

HCE - The Hardware

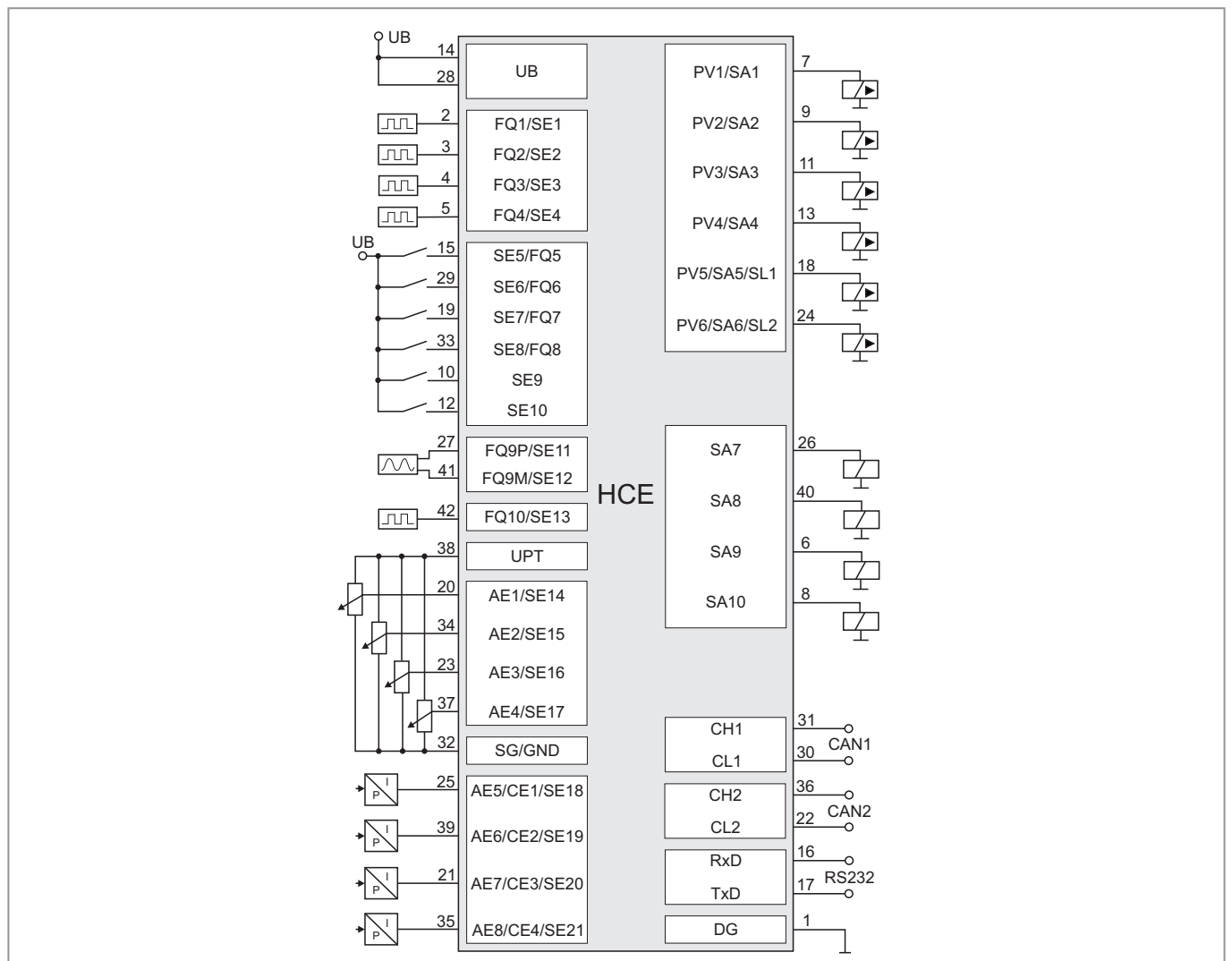
HCE is a universal controller for mobile hydraulic applications. HCE is equipped with two microcontrollers with mutual monitoring and a safety shutdown for the outputs. The serial flash memory (2MB) allows the extensive logging of various machine states.

Specific applications are flexibly configured via software. To customize and enter the individual data the PC program ConDoc - Control & Document® is used.

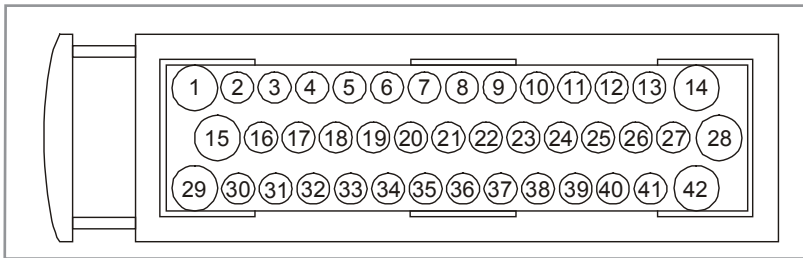
HCE-controllers can be interconnected to form a larger system via the CAN fieldbus. CAN also enables communication with other electronic systems.



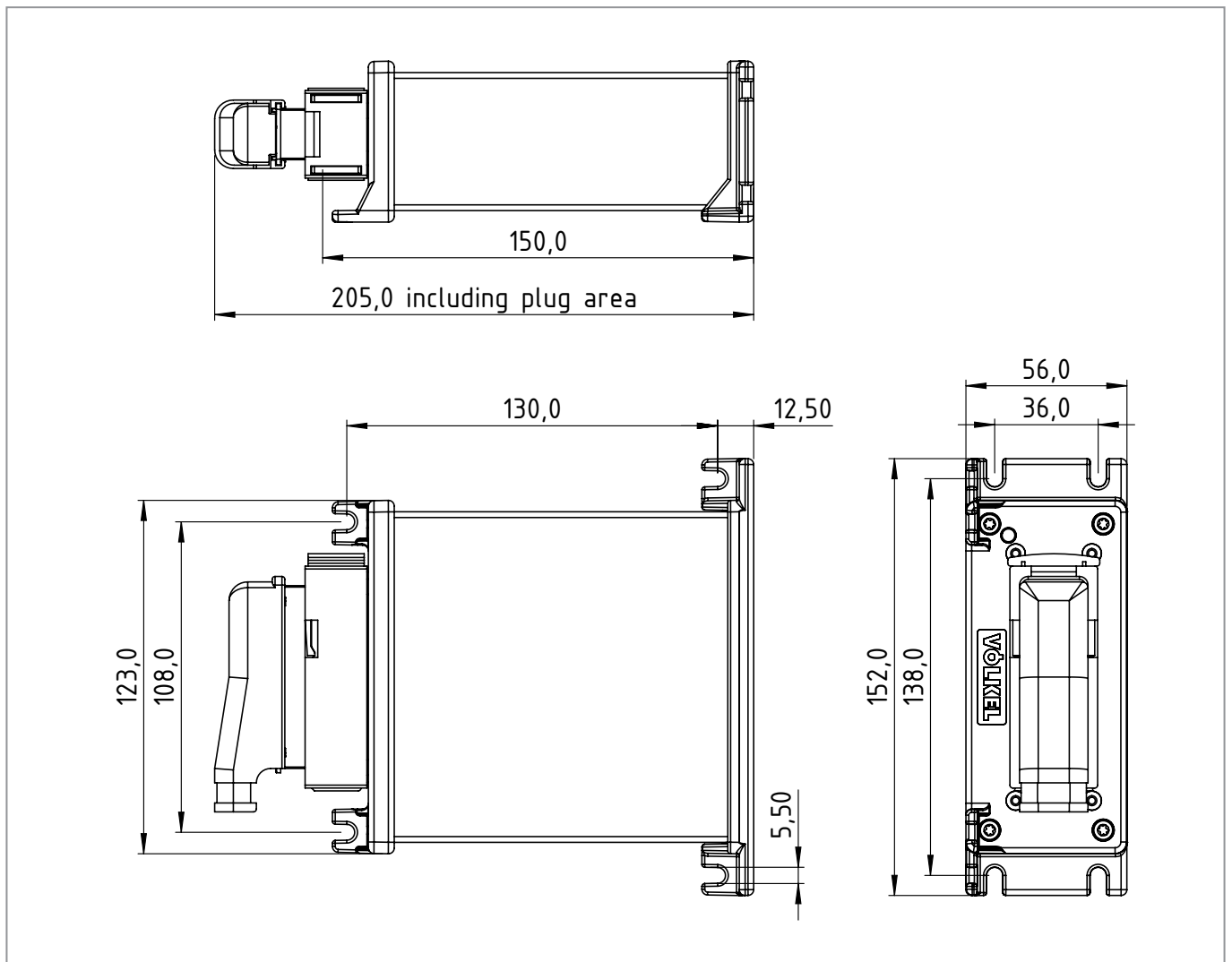
HCE - Connection diagram



HCE - Connector



HCE - Housing dimensions



HCE - Pin assignment

1	DG	Supply, minus (earth)
14	UB	Supply, plus (12V / 24V)
28	UB	Supply, plus (12V / 24V)
2	SE1 / FQ1	Switch input 1 / frequency input 1
3	SE2 / FQ2	Switch input 2 / frequency input 2
4	SE3 / FQ3	Switch input 3 / frequency input 3
5	SE4 / FQ4	Switch input 4 / frequency input 4
15	SE5 / FQ5	Switch input 5 / frequency input 5
29	SE6 / FQ6	Switch input 6 / frequency input 6
19	SE7 / FQ7	Switch input 7 / frequency input 7
33	SE8 / FQ8	Switch input 8 / frequency input 8
10	SE9	Switch input 9
12	SE10	Switch input 10
27	FQ9P / SE11	Switch input 11 / pickup H
41	FQ9M / SE12	Switch input 12 / pickup L
42	FQ10 / SE13	Switch input 13 / clamp W
38	UPT	Output 5V...10V
20	AE1 / SE14	Analogue input 1 (10V) / Switch input 14
34	AE2 / SE15	Analogue input 2 (10V) / Switch input 15
23	AE3 / SE16	Analogue input 3 (10V) / Switch input 16
37	AE4 / SE17	Analogue input 4 (10V) / Switch input 17
32	SG	Signal earth
25	AE5 / CE1 / SE18	Analogue input 5 (5V/10V) / 4 to 20 mA Current input / Switch input 18
39	AE6 / CE2 / SE19	Analogue input 6 (5V/10V) / 4 to 20 mA Current input / Switch input 19
21	AE7 / CE3 / SE20	Analogue input 7 (5V/10V) / 4 to 20 mA Current input / Switch input 20
35	AE8 / CE4 / SE21	Analogue input 8 (5V/10V) / 4 to 20 mA Current input / Switch input 21
7	PV1 / SA1	Proportional output 1 / Switch output 1
9	PV2 / SA2	Proportional output 2 / Switch output 2
11	PV3 / SA3	Proportional output 3 / Switch output 3
13	PV4 / SA4	Proportional output 4 / Switch output 4
18	PV5 / SA5 / SL1	Proportional output 5 / Switch output 5 / Switch Low Side 1
24	PV6 / SA6 / SL2	Proportional output 6 / Switch output 6 / Switch Low Side 2
26	SA7	Switch output 7
40	SA8	Switch output 8
6	SA9	Switch output 9
8	SA10	Switch output 10
31	CH1	CAN1 line H
30	CL1	CAN1 line L
36	CH2	CAN2 line H
22	CL2	CAN2 line L
16	RXD	RS232 receive cable
17	TXD	RS232 send cable

HCE - Technical data

Dimensions	(W/H/D) 152mm x 150mm x 56mm
Housing	Aluminium housing with ventilation membrane Protection category IP69 (DIN EN 60529)
Weight	700g
Plug connections	Multipole connector, 42 contacts, AMP 1-0967280-1
Power supply	UB = 6...32V
Operation temperature	-40...85°C
Current consumption	Approx. 50mA at 24V (plus valve current)
Microcontroller	HCE_01: XC2287 / 80MHz HCE_02: XC2289H / 100MHz XC2287 / 80MHz
Safety microcontroller	ATTINY84
Program memory	HCE_01: 768kByte Flash-EPROM HCE_02: 1600kByte Flash-EPROM
Data memory	HCE_01: 83kByte RAM HCE_02: 138kByte RAM2MB 2MB external serial Flash
Parameter memory	32kByte EEPROM
Inputs	<p>4 Digital switch inputs with switchable 4,1-kΩ pull-down / pull-up resistors. Pairwise adjustable switching thresholds in the range of -2...32V. Suitable as frequency inputs up to 10kHz. Also appropriate for Namur sensors due to 1,3kΩ pull-down which can be additionally connected.</p> <p>6 Digital switch inputs with 4,5kΩ pull-down resistors and switching thresholds in the range of 0...32V, 4 of them usable as frequency inputs up to 4kHz with fixed switching thresholds: U_{on} = ca.2,8V, U_{off} = approx. 1,5V.</p> <p>1 Rotary frequency sensor input pickup, f_{max} = 10kHz, signal level: U_{ss} = 400mV at 1kHz, increasing tolerance with higher frequencies. Alternatively usable as 2 additional digital switch inputs with 3,3 kΩ pull-down resistors and adjustable thresholds in the range of 0...32V.</p> <p>1 Terminal W, frequency input; f_{max} = 2kHz; Switching thresholds: U_{on} = 75% of UB, U_{off} = 25% of UB. 4,4 kΩ resistor to earth. Can also be used as a digital switch input, threshold adjustment range: 0...32V.</p> <p>4 Analogue inputs for voltage range 0...10V with 10-bit resolution and >100kΩ input resistance. Configurable as switch inputs, adjustable thresholds in the range 0...32V und 4,7kΩ pull-down.</p> <p>4 Current inputs, 4...20mA with 220Ω load to earth and 10-bit resolution. Protected against overload. Switchable as analogue inputs with voltage range of 0...5V or 0...10V at 10-bit resolution and >100kΩ input resistance. Also configurable as switch inputs with 4,7kΩ pull-down and adjustable thresholds in the range of 0...32V.</p>

HCE - Technical data

Outputs	<p>6 Proportional solenoid outputs, each for a maximum of 3A. Can be used as switch outputs for a maximum of 3A. 2 of them can be used as a low-side switch for a maximum of 1.5A.</p> <p>4 Switch outputs for a maximum of 4A.</p> <p>1 Power supply output with 5V...10V for Namur sensors and potentiometers up to 400mA load. Output voltage is dependent on the supply voltage.</p> <p>1 Safety switch to shut down jointly the 6 proportional outputs. The safety switch is controlled by the safety microcontroller.</p>
Interfaces	<p>2 x CAN (maximum baud rate: 1Mbit/s)</p> <p>1 x RS232</p>
Safety	<p>Two microcontrollers Mutual monitoring, each with Microcontroller watchdog Double voltage regulation Double cycle generation Safety shutdown of outputs Reverse polarity protection</p>
MTTFd	87 years
EMC	
Road vehicles	Directives 2014/30/EU, UN/ECE-R10
Construction machinery	ISO 10605, ISO 7637-1, ISO 7637-2, ISO 7637-3 DIN EN 13309, ISO 7637-3
Agricultural, forestry vehicles	Directive 2009/64/EC, DIN EN ISO 14982, ISO 7637-3
Industrial use	DIN EN 61000 6-2, DIN EN 61000 6-4
Mechanical strength, Climatic resistance	<p>Cold: IEC 60068-2-1</p> <p>Dry heat: IEC 60068-2-2</p> <p>Vibrations: IEC 60068-2-6</p> <p>Change of temperature: IEC 60068-2-14</p> <p>Shock: IEC 60068-2-27</p> <p>Bump: IEC 60068-2-27</p> <p>Damp heat: IEC 60068-2-30</p> <p>Rough handling shocks: IEC 60068-2-31</p>

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