

1.2.2 System components

HCS01 drive controllers

Type code

Short type designation	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	4		
Example:	H	C	S	0	1	.	1	E	-	W	0	0	1	3	-	A	-	0	2	-	E	-	S	3	-	E	C	-	N	N	-	N	N	-	N	N	-	N	N	-	F	W	
	①	②				③	④			⑤			⑥					⑦		⑧		⑨			⑩		⑪		⑫		⑬		⑭		⑮								
①	Product: HCS = HCS																																										
②	Series: 01 = 01																																										
③	Design: 1 = 1																																										
④	Power supply unit: E = Feeding																																										
⑤	Cooling type: W = Air, internal																																										
⑥	Maximum current ¹⁾: 0003 = 3 A 0005 = 5 A 0006 = 6 A 0008 = 8 A 0009 = 9 A 0013 = 13 A 0018 = 18 A 0028 = 28 A 0054 = 54 A																																										
⑦	Degree of protection: A = IP20																																										
⑧	Mains connection voltage ¹⁾: 02 = 3 × AC 110 ... 230 V 03 = 3 × AC 200 ... 500 V																																										
⑨	Control section design ²⁾: A = ADVANCED B = BASIC E = ECONOMY																																										
⑩	Communication ²⁾: S3 = Sercos / EtherCAT CC = Sercos master (cross communication) ET = Multi-Ethernet																																										

Short type designation	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	4		
Example:	H	C	S	0	1	.	1	E	-	W	0	0	1	3	-	A	-	0	2	-	E	-	S	3	-	E	C	-	N	N	-	N	N	-	N	N	-	N	N	-	F	W	
	①	②		③	④		⑤			⑥			⑦		⑧		⑨		⑩		⑪		⑫		⑬		⑭		⑮														
⑪	Interface 1: EC = Multi-encoder interface																																										
⑫	Interface 2 ²⁾: CN = CANopen DA = Digital/analog I/O extension EC = Multi-encoder interface EP = Engineering port EM = Encoder emulation ET = Multi-Ethernet NN = Not equipped PB = PROFIBUS																																										
⑬	Interface 3 ^{2) 3)}: L3 = STO (Safe Torque Off) L4 = STO (Safe Torque Off) and SBC (Safe Brake Control) NN = Not equipped S4 = Safe Motion S5 = Safe Motion SB = Safe Motion Bus																																										
⑭	Other design: NN = None																																										
⑮	Firmware ⁴⁾: AW = With Advanced control panel, firmware has to be ordered separately FW = With Standard control panel, firmware has to be ordered separately																																										

- 1)

See table "Possible combinations of maximum current and mains connection voltage"
- 2)

See table "Possible combinations of options"
- 3)

The L3, S4, S5 and SB interfaces guarantee both the function and the certification
- 4)

See table "Availability of control section and control panel"
- Tab. 1-6:

HCS01 type code

Possible combinations of maximum current and mains connection voltage:

Mains connection voltage [V]	Maximum current [A]								
	3	5	6	8	9	13	18	28	54
3 × AC 110 ... 230	✓	–	✓	–	✓	✓	✓	–	–
3 × AC 200 ... 500	–	✓	–	✓	–	–	✓	✓	✓

Tab. 1-7: Possible combinations of maximum current and mains connection voltage

Possible combinations of options:

Maximum current	Control section Communication	Interface 2								Interface 3					
		CN	DA	EC	EM	EP	ET	NN	PB	L3	L4	NN	S4	S5	SB
All	A-CC	✓	–	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
		–	✓	–	–	–	–	–	–	–	–	✓	–	–	–
	A-ET	–	–	✓	✓	–	–	✓	–	✓	✓	✓	✓	✓	✓
		–	✓	–	–	–	–	–	–	–	–	✓	–	–	–
	B-ET	✓	–	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	✓
		–	✓	–	–	–	–	–	–	–	–	✓	–	–	–
	E-S3	–	–	–	–	✓	–	✓	–	✓	✓	✓	–	–	–
		–	–	–	–	–	–	–	–	–	–	–	–	–	–

Tab. 1-8: Possible combinations of options

Availability of control section and control panel:

Control section	Firmware	Control panel	Information
A	FW	HAP01.1A-018-NN-FW	always equipped
B	FW	HAP01.1N-018-NN-FW	preferred option
B	AW	HAP01.1A-018-NN-FW	alternative option
E	FW	HAP01.1N-018-NN-FW	preferred option
E	AW	HAP01.1A-018-NN-FW	alternative option
B	PW	HAP01.1N-018-NN-FW	always equipped

Tab. 1-9: Availability of control section and control panel



The figure illustrates the basic structure of the type code. Our sales representative in charge will help you with the currently available designs.

Description	Symbol	Unit	HCS01.1E -W0003- _02	HCS01.1E -W0006- _02	HCS01.1E -W0009- _02	HCS01.1E -W0013- _02	HCS01.1E -W0018- _02
Output voltage	U_{out}	V	3 x AC 0...230				
Output current	I_{out}	A	1.1	2.0	3.0	4.5	7.6
Latest amendment: 2012-01-23							

1) Mains input L1, L2, L3 (for HMV and HCS only); For use on a solidly grounded wye source only.

Tab. 4-16: HCS - Ambient and operating conditions - UL ratings

Ambient and operating conditions - UL ratings

Description	Symbol	Unit	HCS01.1E -W0005- _03	HCS01.1E -W0008- _03	HCS01.1E -W0018- _03	HCS01.1E -W0028- _03	HCS01.1E -W0054- _03
Short circuit current rating	SCCR	A rms	42000				
Rated input voltage, power ¹⁾	U_{LN_nenn}	V	3 x AC 200...500				
Rated input current	I_{LN}	A	1.5	2.5	5.0	10.0	28.0
Output voltage	U_{out}	V	3 x AC 0...500				
Output current	I_{out}	A	1.7	2.7	7.6	11.5	21.0
Latest amendment: 2013-01-10							

1) Mains input L1, L2, L3 (for HMV and HCS only); For use on a solidly grounded wye source only.

Tab. 4-17: HCS - Ambient and operating conditions - UL ratings

4.4.4 Compatibility with foreign matters

All Rexroth controls and drives are developed and tested according to the state-of-the-art technology.

As it is impossible to follow the continuing development of all materials (e.g. lubricants in machine tools) which may interact with the controls and drives, it cannot be completely ruled out that any reactions with the materials we use might occur.

For this reason, before using the respective material a compatibility test has to be carried out for new lubricants, cleaning agents etc. and our housings/ materials.

4.5 Mechanical project planning

4.5.1 Drive controller

Dimensional Drawings

Options for Mounting

- **Standard mounting:**
The back of the device is directly mounted to the mounting surface in the control cabinet
- **Left-hand or right-hand mounting:**
The left or right side of the device is directly mounted to the mounting surface in the control cabinet

Dimensions, mass, insulation, sound pressure level

Data for mass, dimensions, sound pressure level, insulation

Description	Symbol	Unit	HCS01.1E -W0003- _02	HCS01.1E -W0006- _02	HCS01.1E -W0009- _02	HCS01.1E -W0013- _02	HCS01.1E -W0018- _02
Mass	m	kg	1.30				2.10
Device height ¹⁾	H	mm	215				268
Device depth ²⁾	T	mm	196				
Device width ³⁾	B	mm	50				70
Insulation resistance at 500 V DC	R _{is}	Mohm	10.00				
Capacitance against housing	C _Y	nF	2 x 68				2 x 100
Latest amendment: 2018-05-29							

1) 2) 3) Housing dimension; see also related dimensional drawing
Tab. 4-18: HCS - Data for mass, dimensions, sound pressure level, insulation

Data for mass, dimensions, sound pressure level, insulation

Description	Symbol	Unit	HCS01.1E -W0005- _03	HCS01.1E -W0008- _03	HCS01.1E -W0018- _03	HCS01.1E -W0028- _03	HCS01.1E -W0054- _03
Mass	m	kg	1.30		2.10		4.60
Device height ¹⁾	H	mm	215			268	
Device depth ²⁾	T	mm	196				
Device width ³⁾	B	mm	50			70	130
Insulation resistance at 500 V DC	R _{is}	Mohm	10.00				
Capacitance against housing	C _Y	nF	2 x 68			2 x 100	
Latest amendment: 2018-05-29							

1) 2) 3) Housing dimension; see also related dimensional drawing
Tab. 4-19: HCS - Data for mass, dimensions, sound pressure level, insulation

Temperatures, cooling, power dissipation, distances

Cooling and power dissipation data

Description	Symbol	Unit	HCS01.1E -W0003- _02	HCS01.1E -W0006- _02	HCS01.1E -W0009- _02	HCS01.1E -W0013- _02	HCS01.1E -W0018- _02
Ambient temperature range for operation with nominal data	T_{a_work}	°C	0...40				
Ambient temperature range during operation with reduced nominal data ⁸⁾	$T_{a\_work\_red}$	°C	0...55				
Derating of P_{DC_cont} , P_{BD} , I_{out_cont} when $T_{a\_work} < T_a < T_{a\_work\_red}$	f_{Ta}	%/K	2.0				
Allowed mounting position			G1				
Cooling type			Not ventilated			Forced ventilation	
Volumetric capacity of forced cooling	V	m³/h	-			11.00	56.00
Allowed switching frequencies ¹⁾	f_s	kHz	4, 8, 12, 16				
Power dissipation at $I_{out\_cont} = 0$ A; $f_s = f_s$ (min.) ²⁾	$P_{Diss\_0A\_fs\_min}$	W	4		6		8
Power dissipation at $I_{out\_cont} = 0$ A; $f_s = f_s$ (max.) ³⁾	$P_{Diss\_0A\_fs\_max}$	W	15		17		21
Power dissipation at continuous current and continuous DC bus power respectively ⁴⁾	P_{Diss_cont}	W	8.00	10.00	12.00	20.00	70.00
Minimum distance on the top of the device ⁵⁾	d_{top}	mm	90				
Minimum distance on the bottom of the device ⁶⁾	d_{bot}	mm	90				
Horizontal spacing at the device ⁷⁾	d_{hor}	mm	10				0

Latest amendment: 2015-06-12

- 1) Also depending on firmware and control section; see parameter description "P-0-0001, Switching frequency of the power output stage"; see "P-0-4058, Amplifier type data"; for supply units the switching frequency is 4.2 kHz
- 2) 3) Plus dissipation of braking resistor and control section; find interim values by interpolation to P_{Diss_cont}
- 4) Plus dissipation of braking resistor and control section
- 5) 6) 7) See fig. "Air intake and air outlet at device"
- 8) UL certificate applies to a maximum ambient temperature of 40 °C

Tab. 4-20: HCS - Data for cooling and power dissipation