

**THE ART OF
CONTROL**

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HCS
HYDRAULIC CONTROL SYSTEMS

In cooperation with:

SERVI
GROUP™

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)



PROFI[®]
BUS

PROFI[®]
NET

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

*2: HAWE HYDRAULIK GMBH & CO. KG, D- 81673 MÜNCHEN, www.hawe.com

1 Applications and usage

Amplifier modules DMA-2 are generally used for:

- proportional valves with feedback as
 - directional / 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

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
- 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

3 Technical data

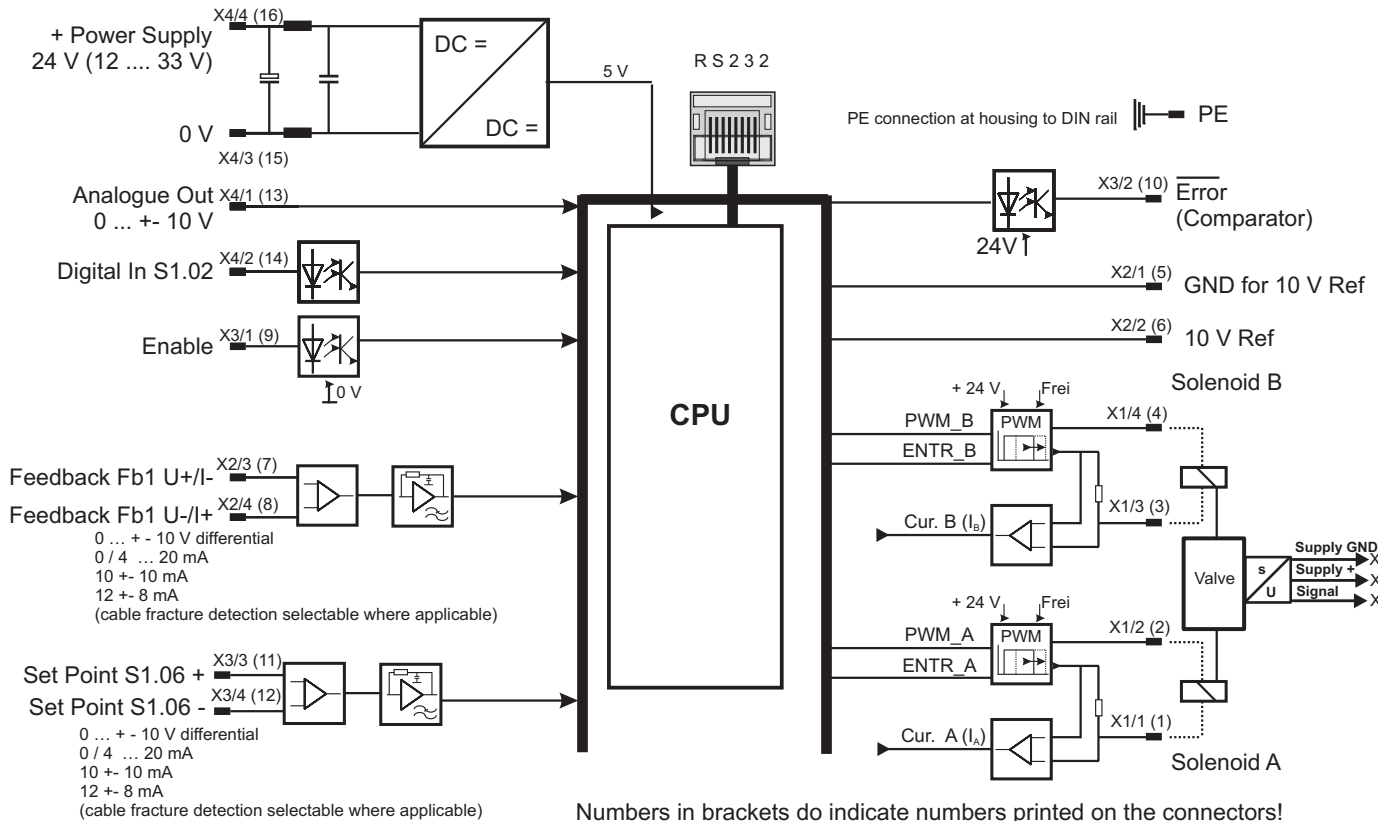
Feature	Range, characteristics
Supply voltage	Unom = 24 V (12 ... 33V) DC, residual ripple < 10 % (max. 50 VA power draw) The modul can also be used on supply voltage of Unominal = 12 V (> 9,5 V)
Solenoid system selection	0,15 A; 0,24 A; 0,5 A; 0,63 A; and 0,8 A (optimised for Hawe solenoids)
Control voltage for digital inputs	(12) 24 V +/- 10 %, residual ripple < 10 %, current draw per input < 20 mA
Temperature ranges	Ambient: 0° C ... 60° C (other on request) storage- 20° C ... 60° C
Connection	16 pole (4 x 4); screw terminals for 0.2 - 2.5 mm ² (AWG 24 -12); for detailed technical data refer to Phoenix Contact Combicon Product Catalog
Type of connector	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
EMC	In accordance with applicable standards (CE); Germanischer Lloyd VI-7-2 on request
Analogue set value and feedback value (input)	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
Digital inputs	2 digital inputs (Enable, S1.02), opto-coupled
Solenoid current (output)	2 output stages, each for up to max. 0.8 A (with over-energ. and quick de-energization);
Digital output	1 output opto-coupled, voltage level 0 V / 24 V, 10 mA (ERROR/Comparator)
Reference output	1 Reference output 10 V (max. 20 mA), short circuit protected; supply for hall sensor
Analogue output (optional)	1 Analogue output 0 ... +/- 10 V (max. 20 mA), short circuit protected; for monitoring etc.
Interface 1	RS232, 6-pole female RJ45/6 connector
Interface 2 *1 (only one available per module) Versions with Bus-Interface only!	PROFIBUS-DP: RS485, Sub-D 9-pole female PROFINET (in/out): 2 x RJ45 (integrated switch) ETHERNET/IP: RJ45 CAN-OPEN: Sub-D 9-pole male
Status signals	3 status LED's at front (Run/OK; Enable, Error)
PWM frequency, cycle times	Approx. 22 kHz PWM frequency, cycle time max 0.220 msec
Mounting/housing	Mounting: top-hat rail (mounting rail) in accord. with EN50022 with inetgrated 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)



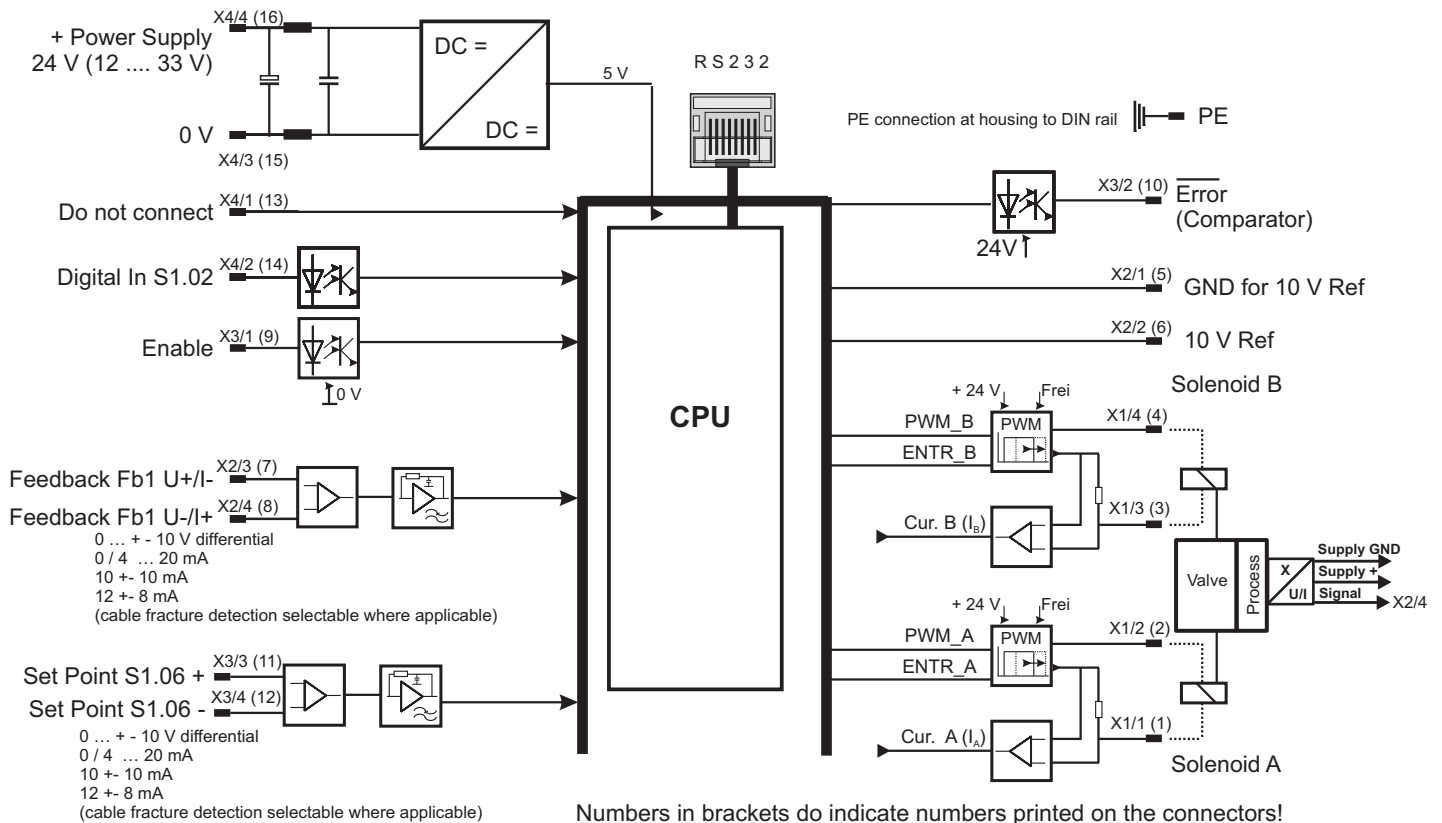
*1: For more detailed information regarding DMA with bus-interfaces please refer to the accoding data sheet!

4 Hardware block diagram

Example diagram for version: DMA-22-**05**-xxx-SHPR-ANAOut; Operation Mode: **05**

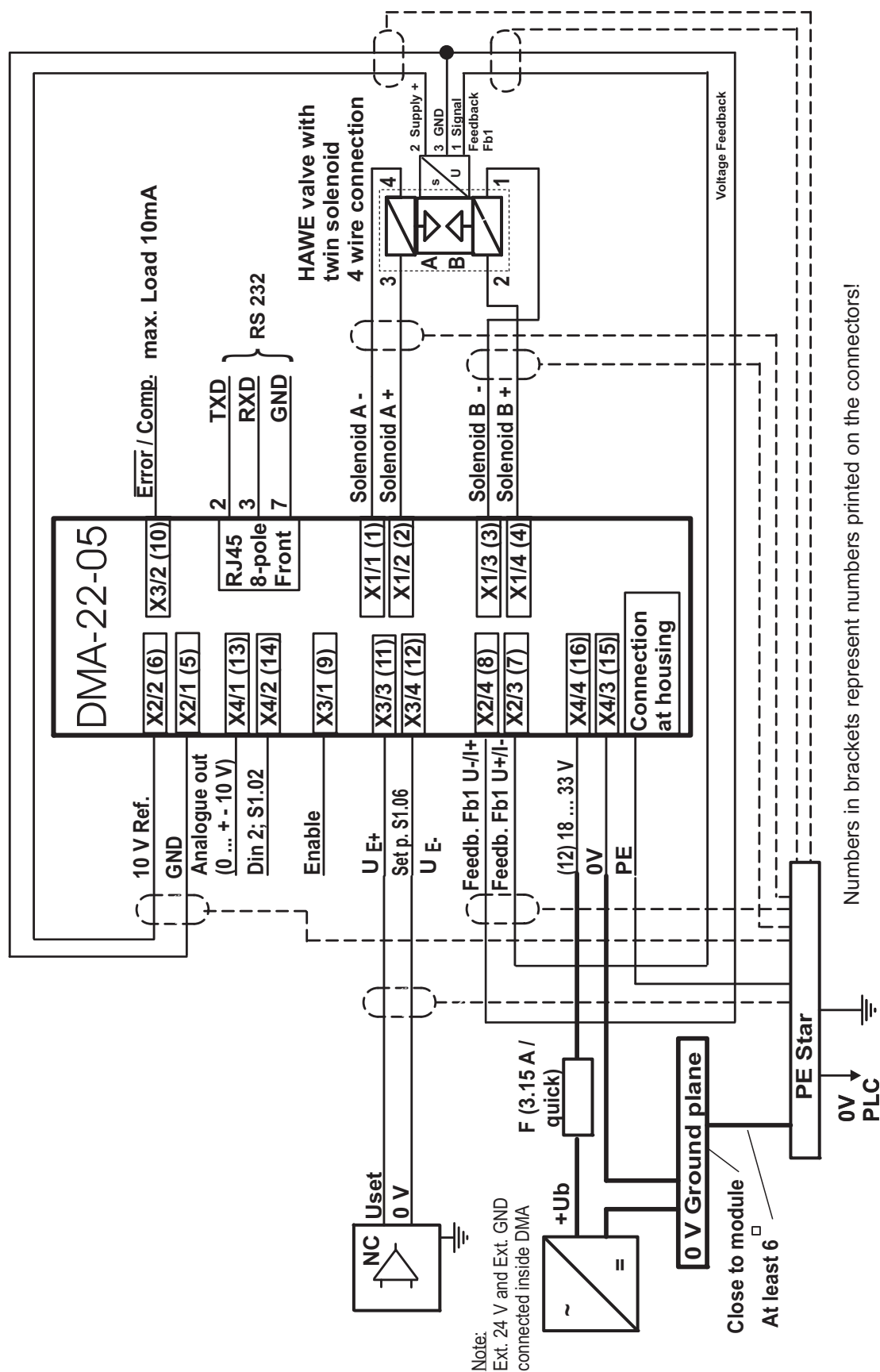


Example diagram for version: DMA-22-**05**-xxx-SHPR; here for Operation Mode: **04**



5 Wiring diagram

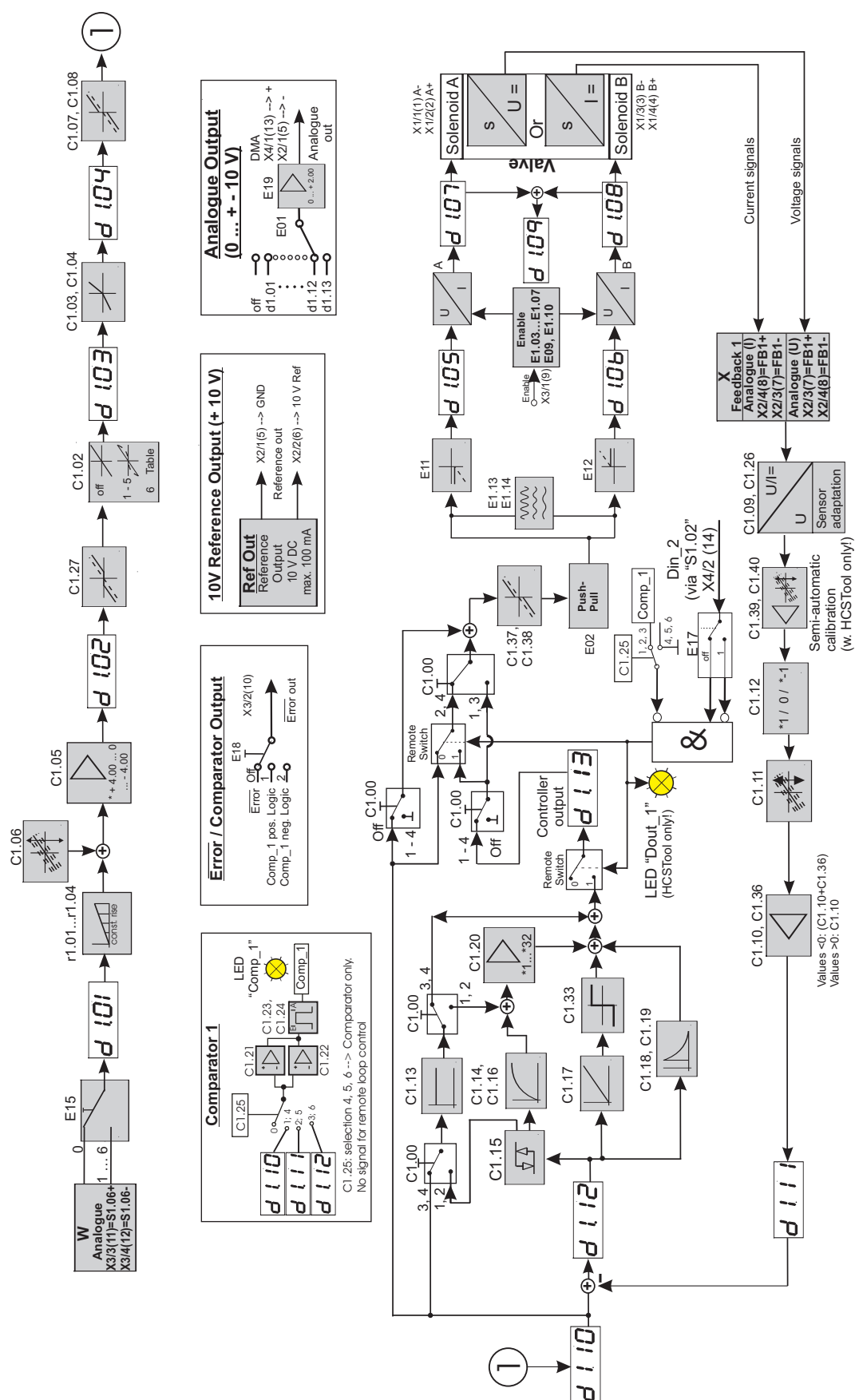
Version: DMA-22-05-xxx-SHPR-ANAOut; Software Versions V39.11x
 Operation Mode: 05, with 10 Vref out and Analogue Output



6 Block diagram of software functions

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

Operation Mode: 05, 1 valve with 2 solenoids and feedback; with „10 Vref Out“ and „Analogue Out“



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



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Certificate no.: Z01871

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&M0...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



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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

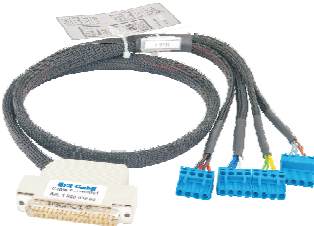
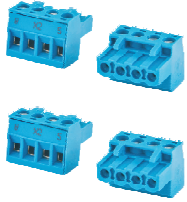
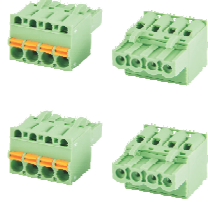
d) CAN-OPEN. Features:

- 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

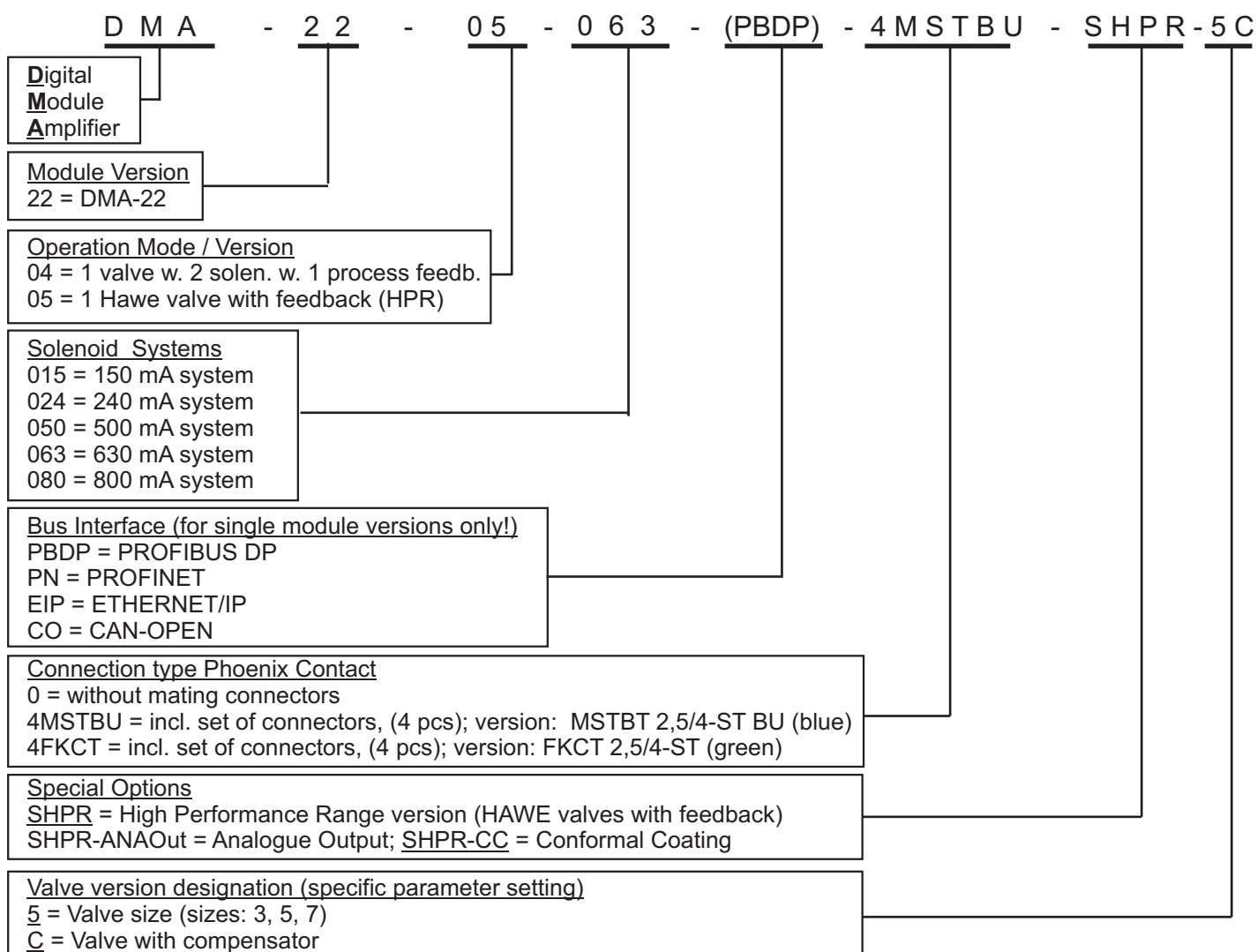
8 Accessories and Options

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/
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, serviceing, 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

Not to scale!

Commissioning Unit	Cable for comm. unit	Interface Cable	Interface Cable
			
HCSTool	EKB-4	Connectors 4MSTBU	Connectors 4FKCT
			

9 Ordering code, including single module bus versions (not all combinations available!)



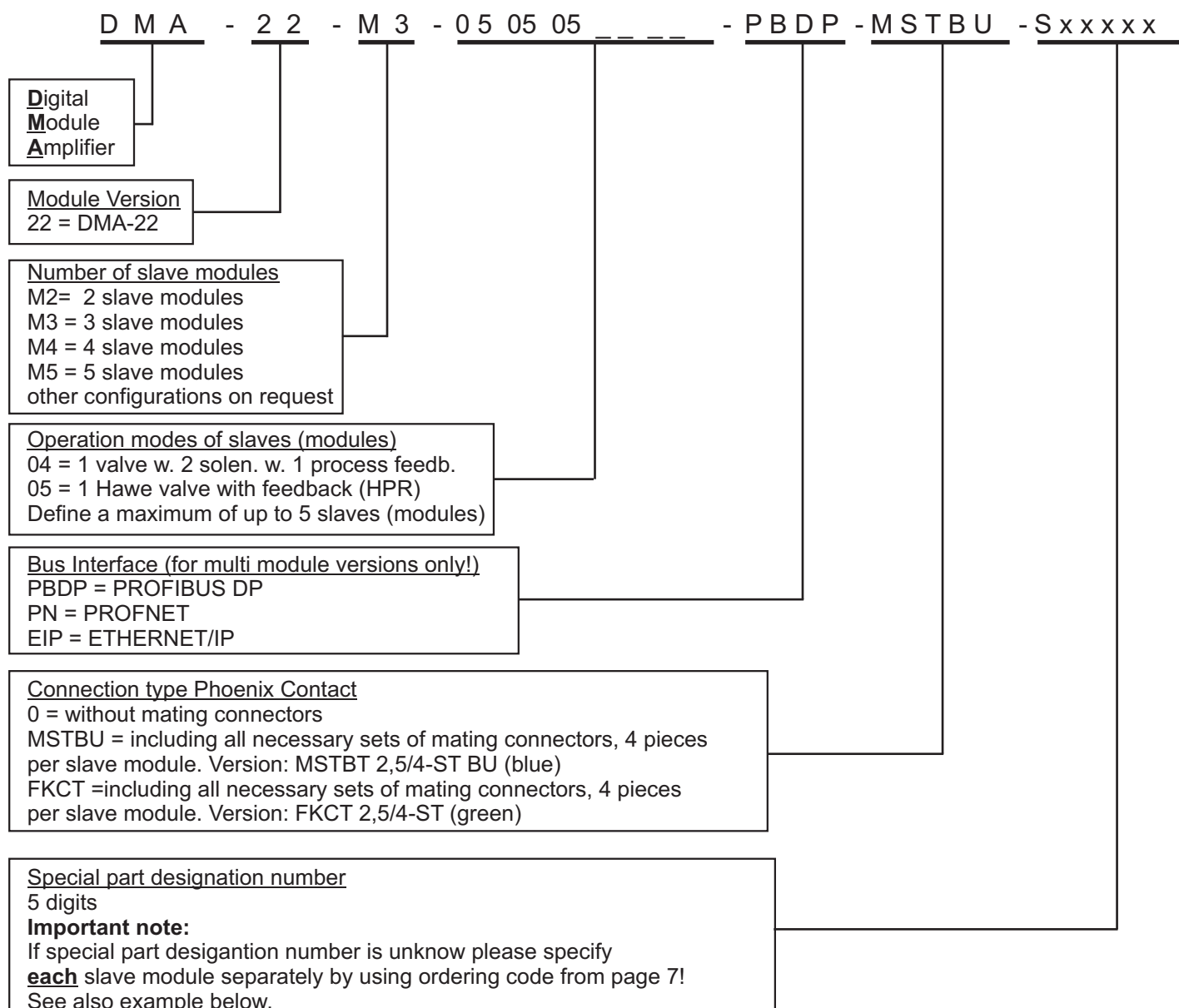
Important note: for ordering of multi-module bus versions refer to ordering code on page 9

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

10 Ordering code, only multi module bus versions (not all combinations available!)



Important note: for ordering single bus versions refer to ordering code on page 8

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

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EC Declaration of Conformity in accordance with EMC Directive 2004/108/EG

**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)
Relevant EC Directive:	EMC Directive 2004/108/EG
Applicable EU Standards:	
Emissions:	EN 61000-6-3:2007 + A1:2011 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)

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