



# DC 150 Intelligent DDC control & PLC module

- 8 digital inputs, also suitable for frequency signals
- 8 digital inputs/outputs, individual configuration
- 8 analog inputs
- 8 analog outputs
- 2 field bus ports
- Serial interfaces
- up to 8 Mbyte memory
- Real-time clock
- Profibus DP interface (option)

## PROFILE

The DC 150 provides transparent solutions for automation tasks with distributed intelligence. Apart from standard PLC functions, the module is particularly suited as a stand-alone controller.

Programming is done according to the international IEC 61131-3 standard.

With its powerful computation facilities and high-speed I/O scanning (1 ms), the DC 150 is an ideal choice for fast control loops. For this purpose, pre-configured controller function blocks (IEC 61131) are available.

Two field-bus ports and 3 serial interfaces are provided for communication with a central PLC or a visualization system. Similarly, the connection of an operating terminal, a supervisory computer or a PC for the engineering is possible.

By means of a conventional modem, the DC 150 can be addressed remotely, e.g. for debugging and down-loading. Besides real-time, 32-bit processing, the unit features 8 on-board digital inputs, and 8 digital inputs/outputs that can be configured individually as inputs or outputs, plus 8 analog (current/voltage) inputs and 8 analog outputs. With its real-time clock, modem interface, and an expandable Flash memory (up to 9 Mbytes), the DC 150 meets all the requirements for de-centralized data logging.

Should more than the on-board I/O be needed, extensions are easily implemented by connecting additional I/O modules via the CANbus. Similarly, a local operating terminal can be connected via CANbus.

The housing is designed for clip-on mounting to standard DIN rails. With its compact dimensions of 124 x 170 mm, and a depth of 85,5 mm, the DC 150 is ideally suited for mounting close to the process in de-centralized systems. For communication and programming, the DC 150 is fitted with a complete CANopen master/slave implementation as a library for IEC 61131-3.

## Convenient field connections

Electrical wiring from the machine or process is taken directly to the terminal strips at top and bottom of the modules. The terminal strips are of the plug-in type, allowing system pre-wiring as well as fast module exchange.

The following options are available for the terminal strips:

- Screw terminals
- Screwless spring-clamp terminals
- Crimp terminals.

Inputs/outputs are connected using the 2-wire principle. I/O energization is provided via the input/output connectors.

Front panel LEDs indicate the signal status of every I/O, and the module's operational status. The LED positions are directly correlated to the relevant I/O's.

Inscription labels on the terminal strips allow clear identification of each I/O.

## Programming with standard tools

Programming of the DC 150 is executed with a PC and a Windows-based (95/98 or NT) software tool.

The universal programming tool is used for all of PMA's P-open modules.

Depending on your application, the programming software to IEC 61131-3 lets you choose the most convenient method: Instruction List (IL), Ladder Diagram (LD), Structured Text (ST) and/or Function Block Diagram (FBD) and Sequential Function Chart (SFC).

If necessary, we provide full support during development of your own application-specific programs.

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## TECHNICAL DATA

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### Module description

DC 150-CAN (2 CANbus ports)  
DC 150-DP (Prof bus-DP interface and CANbus port)

### CPU

Type:MC 68332, 25 MHz

### Memory

1 Mbyte Flash  
(expandable to 3,5 or 9 Mbyte)  
1 Mbyte CMOS RAM,buffered with a lithium battery

### Real-time clock

buffered with a lithium battery

### Programming

By means of a PC-based software tool (CP1131) under Windows 95/98, NT. Available languages:IL,LD,ST, FBD and SFC conformable to IEC 61131-3. Downloading, debugging from PC:via RS 232 or CANbus.

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## DIGITAL INPUTS /OUTPUTS

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### 8 digital inputs

24 VDC

### Frequency inputs

All 8 digital inputs can be used for frequency signals (24VDC single ended)  
Duty-cycle: 40/60...60/40  
Frequency range: 0,1 Hz...8KHz  
restricted frequency range at other duty-cycles

### 8 digital input/output

individually configurable as 24 VDC inputs/outputs.  
Output current:max.0,07 A per output.

### Output-Protection

All digital outputs are short-circuit proof and have reverse-polarity protection.

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## ANALOG INPUTS /OUTPUTS

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### Scanning speed

1 ms for all inputs and outputs

### 8 Analog Inputs

0...10 V (differential)  
or 0...20 mA.  
The inputs can be configured in groups of 2.  
Input resistance (current): 100  $\Omega$   
Resolution: 12 bits

### 4 Analog Outputs

+/- 10 V or 0...20 mA  
each output individually configurable

### 4 Analog Outputs

+/- 10 V

### Output-Resolution

11 bits + sign

### Output-Protection

All analog outputs are short-circuit proof and have reverse-polarity protection.

### Output load

Current outputs: max. 600  $\Omega$   
Voltage outputs: max. 5 mA into  $\geq 2$  k $\Omega$   
Capacitive load: max. 1  $\mu$ F

### Configuration

Current/voltage inputs/outputs are configured by means of the CP1131 software package

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## INTERFACES

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### 1 x CANbus (Profibus-DP optional)

9-pin D-type connector with locking screws,galvanically isolated.  
Gateway functionality between Profibus DP and CANbus/CANopen

### 1 x CANbus

via terminal strip, galvanically isolated.

### 1 x RS 232 for programming/debugging

9-pin D-type connector with locking screws

### 1 x RS 232 for modem

9-pin D-type connector with locking screws

### 1 x RS 422/485 for host computer

via terminal strip, galvanically isolated.

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## DIAGNOSTICS

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4 LEDs show the module 's operational status.  
16 red LEDs show the switching status of the digital I/O.

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## POWER SUPPLY

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### Module supply

24 VDC; appr. 0,3 A (to EN 61131-2)  
Protection class III (protective low voltage).

### I/O energization

*Digital I/O*  
external 24 VDC (to EN 61131-2)  
*Analog I/O*  
from internal DC/DC converter

### Galvanic isolation

between CANbus/serial interfaces, analog I/O and digital I/O

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## ENVIRONMENTAL CONDITIONS

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### Permissible temperature

For operation: 5...50  $^{\circ}$ C  
Storage/transport: 20...60  $^{\circ}$ C

### Climatic category

KUF to DIN 40 040  
Relative humidity:  $\leq 75$  % yearly average, no condensation

### Shock and vibration

#### Vibration test Fc

to DIN 68-2-6 (10...150 Hz)  
Unit in operation:1g or 0,075 mm  
Unit not in operation:1,5g or 0,15 mm

#### Shock test Ea

to DIN IEC 68-2-27 (15g,11 ms)

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## ELECTROMAGNETIC COMPATIBILITY

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### Electromagnetic immunity

Complies with EN 50 082-2

### Electromagnetic radiation

Complies with EN 50 081-2

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## GENERAL

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### Housing

Front dimensions: 124 x 170 mm  
Depth: 85 mm  
Module spacing: B=113/118,5 mm  
Protection mode: IP 20

### CE-marking

Fulfils the European Directives for electromagnetic compatibility and lowvoltage.

### Electrical safety

Tested to IEC 348 (VDE 0411)  
Protection class III (protective low voltage)

### Electrical connections

Choice of screw terminals, screwless spring-clamp connection, or crimp terminals.  
All terminal types simply plug onto the connector strips of the DC 150.

### Mounting method

Clip-on rail mounting (NS 35/7,5  
„top-hat“ rails to DIN EN 50 022)

### Weight:

approx.0,68 kg

### Accessories

Operating instructions

## **ORDERING DATA**

Description	Order no.
<b>DC 150-CAN</b> intelligent DDC control and PLC module with 16 digital I/O, 1 Mbyte SRAM memory and real-time clock 1 x CAN, 2 x RS 232, 1 x RS 485	
<b>plus:</b> 8 analog inputs, 3 Mbyte Flash memory, 1 x CAN	<b>9407 700 51121</b>
8 analog inputs, 5 Mbyte Flash memory	<b>9407 700 52121</b>
8 analog inputs, 8 analog outputs, 1 x CAN, 5 Mbyte Flash memory	<b>9407 700 50341</b>
8 analog inputs, 8 analog outputs, 5 Mbyte Flash memory	<b>9407 700 52321</b>
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<b>DC 150-DP</b> intelligent DDC control and PLC module with 16 digital I/O, 1 Mbyte Flash memory, 1 MByte SRAM memory, real-time clock, 1 x Profibus DP, 1 x CAN, 1 x RS 232, 1 x RS 485 8 analog inputs, 8 analog outputs	<b>9407 700 60331</b>

## **ACCESSORIES**

Description	Order no.
<b>18-pole screw terminal strip</b> (4 x required) Phoenix type FRONT-MSTB 2,5/10 ST-5,08	<b>9407 799 00001</b>
<b>10-pole screw terminal strip</b> (2 x required) Phoenix type FRONT-MSTB 2,5/10 ST-5,08	<b>9407 799 00021</b>
<b>CANbus cable</b> for connecting CANbus modules, standard length 5 m	<b>9407 800 90041</b>
<b>CANbus termination resistor</b> with plug	<b>9407 800 90021</b>
<b>RS 232 Download/Debug-cable</b>	<b>9407 799 00201</b>

## **ENGINEERING TOOLS**

Description	Order no.
CP 1131, german	<b>9407 799 00001</b>
CP 1131, english	<b>9407 799 00011</b>
CNW	<b>9407 799 00051</b>
Engineering Set Profibus, german	<b>9407 999 10411</b>
Engineering Set Profibus, english	<b>9407 999 10401</b>

## **DOCUMENTATION**

Description	Order no.
Operating manual, german	<b>9499 040 56518</b>
Operating manual, german	<b>9499 040 56511</b>
DC 150-function blocks, english	<b>9499 040 53518</b>
DC 150-function blocks, english	<b>9499 040 53511</b>
Profibus-Interface, german	<b>9499 040 60218</b>
Profibus-Interface, english	<b>9499 040 60211</b>

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