Master your HVAC symphony with Alsmart®

Alsmart® is the latest generation of programmable controller platforms for the HVAC market. Think of it as the cyber-secure, intelligent, compact and powerful brain of your application.

Packed with state-of-the-art technology, Alsmart® empowers you to take your thermodynamic knowledge to the next level — reducing time to market with module-based design and software functionality simulations.

Universal programmable controller platform

Alsmart®

28.0°C

AIsmart® universal programmable controller – Elevate your HVAC solution with flexibility

AIsmart® offers a complete and intuitive software platform that helps you take your HVAC application to the next level thanks to the programming tools AIsmart® Design and AIsmart® Service Tool.

AIsmart® Hardware contains a comprehensive range of base controllers, I/O expansion modules, a power supply module, user interfaces and accessories to provide you highly customizable and intelligent control solutions for a wide range of demanding HVAC applications such as chillers, rooftop units, heat pumps and DOAS.

AIsmart® Design is the programming tool that helps you optimize your HVAC application. It is the core of the toolchain and used to program, compile, and debug your application to fully manage the universal controller and expansion modules connected to it.

AIsmart® Service Tool is web-server-based and its main purpose is to set up and monitor the application. The dashboard is customizable, allowing you to add new widgets with live diagrams and graphs, as well as monitor specific preferred parameters.

AIsmart®'s modular design, coupled with its advanced features and robust security, makes it the ideal solution for modern HVAC systems. Discover the power of AIsmart® on the following pages.
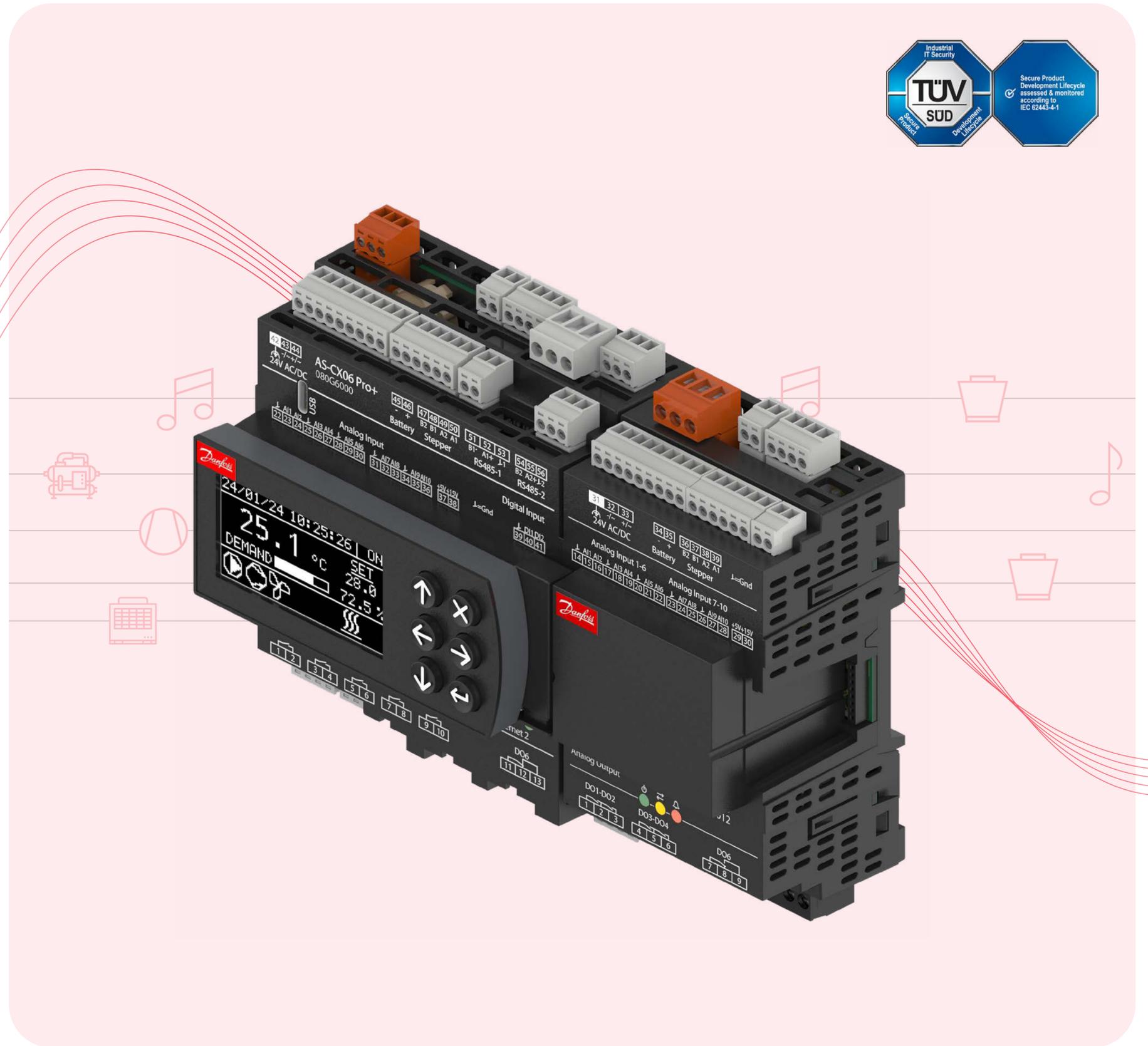
The major Alsmart® pillars to achieve the best performance with your HVAC system
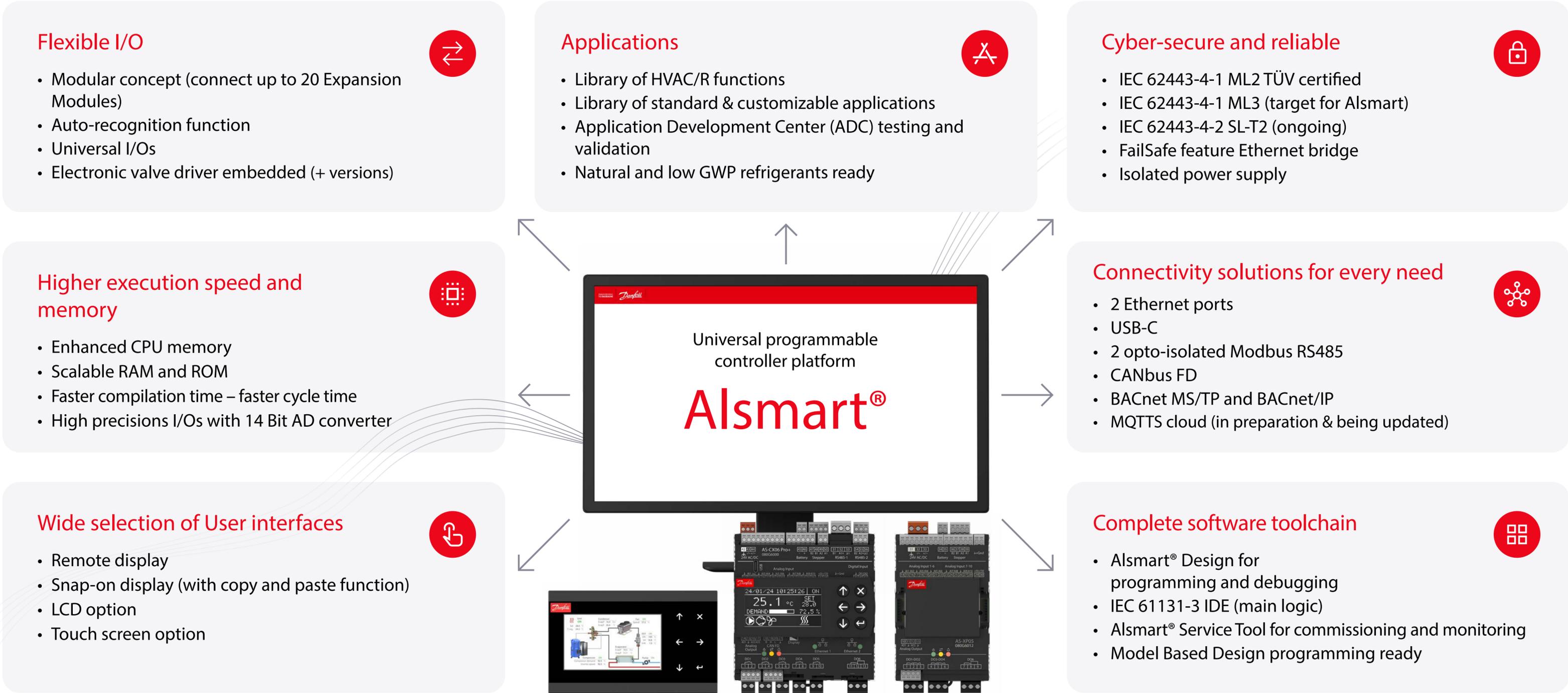
Flexible I/O

- Modular concept (connect up to 20 Expansion Modules)
- Auto-recognition function
- Universal I/Os
- Electronic valve driver embedded (+ versions)

Applications

- Library of HVAC/R functions
- Library of standard & customizable applications
- Application Development Center (ADC) testing and validation
- Natural and low GWP refrigerants ready

Cyber-secure and reliable

- IEC 62443-4-1 ML2 TÜV certified
- IEC 62443-4-1 ML3 (target for Alsmart)
- IEC 62443-4-2 SL-T2 (ongoing)
- FailSafe feature Ethernet bridge
- Isolated power supply

Higher execution speed and memory

- Enhanced CPU memory
- Scalable RAM and ROM
- Faster compilation time – faster cycle time
- High precisions I/Os with 14 Bit AD converter

Connectivity solutions for every need

- 2 Ethernet ports
- USB-C
- 2 opto-isolated Modbus RS485
- CANbus FD
- BACnet MS/TP and BACnet/IP
- MQTTS cloud (in preparation & being updated)

Wide selection of User interfaces

- Remote display
- Snap-on display (with copy and paste function)
- LCD option
- Touch screen option

Complete software toolchain

- Alsmart® Design for programming and debugging
- IEC 61131-3 IDE (main logic)
- Alsmart® Service Tool for commissioning and monitoring
- Model Based Design programming ready

Universal programmable controller platform
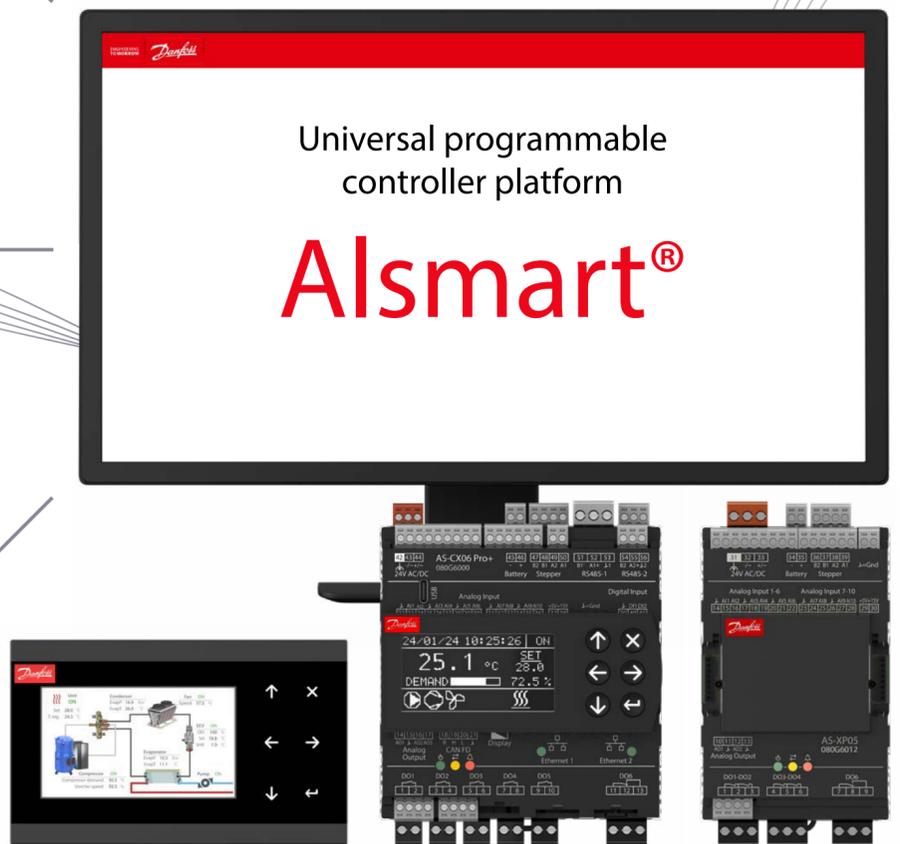
Alsmart®

AIsmart® – Connectivity highlights

Electronic valve driver

Unipolar/Bipolar

USB-C

Pen drive
PC connection

Display port / CAN FD

MMIGRS2

VLT® Drive

AS-UI04 Display

AS-CX06 Pro+
080G6000

42 43 44	45 46	47 48 49 50	51 52 53	54 55 56
24V AC/DC	Battery	Stepper	RS485-1	RS485-2

Analog Input

Digital Input

CIRCUIT   10.3 → 12.0 BAR
PRESSURES   FAN 42.5 %
27.4 BAR
10.3 BAR   52.5 %
REG.DEMAND   ON
72.5 %   25.1 22.1
          25.1   28.0 °C

14 15 16 17	18 19 20 21	Display
AO1 AO2 AO3	CAN FD	
Analog Output		Ethernet 1 Ethernet 2

DO1 DO2 DO3 DO4 DO5 DO6
1 2 3 4 5 6 7 8 9 10 11 12 13

Opto-isolated Modbus RS485

To BMS

VZH & VZN inverter scroll compressors

Turbocor®

AB-QM with NovoCon®

3rd. Party device

Field bus

RS485 fieldbus

(BACnet, Modbus)

2nd AS-CX controller

3rd AS-CX controller

Ethernet port 2

Cloud*

BMS

AIsmart Service tool

Ethernet port 1

Alsmart® – User Interfaces

Alsmart® AS-UI Snap-on

Plug & play
Fast and ready to use with magnetic lock on AS-CX controller

Monochrome
LCD FSTN display – resolution 128 x 64 dots
Simple design, black and white colors

Small but incisive screen
Total Dimension 105 mm x 44.5 mm x 17 mm
Display Dimension 58.4 mm x 32.2 mm

More than a display
Accelerate commissioning by easily copying and pasting parameters and settings across multiple units with Alsmart Snap-on display

Alsmart® AS-UI04 Display

User-friendly
Panel and Wall mounted version with easy connection to Alsmart controller through plug connection (via CAN FD)

High resolution
LCD TFT display – resolution 480 x 272 dots
New set of fonts and symbols to elevate experience
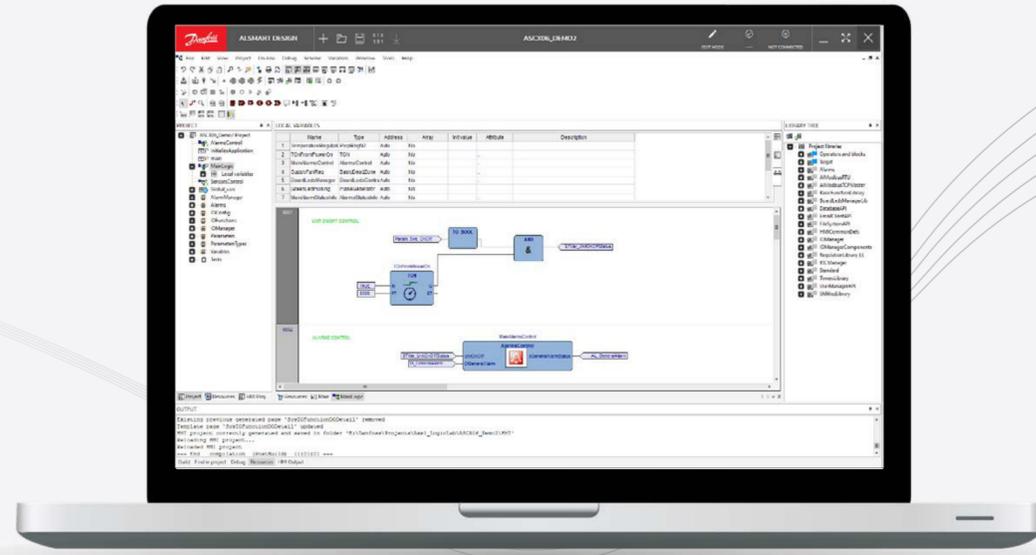
Full color, big screen
Total Dimension 166 mm x 101 mm x 27 mm
Display Dimension 96.7 x 55.5 mm (4.3")

Customized screens
Design your screens from Alsmart Design linked to your application or use the auto-generated screens available to speed up your development

Software Toolchain

Alsmart® Design

is the core of the toolchain, the programming tool used to program, compile, and debug your application to fully manage the universal controller and expansion modules connected to it. It fully complies with the IEC 61131-3 standard and supports five main standard programming languages, with an automated test function embedded, a simulation mode function, options to design and customize your user interface, and many other features that will make the difference in optimizing the performance of your HVAC application.
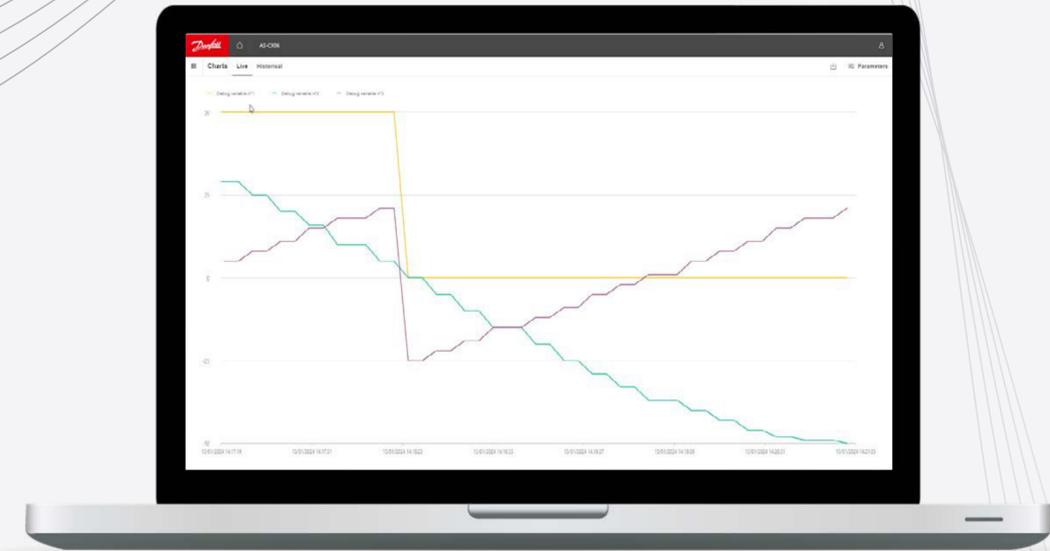
Alsmart® Service Tool

is web-server-based and its main target is to set up and monitor the application. The dashboard is customizable by adding new widgets with live diagrams and graphs but also to check preferred specific parameters. It's possible to set different users with different access and visibility to create different levels to monitor and manage all application parameters and set up the communication of the controller. From a service part point of view, it's possible to look, save, and download alarms, logs, and behavior history, in order to have a clear understanding of what is happening live in the system and, as a consequence, in order to easily define the best performance of the system and replicate it quickly once again. It also offers the best support for backing up and restoring controller settings for the ultimate maintenance experience.

A world of possibilities

With Alsmart®, you can configure your controller to manage virtually any application among many markets. To make things even easier, we are developing a library of pre-programmed blocks and software applications specifically designed for HVAC systems, providing a quick and efficient way to get started.
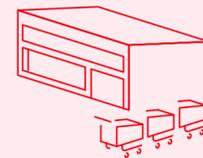
Our ADC laboratory is contributing greatly to the drafting and testing of the software applications to ensure maximum thermodynamic process optimization during the drafting of the application code.

We've leveraged our vast application know-how, broad portfolio and comprehensive support to create the best HVAC control experience with the highest level of performance and safety for you.
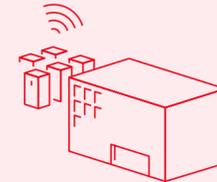
Alsmart®
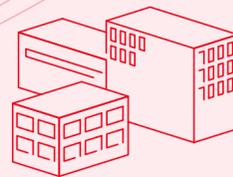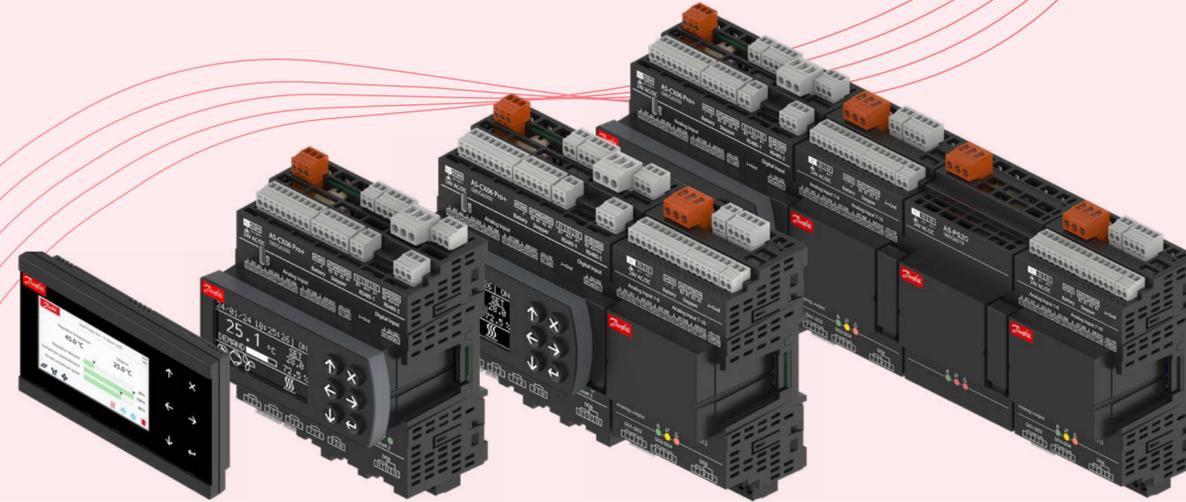
| Residential buildings | Supermarkets | Data centers | Commercial buildings | District heating | BESS |
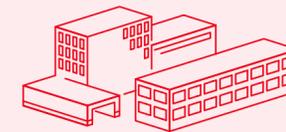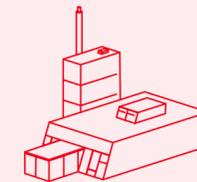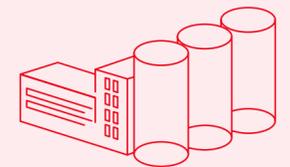
Chillers	Heat pumps	Rooftops	CDU	CRAC
Heating circuits	Domestic hot water	Thermal management	Energy flow regulation	AHU

Alsmart® Design – Highlights

- IEC 61131-3 IDE (main logic)

- UI designer for low resolution displays
  (monochromatic LCD, 7-segment*)

- UI designer for high resolution displays (UI04)

- Model Based Design programming ready

- Debugger and simulator

- Parameter database

- Translation tool

- Standalone Simulator (no source code needed)

- Standalone ASPKG maker (customize the element
  of the application)

- Auto generation of menu pages and alarming list

- Database Event Handler

- Automated test system*

- Documentation generator*

* In preparation

Alsmart® Service Tool – Highlights

- Four levels of access with different visibility

- Dashboard view customizable with widgets

- Alarm log and history accessible and downloadable

- Event log collect in one view all the system notifications and alarms

- Settings and users' sections

- Backup to restore and copy parameters and settings

- I/O Configuration - Simplifies system setup and troubleshooting, reducing installation time and costs

Product range overview – Hardware

Universal Controller AS-CX06

		Lite	Mid	Mid SSR *	Mid+	Mid+ SSR *	Pro	Pro+
Dimension		4 DIN	6 DIN					
Digital Output	N	6	6	6	6	6	6	6
	Type	5xSPST 1xSPDT	5xSPST 1xSPDT	4xSPST 1xSPDT 1xSSR	5xSPST 1xSPDT	4xSPST 1xSPDT 1xSSR	5xSPST 1xSPDT	5xSPST 1xSPDT
Digital Input	N	2	2	2	2	2	2	2
	Type	Voltage free						
Analog Output	N	3	3	3	3	3	3	3
	Type	0/10V or PWM						
Universal Input	N	10	10	10	10	10	10	10
	Type	NTC, PTC1000, 4-20mA, DI, 0/5V ratio, 0-1V / 0-5V / 0-10V						
Electronic valves		–	–	–	1	1	–	1
CAN FD		YES	YES	YES	YES	YES	YES	YES
Ethernet / Web server		–	–	–	–	–	2/1	2/1
Modbus RS485 (opto-isolated)		1	2	2	2	2	2	2
USB-C / Web server		YES						
Power Supply		24 Vac or 20…60 Vdc						

Expansion Modules AS-XP

	AS-XP05	AS-XP05+	AS-XP10 *
Dimension	4 DIN		6 DIN
Digital Output N	5	5	10
Type	4x SPST 1xSPDT	4xSPST 1xSPDT	8xSPST 2xSPDT
Digital Input N	–	–	4
Type	–	–	24Vac or 230Vac
Analog Output N	2	2	2
Type	0/10V or PWM		
Universal Input N	10	10	10
Type	NTC, PTC1000, 4-20mA, DI, 0/5V ratio, 0-1V / 0-5V / 0-10V		
Electronic valves	–	1	–
CAN FD	–	–	–
Ethernet / Web server	–	–	–
Modbus RS485	–	–	–
USB-C / Web server	–	–	–
Power Supply	From main controller, except for electronic valve		

Power Module

	AS-PS20
Dimension	4 DIN
Digital Output N	–
Type	–
Digital Input N	–
Type	–
Analog Output N	–
Type	–
Universal Input N	–
Type	–
Electronic valves	–
CAN FD	–
Ethernet / Web server	–
Modbus RS485	–
USB-C / Web server	–
Power Supply	24 Vac or 20…60 Vdc

* Available from Q2 2026

Product range overview – User Interfaces & configurations

Go to datasheet ›
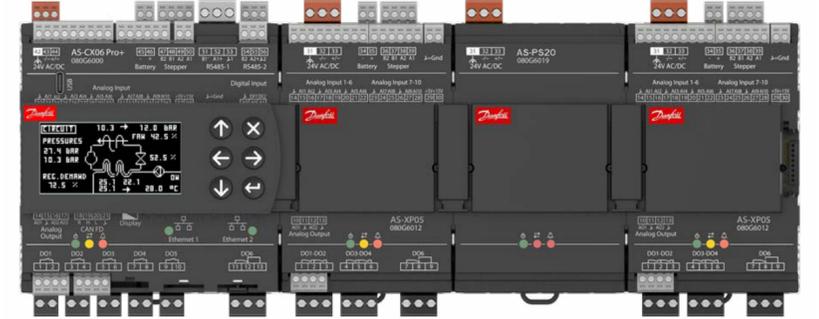
User Interfaces

	AS-UI Snap-on	AS-UI04**
Type	Graphic LCD FSTN	Graphic LCD TFT
Colors	Black/white	65k colors
Backlight	Dimmerable via software	Dimmerable via software
Resolution	128 x 64	480 x 272
Mounting	Magnetic lock on AS-CX controller	Panel or wall mounting
Dimension (mm)	105 x 44.5 x 17	166 x 101 x 27
Viewing Area (mm)	58.4 x 32.2	96.7 x 55.5 (4.3")
Connectivity	–	CAN FD
Operating T (°C)	-20 / 60	-20 / 60
Degree of Protection	IP40	Panel (front): IP65 Wall: IP20

** Available from Q2 2026

Configurations

| Configuration extensions	Lite		Mid, Mid SSR		Mid+, Mid+ SSR		Pro		Pro+	
Max. Expansion modules (incl. AS-PS20)	1		7		7		20		20	
Max Configuration*	1x XP05 or XP05+ or 1x XP10		1x AS-PS20 plus 4x XP05 or XP05+ or 2x AS-PS20 plus 5x XP10				4x AS-PS20 plus 16x XP05 or XP05+ or 5x AS-PS20 plus 15x XP10			
Max. Electronic valves	–		–		1		–		1	
Max. configurations with max. number of XP expansion modules	XP05 / XP05+	XP10**	XP05 / XP05+	XP10**	XP05 / XP05+	XP10**	XP05 / XP05+	XP10**	XP05 / XP05+	XP10**
Max. Digital Outputs	11 6+5	16 6+10	36 6+(5x5)	56 6+(5x10)	31 5+(5x5)	56 6+(5x10)	86 6+(16x5)	156 6+(15x10)	86 6+(16x5)	156 6+(15x10)
Max. Digital Inputs	2 2+0	6 2+4	2 2+(5x0)	22 2+(5x4)	2 2+(5x0)	22 2+(5x4)	2 2+(16x0)	62 2+(15x4)	2 2+(16x0)	62 2+(15x4)
Max. Analog Outputs	5 3+2	5 3+2	15 3+(5x2)	13 3+(5x2)	13 3+(5x2)	13 3+(5x2)	35 3+(16x2)	33 3+(15x2)	35 3+(16x2)	33 3+(15x2)
Max. Universal Inputs	20 10+10	24 10+14	70 10+(5x10)	80 10+(5x14)	60 10+(5x10)	20 10+(5x14)	170 10+(16x10)	220 10+(15x14)	170 10+(16x10)	220 10+(15x14)
Max. Electronic valves (i.c.w. XP05+ only)	1	–	6	–	7	–	16	–	17	–

* Requires 1x AS-PS20 per 4x XP05 or XP05+ or per 3x XP10

** Available from Q2 2026

Ready to get started?

To learn more about how AIsmart® can optimize your application, reach out to us.

Contact us here >
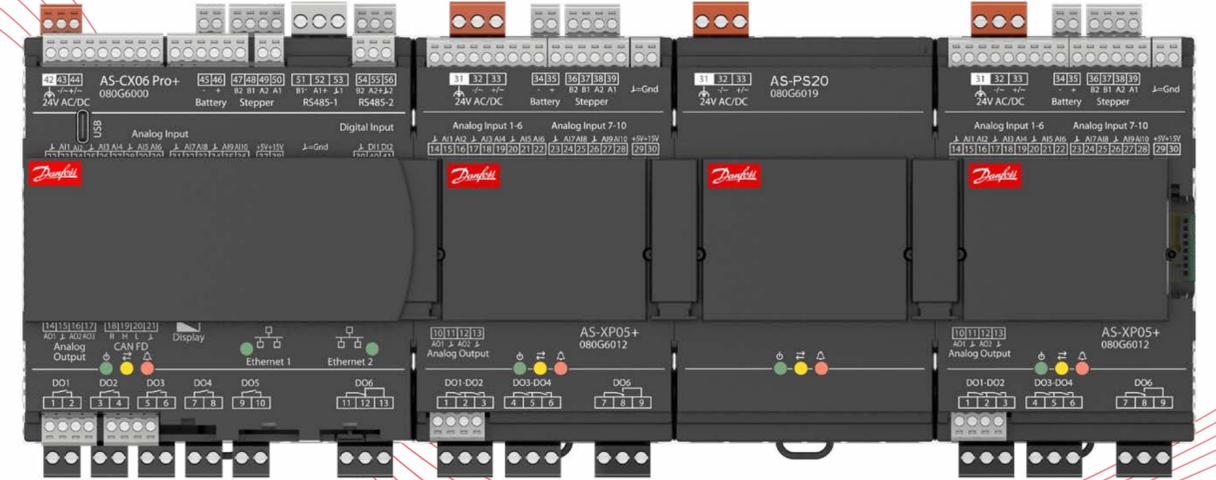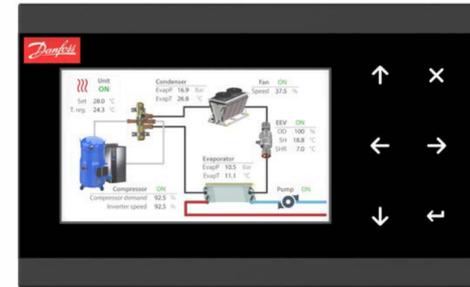
Visit our AIsmart® website

To learn more about AIsmart® and the supporting software toolchain, please visit our dedicated AIsmart® website.

Visit website >

AIsmart® software suite

To learn more about AIsmart® Design & AIsmart® service tool please visit the Partner portal web page, where you can find documentations, video, guides and further useful tools to quickly get familiar with the AIsmart® tool chain.

Partner portal >

AIsmart® Training On-demand

For the AIsmart® portfolio Danfoss provide the option for Online Training or Face to Face. We offer standard courses or customize the training according to your needs. These courses are subject to a fee. Fill out the form and you are on your way to in-depth AIsmart® training.

Training >