

New generation of Mandík control

Maximum efficiency for your project.

Starting point & goal

Why we are changing the control platform

Today: Siemens Climatix

- 15 years of development, thousands of units worldwide (POL638, POL648, POS466)
- The architecture is the weak point – no long-term maintainable standard
- Custom versions, poor traceability and versioning

Goal: Mandík control

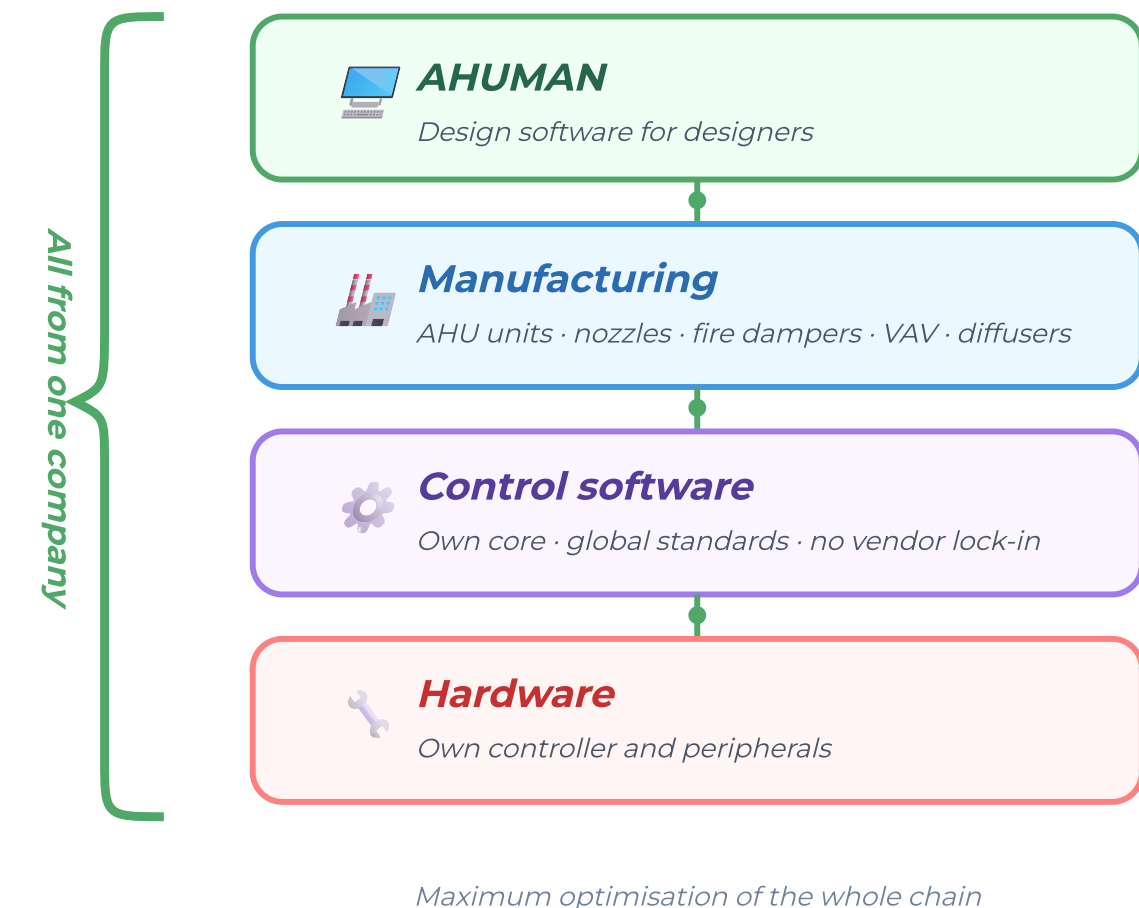
- Our own platform with no configuration limits
- One software for all units
- Open ST code, clean version control in Git
- A gradual, controlled transition – not overnight

We continue to fully service and support existing Climatix installations – the transition is gradual and controlled.

We are a complete manufacturer

We cover the whole chain from software to hardware

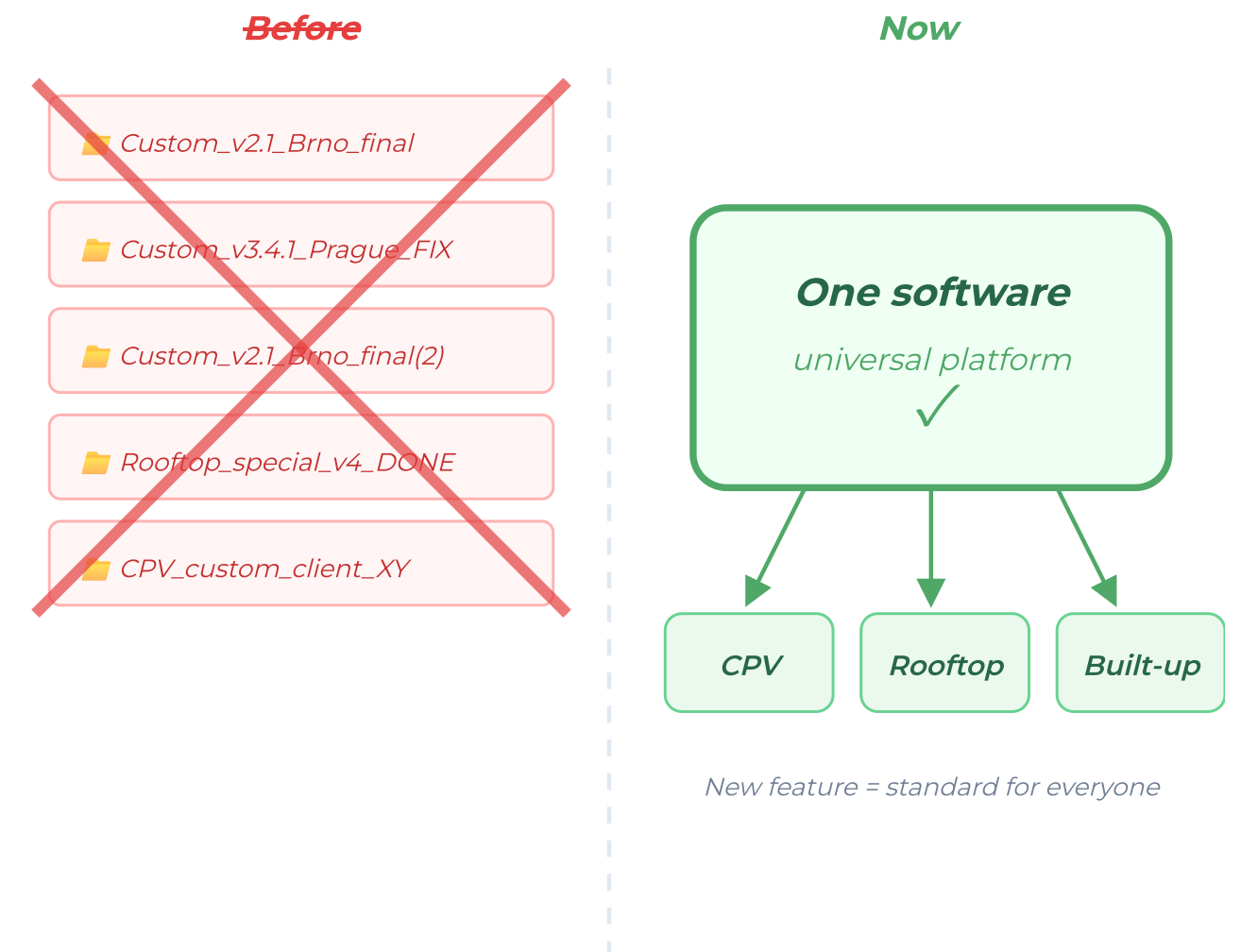
- **AHUMAN design software:** Our own environment for designers.
- **Technology manufacturing:** Complete development and production of HVAC units.
- **Control software:** Our own software core – none of the limits of off-the-shelf solutions. Even though it is our SW, it follows a global standard and can be ported to other hardware if needed.
- **Hardware:** In-house development of HW peripherals.



The end of "custom projects"

One software to rule them all

- One unified software for **ALL** applications (CPV, CPX, Rooftop and built-up units).
- No unique versions for specific projects = dramatically fewer errors.
- Every feature developed becomes a standard part of the platform for everyone.
- **Code version control (Git)** – every change is backed up and fully traceable, so we always know which version is running at the customer.



Why Structured Text, not graphical blocks

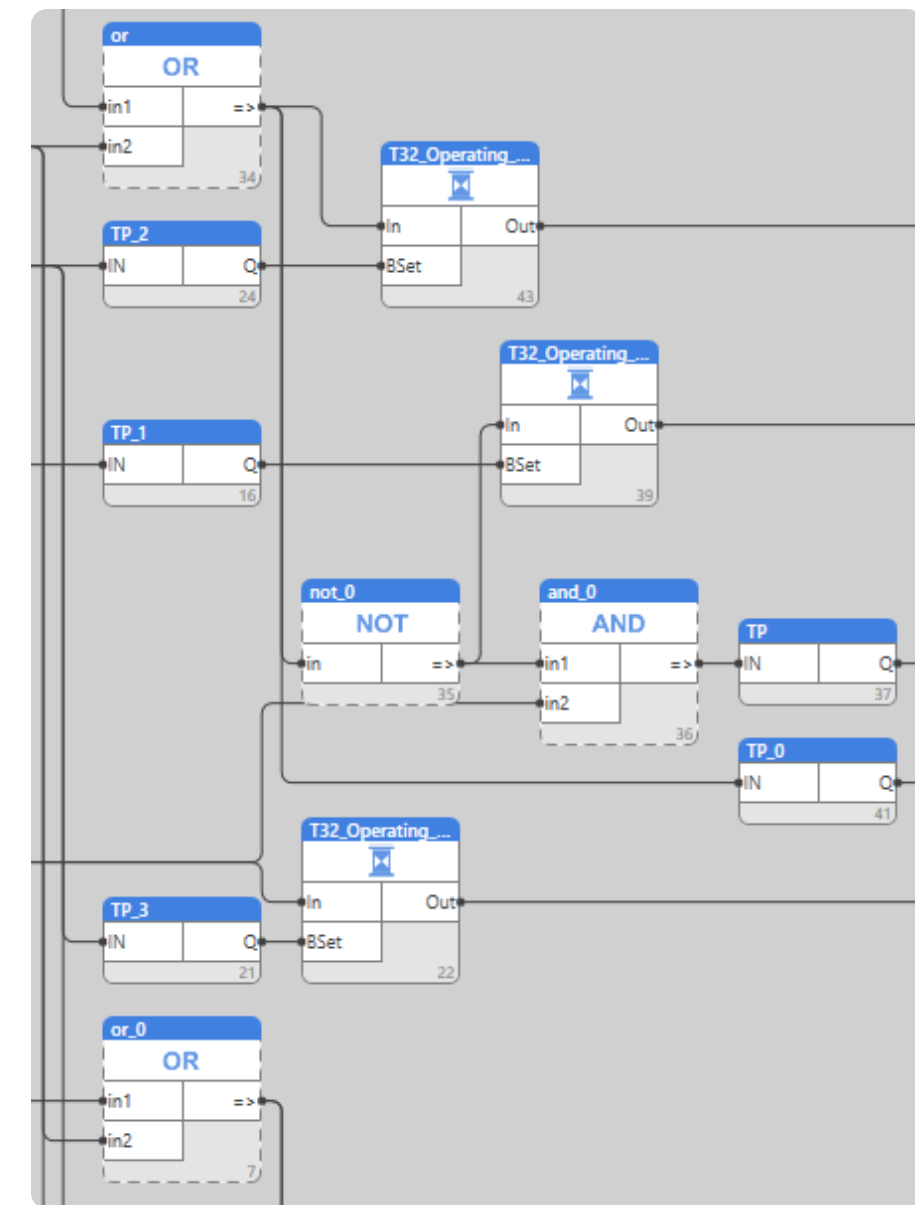
Control programming: text code (ST) vs. graphical function blocks (FBD)

FBD advantages

- clear for simple logic,
- most PLC environments highlight active paths and values directly in the blocks,
- close to an electrical wiring diagram,
- controls people often think in “input → condition → output”,
- less syntax (semicolons, brackets, variable declarations).

FBD disadvantages

- large projects become hard to follow,
- hundreds of blocks and links create a “spaghetti map”,
- loops and algorithms are hard to implement,
- sorting, searching, working with arrays, matrices or statistics is cumbersome,
- what is a few lines in ST is often dozens of blocks in FBD,
- difficult version control,
- with ST code the difference between versions is clearly visible,
- frequent copying of similar logic.

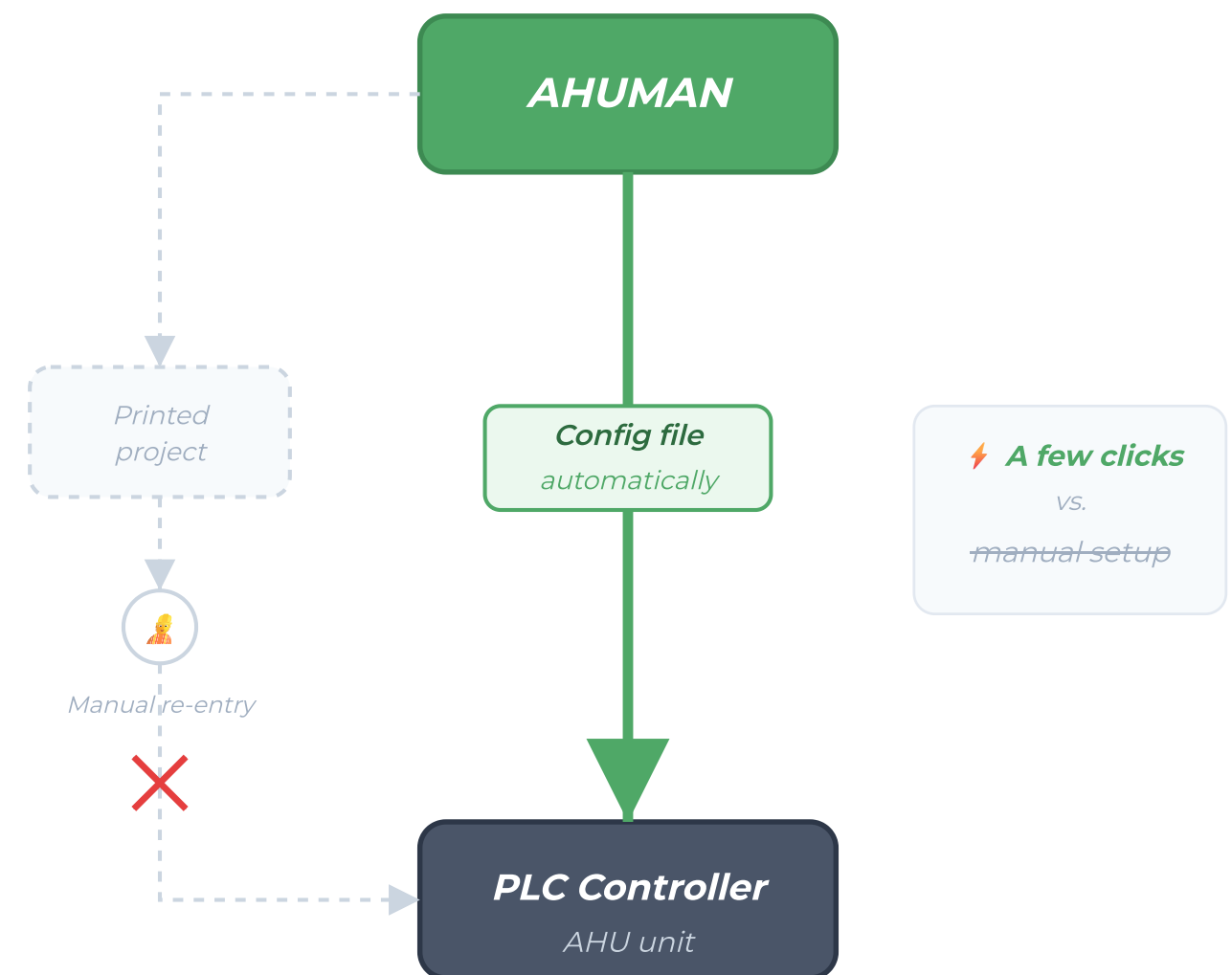


Mandík offers full flexibility of components and can program practically anything – purely graphical programming is unsuitable for that in the long run. **That's why we build on ST.**

From design straight to operation

Direct link with AHUMAN

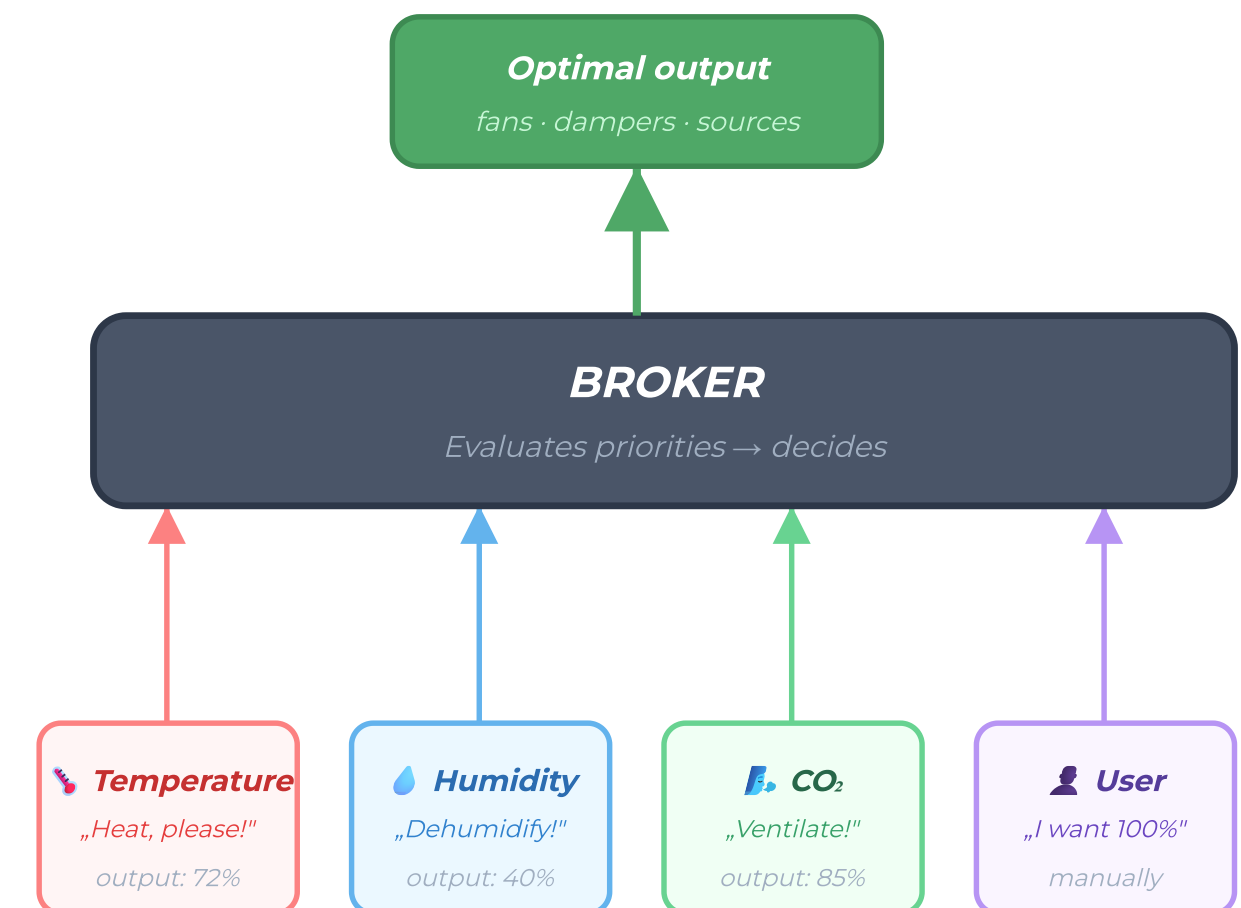
- The designer lays out the whole assembly in AHUMAN.
- Production generates the file for the specific unit in one click.
- Import straight into the PLC controller.
- **Result:** Automatic system setup without wasted time and manual errors.



The "managers" system

The end of conflicts between demands

- We don't use "hard code"; the system is split into managers (Temperature, Ventilation, CO₂, Humidity).
- Each manager evaluates its own task independently and generates a request.
- The main system optimises smooth operation so everyone is satisfied without overriding functions.

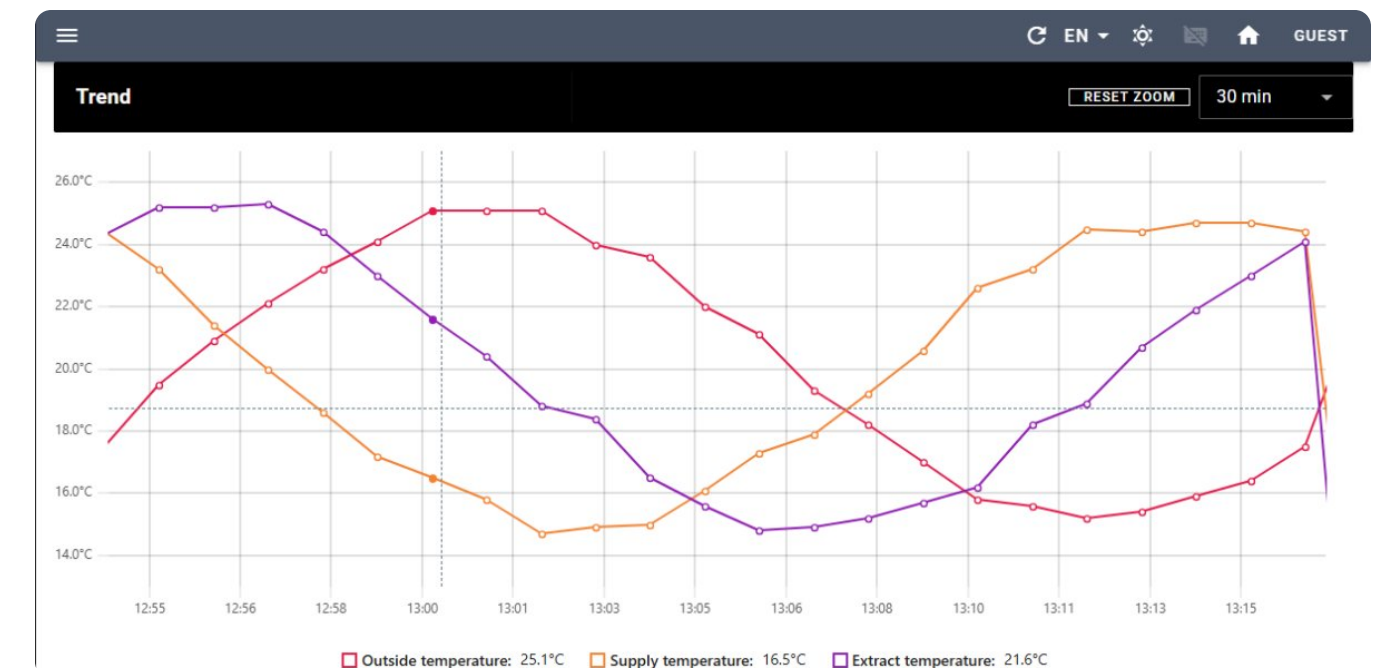


Each manager requests independently – the Broker optimises smoothly

Intelligent temperature control

Combining qualitative and quantitative control

- **Qualitative control:** First free cooling, then heat recovery, and active sources (cool/heat) only as a last resort.
- **Quantitative control:** The fan has a min. and max. speed setpoint. If the unit cannot reach the required temperature by changing the supply air temperature alone, it gradually increases fan speed within the allowed limits. Qualitative control still holds the setpoint – but at higher flow it reaches the target temperature on extract / in the room more efficiently.
- Always with a focus on absolutely lowering the building owner's running costs.



Intelligent humidity control

Specific humidity (g/kg) control with a Mollier diagram

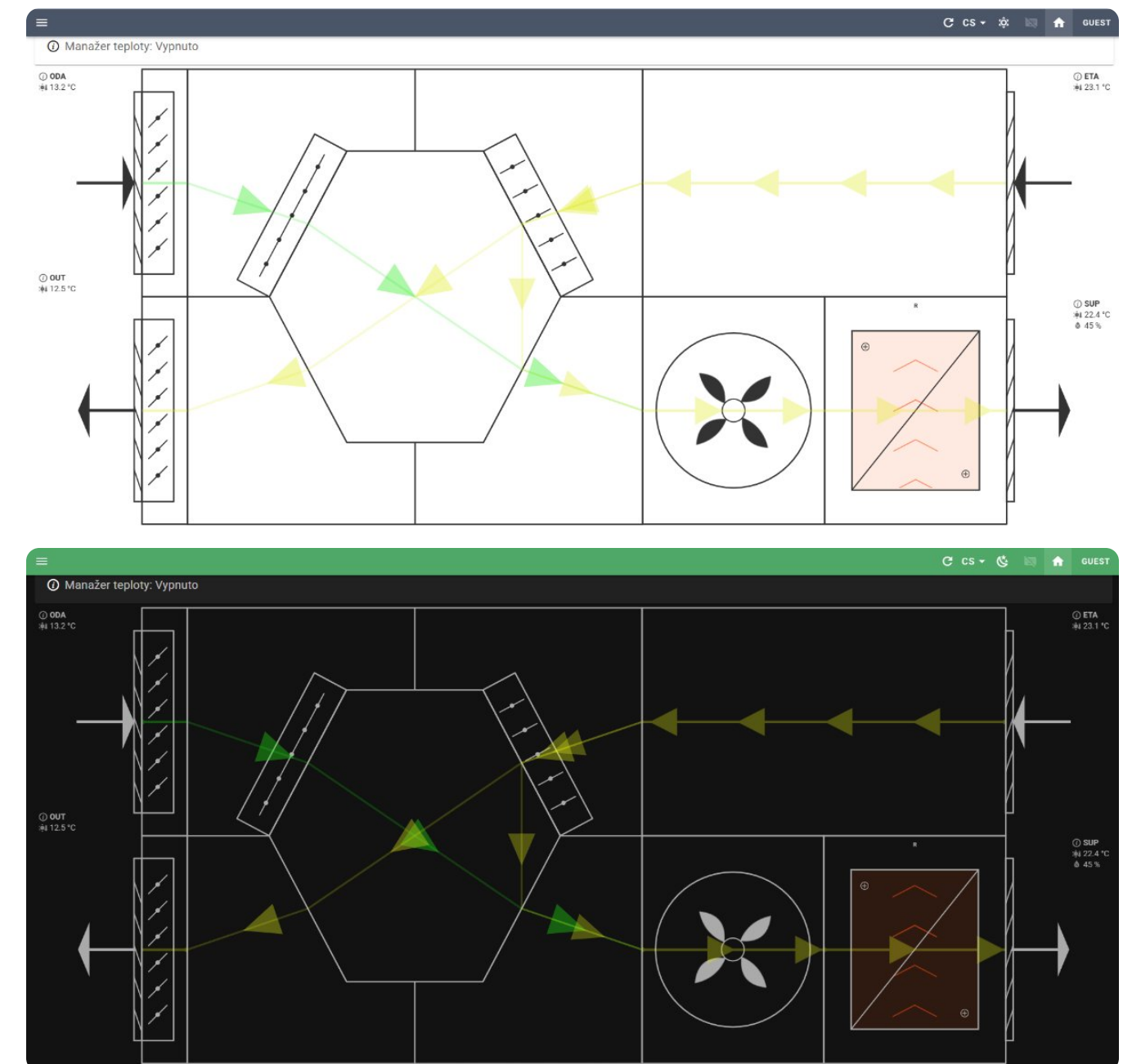
- Controls **specific humidity (g/kg)** – independent of temperature, so more precise than relative humidity alone.
- The user enters **% relative humidity**; the system converts the values to specific humidity.
- Dead band:** dehumidify / humidify / do nothing – no needless switching.
- Uses existing components (cooler / heat pump, steam humidifier) and works with the temperature manager.
- Mollier h-x diagram right in the visualisation** – the user sees where the unit is operating.



Visualisation for the 21st century

A modern, fully responsive Web UI

- Integrated web interface (Google Material Design).
- Adapts 100% to PC, tablet and phone screens on its own.
- A smooth user experience – it works like a modern App Store app.
- No cost for extra HMI hardware – any display with a browser will do.



4 user modes & time schedule

Graphical touch weekly schedule – set up the whole week in seconds

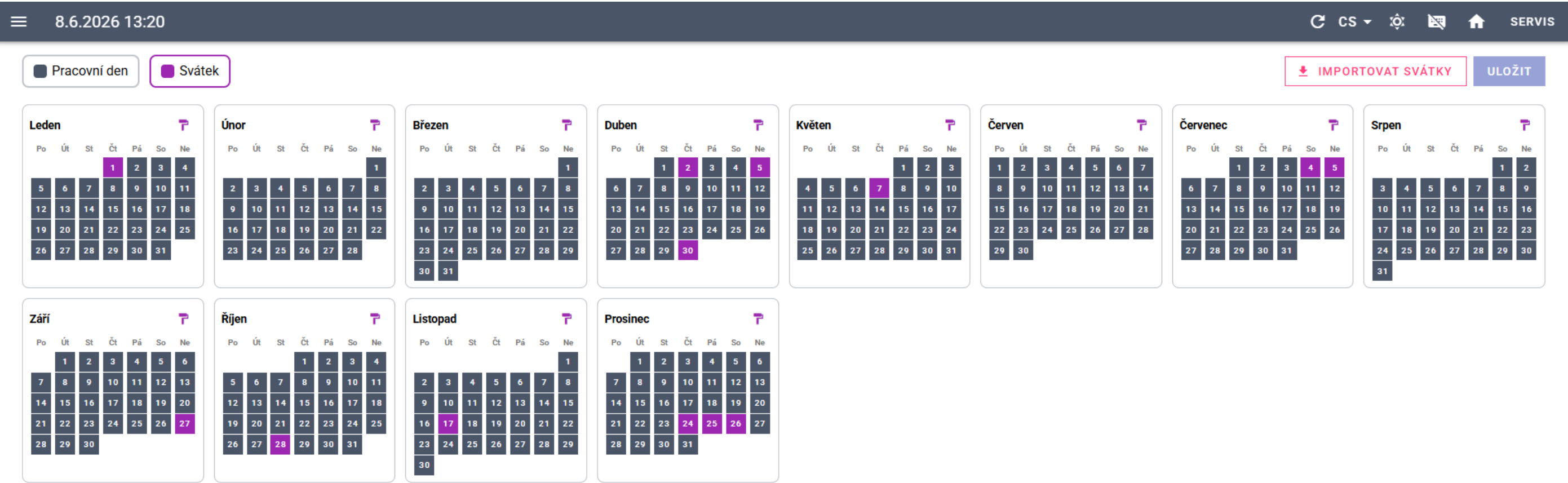
- **4 fully configurable modes** – the customer names them as needed (Comfort, Reduced, Night, ...).
- Each mode defines the complete state of the unit, including the fan control style (constant pressure VAV / constant flow CAV / fixed speed % / external control) and the type of temperature control (supply / room / extract).
- **Graphical touch schedule** – coloured blocks on a timeline, drag with your finger. Much faster than typing in times.
- Transitions between modes are smooth, with no dangerous step changes.



Annual calendar & holiday schedule

Holidays, shutdowns and non-standard days – all in one place

- **Holiday day schedule** – a separate page to set the time profile of a holiday day (same graphical principle as the weekly schedule).
- **Annual calendar** – an overview of 12 months where holiday days are marked. These then follow the holiday schedule instead of the standard weekly one.
- **Import public holidays** – one click and the system automatically loads the public holidays for the chosen country (CZ, SK, DE, AT...).
- You can also mark planned **shutdowns** or special operating days.



A revolution in on-site support

A manual right at your fingertip by every value – no more deciphering three-letter abbreviations

Almost every parameter has its own **info icon** (i). One tap unfolds a complete, readable description, including default values and limits. A huge saving on calls to the service department.

CS

GUEST

Teploty

	Konfigurace	Typ	Vstup	Hodnota
<i>i</i> Venkovní	✓	NTC10k	AI 1_1	12.5°C
<i>i</i> Nasávaná	✓	NTC10k	AI 1_2	13.2°C
<i>i</i> Air.TempRoom1	✓	NTC10k	AI 1_6	22.8°C
<i>i</i> Přiváděná	✓	NTC10k	AI 1_3	22.4°C
<i>i</i> Odváděná	✓	NTC10k	AI 1_4	23.1°C
<i>i</i> Odpadní	✓	NTC10k	AI 1_5	15.8°C

Rekuperátor

	Konfigurace	Typ	Vstup	Hodnota
<i>i</i> Nasávaná	✓	NTC10k	Set	13 °C
<i>i</i> Přiváděná	✓	NTC10k	Set	19.5 °C

Venkovní teplota

Venkovní teplota slouží jako vstupní veličina pro řízení regulace, určení teplotního období (léto / zima) a optimalizaci využití venkovního vzduchu při provětrávání. Čidlo je obvykle instalováno na fasádě nebo v blízkosti jednotky. Při instalaci je nutné zohlednit vliv přímého slunečního záření.

CLOSE

CS

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Nastavení parametrů:

Režim 1

Ventilátor:

Přivodní

Typ řízení:

Otáčky

Setpoint :

30 %

Směšovací klapka - Typ řízení:

PID

Pozice - Minimální:

0 %

Kvalita vzduchu:

Regulovaná CO2:

Odváděná

Kvalita vzduchu - Typ řízení:

PID

Zvýšení otáček ventilátoru:

0 %

Aktuální režim: Vypnuto

Aktuální otáčky ventilátoru: 75 %

Maximální Setpoint : 100 %

Směšovací klapka - Pozice: 75 %

Pozice - Maximální: 100 %

Stav:

Aktuální regulovaná hodnota: 650 ppm

Setpoint : 800 ppm

MgC.Fan_Enable: 650 ppm

Odvodní ventilátor

	Konfigurace	Typ	Vstup	Hodnota
<i>i</i> Měření tlaku	✓	0-10V	AI 1_8	1.0 Pa

Přivodní filtr 1

Měření tlaku

Čidlo je instalováno na potrubí a měří statický tlak v potrubí vůči atmosférickému tlaku. Hodnota může být využívána k řízení výkonu ventilátoru a k udržování konstantního tlaku v systému VAV.

CLOSE

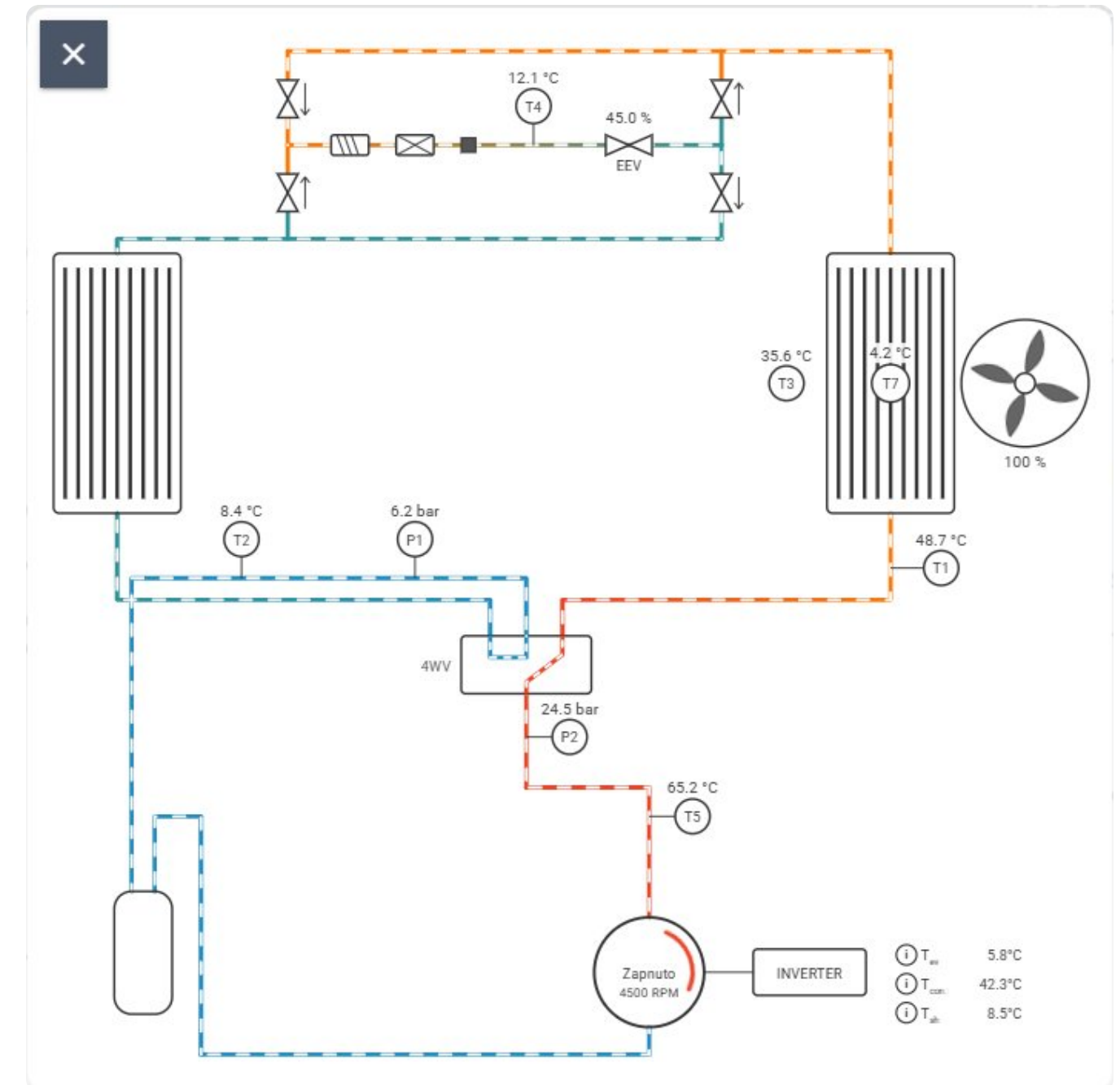
MANDÍK, a.s.

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Ready for the future

Cloud, diagnostics and remote management

- Secure remote access from anywhere in the world (climan.online).
- Detailed history capture (trends) enabling forensic fault analysis.
- Ability to adjust the client's settings remotely – a saved service call-out.
- Live visual schematics of the technology, generated automatically.



Connectivity & access

Supervisory systems, room control and control & network peripherals

Supervisory system (BMS)

- **Modbus TCP** (Ethernet)
- **Modbus RTU** (RS-485)
- **BACnet IP** (Ethernet)
- Analog / digital signals

KNX not supported yet

Room devices

- **Belimo room device** – via Modbus RTU
- **Analog / digital signals** – HMI/RO3 or CP-M-B device

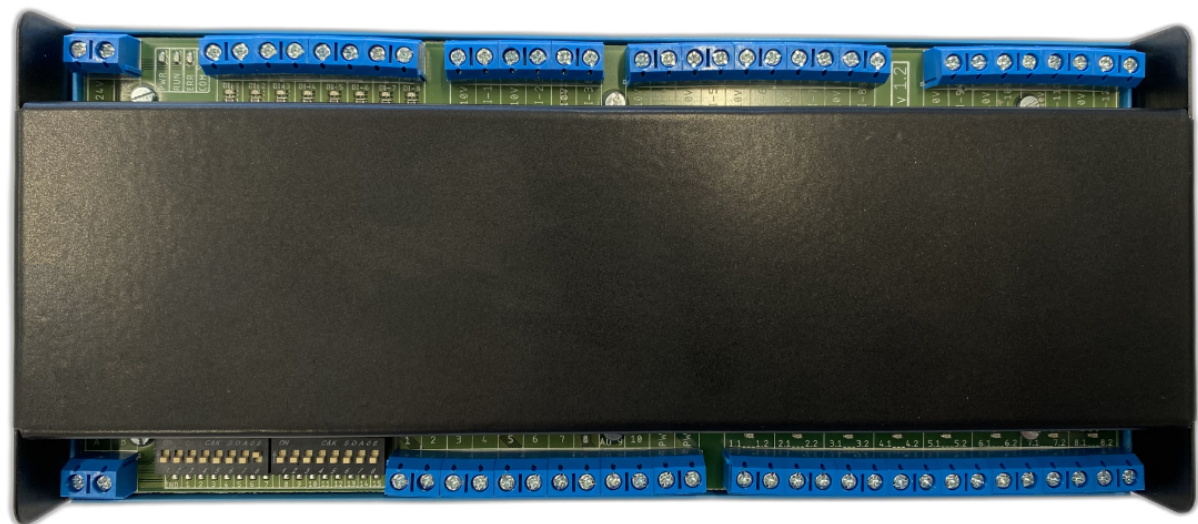
Control & access

The same full web interface from phone or laptop:

- **10" touch display** – local control, can create its own hotspot
- **Local router** – API hotspot for on-site connection
- **Teltonika router** – remote access via Cloud

In-house CLIMAN hardware

More than 10 years of experience forged into our own PLC



Parameter	Value
Digital inputs (DI)	8
Relay outputs (DO)	8
Analog inputs (AI)	12
Analog outputs (AO)	12
Power supply	24 VDC
Communication	Modbus RTU (RS-485)
Addressing	DIP switches

- Status LED on every DI and DO** – the technician instantly sees whether an input/output is switched, with no measuring instrument needed
- Developed with a focus on **straightforward diagnostics** of device status right at the panel
- Rugged industrial casing** – DIN-rail mounting, resistance to vibration and interference
- Up to 30 modules** on a single bus – unlimited expandability
- Control runs on **any Modbus PLC** – supplier independence
- Also used in **Monzun-HPB** – industrial heating with its own firmware

What the software can control

Climatix vs. the new-generation Climan

Control	Climatix	Climan
Fans	speed / pressure / flow / external	same + selectable per mode
Temperature control	supply / extract / room	same + selectable per mode
Water exchangers	2× heating + 1× cooler	4× exchanger, each heating & cooling
Electric heating	2× with 2 stages	3× with 10 stages
Condensing units	1× with 6 stages	3× with 6 stages
Integrated heat pump	2 circuits	2 circuits × 2 compressors

Platform comparison

MANDÍK Control System vs. Siemens Climatix

Parameter	MANDÍK Control System (Unipi Gate G110)	Climatix POL648 (freely programmable)	Climatix POS466 (application-specific)
Processor	4× ARM A53 600 MHz	1× ARM M4 120 MHz	1× ARM Cortex 7 188 MHz
RAM	1 GB	64 MB	32 MB
Storage	32 GB eMMC + microSD	64 MB Flash	16 MB Flash
Ethernet	1 Gbit + 100 Mbit	1× 100 Mbit	1× 100 Mbit
RS-485	2× ports	2× port	1× port
Power supply	24 V DC	24 V AC/DC	230 V AC
Protection / body	IP20 · aluminium	IP20 · plastic	IP20 · plastic
Visualisation	Full web server (Vue.js, responsive)	Basic web server	Basic web server

Input and output comparison

Climatix: 27 possible combinations of 3 expansion types vs. CLIMAN: 1 module type, add as needed

Climatix configuration	DI	DO	TI	U I/O	AO	Σ	CLIMAN	DI	DO	AI	AO	Σ
POL648 (base)	4	6	0	11	0	15	1×	8	8	12	12	32
+ 1× POL945	6	10	2	11	0	19	1×	8	8	12	12	32
+ 1× POL955	4	10	0	19	2	25	1×	8	8	12	12	32
+ 2× POL945	8	14	4	11	0	23	2×	16	16	24	24	64
+ 1× POL945, 1× POL955	6	14	2	19	2	29	2×	16	16	24	24	64
+ 1× POL985	7	14	3	19	0	29	2×	16	16	24	24	64
+ 2× POL955	4	14	0	27	4	35	2×	16	16	24	24	64
+ 2× POL945, 1× POL955	8	18	4	19	2	33	2×	16	16	24	24	64
+ 1× POL945, 1× POL985	9	18	5	19	0	33	2×	16	16	24	24	64
+ 1× POL945, 2× POL955	6	18	2	27	4	39	2×	16	16	24	24	64
+ 1× POL955, 1× POL985	7	18	3	27	2	39	2×	16	16	24	24	64
+ 2× POL945, 1× POL985	11	22	7	19	0	37	3×	24	24	36	36	96
+ 2× POL945, 2× POL955	8	22	4	27	4	43	3×	24	24	36	36	96
+ 1× POL945, 1× POL955, 1× POL985	9	22	5	27	2	43	3×	24	24	36	36	96
+ 2× POL985	10	22	6	27	0	43	3×	24	24	36	36	96
+ 2× POL945, 1× POL955, 1× POL985	11	26	7	27	2	47	3×	24	24	36	36	96
+ 2× POL955, 1× POL985	7	22	3	35	4	49	3×	24	24	36	36	96
+ 1× POL945, 2× POL985	12	26	8	27	0	47	3×	24	24	36	36	96
+ 1× POL945, 2× POL955, 1× POL985	9	26	5	35	4	53	3×	24	24	36	36	96
+ 1× POL955, 2× POL985	10	26	6	35	2	53	3×	24	24	36	36	96
+ 2× POL945, 2× POL985	14	30	10	27	0	51	4×	32	32	48	48	128
+ 2× POL945, 2× POL955, 1× POL985	11	30	7	35	4	57	4×	32	32	48	48	128
+ 1× POL945, 1× POL955, 2× POL985	12	30	8	35	2	57	4×	32	32	48	48	128
+ 2× POL945, 1× POL955, 2× POL985	14	34	10	35	2	61	4×	32	32	48	48	128
+ 2× POL955, 2× POL985	10	30	6	43	4	63	4×	32	32	48	48	128
+ 1× POL945, 2× POL955, 2× POL985	12	34	8	43	4	67	4×	32	32	48	48	128
MAX: 2× POL945, 2× POL955, 2× POL985	14	38	10	43	4	71	5×	40	40	60	60	160
4× POL945, 4× POL955, 4× POL985	24	70	20	75	8	127	5×	40	40	60	60	160

Climatix – 27 possible combinations
3 different expansion types · max. 2 of each · 6 expansions = **hard ceiling**
Universal I/O shares functions (temp / 0-10V in / 0-10V out on one pin)

CLIMAN – 1 module type
Clear separation: 8 DI + 8 DO + 12 AI + 12 AO per module
Need more? Add a module. **Up to 30× = 240 DI, 240 DO, 360 AI, 360 AO**

Thank you for your attention

New generation of Mandík control

Control that adapts to your project – not the other way around.