



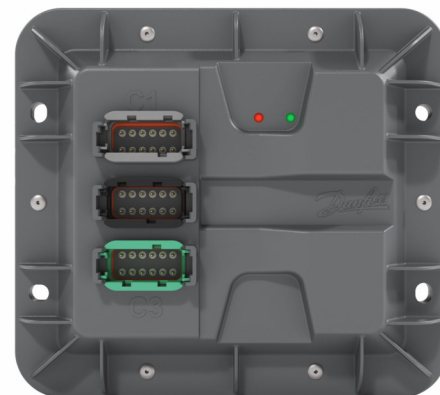
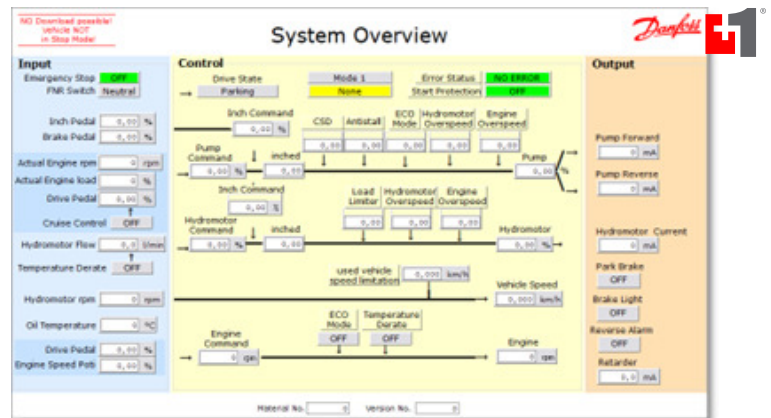
# PLUS+1 Safety Controller PC036 with Propel Software

The PC036 propel controller solution is the smallest controller of a family of propel controllers. It is designed to support single path hydrostatic transmissions systems consisting of one pump (available size 28 – 280cc) and one hydromotor or up to four hydromotors. The state of the art design with a 32bit AURIX TC265D in a strong aluminum housing offers best performance in harsh environments. Danfoss offers several software configurations to cover the OEM demands.

With the pre-installed application software and easily changeable control parameters, it is possible to tailor the vehicles driving behavior to the individual requirements of the customer. The semi-auto-calibration function and a quick-start guide with implemented hyperlinks in the service tool will make changes and tuning more easily and effective.

The PC036 controller fulfills the safety requirements according the EU machine directive (2006/42/EC).

The design of this safety controller includes features required for sophisticated vehicle control strategies. It is equally suited for use in safety related or general vehicle control applications. The controllers support redundant digital and analogue inputs. The safety processor has direct control of the digital and PWM outputs.



## Features

- Four system modes, selectable by the driver for different drive behavior
- Independent pump/hydromotor profiling and ramping for each mode
- Electric drive pedal
- Electric inching
- Hand throttle for engine speed control
- Reversing in all possible driving conditions
- Load dependent pump displacement control (automotive)
- Load independent pump displacement control

- Proportional hydromotor displacement control
- 2 Status LED (red, green, yellow)
- Standard DM1, DM2 error codes

### Protection and safety functions

- Safety controlled start protection
- Operator presence detection
- Hydraulic system overheat and low temperature protection
- Safety functions according EN1459, ISO20474, ISO 25119 and ISO 13849 up to PL d

### Target applications

- Wheel loader, telehandler, dumper (torque controlled)
- Sweeper, forestry machines (speed controlled)
- Multi-purpose, tool carrier, or sweeper machines equipped with orbital or radial piston motors

### **Engine control and protection**

- CAN J1939 engine protocol
- Kubota engine protocol
- Engine speed control via drive pedal or hand throttle with safety controlled monitoring function
- Engine over speed and cold start protection

Comprehensive technical literature is online at  
[powersource.danfoss.com](https://powersource.danfoss.com).

## Performance functions

- Flash memory for data logging (Predictive maintenance) optional
  - ECO fuel saving mode
  - Cruise control in work mode
  - Vehicle constant speed control by drive pedal
  - Vehicle speed limitation
- Digital outputs for:
  - dynamic brake light
  - automatic park brake
  - reverse buzzer
  - vehicle speed controlled output
  - Engine speed-dependent retarder control
- Temperature compensation for predictable performance
- Advanced CAN J1939 interface

## I/O Configuration

Function / Pin	PC036
Power supply ground (KL31)	1
Wakeup pin / ignition on (KL15)	1
Power supply battery voltage (KL30)	2
Internal 5V sensor power supply 500 mA	1
CAN interface (CAN FD)	1
<b>Inputs</b>	<b>16</b>
Analog/Digital input	9
Analog/Frequency input	2
Digital /Analog/4-20mA/resistance	5
<b>Outputs</b>	<b>12</b>
PWM output 4A high side, switch to battery voltage	5
Digital output 4A low side, switch to ground	3
Digital output 4A high side, switch to battery voltage	4

## Specification

Rated supply voltage	12V system: 9-16 V 24V system: 18-36V
Processor	Infinion AURIX TC265D, 32bit Dual TriCore, 2,5MB Flash, 240kB SRAM
Operating Temperature Range	-40 to +105°C
Degrees of Protection, Dust and Water	IP69k with connectors installed
Housing material	Plastic and aluminum
Chemical Resistance	IEC 60068-2-52 and ISO 16750-2
EMC Immunity	ISO 13766 - 150 V/m
Vibration and Shock	IEC 60068-2-64 IEC 60068-2-27 test Ea
Functional Safety	ISO 13849 PLd, IEC61508 SIL2
Connector	DEUTSCH DTM 06-12

Pin No.	Function
C1:01	Power ground -
C1:02	Ignition on (KL15)
C1:03	CAN High
C1:04	CAN Low
C1:05	DIN/AIN
C1:06	DIN/AIN
C1:07	DIN/AIN
C1:08	+ 5V Sensor Power
C1:09	Sensor Power -
C1:10	DIN/AIN
C1:11	DIN/AIN
C1:12	DIN/AIN/FreqIN/SENT

Pin No.	Function
C2:01	DIN/AIN
C2:02	DIN/AIN
C2:03	PWM Out High side
C2:04	PWM Out High side
C2:05	DOUT – Low side
C2:06	DOUT – Low side
C2:07	PWM Out high side
C2:08	DOUT - High Side
C2:09	DOUT - High Side
C2:10	DOUT - High Side
C2:11	DOUT - High Side
C2:12	Power supply +

Pin No.	Function
C3:01	DIN/AIN/4-20mA
C3:02	DIN/AIN/4-20mA
C3:03	DIN/AIN
C3:04	DIN/AIN/Resistance
C3:05	DIN/AIN/Resistance
C3:06	DIN/AIN/FreqIN/SENT
C3:07	DIN/AIN
C3:08	DIN/AIN/4-20mA
C3:09	PWM/DOUT - High Side
C3:10	PWM/DOUT - High Side
C3:11	DOUT - Low Side
C3:12	Power supply +



### Available Features and Software Packages

- Propel Software for displacement controlled (EDC) and performance/torque controlled (NFPE) pump
- Available for mechanical controlled engines in combination with pressure controlled Hydromotor (PCOR)
- Antispin control for two hydromotors
- Fan Drive control function
- SpeedShift for 2 speed gearboxes
- Data logging for predictive maintenance
- UDS protocol support
- Customer programmable (FLEX)

Product Part Number	
PC036 Controller with PC-GO Software	11306320
PC036 Controller with PC-PRO Software	11341661
Mating Connector Assembly Bag, DEUTSCH, PC036, (24-20 AWG) 0,21 - 0,52 mm <sup>2</sup>	11298682
Mating Connector Assembly Bag, DEUTSCH, PC036, (22-16 AWG) 0,32 - 1,31mm <sup>2</sup>	11298683
PLUS+1 Gateway CG150-2 CAN/USB	11153051

### PC-GO

The perfect match for cost sensitive applications. The propel software package PC-GO offers a propel solution for vehicles without having requirements in advanced functionality at an advantageous price level.

In the PC-GO software the hydrostatic pump can be controlled in pressure dependent (NFPE) pump control mode. It is optimized for use with a hydromotor equipped with a proportional (PROP) valve to control the displacement.

The Danfoss patented Delta-Flow concept uses the hydrostatic ratio to control the pump and hydromotor displacement by considering the most optimal operation point.

### PC-PRO

The PC-PRO software package offers a complete propel solution with advanced functionality, supporting different driveline concepts, driving modes, integration with work function and smart ECO mode.

In the PC-PRO software the hydrostatic pump can be controlled in pressure dependent (NFPE) pump control mode or displacement controlled (EDC). It is optimized for use with a hydromotor equipped with a proportional (PROP) valve to control the displacement.

Auto inching and advanced ECO mode cut energy use and improve operator comfort.

Smart Compensation features such as pump calibration, leakage, and temperature compensation ensure consistent performance under varying conditions.

In addition to proportional motors, the PC-PRO supports orbital, two-position, and fixed motors, including EMD speed sensors.

Please find more detailed information in the System Description AB540963419552en-00010.

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