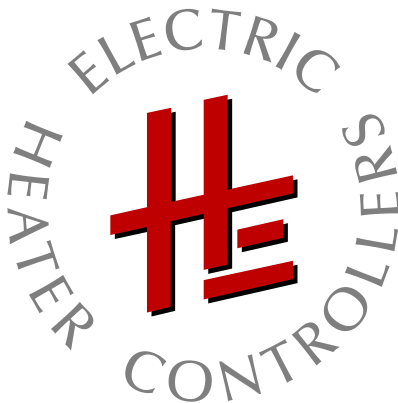


HC500 Heater Controller

Hardware description -
CPU-unit (CU) with HC-NET (-HN) and HC-COM (-HCOM)



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2 Important Safety Information (read before using products)

To read and fully understand this manual, all *Hardware descriptions* of all other applied HC500 devices and the *Function descriptions* are prerequisite to ensure correct and safe operation of this equipment.

Above documents will be sent upon request via e-mail.

In general

- proper storage,
- proper shipping and handling,
- professional installation by qualified personnel,
- professional master programming by qualified personnel, and
- professional service and maintenance by qualified personnel
are necessary for the correct and safe operation of this equipment.



The use of these products must be limited to technically qualified personnel with the proper education and experience to design, install and maintain complex high voltage (and/or high current) automated control systems.

Technically qualified personnel are, for example:

- project and design personnel for electrical control panels and cabinets,
- high voltage automated control system engineers or programmers
- electricians and electric control panel builders, and
- service technicians,

all who know the applicable electrical codes and regulations and can properly apply this knowledge in the design of complex high voltage (and/or high current) automated control systems.

Unqualified personnel do not possess the ability to properly interpret the handling and installation information in the product documentation, and therefore must not be responsible for the installation or use of these products.

Unqualified personnel must not use this product!



These products operate under high voltage. Improper handling of these products may result in death, serious injury, and/or the loss of property.

For each specific installation of this product, all applicable safety regulations and industry standards must be observed.

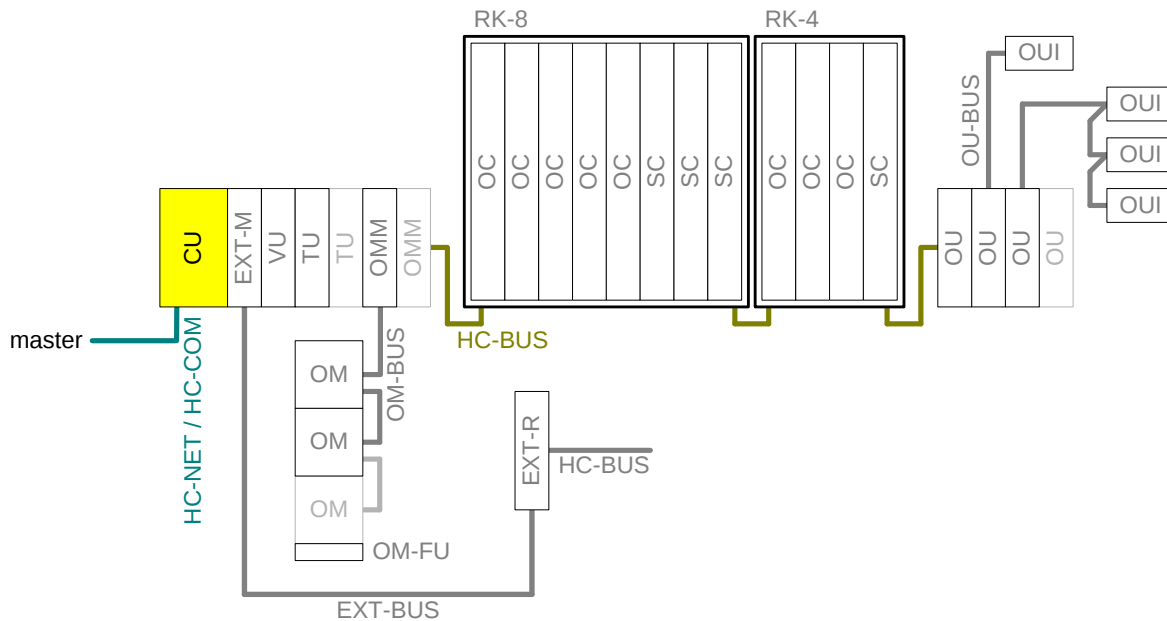
3 Introduction



To understand this document, knowledge of the *Hardware description - basics* is essential.

This document describe the hardware of the

- CPU-units (CU)
with HC-NET (-HN) and HC-COM (-HCOM) interfaces.



For

- CUs with different interfaces (PROFIBUS-DP, EtherCAT, ...)
 - and
 - CUs of the first HC500 generation
- specific *hardware descriptions* are available.

The

- first HC500 generation is replaced in 2017 by the
- *Second generation -#2*

4 Hardware



product name	order code	Out of production. Compatible successor = <i>Hardware description - CPU-unit (CU2) with HC-NET (-HN) and HC-COM (-HCOM)</i>
HC500-CU-HN	500.102	HC500-CU2-HN
HC500-CU-HCOM	500.103	HC500-CU2-HCOM

dimension (H x W x D)	103.5 x 45 x 117 mm 4.07 x 1.77 x 4.61 inch
weight	0.18 kg 0.4 lb

construction	plastic enclosure
--------------	-------------------

ambient temperature	0 - 45 °C; 32 - 113 °F
climate condition	≤ 75 % rel. humidity without condensation
ingress protection	IP20

connector X2, X7, X8	screw connection
cable section	0.1 - 1.5 mm ² AWG 28 – 16
torque	0.5 - 0.6 Nm 4.4 - 5.3 lb in

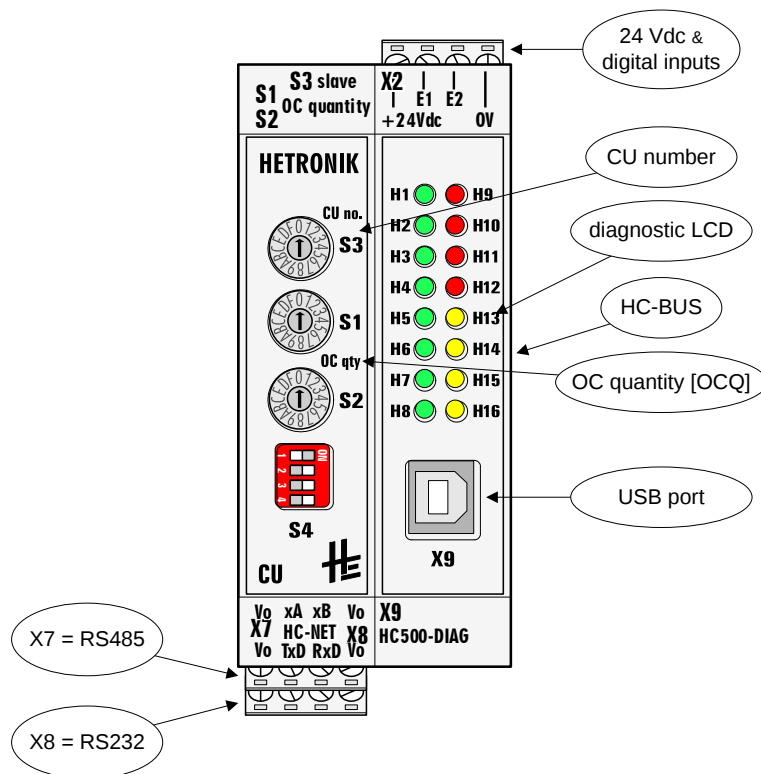
Model naming:

HC500-CU-#

CU = CPU-unit

HN = HC-NET

HCOM = HC-COM



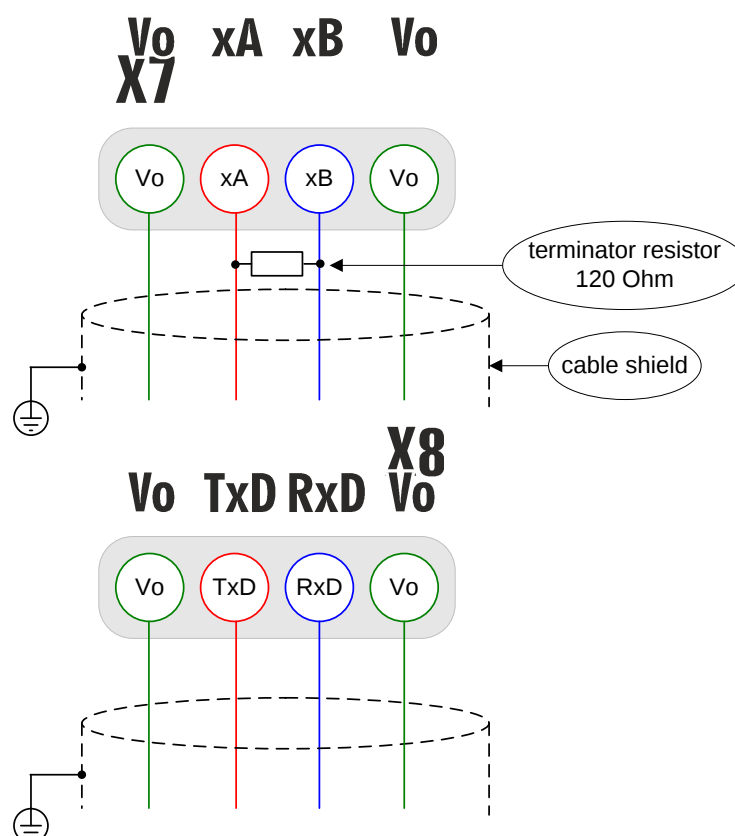
5 Interfacing

HC-NET (-HN) is HETRONIK specific data protocol developed originally for the HC-blocks HC100, HC200, HC300 and HC400 HC-blocks

[Protocol description - HC-NET](#)

HC-COM (HCOM) is the not compatible successor of HC-NET, available only for the HC500.

[Protocol description - HC-COM](#)



6 Setup

6.1 HEX-switches S1 and S2

Hardware description - basics

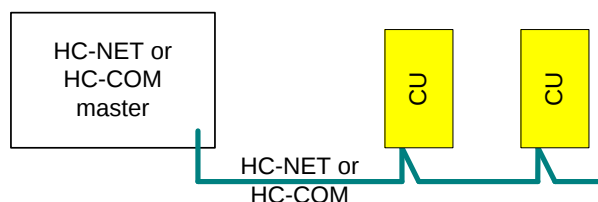
6.1 HEX-switch S3



Only for already installed HC500 systems.
Nowadays HC500 devices are remote via HC-BUS extenders
Hardware description - HC-BUS Extender

All HC-BUS cables of one HC500 system (for each CU) together are not to exceed a maximum length of 3 m.

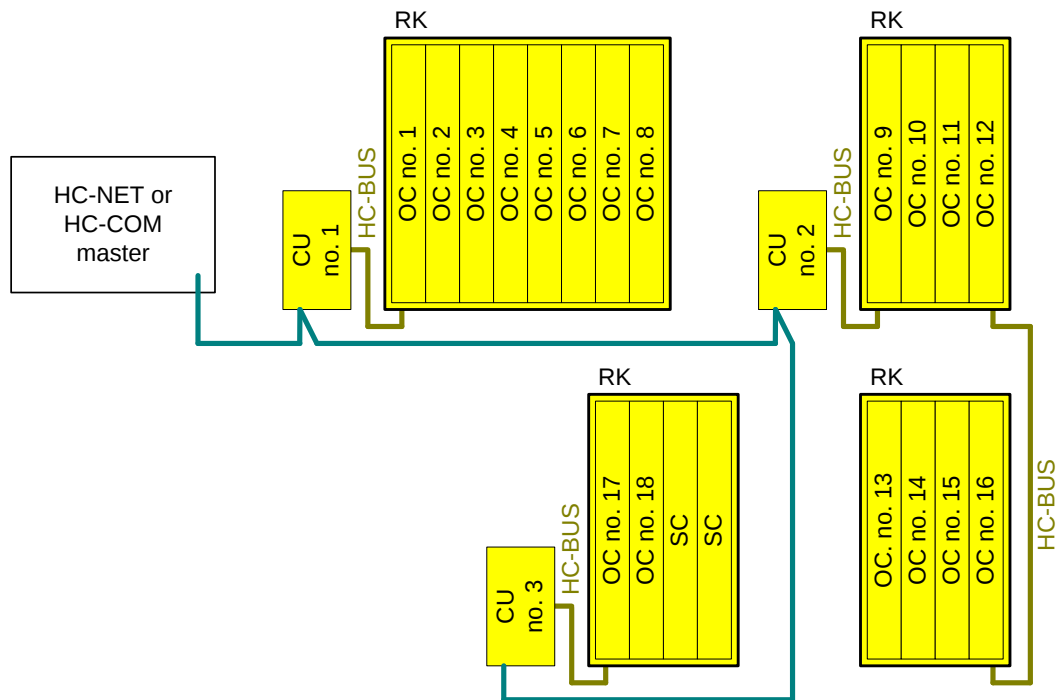
To remote output-cards (OC) over longer distances more than one CU can be networked with a master.



Via HEX-switch S3 is setup:

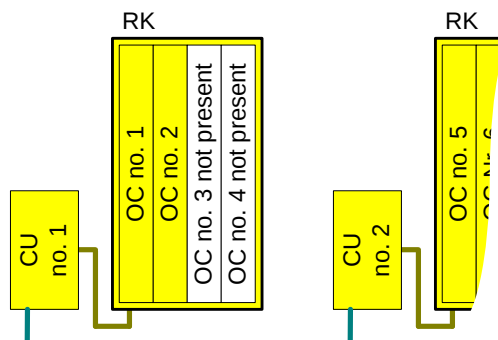
S3 =	CU answer to the master starting at OC number
0	1
1	5
2	9
3	13
4	17
5	21
6	25
7	29
8	33
9	37
A	41
B	45
C	49
D	53
E	57
F	61

Example



Only for already installed HC500 systems.
 Nowadays not available OCs are disabled via the HC-parameter SlotList
Function description - SlotList

Certain applications will have a HC500 rack (RK) that is not fully equipped with outputs-cards (OC).
 For example a 4-slot rack (RK) only equipped with OC no. 1 and no. 2:



HC-NET and HC-COM masters typically expect answers from OC no. 1 to OC max. If an OC between OC no. 1 and OCmax is not answering, a master will generally try to establish communications several times what can dramatically reduce the data transmission time and generate alarms similar to "OC number xx not found".

For this reason, a CU answer as if the last RK at the CU is fully equipped OC, even if the RK is not fully equipped.

The following are some practical S3, S1 and S2 settings:

S3	S1 / S2	CPU-unit (CU) answer for output card (OC) no.
1	1 / 7 (23 OCs)	5....28 despite OC no. 28 is not present
2	0 / 1 (1 OCs)	9 ... 12 despite OC no. 10 ... 12 are not present
2	0 / 6 (6 OCs)	9....16 despite OC no. 15 and 16 are not present

Bit 0 of OCS [output-card-status] for non-existing OC is "1" (OC available) in order not to make changes to HC-NET and HC-COM masters, that react at OCS bit 0 = "0" with an alarm (OC not present).



notice

If the S1/S2+S3 setting is incorrect A HC-NET or HC-COM data conflict cannot be avoided, since more than one CU react at the same OC numbers.



i info

If a HC500 system has only one CU, HEX-switch S3 must be set to "0".

7 Diagnostics



All HC-parameter should be displayed in HMI pages and HC failures should trigger alarm messages.

LEDs on all HC500 devices, indicates general status.

Detailed diagnostics are available via software installed on a WINDOWS PC to be interfaced via a USB cable with the CU. [Product description - #-DIAG](#).

7.1 LEDs

H1 ● H9
 H2 ● H10
 H3 ● H11
 H4 ● H12
 H5 ● H13
 H6 ● H14
 H7 ● H15
 H8 ● H16

H1 OC H9 power supply
 H2 VU H10 power circles
 H3 TU H11 OC temperat.
 H4 --- H12 master com.
 H5 ON normal H13 HC-BUS
 H6 ON softSART H14 HC-NET/HC-COM
 H7 volt. comp. H15 ---
 H8 save param. H16 HC500-DIAG2

LED	meaning	color	LED off	LED on	LED blinking [fast blinking]
H1	output-cards (OC)*	green	CPU (CU) 24 Vdc supply voltage missing	all OC present	min. 1 OC missing or S1 + S2 wrong
H2	voltage-unit (VU)	green	VU not present	VU present & ok	VU not present but power voltage fluctuation compensation = ON [error]
H3	temperature-units (TU)	green	no TU setup	all TU present & ok	min. 1 TU missing [min. 1 TU with failure]
H4	---	green	---	---	---
H5	power-outputs	green	heating OFF	heating ON with normalSTART	[automatic heating OFF because of communication problem]
H6		green		heating ON with softSTART(light)	
H7	power voltage fluctuation compensation	green	OFF	ON	---
H8	---	green	---	---	---

* OC = output-cards has same meaning as
 OM = output-modules and
 OU = output-units

continue

LED	meaning	color	LED off	LED on	LED blinking [fast blinking]
H9	power voltage	red	power voltage of all OCs ok	---	min. 1 OC with power voltage problem [emergency mode power voltage]
H10	power circles	red	ok	error in one or more power circles	---
H11	monitoring of HC- electronic temperature	red	normal	min. 1 OC > 60 °C	emergency mode electronic temperature
H12*	communication with master	red	---	missing	disturbed or faulty
H13	HC-BUS	yellow	no OC, VU, TU found	all OC, VU, TU present	min. 1 OC, VU, TU missing or wrong address
H14	HC-NET / HC-COM	yellow	no data exchange	data exchange	data exchange
H15	---	yellow	---	---	---
H16	HC-DIAG(2)	yellow	not active	diagnostic mode	master mode [simulation mode]

* firmware 2.0 and higher