IMI CCI®

# VRA

Engineering GREAT Solutions

## Low Pressure Control Valve

IMI Critical Engineering

# VRA: Low Pressure Control Valve

This large capacity pressure reduction valve is mainly used in large CHP plants, like desalination for turbine extraction control valve and LP dump to condenser applications. It is beneficial where supercritical pressure drops exist in some conditions in combination with low pressure drop in other conditions.

The IMI CCI VRA has been designed to provide high capacity at low pressure drops, tight shut-off to minimise heat losses, and very high rangeability. The IMI CCI VRA is available with IMI CCI desuperheaters.

## Key features

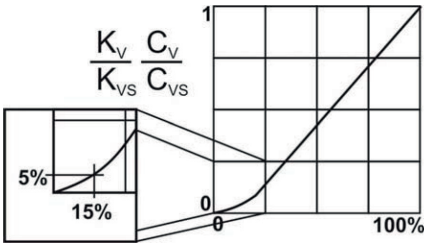
VRA type valves are high capacity pressure reducing valves. The steam flow is throttled through a fixed cage with multiple drilled holes and a moving plug internally, which provide optimum characteristics for control of the steam pressure. The plug slides in a surface hardened body, thus uncovering a greater or smaller number of the throttling holes. In the closed position the plug seats on the hard-faced seat. The facing is made of a tough material with excellent sealing properties and good resistance against corrosion, erosion and thermal fatigue.

> All internal parts of the valve can be removed without the valve having to be dismantled from the pipe. The valve seat is designed for field replacement

> The outer cage doubles as a strainer to protect the seat area from foreign objects

> The plug connects to its actuator via a straight stem. The plug and stem are made of heat and corrosion resistant material, hardened in a unique process. The stem is sealed with a conventional stuffing box

> The pressure reduction continues in the outlet that is furnished with pressure reducing pipes




Modified linear valve characteristic for VRA.
Other characteristics on request.

## Benefits

> Angle valve with bolted bonnet and quick replacement bolted seat

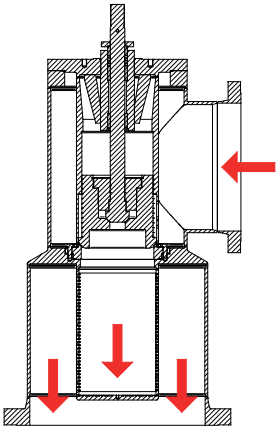
> Tight shut-off trim minimises heat losses

> Hanging cage trim design resists thermal stress, and requires no additional preheating above the demand for superheated steam in the inlet

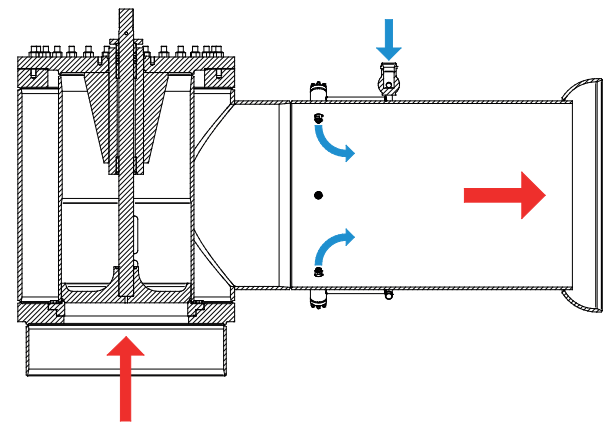
> Outer cage with small holes for flow control that results in a protected seat area and high rangeability – 50:1 or more and ability to provide low noise

> Option to add desuperheating and additional stages for supercritical pressure drop

> Valve can be provided with both flow to open and flow to close design



VRA flow to close with outlet cage to control noise



VRA flow to open with included desuperheating

## Sizing, installation and actuator

The Kv/Cv-value of the valve depends on the pressure ratio p1/p2 and must – for each valve – be calculated in the IMI CCI valve sizing computer program PowerSiz, where all throttling points in the valve are taken into consideration. A certified dimensional drawing will be supplied by IMI CCI.

The actuator must always be vertical due to the very large valve size.

The VRA is available with balanced tight trim, which comes with option for pneumatic, electric, or hydraulic actuator.

## Noise control

VRA valves can be equipped with features to avoid supersonic velocities in the final pressure reducing step. This is of importance as supersonic velocities may cause shock cells, possible sources of noise and vibrations.

The valve outlet can therefore be equipped with an additional perforated diffuser package. This increases the number of expansion stages and simultaneously the steam flow is broken up into a great number of partial fluid jets. This helps the rapid dissipation of kinetic energy in the steam and results in a substantially reduced emission of noise and vibrations.

As a special customer service, IMI CCI can on request supply noise level predictions for each valve supplied and make specific recommendations regarding insulation, installation, and control.

## Product specification

**Valve configurations**

| | |
|---|---|
| VRA-TC | Tight design. Selected when leakage tightness according to ANSI FCI 70-2/EN 1349 class V is required |
| VRA-BC | Balanced design. Selected together with pneumatic, hydraulic or electric actuators where the leakage tightness according to ANSI FCI 70-2/EN 1349 class III or IV is acceptable. |

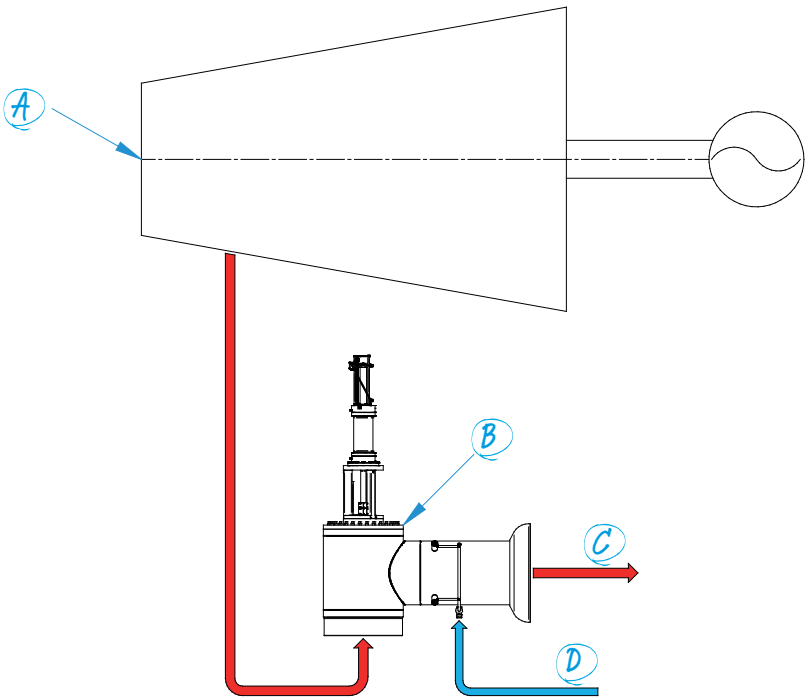
**Valve designation guide**

| | |
|---|---|
| Valve type | VRA |
| Plug diameter | -800* |
| Plug design | B |
| Plug type | T |
| Extended Bonnet Strainer | C |

*Maximum plug diameter of 800mm

**Materials**

- Valve body and desuperheater are rolled and welded using low chrome steel (10CrMo9-10)
- Trim materials are DIN 1.4913 with surface hardening. Seat ring is hard faced with cobalt overlay
- All materials available on request




A. Steam turbine
B. VRA with built-in desuperheating
C. Turbine extract to process steam
D. Feedwater / condensate water

VRA used to regulate turbine extraction steam

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