

**THE ART OF
CONTROL**

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

DMA-22-01/02

VERSIONS FOR OPEN LOOP APPLICATIONS

- ◆ Amplifier module for 1 or 2 proportional valves without feedback
- ◆ Both output stages individually controllable by means of two independent analogue inputs (version dependent)
- ◆ Optional with bus interface (Profibus DP, ETHERNET/IP, CAN-Open) multi module configurations available
- ◆ Adaptation possible to all common proportional valves of all kinds of manufacturers
- ◆ Full digital PI current controller for both output stages
- ◆ Universal usage for hydraulic, pneumatic and other applications
- ◆ Analogue input with high resolution and accuracy
- ◆ Easy usage and operation by means of WINDOWS- or terminal program
- ◆ Extreme short cycle time for best dynamic behaviour



1 Applications and usage

The amplifier modules DMA-2 are used for:

Control of proportional valves of all kinds (only without feedback): proportional directional (direct and pilot operated), flow control, pressure limiting and pressure reduction valves, cartridge and servo valves (with torque motor on request)

2 Features

- Fully digitized amplifier modul
- All adjustments and parameter settings possible by means of PC. No on board potentiometers on the modul (user friendly adjustment)
- Flexible and reliable system, use of a modern 16 bit CPU with high power reserve
- Optional available with several bus interfaces
- Flexibility due to possible software and hardware extensions and options for customer specific requirements
- Flash-EPROM technology for easy software update or modifications from PC via RS232 interface
- Variable settings for all kinds of solenoid systems
- Change of selected parameters “on-the-fly” without interference of function; monitoring of display values via PC
- High resolution and accuracy for analogue set point signal due to a 12-Bit A/D-converter
- Two output stages can be used either for one proportional valve with two solenoids or for two valves with one solenoid each due to two independant analogue inputs
- All kinds of customer specific adaptations of hardware and software for specific applications possible. Just ask us and we provide the right solution
- Fast and easy mounting, installation and exchange due to top-hat rail (DIN mounting rail) in accordance with EN50022 and connectors with screw terminals 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 Unominel = 12 V (> 9,5 V)
Solenoid system selection	0,8 A; 1,1 A; 1,3 A; 1,6 A; 2,4 A; 2,7 A and 3,5 A (intermediate values adjustable)
Control voltage for digital inputs	(12) 24 V +/- 10 %, residual ripple < 10 %, current draw per input < 20 mA
Temperature ranges	Ambient: 0° C ... 50° 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 connector with screw terminals, type: MSTBT 2,5/ 4-ST Also available on request: 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 (input)	Version DMA-22-01: 1 differential input with 12 bit resolution, 0 ... +/- 10 V / 0 ... 20 mA / 4 ... 20 mA Version DMA-22-02: 2 differential inputs with 12 bit resolution, 0 ... +/- 10 V / 0 ... 20 mA / 4 ... 20 mA
Digital inputs	Version DMA-22-01: 5 inputs, opto-coupled (S1.01, S1.02, S1.03, S1.04, ENABLE) Version DMA-22-02: 3 inputs, opto-coupled (S1.01, S2.01, ENABLE)
Solenoid current (output)	2 output stages, each for up to max. 3,5 A (with over-energ. and quick de-energization); max. combined current = 4,5 A
Digital outputs	1 output opto-coupled, voltage level 0 V / 24 V, 10 mA (ERROR)
Interface 1	RS232, 6-pole female RJ45/6 connector
Interface 2; optional: (only one available per module) Versions with Bus-Interface only!	Profibus-DP: RS485, Sub-D 9-pole female Ethernet: RJ45 CAN-Bus: Sub-D 9-pole male (on request) Device Net: 1 x MSTBT 2,5/ 4-ST (on request) Modbus: RS485, Sub-D 9-pole female (on request)
Status signals	3 status LED's at front (Run/OK; Enable, Error)
PWM frequency, cycle times	Approx. 22 kHz PWM frequency, cycle time 0,085 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)

4 Block diagram hardware

Diagram for version: DMA-22-01-xxx-S0; Operation Mode: 01

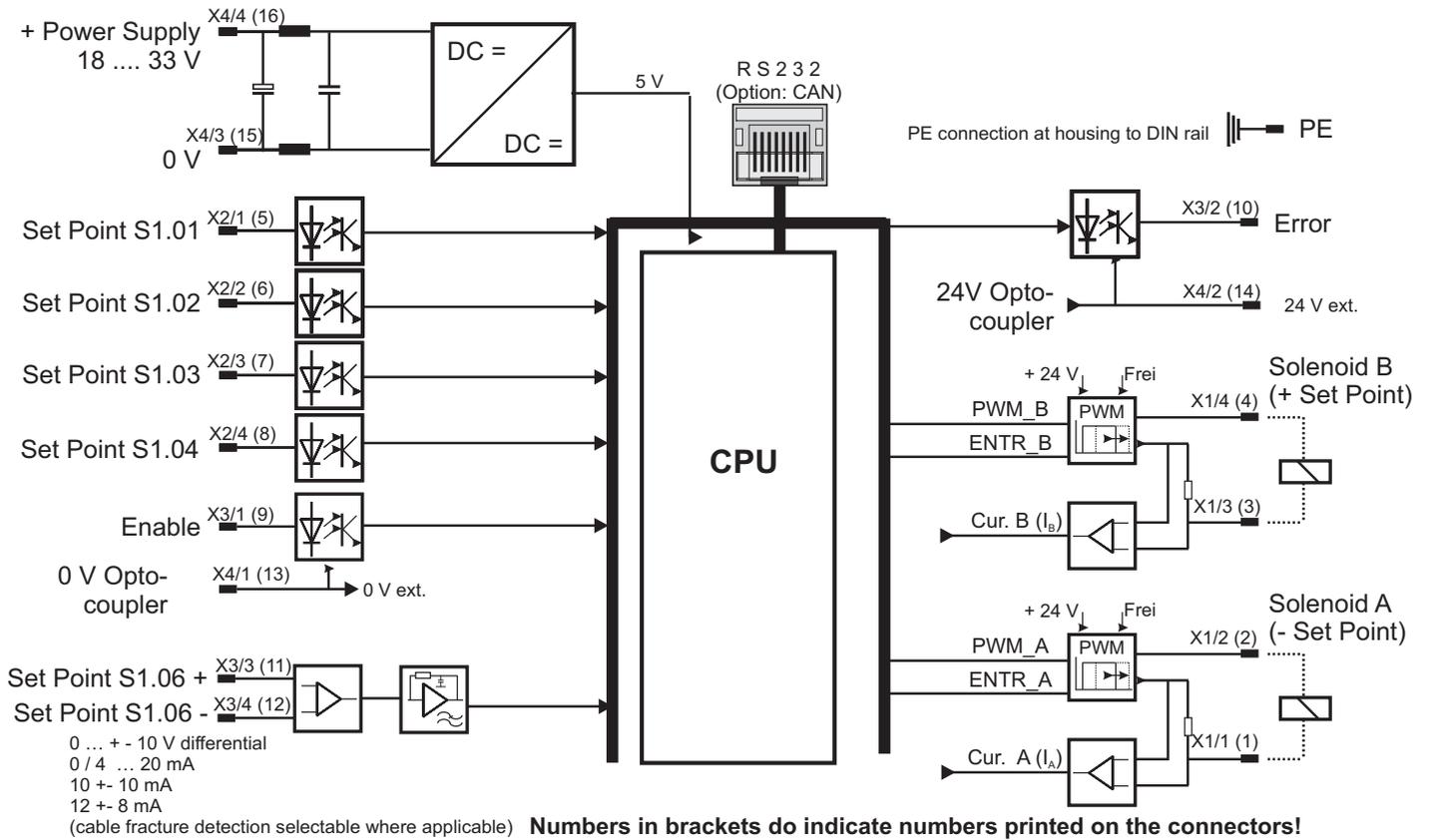
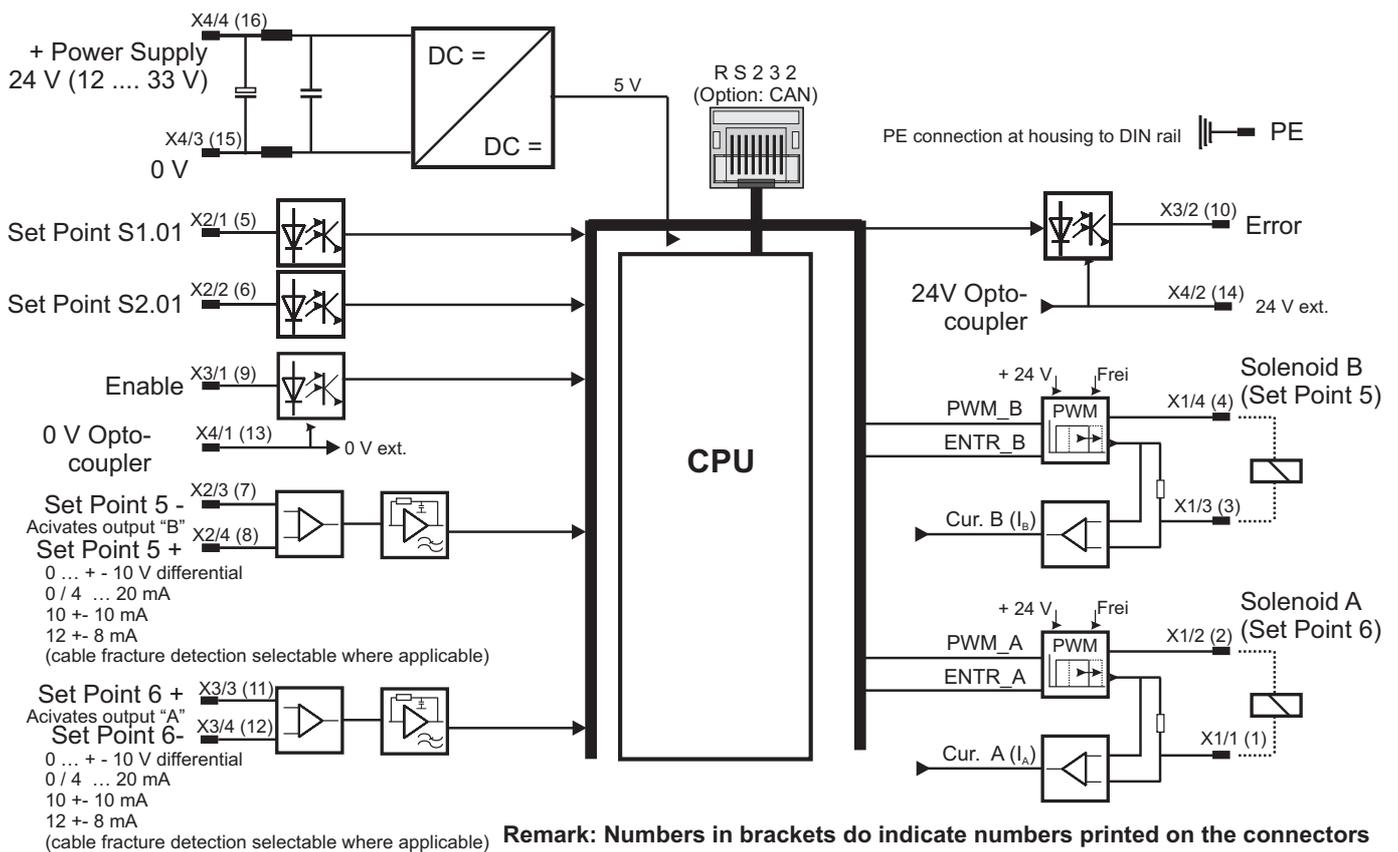
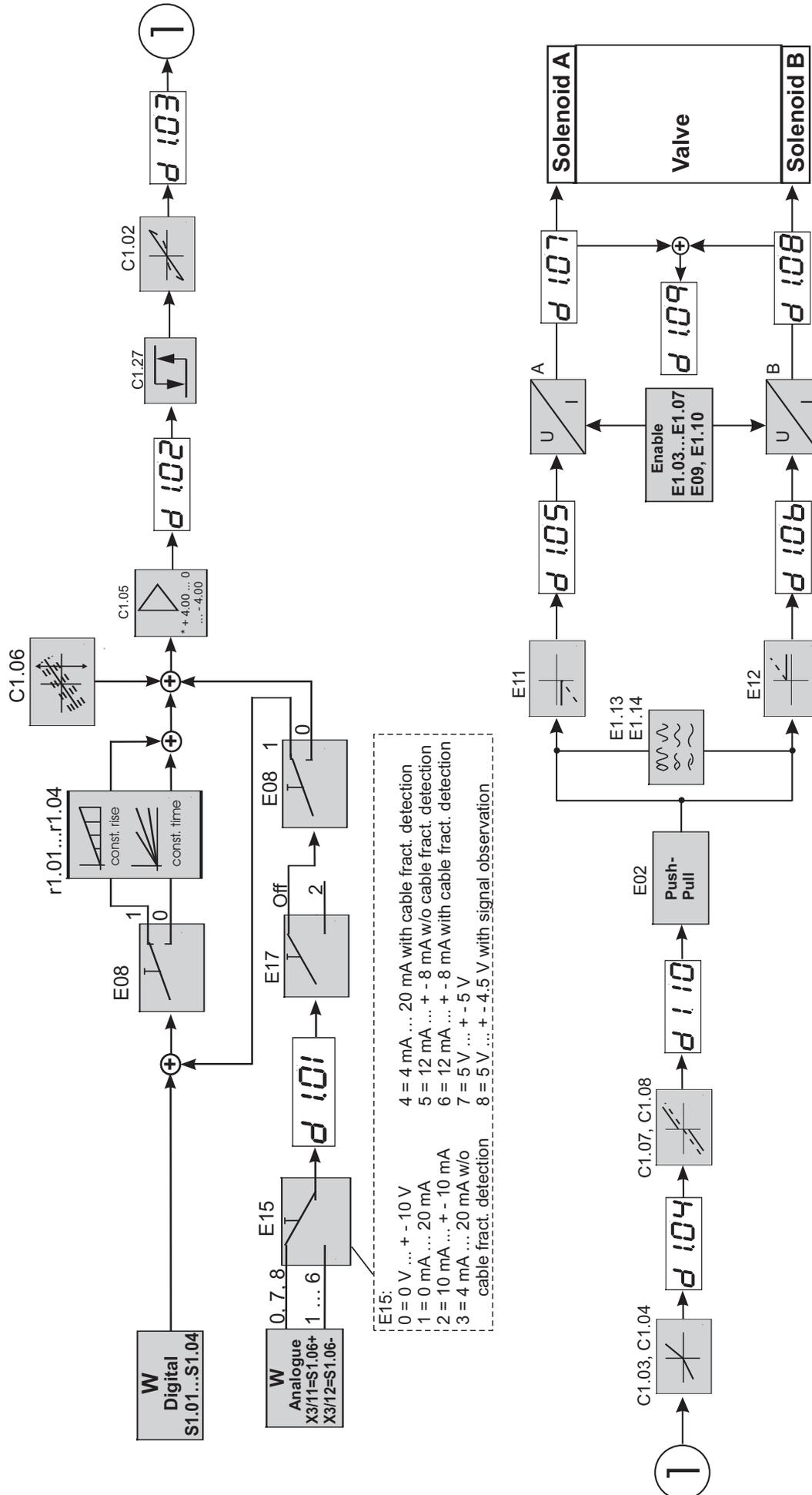


Diagram for version: DMA-22-02-xxx-S0; Operation Mode: 02



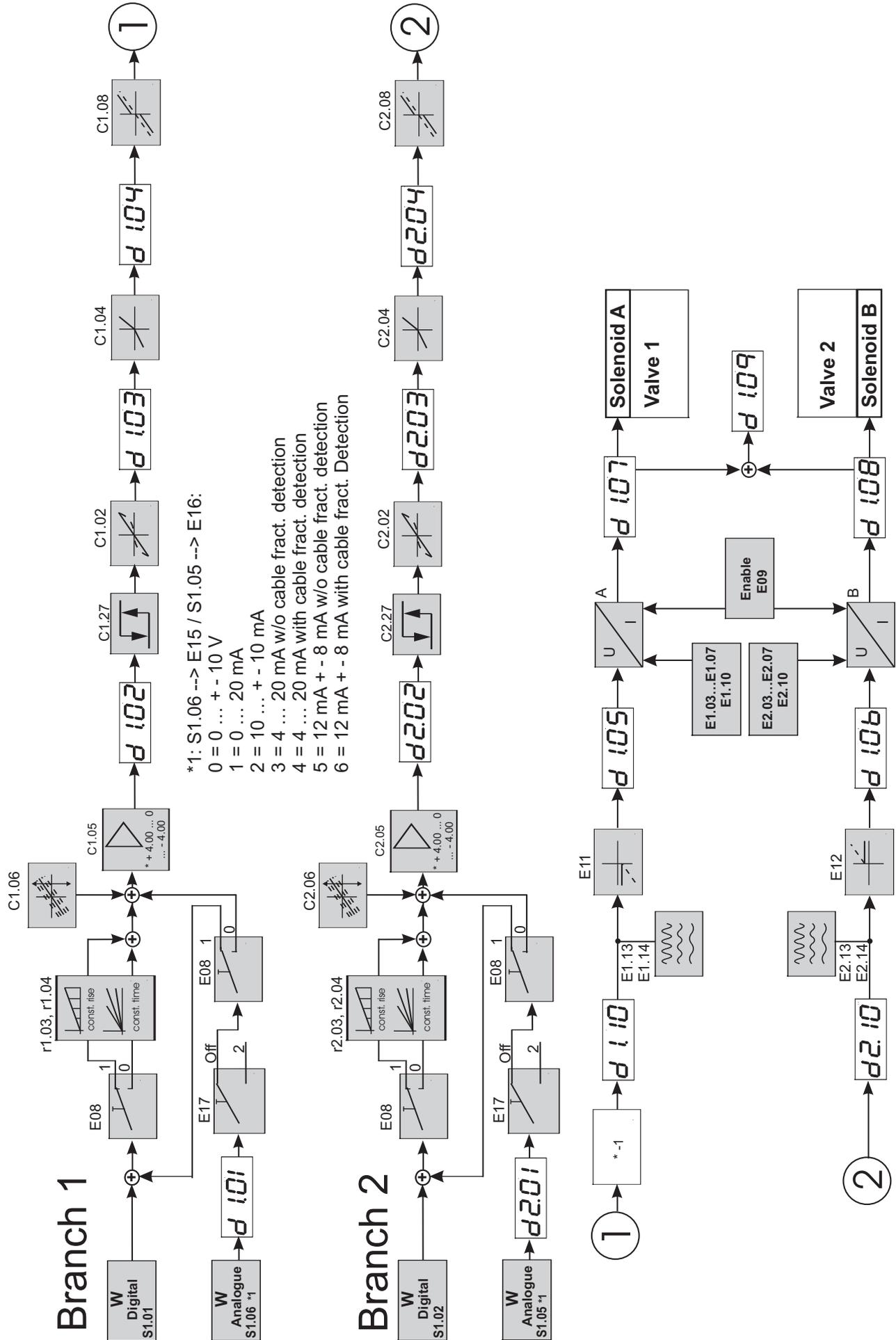
5 Block diagram of software functions

Version: DMA-22-01-xxx-S0 / Operation Mode: 01 ; 1 valve (open loop) with 2 solenoids



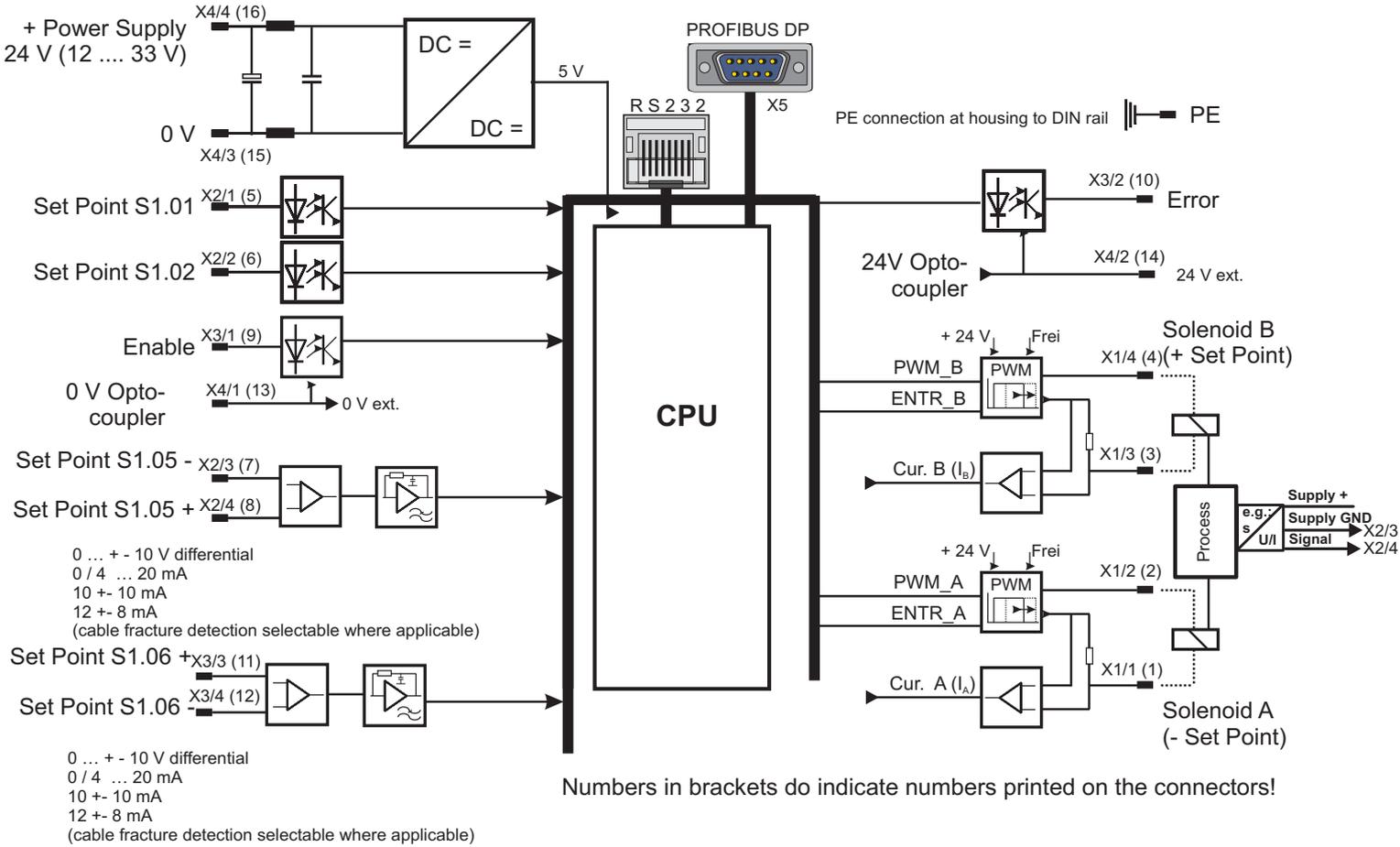
6 Block diagram of software functions

Version: DMA-22-02-xxx-S0 / Operation Mode: 02 ; 2 valves (open loop) with 1 solenoid each



7 DMA-22-02-xxx-PBDP-x-S0: example for Profibus (operation mode **02**)
Single module version

a) Block diagram hardware and terminal configuration:



b) 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

c) Examples single and multi-fold:

DMA-22-04-xxx-PBDP-x-S0:
example for Profibus single module version

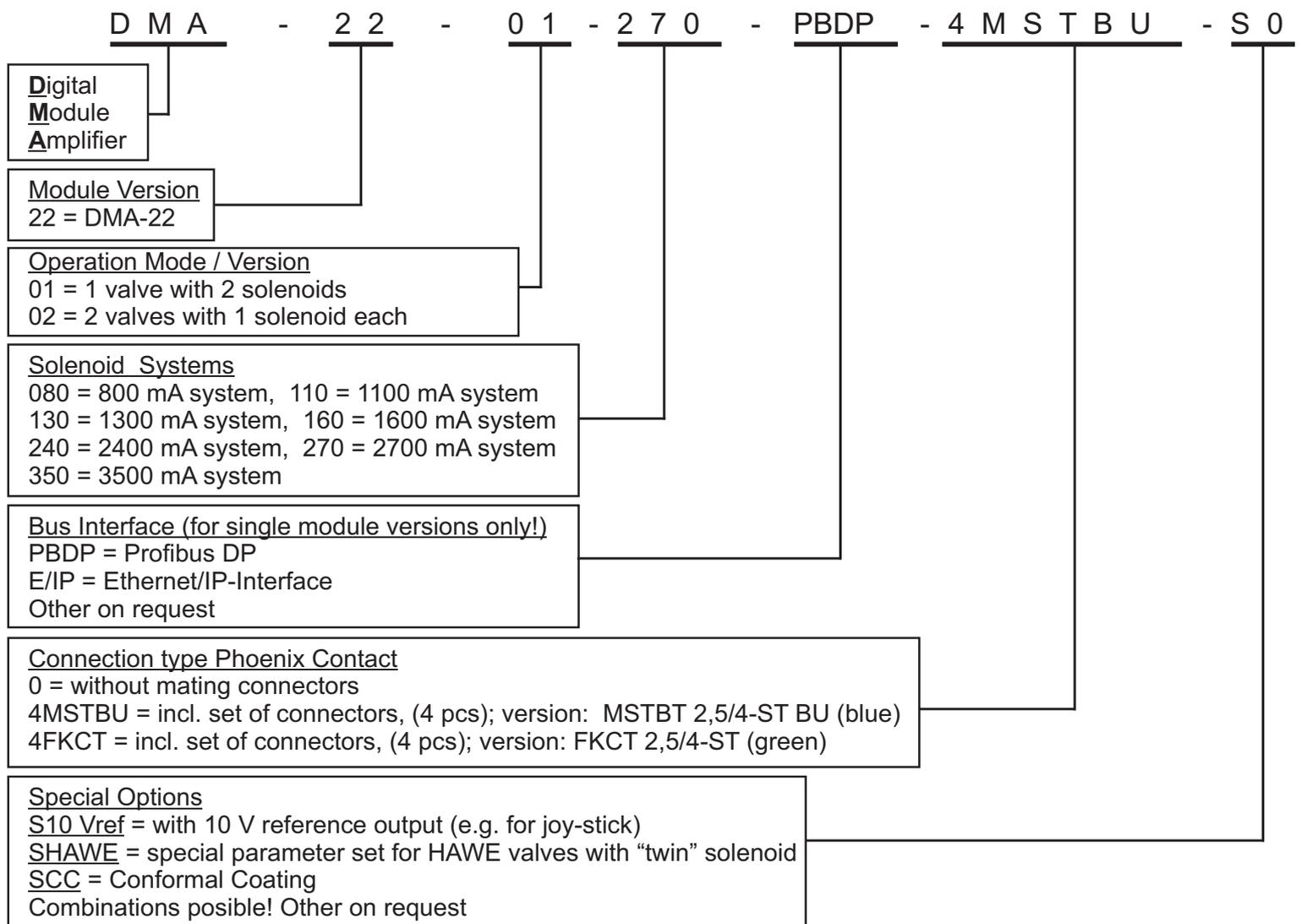
DMA-22-M5-0101010101-PBDP-MSTBU-S36001 :
example for Profibus 5-fold slave configuration



8 Accessories and Options

Name	Description
HCSTool	Software for parameterization, operation, monitoring, storage and documentation of adjustments. In English, French and German on CD.
DMA-2PC	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
	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
CAN/other Bus systems	On request
Vibration/shock protect.	In accordance with EN 60068-2-6 / EN 60068-2-27 for DMA-2 on request
Conformal coating	Conformal coating for DMA-2 on request
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

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



Important note: for ordering of multi-module bus versions refer to according ordering code on page 8

Ordering code examples:

Version for one valve with 2.7 A solenoid;
operation in mode 1, including connectors

Version with Profibus for two valves and 0.8 A
solenoids; operation in mode 2, including connectors

DMA-22-01-270-4MSTBU-S0

DMA-22-02-080-PBDP-4MSTBU-S0

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

D M A - 2 2 - M 3 - 0 1 0 1 0 2 - - P B D P - M S T B U - S x x x x x

D
Digital
M
Module
A
Amplifier

2 2
Module Version
22 = DMA-22

M 3
Number of slave modules
M2= 2 slave modules
M3 = 3 slave modules
M4 = 4 slave modules
M5 = 5 slave modules
other configurations on request

0 1 0 1 0 2
Operation modes of slaves (modules)
01 = 1 valve with 2 solenoids
02 = 2 valves with 1 solenoid each
Define a maximum of up to 5 slaves (modules)

Bus Interface (for single module versions only!)
PBDP = Profibus DP
E/IP = Ethernet/IP-Interface
Other on request

M S T B U
Connection type Phoenix Contact
0 = without mating connectors
MSTBU = including all necessary sets of mating connectors, 4 pieces per slave module. Version: MSTBT 2,5/4-ST BU (blue)
FKCT =including all necessary sets of mating connectors, 4 pieces per slave module. Version: FKCT 2,5/4-ST (green)

S x x x x x
Special part designation number
5 digits
Important note:
If special part designation number is unknown please specify **each** slave module separately by using ordering code from page 6!
See also example below.

Important note: for ordering single multi-module bus versions refer to ordering code on page 7

Ordering code example:

Version with 3 slaves (DMA modules). Each of the 3 slaves (modules) is the same version for valves with two coils each with 2.7 A including the connectors.
Please specify each of the modules.

DMA-22-M3-010102-PBDP-MSTBU-Sxxxxx containing
DMA-22-01-270-x-S0 (module in operation mode 1)
DMA-22-01-270-x-S0 (module in operation mode 1)
DMA-22-02-270-x-S0 (module in operation mode 2)