pipe.

Application

D901 flow measurement devices are suitable for systems where pipes have been sized on the basis that pipe frictional losses lie in the range 100 to 400 Pa/m.

D902 flow measurement device (1/2 /DN15 size only) is suitable for the measurement of ultra low flows in the range 0.015 to 0.06 l/s e.g. flows to fan coil units.

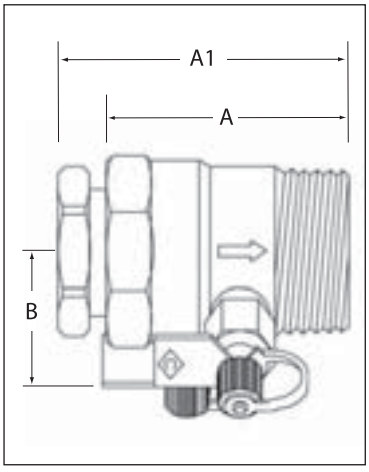
Please note: The fitting of P82 test points will give an increased temperature rating of 180ºC

Pressure Temperature Ratings

Temperature °C	-10 to 100	110	120
Pressure (Bar)	25	23.4	21.8

Maximum temperature 120°C

Note: In line with BS EN 1254/2 the maximum pressure must not exceed 16 bar when using compression adaptors.



*Except pressure rating: exceeds BS

Dimensions, Coefficients and Weights

Fig. No.	Nom. Size	End to end Amm	A1mm	Centre-to-top Bmm	Flow Kv	Head loss K	Kvs	Weight Kg
D901	1/2 DN15	57	66	55	2.8	13.5	2.2	0.29
	3/4 DN20	58	-	61	6.1	9.1	4.7	0.30
	1 DN25	66	-	65	11.9	6.1	8.6	0.40
	1 1/4 DN32	72	-	71	23.4	4.8	16.6	0.50
	1 1/2 DN40	72	-	73	36.2	3.7	24.5	0.54
	2 DN50	82	-	79	71.6	2.4	46.1	0.77
D902	1/2 DN15	57	66	55	0.57	333	0.54	0.29

Materials

Part	Material	Specification
Body and Integral orifice	DZR copper alloy	BSEN12164 CW602N
P84 Pressure test valve	DZR copper alloy	BSEN12164 CW602N

Double Regulating Valve (DRV) D921/D923 PN25

Threaded BS21 (ISO 7) For Two Unit System
Conforms to BS7350*

Specification

Y-pattern globe valves having characterised throttling disk tending towards equal percentage performance. Double regulating feature allows valve opening to be set with an Allen key.
Operation of the valve is by means of the Microset hand wheel.
WRAS approved.

End Connection

Sizes 1 to 2 BS EN 10266 (ISO 7) parallel
Sizes 1/2 & 3/4 DN15 & DN20 BS 2779 (ISO 228) parallel.

Adaptor kits for use with copper tube also available

Also available threaded ANSI B1.20.1 order code D921AT/D923AT.

Application

In two unit systems, the D921 has sufficient authority to give effective regulation over the range of flows covered by matching flow measurement devices/valves.

In particular the D923 low flow regulating valve has an authority matched to the range of ultra low flows covered by the D902 flow measurement device.

Pressure Temperature Ratings

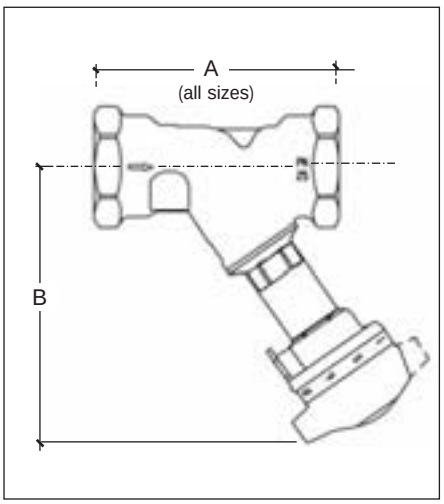
Temperature °C	-10 to 100	110	120
Pressure (Bar)	25	23.4	21.8

Maximum temperature 120°C

Note: In line with BS EN 1254/2 the maximum pressure must not exceed 16 bar when using compression adaptors.

Dimensions, Coefficients and Weights

Fig. No.	Nom. Size		Dimensions (mm) A	Dimensions (mm) B	Full Open Flow K_V	Full Open Head loss K	Weight Kg
D921	1/2	DN15	87	105	2.14	23.11	0.54
	3/4	DN20	96	106	3.61	26.14	0.58
	1	DN25	100	127	6.37	21.45	0.88
	1 1/4	DN32	114	128	12.30	17.42	1.05
	1 1/2	DN40	125	143	21.30	10.66	1.43
	2	DN50	146	144	31.30	12.63	1.88
D923	1/2	DN15	87	105	2.26	20.72	0.54



*Except pressure rating: exceeds BS

Materials

Part	Material	Specification	Part	Material
Body	Bronze	BSEN1982 CC491K	'O' Ring Seal	EPDM Rubber
Bonnet	DZR copper alloy	BSEN12165 CW602N	Hand Wheel	Plastic
Stem	DZR copper alloy	BSEN12164 CW602N		
Disc	DZR copper alloy	BSEN12164/5 CW602N		

Fixed Orifice Double Regulating Valve (FODRV)
D931/D933/D934 PN25

Threaded BS21 (ISO 7) for Single Unit Systems Conforms to BS7350*

Specification

Y-pattern globe valves having characterised throttling disk tending towards equal percentage performance. Integral square edged entrance orifice plate and P84 insertion test points fitted. Double regulating feature allows valve opening to be set with an Allen key. Operation of the valve is by means of the Microset hand wheel.
WRAS Approved.

End Connection

Sizes 1 to 2 BS EN 10266 (ISO 7) parallel
Sizes 1/2 & 3/4 DN15 & DN20 BS 2779 (ISO 228) parallel.

Adaptor kits for use with copper tube alse available.

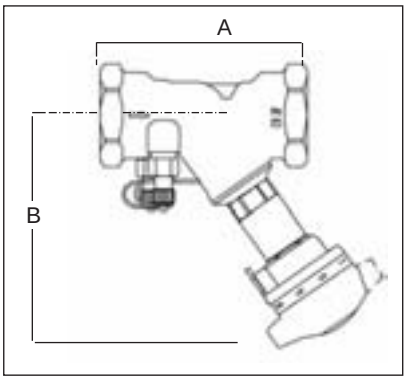
Also available threaded ANSI B1.20.1
Order code D931AT/D933AT/D934AT.

Application

This single unit-commissioning valve D931 is designed for installation in circuits where combined functions of regulation and flow measurement are required. Accuracy of flow measurement is ±5% across all hand wheel settings.

D933 size 1/2" low flow FODRV combines the functions of regulation and flow measurement in a unit of high authority making it particularly suitable for low flow applications in the range of 0.03 to 0.07 l/s.

D934 size 1/2" ultra low flow FODRV combines the functions of regulation and flow measurement in a unit of high authority making it particularly suitable for ultra low flow applications in the range of 0.016 to 0.04 l/s.



Pressure Temperature Ratings

Temperature °C	-10 to 100	110	120
Pressure (Bar)	25	23.4	21.8

Maximum temperature 120°C

Note: In line with BS EN 1254/2 the maximum pressure must not exceed 16 bar when using compression adaptors.

Dimensions, Coefficients and Weights

Fig. No.	Nom. Size		Dimensions (mm) A	B	Full Open Flow K_V	Head loss K	KVs	Weight Kg
D931	1/2	DN15	87	105	1.87	30.27	2.2	0.61
	3/4	DN20	96	106	3.14	34.55	4.7	0.65
	1	DN25	100	127	5.59	27.85	8.6	0.95
	1 1/4	DN32	114	128	10.80	22.60	16.6	1.13
	1 1/2	DN40	125	143	18.10	14.76	24.5	1.52
	2	DN50	146	144	29.10	14.62	46.1	1.98
D933	1/2	DN15	87	105	1.06	94.20	1.1	0.61
D934	1/2	DN15	87	105	0.57	325.8	0.58	0.61

*Except pressure rating: exceeds BS

Materials

Part	Material	Specification	Part	Material	Specification
Body	Bronze	BSEN1982 CC491K	'O' Ring Seal	EPDM Rubber	
Bonnet	DZR copper alloy	BSEN12165 CW602N	Orifice Insert	DZR copper alloy	BSEN12164 CW602N
Stem	DZR copper alloy	BSEN12164 CW602N	P84 test valve	DZR copper alloy	BSEN12164 CW602N
Disc	DZR copper alloy	BSEN12164/5 CW602N	Hand Wheel	Plastic	

MotoBalance

with profiled disc to give equal percentage flow control

Specification

Y-pattern globe valve.
Integral square edged entrance orifice plates and P84 insertion test points fitted.
Double regulating feature allows valve opening to be manually set.
Operation of the valve is by means of motorised actuator.
MotoBalance should be fitted with a suitable actuator. These include thermal actuators for on/off control specified 'normally open or normally closed' with either 24V or 230V supply.
Alternatively use with a fully modulating control actuator that requires a 24V supply and a control signal 0-10V.

End Connection

Sizes 1/2" and 3/4" DN15 & DN20 BS EN ISO 28 parallel.
All sizes also available threaded ANSI B1.20.1

Application

The MotoBalance valve is designed for installation in circuits where combined functions of actuated regulation and flow measurement are required. Accuracy of flow measurement is ± 5% across all drive setting.

D981P - The 1/2" MotoBalance has a flow range of 0.061 to 0.132 l/s.
The 3/4" MotoBalance has a flow range of 0.131 to 0.289 l/s.

D983P - 1/2" low flow MotoBalance is particularly suitable for low flow applications in the range of 0.03 to 0.07 l/s.

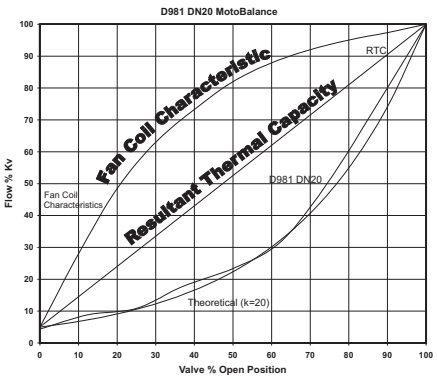
D984P - 1/2" ultra low flow MotoBalance is particularly suitable for ultra low flow applications in the range of 0.016 to 0.04 l/s.

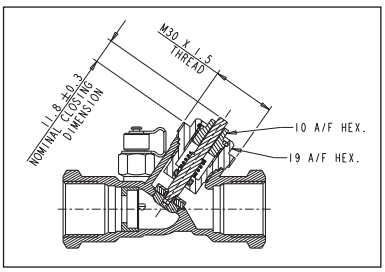
Pressure Temperature Ratings

The maximum static pressure is 16 bar, the maximum differential pressure is 1.2 bar.
Maximum working temperature: 120ºC
Minimum working temperature: -10ºC

Temperature ºC	-10 to 100	110	120
Pressure (bar)	16.0	14.8	13.5

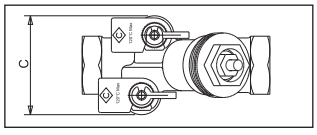
Note: In line with BS EN 1254/2 the maximum pressure must not exceed 16 bar when using compression adaptors.

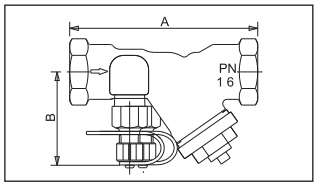




Materials

Part	Material	Specification
Body	Bronze	BSEN1982 CC491K
Bonnet	DZR copper alloy	BSEN12165 CW602N
Stem	DZR copper alloy	BSEN12165 CW602N
Disc	EPDM rubber	
O' Ring Seal	EPDM rubber	BS4518 0056-024
Orifice Insert	DZR copper alloy	BSEN12165 CW602N
P84 Test Point	DZR copper alloy	BSEN12165 CW602N





Dimensions, Coefficients and Weights

Fig. No.	Nom. Size	Dimensions (mm)			Full Open			
		A	B	C	Flow Kv	Head loss	KVs	Weight Kg
D981P	1/2" DN15	87	50	46	1.245	30.27	2.2	0.41
	3/4" DN20	96	51	51	2.300	34.55	4.7	0.45
D983P	1/2" DN15	87	50	46	0.667	90.42	1.1	0.41
D984P	1/2" DN15	87	50	46	0.587	325.80	0.58	0.41

Dominator® Z3000

PN16

Flow Management system for fan coil units

Specification

The patent protected bypass valve unit comprises two T-ported ball valves allowing easy back flushing, forward flushing and isolation. The position of the T-handle gives clear indication of flow/bypass mode. Designed around 3/4" full bore ball for optimum flow, can be adapted to 1/2", 3/4" and 1" end connections. Simple attachment to existing hangers. The strainer unit has an integral drain cock and pressure test point enabling measurement of pressure drop across load and allowing for flushing of strainer and coil without need to remove basket.

Application

The Z3000 is a prefabricated unit combining the essential control components and connecting pipework associated with fan coils, into one compact, fully assembled unit ready for simple and fast on-site connection.

The Dominator is compact and lightweight

- The complete unit is factory tested
- Integrated union joints allow for custom alignment
- 80mm supply/return centres allow for ease of lagging
- Ease of installation

The unique bypass valve unit comprising two T-ported ball valves

- Allows easy back flushing, forward flushing and isolation
- The position of the T-handle gives clear indication of flow/bypass mode
- Designed around 3/4" full bore ball for optimum flow
- Can be adapted to 1/2", 3/4" and 1" end connections
- Simple attachment to existing hangers

The strainer unit has an integral drain cock and pressure test point

- Enabling measurement of pressure drop across load
- Allowing for flushing of strainer and coil without need to remove basket

Benefits for Design Engineers

- minimal design involvement
- all the necessary components supplied as one tested unit
- no risk of a component being omitted from a system at installation
- known performance of the entire unit
- saves time, reduces specification risks and provides maximum value to the client

Benefits for Installing Contractors

- Significant reduction in site labour and installation costs
- fast connection of one complete assembly
- standardised components with guaranteed tested performance
- less purchase orders, minimal administration
- simple on-site connection

Materials

Item	Description	Material
1	Bypass valve	Bronze to BSEN 1982 CC491K
2	ProBalance valve (D931)	Refer to ProBalance literature
3	D297 strainer	Bronze to BSEN 1982 CC491K
4	Union	Brass to BSEN 12165 CW617N
5	P84 test points	DZR to BSEN 12164 CW602N
6	Drain cock	DZR to BSEN 12164 CW614

Pressure/temperature ratings

Temperature °C	-10 to 100	110	120
Pressure (bar)	16.0	16.0	16.0

Maximum temperature 120°C

Dominator range at-a-glance

The Dominator range comprises two series:

Z3000 series features the Crane ProBalance Fixed Orifice Double Regulating valve D931.

Z3900 series features the Crane MotoBalance valve D981 motorised for use with actuator.

Both series provide versions for heated and chilled water systems and combinations with and without drains and strainers.The versions for chilled water systems include extension stems (EXS) on the ball valve T-handles to allow for lagging. The Z3000 series also includes low flow and ultra low flow versions.

Z3000 Series comprises the three variants as shown below.

Z3000 with ProBalance includes drain and strainer

Z3010 with ProBalance without drain and strainer

Z3020 with ProBalance including drain but without strainer

This series utilises the Crane ProBalance Valves D931, D933 or D934 depending on flow rate required.

All selections are made by Crane and each unit is tagged with individual fan coil ref nos to assist contractors with site assembly. Extension stems are fitted to isolation ball valves for chilled water services.

Z3900 Series comprises the three variants as shown below.

Z3900 with MotoBalance includes drain and strainer

Z3910 with MotoBalance without drain and strainer

Z3920 with MotoBalance including drain but without strainer

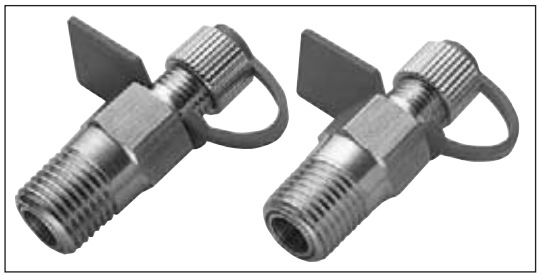
This series utilises the Crane MotoBalance Valves D981P, D983P or D984P depending on flow rate required.

The MotoBalance offers on/off or modulating control with equal percentage characteristics.

All selections are made by Crane and each unit is tagged with individual fan coil ref nos to assist contractors with site assembly. Extension stems are fitted to isolation ball valves for chilled water services.

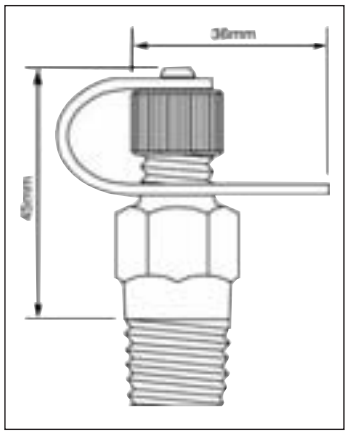
Pressure Test Points P84

Threaded BS21 (ISO 7)



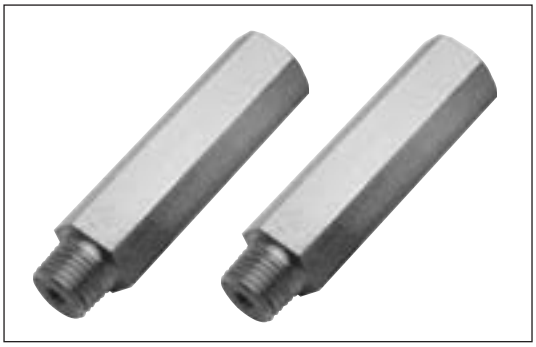
P84 insertion style pressure test points are fitted as standard to all Crane flow measurement and regulation valves.

Weight	0.032kg
Pressure Rating	PN25
Max. Temp.	120°C

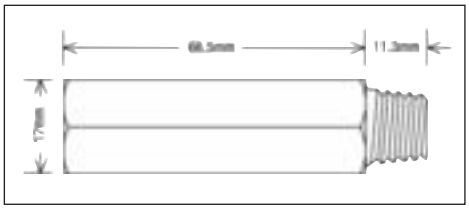


	Part	Material	Specification
1	Cap	DZR copper alloy	BSEN12164 CW602N
2	Cap Washer	EPDM	
3	Body	DZR copper alloy	BSEN12164 CW602N
4	Tie	Polypropylene	
5	Seal	EPDM	
6	Retaining Ring	DZR copper alloy	BSEN12164 CW602N

Extension Tube P83



Part	Material	Specification
P83	DZR copper alloy	BSEN12164 CW602N



P83 pressure test point extension tubes allow Crane valves to be insulated to a thickness of 2" without the test points being covered.

Pressure Test Valve P82

Threaded BS21 (ISO 7)

Specification

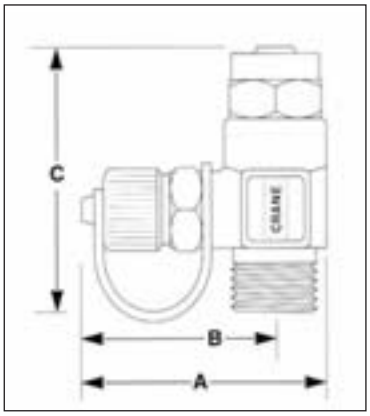
Pressure test valve P82 is suitable for use in LTHW and MTHW systems. A conventional needle valve, operated by a standard radiator aircock key, is backed by a spring loaded self-sealing ball unit to provide double sealing. The double sealing facility offers maximum operational safety in accordance with the Health & Safety at Work legislation. It also makes it possible, with the valve closed to pipeline pressure, to clear the ball seat of any pipeline debris.

Although P82 is also suitable for use in HTHW systems it should not be operated while such a system is 'live'. For 'live' HTHW systems copper bleed tubes should be taken from the valves and terminated in needle valves, e.g. Crane D71 or D72.

The manometer connection on the valve accepts a Mechseal adaptor. When not in use a screw cap protects the connection from dust.

Materials

Part	Material	Part	Material
Body	DZR	Adaptor	DZR
Stem	DZR	Ball	Stainless Steel
Shield	Brass	Spring	Stainless Steel
'O' Ring	Viton	Viton	Brass



Dimensions and Weights

A mm	B mm	C mm	Weight kg
37.5	37.5	40.0	0.07

DM900

BS 4504 Flange Mounting for Flow Measurement

Specification

DM900 is a stainless steel orifice plate having a square edged entrance. The two stainless steel extension tubes are fitted with Crane Cat. No. P84 pressure test points. Accuracy of flow measurement at normal velocities is ±3%.

Installation

The DM900 can be mounted between valve and/or pipe flanges to BS EN1092-2 having PN10, PN16 or PN25 ratings. The outside diameter ensures a proper alignment when installed between PN10/16 flanges and PN25 flanges up to 80mm size. When assembling between PN25 flanges sizes 100mm and larger, ensure the device has been correctly centred with the mating flanges.

Application

DM900 can be used as a single unit or close coupled to other regulating or isolating valves to provide accurate flow measurement.

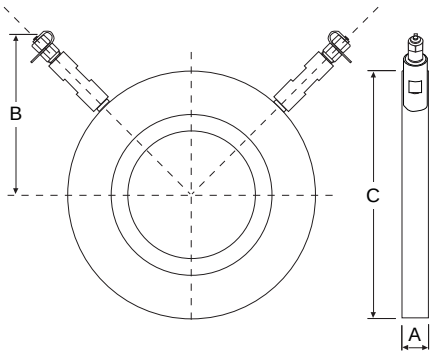
Suitable for use with PN10. PN16, or PN25 flanges or flanged valves having ratings detailed in the appropriate flange or valve product standard. When normally fitted with P84 pressure test valves, the DM900 is limited to 120°C max. For use at temperatures above 120°C suitable alternative pressure test valves should be fitted, please consult Crane.

Pressure/temperature ratings

Temperature °C	-10 to 100	110	120
Pressure (Bar)	25.0	25.0	25.0

Materials

Part	Material
Orifice and carrier	Stainless steel
Extension tubes	Stainless steel
Pressure test valves (P84)	DZR



Dimensions and weights

DN	Face-to-face A mm	Centre-to-top B mm	Outside diameter C mm	Weight kg
20	18	116	63	0.7
25	18	119	73	0.8
32	18	124	84	1.0
40	18	127	94	1.1
50	18	131	109	1.4
65	18	114	129	1.5
80	18	120	144	1.8
100	18	127	164	2.2
125	18	137	194	2.6
150	18	147	220	3.0
200	18	167	275	4.4
250	18	187	331	5.7
300	18	207	386	7.1
350	21	216	444	12.4
400	21	235	495	14.5
450	21	256	555	18.0
500	21	278	617	22.1
600	25	319	734	36.1

*Larger sizes available on application.

Coefficients

DN	Flow Kv	Headloss K	Kvs
20	6.0	9.6	4.7
25	11.6	6.6	8.6
32	23.0	5.1	16.6
40	35.0	4.0	24.5
50	72.0	2.5	46.1
65	154.0	1.5	90
80	220.0	1.4	120
100	373.0	1.4	220
125	570.0	1.4	342
150	789.0	1.5	468
200	1383.0	1.6	792
250	2122.0	1.7	1224
300	3116.0	1.6	1800
350	2754	2.6	1795
400	3573	2.6	2334
450	4583	2.6	2981
500	5686	2.6	3700
600	8229	2.6	4491

Double Regulating Valve (DRV) DM921 PN16

Flanged BS EN 1092-2 PN16 (formerly BS 4504) for Two Unit System

Specification

Y-pattern globe valves having a characterised throttling disk and ends flanged BS EN 1092-2 PN16. The valve opening may be set to control flow at a pre-determined rate. Operation of the valve is by means of a handwheel incorporating a micrometer device.

A bronze seat ring and PTFE disk seal are incorporated to ensure tight closure. Valves conform to requirements of BS 7350.

Application

In two unit systems, the DM921 has sufficient authority to regulate flow in circuits incorporating a flow measurement device.

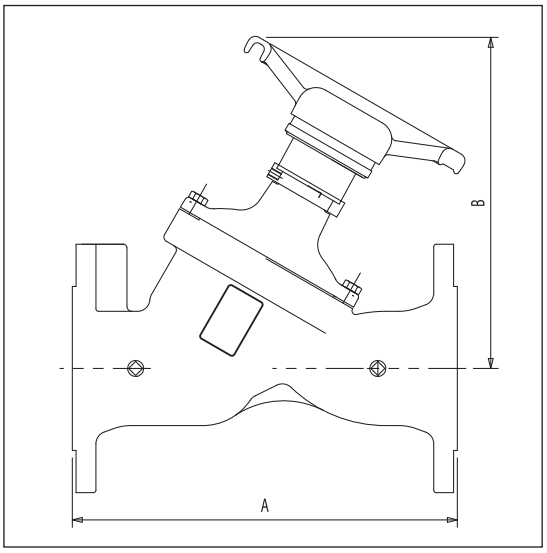
Fitted with 2 x $^{3}/_{4}$" BSPT plugs for conversion to DM931 if required.


DM921

Pressure/temperature ratings

Temperature°C	-10 to 100	110	120
Pressure (bar)	16.0	16.0	16.0

Ratings align with BS EN 1092-2 PN16 (formerly BS 4504)



Materials

Part	Material
Body	Ductile Iron
Bonnet:	Ductile Iron
Bonnet gasket	Non-asbestos
Disc (All sizes)	EPDM Coated Cast Iron
Disc Bush	Bronze
Stem	410 SS
Gland (65 to 150mm)	Brass
Gland (200 to 300mm)	Cast Iron
Gland nut	Brass
Packing	Non-asbestos
Seat ring	Bronze

Dimensions and Weights

DN	Face-to-face A mm	Centre-to-top B mm	Weight kg
65	290	262	15.8
80	310	267	19.5
100	350	300	28.0
125	400	325	37.5
150	480	340	50.5
200	600	525	123.0
250	730	575	192.0
300	850	645	251.0

Coefficients*

DN	Flow Kv	Headloss K
65	85	4.9
80	111	5.5
100	146	9.2
125	250	7.3
150	380	6.5
200	600	7.8
250	1211	4.6
300	1521	6.0

* Fully open position

Variable Orifice Double Regulating Valve (VODRV)
DM931 PN16 DA931 Class 125

DM931 Flanged BS EN 1092-2 PN16

BS EN 1092-2 for Single Unit System

DA931 Flanged ANSI Class 125

Specification

These are Y-pattern globe valves fitted with two pressure test valves P84 to provide flow measurement, regulation and isolation. Valves conform to requirements of BS 7350.

Application

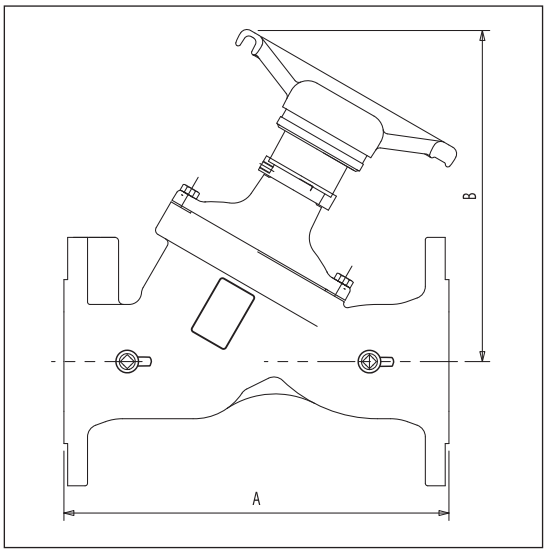
Primarily used in injection or other circuits requiring a double regulating valve for systems balancing. Accuracy of flow measurement is ±5% at the full open position of the valve. Some reduction in accuracy occurs at partial openings of the valve in accordance with BS 7350.

DM931

Pressure/temperature ratings

Temperature °C	-10 to 100	110	120
Pressure (bar)	16.0	16.0	16.0

Ratings align with BS EN 1092-2 PN16 (formerly BS 4504)



Materials

Part	Material
Body	Ductile Iron
Bonnet:	Ductile Iron
Bonnet gasket	Non-asbestos
Disc (All sizes)	EPDM Coated Cast iron
Disc Bush	Bronze
Stem	410 SS
Gland (65 to 150mm)	Brass
Gland (200 to 300mm)	Cast Iron
Gland nut	Brass
Packing	Non-asbestos
Seat ring	Bronze

Dimensions and Weights

DN	Face-to-face A mm	Centre-to-top B mm	Weight kg
65	290	262	15.8
80	310	267	19.5
100	350	300	28.0
125	400	325	37.5
150	480	340	50.5
200	600	525	123.0
250	730	575	192.0
300	850	645	251.0

Coefficients*

DN	Flow Kv	Headloss K
65	85	4.9
80	111	5.5
100	146	9.2
125	250	7.3
150	380	6.5
200	600	7.8
250	1211	4.6
300	1521	6.0

* Fully open position

Fixed Integral Orifice Double Regulating Valve (FODRV)
DM941 PN16 DA941 Class 125

DM941 Flanged BS EN 1092-2 PN16
BS EN 1092-2 for Single Unit System

DA941 Flanged ANSI Class 125

Specification

Single unit Y-pattern globe valves incorporating an integral orifice plate to form a fixed orifice flow measurement unit with regulation and isolation capacity. Valves conform to requirements of BS 7350.

Application

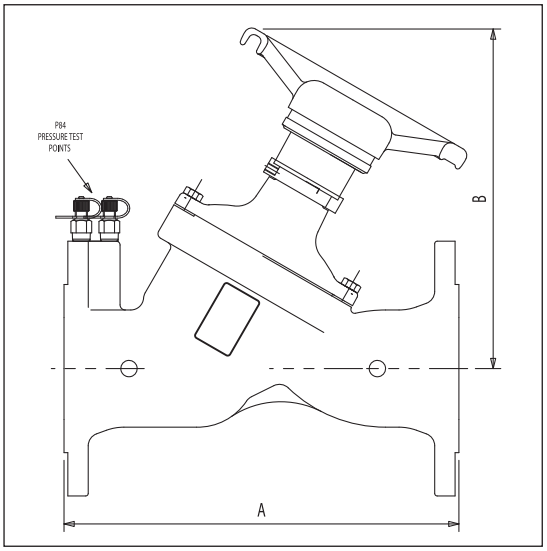
Primarily used in injection or other circuits requiring a double regulating valve for systems balancing. Accuracy of flow measurement is ±5% at all open positions of the valve in accordance with BS 7350.

DM941

Pressure/temperature ratings

Temperature °C	-10 to 100	110	120
Pressure (bar)	16.0	16.0	16.0

Ratings align with BS EN 1092-2 PN16 (formerly BS 4504)



Materials

Part	Material
Body	Ductile Iron
Bonnet:	Ductile Iron
Bonnet gasket	Non-asbestos
Disc (All sizes)	EPDM Coated Cast Iron
Disc Bush	Bronze
Stem	410 SS
Gland (65 to 150mm)	Brass
Gland (200 to 300mm)	Cast Iron
Gland nut	Brass
Packing	Non-asbestos
Seat ring	Bronze

Dimensions and Weights

DN	Face-to-face A mm	Centre-to-top B mm	Weight kg
65	290	262	16.3
80	310	267	20.0
100	350	300	28.5
125	400	325	38.0
150	480	340	51.0
200	600	525	124.0
250	730	575	194.0
300	850	645	254.0

Coefficients*

DN	Flow Kv	Headloss K	Kvs
65	93	6.9	90
80	99	6.8	120
100	136	12.7	220
125	229	8.7	342
150	342	8.9	468
200	550	10.3	792
250	1052	6.0	1224
300	1367	7.8	1800

* Fully open position

Gearbox Operated Double Regulating Valve

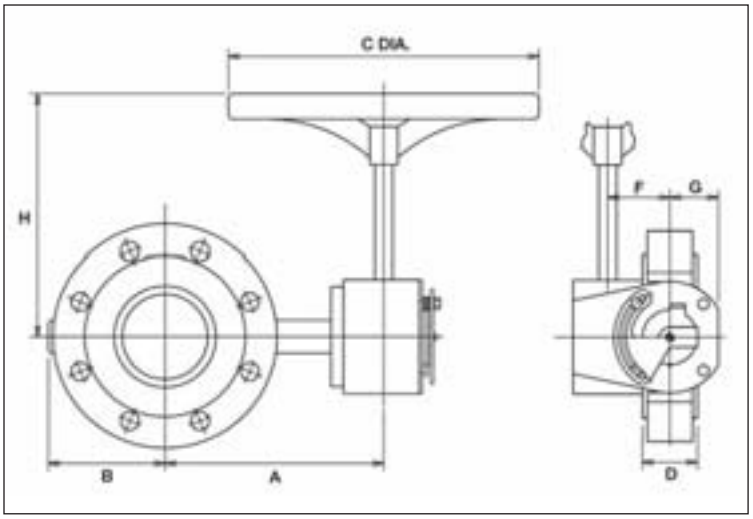
DM925G PN16

Specification

The DM925G Double Regulating Butterfly Valve comprises a fully lugged, EPDM liner butterfly valve fitted with a Double Regulating Gearbox. The gearbox Double Regulating feature allows the valve to be used to isolate and to be re-opened to its pre-set position.

Installation

As an alternative to the DM921 the DM925G can be used in conjunction with a flow measurement device to measure flow.



Pressure/temperature ratings

Temperature °C	-10 to 100
Pressure (bar)	16.0

Materials

Part	Material	Sizes
Body	Ductile Iron ASTM A536 65-45-12	All
Disc	Aluminium Bronze	All
Seat	EPDM	All
Shaft	Stainless Steel ASTM A532 Type 416	All
Taper Pin	Stainless Steel ASTM A276 Type 316	All
Key	Carbon Steel	All
'O' Ring	Nitrile (Buna)	All
Shaft Bushing	PTFE or Bronze	All

Dimensions and weights

DN	Weight kg	A mm	B mm	C mm	D mm	F mm	G mm	H mm
50	8.6	162	80	150	42	45	54	158
65	9.1	175	89	150	45	45	54	158
80	11.8	181	95	150	45	45	54	158
100	17.2	200	114	150	52	45	54	158
125	18.1	213	127	200	54	45	54	148
150	19.5	225	139	200	56	45	54	148
200	29.5	260	175	300	61	78	81	226
250	39.9	292	203	300	66	78	81	226
300	54.9	337	242	300	77	78	81	226

Coefficients

DN	Flow Kv	Headloss K
50	100	1.216
65	170	0.856
80	261	0.856
100	519	0.650
125	884	0.553
150	1366	0.483
200	2713	0.367
250	4619	0.315
300	7136	0.266

Gearbox Operated Flow Measurement and Regulating Valve
DM950G PN16

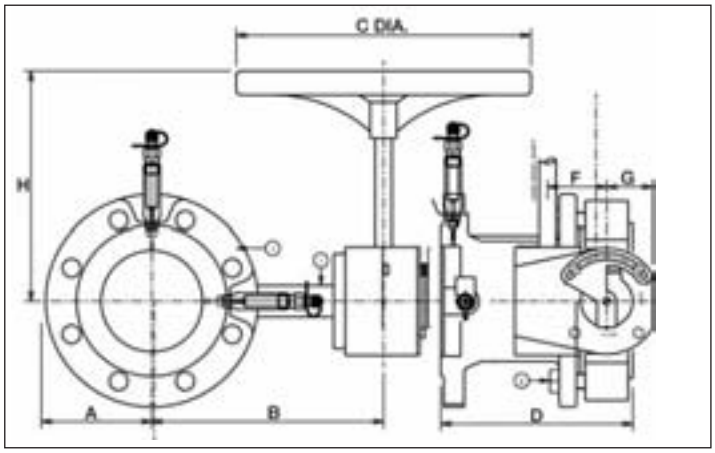
Specification

The DM950G comprises DM925G coupled to a fixed orifice flow measurement device using a spool piece connector, forming a fixed orifice flow measurement unit with regulation and isolation capability.

Test points supplied loose.

Installation

The DM950G is supplied ready assembled to site. Suitable gasket and bolting should be provided by the contractor/installer.



Pressure/temperature ratings

Temperature °C	-10 to 100
Pressure (bar)	16.0

Materials

Part	Material	Sizes
Extension piece	Steel DIN 17100 R.St.37.2/ASTM A53.Gr.A	150-300mm
Extension piece	Steel DIN 17100 R.St. 37.2	50-125mm
P84 Test Valve	See Fig No P84	All
Orifice Plate Retain	Steel DIN 17100 R.St. 37.2	All
Orifice Plate	Stainless steel BS970 316S31	All
Orifice Plate Gasket	Asbestos free	All
Flange Bolts	Steel BS3692 Gr. 8.8	All
DM925G	See Fig No DM925G Gear Operated	All
Test Point Extension	DZR Brass BSEN12164 CW602N	All
Test Point Adaptor	DZR Brass BSEN12164 CW602N	50-125mm
Socket Head Cap Screw	Steel BS4168 Gr. 12.9	All

Dimensions and weights

DN	Weight kg	A mm	B mm	C mm	D mm	F mm	G mm	H mm
50	19.7	162	80	150	158	45	54	158
65	20.8	175	89	150	161	45	54	158
80	23.4	181	95	150	171	45	54	158
100	32.5	200	114	150	181	45	54	158
125	38.4	213	127	200	190	45	54	148
150	47.1	225	139	200	232	45	54	148
200	67.8	260	175	300	287	78	81	226
250	89.2	292	203	300	345	78	81	226
300	124.2	337	242	300	404	78	81	226

Coefficients

DN	Flow Kv	Headloss K	Kvs
50	61	3.4	46.1
65	117	2.6	90
80	173	2.3	120
100	315	2.0	220
125	501	1.8	342
150	719	1.8	468
200	1303	1.6	792
250	2049	1.6	1224
300	3038	1.5	1800

Gearbox Operated Double Regulating Valve DM975G PN25 to BSEN593

CRANE FLUID SYSTEMS

Specification

The DM975G Double Regulating Butterfly Valves comprise:

- A fully lugged butterfly valve for use with PN25 flanges.
- High temperature EPDM liner for applications up to 120ºC
- A Double Regulating Gearbox as standard.

The Double Regulating feature allows the valve to be used for isolation and to be re-opened to its pre-set position to maintain required flow rate.

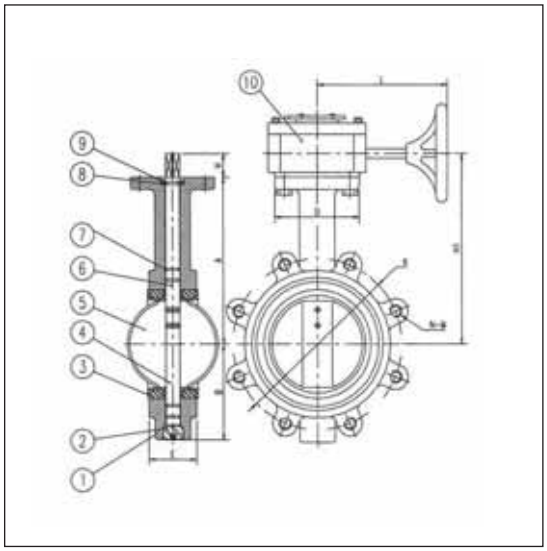
Installation

The DM975G can be used in conjunction with a flow measurement device DM900 to regulate and measure flow.

Also available with lever version

Pressure/temperature ratings

Temperature ºC	-10 to 100
Pressure (bar)	25



Materials

Item	Part	Material
1	Body	Ductile Iron - ASTM A536 65-45-12
2	Plug	Carbon Steel
3	Liner	EPDM
4	Shaft (Lower)	Steel - AISI 431
5	Disc	Stainless Steel - SS304
6	Shaft (Upper)	Steel - AISI 431
7	O Ring	EPDM
8	Lock Plate	Brass - ASSTM B16 C36000
9	Snap Ring	Carbon Steel
10	Gearbox	

Dimensions and Weights

Size	Weight (kg)	A (mm)	B (mm)	H (mm)	D (mm)	E (mm)	L (mm)	K (mm)	N-M (mm)	H1 (mm)
50	10.0	140	68	35	90	43	160	125	4-M16	172.5
65	10.8	152	76	35	90	45	160	145	8-M16	184.5
80	11.0	160	85	35	90	46	160	160	8-M16	192.5
100	13.0	180	100	35	90	51.5	160	190	8-M20	212.5
125	16.0	191	120	35	90	56	160	220	8-M24	223.5
150	18.5	202	132	35	90	56.5	160	250	8-M24	234.5
200	29.8	241	160	45	125	60	238	310	8-M24	278.0
250	40.0	274	200	45	125	68.5	238	370	12-M27	311.0
300	53.0	315	230	45	125	79.5	238	430	16-M27	366.0

Coefficients*

Size	Flow (Kv)	Headloss K
50	85	1.86
65	204	0.95
80	370	0.50
100	820	0.29
125	982	0.37
150	1353	0.43
200	2923	0.31
250	3374	0.56
300	6350	0.33

***Fully open position**

Precision Setting Hand Wheel

Precision Setting of Regulating Valves

If the actual flow rate in a system differs too much from the calculated/design flow rate, part or all of the energy savings from balancing a system may be lost. The more accurate the flow rate setting, the greater the energy savings.

Regulating accuracy is not only a question of precision made valves, but also depends on how easy it is to define and find the correct setting. For this, clear, easy to read scales that cannot be misinterpreted are needed.

Crane Microset P81 - Digital Style Hand Wheel

Fitted to valve sizes 1/2 to 2 they are manufactured in high strength nylon and incorporate a gear operated counter mechanism.

Valves between sizes 1/2 to 2 require four anticlockwise turns of the hand wheel from the fully closed to the fully open position. Microset has two distinct scales. A highly visible window indicates the number of complete turns of the hand wheel from fully closed (0) to fully open (4) and a numbered ring indicates the division of each turn in tenths from 0 to 9. A total of 80 distinct settings are available. The Microset hand wheel can be removed and repositioned on the valve spindle in any one of 6 positions to allow ease of scale reading in any installation orientation.

Setting Facility: Having adjusted the valve to the required operational position, the hand wheel setting corresponding to this position, can be retained as follows:

1. Remove the cap from the centre of the hand wheel
2. Insert the 3mm AF Allen key provided and screw down the central socket screw in a clockwise direction until no further movement occurs
3. Replace hand wheel cap
4. The valve's operational position is now set. The valve may be closed from the set position, but on re-opening the original position will be restored precisely.

Security

To prevent unauthorised tampering with the valve setting the following action may be taken:

The Microset hand wheel is provided with two holes on its upper surface through which a wire seal may be fitted to prevent unauthorised access to the central socket screw. The valve may still be operated between the set and closed position.

Micrometer Style Hand Wheel

Crane Micrometer Style Hand Wheel fitted to valves sizes 65mm and larger, is manufactured in nodular cast iron and incorporates a micrometer indicator.

Valve sizes 65 to 150mm require eight anti-clockwise turns of the hand wheel, sizes from 200 and 250mm require twelve turns and size 300mm requires 18 turns from the fully closed to the fully open position. This style of hand wheel uses two scales - a black sleeve within the hand Wheel has eight, twelve or 18 numbered rings and a ten division scale (numbered 0-9) around the base of the hand wheel. As the valve is opened from the fully closed position each turn of the hand wheel reveals one ring on the black sleeve. Each numbered division on the hand Wheel base represents 1/10 of a turn. The fully open position is reached when all eight, twelve or 18 rings are visible and the hand wheel scale is at '0' position. A total of 80 settings are available on valves sizes 65 to 150mm, 120 settings on valves sizes 200 and 250mm, and 180 settings on the 300mm size.

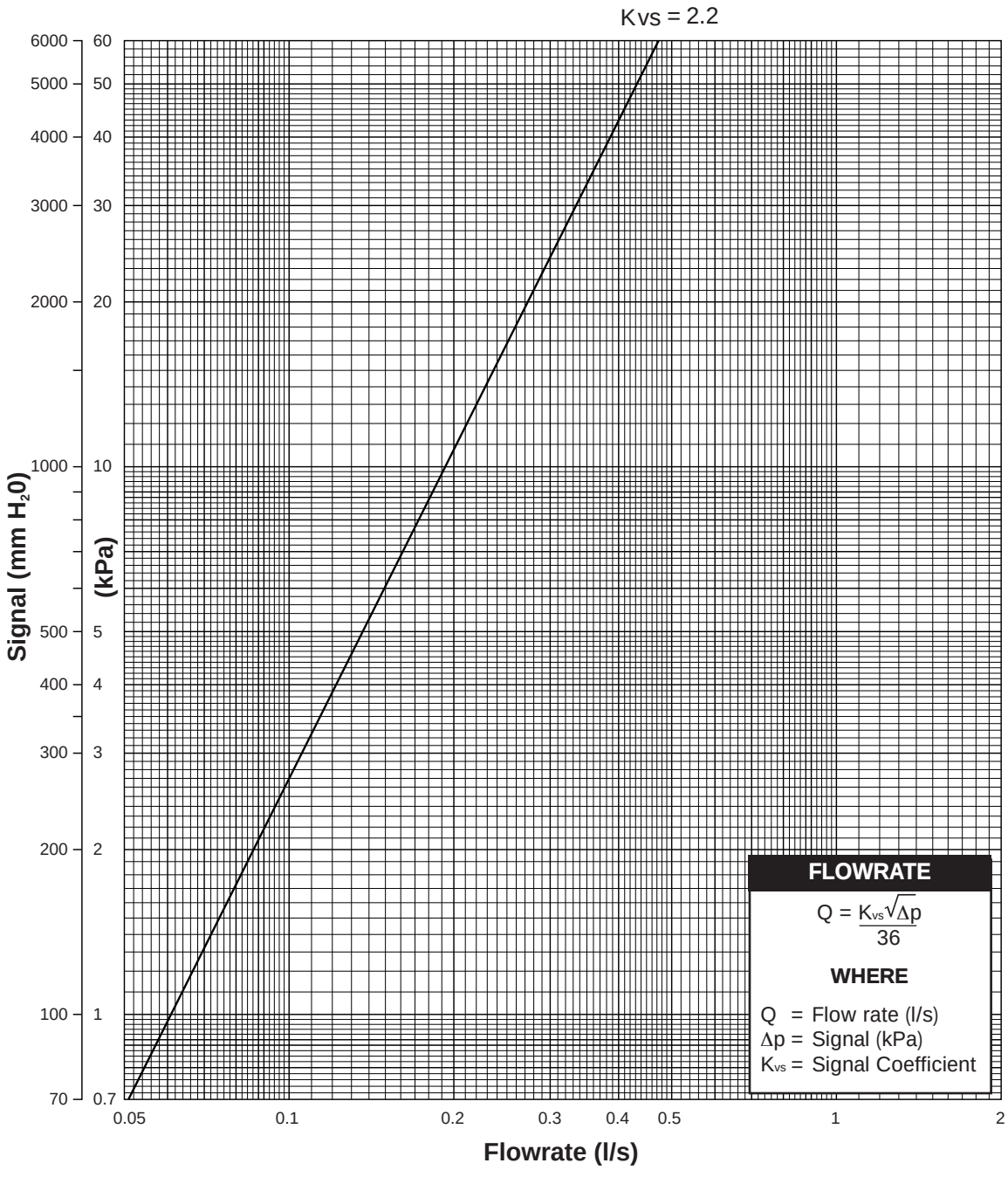
Setting facility

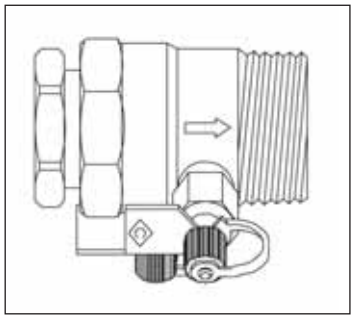
The valve setting at which the required flow rate may be achieved may be retained by loosening the memory stop screws and sliding the memory stop up until it contacts the grey plastic sleeve protruding from the hand wheel. Retighten the screws.

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.

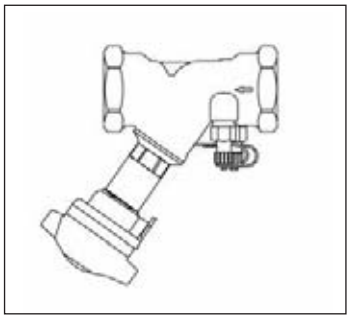
Size 1/2 (DN15) D901-D931-D981

Fixed orifice devices for standard applications





D901



D931

Head / Pressure Loss

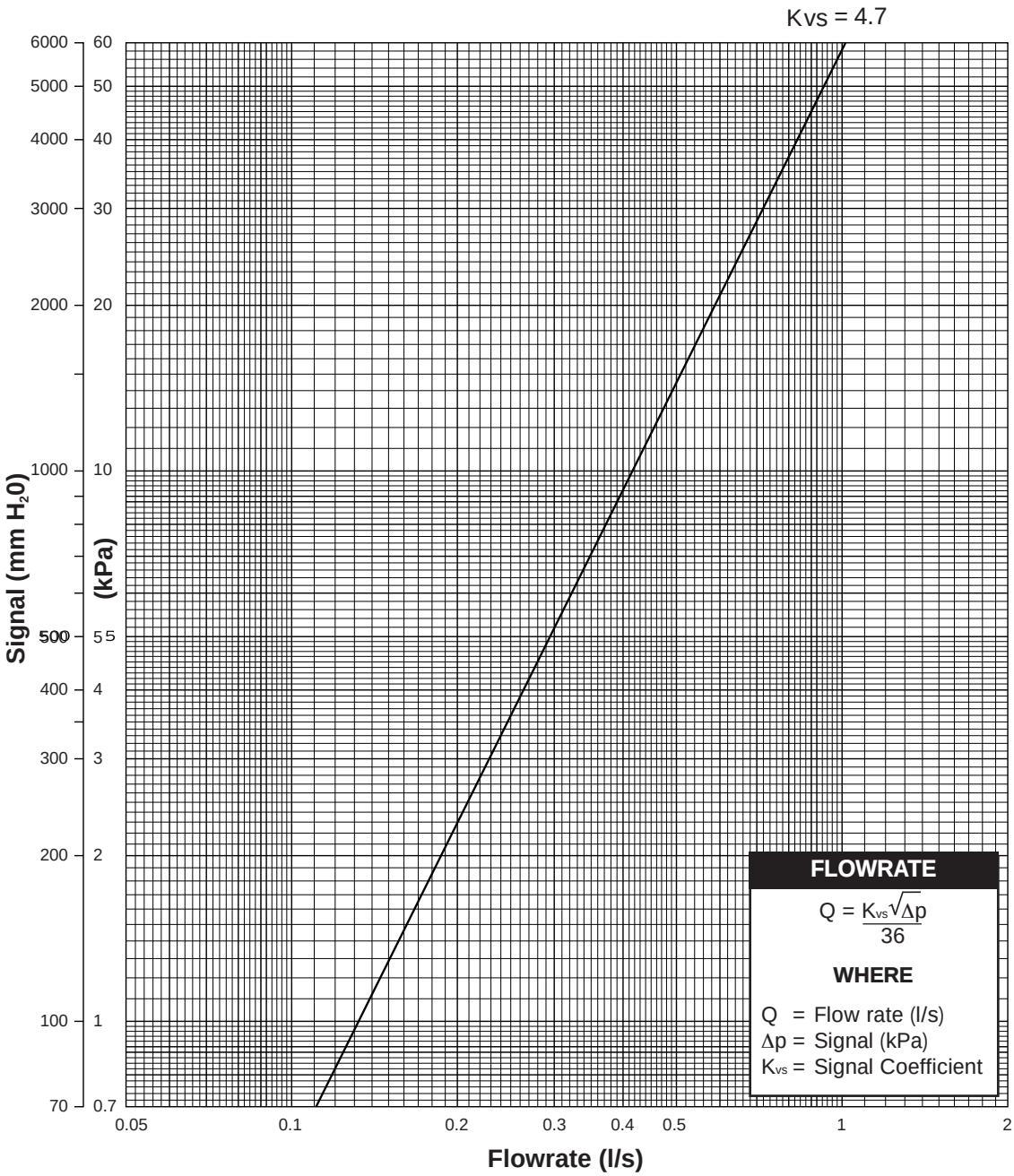
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

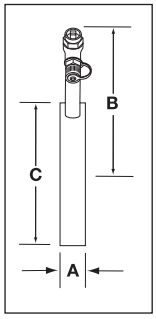
Fig No.	Factor
D901	0.62
D931 (Fully open)	1.38
D981	1.38

Flow Measurement Graphs

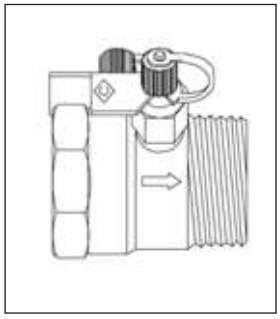
Size 3/4 (DN20) D901-D931-DM900-D981P

Fixed orifice devices for standard applications

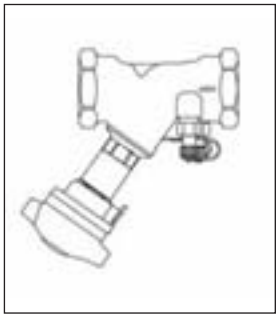




DM900



D901



D931

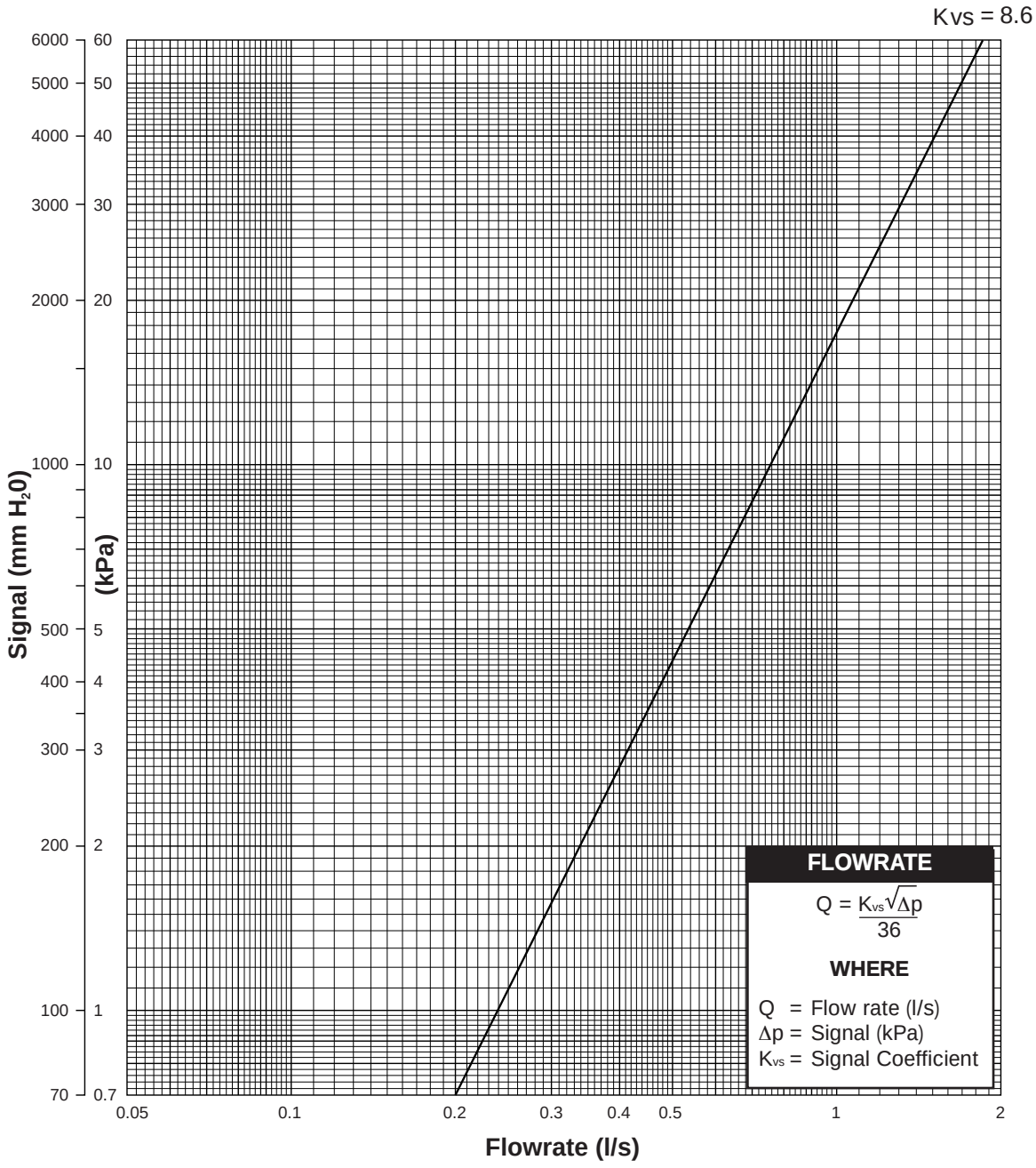
Head / Pressure Loss

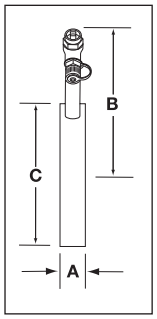
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

Fig No.	Factor
D901	0.59
D931 (Fully open)	2.24
DM900	0.61
D981	2.24

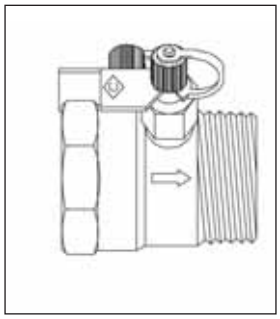
Size 1 (DN25) D901-D931-DM900

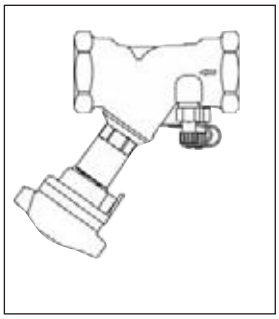
Fixed orifice devices for standard applications





DM900


D901


D931

Head / Pressure Loss

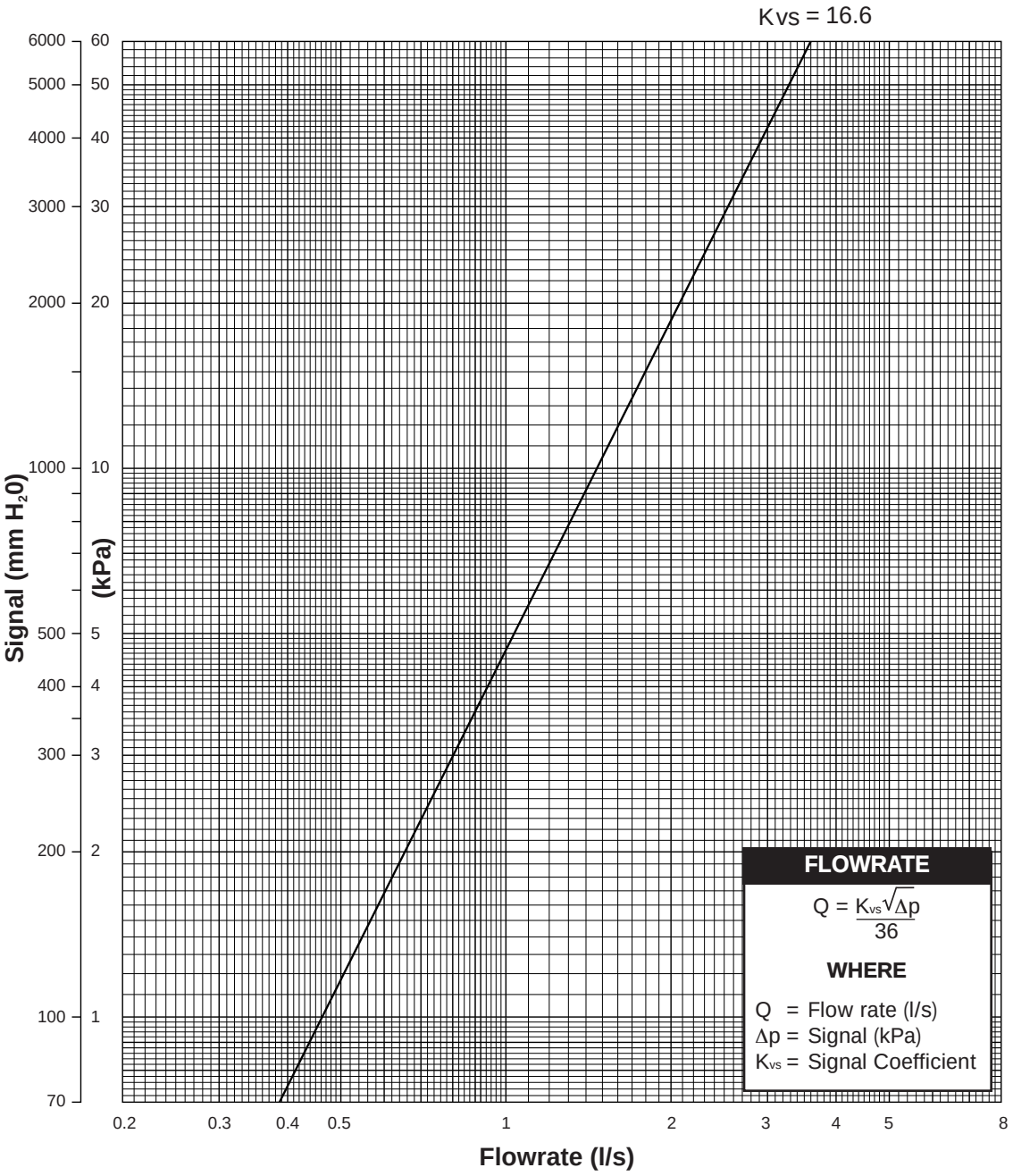
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

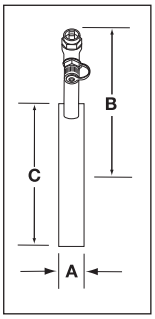
Fig No.	Factor
D901	0.52
D931 (Fully open)	2.37
DM900	0.55

Flow Measurement Graphs

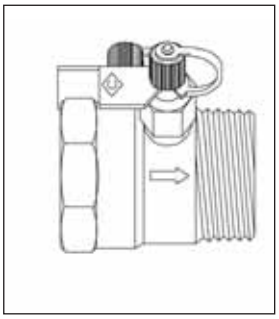
Size 1 1/4 (DN32) D901-D931-DM900

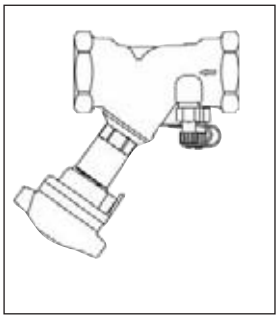
Fixed orifice devices for standard applications





DM900


D901


D931

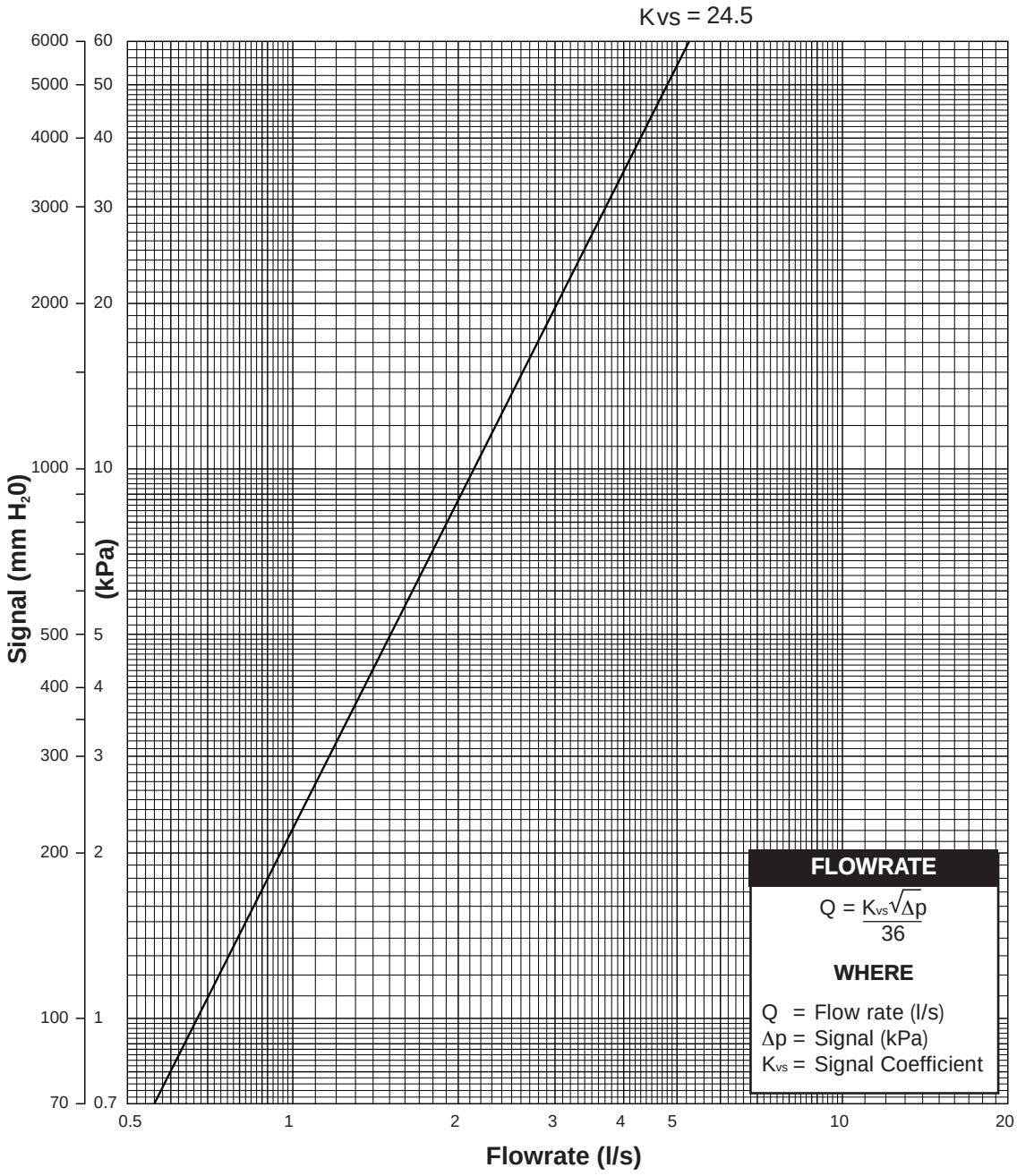
Head / Pressure Loss

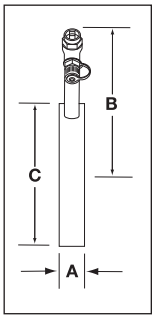
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

Fig No.	Factor
D901	0.50
D931 (Fully open)	2.37
DM900	0.52

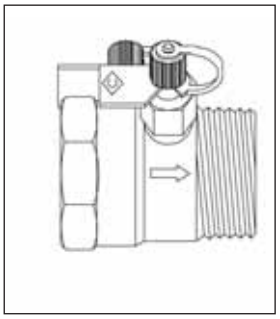
Size 1 1/2 (DN40) D901-D931-DM900

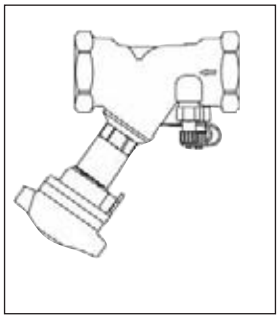
Fixed orifice devices for standard applications





DM900


D901


D931

Head / Pressure Loss

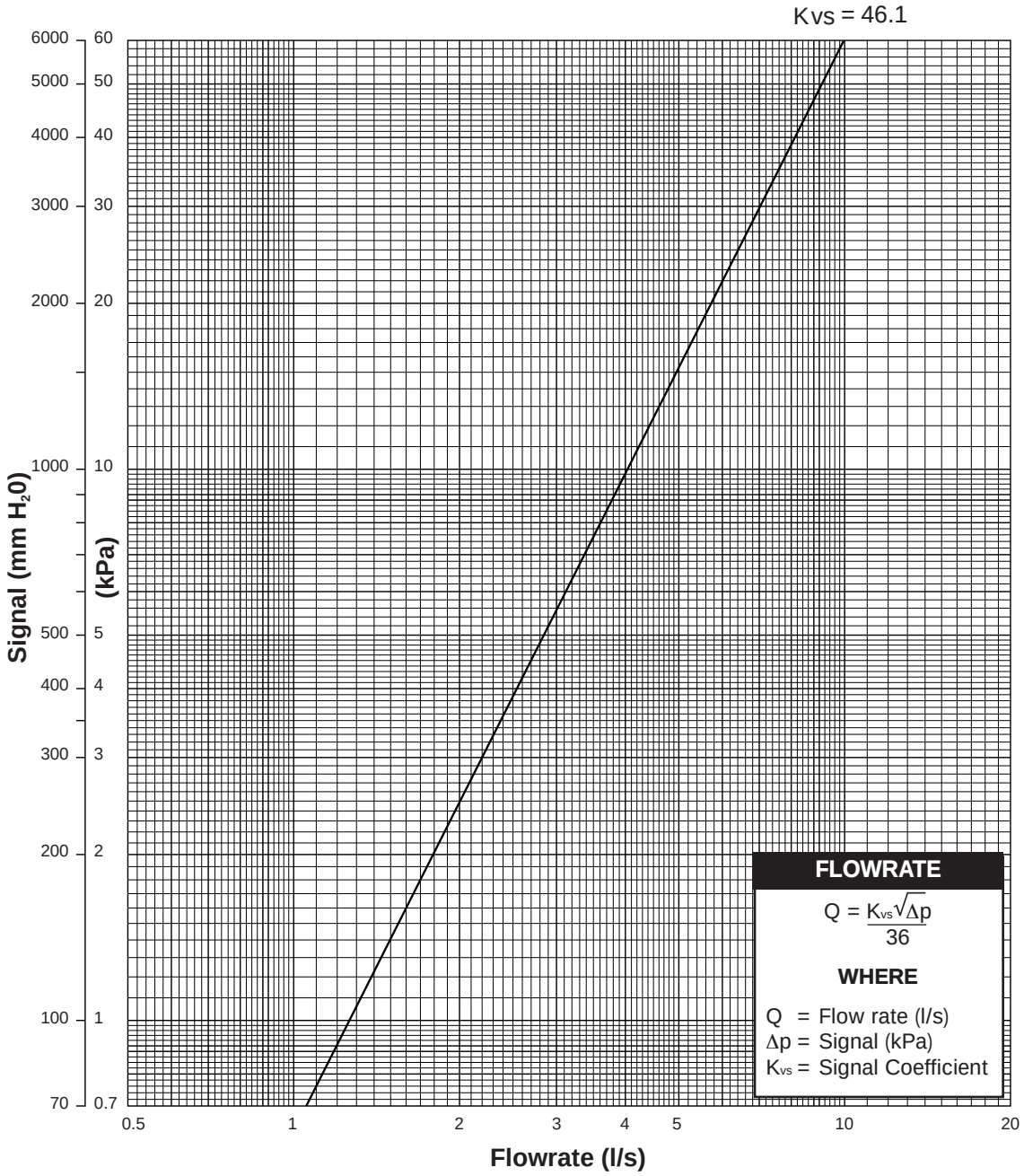
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

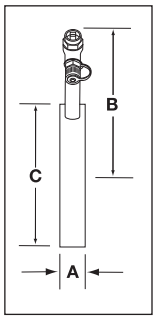
Fig No.	Factor
D901	0.46
D931 (Fully open)	1.83
DM900	0.49

Flow Measurement Graphs

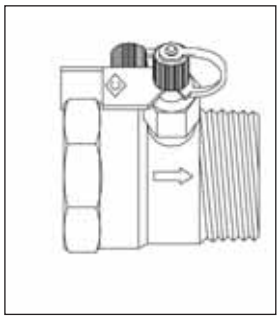
Size 2 (DN50) D901-D931-DM900-DM950G

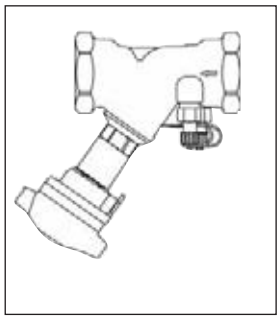
Fixed orifice devices for standard applications





DM900


D901


D931

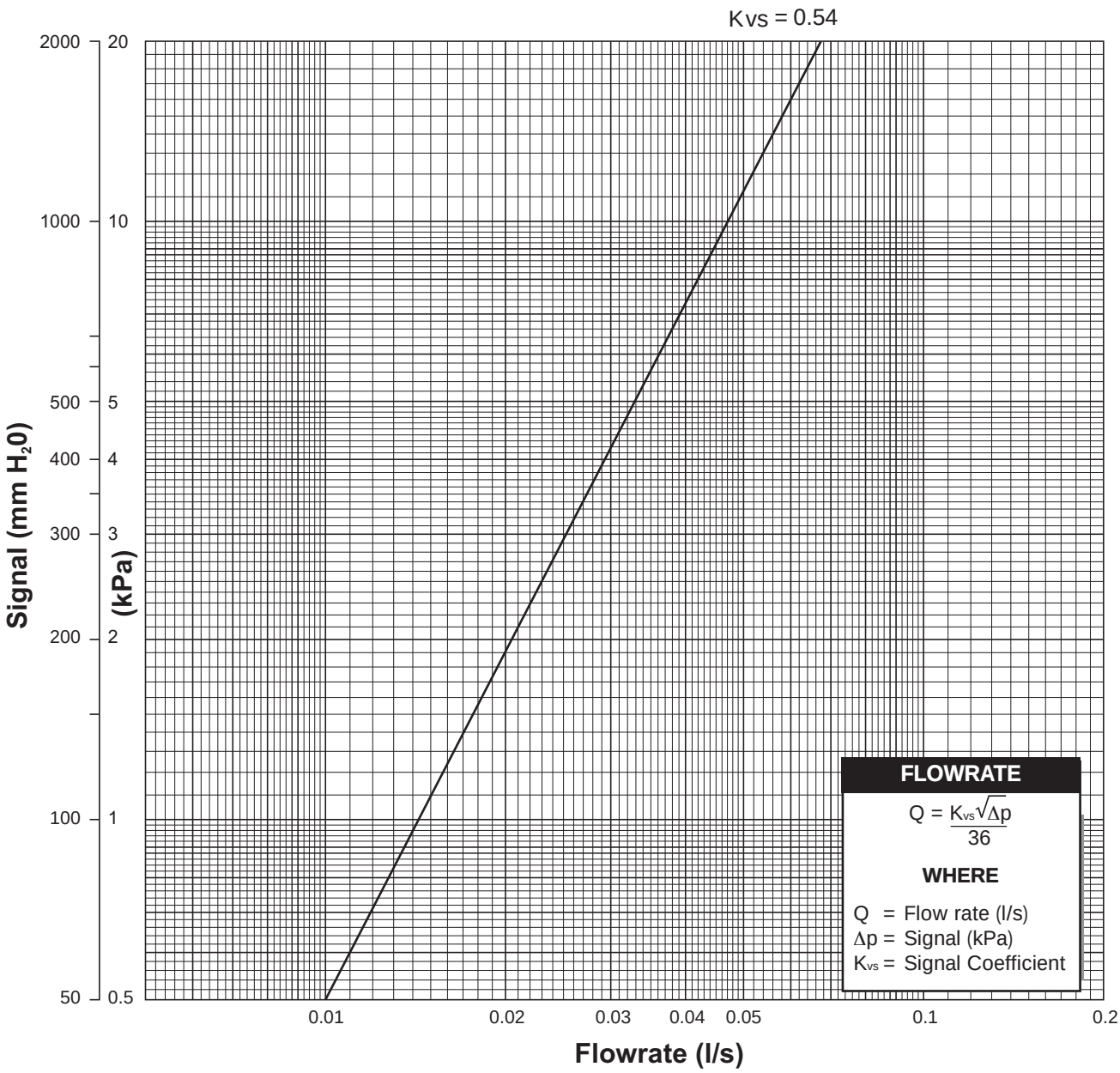
Head / Pressure Loss

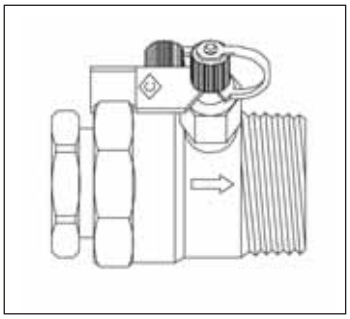
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

Fig No.	Factor
D901	0.41
D931 (Fully open)	2.50
DM900	0.41
DM950	0.57

Size 1/2 (DN15) D902

Fixed orifice devices for low flow applications





D902

Head / Pressure Loss

The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

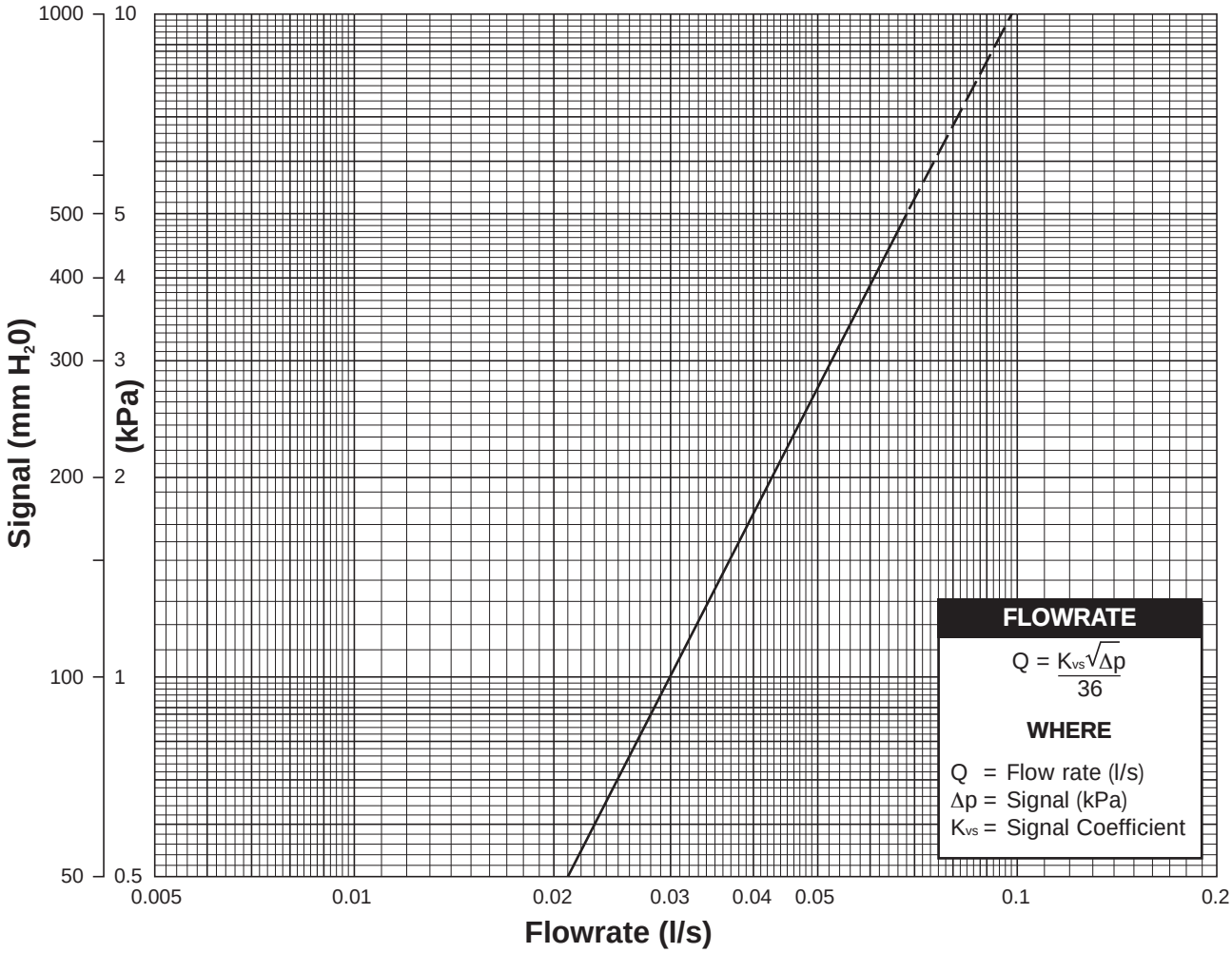
Fig No.	Factor
D902	0.90

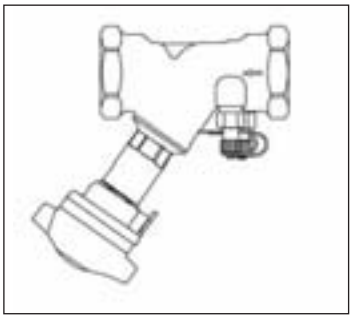
Flow Measurement Graphs

Size 1/2 (DN15) D933-D983P

Fixed orifice device for low flow applications

Kvs = 1.1





D933

Head / Pressure Loss

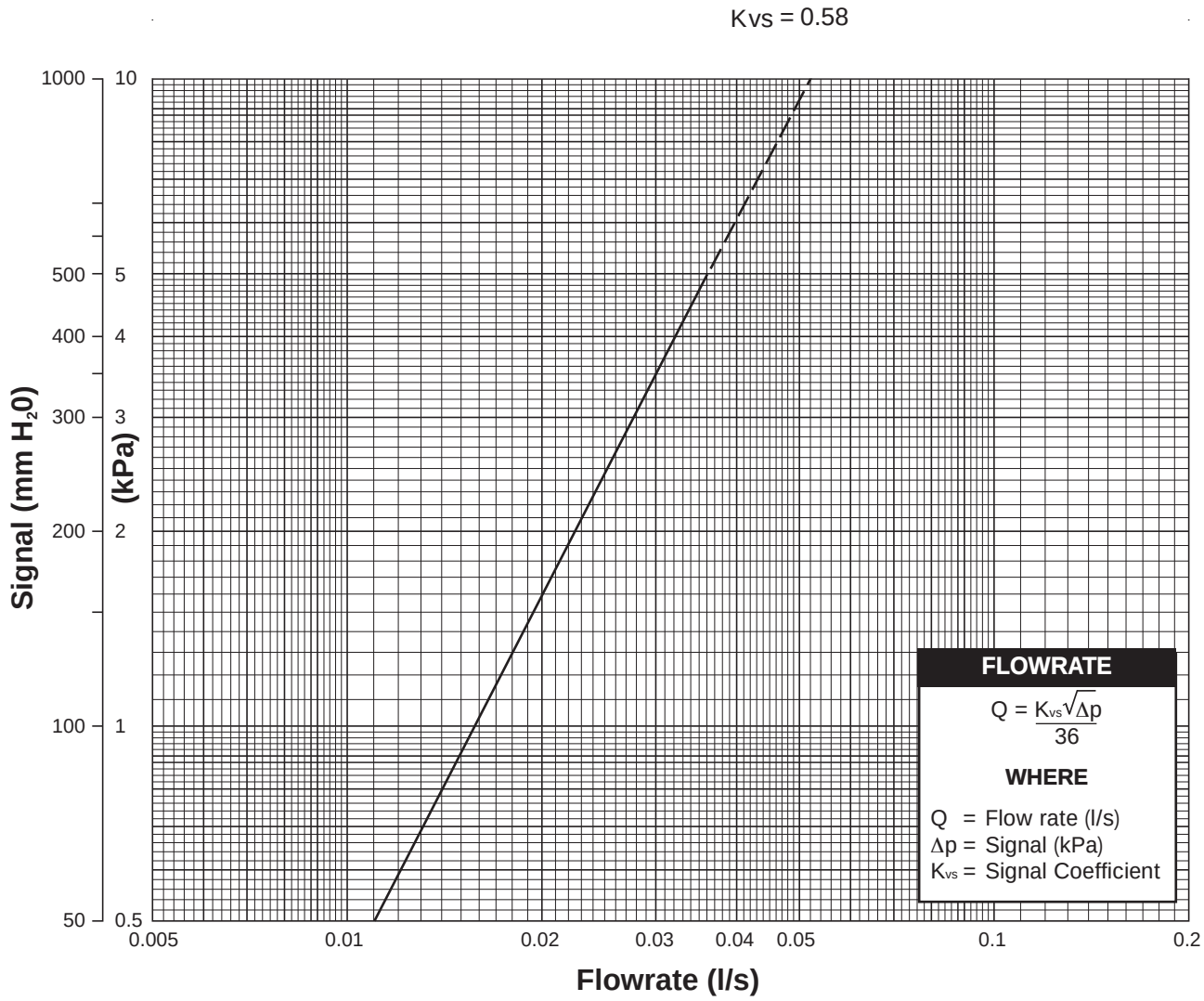
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

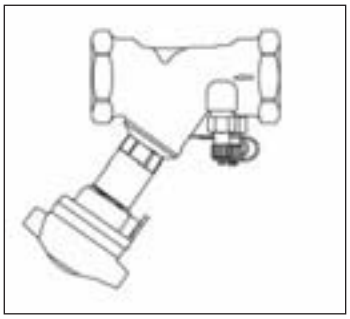
Fig No.	Factor
D933 (fully open)	1.07
D983	1.07

Note: Performance line shown dotted is outside Crane recommended range for this product see D931 curve.

Size 1/2 (DN15) D934-D984P

Fixed orifice device for ultra low flow applications





D934

Head / Pressure Loss

The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor.

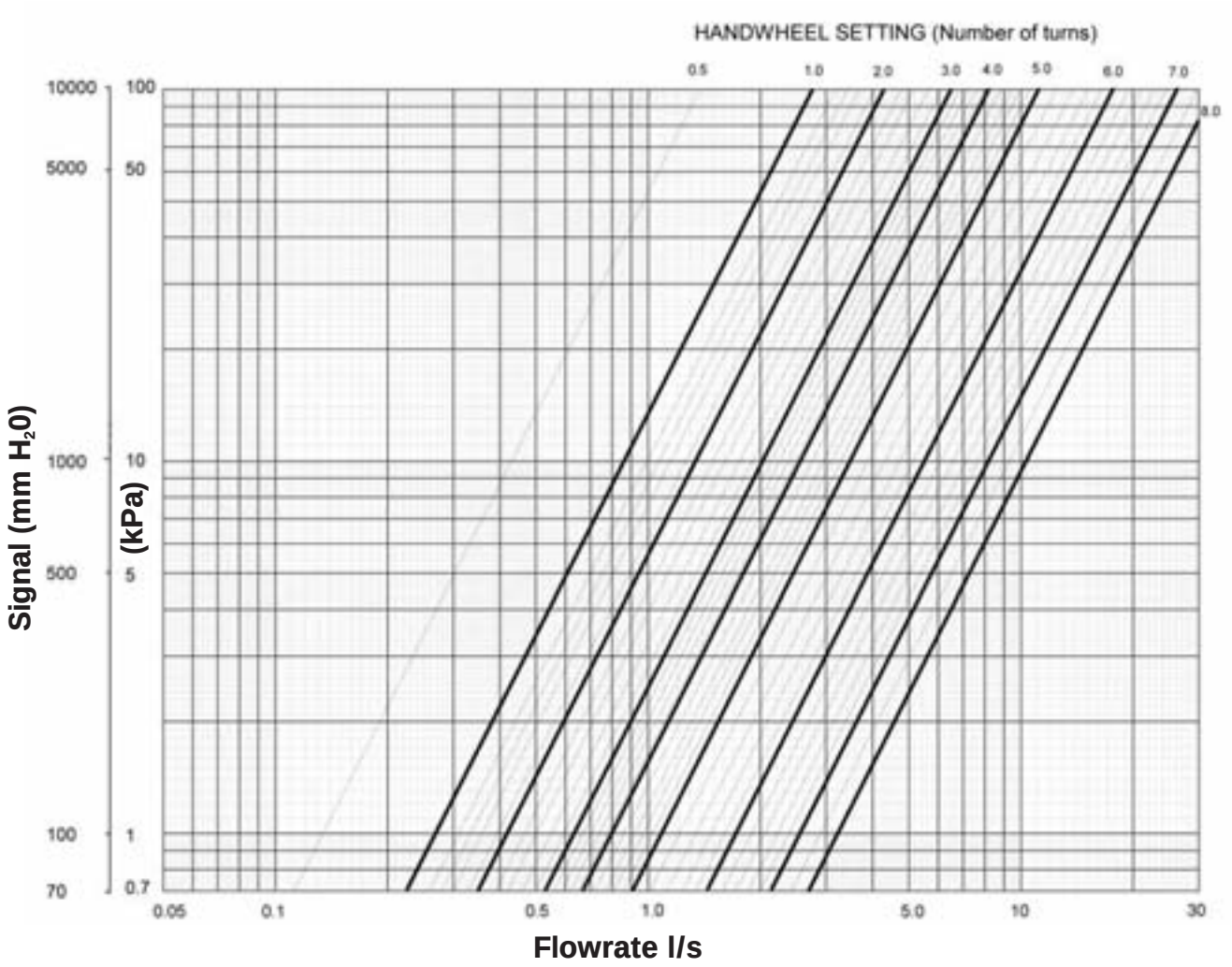
Fig No.	Factor
D934 (fully open)	1.03
D984	1.03

Note: Performance line shown dotted is outside Crane recommended range for this product see D933 curve.

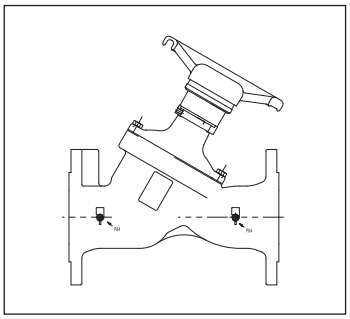
Flow Measurement Graphs (Flanged only)

Size 2 1/2" (65mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel position	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0
Kvs Value	5.0	10.0	12.5	15.0	19	23	29	39	57	74	85



DM931/DA931

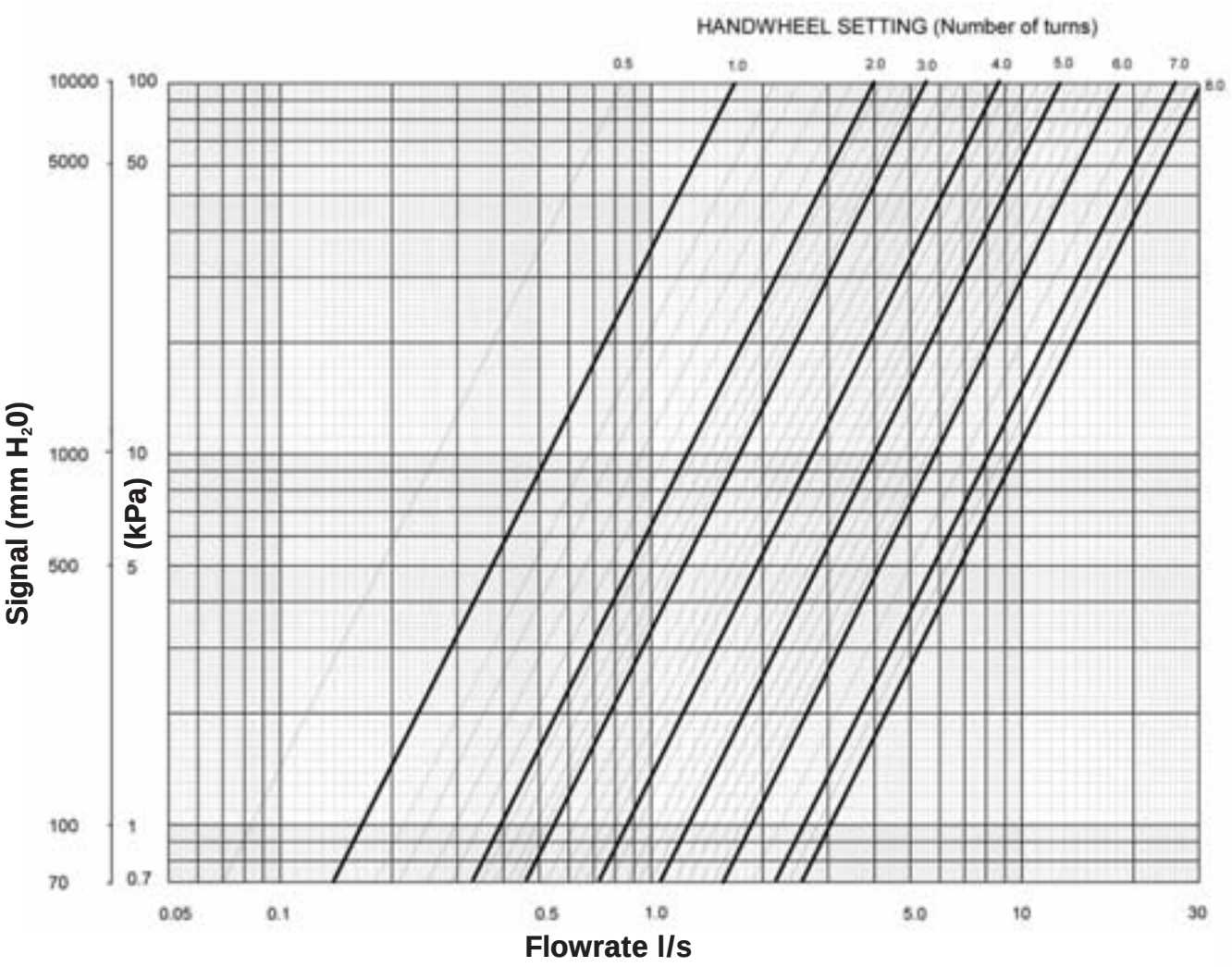
Head/Pressure Loss

DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

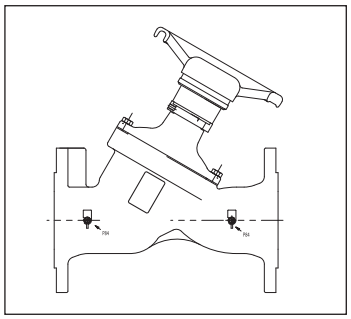
DM921: The loss for DM921 and DM931 is identical

Size 3" (80mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel position	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0
Kv Value	3.0	6.0	10	14	17	20	31	46	68	94	111



DM931/DA931

Head/Pressure Loss

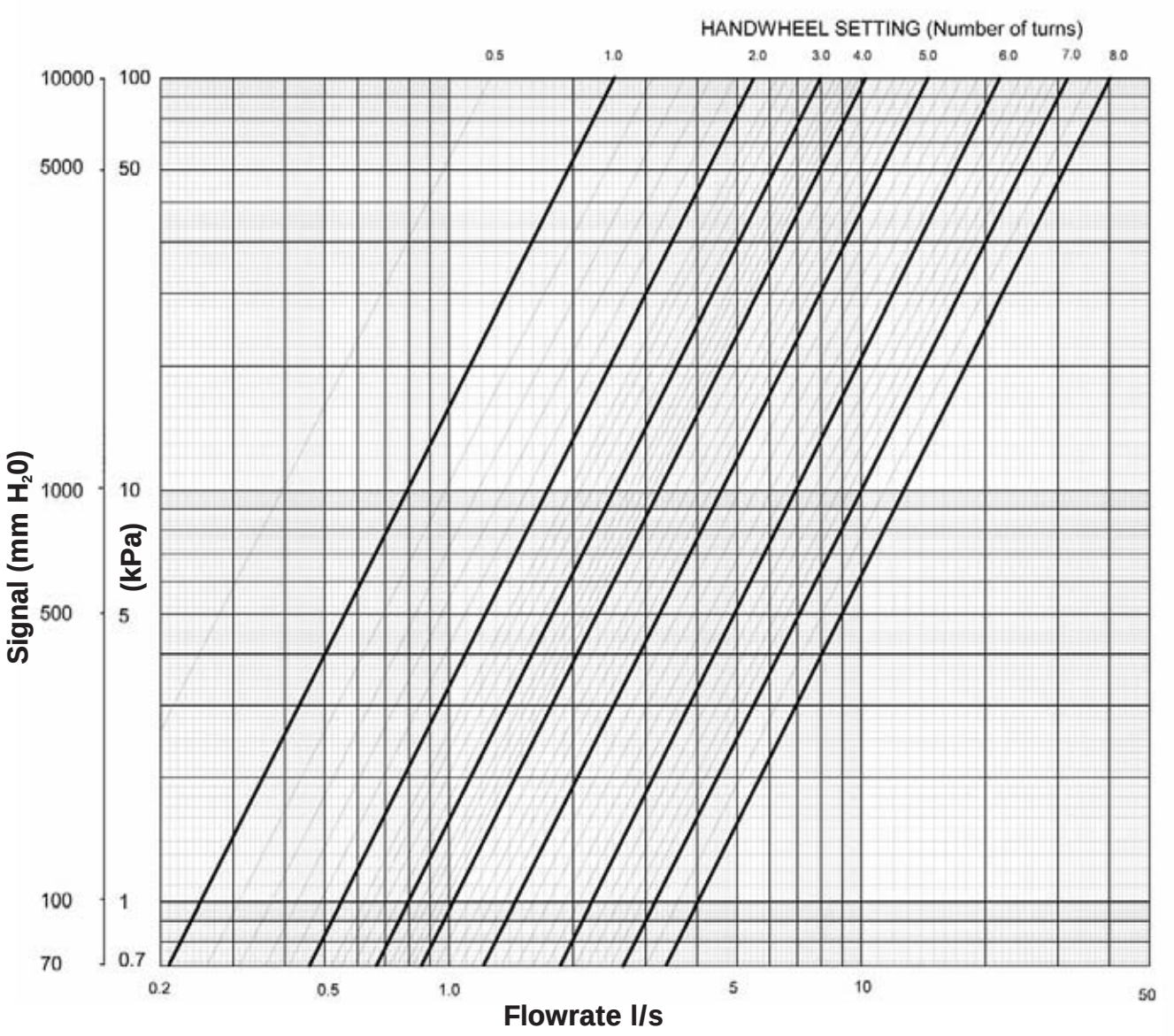
DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

DM921: Head/Pressure loss identical to DM931

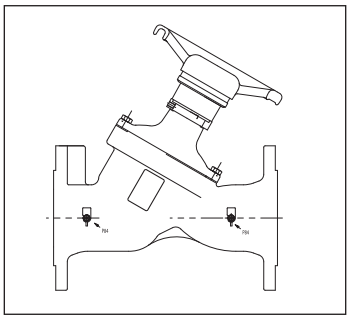
Flow Measurement Graphs

Size 4" (100mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel position	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0
Kv Value	4.5	9.0	14.5	20	24.5	29	37	52	80	114	146



DM931/DA931

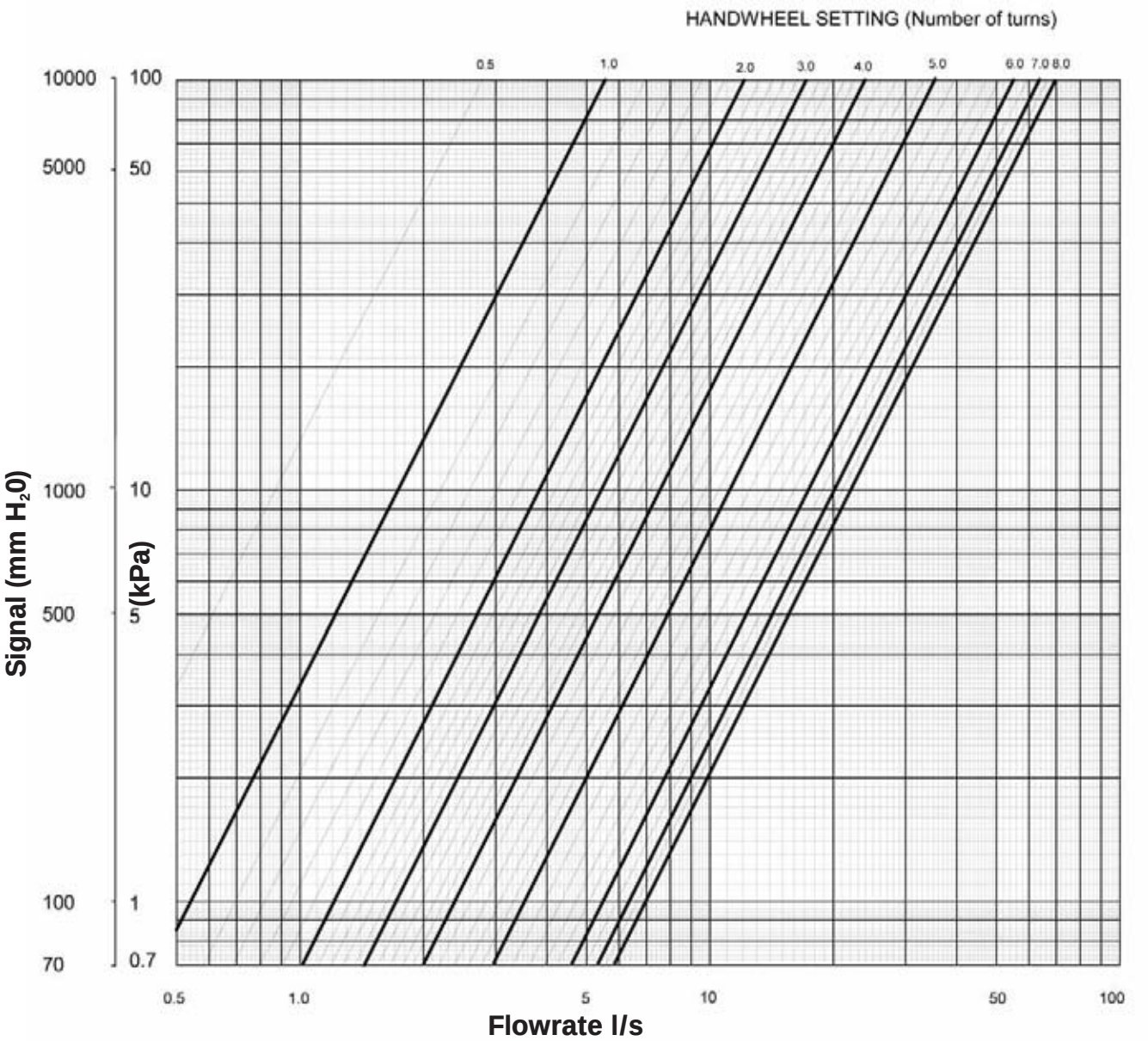
Head/Pressure Loss

DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

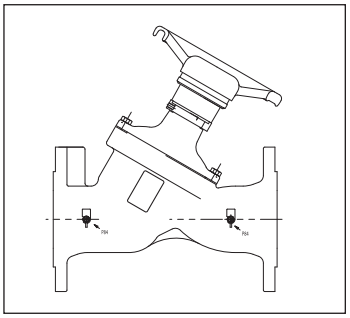
DM921: Head/Pressure loss identical to DM931

Size 5" (125mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel position	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0
Kv Value	10	20	32	44	53	62	86	128	198	230	250



DM931/DA931

Head/Pressure Loss

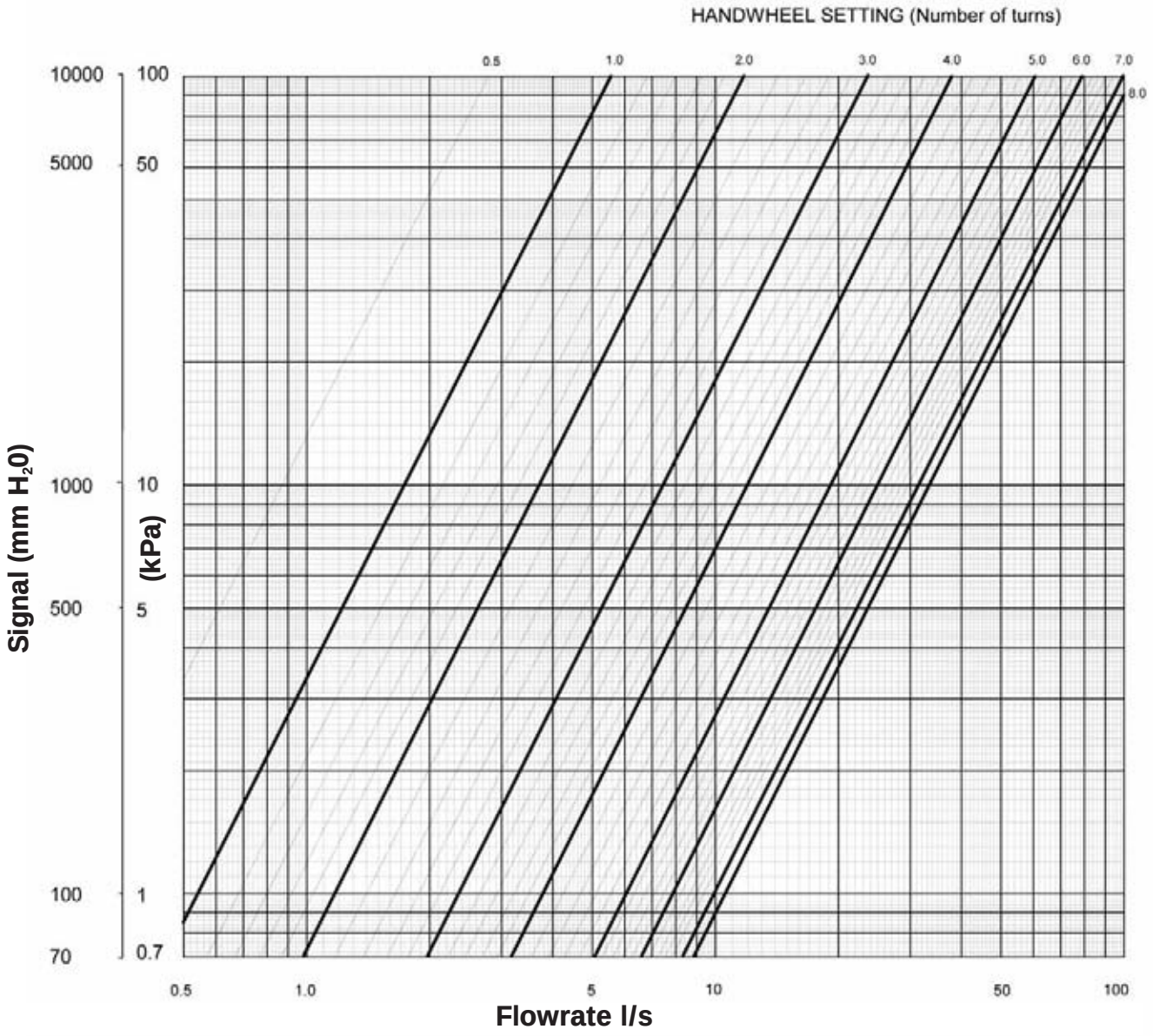
DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

DM921: Head/Pressure loss identical to DM931

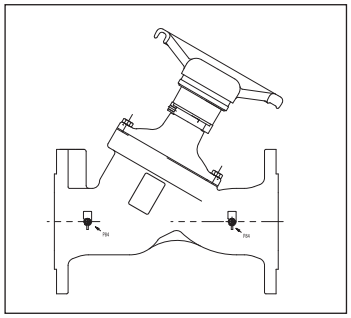
Flow Measurement Graphs

Size 6" (150mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel position	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0
Kv Value	10	20	31	42	63.5	85	137	217	284	351	380



DM931/DA931

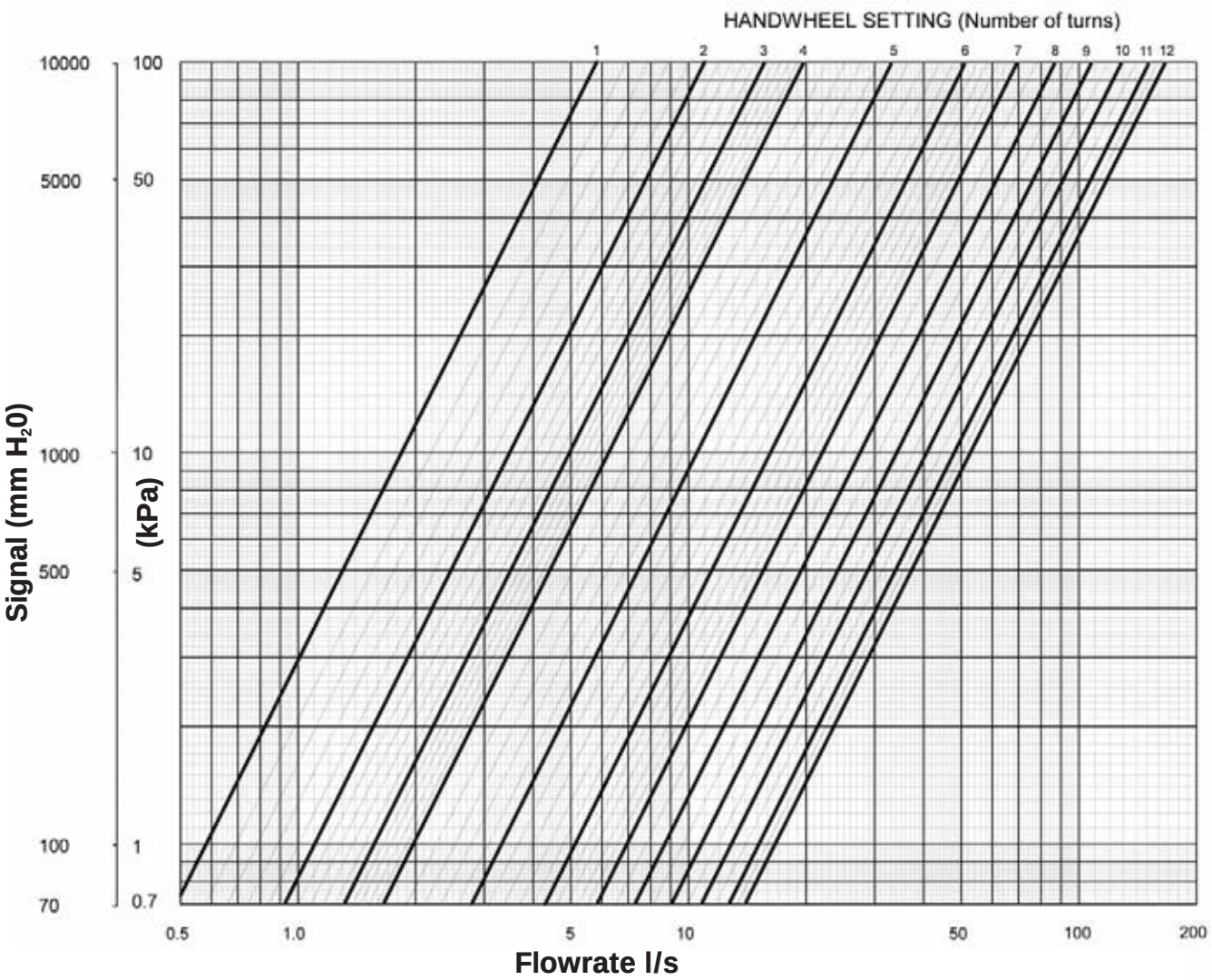
Head/Pressure Loss

DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

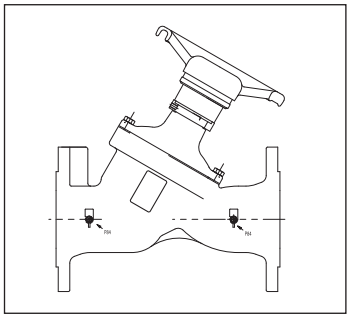
DM921: Head/Pressure loss identical to DM931

Size 8" (200mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel position	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
Kv Value	21	40	57	72	120	185	250	315	390	470	550	600



DM931/DA931

Head/Pressure Loss

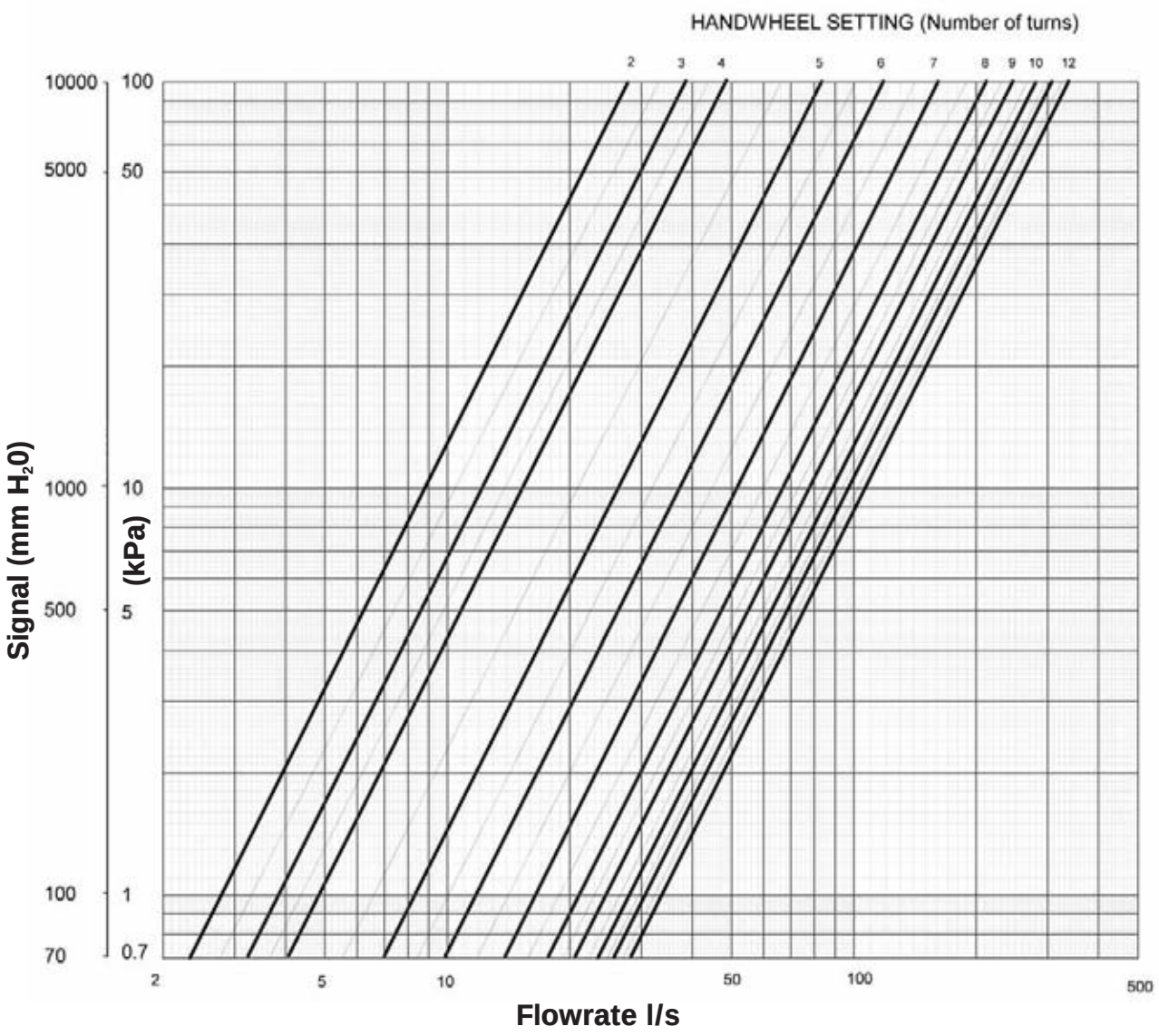
DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

DM921: Head/Pressure loss identical to DM931

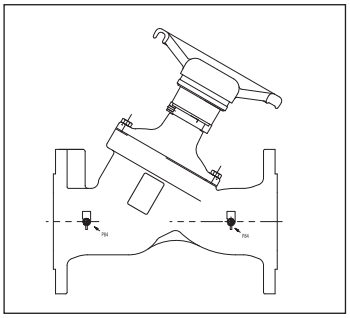
Flow Measurement Graphs

Size 10" (250mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel position	2	3	4	5	6	7	8	9	10	11	12
Kv Value	100	138	176	301	426	594	762	889	1015	1113	1211



DM931/DA931

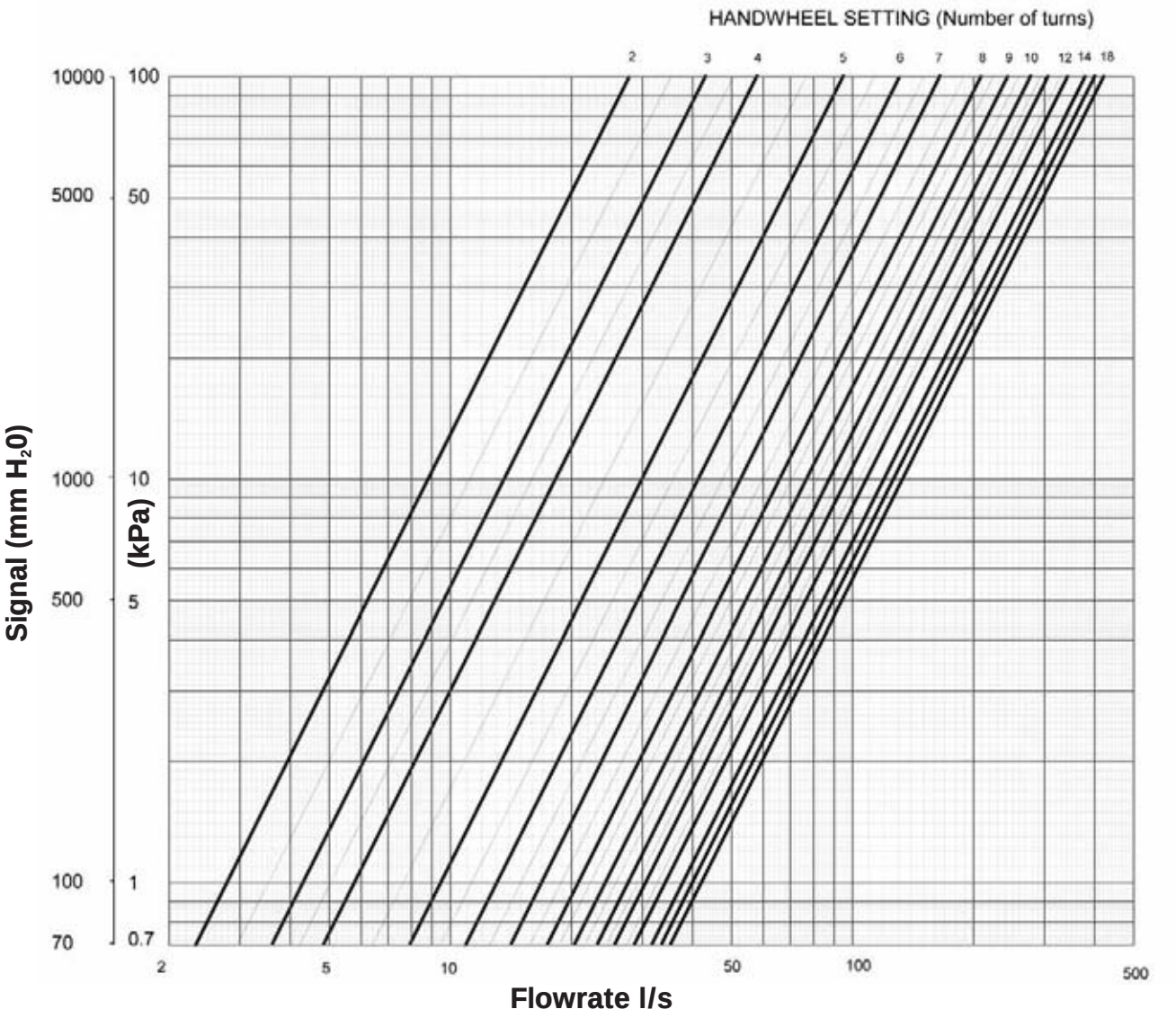
Head/Pressure Loss

DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

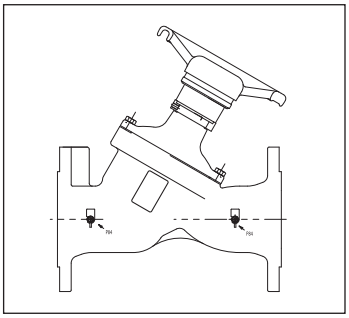
DM921: Head/Pressure loss identical to DM931

Size 12" (300mm) DM931-DA931

Variable orifice double regulating valve for standard applications



Handwheel Position	2	3	4	5	6	7	8	9	10	11	12	14	16	18
Kv Value	100	155	210	341	471	610	749	872	994	1112	1230	1369	1438	1521



DM931/DA931

Head/Pressure Loss

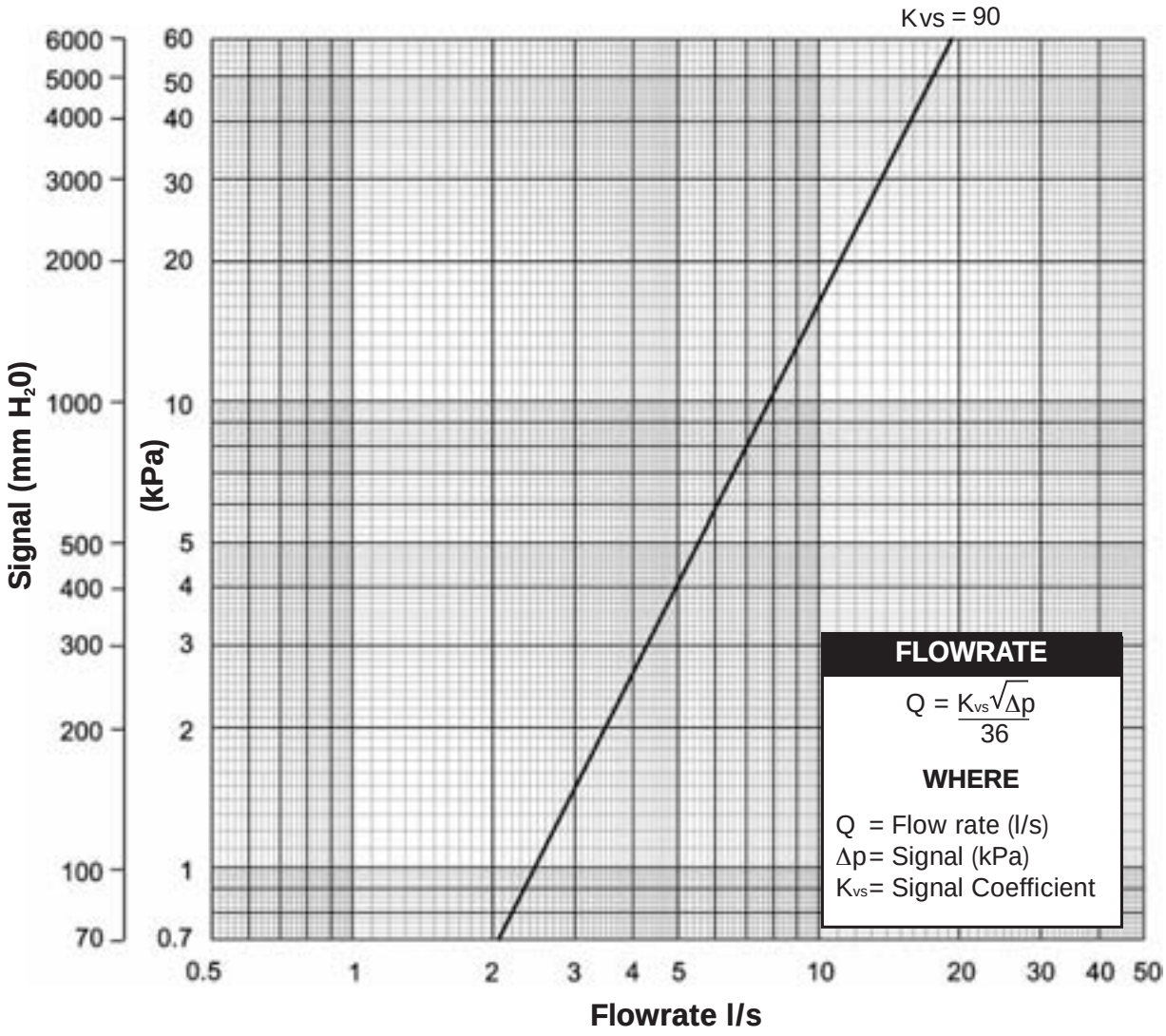
DM931/DA931: The loss resulting from the insertion of the valve in the pipeline equates to the signal measured at the pressure test valves.

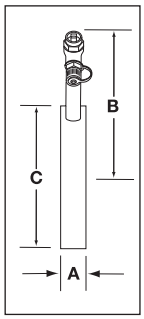
DM921: Head/Pressure loss identical to DM931

Flow Measurement Graphs

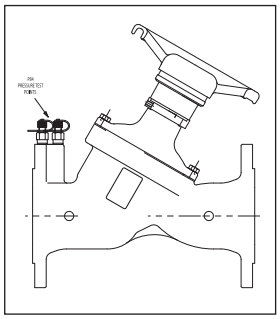
Size 65mm DM900-DM941-DA941-DM950G

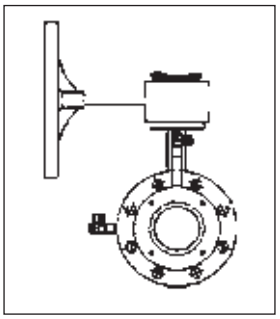
Fixed orifice devices for standard applications





DM900


DM941/DA941


DM950G

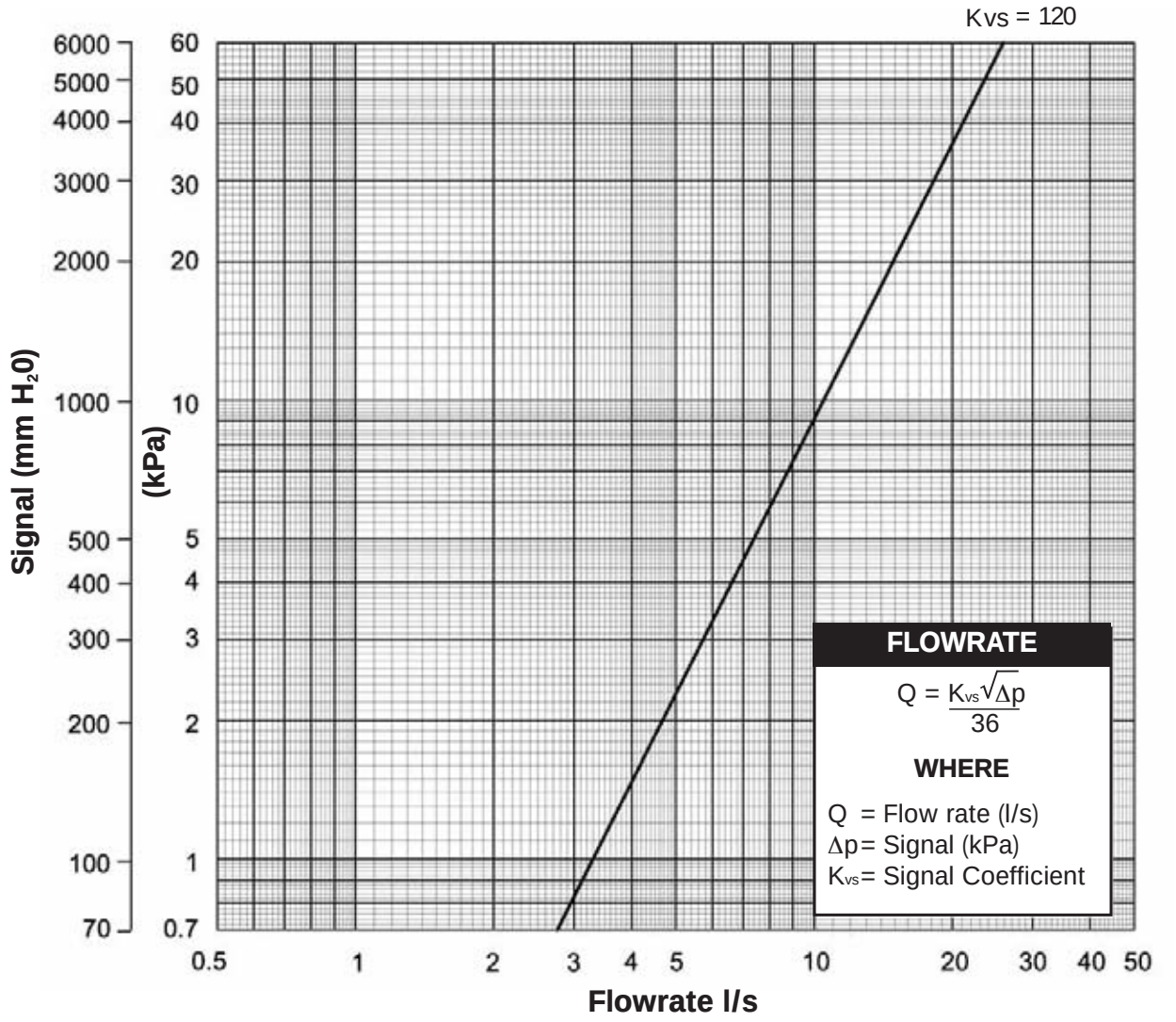
Head/Pressure Loss

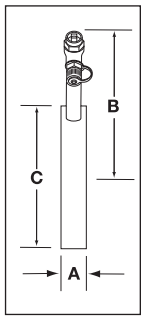
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.34
DM941/DA941 (Fully open)	1.56
DM950G	0.59

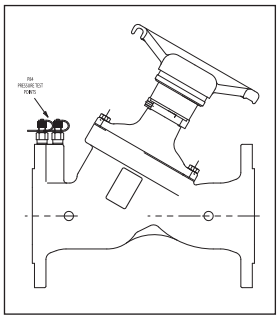
Size 80mm DM900-DM941-DAG941-DM950G

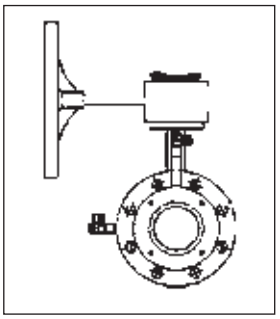
Fixed orifice devices for standard applications





DM900


DM941/DA941


DM950G

Head/Pressure Loss

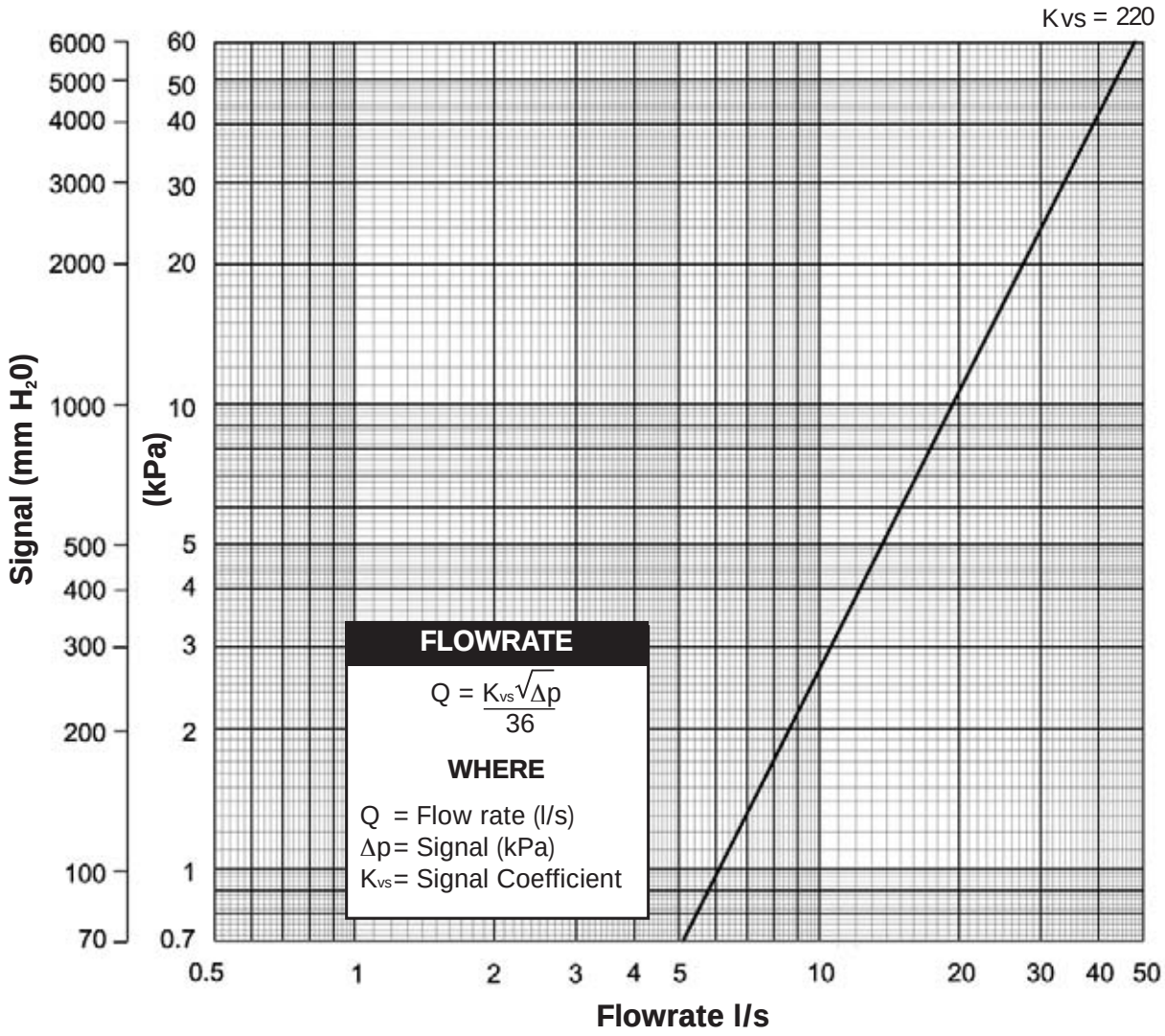
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

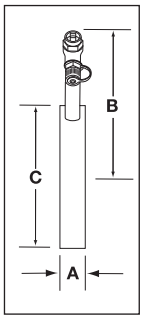
Fig No.	Factor
DM900	0.30
DM941/DA941 (Fully open)	1.44
DM950G	0.48

Flow Measurement Graphs

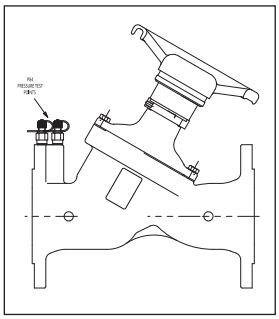
Size 100mm DM900-DM941-DA941-DM950G

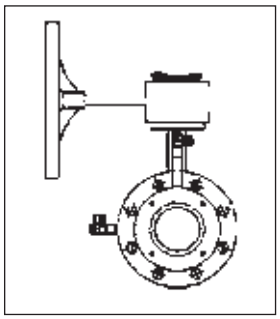
Fixed orifice devices for standard applications





DM900


DM941/DA941


DM950G

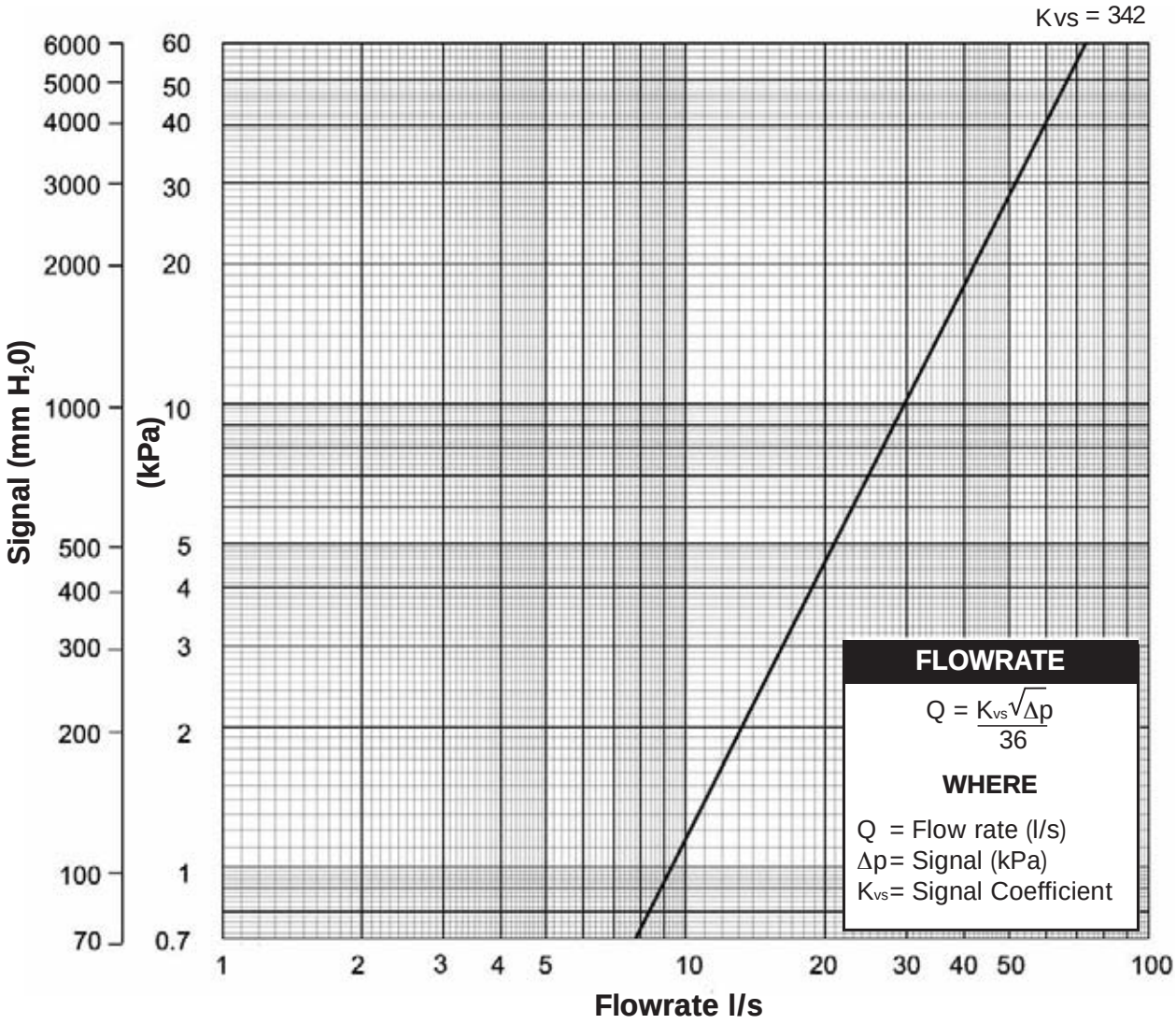
Head/Pressure Loss

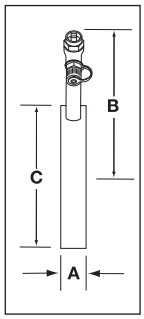
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.35
DM941/DA941 (Fully open)	3.15
DM950G	0.49

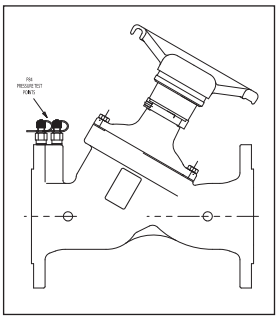
Size 125mm DM900-DM941-DA941-DM950G

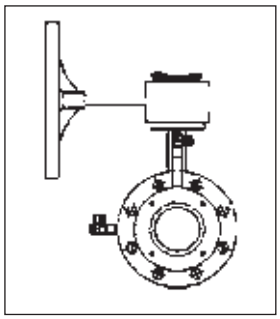
Fixed orifice devices for standard applications





DM900


DM941/DA941


DM950G

Head/Pressure Loss

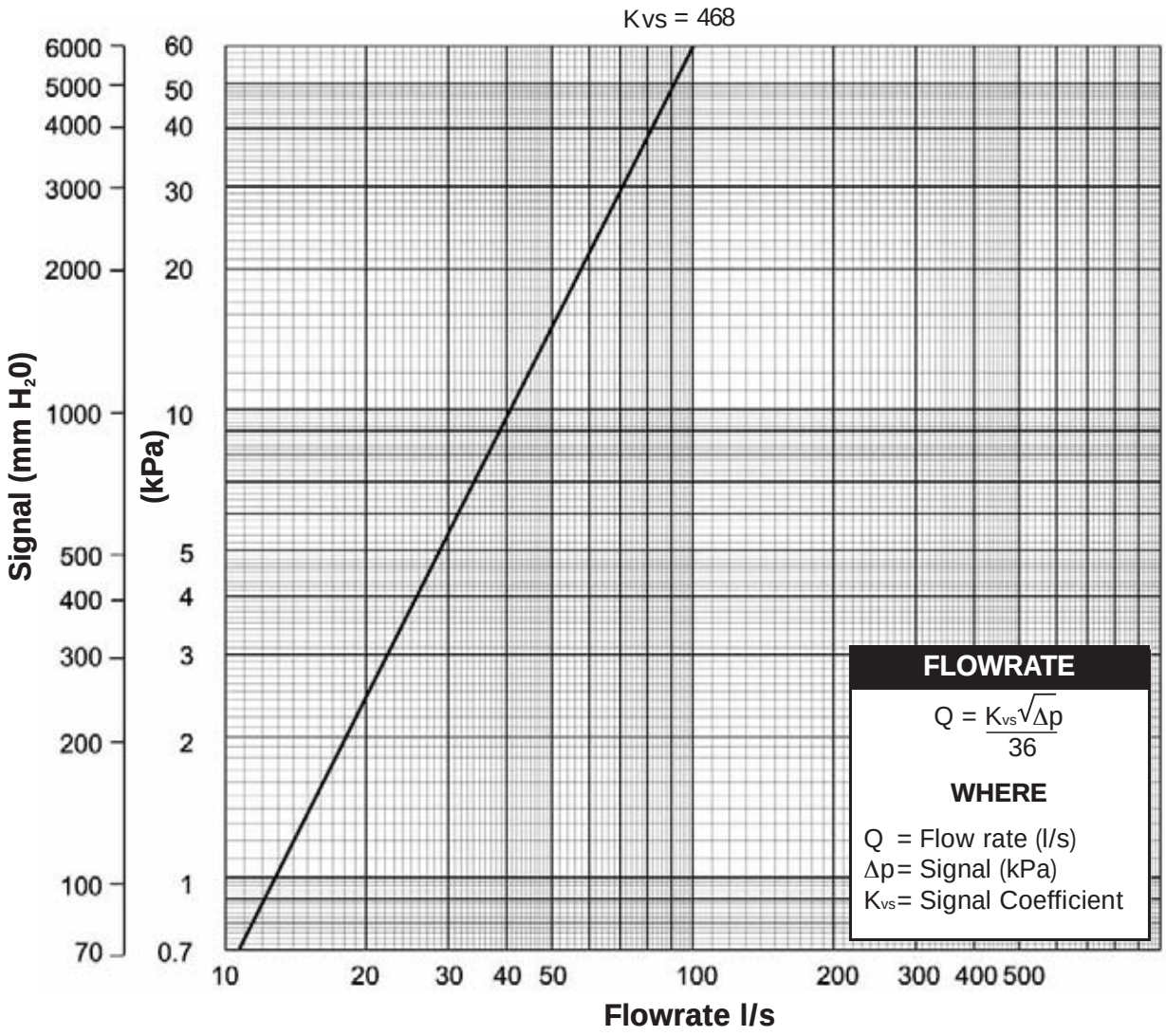
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

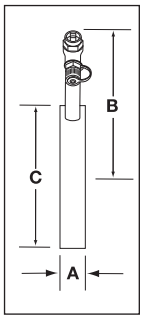
Fig No.	Factor
DM900	0.36
DM941/DA941 (Fully open)	2.23
DM950G	0.47

Flow Measurement Graphs

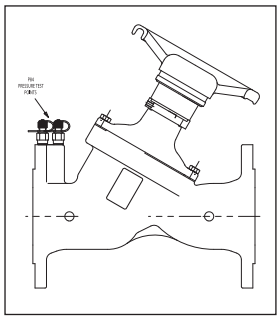
Size 150mm DM900-DM941-DA941-DM950G

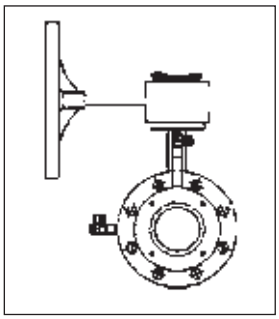
Fixed orifice devices for standard applications





DM900


DM941


DM950G

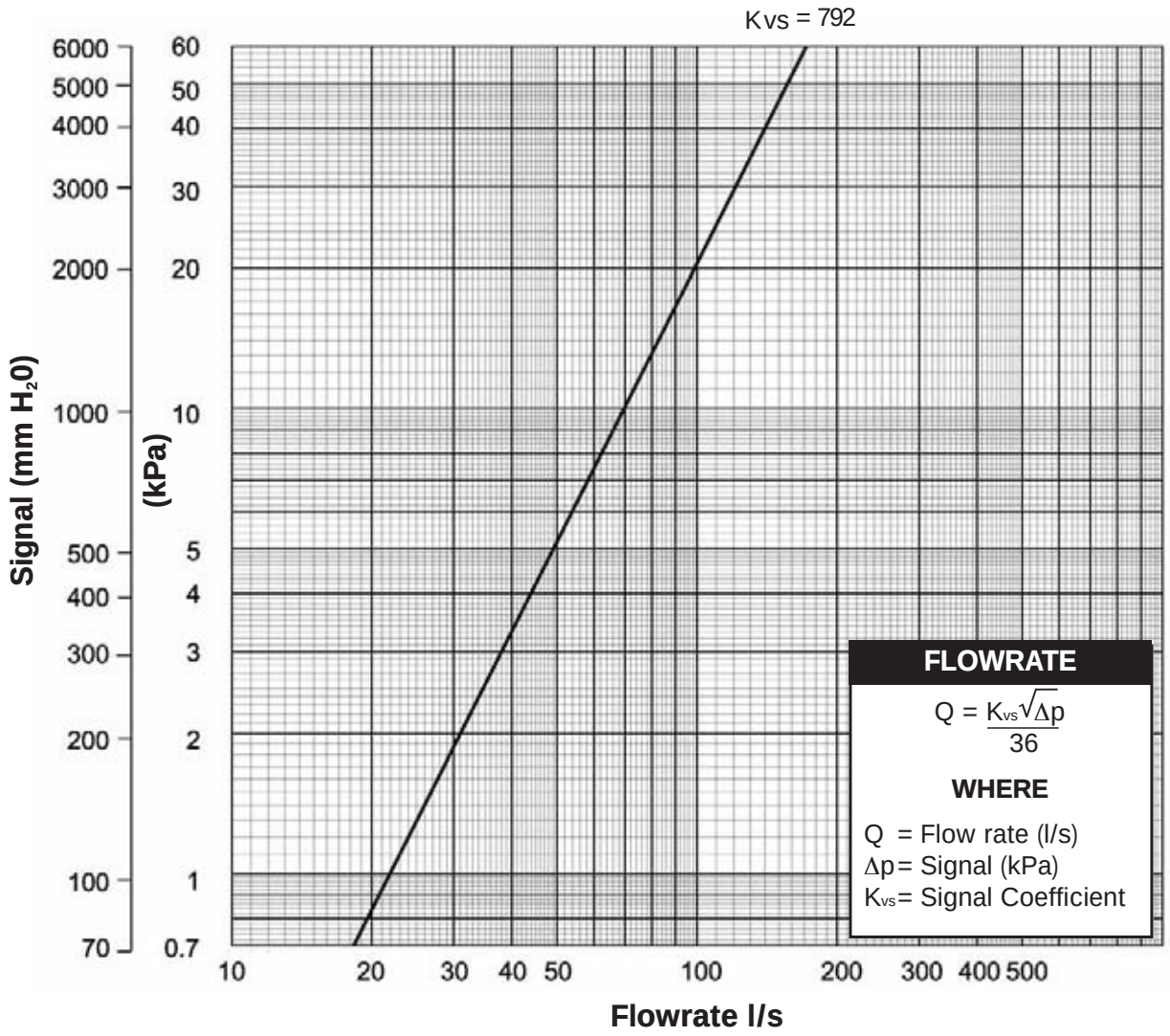
Head/Pressure Loss

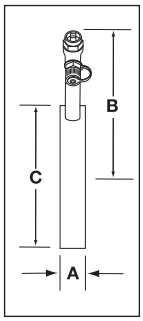
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.35
DM941/DA941 (Fully open)	2.09
DM950G	0.42

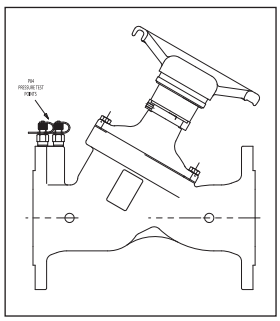
Size 200mm DM900-DM941-DA941-DM950G

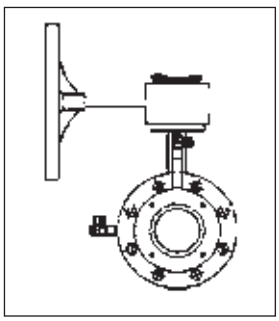
Fixed orifice devices for standard applications





DM900


DM941/DA941


DM950G

Head/Pressure Loss

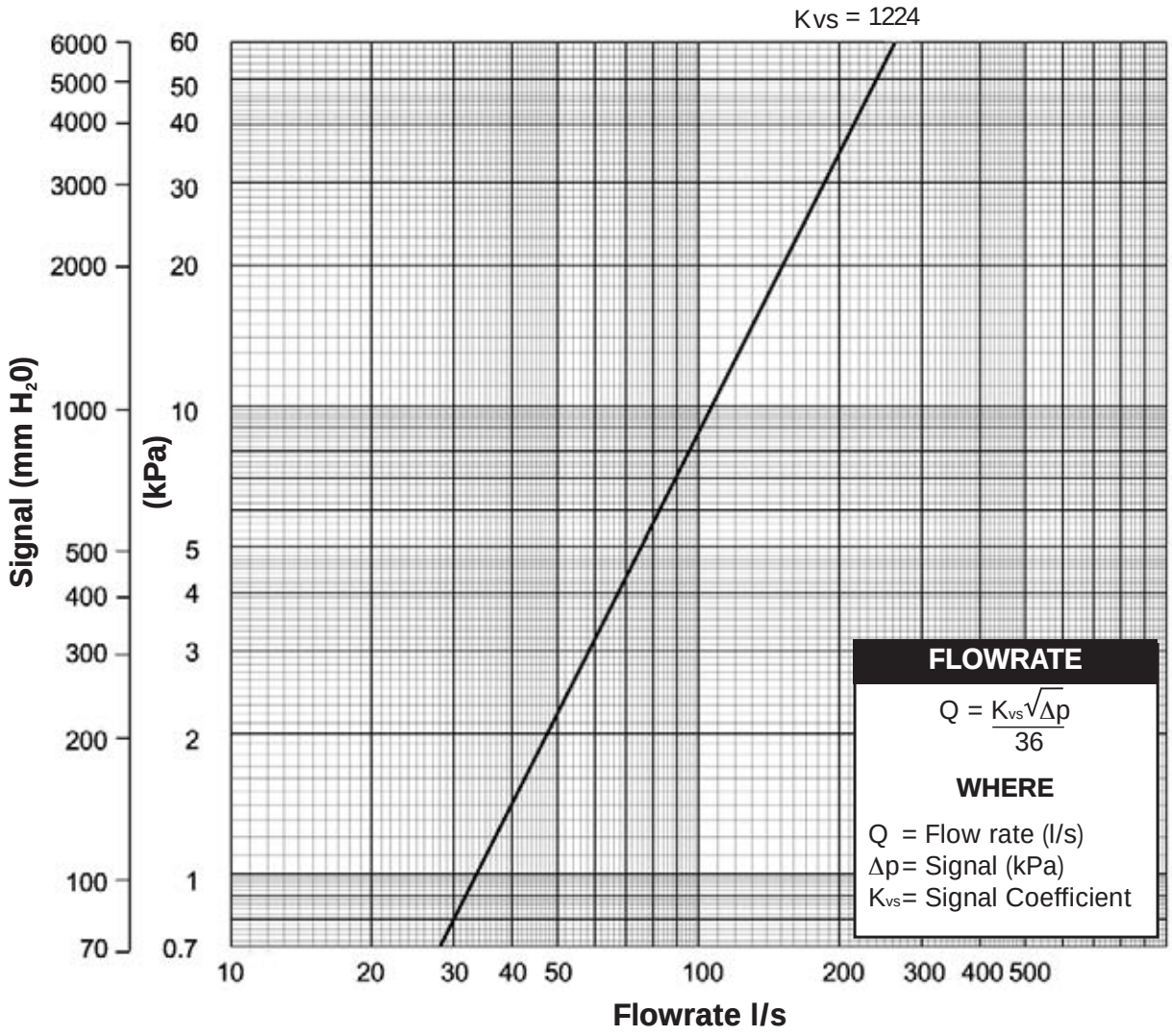
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

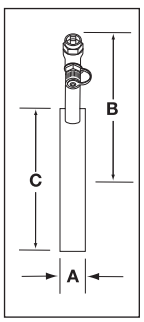
Fig No.	Factor
DM900	0.33
DM941/DA941 (Fully open)	2.28
DM950G	0.37

Flow Measurement Graphs

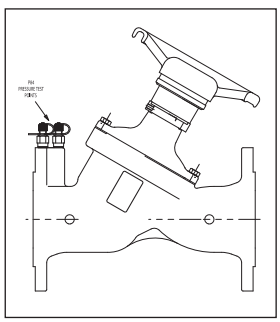
Size 250mm DM900-DM941-DA941-DM950G

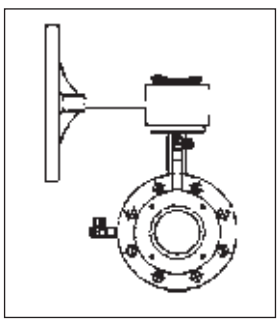
Fixed orifice devices for standard applications





DM900


DM941/DA941


DM950G

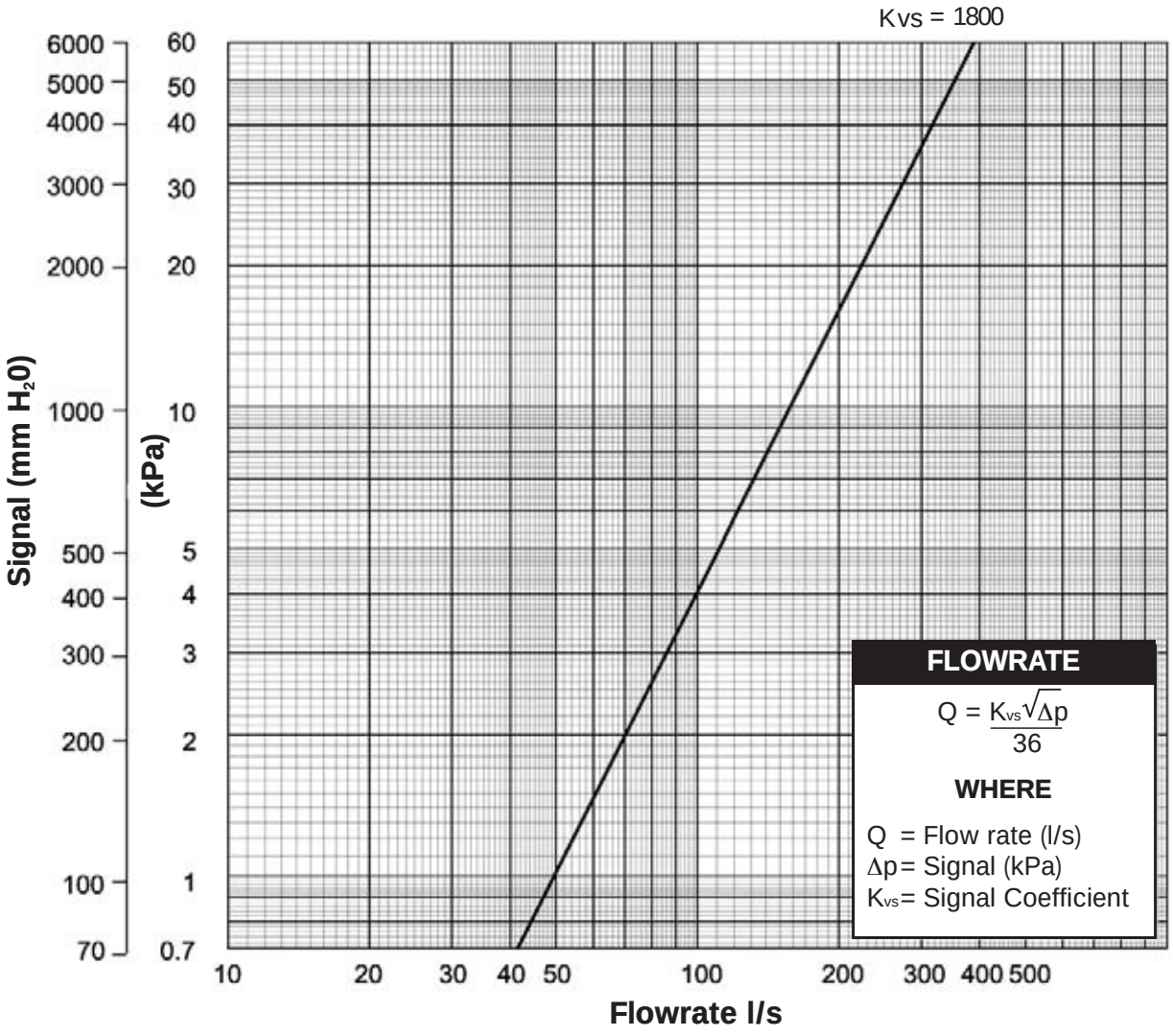
Head/Pressure Loss

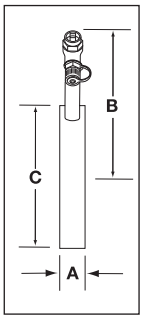
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.33
DM941/DA941 (Fully open)	1.34
DM950G	0.36

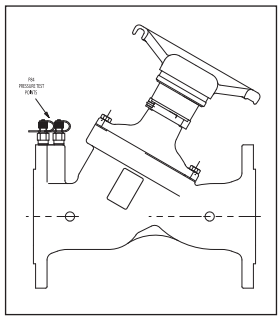
Size 300mm DM900-DM941-DA941-DM950G

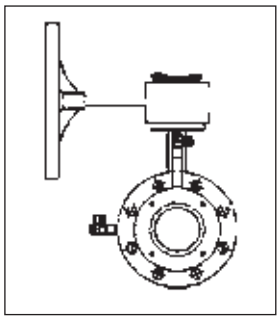
Fixed orifice devices for standard applications





DM900


DM941/DA941


DM950G

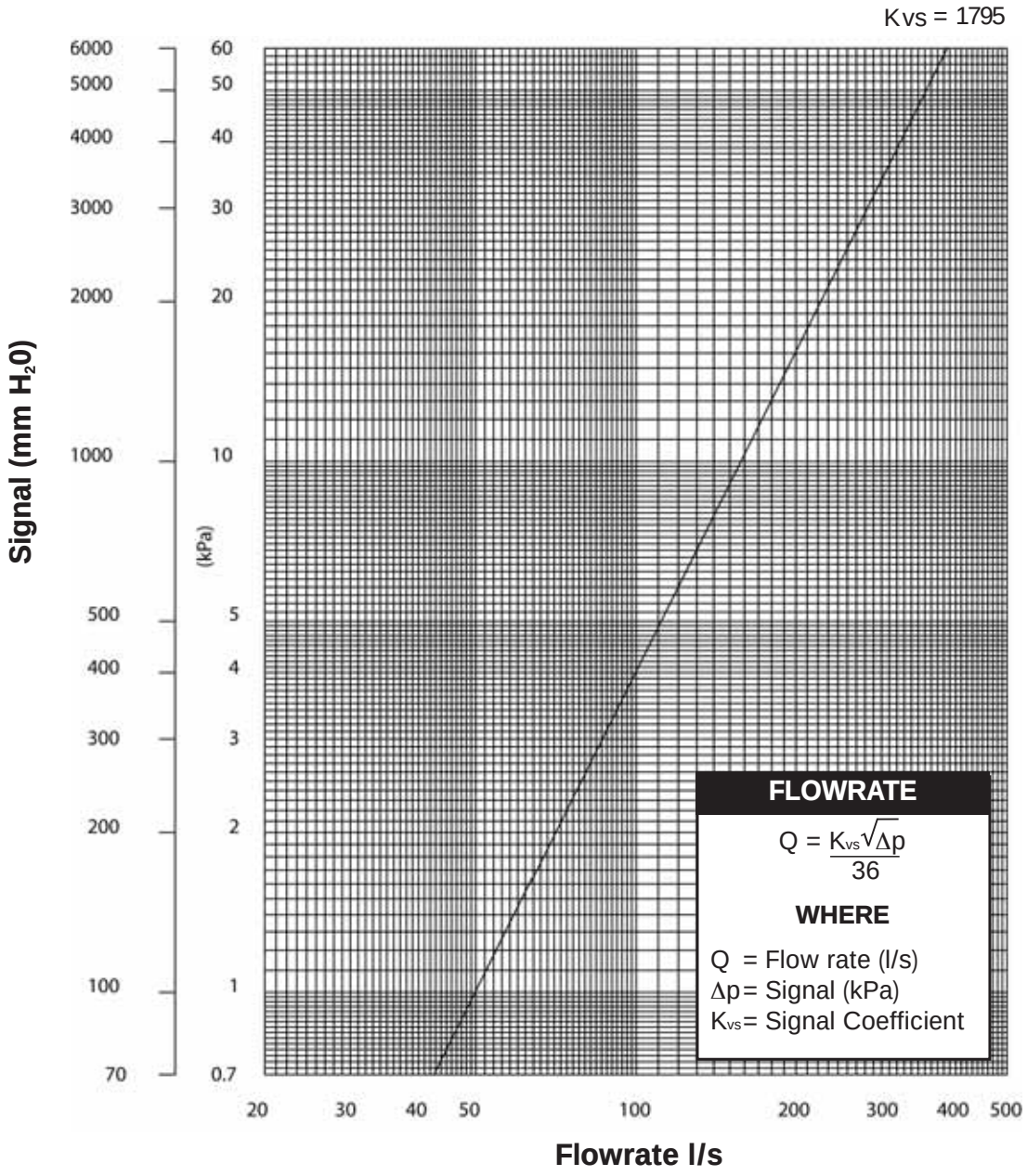
Head/Pressure Loss

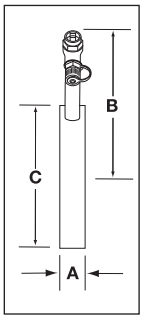
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.33
DM941/DA941 (Fully open)	1.84
DM950G	0.35

Size 350mm DM900

Fixed orifice devices for standard applications





DM900

Head/Pressure Loss

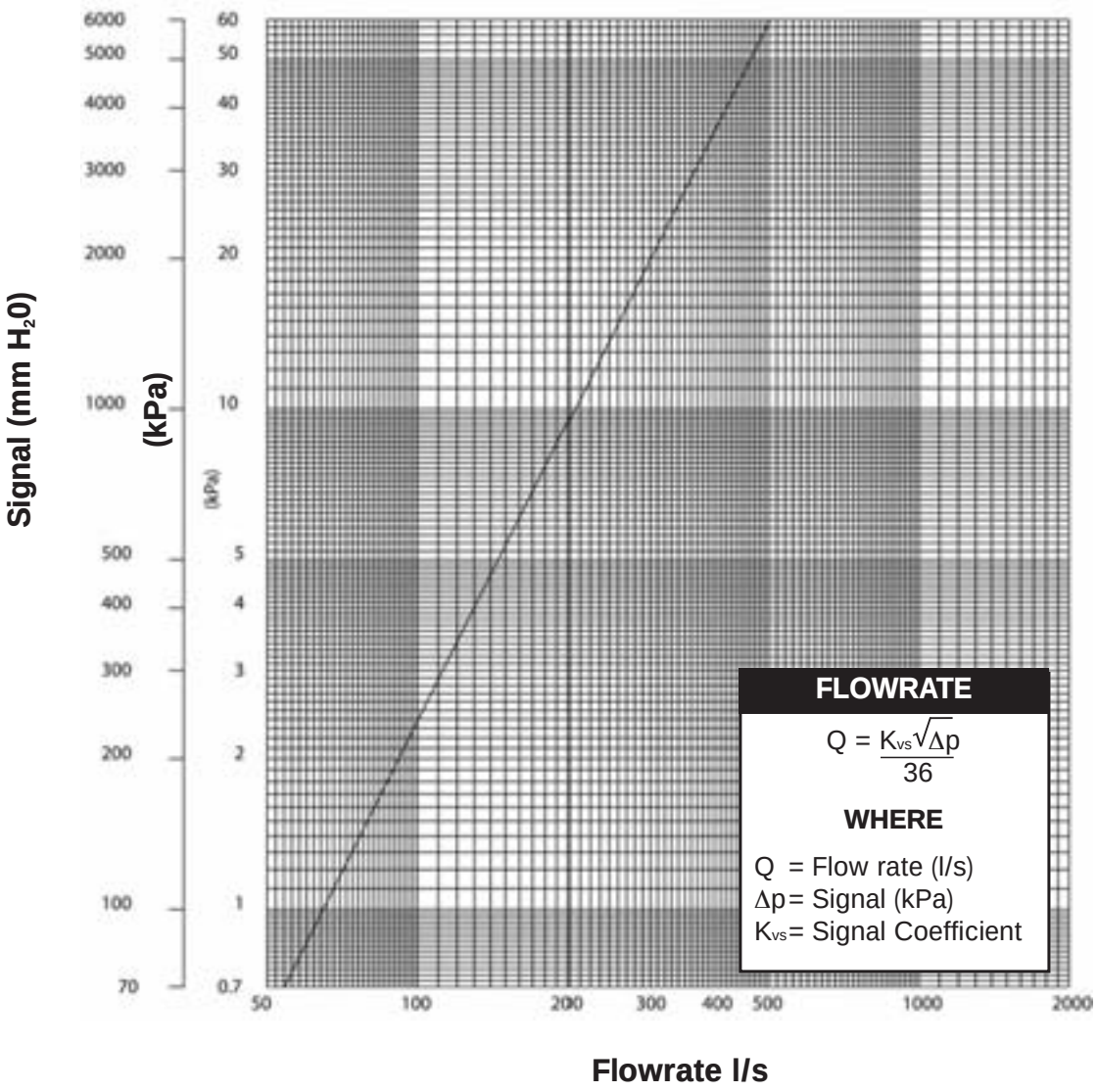
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.42

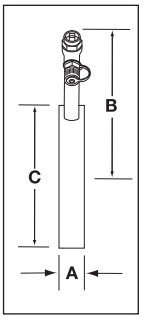
Size 400mm DM900

Fixed orifice devices for standard applications

Kvs = 2334



Flowrate l/s



DM900

Head/Pressure Loss

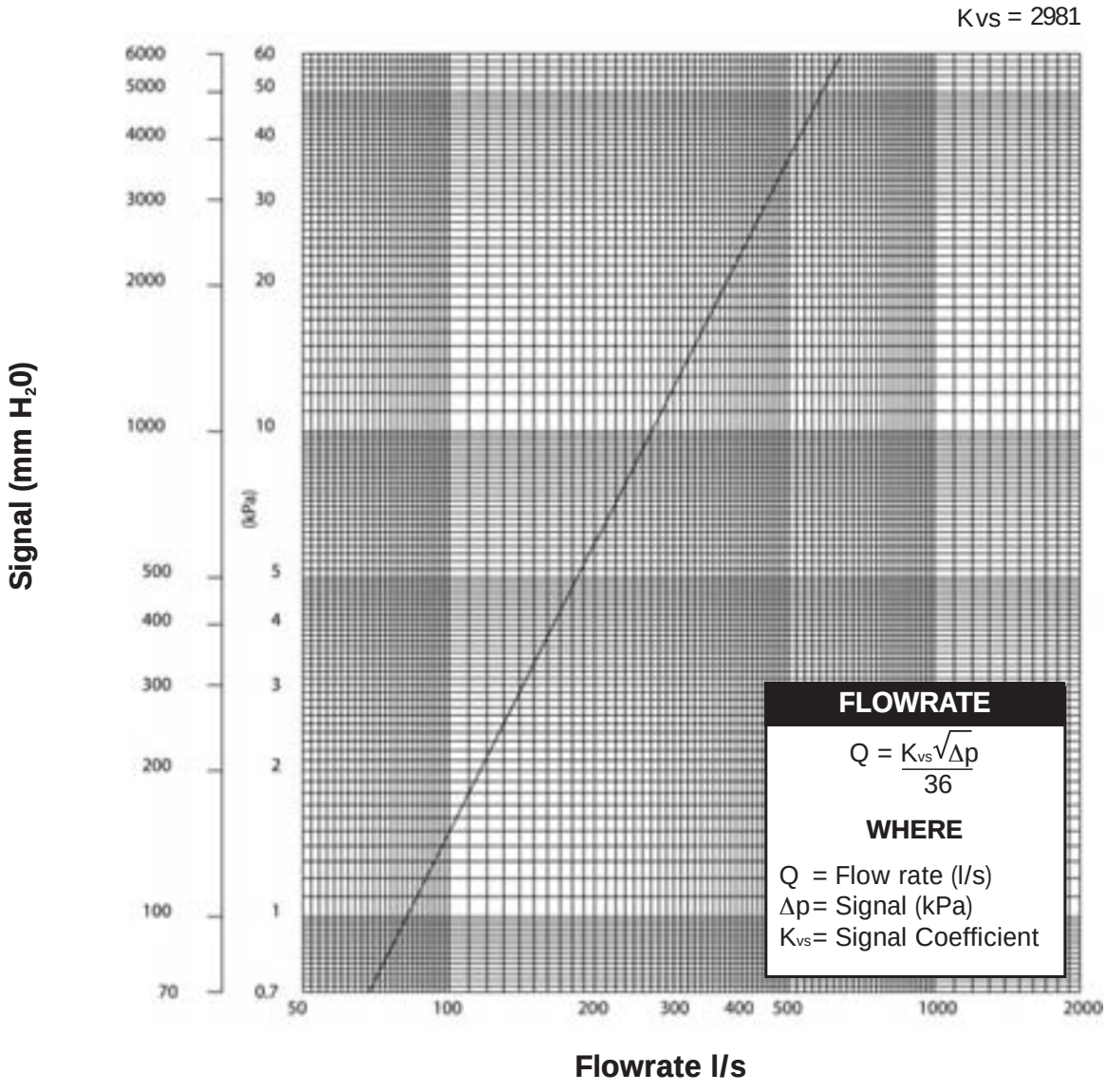
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.42

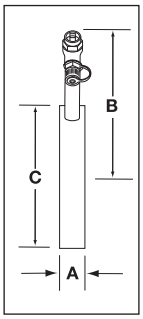
Size 450mm DM900

Fixed orifice devices for standard applications

Kvs = 2981



Flowrate l/s



DM900

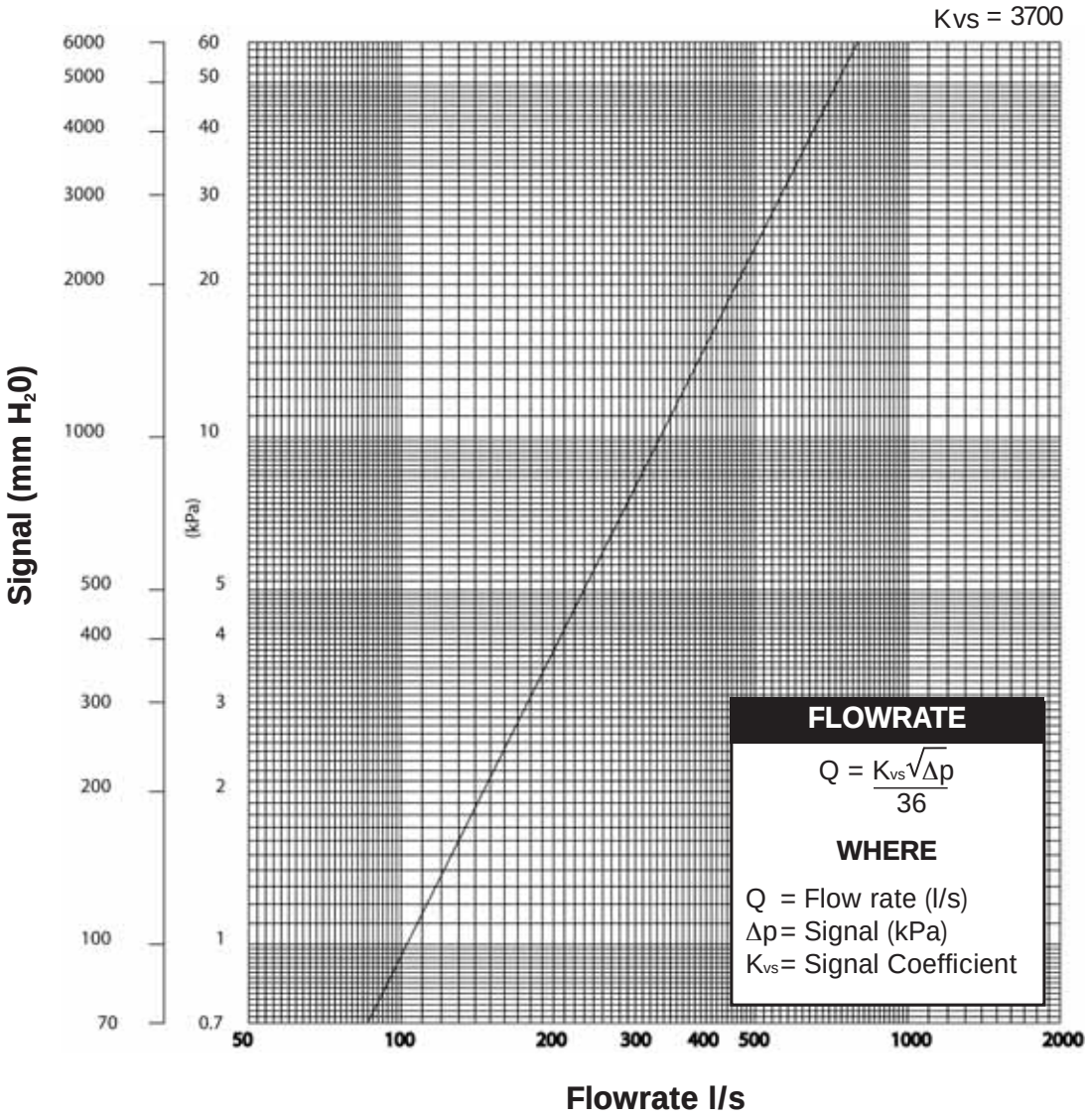
Head/Pressure Loss

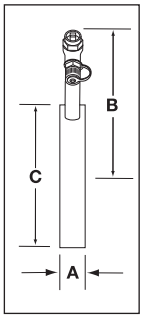
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.42

Size 500mm DM900

Fixed orifice devices for standard applications





DM900

Head/Pressure Loss

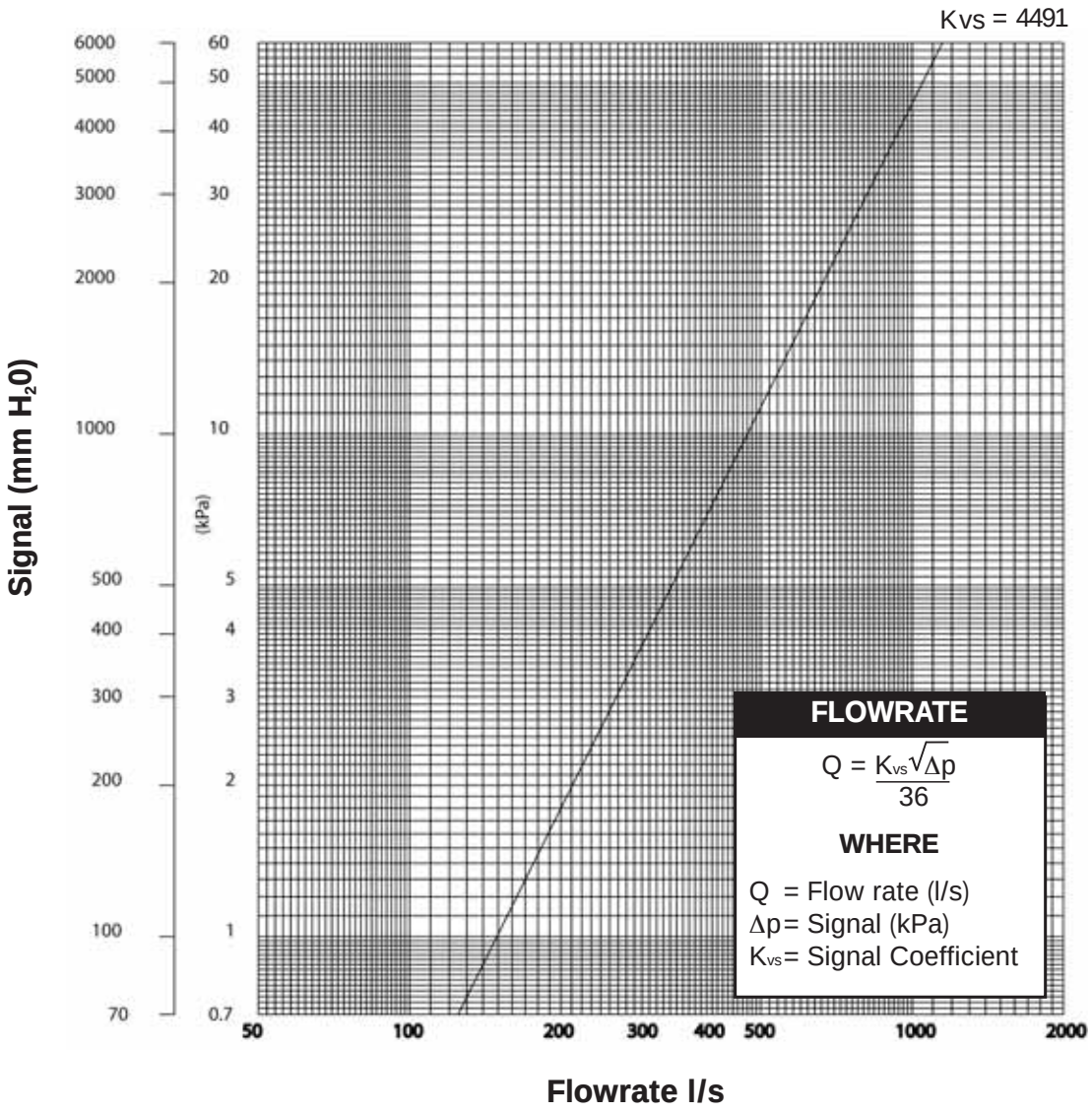
The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

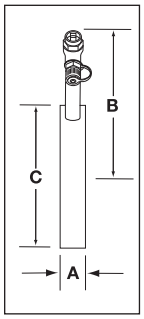
Fig No.	Factor
DM900	0.42

Flow Measurement Graphs

Size 600mm DM900

Fixed orifice devices for standard applications





DM900

Head/Pressure Loss

The loss resulting from the insertion of the device in the pipeline may be calculated by multiplying the signal by the appropriate factor

Fig No.	Factor
DM900	0.42

Thinking inside the box...

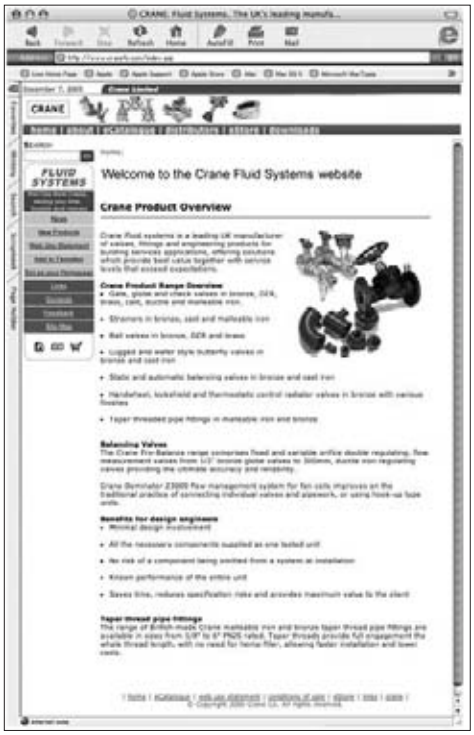
one easy point for commissioning multiple terminal units.

- Up to six terminals can be served
- All units are custom built
- All terminal connections and mountings are outside the box
- Variable or constant flow systems
- Fan coil units can be flushed, vented and balanced by one commissioning engineer instead of a team
- A single strainer serves all circuits
- Box is insulated for condensation control as Building Regs Part L

CommPac
Manifold Commissioning System

CRANE FLUID SYSTEMS

www.cranefs.com



www.cranefs.com is the home of the Crane Fluid Systems Internet Site. Here users will find a valuable information source on Crane and all of its products.

The site is split into 6 sections providing general information on Crane plus full technical data on the entire product range. It also provides a one-stop source of information on valves and their applications, as well as publishing technical papers on issues affecting the industry.

Technical advice on the range of Crane products is only an email away via the 'ask the expert' facility within the contacts section.

home

The Home Page provides access to the news section of the site, as well as product features which focus on recently introduced Crane products. A map of how to find us is also available as well as a site map for easy navigation around the many areas of the site.

about

Information on Crane is available in this section including the vision statement, company history, casting services and information on career opportunities with Crane.

e-catalogue

Information on the complete range of Crane valves and fittings resides in this area of the site. Users can view and print database generated product catalogue pages for all products within the Crane range. In addition, photos and dimensional drawings can be downloaded by the user for printing.

Being on-line, the catalogue is always up to date; the latest information on all current Crane products is just a few clicks away. The Crane Product Profile can be ordered from this section.

Distributors

Crane products are sold exclusively through a comprehensive network of distributors and agents. Use the search facility to find your nearest distributor of Crane valves and fittings anywhere in the world.

downloads

Click here to download the latest Crane valve selection software, allowing fast and efficient selection of all Crane balancing products.

Visit www.cranefs.com

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The Company reserve the right to amend any product without notice.

CFS_FMARV_09_2009

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