

Multi-axis controller V85 / VV85



The multi-axis controller V85/VV85 is available in either single-axis or multi-axis options and is a robust controller used commonly in electro-hydraulic applications. With many output options including voltage, amperage and switching contacts and many handle options the V85/VV85 series is flexible and customisable. The V85/VV85 is resistant to oil, maritime conditions e.g. offshore / vessels, UV radiation typically from the sun.



1

Technical data

Mechanical life V85	10 million operating cycles
Mechanical life VV85	20 million operating cycles
Supply voltage	See interface
Operation temperature	-40°C to +85°C
Degree of protection	up to IP67
Functional safety	PLd (EN ISO 13849) possible

		VV85	S8	P	T	-Z80	+R11	-B	-E...	-S...	-X
Basic unit											
V85.1	1-axis										
V85	2-axis										
Reinforced version											
VV85.1	1-axis										
VV85	2-axis										
Control-handle extended											
	Standard 160 mm*										
S5	-20 mm										
S8	+20 mm										
*Only available in combination with grip!											
Gate											
P	Cross gate										
P X	Special gate										
Grip / palm grip											
	Knob (included in basic unit!)										
M	Knob with mechanical zero interlock										
T	Dead man										
H	Signal button										
D	Push button										
B...	Palm grip B... (see page palm grip 157)										

Technical details may vary based on configuration or application! Technical data subject to change without notice!

VV85 S8 P T -Z80 +R11 -B -E... -S... -X

Axis 1 / Axis 2 (not applied for V/VV85.1)

Z	Spring return
R	Friction brake*
	Latching:*
11	1-0-1
22	2-0-2
33	3-0-3
44	4-0-4
55	5-0-5
08	end-position latching SR2 or SR4
19	1-0-1 + end-position latching SR2 or SR4
80	end-position latching SR1 or SR3
91	1-0-1 + end-position latching SR1 or SR3
88	end-position latching SR1 + SR2 or SR3 + SR4
99	1-0-1 + end-position latching SR1 + SR2 or SR3 + SR4

*Maximum deflection angle +/- 25 degree!

Degree of protection

B	Cover housing (included in basic unit!)
B10	Joystick-main board sealed (IP67)
B11	Joystick-main board sealed (IP67) and handle function sealed, handle with drain hole

For a schematic description of the protection class, see page 139

Interface (description see on the following pages)

E0xx	Switching output
E1xx	Voltage output
E2xx	Current output
E3xx	CAN-interface
E4xx	CANOpen safety interface
E5xx	Profibus DP-interface
E6xx	Profinet
E7xx	Profinet safe
E8xx	PWM - Output
E9xx	other outputs

Plug connectors

S..	Standard plug connectors (see page 138)
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Special model

X	Special / customer specified
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Combination possibilities with our handles

B1  p. 185	B2  p. 187	B3  p. 161	B5  p. 189	B6  p. 191	B7 B8  p. 182	B9  p. 180	B10  p. 197	B14 B15  p. 199
B20  p. 174	B22  p. 176	B23  p. 172	B24  p. 178	B25  p. 157	B28  p. 193	B29  p. 195	B30  p. 159	B31  p. 164
B32  p. 166	B33  p. 168	B34  p. 170						

Digital output

Supply voltage	9-32 V DC	
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA	
Mounting depth A	65 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)	
		S
2 Direction signals + 1 zero position signal (galvanically isolated) per axis		
	1 axis	E001 1
	2 axis	2

Voltage output (not stabilized)

Supply voltage	4,75-5,25 V DC	
Current carrying capacity	Direction signal 8 mA	
Mounting depth A	65 mm	
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)	
		S
0,5...2,5...4,5 V redundant + 2 direction signals per axis		
	1 axis	E104 1
	2 axis	2
	Output options	
	Characteristic:	
	Inverse dual	1
	Dual	2
	Inverse dual with dead zone +/- 3° (standard)	3
	Dual with dead zone +/- 3°	4

Voltage output	
Supply voltage	9-32 V DC (*11,5-32)
Current carrying capacity	Direction signal 150 mA
	Zero position signal 500 mA
Mounting depth A	65 mm
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector
	2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector
Optional with plug connector (<i>standard plug connectors see page 138</i>)	
0,5...2,5...4,5 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis	
	1 axis E112 1
	2 axis 2
	3 axis* 3
	4 axis* 4
0...5...10 V redundant + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC	
	1 axis E132 1
	2 axis 2
	3 axis* 3
	4 axis* 4
10...0...10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, sensor redundant with error monitoring and error signal	
	1 axis E136 1
	2 axis 2
	3 axis* 3
	4 axis* 4
+10...0...-10 V + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, supply voltage 11,5 - 32 V DC, redundant sensor with error monitoring	
	1 axis E138 1
	2 axis 2
	3 axis* 3
	4 axis* 4
Output options	
Characteristic:	
Inverse dual *1	1
Dual *1	2
Inverse dual with dead zone +/- 3° *1 (standard)	3
Dual with dead zone +/- 3° *1	4
*1 not combinable with output E136X + E138X	
Single *2	5
Single with dead zone *2 (standard)	6
*2 not combinable with output E112X and E132X	
Digital output signals:	
Output signals standard:	
Direction signals and zero position signals 1,5A 24V DC	1

*Axis for handle functions, interface can vary depending upon actuation element!

Voltage output with other value on request!

Current output	
Supply voltage	9-32 V DC
Current carrying capacity	Direction signal 150 mA Zero position signal 500 mA
Mounting depth A	65 mm
Wiring	1. cable 14 x 0,25 mm ² 500 mm long without plug connector 2. cable 14 x 0,25 mm ² (optional for grip function) 500 mm long without plug connector Optional with plug connector (<i>standard plug connectors see page 138</i>)
0...10...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal	
	1 axis E206 1 2 axis 2 3 axis* 3 4 axis* 4
20...0...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal	
	1 axis E208 1 2 axis 2 3 axis* 3 4 axis* 4
4...12...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal	
	1 axis E214 1 2 axis 2 3 axis* 3 4 axis* 4
20...4...20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring and error signal	
	1 axis E216 1 2 axis 2 3 axis* 3 4 axis* 4
+20...0...-20 mA + 2 direction signals + 1 zero position signal (galvanically isolated) per axis, sensor redundant with error monitoring	
	1 axis E226 1 2 axis 2 3 axis* 3 4 axis* 4
Output options	
	Single 5
	Single with dead zone +/- 3° (standard) 6
Digital output signals:	
Output signals standard:	
	Direction signals and zero position signals 1,5A 24 V DC 1
*Axis for handle functions, interface can vary depending upon actuation element! Current output with other value on request!	

CAN		
Supply voltage	9-32 V DC	
Idle current consumption	120 mA (24 V DC)	
Current carrying capacity	Direction signal 100 mA	
	Zero position signal 100 mA (potential-free)	
	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs)	
	Digital switching output (potential-free) 100 mA	
Mounting depth A	E3091: 65 mm	
	E3091X: 85 mm	
	E3101X - E3103X: 85 mm	
	E3104X - E3105X: 105 mm	
Protocol	CANopen CiA DS 301 or SAE J1939	
Baud rate	20 kBit/s to 1 Mbit/s (standard 250 kBit/s)	
Output value	255...0...255	
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)	
	CAN (OUT) cable 300 mm with plug connector M12 (female)	
	External in-/outputs cable 300 mm long without plug connector	
	External in-/outputs cable 300 mm long without plug connector (additionally from 32 in-/outputs)	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
CAN Expansion stage 1		E309 1
- 7 analog joystick axis		
- 16 digital joystick functions		
- Input for capacitive sensor		
With additional external in-/outputs		
- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs		2
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs		3
<i>External LED-outputs can be used in the grip for LEDs</i>		
<i>*With the use of capacitive sensor, the external digital inputs reduce by one input!</i>		
CAN Expansion stage 2		E310 1
- 10 analog joystick axis		
- 16 digital joystick functions		
- 2 inputs for capacitive sensors		
With additional external in-/outputs		
- 8 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs		2
- 16 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs		3
- 24 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs		4
- 32 external LED-outputs (dimmable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs		5
<i>External LED-outputs can be used in the grip for LEDs</i>		
<i>*With the use of two capacitive sensors, the external digital inputs reduce by one input!</i>		
Main-axis with additional digital-/analog outputs separately wired (not via CAN)		
- 2 direction signals + 1 zero position signal (potential-free) per main-axis		3
<i>Additional analog outputs on request!</i>		

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CANopen safety		
Supply voltage	9-32 V DC	
Idle current consumption	120 mA (24 V DC)	
Current carrying capacity	Direction signal 100 mA	
	Zero position signal 100 mA (potential-free)	
	External digital output for LEDs 5 mA - 30 mA (dependent on the number of LEDs)	
	Digital switching output (potential-free) 100 mA	
Mounting depth A	E4091: 65 mm	
	E4091X: 85 mm	
	E4101X - E4103X: 85 mm	
	E4104X - E4105X: 105 mm	
Protocol	CANopen Safety CIA 304	
Baud rate	20 kBit/s to 1 MBit/s (standard 250 kBit/s)	
Output value	255...0...255	
Wiring	CAN (IN) cable 300 mm with plug connector M12 (male)	
	CAN (OUT) cable 300 mm with plug connector M12 (female)	
	External in-/outputs cable 300 mm long without plug connector	
	External in-/outputs cable 300 mm long without plug connector (additionally from 32 in-/outputs)	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S
CANopen safety expansion stage 1		E409 1
- 7 analog joystick axis		
- 16 digital joystick functions		
- Input for capacitive sensor		
With additional external in-/outputs		
- 8 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs		2
- 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16* external digital inputs		3
*external LED-outputs can be used in the grip for LEDs		
*With the use of capacitive sensor, the external digital inputs reduce by one input!		
CANopen safety expansion stage 2		E410 1
- 10 analog joystick axis		
- 16 digital joystick functions		
- 2 inputs for capacitive sensors		
With additional external in-/outputs		
- 8 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 8 external digital inputs		2
- 16 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 16 external digital inputs		3
- 24 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 24 external digital inputs		4
- 32 external LED-outputs (dimnable optional), 1 switching output (potential-free, 100 mA), 32* external digital inputs		5
External LED-outputs can be used in the grip for LEDs		
*With the use of two capacitive sensors, the external digital inputs reduce by one input!		
Main-axis with additional digital outputs separately wired (not via CAN)		
- 2 direction signals + 1 zero position signal (potential-free) per main-axis		3
Additional analog outputs on request!		

Profibus DP

Supply voltage	18-30 V DC	
Baud rate	to 12 MBit/s	
Output value	0...128...255	
Mounting depth A	105 mm	
Wiring	Profibus, cable 100 mm with plug connector D-Sub 9	
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector	
	External in-/outputs, cable 300 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S

Profibus DP

- 4 analog joystick axis		E501 1	
- 16 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
- 16 external LED-outputs, 16 external digital inputs		3	
<i>*External LED-outputs can be used in the grip for LEDs</i>			
Main-axis with additional contact equipment separately wired (not via profibus)			
- 2 direction contacts + 1 zero position contact (not potential-free) per main-axis			1
- 1 zero position contact (potential-free) per main-axis			2

Profinet

Supply voltage	18-30 V DC	
Baud rate	to 100 MBit/s	
Output value	0...512...1023	
Mounting depth A	85 mm	
Wiring	Profinet (1), cable 300 mm with M12 plug connector (female)	
	Profinet (2), cable 300 mm with M12 plug connector (female)	
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector	
	External in-/outputs, cable 300 mm long without plug connector	
	Optional with plug connector (<i>standard plug connectors see page 138</i>)	S

Profinet

- 4 analog joystick axis		E601 1	
- 16 digital joystick functions			
- Input for capacitive sensor			
With with additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
- 16 external LED-outputs, 16 external digital inputs		3	
<i>*External LED-outputs can be used in the grip for LEDs</i>			
Main-axis with additional signals separately wired (not via profinet)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

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Profinet safe			
Supply voltage	18-30 V DC		
Baud rate	to 100 MBit/s		
Output value	0...512...1023		
Mounting depth A	85 mm		
Wiring	Profinet (IN), cable 300 mm with M12 plug connector (female)		
	Profinet (OUT), cable 300 mm with M12 plug connector (female)		
	Supply voltage (if applicable contact wiring) cable 12 x 0,25 mm ² 300 mm long without plug connector		
	External in-/outputs, cable 300 mm long without plug connector		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
- 4 analog joystick axis		E701 1	
- 16 digital joystick functions			
- Input for capacitive sensor			
With additional external in-/outputs			
- 8 external LED-outputs, 8 external digital inputs		2	
- 16 external LED-outputs, 16 external digital inputs		3	
<i>*External LED-outputs can be used in the grip for LEDs</i>			
Main-axis with additional signals separately wired (not via profinet safe)			
- 2 direction signals + zero position signal (potential-free) per main-axis			3

PWM Outputs			
Supply Voltage:	9-32V DC		
Valve control current:	max. 3 A		
PWM-frequency:	1225 Hz		
Dither frequency:	1...250 Hz adjustable		
Mounting depth A	85 mm		
Other features	Creep speed per axis		
	5 configurable switching outputs 2A		
	LED outputs for status indication		
	Input for redundant deadman		
Wiring:	Built-in socket Phoenix 2-pole (power supply)		
	Cable 1 (PWM) 12 x 1mm ² 300 mm long without plug		
	Cable 2 (switching output) 12 x 1mm ² 300 mm long without plug		
	Cable 3 (creep speed / dead man) 14x0,25mm ² 300mm long without plug		
	Optional with plug connector (<i>standard plug connectors see page 138</i>)		S
PWM Output 0-3 A for 2 proportional valve magnets per axis	1 axis	E801 1	
	2 axis	2	
	3 axis	3	
	4 axis	4	

Other outputs

Voltage output for PVG32 0,25...0,5...0,75Us, power supply 9-32 V DC

- Wiring:
1. cable 14 x 0,25 mm² 300 mm long without plug connector
 2. cable 14 x 0,25 mm² 300 mm long without plug connector (optional for grip function)

Optional with plug connector (*standard plug connectors see page 138*)

S

1 axis	E907 1
2 axis	2
3 axis	3
4 axis	4
5 axis	5
6 axis	6

Main-axis with additional direction signals and zero direction signals (potential-free) per main-axis

3

8 Bit Gray-Code with direction signals per main-axis, supply voltage 9-36 V DC

- Wiring:
1. cable 37 x 0,14 mm² 300 mm long without plug connector (axis 1+2)
 2. cable 37 x 0,14 mm² 300 mm long without plug connector (optional for axis 3+4)

Optional with plug connector (*standard plug connectors see page 138*)

S

1 axis	E903 1
2 axis	2
3 axis	3
4 axis	4

8 Bit Binär-Code with direction signals per main-axis, supply voltage 9-36 V DC

- Wiring:
1. cable 37 x 0,14 mm² 300 mm long without plug connector (axis 1+2)
 2. cable 37 x 0,14 mm² 300 mm long without plug connector (optional for axis 3+4)

Optional with plug connector (*standard plug connectors see page 138*)

S

1 axis	E904 1
2 axis	2
3 axis	3
4 axis	4

Attachments

Z01	Mating connector (CAN) M12 (male insert) with 2 m cable	20201140
Z02	Mating connector (CAN) M12 (female contact) with 2 m cable	20202298
Z03	Mating connector (Profibus) straight	22201440
Z04	Mating connector (Profibus) 90° angled	22201741
Z05	Mating connector (Profinet) M12 (male insert) with 2 m cable	530000222

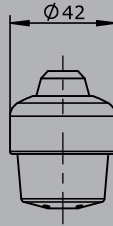
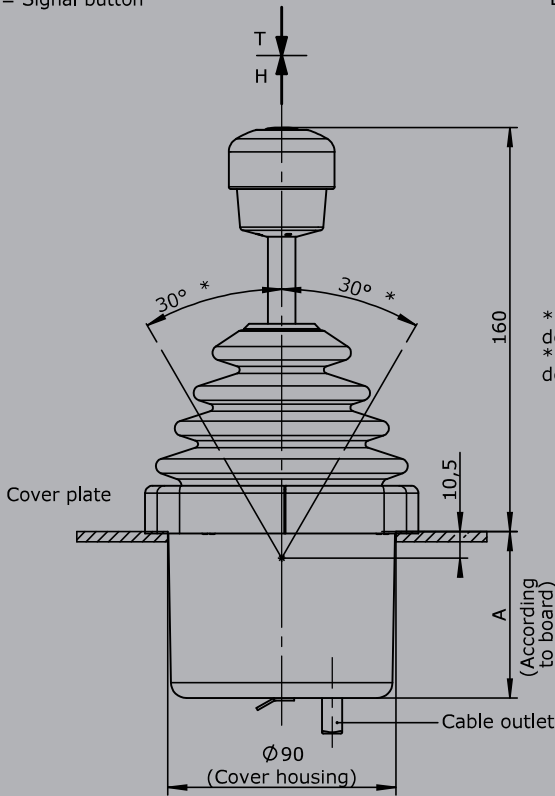
1

T = Dead man's button
H = Signal button

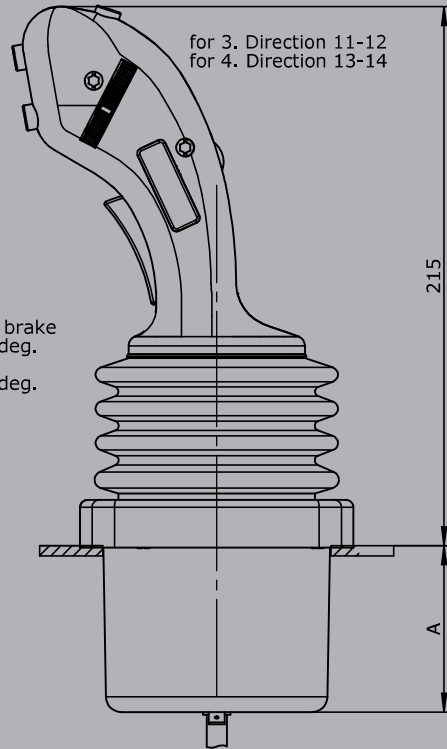
Knob solid
D= Push button

Palm grip B3

for 3. Direction 11-12
for 4. Direction 13-14



* Type with friction brake
deflection max. 25 deg.
* Type with detent
deflection max. 25 deg.



Palm grip B25

