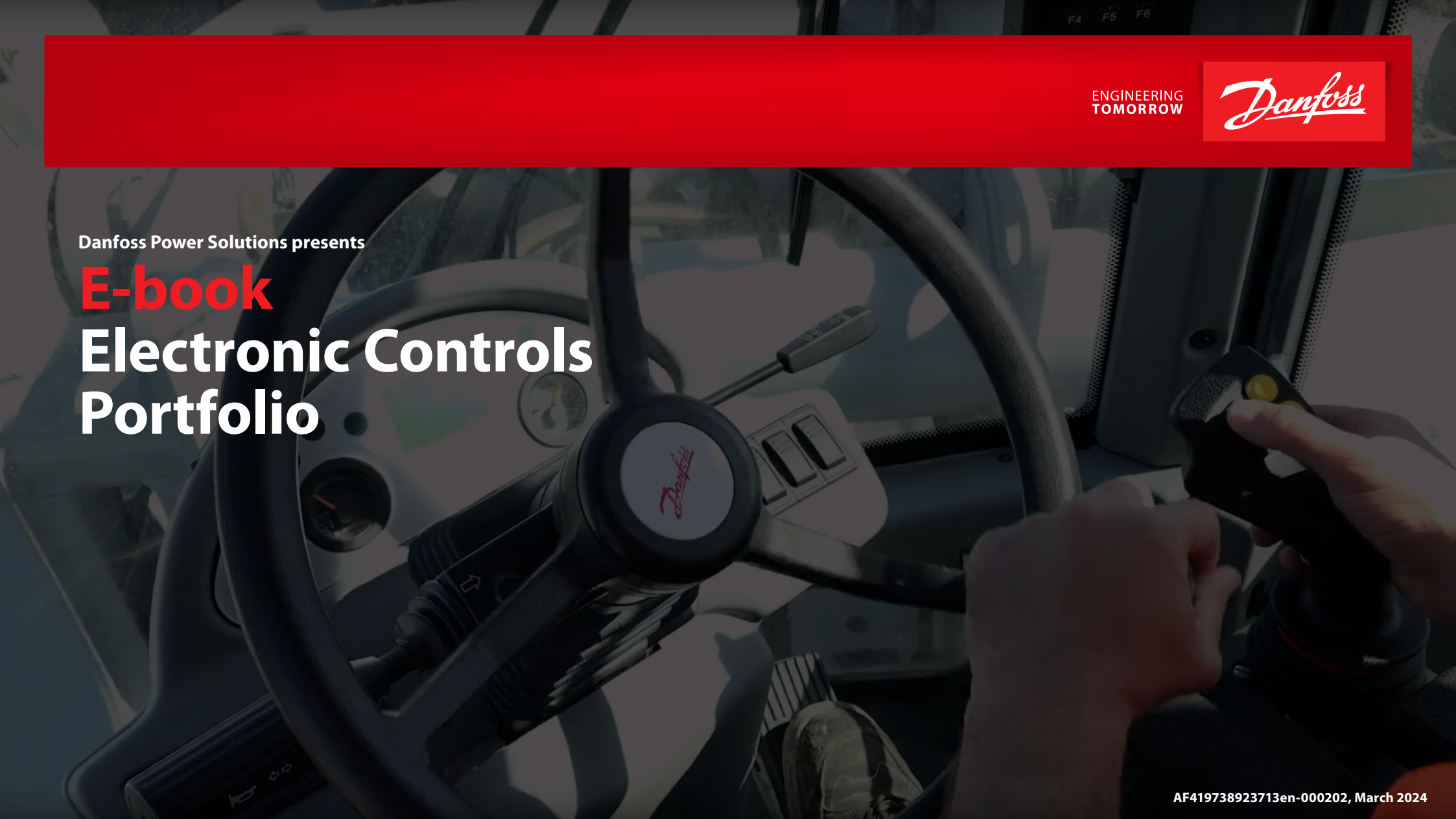
ENGINEERING
TOMORROW

Danfoss Power Solutions presents

E-book
Electronic Controls Portfolio

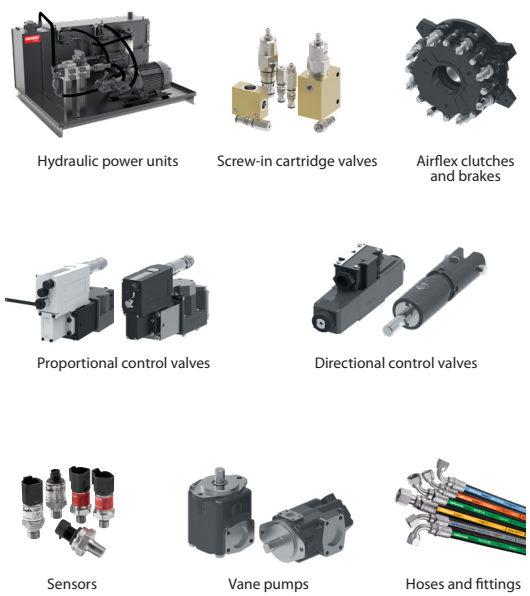


AF419738923713en-000202, March 2024

PLUS+1® Eco System
The evolution from hardware-only to software systems and services

Mobile off-highway

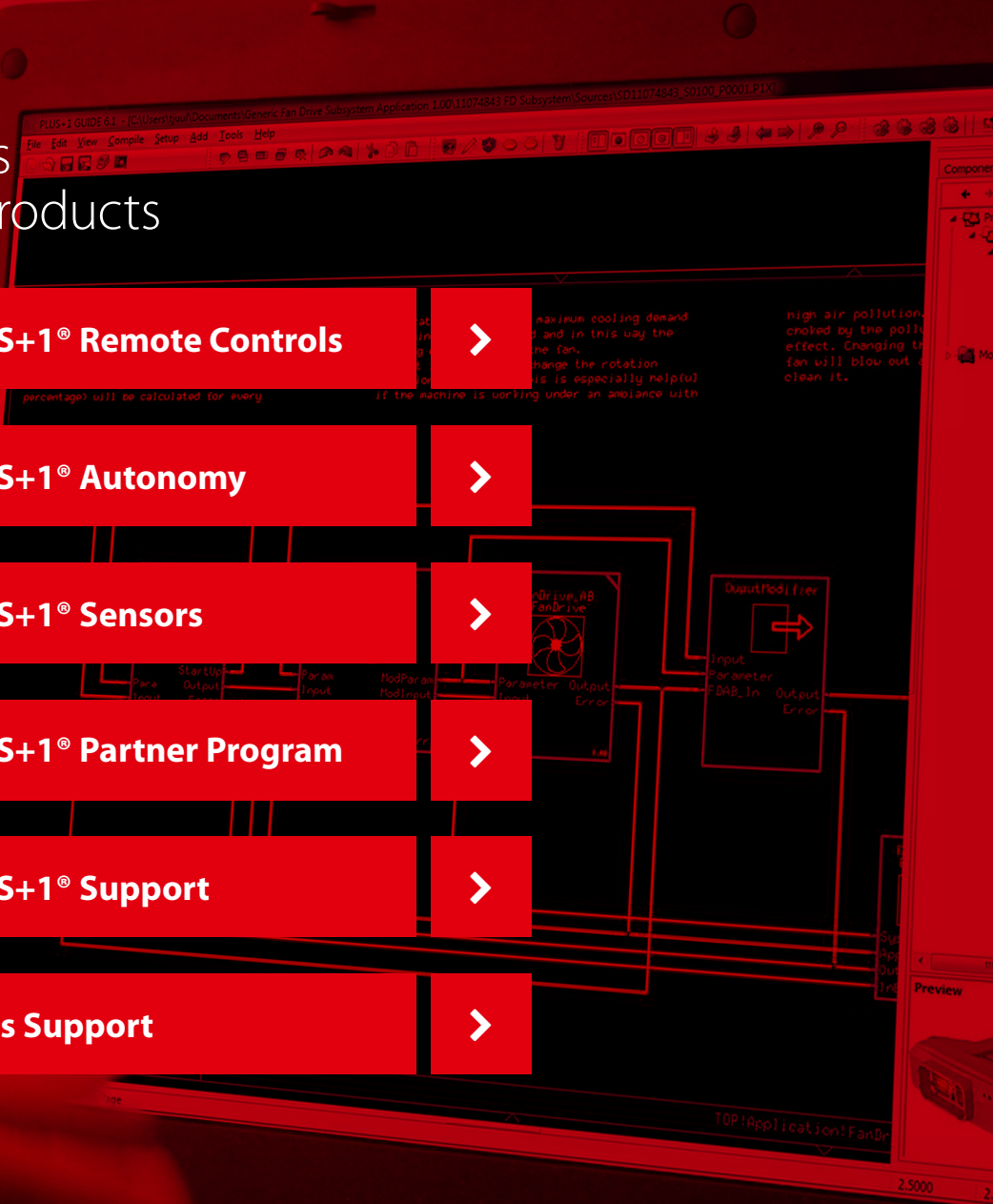
Industrial



On-highway and Marine

PLUS +1

Navigate through this e-book
by **clicking** on the different buttons
and learn more by clicking on the products



- PLUS+1® Platform
- PLUS+1® Controllers
- PLUS+1® Displays
- PLUS+1® Joysticks and Foot Pedals
- PLUS+1® Operator Interfaces
- PLUS+1® Connected Solutions
- PLUS+1® Remote Controls
- PLUS+1® Autonomy
- PLUS+1® Sensors
- PLUS+1® Partner Program
- PLUS+1® Support
- Sales Support

PLUS+1® Platform

Fast. Easy. Open.

PLUS+1 GUIDE and PLUS+1 Service Tool are the foundation of the PLUS+1 Platform. Engineered to accelerate your development process and bring higher quality machines to market faster.
Build your application with drag and drop logical components or software blocks in the PLUS+1 GUIDE graphical interface.
Get started today with a free Express licence or 30-day Professional trial of PLUS+1 GUIDE and Service Tool.

- ✔ The PLUS+1 Platform is specifically designed for mobile control, giving you tools to bring your machine applications to market faster
- ✔ The simple and intuitive interface makes PLUS+1 GUIDE and Service Tool easy to learn
- ✔ Import any existing IEC 61131-3 language (PLCopen), or C-code programs with the openness of the PLUS+1 platform
- ✔ PLUS+1 Compliance - Choose from hundreds of function blocks/libraries specifically designed for mobile control
- ✔ Go to market faster with a variety of off-the-shelf sub-system applications
- ✔ Functional Safety ready – Fulfils requirements for IEC 61508:2010 support tool certification
- ✔ Bespoke application software support services
- ✔ Service your machines wired or wirelessly with the very powerful PLUS+1 Service Tool or PLUS+1 Mobile Service Tool solution

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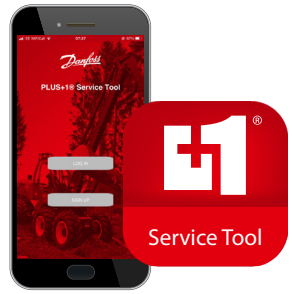
PLUS+1 GUIDE

SIMULINK
PLCopen logic ST LD IL SFC FBD IEC 61131-3
fmi Functional Mock-Up Interface

PLUS+1 Open

PLUS+1 Service Tool



PLUS+1 Mobile Service Tool

PLUS+1® Controllers

Intelligent vehicle control

Our PLUS+1 controllers are the brains behind intelligent vehicle control. Swiftly programmable to your specific requirements. Our powerful PLUS+1 microcontrollers bring intelligence to every node of a distributed control system. Thanks to their rugged design, they'll withstand the toughest conditions your vehicle comes up against. Programming our controllers requires minimum effort with our easy-to-learn PLUS+1 GUIDE software.

- Hardware specifically designed for mobile use
- High speed technology to process even the most complex applications
- Software-configurable universal I/O for multiple control options
- Simpler system design and faster development cycles with PLUS+1 Toolchain
- Off-the-shelf intelligent software available to reduce time to market, and increase machine productivity
- SC/XL controllers are SIL 2 capable (Safety Integrity Level 2 according to IEC 61508)
- C-open programming capability and high current driver options on some controllers

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PLUS+1 safety SC microcontrollers

PLUS+1 MC microcontrollers

PLUS+1 input/output expansion modules

PLUS+1 PC propel controllers

PLUS+1 high current controllers

PLUS+1 XL controllers

PLUS+1® Displays

Monitoring, control and diagnostics

Monitoring vehicle performance has never been easier. Our displays give a customised all-in-one overview of your vehicle's CAN-based network. Just what operators need for continuous monitoring, control and diagnostics.

Many options are available with our PLUS+1 programmable displays – from plug and play, to customised operator interfaces with optional external video.

All of our displays have one thing in common: they provide an integrated operating network that brings the entire hydraulic system on your vehicle together. Whatever your needs, our displays can monitor every hydraulically-controlled detail, from oil pressure to machine angles.

- ✔ Supreme viewability with high brightness and optical bonding
- ✔ Touch technology and multiple button configuration options
- ✔ Multiple connectivity options
- ✔ Simpler screen design with PLUS+1 toolchain and widget libraries
- ✔ CAN rotary device for external screen navigation and machine control – The next level in operator comfort and machine modernisation

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DM700 (7")

DM1000 (10") and DM1200 (12") series

HMR CAN Rotary device

DM430E (4.3") series

PLUS+1®
Joysticks and Footpedals

Endless configuration possibilities

Operators get a real feel for control with our wide range of joysticks. Endless configuration possibilities and ergonomic designs enable smooth and comfortable operation of your medium or heavy-duty vehicles. With single and dual-axis configurations and multiple mechanical and electrical interface options, our joysticks are as versatile as they come. Our complete range of modular PLUS+1 Compliant joysticks will seamlessly integrate into your intelligent mobile control solutions.

- ✔ Customisable solutions: Build your own joystick. Choose from four bases and five ergonomic grip types, with flexible button and switch placement
- ✔ PLUS+1 GUIDE programmabilty – Remove the need for an additional controller in the system
- ✔ Multiple electrical interfaces available for ease of configuration - including CAN+ (input module capability - allow up to 11 digital/analogue inputs)
- ✔ Hydraulic joystick bases and footpedals to complete the portfolio offering
- ✔ Superior performance. PLUS+1 Compliance enables simple and seamless future-oriented integration in the machine control system
- ✔ Faster, more flexible fulfilment times. The JS1-H standard portfolio is readily available, enabling you to reduce your warehouse stocks
- ✔ Bi-directional and uni-directional footpedals: Rugged design, high operating life, SIL 2 (Safety Integrity Level 2 according to IEC 61508)

JS1-H

JS1000

Bi-directional foot pedal

Uni-directional foot pedal

PLUS+1® Operator Interfaces

Operator ergonomics and machine moderniation possibilities

We are constantly striving to provide our operators with the most ergonomic and modernised human-machine interfaces. Our Human Machine Interface (HMI) CAN-based devices combine an ergonomic, modern and rugged design, into compact solutions for both open and enclosed cabs.

- ✔ CAN Rotary device for external screen navigation and machine control, the next level in operator comfort and machine modernisation
- ✔ Online configurator with almost 5,000 different icons as per ISO 7000, or fully customized for a truly unique appearance
- ✔ Intuitive five-finger control, allowing for "blind" operation of the device
- ✔ CAN controlled RGB LEDs provide the flexibility to easily customise each button for colour and frequency
- ✔ Simpler system design and faster development cycles with PLUS+1 Toolchain
- ✔ PLUS+1 Partner Program for fast integration of CAN keypads

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HMR CAN rotary devices

HMK powered by
PLUS+1 Partner Program

PLUS+1® Connected Solutions

Leveraging your data for optimal performance

PLUS+1 Connect combines telematics hardware, software infrastructure and a user-friendly interface, on a single cloud platform; to provide one cohesive, connected experience. The platform opens the door to numerous value-adding services, from fleet management to remote diagnostics and over-the-air programming. Built-in alerts and alarms will keep you informed about the machine condition, or if a preset geo-fence is crossed.

Our hardware portfolio meets a wide range of connectivity needs, via cellular services, Wi-Fi networks and/or Bluetooth connections. The PLUS+1 Connect machine monitoring platform then provides insights to optimise machine efficiency, improve productivity and facilitate servicing through data generated on site.

- ✔ Machine monitoring, diagnostics and remote updates
- ✔ Entire hardware portfolio on a single platform to meet mixed-fleet needs
- ✔ Customisable, widget-based interface with multiple dashboard levels
- ✔ Fully encrypted to ensure data security
- ✔ PLUS+1 Remote and Mobile Service Tool capability (CS10/CS500)
- ✔ Complete solution including hardware, software and digital services
- ✔ Easy to order digital service plans via PLUS+1 Marketplace

Click on products to learn more

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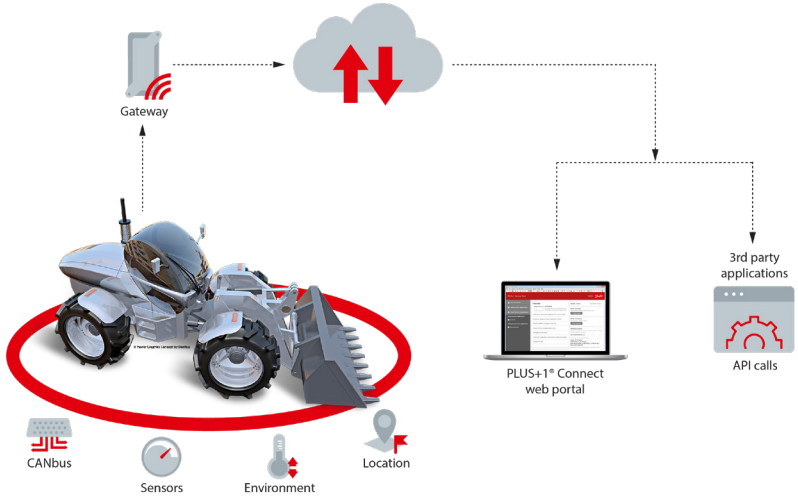

CS10 wireless gateway

CS100 cellular gateway

CS500 IoT gateway

PLUS+1 Mobile

PLUS+1 Connect Portal

PLUS+1 Marketplace

PLUS+1® Remote Controls

Intelligent vehicle control

Our PLUS+1 remote controls incorporate the latest human-machine interface technologies. Through radio technology, the operator is kept at a safe distance while also improving productivity. The user-friendly programming tools and plug-and-play systems, ensure a fast customisation and commissioning. Our remote controls are robust, ergonomic and safe.

- ✔ Flexible and freely configurable. The console boxes front plate is 100% customizable and all the devices are equipped with an external configurable SIM EEPROM
- ✔ Ergonomic design. Operator comfort is crucial for a human machine interface, which is why we have ergonomy at our core when designing the products
- ✔ Knowledge and tool sharing. We have developed support and service solutions to enable an autonomous approach, thus enhancing the customer experience. Such as:
  - ✔ PLUS+1 Compliance block
  - ✔ Remote control and display configurator
  - ✔ EEPROM programmer
  - ✔ Remote Controls Customer Service Center
- ✔ Safety comes first. The most recent software platform, working in 2.4GHz band has been certified with category 3-PLe by TÜV on the E-Stop

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Transmitters

iKontrol family

Ikompact

Ikore

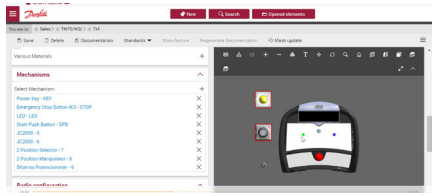
Ikargo

Receivers

R family

MP family

Explosion-proof portfolio



Sales configurator tool

ENGINEERING TOMORROW

Danfoss

Remote Controls | Build Center

Build Center Program

PLUS+1® Autonomy

Fast-track to autonomous machine functions

Danfoss Autonomy engineer solutions increase machine safety, precision, productivity, and value; with the added benefit of reducing development time and getting machines to market faster.

Designed for in-house engineering teams, A+ Essentials and A+ Advanced software packages consist of pre-programmed and pre-tested software blocks, that can be customised within the PLUS+1 GUIDE software platform.

The XM100 autonomous controller has been specifically designed to run the A+ software packages, supporting customers in enabling entry-level autonomous applications and delivering the central processing power for the future of mobile machinery and development. The XM100 controller meets the needs of autonomous machines by interfacing with GNSS systems, LiDAR, Radar and inertial sensors while carrying out autonomous navigation tasks.

- ✔ Accelerate the development of your autonomous machines
- ✔ Increase the value of your machine, thus boosting your competitive advantage
- ✔ Get to market faster with off-the-shelf integrated solutions

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Autonomous Custom Engineering Services (ACES):

- ✔ Help accelerating road to autonomy
- ✔ Project scoping
- ✔ Hardware architecture definition
- ✔ Software customization and implementation

ACES

Software features:

- ✔ Path recording and following Lidar-based feature detection
- ✔ Accurate positioning
- ✔ Obstacle detection and avoidance
- ✔ Feature localization and navigation

XM100 controller

Hardware features:

- ✔ Powerful i.MX 6 QuadPlus processor
- ✔ 8 GB of flash and 2GB of DDR3RAM
- ✔ 4 CAN ports
- ✔ Interfaces for LiDAR and radar over Ethernet (10/100)
- ✔ Integrated 6-Axis Inertial Measurement Unit
- ✔ GNSS receiver
- ✔ Simpler system design and faster development cycles with PLUS+1 toolchain

A+ software packages

PLUS+1 Autonomy eBook

PLUS+1® Sensors

Compliance support

Our temperature or pressure-detecting sensors link your machine functions directly into the control system. PLUS+1 Compliance further supports easy device integration, and contributes to precision control in all types of mobile control application.

Many of the sensors in our broad range are PLUS+1 Compliant.

- ✔ Hall-effect and MEMS technology
- ✔ Single or redundant options
- ✔ Customizable, multiple output options, i.e. current or ratiometric
- ✔ High burst and over pressure capabilities due to fully welded design
- ✔ SIL 2 (Safety Integrity Level 2 according to IEC 61508) pressure sensors
- ✔ Simpler system design and faster development cycles with PLUS+1 Toolchain

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Heavy-duty pressure transmitter

Temperature sensors

KPP speed sensors

PLUS+1® Partner Program

Powerful programming

The PLUS+1 Partner Program extends the PLUS+1 Ecosystem beyond the Danfoss portfolio. We aim to bring an easy integration experience to more products and technologies, to better meet the unique needs of system integrators and machine manufacturers.

PLUS+1 Partner products are supported with PLUS+1 Compliance function blocks, integration documentation, and various integration assets, provided through PLUS+1 Update Center.

- ✔ Fast integration of partner products
- ✔ Increased portfolio of products
- ✔ LINAK® TECHLINE® electric actuators with PLUS+1 compliance block
- ✔ HMI Systems PLUS+1 Compliant keypads
- ✔ Partners in autonomy:
  - ✔ Sensata Technologies radar platform for environmental awareness
  - ✔ Ouster high-resolution digital LiDAR sensors for long-range detecting distances
  - ✔ LSLIDAR for environmental sensing technology

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PLUS+1®
Powered by **Danfoss**

LINAK®
WE IMPROVE YOUR LIFE

HMI SYSTEMS

Sensata Technologies

OUSTER™

PLUS+1® Support

For technical support

Getting help with your PLUS+1 requests has never been easier. A form will now guide you in creating a helpdesk case for any PLUS+1 request. With each new case, you will receive a case number which can be referenced for further support.
Click on the PLUS+1 Helpdesk icon on the right to create your helpdesk support request.

If you are a customer, who receives service from one of our distributors, please contact them for support.

PLUS+1 Training

Danfoss offers flexible PLUS+1 platform training support to help you grow your knowledge and skills. Choose from instructor-led, virtual or self-paced e-Learning options, allowing you to adapt the training to your specific needs.
Click on the PLUS+1 Training icon on the right to see currently offered training classes.

PLUS+1 user forum

The PLUS+1 User Forum is designed to help you find information and share your own experience. We hope this forum will become a valuable resource of knowledge and ideas for the PLUS+1 programming community. The PLUS+1 Helpdesk team provides comments and answers to questions posted, complementing the phone and email support we already provided.

Click on products to learn more

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PLUS+1 Training

PLUS+1 Helpdesk

PLUS+1 User Forum

PLUS+1 YouTube channel

Sales Support

Please **contact** your local sales representative

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