

ICV TOTAL CONTROL INSIDE BUILDINGS

ICV DATA CENTER  
SOLUTIONS



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# ICV<sup>®</sup> - member of the AVK Group

The AVK Group, a family business founded in 1941 and headquartered in Denmark, is one of the leading manufacturers of valves and fittings within the water, gas, wastewater, industrial, HVAC and fire protection industries worldwide and has 85+ sales companies and 70+ factories globally within our core business.

AVK Group owns its own foundries and develops, machines, coats and produces in its own valve factories. AVK Gummi produces high quality rubber and sealing used in AVK valves and in 3rd party machinery and medical equipment in other industries.

ICV – IC Valves (Nanjing) Co., Ltd. is the building service and HVAC brand of the AVK Group in Denmark and is a fully owned subsidiary. ICV offers general valves, motorized valves, balancing valves, and hydraulic balancing valves, and intelligent valves for use in buildings and HVAC system....for dedicated solutions in commercial buildings, for district cooling and heating, for industry, and for datacenters and other constructions...to solve all valve requirements for HVAC, plumbing and hydraulic balancing, manual fire & safety valves.



## HVAC in datacenters accounts for 30-40% of energy consumption.

The EU's Energy Efficiency Directive (EED) (Directive (EU) 2023/1791) aims for carbon-neutral data centers by 2030. The Delegated Regulation (EU) 2024/1364 establishes the reporting framework and first phase. Data centers  $\geq 500$  kW must report energy performance (i.e. PUE power usage effectiveness, renewable energy and water usage effectiveness, and waste heat reuse potential). Data centers  $\geq 1$  MW are encouraged to follow the European Code of Conduct, with best practices for

advanced cooling and heat recovery. Further policies driving innovations in HVAC valve precision for energy savings will be implemented.

China mandates carbon neutrality by 2060, with aggressive efficiency targets: Average PUE must be  $< 1.5$  by 2025 (large/hyper-scale targets  $\leq 1.25-1.3$ ). Policies promote energy-saving cooling technologies (e.g., liquid cooling, natural/free cooling) and renewable energy use (annual

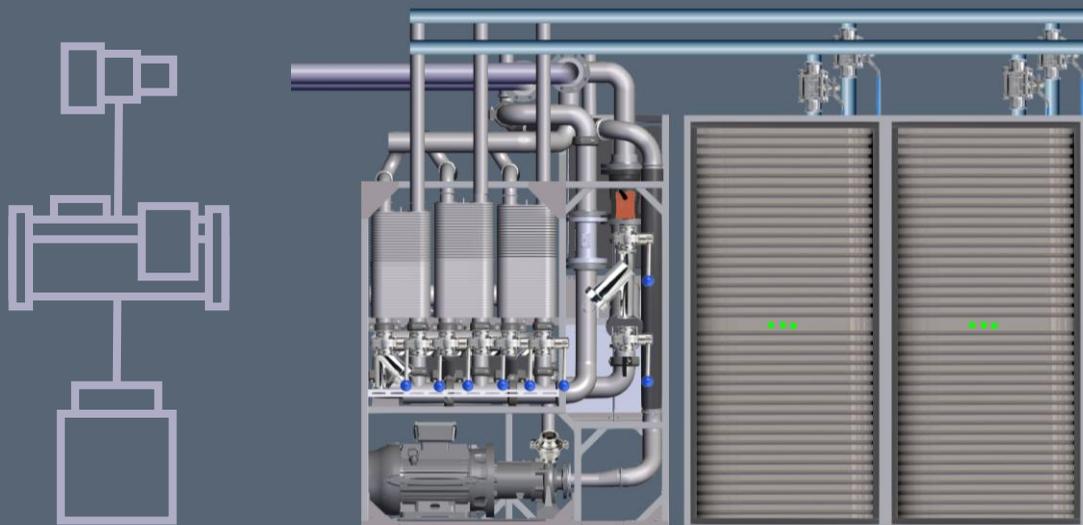
10% increase). Green data center grade facilities, water/energy efficiency rules and incentives.

The US relies on voluntary programs (i.e. EPA Energy Star), the EU emphasizes mandatory reporting with a focus on sustainability, and China imposes the strictest PUE limits and technology mandates.

Global trends favor liquid/immersion cooling to handle rising densities efficiently.



# ICV specialized valve solutions for secondary liquid cooling systems



## The explosive increase in computing power has triggered a heat challenge

The explosion in AI and high-performance datacenters sets unprecedented requirements for cooling and heat dissipation as well as overall energy efficiency. More datacenters are shifting from air cooling to liquid cooling which have much higher material requirements but also higher cooling efficiencies i.e.: PUE's (power usage efficiency) in typical well-designed systems:

- CRAC (air cooling) ~2-2.5
- CRAC with free cooling ~1.2-1.4+
- Cold plate/direct to chip liquid cooling ~1.1-1.2
- Dielectric immersion cooling ~1.05

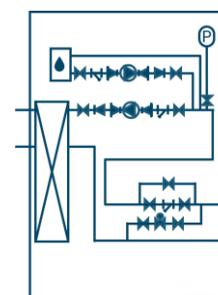
Coolant is delivered directly to the computer chip-embedded cold plates, thus having extremely high requirements for cleanliness, corrosion resistance and leakage.

ICV's specialized valve solution for liquid cooling CDU's, secondary circuits and racks offers polished, degreased, anticorrosive, and clean stainless-steel components, which avoid potential micro contaminants from internal or external sealings, and quick and reliable welded, quick chuck, or flanged installation.

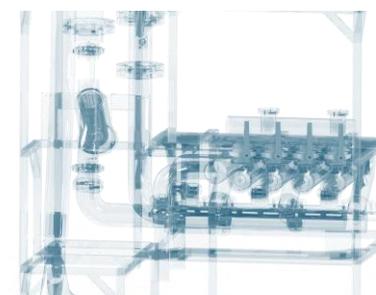
# Born for zero-failure engineering



- Butterfly valves, ball valves, check valves, strainers etc
- Quick clamp (chuck), welded, or flanged connections
- Stainless steels AISI304, 316, 316L
- Compact designs
- Full bore minimizes flow resistance and pressure drop
- Anti corrosive materials and treatment i.e. polishing, degreasing and oil-free
- Prevents contamination by avoiding sealing tapes, threads, or coatings. which may clog the fine pores of the cooling plate



The CDU is the heart of the liquid cooling system optimizing the flow and temperature control, filtration and sealing of the CDU equipment. The secondary circuit



integrated valve pipeline ensures the redundant, safe and leak-free transportation of the system medium and provides convenience for system maintenance.

The liquid-cooling rack ensure that the terminal equipment receives adequate and safe heat dissipation.

- Butterfly valves or ball valves serve as shut-off and switching functions, for maintenance and redundancy flow control, for CDU, cooling racks and secondary circuits.
- Strainers filter impurities and protect equipment.
- Check valves prevents backflow of medium and protects equipment.
- Electric control valves (PICV, Smart Valve™ etc.) for cooling rack flow control and/or CDU heat exchanger primary side and secondary sides.
- Interlocking joints for the secondary circuit of liquid cooling or the internal branch of the cabinet
- Metal bellows flexible joints provide flexible connection

# ICV specialized liquid cooling valves

## 2-piece / 3- butterfly valves

- Features: Compact structure, excellent sealing performance
- Materials: AISI304/316/316L options available
- Connections: DIN/ISO/3A, etc. Options include clamp quick-installation and welding
- Sealings: EPDM, VQM, FPM, etc. options available
- Processing: polishing, oil-free degreasing options available
- Electric actuator options available
- Main application scenarios: internal pipelines of CDU, liquid cooling secondary circuits, liquid cooling cabinets



## Centerline butterfly valve

- Features: Wide range of diameters, excellent sealing performance
- Materials: AISI304/316/316L options available
- Connections: BS EN/GB, etc., wafer/lug/flanged
- Sealings: EPDM, FKM, etc. options available
- Processing techniques: Oil-free degreasing available as an option
- Main application scenarios: Liquid cooling secondary circuit, primary circuit



## 2-piece / 3-piece ball valves

- Features: Compact structure, excellent sealing performance
- Materials: AISI304/316/316L options available
- Connections: DIN/ISO/3A, options for clamp and welded connections
- Sealings: EPDM, VMQ, FPM, etc. options available
- Processing: polishing, oil-free degreasing options available
- Main application scenarios: Internal pipelines of CDU, liquid cooling secondary circuits, liquid cooling cabinets



## Stainless steel check valve

- Features: compact structure, prevents reverse flow of medium
- Materials: AISI304/316/316L options available
- Connections: DIN/ISO/3A, etc., flange quick-installation, welded options
- Sealings: EPDM, VMQ, FPM, etc. options available
- Processing: polishing, oil-free degreasing options available
- Main application scenarios: Internal pipelines of CDU



## Stainless steel strainers

- Features: Removable filter screen, efficient filtration
- Materials: AISI304/316/316L options available
- Connections: DIN/ISO/3A, etc., snap-fit clamp, welded options available
- Sealings: EPDM, VMQ, FPM, etc. options available
- Processing: polishing, oil-free degreasing options available
- Main application scenarios: Internal pipelines of CDU



## Quick couplings - integrated interlocking ball valve

- Features: Quick connection, safety interlock to prevent maloperation
- Materials: AISI304/316/316L options available
- Connections: Threaded and other connections available
- Sealings: EPDM and other options available
- Processing: polishing, oil-free degreasing and oil-free options available
- Main application scenarios: Liquid cooling cabinets and external branch pipes



### Materials

Stainless steel  
304/316 (L) and  
more are available

### Process

Polishing; Oil-free  
degreasing

### Connect

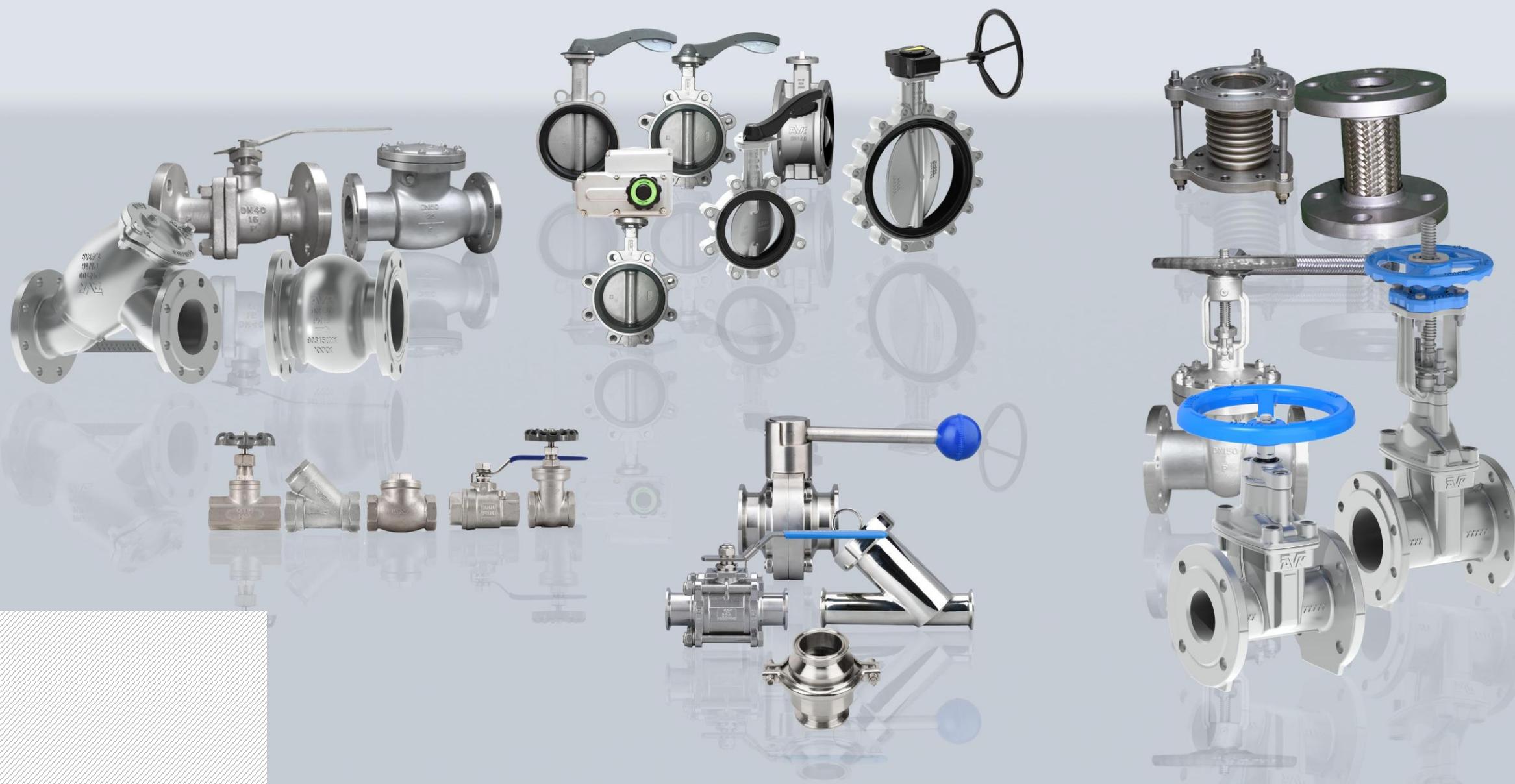
Quick clamp (chuck)  
and welded ISO/DIN  
compliant

### Sealing

High-performance  
EPDM, FKM, PTFE  
etc.

### Energy efficient

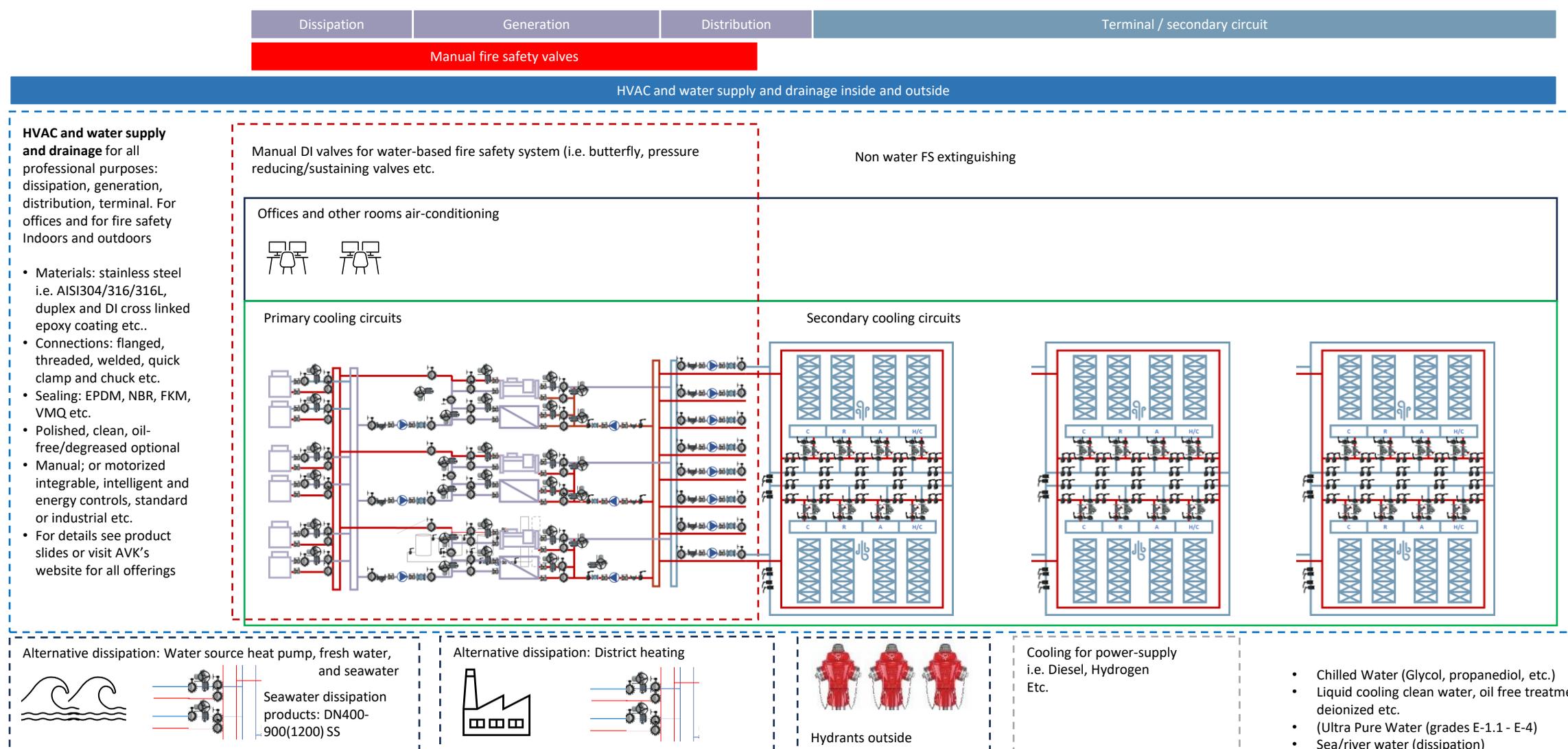
Full-bore design  
minimizes flow  
resistance and  
pressure drop



# ICV valves for primary circuits - and air cooling

## Chiller stations – primary circuit

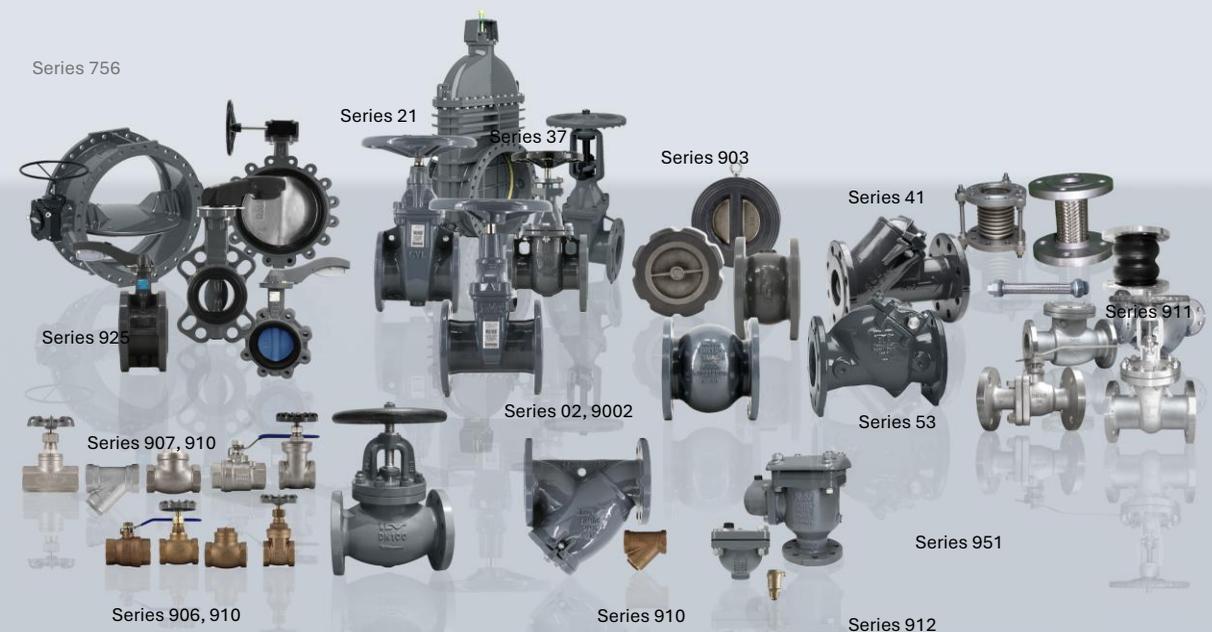
## CRAC/CRAH air cooling



756	Double eccentric double flanged butterfly valve	DI body and disc, AVK EPDM, fusion bond epoxy coated, PN10/16/25, DN200-1400, flanged, SS reinforcement ring
76	Centric wafer, lug, and double flanged butterfly valve	SS304/316/DI body, DI/SS304/SS316 disc, AVK EPDM, fusion bond epoxy coated, PN16, wafer/lug DN50-600
925	Centric wafer, lug, and double flanged butterfly valve	SS304/316/DI body, DI/SS304/SS316 disc, fusion bond epoxy coated, EPDM/FKM/NBR etc. PN16/25 Wafer/lug DN50-600, double flanged DN50-1200
9002 02	Resilient seated non-rising valve valve	DI body, AVK EPDM disc, fusion bond epoxy coated, PN10/16, flanged
21	Resilient seated rising or non-rising gate valve	DI body, AVK EPDM disc, fusion bond epoxy coated, PN10/16, flanged, DN50-400
37	Metal seated rising or non-rising gate valve	DI body, brass seated, fusion bond epoxy coated, PN10/16/25, flanged, DN50-300
54	Metal seated rising or non-rising gate valve	DI body, brass seated, fusion bond epoxy coated, PN10/16/25, flanged, DN350-1800
53	Ball check valve	DI body, AVK NBR ball, fusion bond epoxy coated, PN10, threaded/flanged, DN32-600,
41	Swing check valve	DI body, AVK EPDM seat, fusion bond epoxy coated DI disc, PN16, flanged, DN50-600 (series 641 up to DN1400) 903/00: DI body, SS316/304 disc/seat/stem, fusion bond epoxy coated, PN16, DN50-600, PN25, DN50-400, K flanged 903/40: Stainless steel silent check valve, stem, seat, spring, DN65-300, PN16 903/02: DI body, SS316/304/alu-bronze disc/seat/stem, fusion bond epoxy coated, PN16/25, wafer, DN50-600 903/03: DI body, SS stem, DI coated with EPDM disc, EPDM seat, fusion bond epoxy coated, PN16/25, flanged, DN50-600 903/04: DI body, DI/copper alloy/NBR/SS internals, fusion bond epoxy coated, PN16, flanged, DN50-500
904	Dual door check valve	DI body, SS316/304 disc/stem, EPDM seat, fusion bond epoxy coated, PN16, wafer, DN50-600
910	Y-strainer	910/00: DI body, SS316/304 filter, fusion bond epoxy coated, PN16/25, flanged, DN50-600 910/02: DI body, SS316/304 filter, fusion bond epoxy coated, PN16/25, flanged, DN50-600
902	Globe valve	DI/CI body/disc, bronze seat, SS stem, fusion bond epoxy coated, PN16/25, flanged, DN50-300
851	Dual function air valve	DI body, fusion bond epoxy coated, DN16/25, threaded/flanged, DN25-250
912	Air valve	Brass, PN16, threaded, DN15-25
907/910	Stainless steel threaded valves	ICV 907/01 Stainless steel gate valve, AISI304/316, PN16, DN15-50 ICV 907/02 Stainless steel globe valve, AISI304/316, PN16, DN15-50 ICV 907/03 Stainless steel check valve, AISI304/316, PN16, DN15-50 ICV 907/04 Stainless steel ball valve, AISI304/316, PN16/25, 2P/3P, DN15-100 ICV 910/06 Stainless steel strainer, AISI304/316, threaded, PN16
906/910	Bronze, brass threaded valves	ICV 906/01 Brass gate valve, PN16, DN15-100 ICV 906/02 Bronze gate valve, PN20, DN15-50 ICV 906/03 Brass globe valve, PN16, DN15-50 ICV 906/04 Bronze globe valve, PN16, D15-50 ICV 906/05 Brass check valve, PN16, DN15-50 ICV 906/06 Bronze check valve, PN20, DN15-50 ICV 906/07 Brass ball valve, PTFE seat, PN25, DN15-50 ICV 906/08 Bronze ball valve, PTFE seat, PN20, DN15-50 ICV 910/07 Bronze strainer, PN20, DN15-50 ICV 910/08 Brass strainer, PN16, DN15-50
907/08	Stainless steel ball valves	SS304/SS316 body, PN16/25, DN15-250, flanged
901/01	Metal seated rising or non-rising gate valve	DI body, bronze trim, PN16/25, flanged, DN50-400
901/02	Stainless steel metal seated rising stem gate valve	SS304/316 body, PN16, flanged, DN50-400 SS304/316 body, PN16/25, flanged, DN50-300
910/81	Stainless steel Y-strainer	910/81: SS304/316 body, PN16, flanged, DN50-400
910/05	Stainless steel Y-strainer	910/05: SS304/316 body, PN16/25, flanged, DN50-300
904/02	Stainless steel swing check valve	SS304/316 body, PN16/25, flanged, DN50-300
911	Flexible joint	ICV 911/01 Single sphere rubber flexible joint, EPDM, nylon reinforced, Galvanized steel flange, PN16/25 ICV 911/02 Double sphere rubber flexible joint, EPDM, nylon reinforced, Galvanized steel flange, PN16/25 ICV 911/03 Rubber flexible joint thread end, PN16 ICV 911/04 Stainless steel flexible joint FCU, AISI304, PN16/25 ICV 911/05 Stainless steel flexible joint, AISI304, threaded, PN16/25 ICV 911/06 Stainless steel flexible joint, AISI304, flanged, PN16/25
911/08	Expansion joint	SS304 body, galvanized steel flange/rod, PN16/25, DN32-1000

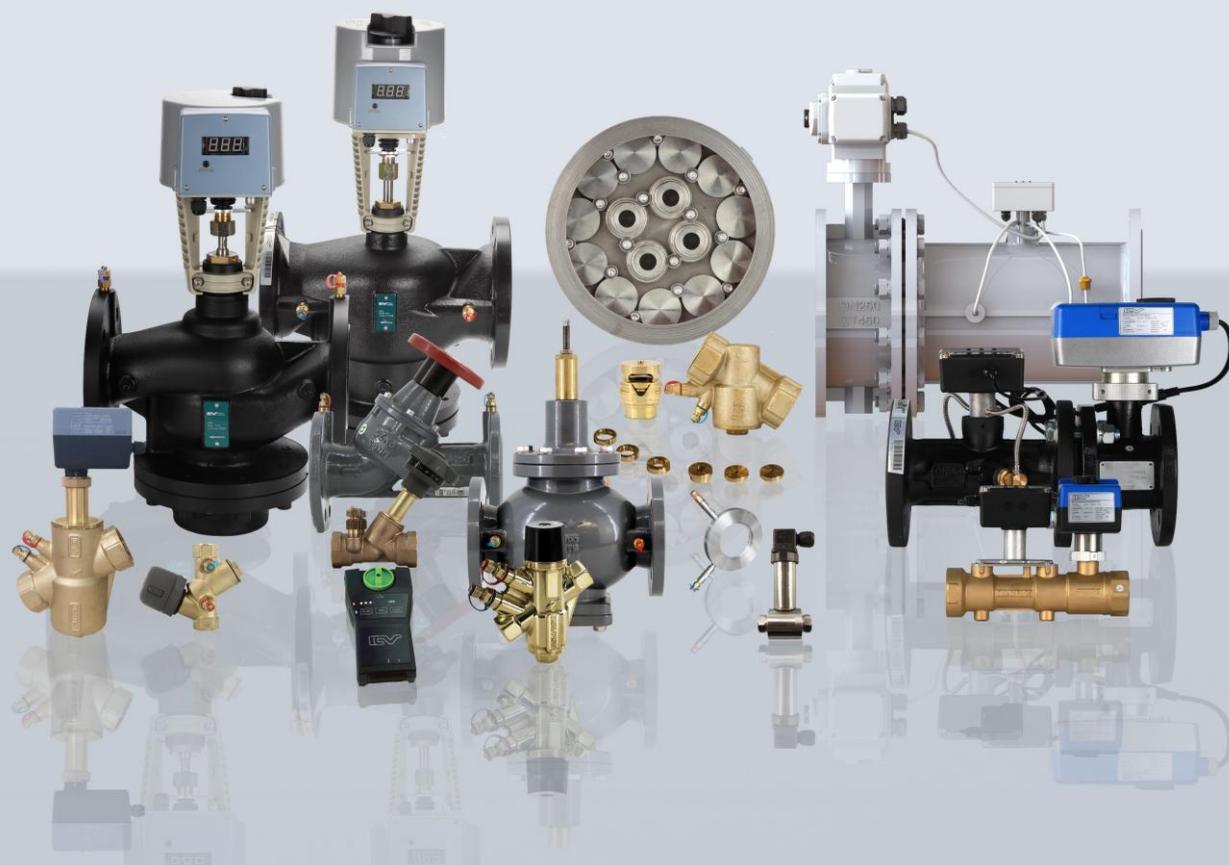
# ICV manual valves

The ICV range of general and manual valves covers all applications and includes very large ranges of butterfly valves, gate valves, check valves, strainers, joints, air valves, bronze and stainless-steel valves etc. from DN15 up to DN4000 for certain types



# ICV balancing valves

The ICV range of balancing valves cover all balancing requirements accurately and reliably and support on commissioning and design is offered



951/003	ICV Smart Valve™	Intelligent valve with flow and temperature optimization functionality and BMS integration, RTU Modbus, Bluetooth, 4G. Control/feedback: 0-10V/2-10V/4-20mA. IP54 DN15-50: brass body, SS inserts, integrated control ball valve, PN25, threaded DN65-150: DI body, SS inserts, integrated control ball valve, PN16/20, flanged DN200-400: DI body, SS inserts, integrated butterfly valve, PN16, flanged
908/20 908/00	Deltaflow™ manual/static balancing valve flanged	DI body, epoxy coated, PN16/25 flanged, DN65-400, EQ design, accuracy to ±5%, pressure compensated DN200-400, lockable turn counter
908/02	Deltaflow™ manual/static balancing valves threaded	Bronze CC491K body, PN25, DN15-50, accuracy to ±5%, accurate turn counter
908/03	Deltacontrol™ differential pressure balancing valve	DZR brass/brass threaded body DN15-50, PN16/25. DI flanged body DN50-200, PN16/25. Adjustable control pressure,
951/20	Flowmaster™ 3-in-1 PICV – pressure independent motorized balancing control valve	24V/220V, motoric, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA), IP54. DZR/CW617 brass body, PN25, DN15-50, threaded, accuracy to ±5%
951/002	Flowmaster™ 3-in-1 PICV – pressure independent motorized balancing control valve	24V/220V, motoric, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA), IP54. CI body, PN16/25, DN40-200, flanged, accuracy to ±5%
951/006	Flowmaster™ 3-in-1 PICV – pressure independent motorized balancing control valve	24V/220V, motoric, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA), IP54. CI body, PN16/25, DN65-150, flanged, accuracy to ±5%. (mechanical)
955	Flowmaster™ pressure independent motorized balancing on/off valve	DZR brass/ brass body, PN25, DN15-25, threaded, accuracy to ±5%. 24V/110V/220V, on/off, thermic actuator
952	Deltamatic™ dynamic/automatic balancing valve	DZR brass/ brass body, PN25, DN15-50, 0.007 – 3.154 l/s, accuracy to ±5%
953	Deltamatic™ dynamic/automatic balancing valve	DI body, SS304/316 cartridges, PN25, DN50-800, 1.061 – 12,500 l/s, accuracy to ±5%
908/07	Measuring orifice	SS304/316, PN16/25, DN50-600+
920510XXX	Differential pressure bypass kit	Dp bypass kit 220-24V, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA)
PFM	Balancing tool	Includes data on all ICV balancing valves for easy balancing

# ICV motorized valves

The ICV range motorized control valves offers precise modulating or on/off control for flow control all equipment from DN15 up to DN1200 and above and integrates into all SCADA and BAS systems

1150/756	Motorized double eccentric double flanged butterfly valve	220V/380V (230V/400V), IP67, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA). DI body and disc, AVK EPDM, fusion bond epoxy coated, PN10/16/25, DN200-1400, flanged, SS reinforcement ring. Options: industrial type actuators i.e. (light, full, industrial)
1150/76	Motorized centric loose liner butterfly valve	220V/380V (230V/400V), IP67, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA). SS304/316/DI body, DI/SS304/SS316 disc, AVK EPDM, fusion bonded epoxy coated, PN16, wafer/lug DN50-600 Lightweight, standard or industrial types optional. ICV925 or other valves optional
1150/75	Motorized centric fully vulcanized butterfly valve	220V/380V (230V/400V), IP67, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA). SS304/316/DI body, DI/SS304/SS316 disc, AVK EPDM, fusion bonded epoxy coated, PN16, wafer/lug DN50-600 Lightweight, standard or industrial types optional.
925/76	Motorized (light) centric butterfly valve	220V/380V, IP67, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA) SS304/316/DI body, DI/SS304/SS316 disc, AVK EPDM, fusion bonded epoxy coated, PN16, wafer/lug DN50-600 ICV925 or other valves optional
925/06	Motorized centric butterfly valve	220V/380V, IP67, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA) DI body, DI/SS304/SS316 disc, epoxy coated, PN16/25, wafer/lug DN50-600, flanged DN50-1200 Options: 1150, Rotork, AUMA industrial type actuators
925/762	Light motorized butterfly valve	220V/380V, IP67, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA) DI body, DI/SS304/SS316 disc, epoxy coated, PN16/25, wafer/lug, flanged, DN50-500 PN16 DN50-300 PN25
920/01	Motorized on/off valve for fan-coils	Brass body, 2-way, threaded, on/off, 220V/24V, DN15-25, PN16
920/02	Motorized control ball valves	Brass body, 2/3-way, CI body, 2way, threaded/flanged, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA), DN15-150, PN16, IP54
920/03	Motorized control stroke valves threaded	Brass body, 2/3-way, threaded, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA), DN15-80, PN16, IP54
920/04	Motorized control stroke valves flanged	CI GG25 body, 2/3-way, flanged, control/feedback: on/off, modulating (0-10V, 2-10V, 4..20mA), DN65-200, PN16, IP54

For even higher reliability for critical applications industrial type motoric actuators like AUMA or Rotork are also offered. For information on PICV please see under balancing valves





## HUAWEI DATACENTERS

Huawei Suzhou Corporate Business datacentre  
 Huawei Suzhou Laboratory datacentre  
 Huawei Semiconductor Plant datacentre

ICV is a key supplier to Huawei of high quality valves for their investments in R&D facilities, production facilities, offices and employee residences i.e. Huawei Songshanhu phases 1&2, Huawei Songshanhu employee apartments, Huawei Songshanhu fire & safety project, Huawei E2C projects, Huawei Hupan Lake Garden projects, Huawei Green Gardens, Huawei Chengdu Hetian Grand Hotel, Huawei Hangzhou production plant, Huawei Wuhan Research and Development Center, Nanjing Huawei projects etc.



## CHINA MOBILE

China Mobile Hubei Branch Guanggu datacentre  
 China Mobile Henan Branch datacenter  
 China Mobile Shenzhen Information Building  
 China Mobile Jiangxi Hongjiaozhou production plant  
 China Mobile Zhengzhou high-tech mobile datacenter



## CHINA UNICOM

China Unicom Henan Zhengzhou datacenter (2<sup>nd</sup> phase DC3)



## SUZHOU INTERNATIONAL SCIENCE-PARK DATA CENTER

4200 standard servers, totally 52000 m<sup>2</sup>  
 Suzhou International Science-Park datacentre



## Hainan Airlines South datacenter

Hainan Airlines South datacentre  
 Hainan Airlines datacentre

# Cases

**Infrastructure and equipment providers ▪ communication and service providers ▪ high tech science and data providers ▪ banking, science and other high tech company internal IT networks**

## ASIA



Shanghai Dingyi datacentre

### Singapore



Kingsland Development  
 M&E Consultant: i3 Critical Facilities Pte Ltd  
 Project GFA: 20,000m<sup>2</sup>  
 Series 76 DN65-400 600pcs. Series 756 DN600-800 120pcs



Singtel  
 M&E Consultant: DSCO Group  
 Project GFA: 53,000m<sup>2</sup>  
 Series76 butterfly valves DN65-400 600pcs. Series 756 DN450-1100 145pcs.



Ascenda Singbridge and DSCO Group  
 Ascendas Singbridge Data Centre.  
 2019  
 Project GFA: 40,000m<sup>2</sup>  
 Series 76 concentric and Series 756 double eccentric butterfly valves etc.

### Philippines

Makati CBD PLDT Engr. Ramon Aguiluz 2017

### Other:

Singtel west data centre. DSCO Group 2019  
 M7 Data Centre DSCO Group 2017  
 Singtel Geylang Telephone Exchange Tan Consultants 2016  
 Singtel West Data Centre DSCO Group 2015  
 Starhub Data Center DSCO Group 2015  
 Kingsland Data Center i3 Critical Facilities 2015  
 Singtel Fort Site ST Electronic 2014  
 Singtel Pegasus ST Electronic 2014  
 Nanyang Poly 2014