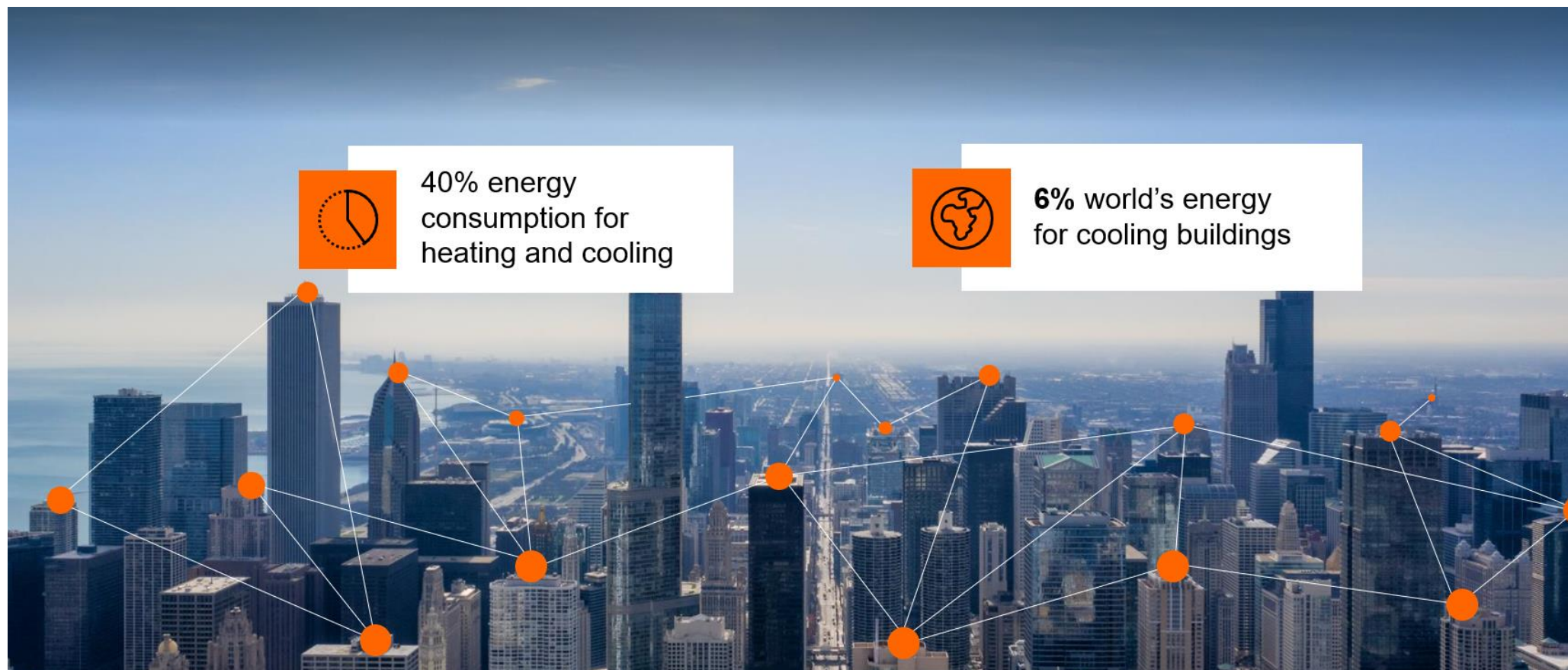


A large, bold, black, sans-serif version of the word "BELIMO" with a registered trademark symbol (®) at the end. Above the letters "I" and "M" are two parallel orange diagonal bars. A thick orange horizontal line is positioned below the word.

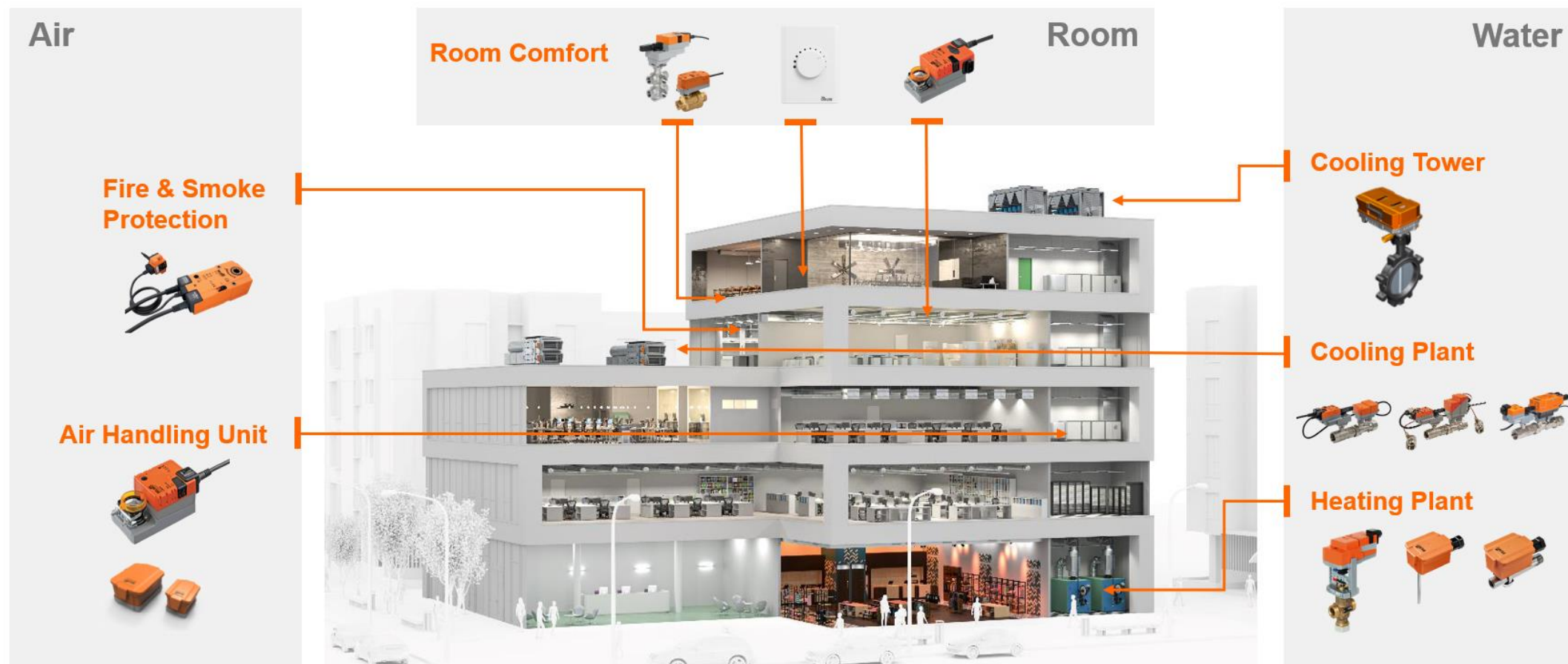
Podgorica, 16.09.2022.

# Energetska efikasnost – imperativ u celom svetu



- Proizvodni program firme Belimo
- Belimo Energy Valve™ pritisno- i temperaturno-nezavisni regulacioni ventil sa praćenjem potrošnje energije
- Poređenje i izbor pritisno-zavisnih i pritisno-nezavisnih ventila
- „Low delta T syndrom“ i dT menadžer
- Belimo Energy Valve™ kao IoT uređaj

# Proizvodni program



# Novo: Sobne radne jedinice sa ePaper ekranom i Display App



## Types / Specifications

### Room sensors:

- 01RT / Temp. 0...50 °C
- 22RT / CO<sub>2</sub> 0...2000 ppm, r.H. 5...100%, Temp. 0...50 °C

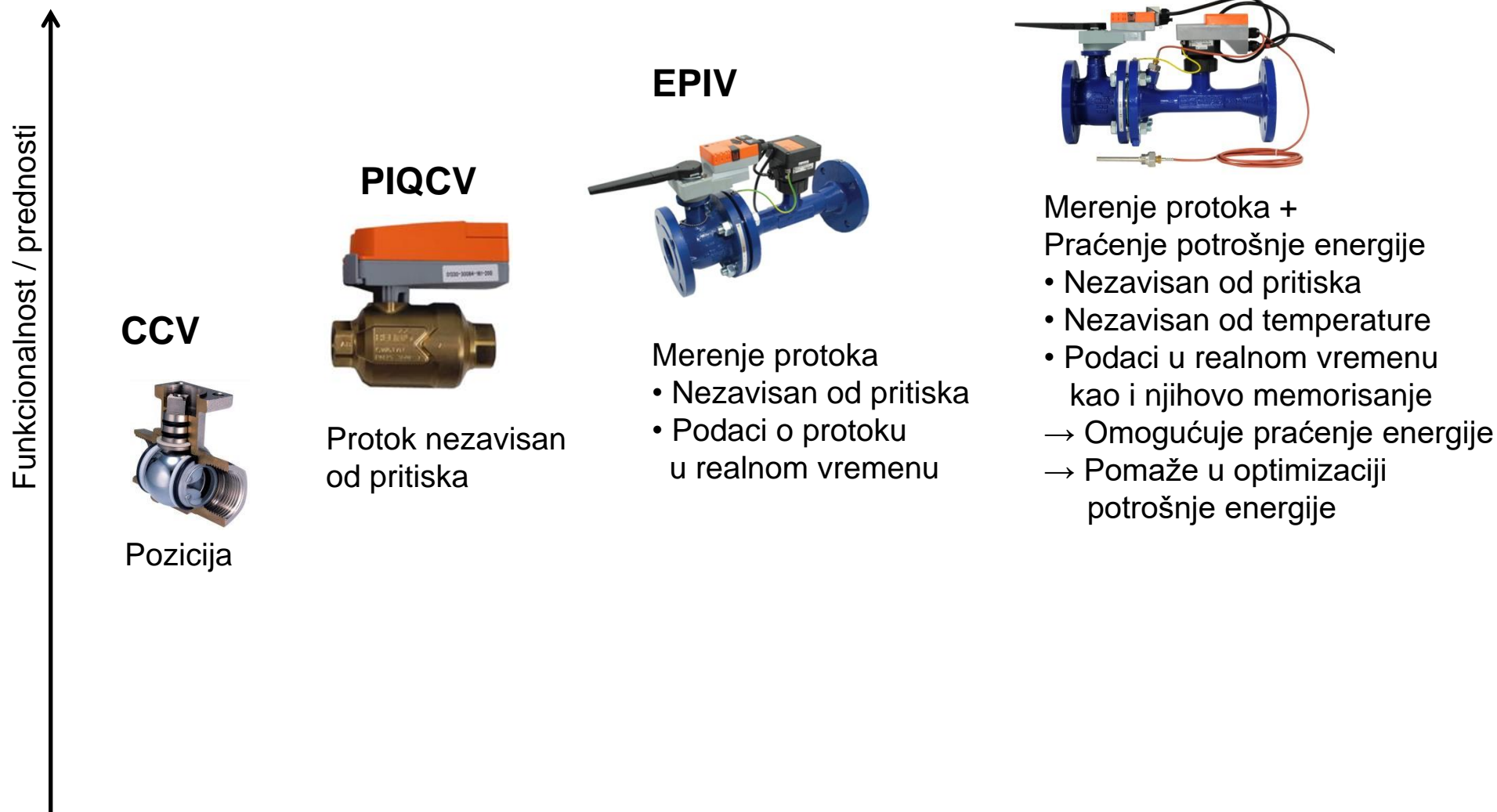
### Room operating unit:

- P-01RT / Temp. 0...50 °C

## Applications

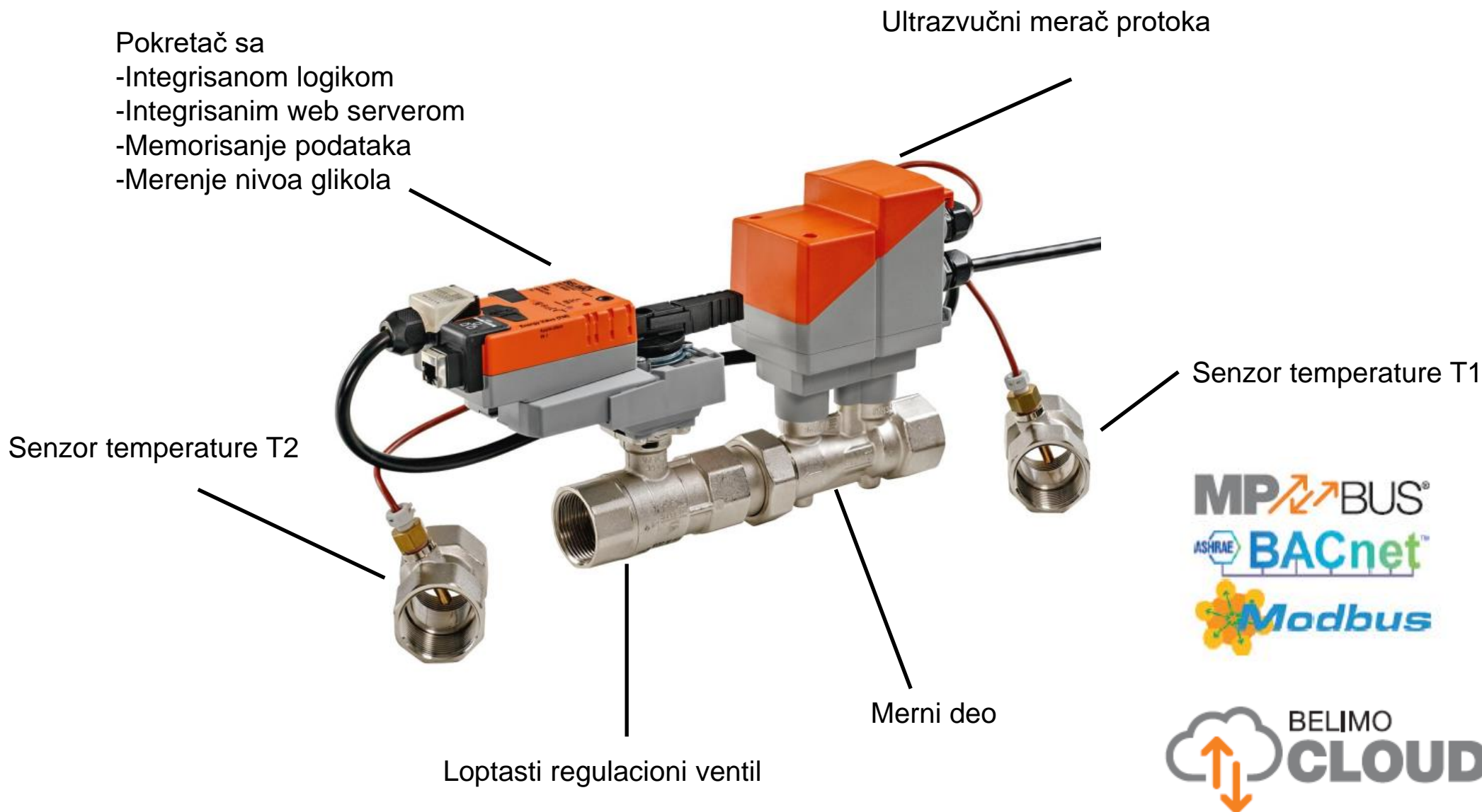
- Room temperature measurement
- Room CO<sub>2</sub>, humidity and temperature measurement
- Room temperature measurement incl. setpoint adjuster

# Ventili nezavisni od pritiska





# Belimo Energy Valve™



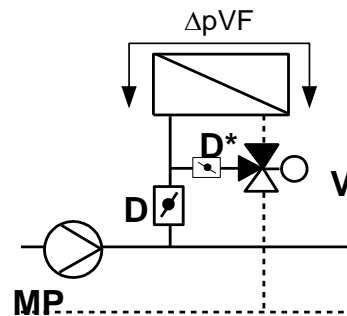
# Hydraulic circuits with 3-way valves, Part 1

Trend  
in EU

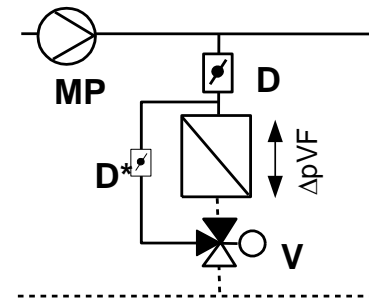
**Diversion  
circuit**

$$\Delta p_{v100} > \Delta p_{VF}$$

geographic



synoptic



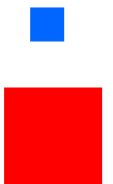
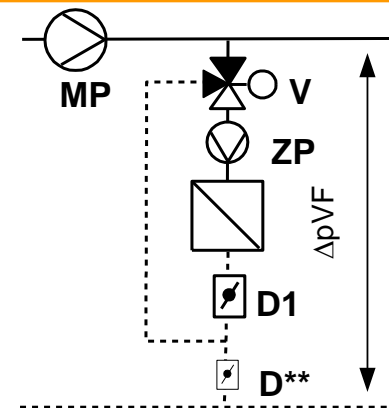
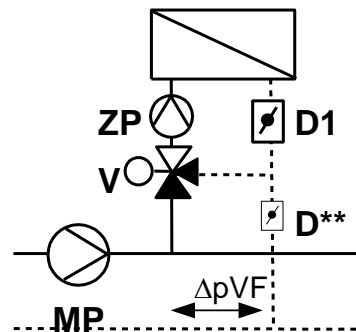
US

EU



**Mixing circuit**

$$\Delta p_{v100} > \Delta p_{VF}$$



● Cooling with  
Dehumidification

■ Cooling

● Reheating

■ Preheating



# Hydraulic circuits with 3-way valves, Part 2

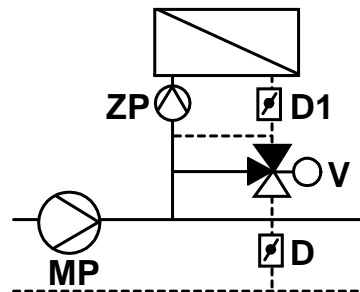
Trend  
in EU

**Injection circuit  
with 3-way valve**

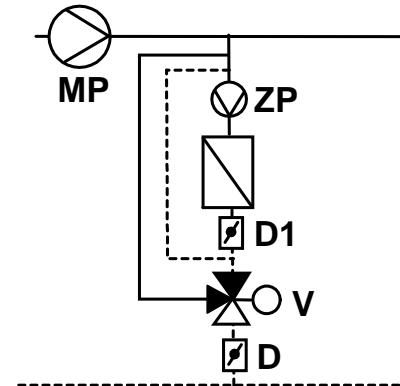
$$\Delta p_{v100} > 3kPa$$



geographic



synoptic



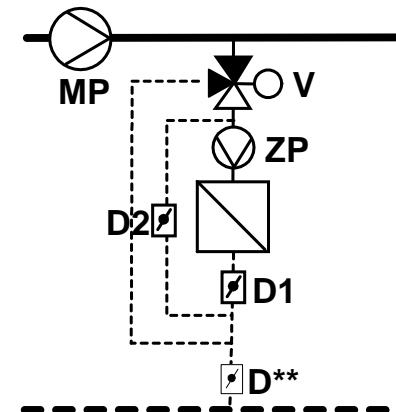
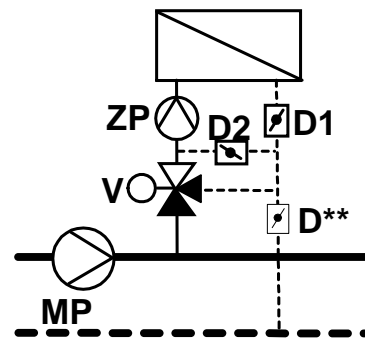
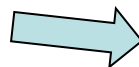
US

EU

**Double mixing  
circuit**

with unpressurised manifold

$$\Delta p_{v100} > 3kPa$$



Cooling



Heating

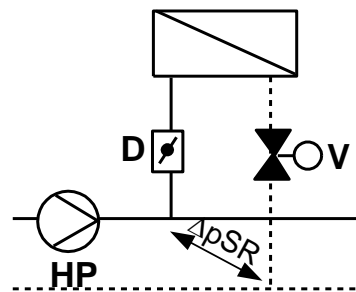
# Hydraulic circuits with 2-way valves

Trend  
in EU

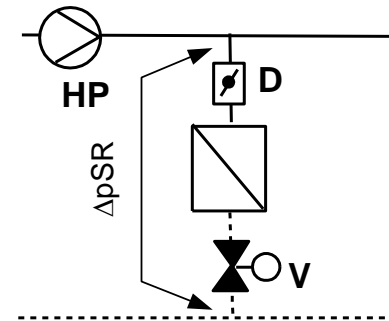
**Throttling  
circuit**

$$\Delta p_{v100} > \frac{\Delta p_{SR}}{2}$$

geographic



synoptic



US

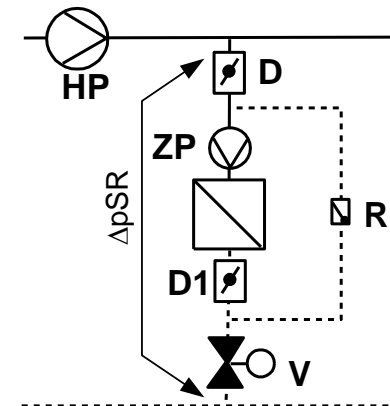
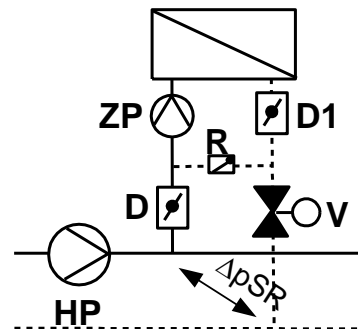
EU



$$\Delta p_{v100} = 4 \text{ psi}$$

**Injection circuit  
with throttling  
valve**

$$\Delta p_{v100} > \frac{\Delta p_{SR}}{2}$$



$$\Delta p_{v100} = 4 \text{ psi}$$



Cooling  
Dehumidification



Cooling



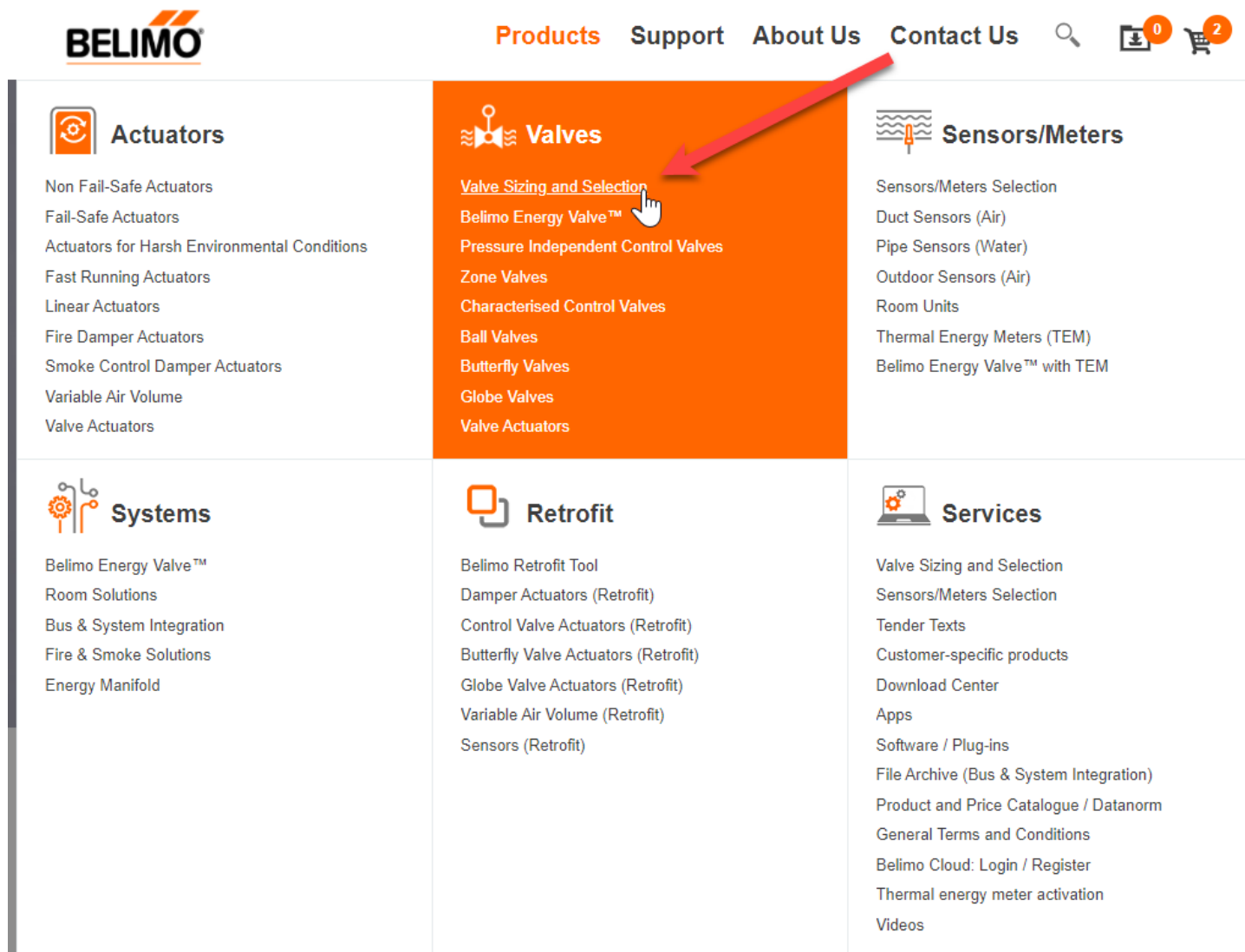
Reheating



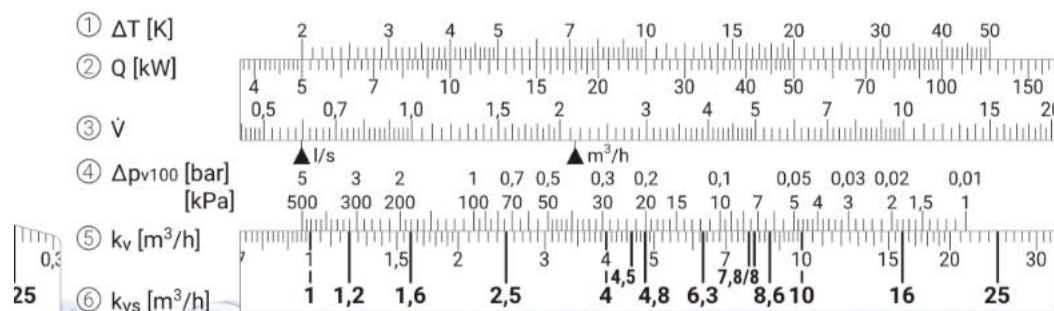
Preheating

# Program za izbor ventila

## www.belimo.at



## Klasičan izbor ventila

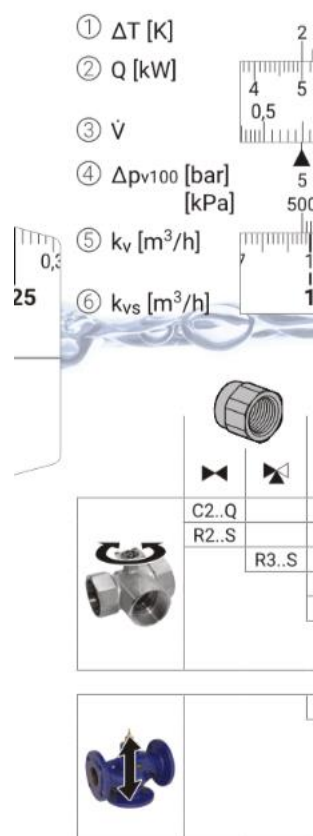


6-way	DN15-25	R30...-B..
PN6	DN15-50	R6..B / R7..B
PN6	DN15-100	H6..R / H7..R
PN16	DN25-700	D6..
PN16	DN150-300	D7..
PN16	DN40-150	H6..SP
PN16	DN200-250	H6..W / H7..W
PN25	DN10-20	R4..D(K)
PN25	DN15-50	H2..X / H3..X
PN25	DN15-100	H6..X / H7..X

	C2..Q					4,5	4,8	6,3	$k_{vs}$ [m³/h]	⑦	PN 16 / <sup>(1)</sup> = PN 25	⑧
	R2..S						15		DN			
	R3..S											
	C4..Q											
	R4..											
	R5..											
	R6..W											
	R6											
	C2..Q	J	90 °C									
	R20..		120 °C									
	R30..											
	C4..Q		90 °C									
	R4		100 °C									
	R5		120 °C									
	C4..Q											
	R2..S											
	R4..											
	R5..											
	R6..W											
	H4..B											
	H5..B											
	H6..N											
	H7..N											
	H6..S											
	H7..S											
	H4..B											
	H5..B											
	H6..N											
	H7..N											
	H6..S											
	H7..S											

	15	20	25	32	40	50	65	80	100	125	150
CQ(K)											
TR(F)											
LR(F)											
NR(F)											
SR(F)											
GR(K)											
LV..A											
NV(K)..A											
SV(K)..A											
AVK..A											
EV..A											
RV..A											

# Klasičan izbor ventila



**Belimo SelectPro™**

**BELIMO** Referenca projekta  Ime projekta  Kreirao

Datoteka Module Podešavanja Pomoć

**Aplikacioni parametri**

Fluid  Protok    Kv m³/h Diferencijalni pritisak

**Izbor ventila**

Priključak  Ps  Max. Temp  PN  DN  Klasa curenja

☐ Preporučeni izbor  
☐ Uslovno preporučeni

Tip	Oblik	ps	Prirubnica PN	Max. Temp.	Kvs=4 m³/h DN = 20	Kvs=6,3 m³/h DN = 20
CCV	3-kraki	1600 kPa	PN16	120°C	<b>R3020-4-S2</b>	<b>R3020-6P3-S2</b>

Efektivni dpv (kPa):

**Izbor pokretača**

Upravljanje  Krainii prekidači  Zaštitna funkcija  Nominalni napon

# Klasičan izbor ventila

①  $\Delta T$  [K]

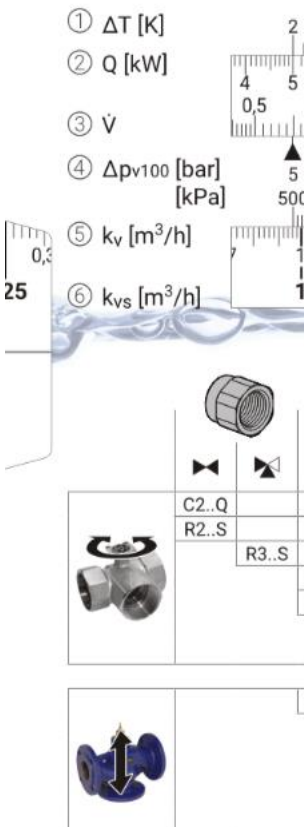
②  $Q$  [kW]


③  $\dot{V}$

④  $\Delta p_{v100}$  [bar]  
[kPa]

⑤  $k_v$  [m<sup>3</sup>/h]

⑥  $k_{vs}$  [m<sup>3</sup>/h]





Referenca projekta

Ime projekta

Kreirao

Datoteka   Module   Podešavanja   Pomoć

**Aplikacioni parametri**

Fluid

Protok  m<sup>3</sup>/h

Diferencijalni pritisak  kPa

4,81 Kv m<sup>3</sup>/h

**Izbor ventila**

Priključak

Ps

Max. Temp

PN

DN

Klasa curenja

■ Preporučeni izbor
■ Uslovno preporučeni

Tip	Oblik	ps	Prirubnica PN	Max. Temp.	Kvs=4 m <sup>3</sup> /h DN = 20	Kvs=6,3 m <sup>3</sup> /h DN = 20
CCV	3-kraki	1600 kPa	PN16	120°C	R3020-4-S2	R3020-6P3-S2
					28,9	11,6

Ponoviti izbor ventila

**Izbor pokretača**

Upravljanje

Krainii prekidači

Zaštitna funkcija

Nominalni napon

Ponoviti izbor pokretača

Belimo prezentacija

2022



# Applications with PI valves

## Injection circuit with 2-way

- Pre-heaters
- *Air cooler without r.h. %*
- *Reheaters*

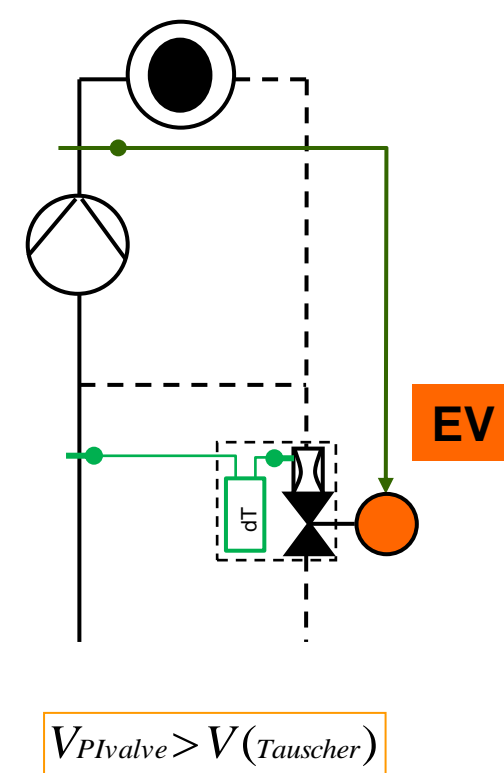
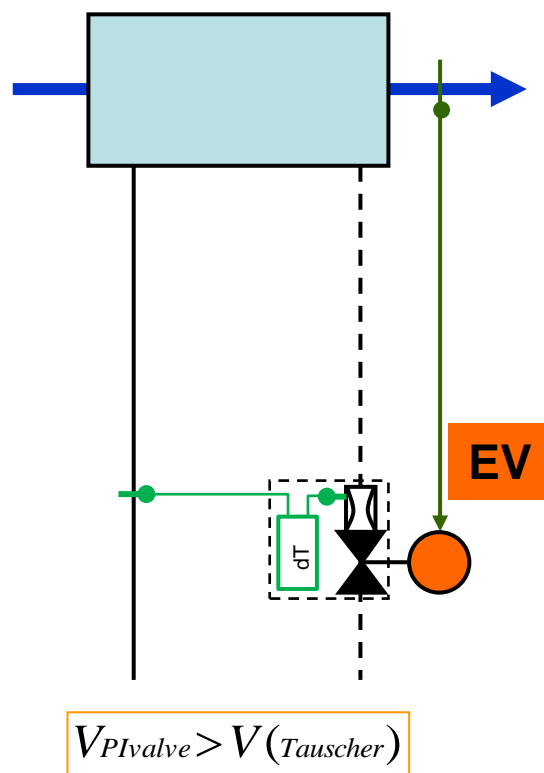
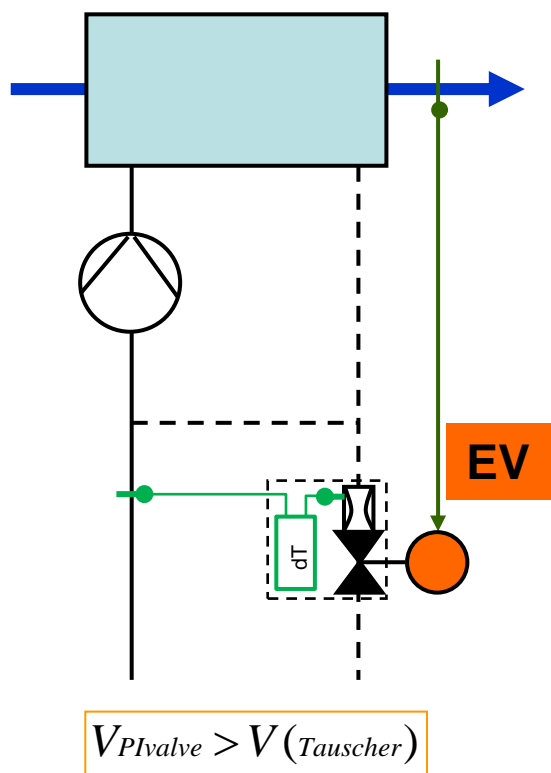
## Throttling circuit

- Reheaters
- Air cooler with r.h. %
- *Pre-heater (glycol)*
- *Local heat (<120°C)*

## Feed regulation

- Groups Heating
- Groups Cooling

Preferred place of installation is the return  
(less temperature stress)



# Izbor pritisno-nezavisnih ventila

- Izbor ventila samo prema zahtevanom protoku
- Svakom ventilu se zadaje tačno definisani protok (pomoću ZTH-EU)
- Teoretska vrednost Kvs-a za određivanje pada pritiska na ventilu

Poz	Oznaka	Količina	Napomena	Tehnički podaci	ΔT [°K]	Zahtevani protok	DN	Nominalni protok	Pritisak zatvaranja	Oznaka ventila	Oznaka pokretača	Moment/Sila
1	EV040R+BAC	1	144 kW		20	1.72 l/s	40	2.50 l/s	1400 kPa	EV040R+BAC	EV040R+BAC	10 Nm
2	EV050R+BAC	1	295 kW		20	3.53 l/s	50	4.80 l/s	1400 kPa	EV050R+BAC	EV050R+BAC	20 Nm
3	EV040R+BAC	1	127 kW		20	1.52 l/s	40	2.50 l/s	1400 kPa	EV040R+BAC	EV040R+BAC	10 Nm
4	EV040R+BAC	1	121 kW		20	1.45 l/s	40	2.50 l/s	1400 kPa	EV040R+BAC	EV040R+BAC	10 Nm
5	EV032R+BAC	1	101 kW		20	1.21 l/s	32	1.80 l/s	1400 kPa	EV032R+BAC	EV032R+BAC	10 Nm
6	EV032R+BAC	1	82 kW		20	0.98 l/s	32	1.80 l/s	1400 kPa	EV032R+BAC	EV032R+BAC	10 Nm
7	EV040R+BAC	1	121 kW		20	1.45 l/s	40	2.50 l/s	1400 kPa	EV040R+BAC	EV040R+BAC	10 Nm
8	P6065W800EV-BAC	1	501 kW		20	5.99 l/s	65	8.00 l/s	690 kPa	P6065W800EV-BAC	P6065W800EV-BAC	20 Nm
9	EV025R+BAC	1	60 kW		20	0.72 l/s	25	1.15 l/s	1400 kPa	EV025R+BAC	EV025R+BAC	5 Nm
10	EV025R+BAC	1	60 kW		20	0.72 l/s	25	1.15 l/s	1400 kPa	EV025R+BAC	EV025R+BAC	5 Nm
11	EV050R+BAC	1	380 kW		20	4.54 l/s	50	4.80 l/s	1400 kPa	EV050R+BAC	EV050R+BAC	20 Nm

Kvs-Teor. [m³/h]	Zahtevani protok [l/s]	Zahtevani protok [m³/h]	dPmin [kPa]
21,3	1,72	6,19	8
32	3,53	12,71	16
21,3	1,52	5,47	7
21,3	1,45	5,22	6
14,2	1,21	4,36	9
14,2	0,98	3,53	6
21,3	1,45	5,22	6
40	5,99	21,56	29
8,6	0,72	2,59	9
8,6	0,72	2,59	9
32	4,54	16,34	26

$$\Delta p_{\min} = 100 \times \left( \frac{\dot{V}_{\max}}{K_{vs \text{ theor.}}} \right)^2$$

$\Delta p_{\min}$ : kPa  
 $\dot{V}_{\max}$ : m³/h  
 $K_{vs \text{ theor.}}$ : m³/h



# Low Delta-T Syndrom



low delta t syndrome



All

Images

Videos

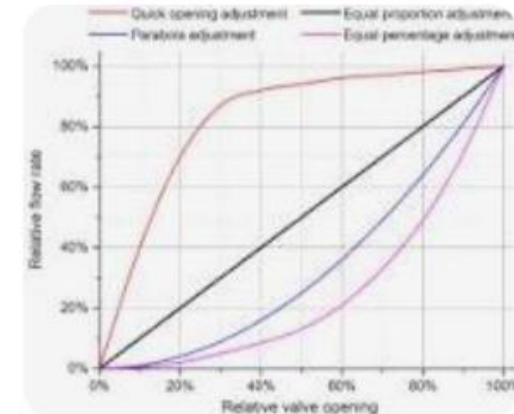
Maps

More

Tools

About 27,500,000 results (0.49 seconds)

Low delta-T syndrome is recognized as a typical technical problem in many chilled water systems. This syndrome typically **increases the energy consumption of chilled water pumps, decreases system overall operating efficiency, and undermines occupant comfort.**



<https://www.sciencedirect.com/science/article/pii>

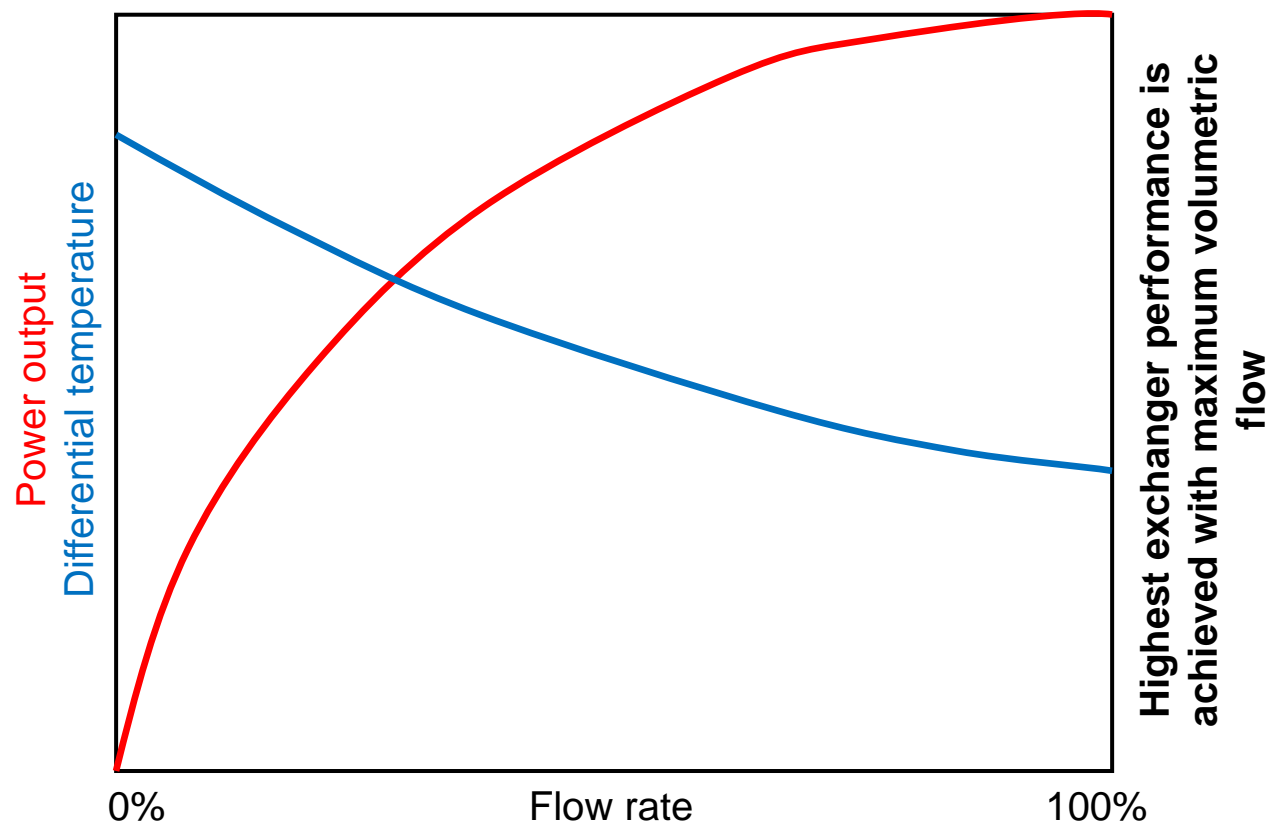
Causes of low delta-T syndrome for chilled water systems in ...

# Heat exchanger



# Heat exchanger performance

- **New condition: Flow rate perfectly matched to heat exchanger characteristic curve.**



$$E(\text{kW}) \sim V(\text{m}^3/\text{h}) \times dT$$

# Worsening of heat exchanger performance...



**...through damage**

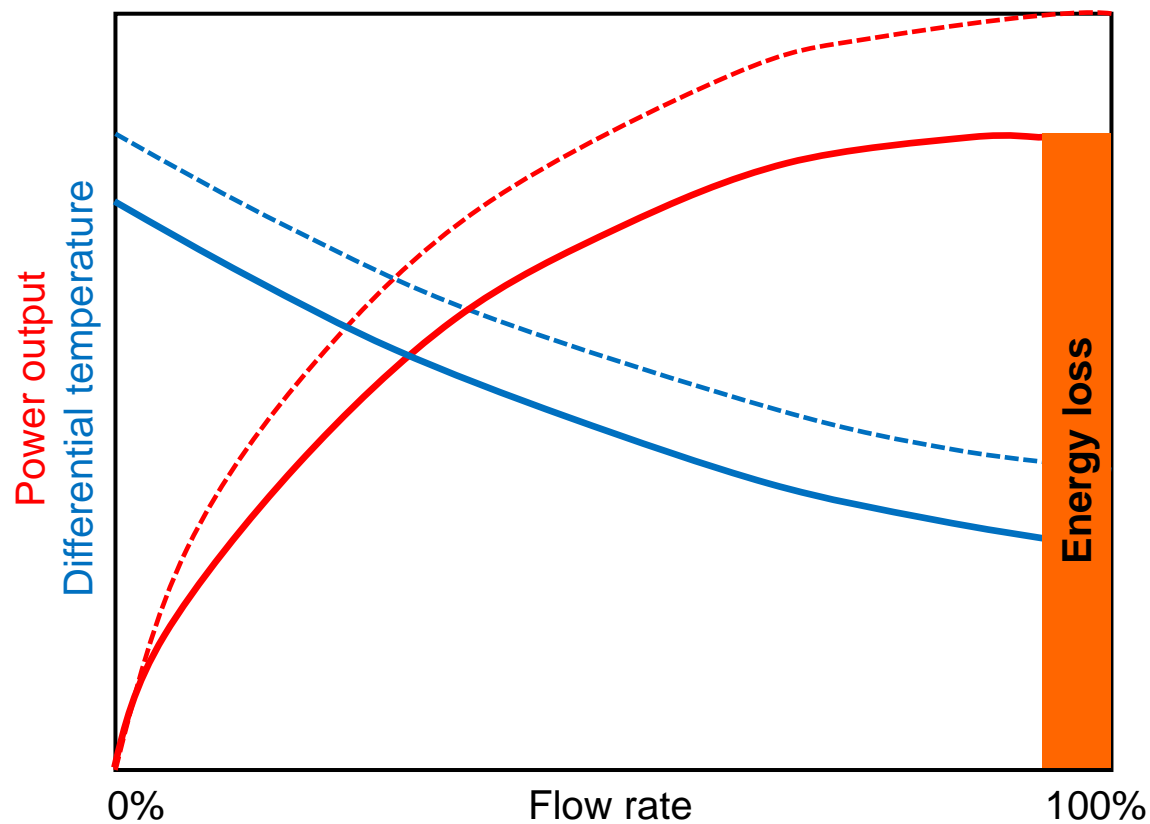


**...through contamination**



# Heat exchanger performance

- In operation: The performance of the exchanger is reduced by contamination or damage.

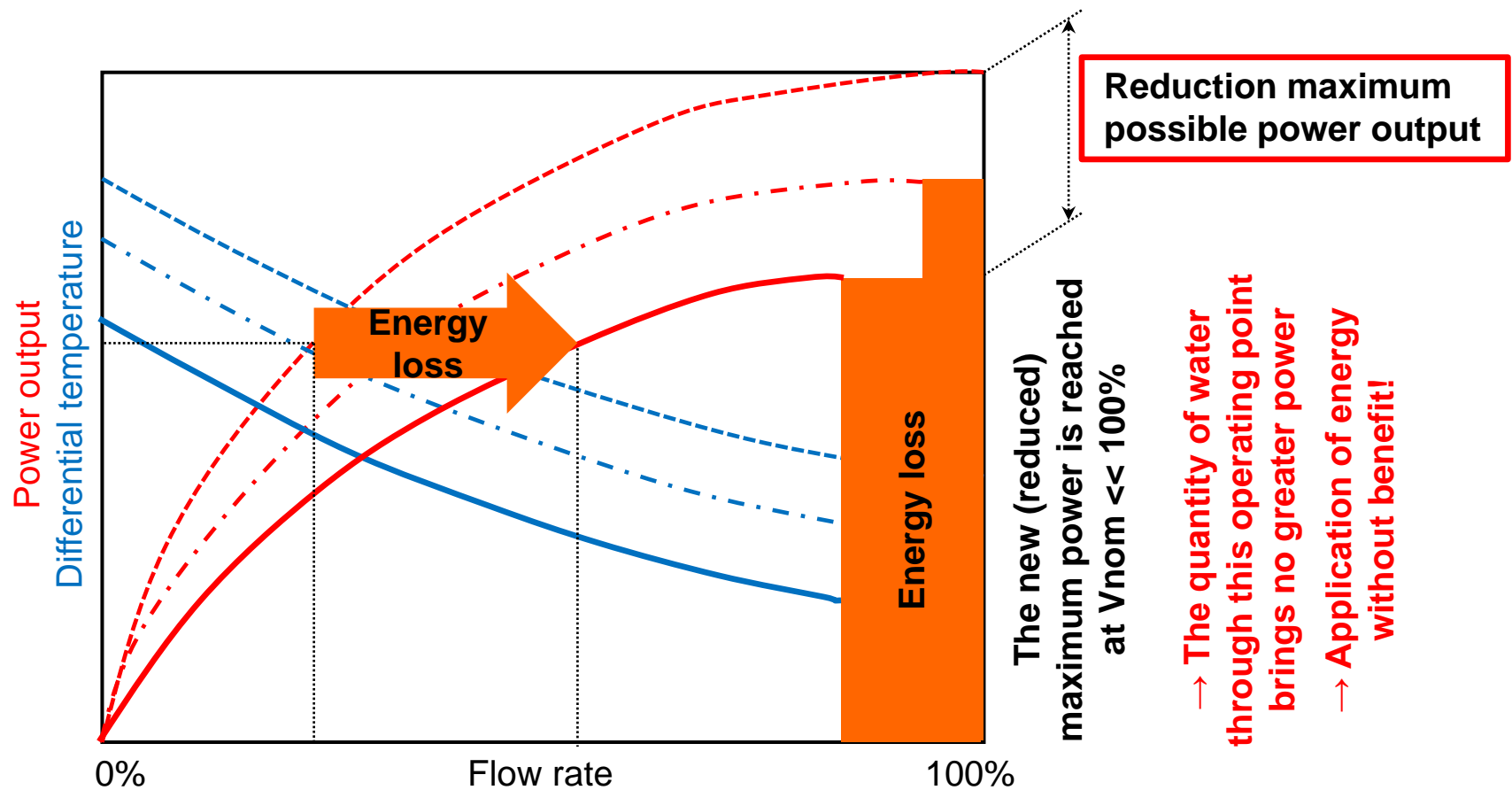


The new (reduced)  
maximum power is reached  
at  $V_{nom} < 100\%$

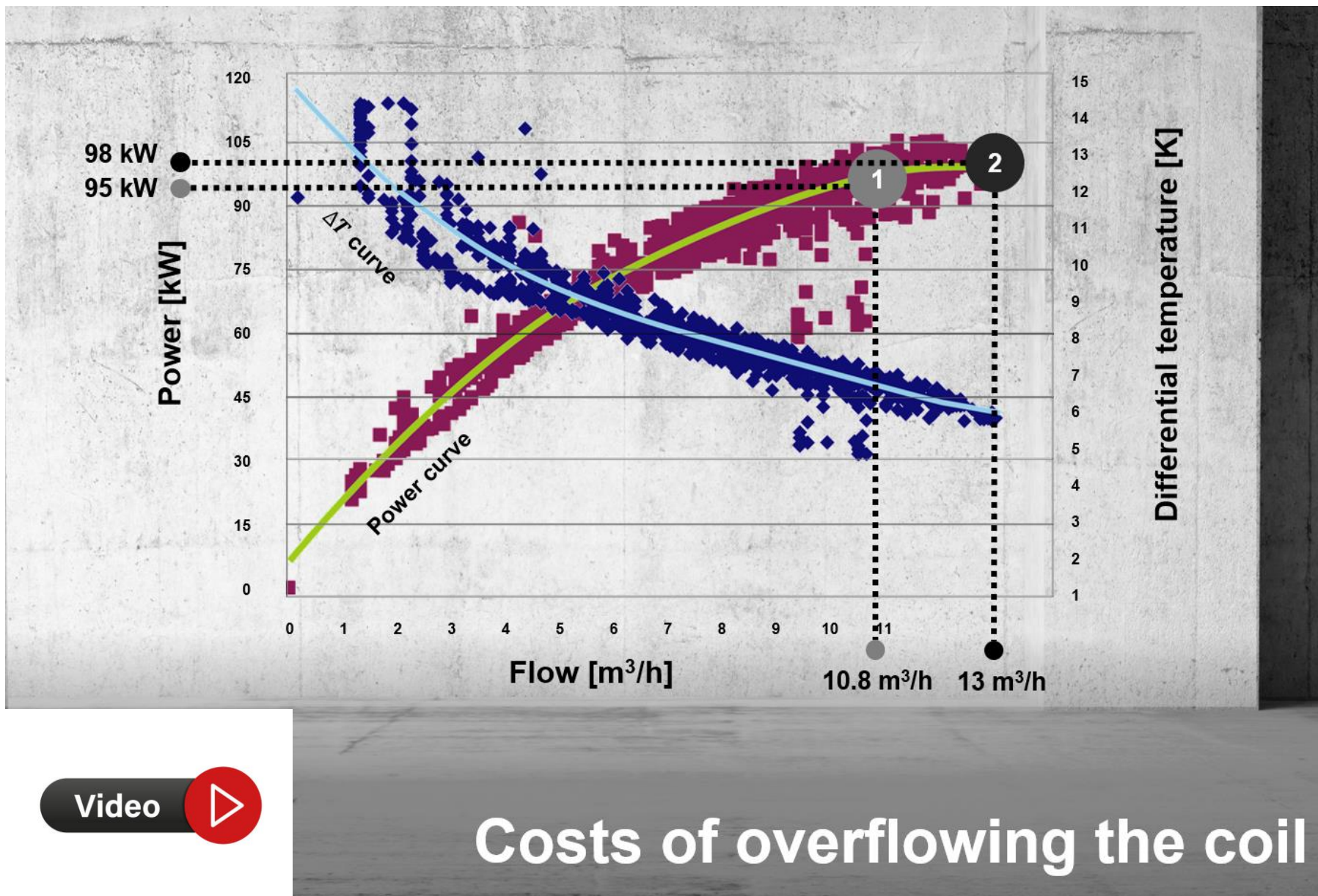
→ The quantity of water  
through this operating point  
brings no greater power  
→ Application of energy  
without benefit!

# Heat exchanger performance

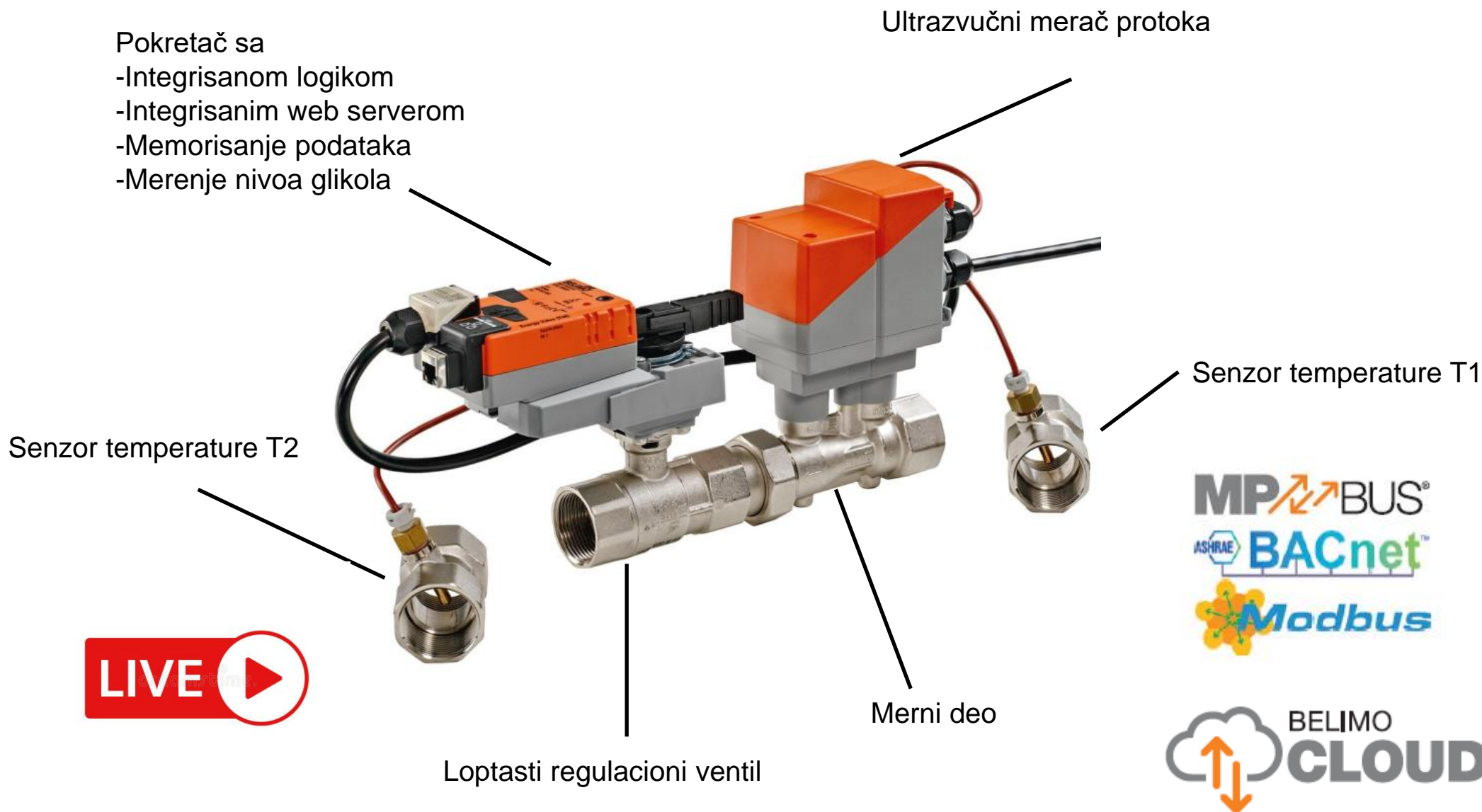
- During operation: The performance continues to decline!



# Heat exchanger performance



# Belimo Energy Valve™ – kao IoT uređaj



Globe Valves

Valve Actuators

## Retrofit

Belimo Retrofit Tool

Damper Actuators (Retrofit)

Control Valve Actuators (Retrofit)

Butterfly Valve Actuators (Retrofit)

Globe Valve Actuators (Retrofit)

Variable Air Volume (Retrofit)

Sensors (Retrofit)

## Services

Valve Sizing and Selection

Sensors/Meters Selection

Tender Texts

Customer-specific products

Download Center

Apps

Software / Plug-ins

File Archive (Bus & System Integration)

Product and Price Catalogue / Datanorm

General Terms and Conditions

[Belimo Cloud: Login / Register](#)

Thermal energy meter activation

Videos





# Belimo Road Show

## 53. KGH Kongres 30.11 – 02.12.2022





# Pitanja i diskusija



**Hvala na pažnji !**

