Even Flow

News from Danfoss Building Solutions
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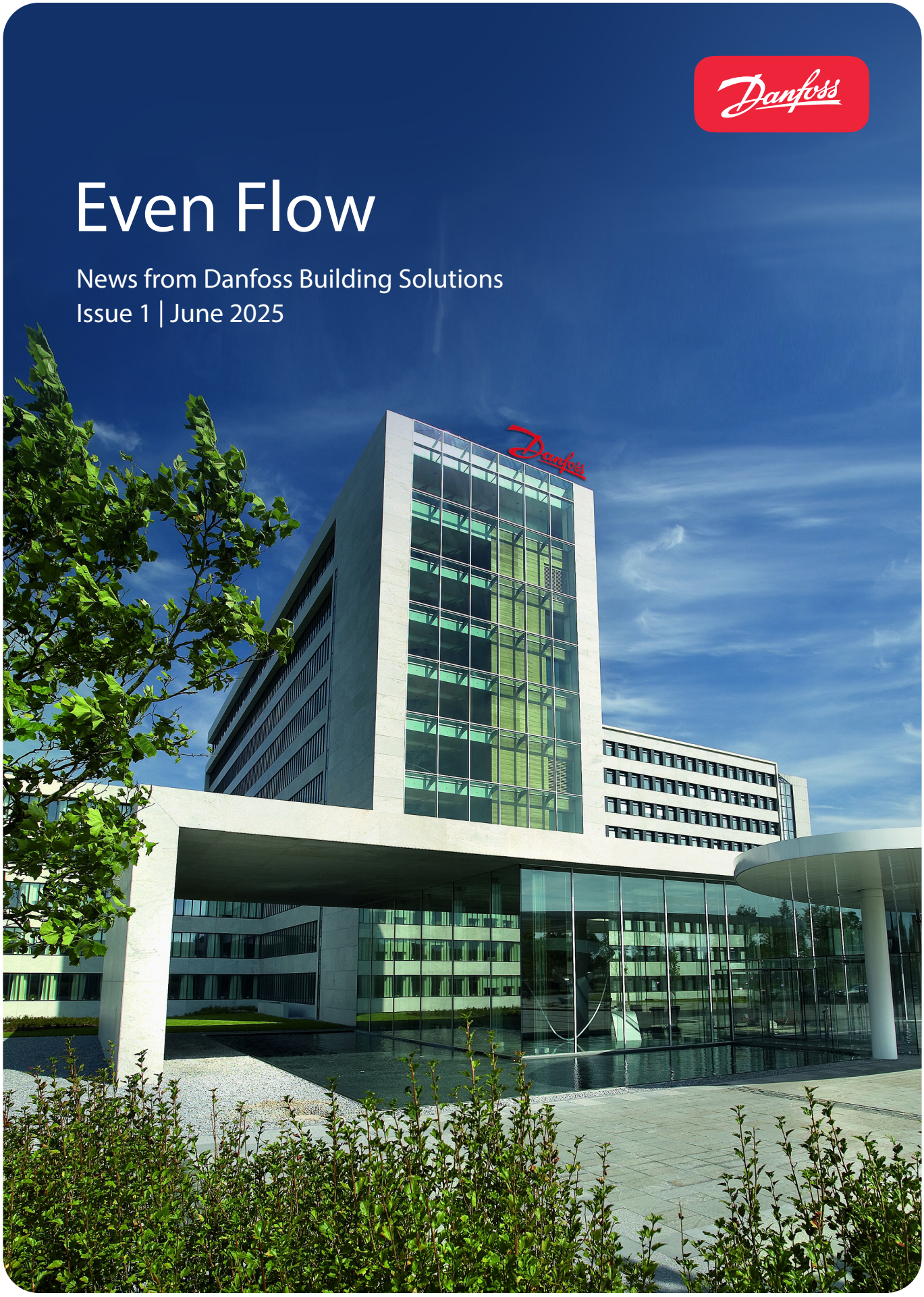

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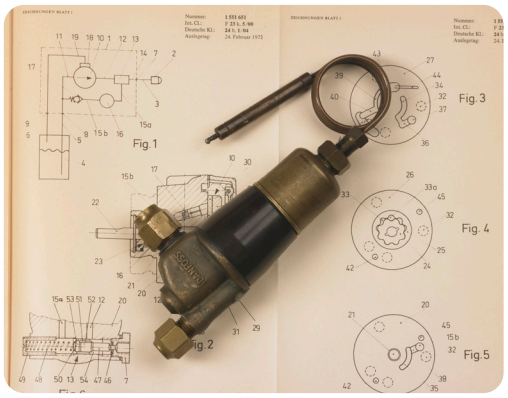
The Evolution of TRVs:
From Basic to Smart Solutions



The first TRV - 1933

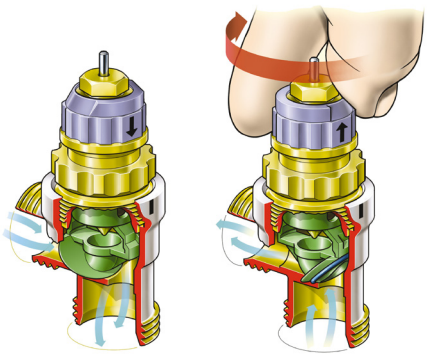
As heating systems evolve, thermostatic radiator valves (TRVs) adapt to meet modern demands. Initially developed as bi-directional valves to handle shifting water flow, TRVs have transformed into key components of smart heating solutions, enhancing comfort and energy efficiency in contemporary systems.

Danfoss introduced its Revolver bi-directional technology around 25 years ago in response to a major shift in heating systems. Traditional gravity-fed boiler systems were giving way to pumped and sealed systems, where water flow direction could vary. Early thermostatic radiator valves (TRVs) were highly sensitive to flow direction, often leading to noise and inefficiencies when installed incorrectly. To combat this, bi-directional TRVs were developed, offering greater flexibility in installation and improving performance. Unlike traditional valves, a bi-directional valve (such as Danfoss' RAS-FS valve and RAS-C2 sensor) can be installed in either a vertical or horizontal position on both the flow and return side. But where it truly shines is in its ability to eliminate water hammer. If water hammer occurs, the installer can effortlessly reverse the water flow over the valve cone using a built-in flow selection device without the need for complex adjustments or system drain-downs.

But how have TRVs evolved since then, and do they still play a crucial role in modern heating systems?

Adapting to an Evolving Heating Landscape

Heating systems have undergone a significant transformation—from gravity-fed cast iron boilers to sealed systems, then condensing boilers, and now heat pumps. To meet these changing demands, the TRV has evolved from simple mechanical designs to self-balancing models, Danfoss' Revolver technology, and now electronic and smart TRVs that integrate seamlessly with home automation systems.



Danfoss 'Revolver ' bi-directional TRV

The Rise of Dynamic Valves

Building upon bi-directional TRVs, Danfoss introduced dynamic TRVs like the RAS-B2, which feature a differential pressure controller. Unlike traditional TRVs that only act as flow limiters, these dynamic valves maintain constant pressure drops, ensuring consistent flow regulation throughout seasonal variations in heating demand.

Additionally, pre-setting the desired flow rate is done on the valve itself, rather than on the lockshield. This innovation alone can save installers up to two hours of valuable working time, making installations more efficient while ensuring system optimisation.

The Emergence of e-TRVs

The latest advancement in TRV technology is the electronic TRV (e-TRV), such as Danfoss' Ally. When properly balanced, e-TRVs help maintain optimal operating conditions for heat pumps, potentially enhancing both performance and lifespan.

Modern e-TRVs are designed to function effectively within the low-temperature operating range of heat pumps. They sense room temperatures with precision, adjusting radiator output accordingly to ensure optimal comfort without unnecessary energy consumption. They can also be integrated with smart home automation systems, allowing for remote control via apps or voice assistants like Alexa.

Danfoss first e-TRV - Living Eco

The Science Behind TRV Sensors

At the heart of every TRV is a sensor, which contains wax, liquid, gas, or electronic components that expand and contract in response to temperature changes. This expansion and contraction impact the spring inside the thermostat; when the room temperature increases, the gas inside the bellow expands causing the valve to close by reducing the flow of hot water through the radiator. When the temperature drops below the pre-set room temperature, the gas bellow automatically contracts and opens the valve to increase the flow of hot water until the desired set temperature is reached. What's the difference? The reaction time. Spanning from 1 – 40 minutes! Wax sensors can take up to 40 minutes to react to temperature changes while e-TRVs can react in just one minute. E-TRVs' rapid response time improves comfort and reduces energy waste, making them a game-changer for modern heating systems.

Danfoss RAS-B2 'self-balancing' TRV

Dynamic Valves and Condensing Boilers: A Perfect Pairing

The dynamic TRV plays a crucial role in helping condensing boilers operate at maximum efficiency. By limiting the flow through each radiator and regulating room temperature, these valves allow the boiler to operate in its most efficient mode.

Without TRVs, a boiler in a wet heating system typically operates in condensing mode just 5% of the time. However, when TRVs are fitted, this efficiency jumps to 80%, significantly reducing energy waste and improving system performance.

The Role of e-TRVs in Heat Pump Systems

As the industry shifts towards low-carbon heating solutions, integrating e-TRVs with heat pumps is not only possible but offers significant comfort benefits to homeowners. e-TRVs can be used to provide zoned heating control, preventing overheating and ensuring that each room is heated only as needed. This prevents wasted energy and allows occupants to achieve a comfortable, tailored heating experience.

Conclusion: Are TRVs Still Relevant?

The simple TRV has evolved into a sophisticated tool for modern heating efficiency. From bi-directional designs to dynamic valves and smart e-TRVs, today's solutions are helping to optimise heating systems for greater comfort, energy savings, and sustainability. As the industry transitions towards heat pumps and renewable energy, TRVs will remain an essential part of efficient heating management. For installers, facility managers, and homeowners, the question isn't "Should I use TRVs?" but rather "Which TRV technology best suits my heating system?"

Danfoss Ally™ is the latest smart heating solution from Danfoss

Product Spotlight

Danfoss Ally™ - Revolutionising Smart Heating for Professionals

Danfoss Ally™ is designed to meet the needs of heating professionals looking to offer sophisticated solutions that combine efficiency, flexibility and ease of integration into modern heating systems. These smart heating solutions not only provide up to 30% energy savings and exceptional convenience for installers and specifiers, but also deliver significant benefits to homeowners.

Seamless Integration and Control

Danfoss Ally™ serves as a WiFi gateway, seamlessly connecting and controlling boilers, TRVs, and UFH components. This system delivers the full benefits of smart heating, allowing professionals to tailor installations to specific project requirements. Homeowners enjoy a customised heating experience that enhances comfort and efficiency.

Empowering Technology for Homeowners

The Danfoss Ally™ app acts as the central hub for remote management, offering precise control from anywhere. Homeowners can easily schedule and monitor their heating systems, ensuring optimal comfort and energy savings. Zigbee 3.0 certification ensures seamless integration with digital assistants like Alexa and Google Assistant, enabling voice-controlled operation for enhanced convenience.

Precision and Efficiency

At the core of the system is the Danfoss Ally™ Gateway, a programmable wireless control unit that manages daily heating schedules with precision. The room sensor provides accurate temperature and humidity readings, while the boiler relay optimizes energy usage by activating the boiler only when necessary, reducing waste and lowering energy bills for homeowners.

Innovative Features for Diverse Applications

Danfoss Ally™ eTRVs are designed for ease of use, featuring a manual handwheel and single button operation. The open window function automatically conserves energy by shutting off heat when a window is opened, providing homeowners with smart energy management.

Equipped to handle hybrid heating systems, Danfoss Ally™ ensures seamless operation across radiators and hydronic UFH, providing homeowners with flexible and efficient heating solutions.

Introducing Icon 2™ for Professional Installations

The new Icon 2™ UFH controller is engineered for rapid installation, averaging just nine minutes. Its automatic balancing functionality ensures hydraulic balancing based on room demand, maximizing comfort and energy efficiency for homeowners. The dual heat emitter supports both radiator and floor heating in the same room, offering versatility in heating solutions.

Icon 2™ features a touch user interface for a modern and intuitive control experience, and powerline communication simplifies installation and setup. The app functionality is compatible with iOS and Android devices, requiring the Ally™ Gateway or a compatible Zigbee gateway. Multiple configurations support 2, 3, or 4 pipe applications, accommodating various system designs.

Danfoss Ally™ Features & Benefits

- Smart Heating Control: Offers full control over radiator and hydronic floor heating systems via a cloud-based solution.
- Voice Control: Compatible with Amazon Alexa and Google Assistant for hands-free operation.
- Energy Savings: Provides up to 30% energy savings with scheduled heating.
- Intuitive App: The Danfoss Ally™ App allows easy scheduling and monitoring from anywhere.
- Easy Installation: Compatible with 95% of all valves, with a simple setup process.

For more information on how Danfoss Ally™ can enhance your installations and benefit your customers, visit Danfoss Ally™.

Product Spotlight

Effortless Control & Efficiency: Danfoss Icon2™ Floor Heating

Danfoss Icon2™ transforms underfloor heating with precise control, smart-home capability & versatile applications.

Designed for professionals and homeowners, Danfoss Icon2™ integrates seamlessly into modern systems, ensuring comfort and efficiency.

Smart Operation and Design

Icon2™ offers app-based installation via the Danfoss Ally App, blending functionality with sleek design. Its touchscreen interface fits elegantly into any environment and links seamlessly with the Ally Gateway for enhanced smart heating features.

Automatic Balancing

Icon2™ maintains room balance by adjusting pipe "on" times, prioritizing longer pipes in large rooms during high heat demand. This ensures efficient energy distribution, operating at lower temperatures for energy savings without complex calculations.

Smart Home Integration

Compatible with Danfoss Ally™ solutions, Icon2™ allows remote control via the Ally™ App. The Zigbee 3.0 protocol supports third-party smart home systems, enhancing connectivity.

Installation Made Easy

Installation is quick and straightforward, taking just nine minutes. Magnetic mounting simplifies thermostat placement, offering flexibility. Elegant thermostats, wired or wireless, feature a compact design and responsive touchscreen.

Installer App

The Installer App streamlines configuration, providing presets for circuits based on pipe type and room division. It ensures accurate setup and easy customer handover.

Quality Assurance

Danfoss Icon2™ guarantees reliable performance with top-tier components and a 5-year warranty when professionally installed. Experience advanced floor heating with Danfoss Icon2™.

For more information on how Danfoss Icon2™ can enhance your installations and benefit your customers, visit Danfoss Icon2™.
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Campaign Overview

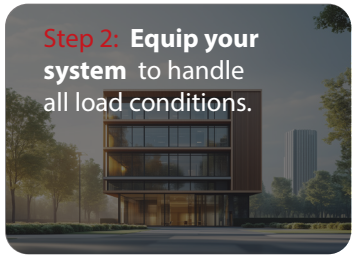
Unlocking Energy Efficiency in Commercial Buildings Through Smart Retrofitting

In today's dynamic landscape, commercial buildings face the challenges of rising energy costs, stringent environmental regulations, and ambitious sustainability targets. Whether you invest in, own, manage, or design these spaces, achieving energy efficiency, sustainability, regulatory compliance, and tenant satisfaction is crucial. Retrofitting stands as a strategic solution, engineered to enhance building performance and sustainability.

Unlocking Optimisation Potential

Research reveals that over 80% of existing heating systems hold significant optimisation potential. As your dedicated decarbonisation partner, we are committed to engineering solutions that help you achieve your sustainability goals. Discover three transformative retrofit strategies that can revolutionise your building's HVAC system, unlocking new levels of property value and operational efficiency.

Hydronic balancing ensures the right flow rates during full and partial load conditions, providing sufficient capacity, precise temperature control, and maximum efficiency. Dynamic hydronic balancing, using Pressure Independent Control Valves (PICVs), offers superior energy efficiency for large commercial or multi-family buildings. These valves simplify balancing and reduce system interdependence, ensuring a perfectly balanced system at all loads..

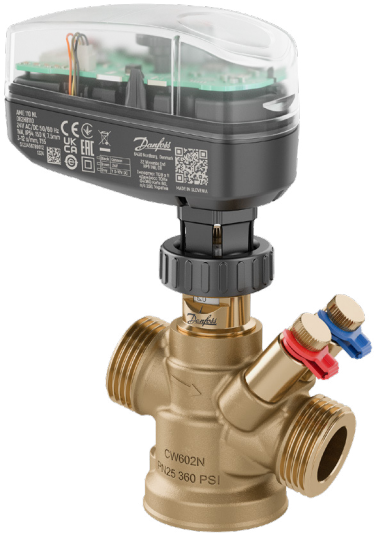


Dynamic balancing increases heating efficiency by controlling the system at the terminal unit level. Danfoss' AB-QM PICVs eliminate the need for detailed system knowledge, allowing retrofitting by terminal unit, branch, or section.

This flexibility is crucial when working with limited budgets, enabling incremental upgrades without compromising efficiency.

Digitalising your HVAC system unlocks its full energy-saving potential. NovoCon® digital IoT actuators, designed to work with AB-QM PICVs, provide real-time flow indications, enable BMS integration, and offer bi-directional communication. They facilitate energy monitoring, benchmarking, and management, allowing proactive maintenance and optimization.

To take a deeper dive into how Danfoss solutions can help revolutionise a building's HVAC system. Visit our Commercial Building Retrofit page to explore the innovative solutions and download our comprehensive eBook today!



AME 110NL/X: Revolutionising HVAC Control and Efficiency.

The 2nd generation of Danfoss AME 110NL/X modulating actuators brings improved accuracy and efficiency through the integration of a step motor, converting analog signals into precise digital positions. This results in better indoor comfort, enhanced HVAC system performance, and reduced energy consumption. With a robust design and increased durability, the new generation ensures long-lasting reliability while supporting sustainability goals.

AME 110NL(X) modular actuators are designed for high-precision control in hydronic HVAC applications, such as fan coil units (FCU), chilled beams, radiant panels, and other terminal units. Its digital step motor has a resolution up to 4,000 distinct positions covering the full AB-QM 4.0 valve stroke, delivering highly precise flow regulation that significantly enhances system efficiency.

Durability is a standout feature of the AME 110NL(X). With an upgraded IP54 rating, it offers robust water resistance and can be installed in any orientation, providing flexibility and reliability for various applications. This makes it a reliable choice for diverse environments and installation requirements. Utilizing it's abilities to be powered with 24V AC as well DC voltage, flexibility is at the core of the AME 110NL(X).

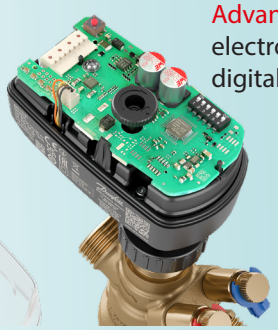
This enables designers and system integrators to use the actuators in virtually any building automation or modulating room control solution. Advanced, electronic calibration and valve stroke detection are other key benefits, ensuring consistent and accurate performance. The automatic calibration routine performed on every Power-up (also after a power failure) further enhances the reliability and precision of the actuator.

User-friendly features include LED lights for position indication, with color options for warnings and alarms, providing clear operational feedback. Halogen-free cables in multiple lengths simplify installation and maintenance.

Download the infographic to compare the differences between 1st and 2nd Generation AME actuators.

Analog signal + 24V AC/DC inputs

High accuracy digital position output



Advanced electronic and digital features

Position, warning and alarm LED's

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