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.

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.

**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.
TECHNICAL DATA

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.

DIGITAL INPUTS /OUTPUTS

8 digital inputs
24 VDC

Frequency inputs
All 8 digital inputs can be used for frequency signals (24 VDC single ended)
Duty-cycle: 40/60...60/40
Frequency range: 0.1 Hz...8 KHz
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.

ANALOG INPUTS /OUTPUTS

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 \( \geq 2 \kappa \Omega \)
Capacitive load: max. 1 \( \mu F \)

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

INTERFACES

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.

DIAGNOSTICS

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

POWER SUPPLY

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)

Analogue I/O
from internal DC/DC converter

Galvanic isolation
between CANbus/serial interfaces, analogue I/O and digital I/O

ENVIRONMENTAL CONDITIONS

Permissible temperature
For operation: 5...50 °C
Storage/transport: 20...60 °C

Climatic category
KUF to DIN 40 040
Relative humidity: \( \leq 75 \% \) yearly average, no condensation

Shock and vibration
Vibration test \( F_c \)
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 \( E_a \)
to DIN IEC 68-2-27 (15g, 11 ms)

ELECTROMAGNETIC COMPATIBILITY

Electromagnetic immunity
Complies with EN 50 082-2

Electromagnetic radiation
Complies with EN 50 081-2

GENERAL

Housing
Front dimensions: 124 x 170 mm
Depth: 85 mm
Module spacing: B = 113/118,5 mm

CE-marking
Fulfils the European Directives for electromagnetic compatibility and low-voltage.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 150-CAN 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 plus: 8 analog inputs, 3 Mbyte Flash memory, 1 x CAN</td>
<td>9407 700 51121</td>
</tr>
<tr>
<td>8 analog inputs, 5 Mbyte Flash memory</td>
<td>9407 700 52121</td>
</tr>
<tr>
<td>8 analog inputs, 8 analog outputs, 1 x CAN, 5 Mbyte Flash memory</td>
<td>9407 700 50341</td>
</tr>
<tr>
<td>8 analog inputs, 8 analog outputs, 5 Mbyte Flash memory</td>
<td>9407 700 52321</td>
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</table>

**DC 150-DP** 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 | 9407 700 60331 |

### ACCESSORIES

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>18-pole screw terminal strip (4 x required) Phoenix type FRONT-MSTB 2,5/10 ST-5,08</td>
<td>9407 799 00001</td>
</tr>
<tr>
<td>10-pole screw terminal strip (2 x required) Phoenix type FRONT-MSTB 2,5/10 ST-5,08</td>
<td>9407 799 00021</td>
</tr>
<tr>
<td>CANbus cable for connecting CANbus modules, standard length 5 m</td>
<td>9407 800 90041</td>
</tr>
<tr>
<td>CANbus termination resistor with plug</td>
<td>9407 800 90021</td>
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<tr>
<td>RS 232 Download/Debug-cable</td>
<td>9407 799 00201</td>
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### ENGINEERING TOOLS

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<td>CP 1131, german</td>
<td>9407 799 00001</td>
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<td>CP 1131, english</td>
<td>9407 799 00011</td>
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<tr>
<td>CNW</td>
<td>9407 799 00051</td>
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<td>Engineering Set Profibus, german</td>
<td>9407 999 10411</td>
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<tr>
<td>Engineering Set Profibus, english</td>
<td>9407 999 10401</td>
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### DOCUMENTATION

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<td>Operating manual, german</td>
<td>9499 040 56518</td>
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<tr>
<td>Operating manual, german</td>
<td>9499 040 56511</td>
</tr>
<tr>
<td>DC 150-function blocks, english</td>
<td>9499 040 53518</td>
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<tr>
<td>DC 150-function blocks, english</td>
<td>9499 040 53511</td>
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<tr>
<td>Profibus-Interface, german</td>
<td>9499 040 60218</td>
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<tr>
<td>Profibus-Interface, english</td>
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