

# CONTROL UNIT

Instruction manual



Order. No. 9.5027.00.160



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## **1. GENERAL INFORMATION**

The intended purpose of the Control Unit 9.5027.00.160 is to re-establish 5 voltages from a data stream, which has been transmitted over a distance (e.g. by modem). The Control Unit 9.5027.00.100 is needed to convert the original 5 analogue voltages into the serial data stream.

The Control Unit essentially consists of the following components:

- Power Supply
- CPU
- RS 232 Interface for the asynchronous data transmission
- DAC1 Interface for analogue voltages output
- DAC2 Interface for analogue voltages output

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

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 7) 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. SERIAL INPUT: RS 232

The data telegram, that is processed by this Control Unit is sent from a *Control Unit 9.5027.00.100*. The telegram contains 5 input voltages in ASCII format.

- Type of Interface:  
RS232, serial asynchronous, control line DTR
- Receiving cycle  
The serial input interface scans the received data every second using a timeout of 5 seconds.
- 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 5 and Table 1 "Parameters to set the serial interface" on page 7.
- Type of Leads:  
25 pins D-plug connection (see appendix on pages 7 and 9)

Pin-Nº	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 input 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 evaluated as 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 for the checksum should be "7" (Hex 37) as high byte and "E" (Hex 45) as low byte.
- A decimal value is assumed to be valid, if
  - the inspection of the "frame" is successful,
  - the inspection of the checksum is successful,
  - the conversion of the appropriate characters to a decimal value is successful.

### 3. ANALOGUE OUTPUT: DAC1 INTERFACE

4 Voltages 0...10 V

### 4. ANALOGUE OUTPUT: DAC2 INTERFACE

1 Voltage 0...10 V

- Type of interface  
4 (1) Digital to analogue converters (DAC) with voltage output.
- Update rate, resolution  
The DAC interface updates the data every second with a resolution of 12 bit.
- Error indication  
Voltage output = 10 V  
Error from the serial interface (no reception, checksum) => all 5 outputs = 10 V  
Error transmission from the sending Control Unit => the corresponding output(s) = 10 V
- Type of Leads  
21 pins connector plug OUTUT (see appendix on pages 7 and 9)

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	⊥	

- Load  
Min. Load 1500 Ω, short-circuit proof.

Position of the DIP Switch on the Multicom Assembly

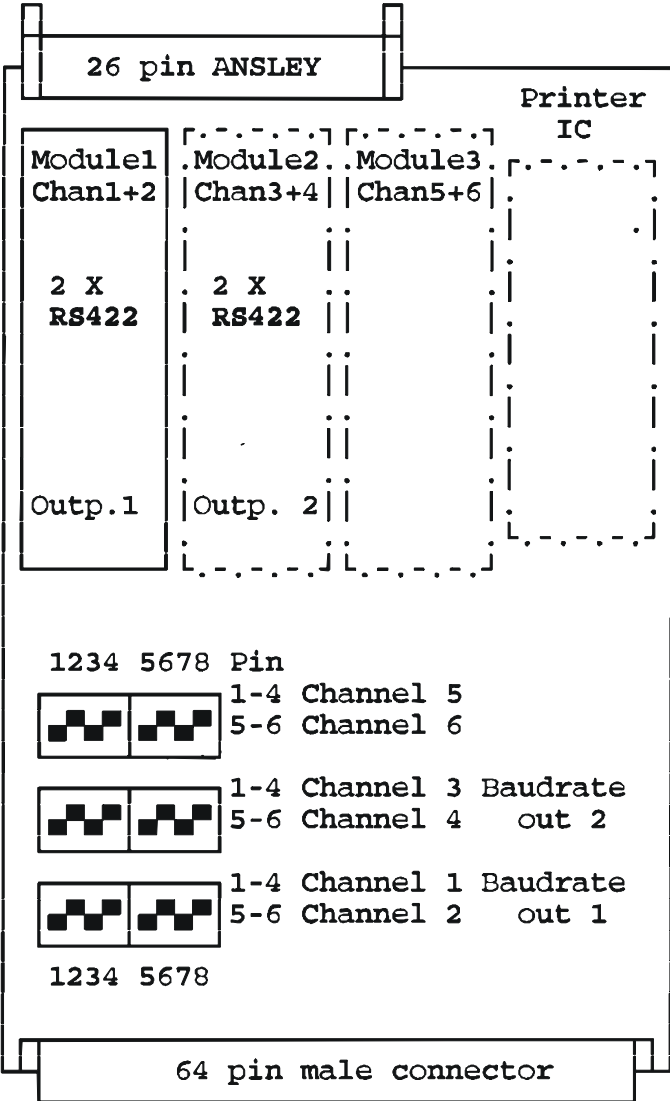
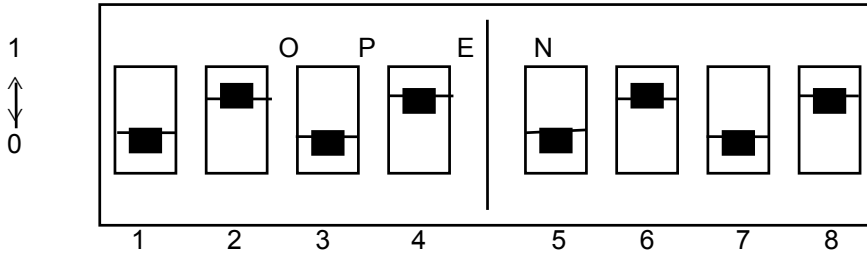


Table 1: Parameters to set the Serial Interface

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

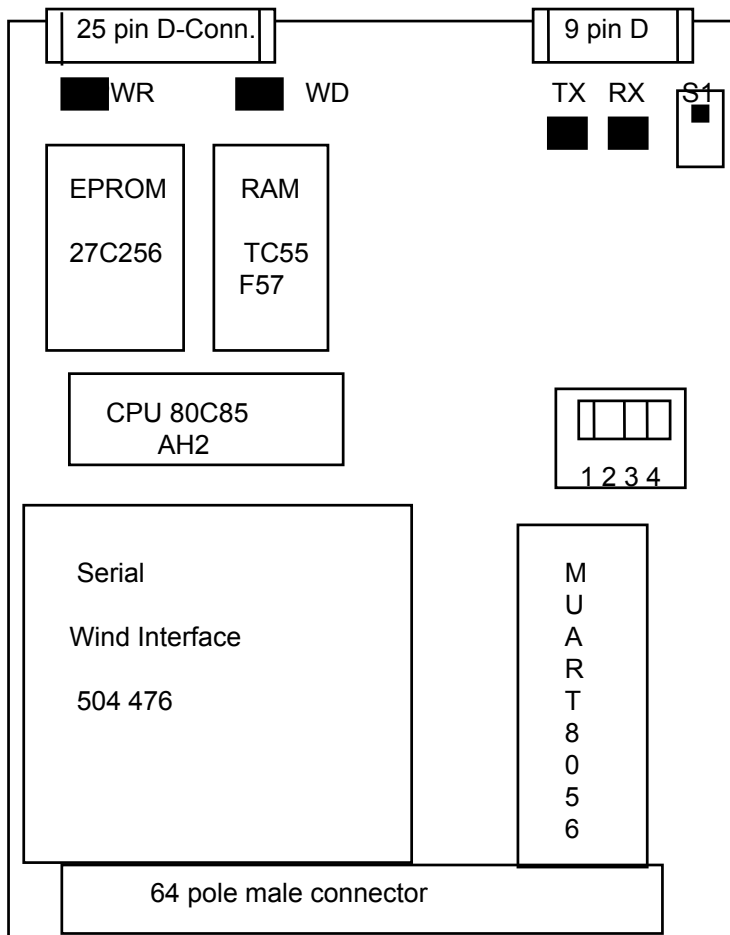
## 5. APPENDIX

### 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	DAC1 Interface	F000	4
4	DAC2 Interface	F800	1
5	Multicom-Interface	E800	1

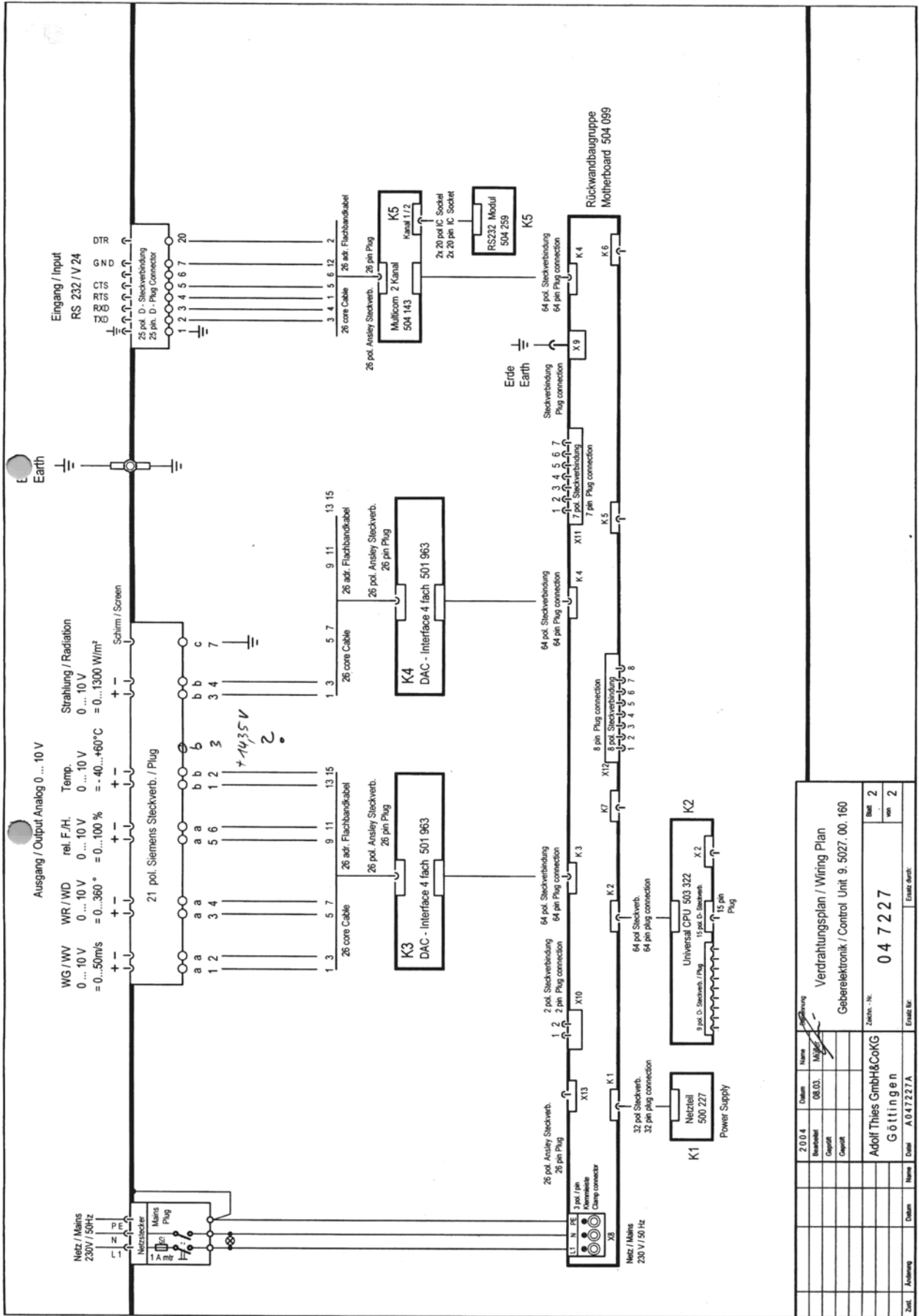
### CPU Card (Mounting Side)



LED WD = Watchdog red  
LED PWR = Power on green

LED TX = Transmit red  
LED RX = Receive red

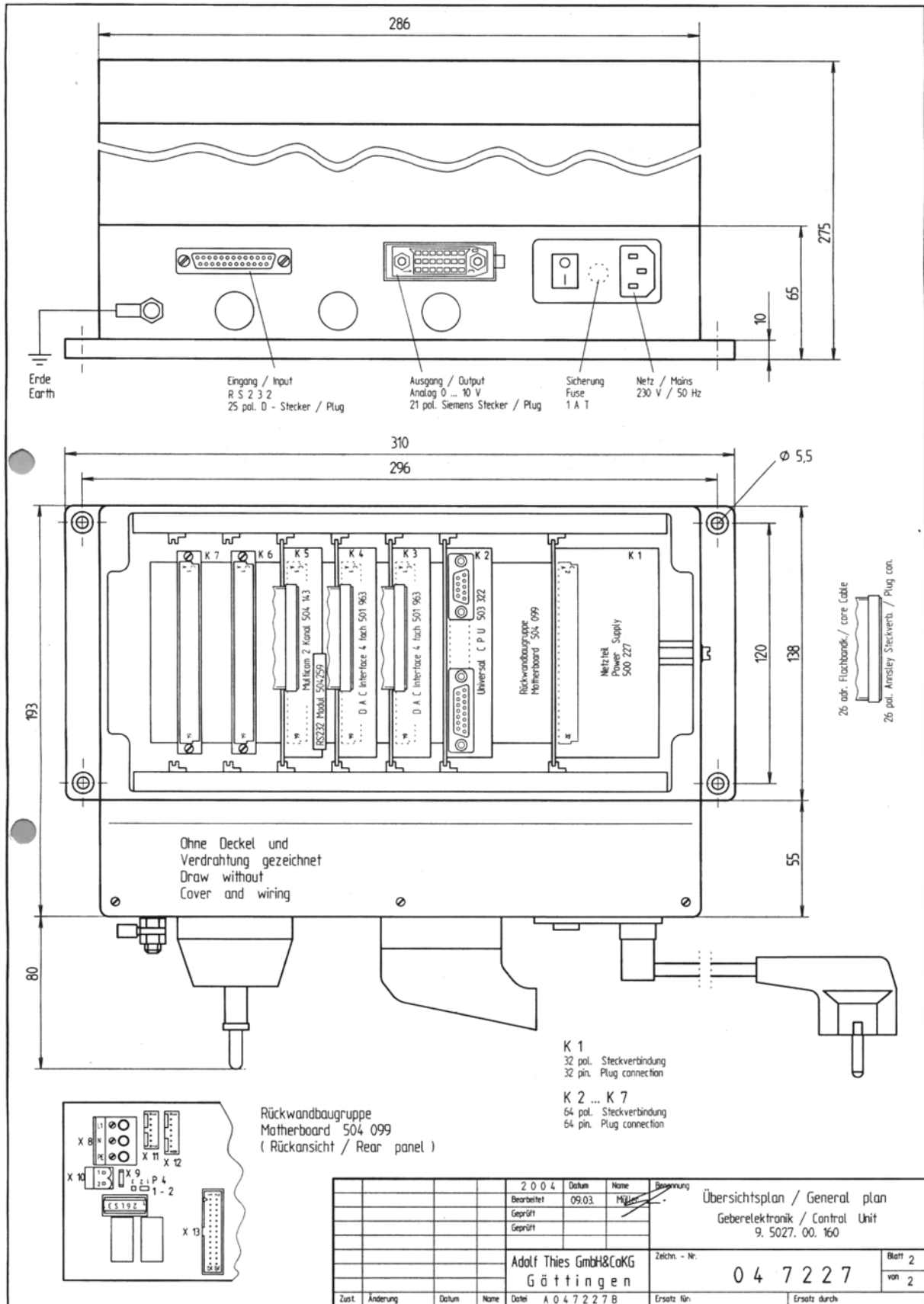
# Wiring Plan for Control Unit 9.5027.00.160



Zust.	Änderung	Datum	Name	Erstellt durch:
		2004		
		08.03.	Müller	
			Geppert	
			Geppert	
<b>Verdrahtungsplan / Wiring Plan</b> Geberelektronik / Control Unit 9.5027.00.160				
Adolf Thies GmbH&CoKG Göttingen				Zeich.-N.: <b>047227</b>
Datum: A.047227A				Blatt: von 2 von 2



# General Plan for Control Unit 9.5027.00.160





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