

# PAD-VTH8 Module

## 8 channel voltage and thermocouple amplifier

- Intelligent amplifier with integrated A/D conversion
- 8 input channels for voltage, current or thermocouple measurement
- CJC integrated in connector
- Internal watchdog timer for device failure protection
- Signal connection via 25 pin SUB-D connector



## Module specifications

	PAD-VTH8
Input channels:	8 differential input channels
Input signals:	
Voltage:	$\pm 15$ mV, $\pm 50$ mV, $\pm 100$ mV, $\pm 500$ mV, $\pm 1$ V, $\pm 2.5$ V
Current:	$\pm 20$ mA (requires external 125 Ohm shunt resistor)
Thermocouple:	J: 0 °C to 760 °C K: -50 °C to 1300 °C T: -100 °C to 400 °C E: 0 °C to 1000 °C R: 500 °C to 1750 °C S: 500 °C to 1750 °C B: 500 °C to 1800 °C N: -270 °C to 1300 °C
Resolution:	16 bit
Accuracy:	
Voltage:	$\pm 0.1$ %
Thermocouple:	CJC within DEWETRON SUB-CONN25 usually better $\pm 2$ °C CJC within custom-selfmade solution usually better $\pm 3$ °C
Isolation voltage:	1000 VDC to system no isolation between channels
Overvoltage protection:	$\pm 35$ VDC
Common mode voltage:	< 2 V
CMR (50/60 Hz):	> 92 dB
RS-485 interface:	Yes
Interface speed:	9600 bps
Power supply voltage:	+12 VDC ( $\pm 10$ %)
Power consumption:	typical 1.2 W

# PAD-VTH8 Module

## Signal connection

### General

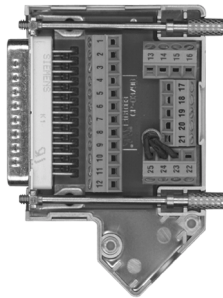
One CJC connector (PAD-OPT1) is included as a standard for each PAD-VTH-8 module.

**CAUTION:** The CJC connector has to be connected, otherwise the module doesn't work and can freeze the complete measurement system!

### PAD-VTH8 module

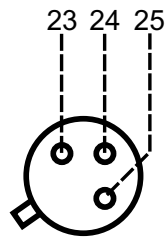


The current module address is labeled in the address field.

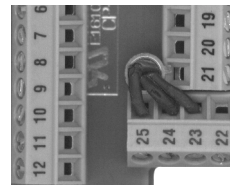


1	Channel 0	(+)	13	Channel 6	(+)
2	Channel 0	(-)	14	Channel 6	(-)
3	Channel 1	(+)	15	Channel 7	(+)
4	Channel 1	(-)	16	Channel 7	(-)
5	Channel 2	(+)	17	Not connected	
6	Channel 2	(-)	18	Not connected	
7	Channel 3	(+)	19	Not connected	
8	Channel 3	(-)	20	+12 VDC sensor supply	
9	Channel 4	(+)	21	Not connected	
10	Channel 4	(-)	22	GND	
11	Channel 5	(+)	23	CJC	
12	Channel 5	(-)	24	CJC	
			25	CJC	

### CJC connection



CJC (schematic)

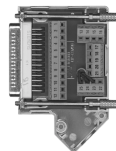


CJC connection

## Connection options for PAD-VTH8 module

### PAD-OPT1

25 pin SUB-D connector with screw terminal and integrated CJC (included as a standard)



### PAD-CB8

Connection box with banana connectors for all 8 channels, cable length approx. 1 m (not included as a standard)



### PAD-CB8K

Connector block with 'K'-type thermocouple connectors, cable length approx. 2 m (not included as a standard)



## Module commands

Command summary for PAD-VTH8 module

Command	Syntax
<i>GENERAL COMMANDS</i>	
<b>Set configuration</b>	<b>%(OldAddr)(NewAddr)(InputRange)(BaudRate)(DataFormat)</b>
Read configuration	\$(Addr)2
Read module name	\$(Addr)M
Read firmware version	\$(Addr)F
<i>FUNCTIONAL COMMANDS</i>	
<b>Read analog data from channel x</b>	<b>#(Addr)(ChannelNo)</b>
Span calibration	\$(Addr)0
Zero calibration	\$(Addr)1
Enable / disable channel for multiplexing	\$(Addr)5(ChannelVal)
Read channel multiplexing status	\$(Addr)6
Read CJC status	\$(Addr)3
CJC offset calibration	\$(Addr)9(Counts)

### Set configuration:

Syntax:     %(OldAddr)(NewAddr)(InputRange)(BaudRate)(DataFormat)

Description: %            Command leading code  
 (OldAddr)    The original / old module address. The factory default address of a module is FF. The address range is 00 to FF hex.  
 (NewAddr)    The new module address (be careful to get no conflict with existing module addresses).  
 (InputRange) Define the analog input range, referred to the table *input range* on next page.  
 (BaudRate)   Define communication baud rate, has to be '06' for 9600 baud (no other values valid).  
 (DataFormat) Define checksum and output data format, referred to the table *data format* on next page.

Response: !(Addr)<CR> The command to this address is valid.  
 ?(Addr)<CR> The command is invalid, parameter values are invalid or change settings not possible.

Example: Command    %0130050600<CR>  
 Description: %: command leading code  
               01: old module address  
               30: new module address  
               05: input range ( $\pm 2.5$  V)  
               06: baud rate (9600)  
               00: data format (engineering units, checksum disabled)  
               <CR>: carriage return  
 Response    !30<CR>  
 Description: Address successfully changed from 01 to 30.

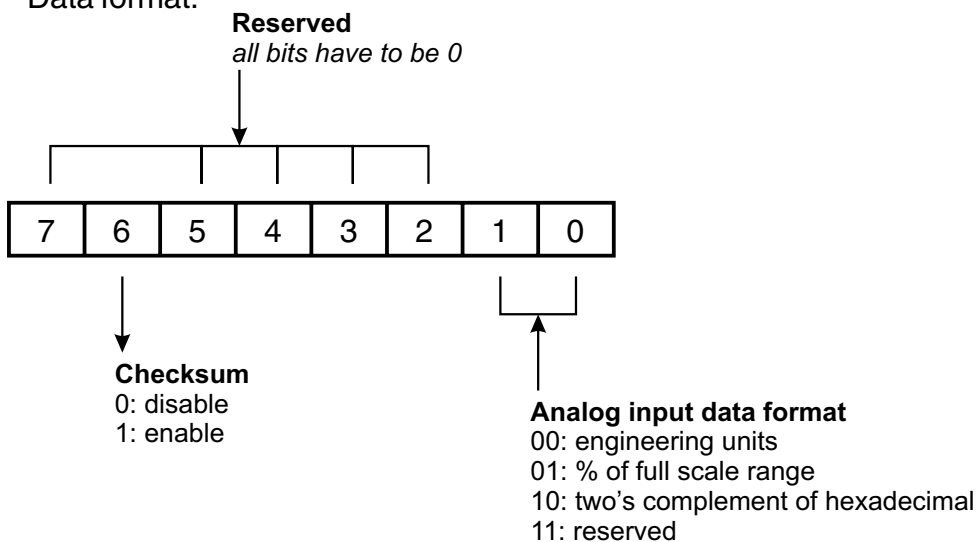
# PAD-VTH8 Module

## Module commands - configuration tables

Input ranges:

Code (hex)	Input range
00	±2.5 V
01	±1 V
02	±500 mV
03	±100 mV
04	±50 mV
05	±15 mV
06	±20 mA (requires external 125 Ohm shunt resistor)
0E	Thermocouple type 'J'      0 °C .. 760 °C
0F	Thermocouple type 'K'      0 °C .. 1000 °C
10	Thermocouple type 'T'      -100 °C .. 400 °C
11	Thermocouple type 'E'      0 °C .. 1000 °C
12	Thermocouple type 'R'      500 °C .. 1750 °C
13	Thermocouple type 'S'      500 °C .. 1750 °C
14	Thermocouple type 'B'      500 °C .. 1800 °C
15	Thermocouple type 'N'      -270 °C .. 1300 °C
16	Thermocouple type 'C'      0 °C .. 2320 °C

Data format:



# PAD-VTH8 Module

## Module calibration

All PAD-VTH8 modules are within specifications when leaving the factory. The time interval for recalibration depends on environmental conditions. Typically, the calibration should be checked once a year.

For recalibration, perform following steps:

1. Select the correct input range on the module.
2. Apply the correct *zero calibration voltage* (see table) for the selected range to the module.
3. Send '*Zero calibration \$(Addr)1*' to the module.
4. Apply the correct *span voltage* (see table) for the selected range to the module.
5. Send '*Span calibration \$(Addr)0*' to the module.
6. Repeat steps 2 to 5 three to five times.

Code (hex)	Input range	Zero calibration voltage	Span calibration voltage
00	±2.5 V	0.000 mV	25.000 V
01	±1 V	0.000 mV	1.000 V
02	±500 mV	0.000 mV	500.000 mV
03	±100 mV	0.000 mV	100.000 mV
04	±50 mV	0.000 mV	50.000 mV
05	±15 mV	0.000 mV	15.000 mV
06	±20 mA	0.000 mA	20.000 mA
0E	Thermocouple type 'J' 0 °C .. 760 °C	0.000 mV	42.922 mV
0F	Thermocouple type 'K' 0 °C .. 1000 °C	0.000 mV	54.875 mV
10	Thermocouple type 'T' -100 °C .. 400 °C	0.000 mV	20.900 mV
11	Thermocouple type 'E' 0 °C .. 1000 °C	0.000 mV	76.358 mV
12	Thermocouple type 'R' 500 °C .. 1750 °C	0.000 mV	21.108 mV
13	Thermocouple type 'S' 500 °C .. 1750 °C	0.000 mV	18.698 mV
14	Thermocouple type 'B' 500 °C .. 1800 °C	0.000 mV	13.814 mV
15	Thermocouple type 'N' -270 °C .. 1300 °C	0.000 mV	47.502 mV
16	Thermocouple type 'C' 0 °C .. 2320 °C	0.000 mV	37.107 mV

# PAD-VTH8 Module

---

## Notes