Universal Digital Module Amplifier for DIN Mounting Rail (Top-Hat Rail)

**DMA-22-05**

**Versions for Closed Loop Applications**

**For HAWE**\(^2\) **Valves with Feedback Systems**

(High Performance Range)

- For one valve with feedback or process value feedback
- With 10 V supply output for feedback sensor and optional analogue output 0.... +/− 10 V
- Optional with bus interface (PROFIBUS DP, PROFINET, ETHERNET/IP, CAN-OPEN) multi module configurations available
- Adaptation possible to all kinds of Hawe proportional valves (series PSL/PSV)
- Optimised for current range of existing twin solenoids and feedback signals
- Full digital PI current controller
- Full digital multifunctional controller for valve or process control systems
- Analogue inputs with high resolution and accuracy
- Easy usage and operation by means of WINDOWS program **HCSTool**
  **NEW:** Now including oscilloscope function!
- Extreme short cycle time for best dynamic behaviour (best in class)

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*1: Servi Hydranor AS, N-1400 Ski, www.servi.no
1 Applications and usage

Amplifier modules DMA-2 are generally used for:
- proportional valves with feedback as
  - direct and pilot operated
  - flow control valves
  - pressure reducing valves
  - pressure regulating valves
  - cartridge valves
  - servo valves (on request)
  - valves without feedback used in applications with process value feedback (e.g. Position, pressure, velocity, rpm, etc.)
- Optional available with several bus interfaces
- Flash-EPROM technology for easy software update or modifications from PC via RS232 interface
- Variable settings for different Hawe solenoid systems
- Adaptation to different valve sizes and versions available
- Switch-over from closed-loop to open-loop operation possible by means of digital input
- Change of selected parameters “on-the-fly” without interference of function; monitoring of display values and 4-channel oscilloscope with HCSTool via PC (RS232 interface)
- High resolution and accuracy for analogue signal due to 12-Bit A/D-converter
- Fast and easy mounting, installation and exchange due to top-hat rail (DIN mounting rail) in accordance with EN50022 and connectors with screw terminals or optional cage clamp technology system COMBICON

2 Features

- Adapted version for Hawe valves series PSL/PSV
- Fully digitized amplifier modul
- All adjustments and parameter settings possible by means of PC --> no on board potentiometers
- Flexible and reliable system, use of a modern 16 bit CPU with high power reserve
- Optional available with analogue output 0 … +- 10 V

3 Technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Range, characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Unom = 24 V (12 … 33V) DC, residual ripple &lt; 10 % (max. 50 VA power draw) The modul can also be used on supply voltage of Unominiel = 12 V (&gt; 9,5 V)</td>
</tr>
<tr>
<td>Solenoid system selection</td>
<td>0,15 A; 0,24 A; 0,5 A; 0,63 A; and 0,8 A (optimised for Hawe solenoids)</td>
</tr>
<tr>
<td>Control voltage for digital inputs</td>
<td>(12) 24 V +/- 10 %, residual ripple &lt; 10 %, current draw per input &lt; 20 mA</td>
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<tr>
<td>Temperature ranges</td>
<td>Ambient: 0° C … 60° C (other on request) storage- 20° C … 60° C</td>
</tr>
<tr>
<td>Connection</td>
<td>16 pole (4 x 4); screw terminals for 0.2 - 2.5 mm² (AWG 24 -12); for detailed technical data refer to Phoenix Contact Combicon Product Catalog</td>
</tr>
<tr>
<td>Type of connector</td>
<td>Phoenix Combicon connectors with screw terminals, type: MSTBT 2,5/ 4-ST - special HCS version with printed on reference numbers. Or: terminals with cage clamp, type: FKCT 2,5/4-ST</td>
</tr>
<tr>
<td>EMC</td>
<td>In accordance with applicable standards (CE); Germanischer Lloyd VI-7-2 on request</td>
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<tr>
<td>Analogue set value and feedback value (input)</td>
<td>2 differential signal inputs with 12 bit resolution, 0 … +/- 10 V, 0 … 20 mA, 4 … 20 mA (one command, one feedback); feedback additionally: 5 V +/- 3 V for Hawe hall sensor</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>2 digital inputs (Enable, S1.02), opto-coupled</td>
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<tr>
<td>Solenoid current (output)</td>
<td>2 output stages, each for up to max. 0.8 A (with over-energ. and quick de-energization);</td>
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<tr>
<td>Digital output</td>
<td>1 output opt-coupled, voltage level 0 V / 24 V, 10 mA (ERROR/Comparator)</td>
</tr>
<tr>
<td>Reference output</td>
<td>1 Reference output 10 V (max. 20 mA), short circuit protected; supply for hall sensor</td>
</tr>
<tr>
<td>Analogue output (optional)</td>
<td>1 Analogue output 0 … +/- 10 V (max. 20 mA), short circuit protected; for monitoring etc.</td>
</tr>
<tr>
<td>Interface 1</td>
<td>RS232, 6-pole female RJ45/6 connector</td>
</tr>
<tr>
<td>Interface 2 ·1 (only one available per module)</td>
<td>PROFIBUS-DP: RS485, Sub-D 9-pole female</td>
</tr>
<tr>
<td>Versions with Bus-Interface only!</td>
<td>PROFINET (in/out): 2 x RJ45 (integrated switch)</td>
</tr>
<tr>
<td></td>
<td>ETHERNET/IP: RJ45</td>
</tr>
<tr>
<td></td>
<td>CAN-OPEN: Sub-D 9-pole male</td>
</tr>
<tr>
<td>Status signals</td>
<td>3 status LED’s at front (Run/OK; Enable, Error)</td>
</tr>
<tr>
<td>PWM frequency, cycle times</td>
<td>Approx. 22 kHz PWM frequency, cycle time max 0.220 msec</td>
</tr>
<tr>
<td>Mounting/housing</td>
<td>Mounting: top-hat rail (mounting rail) in accord. with EN50022 with etegrated PE contact Housing configuration: ventilated (IP20) Material: PA 66 - FR (blue); flammability in accordance with UL94V0 Dimensions approx.: (w x h x d) 22,5 x 100 x 114 mm Bus single module version: dimensions approx.: (w x h x d) 45 x 100 x 114 mm Bus multi module version: dimensions approx.: (w x h x d) ((n+1)x22,5) x 100 x 114 mm; n = number of slaves (modules)</td>
</tr>
</tbody>
</table>

*1: For more detailed information regarding DMA with bus-interfaces please refer to the according data sheet!
Example diagram for version: DMA-22-05-xxx-SHPR-ANAOOut; Operation Mode: 05
Wiring diagram

Version: DMA-22-05-xxx-SHPR-ANAOut; Software Versions V39.11x
Operation Mode: 05, with 10 Vref out and Analogue Output

DMA-22-05

Data Sheet
05.10.2015
Block diagram of software functions

Operation Mode: 05, 05

Version: DMA-22-05-xxx-SHPR-ANAOut; Software Versions V39.11x (DMA-X2)

Operation Mode: 05

1 valve with 2 solenoids and feedback

Numbers in brackets do indicate numbers printed on connectors
7 DMA with Bus Interfaces

a) PROFIBUS. Features:
- Supports PROFIBUS-DP Slave in accordance with IEC 61158
- Supports PROFIBUS DPV1
- Maximum 244 Byte in-/output data
- Supports up to 12 Mbaud (autodetect)
- Electrical isolated and opto-decoupled

b) PROFINET. Features:
- Meets the standard IEC 61158 and IEC 61784
- LAN 10/100Base-T(X)
- 2 x RJ-45 LAN (Daisy Chain)
- Cycling data exchange RT and IRT with ProfiNet IO-Controller
- Sending and receiving of diagnostic- and process alarms
- I&M...4-data available
- Supporting of PROFINET Naming (device name) and TCP/IP addressing
- Fast Startup functionality supported
- Shared Device supported
- Media Redundancy Protocol (MRP) supported
- Electrical isolated interface

c) ETHERNET I/P. Features:
- Supports ETHERNET I/P
- Maximum 32 Byte in-/output data
- Supports 10 and 100 MBit/s (autodetect)
- IP address setting by means of parameter
- Electrical isolated interface
- Software update of Ethernet node via DMA serial interface
- Supports assembly instances 100 and 101
- Additional assembly instances 200, 201, 210, 211 to directly communicate with multi fold modules
- One receive PDO
- One transmit PDO
- One SDO channel
- Node guarding

d) CAN-OPEN. Features:
- Complete CAN-OPEN slave in accordance with standard CIA 301 / V4
- Supports all import Baud rates up to 2 Mbit
- Node number and baud rate by means of vendor specific object
- External bus termination 120 R required
- One receive PDO
- One transmit PDO
- One SDO channel
- Node guarding
### Name | Description
--- | ---
**HCSTool** | Software for parameterization, operation, monitoring, storage and documentation of adjustments. In English, French and German on CD (free download available). Please follow this link in order to download the most recent version of HCSTool: [http://www.h-c-s-gmbh.de/download/](http://www.h-c-s-gmbh.de/download/)

**DMA-RS232-DS9F-RJ45** | Interface cable for communication between PC and DMA-2 for RS232 interface. 1 x Sub-D 9-pole connector female, 1 connector Western-Digital 6-pole, w. 2,5 m cable

**USB-RS232-RJ45** | As above but w. USB-adaptor. 1 x connector Western-Digital 6-pole, w. 2,5 or 10 m cable

**EKB-04** | EKB-04 Handheld keypad and display unit for parameter setting and copying

**CU/DMA** | Commissioning unit for DMA. For adaptation of one DMA. For Commissioning, servicing, testing and trouble shooting etc. at machines, systems, for laboratories and for training

**4MSTBU** | Set of 4 connectors for DMA; Phoenix Combicon connectors with screw terminals, type: MSTBT 2,5/4-ST - special HCS version with printed on reference numbers

**4FKCT** | Set of 4 connectors for DMA; Phoenix Combicon connectors with cage clamp terminals, type: FKCT 2,5/4-ST

**Coding for connectors (order separately)** | Coding section (CR-MSTB), inserted into the recess in the header and keying profile (CP-MSTB), inserted into the slot on the plug (red); packages with 100 pcs each

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**Commissioning Unit** | **Cable for comm. unit** | **Interface Cable** | **Interface Cable**
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[Image of HCSTool] | EKB-4 | Connectors 4MSTBU | Connectors 4FKCT

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**Not to scale!**
Ordering code, including single module bus versions (not all combinations available!)

```
DMA-22-05-063-PBDP-4MSTBU-SHPR-5C
```

**Ordering code example:**
Version with PROFIBUS is a closed loop version (for HPR valve size 5 with compensator) and has a 0.63 A coil including the set of mating connectors.

```
DMA-22-05-063-PBDP-4MSTBU-SHPR-5C
```
Ordering code example:

PROFIBUS Version with 3 slaves (DMA modules). Each of the 3 slaves (modules) is the same version and is a closed loop version (for different HPR valve versions) and has a 0.63 A coil including the set of mating connectors.

Please specify each of the modules.

**DMA-22-M3-050505-PBDP-MSTBU-Sxxxxx** containing
- DMA-22-05-063-4MSTBU-SHPR-3C (module for a size 3 valve with compensator)
- DMA-22-05-063-4MSTBU-SHPR-5C (module for a size 5 valve with compensator)
- DMA-22-05-063-4MSTBU-SHPR-5 (module for a size 5 valve without compensator)
11 Confirmation of conformity

HCS Hydraulic Control Systems GmbH
Neuffener Str. 29
D-72636 Frickenhausen

hereby declares that the product described as follows complies in terms of its design, as well as in the version placed in the stream of commerce by us, with the relevant requirements of the directive. This declaration is void in the event of any changes to the product without our written agreement.

Product: Digital Amplifier and Controller Module
Intended use: Automation systems (industrial applications)
Model: DMA-2
Rated voltage: 24 V DC; SELV
Rated power: max. 100 W
Protection class: III
Protection degree: IP00 (IP20 on request)
Applicable EU Standards:
  EN 61000-6-4:2007 + A1:2011
  Germanischer Lloyd VI-7-2 (EN 60945) on request
- Immunity: EN 61000-6-2: 2005

Date/manufacturer’s signature
01.01.2015
Details of signatory: Dipl.-Ing. (FH) Peter Deuschle (General Manager)
Europe

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