CONTROL UNIT

Instruction manual

Order. No. 9.5027.00.100

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1. GENERAL INFORMATION

The intended purpose of the Control Unit 9.5027.00.100 is to convert 5 analogue voltages into a serial data stream. This data stream can be transmitted over a distance (e.g. by modem) to a Control Unit 9.5027.00.160, which converts the data stream into the original 5 voltages.

The Control Unit essentially consists of the following components:

- Power Supply
- CPU
- RS 232 Interface for the asynchronous data transmission
- ADC Interface for analogue input

The Control Unit connects its different components with each other over a measurement system and processes once a second the converted analogue voltages and the data stream to the asynchronous data output.

The Control Unit can identify hardware and software errors. It can also restart the program (LED "WD" lights up on the CPU, see Appendix on page 6) with the help of a RESET-logic (Watchdog) if the program run has malfunctioned. During normal operation, the LED "WD" on the CPU is off.

Malfunctions in the program run are detected with the aid of a triggerable RESET logic (Watchdog). The CPU is reset and all registers and memories are re-initialised.

2. ADC INTERFACE (Universal analogue interface)

- Input for 5 analogue voltages in the range of 0 to 10 V

- Type of interface
  Multiplexed analogue to digital converter (ADC) with conditioning amplifier and reference voltage.
- Update rate, resolution
  The ADC interface updates the data every second with a resolution of 12 bit.
- Type of Leads
  21 pins connector plug INPUT (see appendix on pages 7 and 8)

Pin-№	Key	
a1	+10V	Analogue voltage #1 0…10 V
a2	⊥	
a3	+10V	Analogue voltage #2 0…10 V
a4	⊥	
a5	+10V	Analogue voltage #3 0…10 V
a6	⊥	
b1	+10V	Analogue voltage #4 0…10 V
b2	⊥	
b3	+10V	Analogue voltage #5 0…10 V
b4	⊥	

3. SERIAL OUTPUT: RS 232

The data telegram of the acquired data is available at the serial output of the electronics for the 5 input voltages in ASCII format for transmission to the *Control Unit 9.5027.00.160*.

- Type of Interface:
  RS232, serial asynchronous, control lines DTR, RTS, CTS, XON/XOFF Software handshake.

  If you do not use a handshake signal, connect DTR with CTS!

- Transmitting cycle
  The Control Unit outputs a data telegram once a second.

- Interface parameters
  The interface parameters can be set individually.
  Baudrate: 150 to 19200 Baud Default: 1200
  Transmission: 8N1, 7E1 Default: 7E1
  See: "Position of the DIP switch on the Multicom Assembly" on page 4 and
  Table 1 "Parameters to set the serial interface" on page 5.

- Type of Leads:
  25 pins D-plug connection (see appendix on pages 7 and 8)

Pin-№	Key	
1	PGND	Protective Ground
2	TxD	Transmit
3	RxD	Receive
4	RTS	Request to send
5	CTS	Clear to send
7	GND	Signal ground
20	DTR	Data terminal ready

Serial output telegram

The data telegram has the following formats (similar according to NMEA):

Character	Key
$	Start of sentence
WI	Talker identifier: Weather instrumentation
VTG	Sentence identifier: Voltages
,	Separator (comma, Hex 2C)
dddd	Decimal value of the voltage #1
,	Separator (comma, Hex 2C)
dddd	Decimal value of the voltage #2
,	Separator (comma, Hex 2C)
dddd	Decimal value of the voltage #3
,	Separator (comma, Hex 2C)
dddd	Decimal value of the voltage #4
,	Separator (comma, Hex 2C)
dddd	Decimal value of the voltage #5
*	Checksum identifier (Hex 2A)
H	Checksum high byte
L	Checksum low byte
<CR>	Carriage return (Hex 0D)
<LF>	Line Feed (Hex 0A)

- All characters are transmitted in ASCII codes
- The checksum is calculated by XOR-operation with all characters between the $ and the * (each exclusively). If the XOR-operation with all these characters (for example) results in the hexadecimal value 7E, then the ASCII characters "7" (Hex 37) as high byte and "E" (Hex 45) as low byte will be sent out.
- If the status of a decimal value is not valid, the characters “FFFF” are sent.
- The telegram is transmitted once a second.

Position of the DIP Switch on the Multicom Assembly

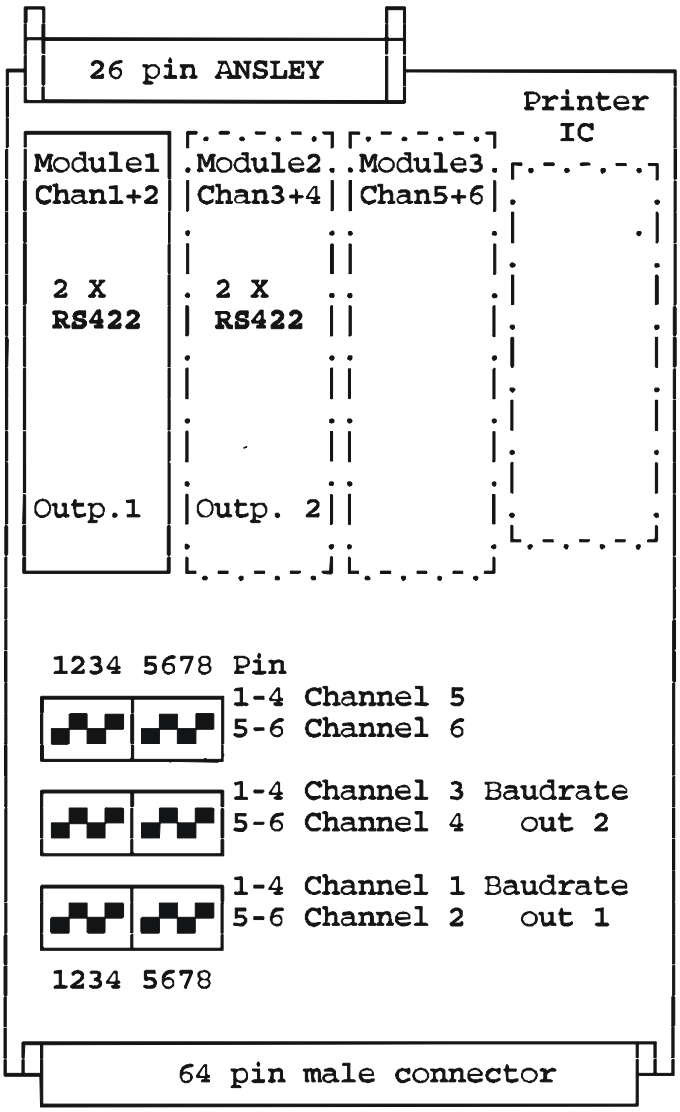
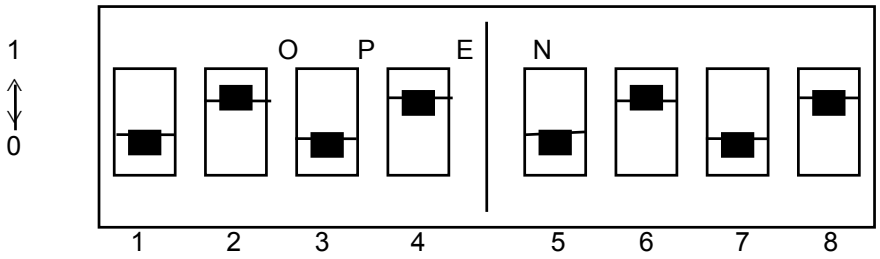


Table 1: Parameters to set the Serial Interface

Position of the DIP switch on the Multicom interface
Switch in Pos. OPEN = 1
Switch in Pos. CLOSED = 0



	Channel 1				Channel 2			
	Baudrate	Baudrate		Par.	Baudrate			Par.
	19200 Bit/s	0	0 0	X	0	0 0		X
	9600 Bit/s	1	0 0	X	1	0 0		X
	4800 Bit/s	0	1 0	X	0	1 0		X
	2400 Bit/s	1	1 0	X	1	1 0		X
*	1200 Bit/s	0	0 1	X	0	0 1		X
	600 Bit/s	1	0 1	X	1	0 1		X
	300 Bit/s	0	1 1	X	0	1 1		X
	150 Bit/s	1	1 1	X	1	1 1		X
	Switch	1	2 3	4	5	6 7		8

Parameters: X = 1 8 bit word, no parity, 1 stop bit (8N1)
X = 0 7 bit word, even parity, 1 stop bit (7E1)

* Default: 1200 7E1

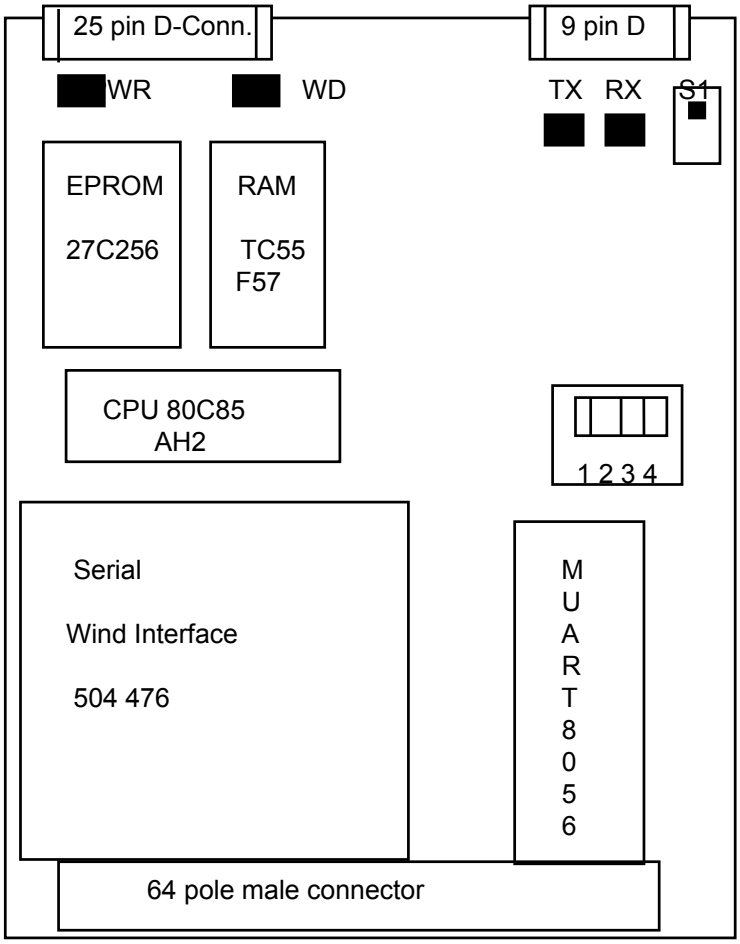
4. APPENDIX

Position of the printed circuit boards

* See on the motherboard from right to left *

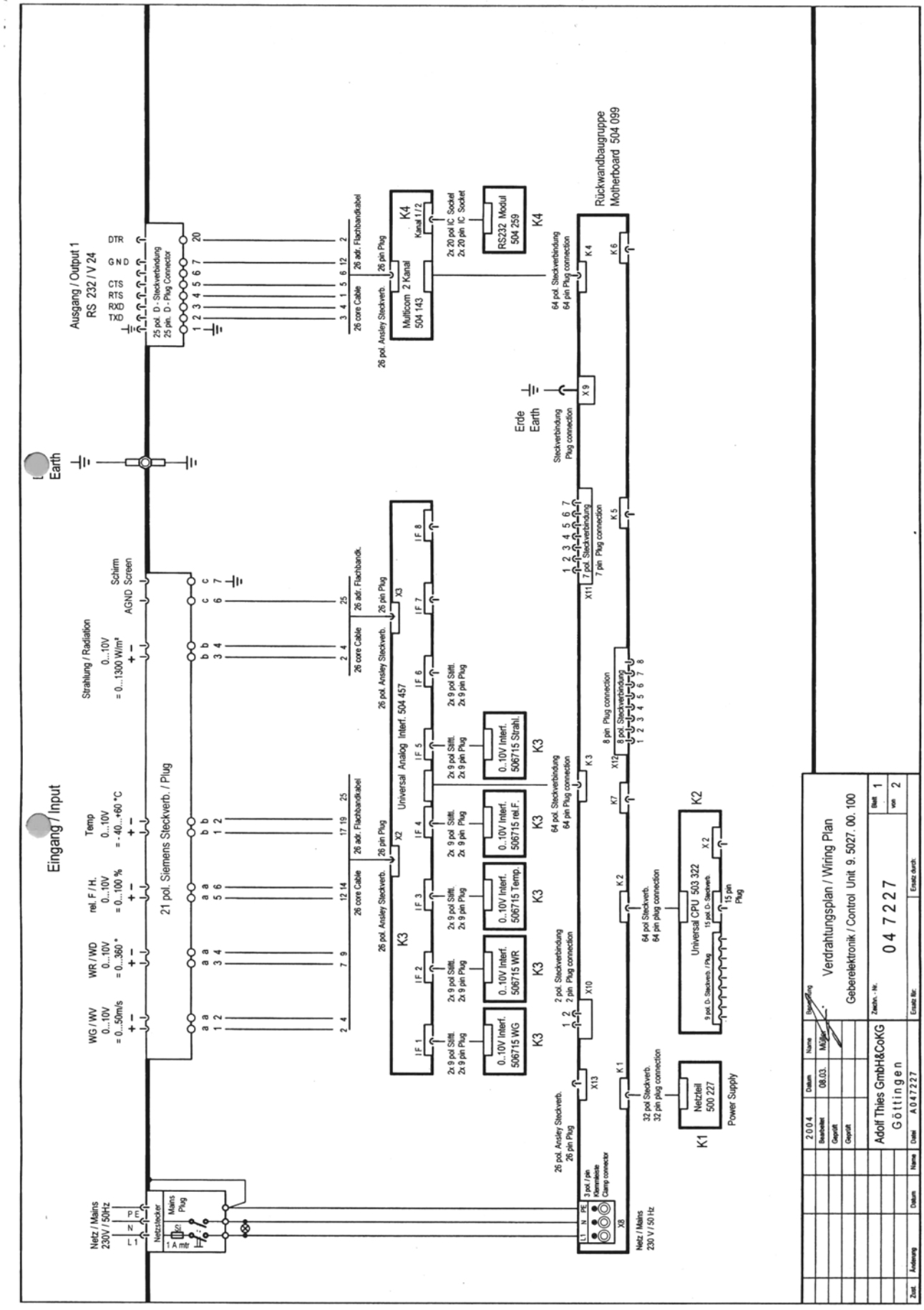
BOARD ASSIGNMENT			
BOARD	TYPE/FUNCTION	ADDRESSE	CHANNEL
1	Power Supply Board +5, ±15 V=		
2	CPU-board EPROM 1 RAM 1	 0000 8000	
3	Universal-Analogue-Interface	E000	5
4	Multicom-Interface	E800	1

CPU Card (Mounting Side)

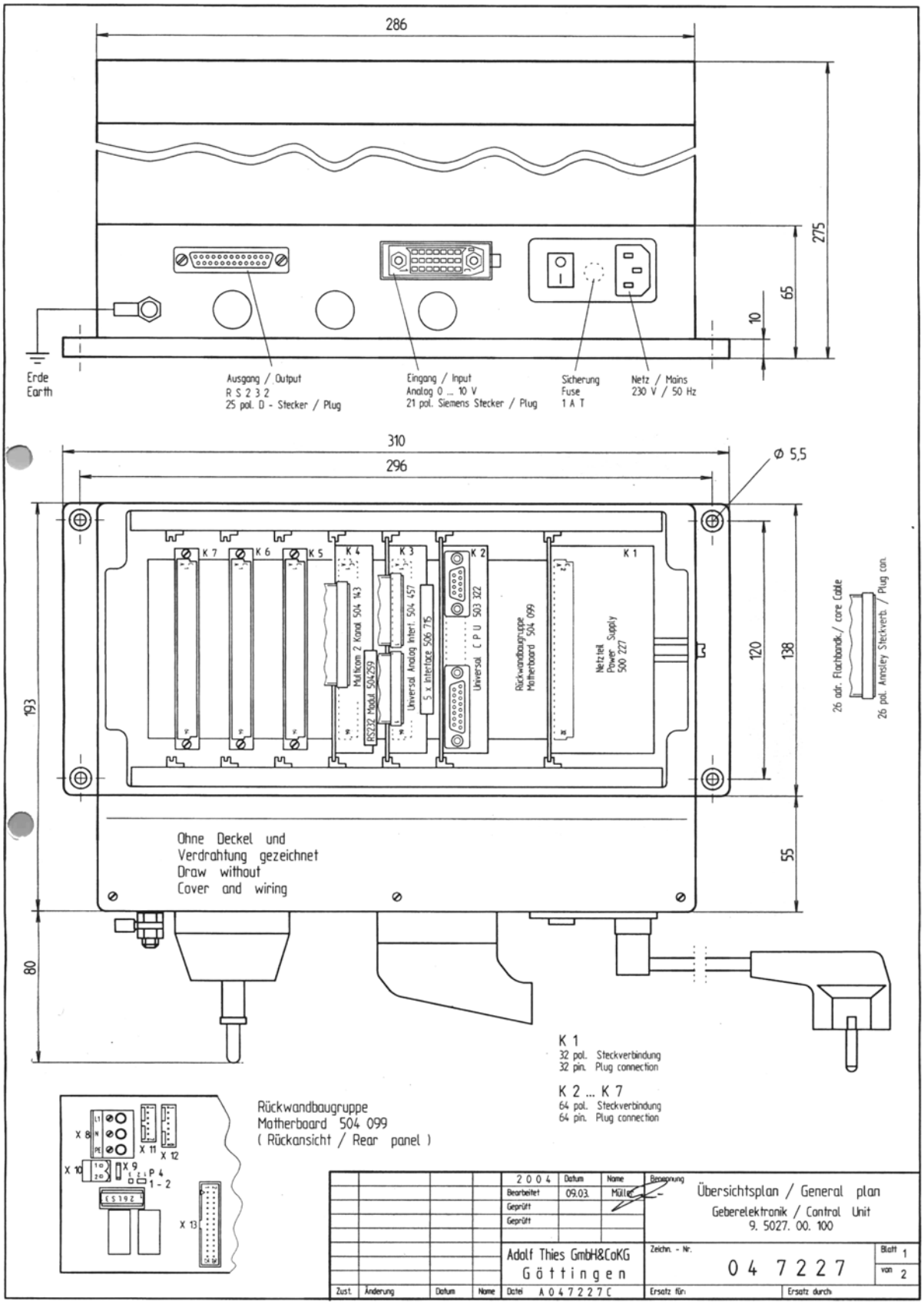


LED WD = Watchdog red LED TX = Transmit red
LED PWR = Power on green LED RX = Receive red

Wiring Plan for Control Unit 9.5027.00.100



General Plan for Control Unit 9.5027.00.100



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