Variable Orifice Double Regulating Valve

Flow Data

and

Installation Instructions

Flow Coefficient

The flow rate can be calculated using the K_v value and a measured signal.

$$K_v = \frac{Q*36}{\sqrt{\Delta P}} \qquad K_{vs} = \frac{Q*36}{\sqrt{\Delta P_s}}$$

where K_v & K_{vs} = flow coefficient (m³/hr at 1 bar differential)

Q = flow rate (l/s)

ΔP = headloss attributable to valve (kPa)

ΔP_s = differential pressure across tappings (signal) (kPa)

K_{vs} Values

The K_{vs} values are given on each flow chart at various positions from 25% to fully open.

Pressure Loss and Kv Value

The pressure loss across a variable orifice double regulating valve is the same as the differential pressure (signal) measured across the body seat.

The K_v value is therefore the same as the K_{vs} value used to calculate flow rate.

Installation

Variable orifice double regulating valves must always be installed with a minimum of 5 pipe diameters of straight pipe, without intrusion, upstream of the valve and a minimum of 2 pipe diameters downstream.
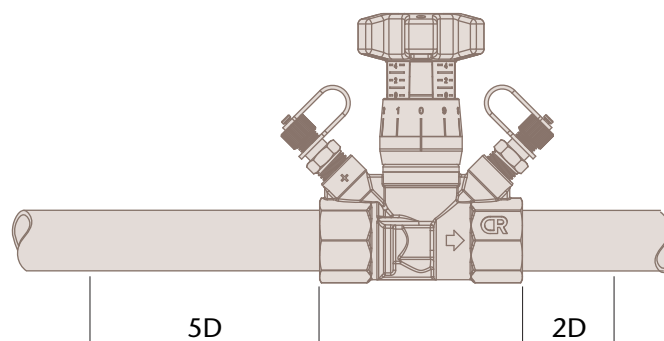
Sizing

Once the required flow rate has been calculated, the size of the variable orifice double regulating valve can be determined based on the following:

   With the valve fully open, a minimum signal at the design flow rate of 1 kPa. The maximum signal is normally less than 5 kPa but can be up to 10 kPa.

   For sizing the flow velocity should not exceed 1.15 m/s at the design flow rate.

Pressure Equipment Directive

Under the Pressure Equipment Directive (PED) these variable orifice double regulating valves have been specified for Group 2 Liquids i.e. non-hazardous

   Sizes ½" to 2" are classified as SEP (Sound Engineering Practice)

$^1/_2$" ART 28 Variable Orifice Double Regulating Valve

Signal kPa vs Flowrate l/s chart
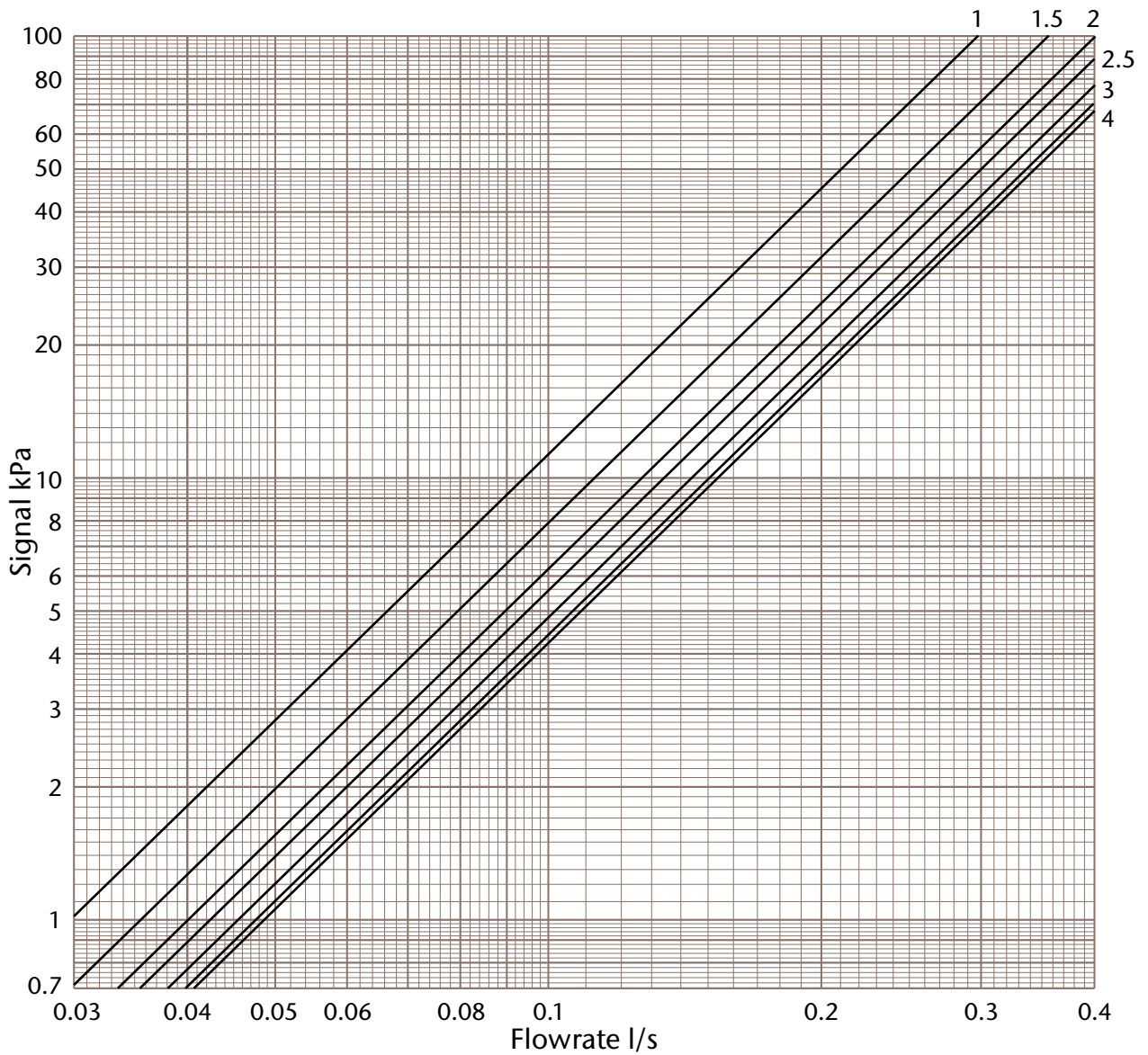
Position	1	1.5	2	2.5	3	3.5	4
Kvs	1.07	1.28	1.44	1.53	1.64	1.71	1.75
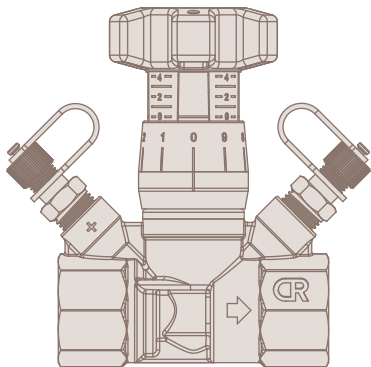
Signal / Flowrate
Chart used to determine flowrate from signal measured across orifice
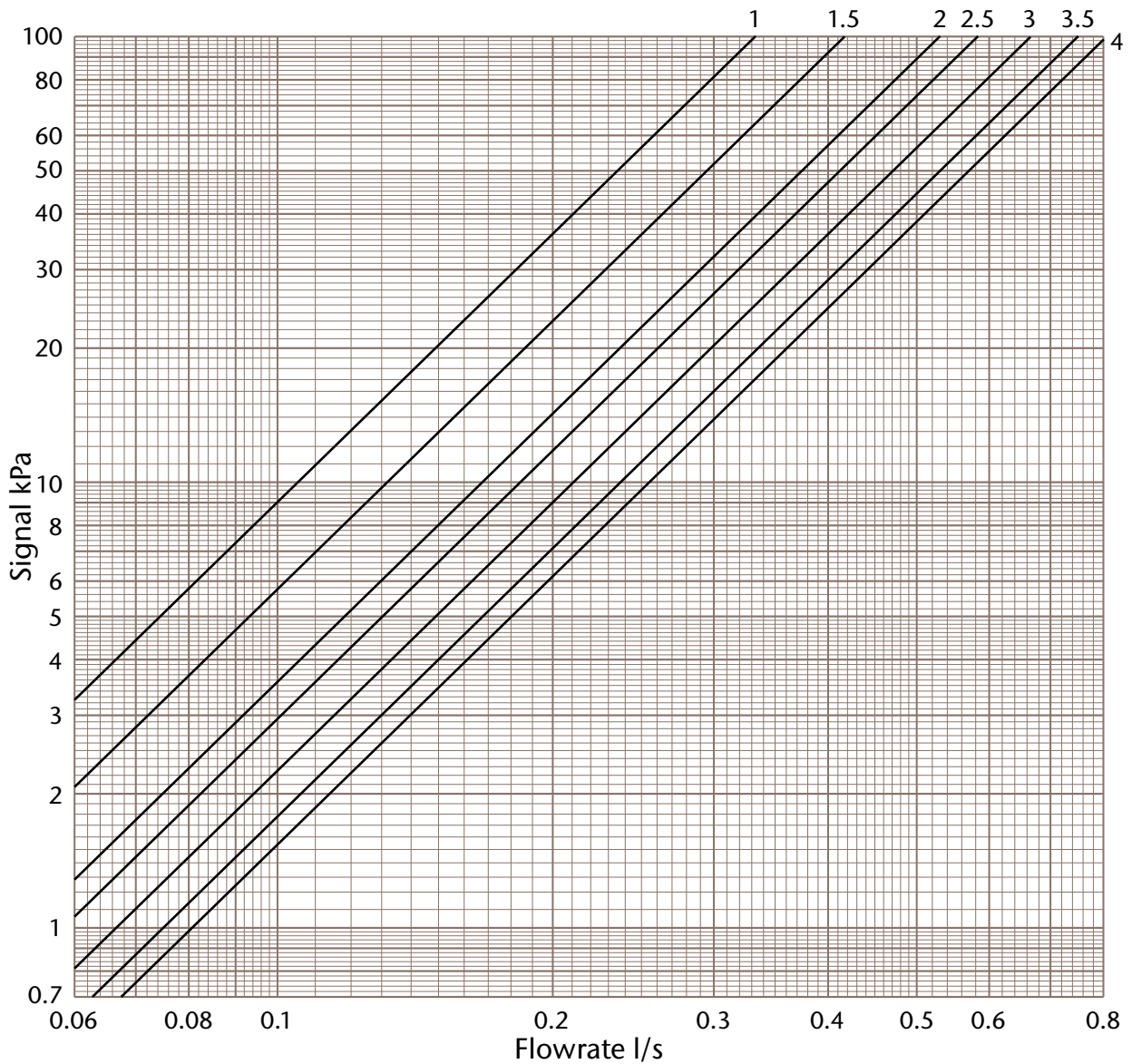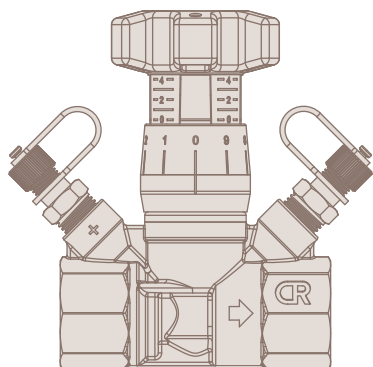
$$Q = \frac{K_{vs} \sqrt{\Delta p}}{36}$$

Where

Q	= Flowrate	l/s
Δp	= Signal	kPa
Kvs	= Signal Co-efficient	

³/₄" ART 28 Variable Orifice Double Regulating Valve

Position	1	1.5	2	2.5	3	3.5	4
Kvs	1.2	1.5	1.9	2.1	2.4	2.7	2.9

Signal / Flowrate

Chart used to determine flowrate from signal measured across orifice

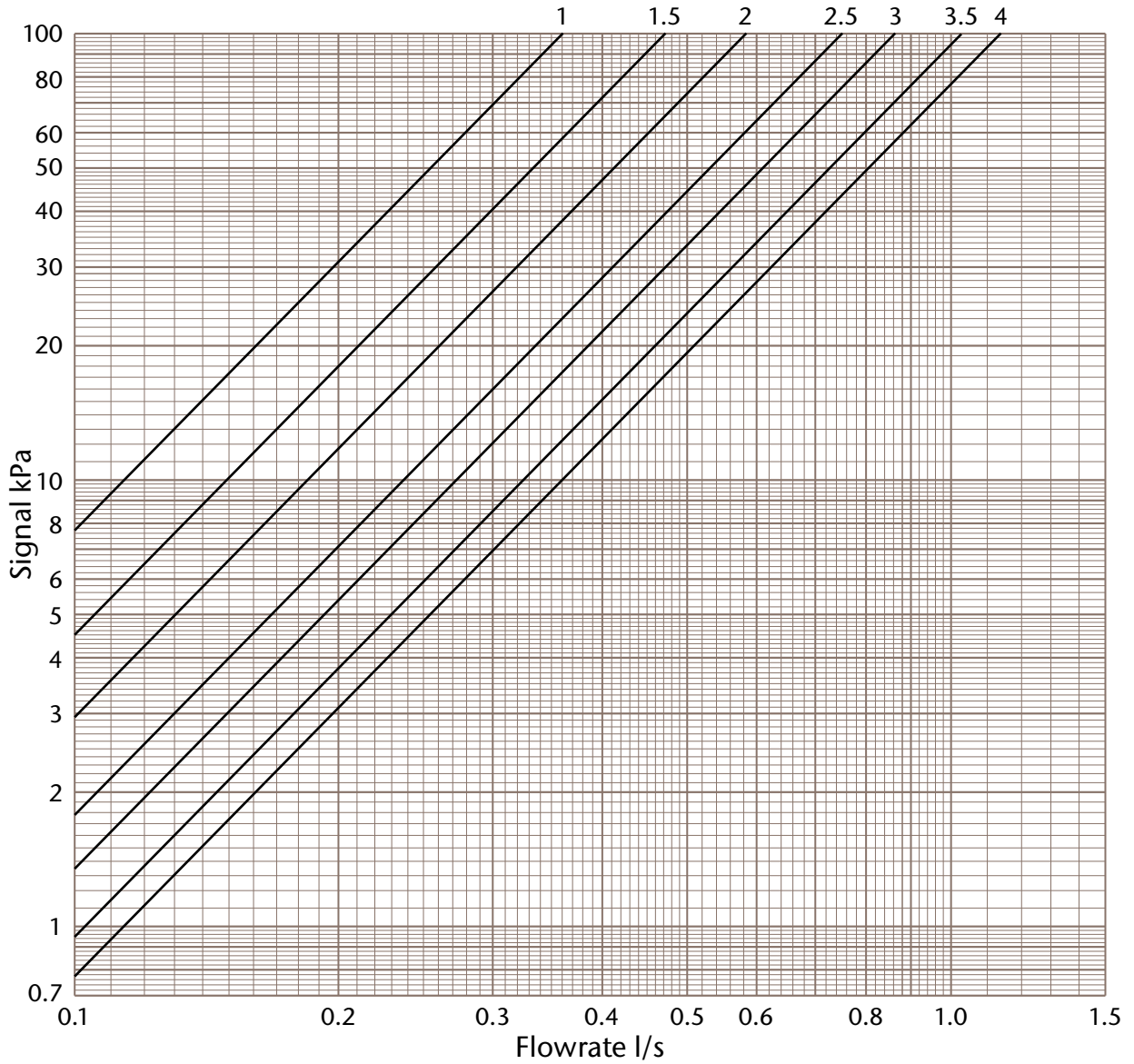$$Q = \frac{K_{vs} \sqrt{\Delta p}}{36}$$

Where

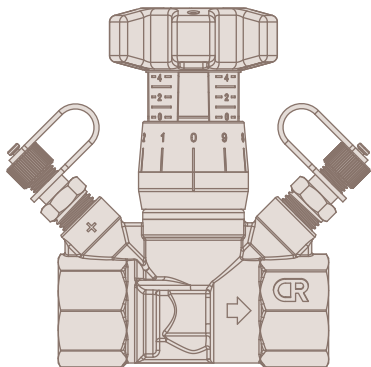|		
Q	= Flowrate	l/s
Δp	= Signal	kPa
Kvs	= Signal Co-efficient	

1" ART 28 Variable Orifice Double Regulating Valve

Signal kPa (vertical axis) vs Flowrate l/s (horizontal axis). Curves labelled 1, 1.5, 2, 2.5, 3, 3.5, 4.

Position	1	1.5	2	2.5	3	3.5	4
Kvs	1.3	1.7	2.1	2.7	3.1	3.7	4.1

Signal / Flowrate

Chart used to determine flowrate from signal measured across orifice
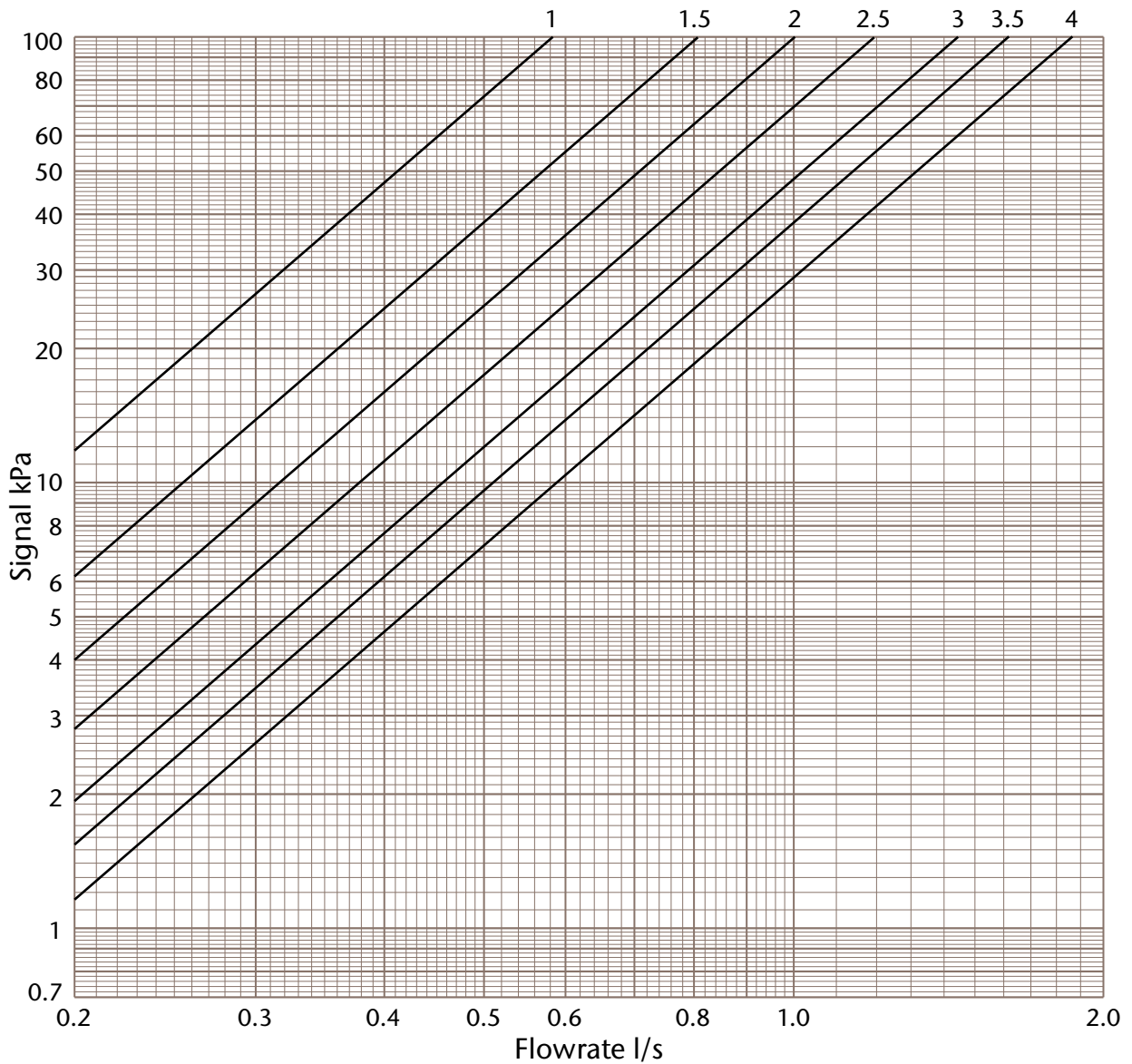
$$Q = \frac{K_{vs} \sqrt{\Delta p}}{36}$$

Where

Q	= Flowrate	l/s
Δp	= Signal	kPa
Kvs	= Signal Co-efficient	

1^1/$_4$" ART 28 Variable Orifice Double Regulating Valve

Position	1	1.5	2	2.5	3	3.5	4
K$_{vs}$	2.1	2.9	3.6	4.3	5.2	5.8	6.7

Signal / Flowrate

Chart used to determine flowrate from signal measured across orifice

$$Q = \frac{K_{vs} \sqrt{\Delta p}}{36}$$
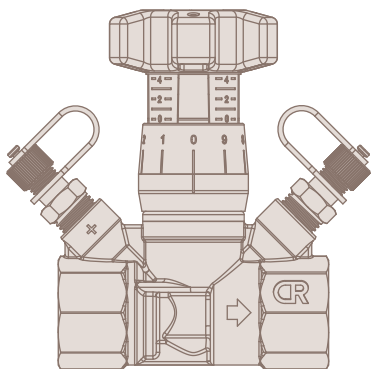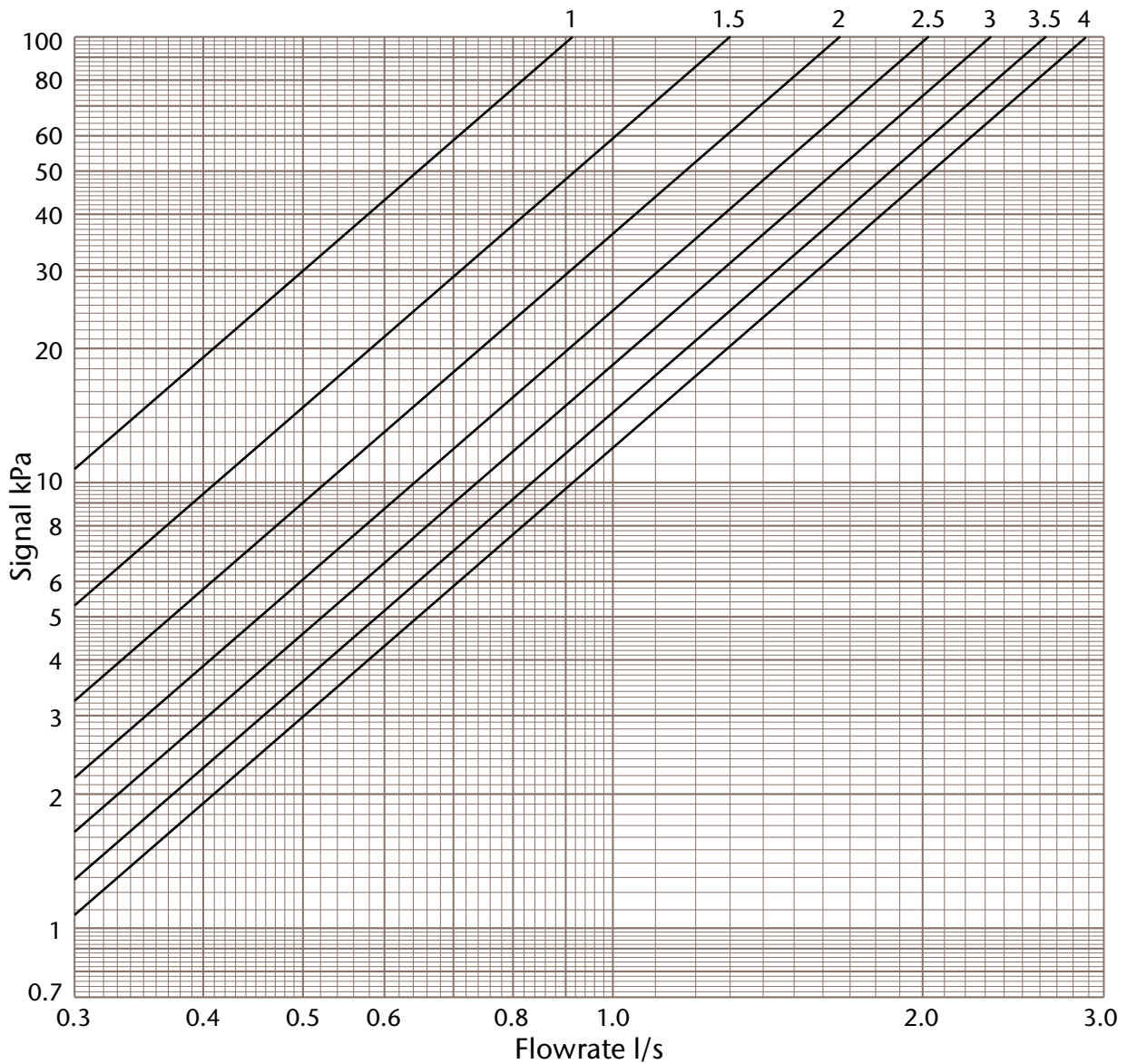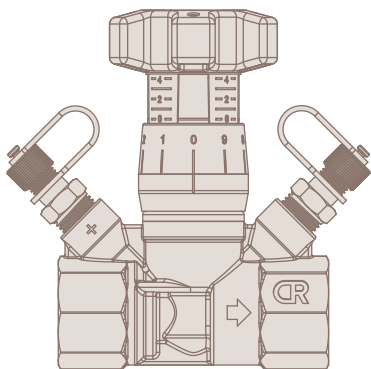
Where

Q = Flowrate   l/s

Δp = Signal   kPa

K$_{vs}$ = Signal Co-efficient

1^1/$_2$" ART 28 Variable Orifice Double Regulating Valve

Position	1	1.5	2	2.5	3	3.5	4
K$_{vs}$	3.3	4.7	6.0	7.3	8.4	9.5	10.4

Signal / Flowrate

Chart used to determine flowrate from signal measured across orifice

$$Q = \frac{K_{vs} \sqrt{\Delta p}}{36}$$

Where

Q	= Flowrate	l/s
Δp	= Signal	kPa
K$_{vs}$	= Signal Co-efficient	

2" ART 28 Variable Orifice Double Regulating Valve

Signal kPa vs Flowrate l/s chart with lines for positions 1, 1.5, 2, 2.5, 3, 3.5, 4

Position	1	1.5	2	2.5	3	3.5	4
Kvs	4.8	7.0	8.8	10.6	12.2	13.7	15.1

Signal / Flowrate

Chart used to determine flowrate from signal measured across orifice
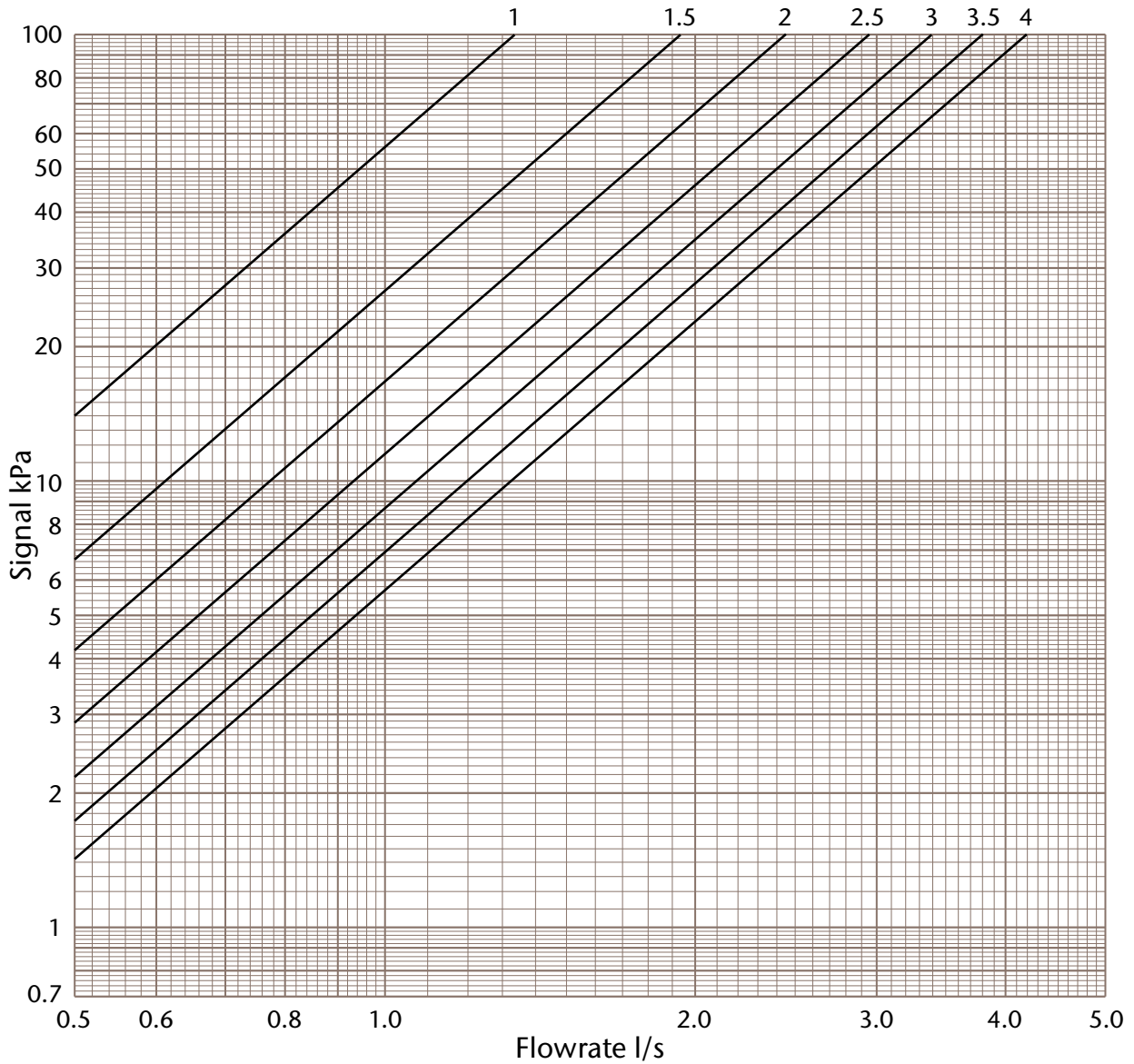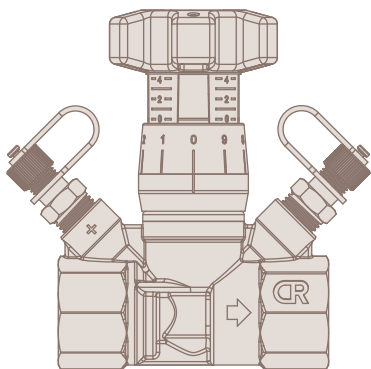
$$Q = \frac{K_{vs} \sqrt{\Delta p}}{36}$$

Where

Q	= Flowrate	l/s
Δp	= Signal	kPa
Kvs	= Signal Co-efficient	