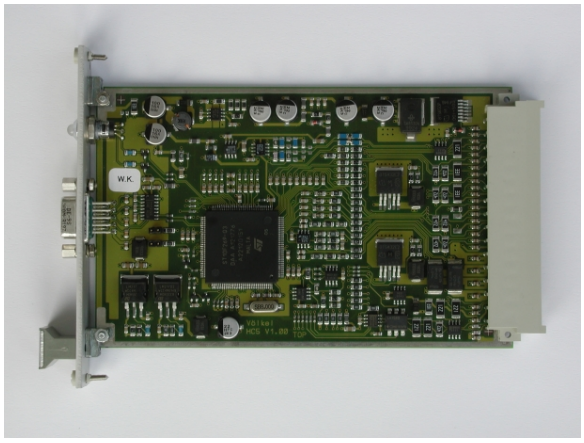
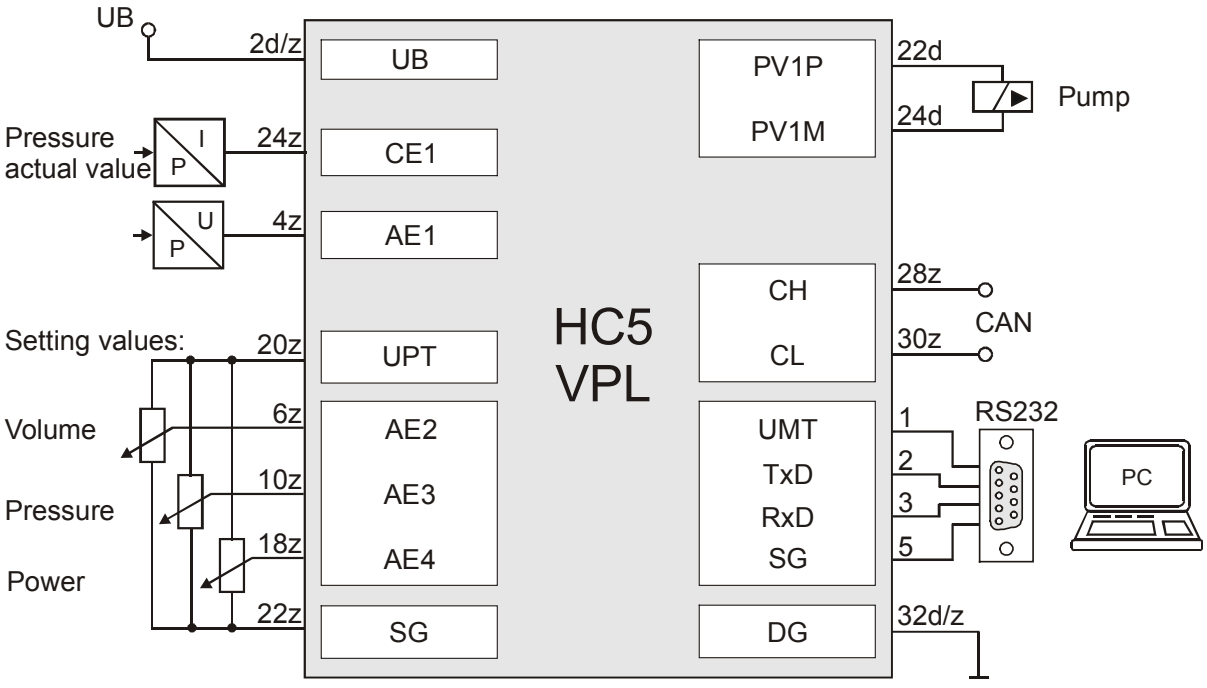
The Volume, Pressure and Power Regulator VPL

The digital regulator VPL for variable displacement pumps controls the operation of hydraulic drive systems and enables optimum economic use of the machines. The VPL regulates the operating variables volume flow and pressure and power output to pre-determined values, dependent on the operating mode. At the same time, the regulation may be applied to all possible combinations of these operating variables. The PC program ConDoc® or the hand terminal MT can be used to set the parameters.



VPL connection diagram



VPL Functions

Setting values

The setting values for the volume, pressure and/or power output are analogue pre-set:

- using a setpoint potentiometer
- using an external 0-10V terminal (e.g. a PLC).

As desired, fixed setting values may also be saved.

Measurement and regulation functions

- Actual valve flow measurement.
- Calculation of the actual power output value from actual pressure and valve flow.
  A pressure sensor is used to record the actual pressure.
- Self-adaptive PIDT1 pressure controller with dynamic adaptation of the proportional factor to the volume flow, i.e. to the respective current operating condition.
- PIDT1 power regulator.
- PI flow controller to regulate the valve flow.
  The correcting variable for the flow controller is calculated from the flow setting value and the correcting variables from the pressure and power output controllers. An additional flow controller monitors the valve flow in order to keep it steady, independent of varying valve parameters (e.g. increased winding resistance when temperatures rise).

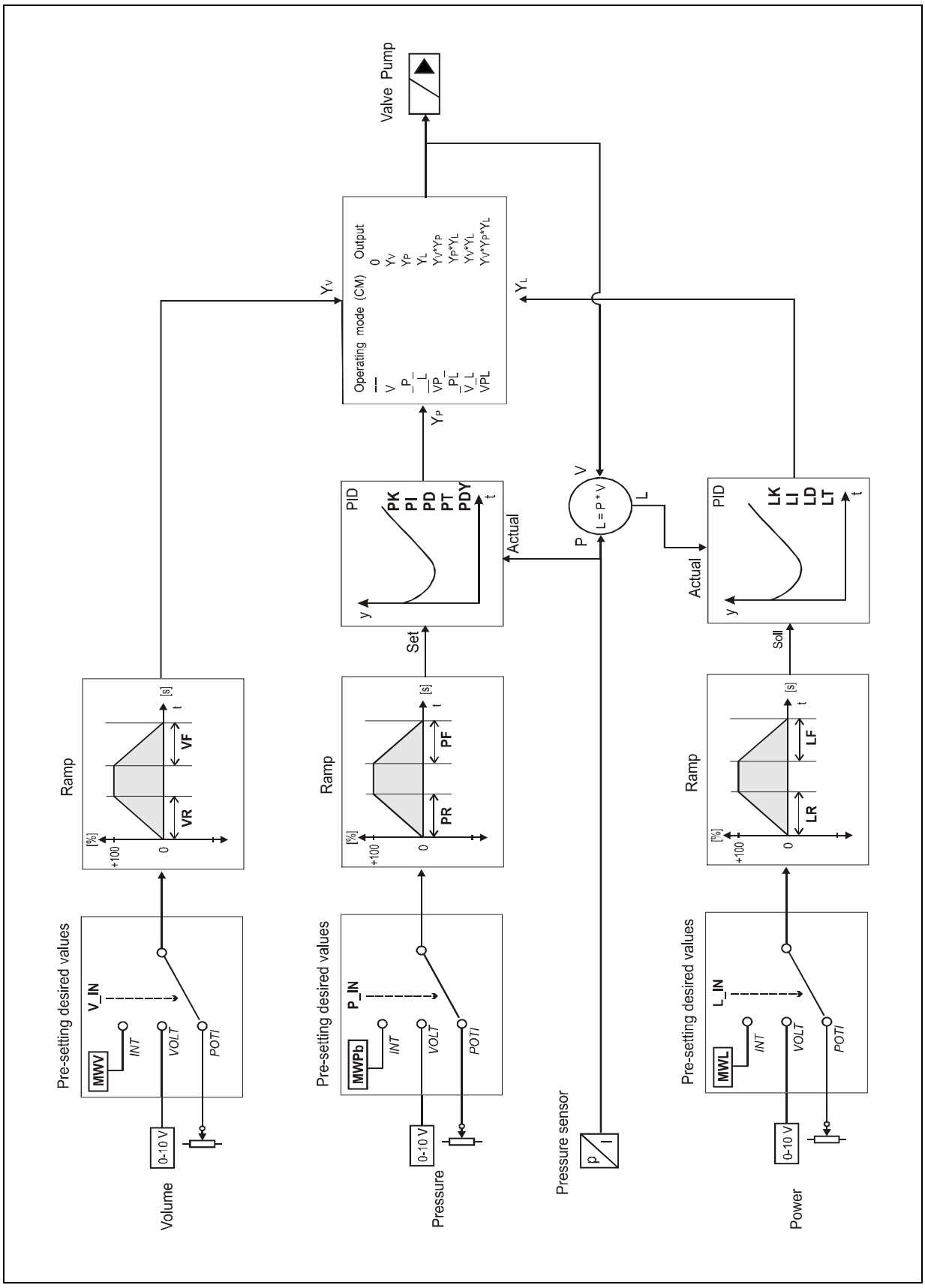
Ramps

- Ramp function for volume, pressure and power setting values with increase and fall times which can be set separately.

Protective function

- Recognition of cable breaks if a 4-20 mA pressure sensor is used.
- Recognition of cable breaks for proportional solenoids.

VPL Function diagram



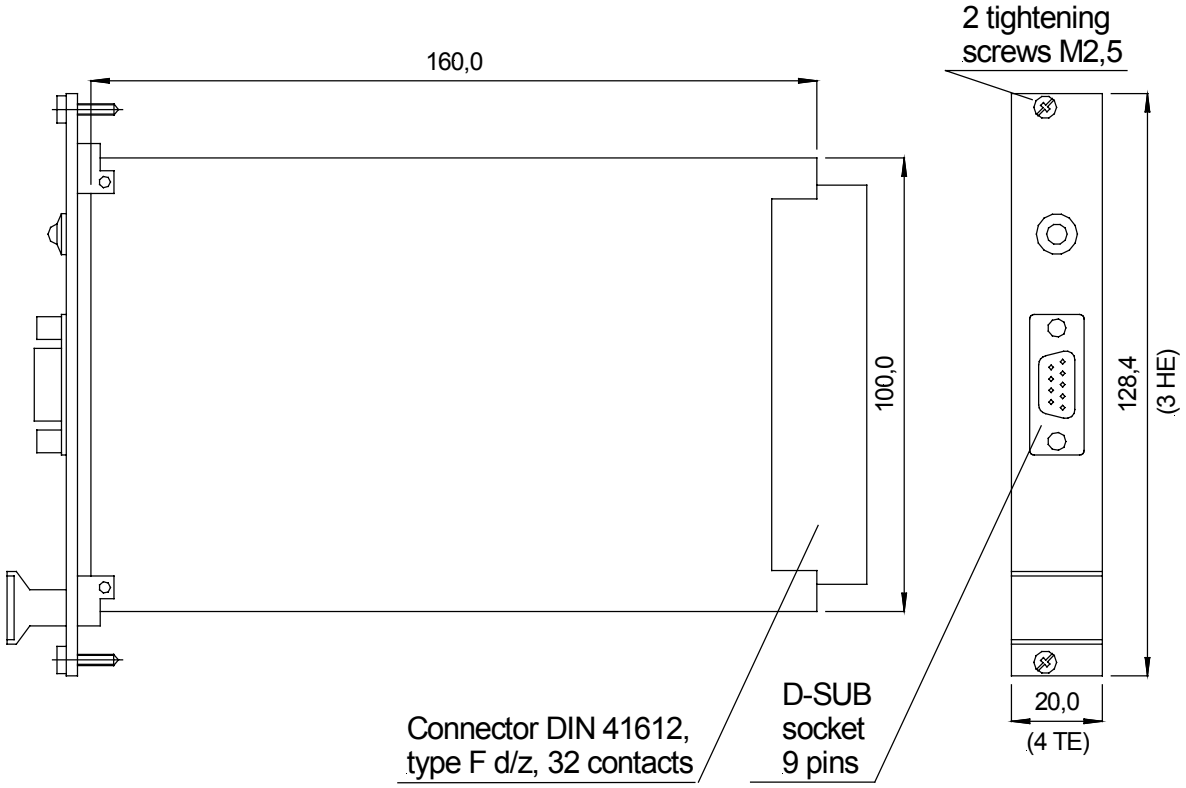
VPL Connectors

	d		z	
UB		2		UB
CE3		4		AE1
SE1		6		AE2
SE2		8		PTP
SE3		10		AE3
SE4		12		PTM
SE5		14		AE5P
SE6		16		AE5M
SE7		18		AE4
SE8		20		UPT
PV1P		22		SG
PV1M		24		CE1
PV2P		26		CE2
PV2M		28		CH
SA1		30		CL
DG		32		DG

VPL Pin configuration

D2/Z2	UB	Supply, plus
D32/Z32	DG	Supply, minus (earth)
Z24	CE1	Current input for pressure sensor 0 (4) –20 mA
Z4	AE1	Voltage input for pressure sensor 0-10V
Z6	AE2	Voltage input for setting value volume (potentiometer, PLC)
Z10	AE3	Voltage input for setting value pressure (potentiometer, PLC)
Z18	AE4	Voltage input for setting value power (potentiometer, PLC)
D22	PV1P	Proportional pump output, plus
D24	PV1M	Proportional pump output, minus
Z20	UPT	8V Output (for potentiometers)
Z22	SG	Signal earth
Z28	CH	CAN wire H
Z30	CL	CAN wire L

VPL Dimensions



VPL Technical data

Dimensions:	160mm x 100mm x 20mm	
Weight:	170g	
Plug connections:	Multiple plug, DIN41612 type F, 32 contacts D sub-socket for RS232, 9 pins	
Power supply:	UB = 12 ... 32V	
Current input:	Approx. 60mA at 24V	
Parameter settings:	Using the hand terminal MT or a PC (RS232)	
Microcontroller:	ST10F269/40 MHz	
Program memory:	256 kByte flash ROM	
Data memory:	12 kByte RAM	
Parameter memory:	64kBit EEPROM	
Interfaces:	RS232, CAN	
Inputs:	4	Analogue inputs, 10 bit, 0 ... 10V, of which one is a potentiometer input, usable for error recognition
	1	Current input 10 Bit, 4 … 20mA measured resistance 220Ω to earth
Outputs:	1	Current supply output, 8V, 50mA maximum for hand terminal MT
	1	Proportional solenoid output, 3A maximum
Safety:	Watchdog microcontroller No terminals with sockets used Reverse pole protection	
Temperature range:	-40 ... 70°C	
EMV:	Industrial application: EN 50081-2 and EN 50082-2; Application in road vehicles: DIN 40839 and guideline 95/54/EG	