



eBook

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.



Alsmart® universal programmable controller

– Elevate your HVAC solution with flexibility

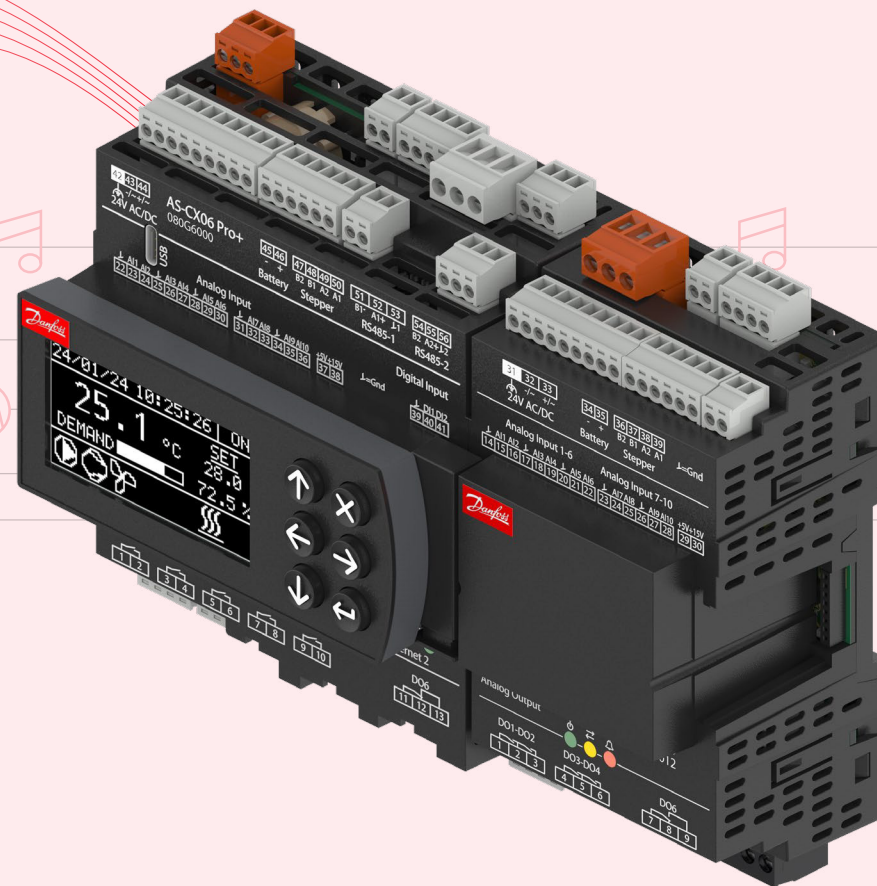
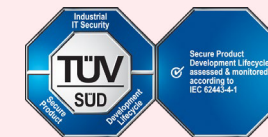
Alsmart® offers a complete and intuitive software platform that helps you take your HVAC application to the next level thanks to the programming tools Alsmart® Design and Alsmart® Service Tool.

Alsmart® 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.

Alsmart® 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.

Alsmart® 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.

Alsmart®'s modular design, coupled with its advanced features and robust security, makes it the ideal solution for modern HVAC systems. Discover the power of Alsmart® 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 expansions)
- Auto-recognition function
- Universal I/Os
- Electronic valve driver embedded (Plus versions)



HVAC applications

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



Cyber-secure and reliable

- IEC 62443-4-1 and TÜV certified
- IEC 62443-4-2 certification in progress
- FailSafe feature Ethernet bridge
- Isolated power supply
- High precisions I/Os with 14 Bit AD converter
- Natural and low GWP refrigerants ready



Higher execution speed and memory

- Enhanced CPU memory
- Scalable RAM and ROM
- Faster compilation time – faster cycle time



Wide selection of User interfaces

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



Connectivity solutions for every need

- 2 Ethernet ports
- USB-C
- 2 opto-isolated Modbus RS485
- CANbus FD
- MQTTs cloud (in preparation & being updated)



Complete software toolchain

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



Alsmart® – Connectivity highlights

Electronic
valve driver



Unipolar/Bipolar

USB-C



Pen drive
PC connection

Display port
/ CAN FD



MMIGRS2



VLT® Drive



AS-UI04 Display



To BMS

Opto-isolated
Modbus RS485



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



Alsmart Service tool



Ethernet port 1

* In preparation & continuously being updated

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

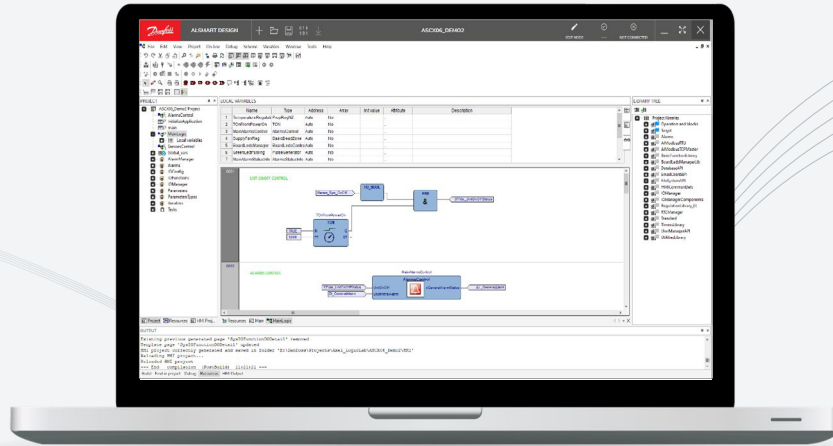
Total Dimension 166 mm x 101 mm x 27 mm
Display Dimension 97 mm x 56 mm [4"3 inches]



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.

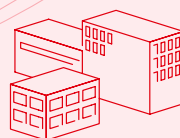
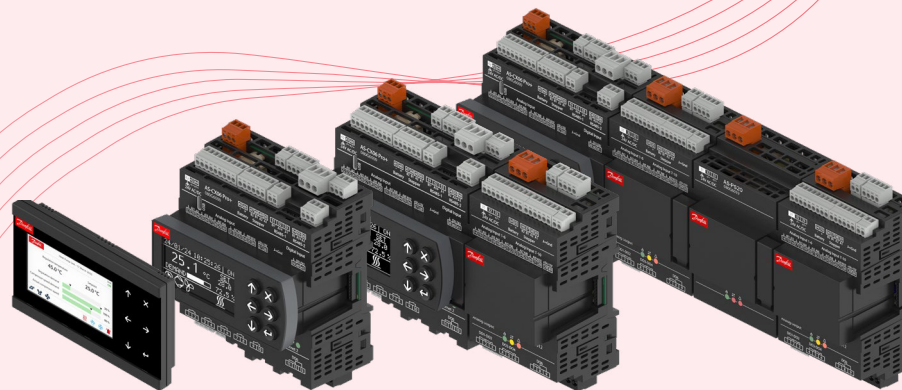
A world of possibilities

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.

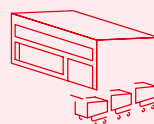
Our ADC laboratory is contributing greatly to the drafting and testing of the software applications to ensure maximum thermodynamic process optimization during the drafting of the application code.

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**



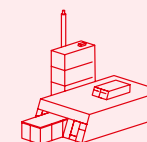
Supermarkets



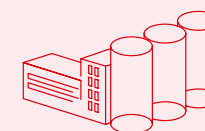
Data centers



**Commercial
buildings**



**District
heating**



BESS

Chillers

Heat pumps

Rooftops

CDU

CRAC

Heating circuits

Domestic hot water

Thermal management

Energy flow regulation

AHU

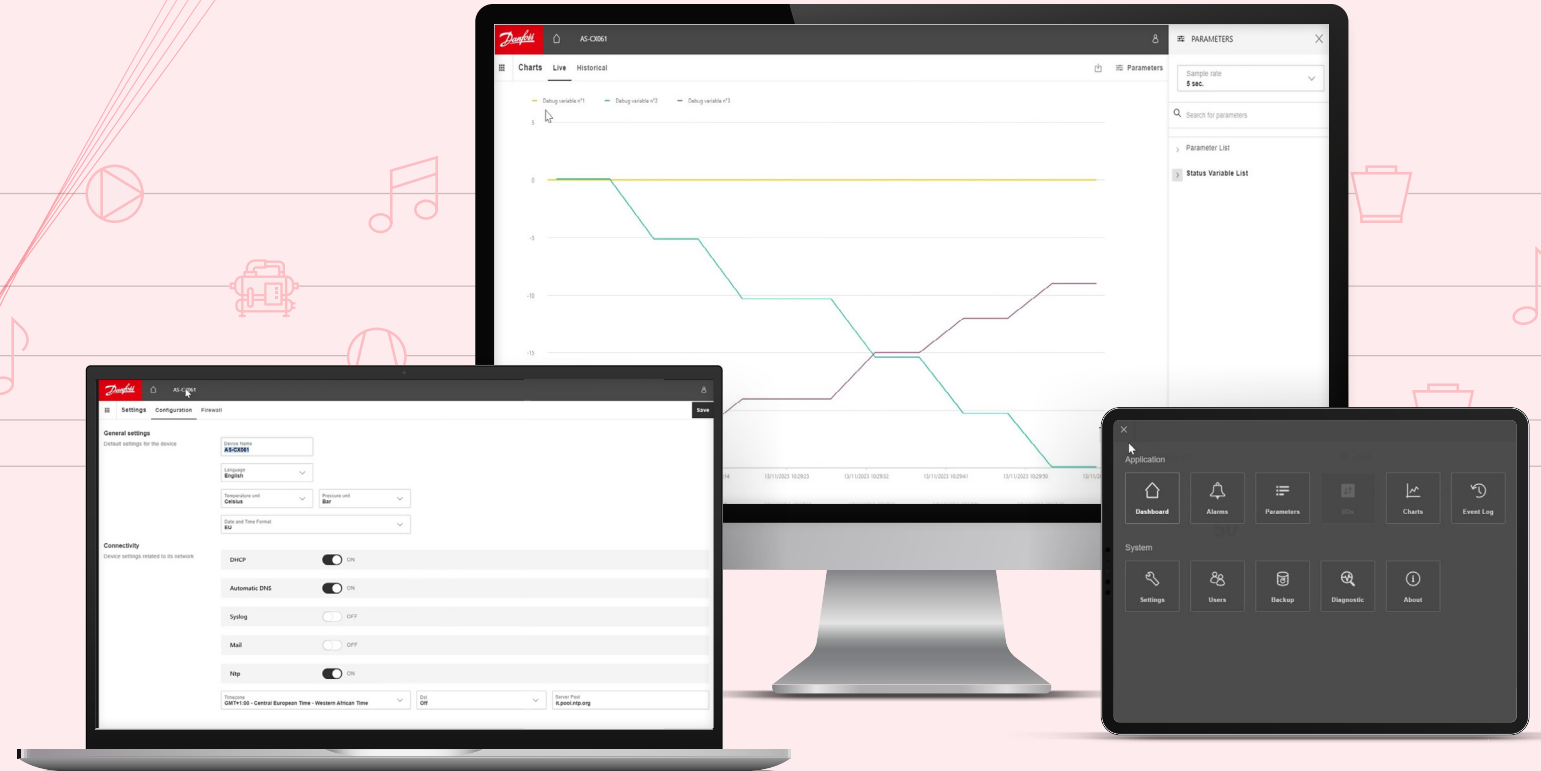
Alsmart® Design – Highlights

- IEC 61131-3 IDE (main logic)
- UI designer for high and low resolution displays
- Model Based Design programming ready
- Debugger and simulator
- Parameter database and normalization
- Translation tool
- Automated test system
- Documentation generator (developer's documentation, user manual)



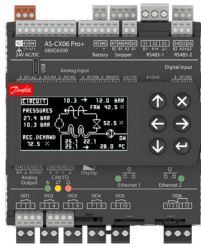
Alsmart® Service Tool – Highlights

- Four level 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



Product range overview – Hardware

Go to datasheet >



Universal Controller AS-CX06

		Lite	Mid	Mid SSR *	Mid+	Mid+ SSR *	Pro	Pro+
Dimension		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	2
Modbus RS485 (opto-isolated)		1	2	2	2	2	2	2
USB		Yes, C type						
Power Supply		24 Vac or 20...60 Vdc						

Go to datasheet >



Expansion Modules AS-XP

AS-XP05	AS-XP05+	AS-XP10 *
4 DIN		6 DIN
5	5	10
4x SPST 1xSPDT	4xSPST 1xSPDT	8xSPST 2xSPDT
—	—	4
—	—	24Vac or 230Vac
2	2	2
0/10V or PWM		
10	10	10
NTC, PTC1000, 4-20mA, DI, 0/5V ratio, 0-1V / 0-5V / 0-10V		
—	1	—
—	—	—
—	—	—
—	—	—
—	—	—
From main control, except for electronic valve		



Power Module

AS-PS20
4 DIN
—
—
—
—
—
—
—
—
—

* Available from Q1 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 55.54.3"
Connectivity	—	CAN FD
Operating T (°C)	-20 / 60	-20 / 60
Degree of Protection	IP40	Panel (front): IP65 Wall: IP20

** Available from Q4 2025

Configuration extensions

	Lite	Mid, Mid SSR	Mid+, Mid+ SSR	Pro	Pro+
Max. Expansion modules	1x AS-XP	6x AS-XP	6x AS-XP	16x AS-XP	16x AS-XP
Max. Power modules	—	1x AS-PS20	1x AS-PS20	3x AS-PS20	3x AS-PS20
Max. Electronic valves	—	—	1	—	1

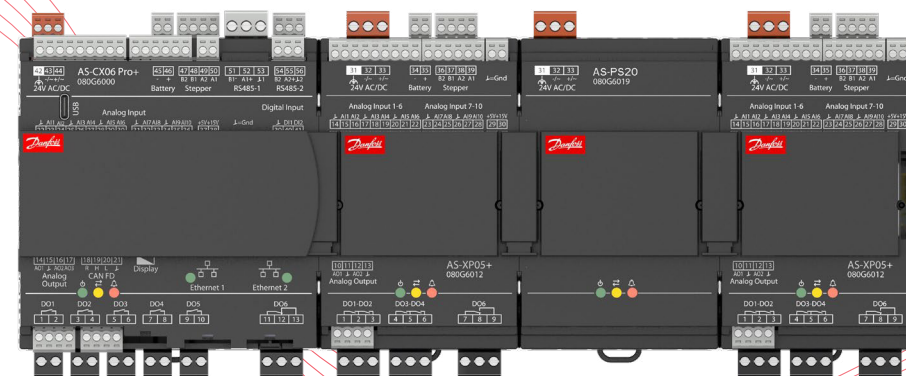
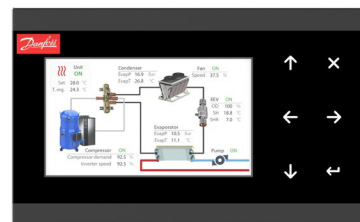
Max. configurations with max. number of XP expansion modules

	XP05	XP05+	XP05	XP05+	XP05	XP05+	XP05	XP05+	XP05	XP05+
Max. Digital Outputs	11 6+5		36 6+(6x5)		36 6+(6x5)		86 6+(16x5)		86 6+(16x5)	
Max. Digital Inputs	2 2+0		2 2+(6x0)		2 2+(6x0)		2 2+(16x0)		2 2+(16x0)	
Max. Analog Outputs	5 3+2		15 3+(6x2)		15 3+(6x2)		35 3+(16x2)		35 3+(16x2)	
Max. Universal Inputs	20 10+10		70 10+(6x10)		70 10+(6x10)		170 10+(16x10)		170 10+(16x10)	
Max. Electronic valves	—	1	—	6	1	7	—	16	1	17

Ready to **get started?**

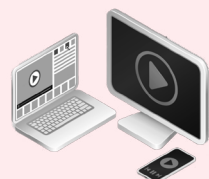
To learn more about how Alsmart® can optimize your application, reach out to us.

Contact us here >



Visit our Alsmart® website

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



Visit website >

Alsmart® software suite

To learn more about Alsmart® Design & Alsmart® 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 Alsmart® tool chain.



Partner portal >

Alsmart® Training On-demand

For the Alsmart® 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 Alsmart® training.



Training >

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product. All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.