Function
The DeZURIK/Copes-Vulcan Type FW-1 system is a self-contained control system for automatic regulation of water level in boilers. The FW-1 valve receives its signal and operating power from the boiler it serves. Evaporation of water in the outer shell of the generator, caused by the change of boiler water level in the inner pipe of the generator, is immediately translated into a hydraulic loading on the diaphragm of the feedwater regulating valve. Valve positioning is both instantaneous and accurate because of the hydraulic linkage between the generator and the valve.

Features
- Self-contained system — no instrument air or electricity required.
- Regulating valve can be located adjacent to, or remote from the generator — ease of maintenance is the only factor to take into consideration when installing the valve.
- Flexibility of installation piping permits sensitivity and level adjustments.
- Speed of response to level changes and mean water level can also be adjusted with system in place.
- Generator piping is both self supporting and adjustable. No welding or bracing is required to mount generator on boiler drum, in water column piping or directly on water column. Within minutes generator can be adjusted to individual boiler requirements.
- Feedwater regulating valves are double ported with stainless steel inner valve, stem and seats.
- Complete valve maintenance is possible without removal from feed lines.

Self contained by-pass makes it possible to jack valve wide open manually or to hold it at any set position. Travel indicator clearly shows valve opening throughout stroke.

Nearly a ton of stem force is available to position valve.

Flexible Type Generator Hook-Up

![Diagram of Flexible Type Generator Hook-Up]
Specifications

Body Style
Double seated

Body Material
Cast Iron ASTM A126 GRB
Cast Steel ASTM A216 WCB

Ends
Threaded 1-2" (25-50mm)
Cast Iron only
Flanged, 1-3" (25-80mm) Flange
Drilling per ANSI Std.

Packing
Non Asbestos Graphite

Disc
304 Stainless Steel

Stem
303 Stainless Steel

Seats
410 Stainless Steel HT 360 BHN

Diaphragm
Neoprene, nylon fabric

Spring
Chrome-Vanadium Steel

Standard raised face furnished on flanged valves.

System Components
The Type FW-1 Thermo-Hydraulic system consists of:
• Type FW-1 Feedwater Regulating Valve
• Steel generator
• Necessary installation piping
• Copper connecting tubing
• Complete installation and maintenance instructions

Dimensions

<table>
<thead>
<tr>
<th>Size</th>
<th>A Threaded</th>
<th>A Flanged</th>
<th>B Threaded</th>
<th>B Flanged</th>
<th>C</th>
<th>D</th>
<th>Shipping Weight</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>250</td>
<td>250</td>
<td>300</td>
<td>600</td>
<td>250</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>1&quot;</td>
<td>150mm</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>5/8&quot;</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1.25&quot;</td>
<td>180mm</td>
<td>–</td>
<td>9/16&quot;</td>
<td>229mm</td>
<td>–</td>
<td>3/4&quot;</td>
<td>100mm</td>
</tr>
<tr>
<td>1.5&quot;</td>
<td>195mm</td>
<td>9.5&quot;</td>
<td>9.5&quot;</td>
<td>240mm</td>
<td>9.5&quot;</td>
<td>240mm</td>
<td>9.5&quot;</td>
</tr>
<tr>
<td>2&quot;</td>
<td>200mm</td>
<td>11.5&quot;</td>
<td>11.5&quot;</td>
<td>290mm</td>
<td>11.5&quot;</td>
<td>290mm</td>
<td>–</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>330mm</td>
<td>13&quot;</td>
<td>13&quot;</td>
<td>330mm</td>
<td>13&quot;</td>
<td>330mm</td>
<td>–</td>
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<tr>
<td>3&quot;</td>
<td>350mm</td>
<td>14&quot;</td>
<td>14&quot;</td>
<td>350mm</td>
<td>14&quot;</td>
<td>350mm</td>
<td>–</td>
</tr>
</tbody>
</table>

Allow 6" (150mm) Min. Clearance

For Connection To Generator

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Sizing and Ordering Information

1. A completed Feedwater Regulator Questionnaire must accompany each order.

2. It is recommended that the valve be the same size as the feedwater piping to the boiler.

3. The pressure drop across the regulating valve should be held relatively constant over the full operating range. DeZURIK/Copes-Vulcan SDS-2 pump governors are recommended.

4. Boiler Operating Pressure Drop Across Feedwater Regulating Valve

- **50-150 psig** (345-1035 kPag) (140 kPa)
  - 20 psi
  - 10,000 to 20,000
  - 4,536 to 9,072

- **150-400 psig** (1035-2755 kPag) (205 kPa)
  - 30 psi
  - 16,500 to 30,000
  - 7,484 to 14,062

- **400-900 psig** (2755-6200 kPag) (275 kPa)
  - 40 psi
  - 22,000 to 40,000
  - 9,979 to 19,958

**Note:** Maximum pressure drop must not exceed 40 psi (275 kPa).

### FW-1 Feedwater Regulator Valve Sizing Chart

<table>
<thead>
<tr>
<th>Valve Sizes</th>
<th>Disc.</th>
<th>Max Cv</th>
<th>Differential Pressure Across Valves at Maximum Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; 25mm</td>
<td>60%</td>
<td>8.5</td>
<td>10,000 12,200 14,100 15,800 17,300 18,700 20,000</td>
</tr>
<tr>
<td>1.25&quot; 35mm</td>
<td>60%</td>
<td>10.5</td>
<td>16,500 20,200 23,400 26,100 28,600 31,000 33,000</td>
</tr>
<tr>
<td>1.5&quot; 40mm</td>
<td>60%</td>
<td>14.0</td>
<td>22,000 27,000 31,000 34,800 38,000 41,000 44,000</td>
</tr>
<tr>
<td>2&quot; 50mm</td>
<td>50%</td>
<td>24.0</td>
<td>38,000 46,500 53,700 60,000 66,000 71,000 76,000</td>
</tr>
<tr>
<td>2.5&quot; 65mm</td>
<td>50%</td>
<td>38.0</td>
<td>60,000 73,500 85,000 95,000 106,000 112,000 120,000</td>
</tr>
<tr>
<td>3&quot; 80mm</td>
<td>50%</td>
<td>79.0</td>
<td>101,000 121,000 141,000 161,000 181,000 197,000 213,000</td>
</tr>
</tbody>
</table>

**Note:** Available in Cast Iron and Steel
Maxum™ Rotary Control Valves — Sizes 1–12" (25–300mm) for highly erosive services. Features high throttling accuracy and four flow capacity ranges.

Eccentric Plug Valves — Sizes 0.5–72" (15–1800mm) in a wide choice of materials and resilient plug facings.

HP Butterfly Valves — Sizes 2–48" (50–1200mm) for applications to 740 psi (5100 kPa), plus Intelli-Seal™ extra-tight metal, fire tested and PTFE seated models.

V-Port Ball Valves — Sizes 1–20" (25–500mm), pressures to 740 psi (5100 kPa) and temperature ratings to 1000°F (537°C). Flanged and flangeless designs.

Resilient Seated Butterfly Valves — Sizes 2–36" (50–900mm) in two styles with 175 and 225 psi (1210 and 1550 kPa) pressure ratings and wafer and lugged body styles.

AWWA Butterfly Valves — Sizes 3–120" (80–3000mm). Meets AWWA C504 standards.

3- and 4-Way Plug Valves — Sizes 3–16" (80–400mm) for shut-off and switching applications, plus a variety of body materials.

Metal Seated Full Port Ball Valves — Sizes 2–12" (50–300mm) are designed for trouble-free operation in digester blow-down applications and for handling corrosive liquids, gases and abrasive slurries.

Precision Electric Control Valves — Unmatched control accuracy provides up to 16,000 discrete repeatable throttling positions in 90° plug rotation. Accepts analog or digital signals. Sizes 4–20mA (100–500mm).

Permasell® Plug Valves — Sizes 0.5–6" (15–150mm) in ANSI Class 150 and 300 ratings. Body styles include 2-way, 3-way, jacketed, double block and bleed and flush through for corrosive and high temperature applications.

Knife Gate Valves — Rugged designs for corrosive and abrasive service on liquids, slurries and dry materials. Pressures to 150 psi (1030 kPa) and sizes 2–72" (50–1800mm).

Consistency Transmitters — Rotating sensor, AccuTrax™ blade sensor, open type and pan type chambers for pulp and paper systems requirements.

Unival Ported Gate Valves — Sizes 2–48" (50–1200mm) for scaling, corrosive and abrasive services. Reinforced elastomer sleeve forms bubble-tight seal flush with the wall of the pipe.

Regulators and Pump Governors — FW-1, BI and D-O Flomatic regulators for direct control of boiler feedwater level. Sizes 1–3" (25–80mm). SDS-2 steam governor for use in automatic steam pressure control up to 200 psig (1380 kPa). Sizes 1.5–4" (40–100mm), pressure class ANSI 250–600.

General Service and Severe Duty Linear Control Valves — Sizes 0.5–24" (15–600mm) with pressure class ratings from ANSI 125–4500. Top Guided, Cage Guided, Balanced, Unbalanced and Tandem construction with quick-change trim. Wide variety of body styles to meet the exact application requirements. Low noise, tight shutoff, low flow and anticavitation trim options to meet the most demanding requirements. Available in straight, angle, fabricated and 3-way globe body styles. Manual, pneumatic, hydraulic or electric actuation.

Steam and Gas Desuperheaters — For line sizes from 1–36" (25–900mm) and larger. Pressure classes ANSI 150–4500. Wide range of products including Mechanical Atomizing, Spring Assisted Multiple Nozzle, Variable Annuus, Steam Atomizing, Variable Orifice and Multiple Nozzle with Integral Control Valve designs. Temperatures to 1200°F (650°C).

Steam Conditioning Equipment — Preconfigured Pressure Reducing and Desuperheating Stations (PRDS) are cast products in sizes 1x2", 2x4", 3x6", 4x8" and 6x12" (25x50, 50x100, 80x150, 100x200 and 150x300mm) angle style bodies with pressure class ratings from ANSI 600–2500. Fabricated Direct Steam Conditioning Valves (DSCV) are fabricated in pressure classes ANSI 150–4500 for sizes 8–36" (200–900mm) angle construction. Widely used in process steam and turbine bypass applications. Manual, pneumatic, hydraulic or electric actuation.

Actuators — Pneumatic Spring and Diaphragm and Piston Actuators for linear control valves. Rotary spring diaphragm, PowerRac® rack and pinion style, G-Series and Compak spring return and double acting actuators. A wide variety of manual and electric motor actuator options.

Control Accessories — Smart, Digital, Electro-Pneumatic and Pneumatic positioners. Other devices including limit switches, position transmitters, transducers, filter regulators, solenoid valves, fail in place devices, booster relays, quick release valves and other accessories available to customize equipment to meet system requirements.

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