



KTL-249 LCD Version Shown

- Accepts Davis Instruments 6490 UV Radiation Sensor
- Accepts Davis Instruments 6450 Solar Radiation Sensor
- Accepts Davis Instruments 7911 Anemometer
- Accepts Maxim / Dallas DS18S20/DS18B20 Digital Temperature Sensor
- Accepts various 0 to 20 mA / 4 to 20 mA Sensors
- Accepts 0 to 30 VDC (Adjustable) Analog Signals
- All readings stored in Modbus Holding Registers
- RS-232 and RS-485 Modbus ports
- 8 to 30 VDC Input Power
- Optional 8x2 LCD

The KTA-249 is an interface for a range of weather monitoring including UV, Solar, Wind and Temperature sensors, whose readings are stored in Modbus Holding Registers and made available for SCADA, PLC or PC monitoring. UV Radiation, Solar Radiation and Wind sensors designed for the Davis Instruments Vantage Pro2 Weather Station can be used with the KTA-249 without the need of an entire weather station unit. Additionally, extra inputs for monitoring 0 to 20 mA signals or Battery Voltages up to 30 VDC are included, as well as Maxim/Dallas DS18S20/DS18B20 1-Wire temperature sensors.

An optional LCD can be used to display the data locally.

Connections:

+V	8 to 24 VDC Power in Positive	S1	Up/Left Button
COM	Common (Power in Negative)	S2	Enter Button
AN1	Analog Input 1 (0 to 30 VDC)	S3	Down/Right Button
AN2	Analog Input 2 (0 to 20 mA or 0 to 3 VDC Jumper Selectable)	Anemom	Anemometer Input or Temperature Sensor Input
COM	Common	UV	UV Sensor Input or Temperature Sensor Input
D+	RS-485 Data+	Solar	Solar Radiation Sensor Input or Temperature Sensor Input
D-	RS-485 Data-		
D9 Female	RS-232		

Supported Sensors and Data:

Sensor	Measures	Units	Notes
Davis Instruments 6490 UV Radiation Sensor	Ultra Violet Radiation	UV Index	Plugs directly into UV Connection
Davis Instruments 6450 Solar Radiation Sensor	Solar Radiation	W/m ²	Plugs directly into SOLAR Connection
Davis Instruments 7911 Anemometer	Wind Speed and Direction	Speed: Knots, km/h, mph, m/s Direction: Degrees	Plugs directly into ANEMOM Connection
Maxim / Dallas DS18S20/ DS18B20 Digital Temperature Sensor	Temperature	Degrees Celsius	Plugs directly into one of the UV, Solar Radiation, or Anemometer socket
0-20 mA / 4-20 mA Sensors	Current Signals	No Unit (Scaled 0-1023 for 0-20mA)	AN2 input J1 jumper installed
0-3 VDC Analog Signal	Voltage Signals	No Unit (Scaled 0-1023 for 0-3V)	AN2 input J1 jumper out
0-30 VDC Analog Signal	Voltage Signals	No Unit (Scaled 0-1023 dependent on max input voltage)	R3 adjusted for max input voltage range

Anemometer Calibration:

The Davis Anemometer measures wind direction using a 360° potentiometer. Unfortunately, there's a small area between 0° and 360° where the potentiometer can report values that are not sensible. To work around this, the circuitry of the KTA-249 measures the potentiometer resistance and calculates direction. To do this, the KTA-249 needs to know the total resistance of the anemometer potentiometer. They are specified as having a total resistance of 20,000 Ohms. A calibration register allows the user to set a different value to more accurately match the KTA-249 to a particular anemometer. In most cases this register should be left set to 20000.

Temperature Sensor:

A dedicated connection is not included for using the DS18S20/DS18B20 temperature sensor from Maxim / Dallas semiconductor. The sensor can connect into any of the 3 6P6C connections for the Davis sensors. Sensors such as the [GJS-002](#) will come with the custom cables, the custom cabling can be made/an additional breakout board can be supplied by Ocean Controls. If custom cabling is to be made the connections required are Pin 1 = One Wire Data, Pin 4 = Common, Pin 6 = +5V these connections can be used at the same time as the Davis sensor. If no sensor can be found on any of the 6P5C connectors but the register is enabled, the temperature will be reported as -100.0°C. On the LCD version, "Error" will be displayed. The holding register will contain -1000 (interpreted as signed integers) or 64536 (interpreted as unsigned integers.)

Analog Input 1:

Analog Input 1 is a voltage input with included voltage dividing trimpot R3. To calibrate the input decide on the voltage that should be the maximum input that will scale to 1023. Set either the LCD or Modbus Master to display the AN1 input and then input the maximum voltage. Wind the R3 trimpot until 1022 is shown then finely adjust the trimpot until 1023 is just shown. I.e., if an input of 0-24 V is required feed 24 V into AN1 and then wind the R3 trimpot until a value below 1023 is shown. Once this happens wind R3 in the opposite direction slowly until the display changes from 1022 to 1023. This will set the range. Check by reducing the input voltage to 12 V, the display should now show approximately 512.

Analog Input 2:

Analog Input 2 can be used as either a 0-20 mA input or a 0-3 VDC input, with jumper J1 inserted the input will be set to 0-20 mA current signals, with J1 out the input will be set to 0-3 VDC voltage signals.

LCD Version:

The LCD version of the KTA-249 can have all the parameters adjusted using the buttons and menu system. Push S2 (the middle button) to enter the menu, S3 navigates down the menu, S1 navigates up the menu, when a menu option is selected using the S2 button it's parameters can be changed using the S1 and S3 buttons. A tick will

show which parameter value is currently selected. Pressing the S2 button will select a parameter and quit the menu.

Menu Item	Parameters	Description
Solar	ON, OFF	Turns Solar Radiation Sensor ON and OFF
UV	ON, OFF	Turns UV Radiation Sensor ON and OFF
Anemom	ON, OFF	Turns Wind Sensor ON and OFF
Temp	DS18S20, DS18B20, OFF	Turns Temperature Sensor ON (with matching sensor type) and OFF
A1	ON, OFF	Turns Analog Input 1 ON and OFF
A2	ON, OFF	Turns Analog Input 2 ON and OFF
Baud	1200, 2400, 4800, 9600, 19200, 38400	Selects Baud Rate
Parity	None, Odd, Even	Selects Parity
MBAAddr	1 – 247	Selects Modbus Address
BL Time	0 – 255	Back Light “On Time”, 0 = Always On
Cycle	0 – 255	Parameter Cycle Time, 0 = Never Cycle
WindUnit	Knots, km/h, mph, m/s	Selects Wind Speed Units
Exit		Exits menu system

When not in the menu the display will show the readings from sensors that are turned ON. If more than one sensor is ON then the next reading can be shown by pressing the S1 or S3 buttons to cycle through the readings. If the cycle time parameter is set to anything other than 0 the KTA-249 will automatically cycle to the next parameter after the current parameter has been shown for the number of seconds set by the cycle time.

The back light can be made to turn off to conserve power for solar powered installations. The back light will stay lit always if the “BL Time” parameter is set to 0, or turn off after the set number of seconds if set greater than 0. Each time a button is pressed the back light will come on and then wait the time again.

Defaults:

If the Baud, Parity or Modbus address have been set to unknown values then the default values of 9600 Baud, No Parity and Modbus address 1 can be set by holding down button S2 (the centre button) while the unit is being powered up.

Modbus Holding Registers:

All parameters and readings are available in the Modbus holding registers as listed below.

Reg	Data	Range	Unit
40,001	Solar Radiation Reading	0 – 1800	W/m ²
40,002	Ultra Violet Radiation Index	0.0 – 16.0	UV Index x 10 ^[1]
40,003	Wind Direction	0 – 360	Degrees
40,004	Wind Speed	130 Knots, 241 km/h, 150 mph, 67m/s	Knots, km/h, mph, m/s x 10 ^[2] Selected by Reg 10
40,005	Temperature	-55.0 – +125.0	Degrees Celsius x 10 ^[3]
40,006	Analog Input 1	0 – 1023	None
40,007	Analog Input 2	0 – 1023	None
40,008	Back Light Time	0 – 255	Seconds
40,009	Cycle Time	0 – 255	Seconds
40,010	Wind Speed Units 0=Knots, 1=km/h, 2=mph, 3=m/s	0 – 3	Dimensionless
40,011	Enable Solar Sensor 0=Disabled, 1=Enabled	0 – 1	Dimensionless
40,012	Enable UV Sensor 0=Disabled, 1=Enabled	0 – 1	Dimensionless
40,013	Enable Anemometer 0=Disabled, 1=Enabled	0 – 1	Dimensionless
40,014	Enable Temperature Sensor 0=Disabled, 1=DS18B20, 2=DS18S20	0 – 2	Dimensionless
40,015	Enable Analog Input 1 0=Disabled, 1=Enabled	0 – 1	Dimensionless
40,016	Enable Analog Input 2 0=Disabled, 1=Enabled	0 – 1	Dimensionless
40,017	Anemometer Calibration Resistance	0 – 65535	Ohms
40,018	Modbus Address	0 – 247	Dimensionless
40,019	Baud Rate 0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400	0 – 7	Dimensionless
40,020	Parity 0=No Parity, 1=Odd Parity, 2=Even Parity	0 – 2	Dimensionless

^[1]UV Index is stored as 10 times the actual value. Eg. a value of 45 in the register will equate to a UV index of 4.5

^[2]Numbers are stored as 16-bit values and 10 times the value. Eg. 49 in register 4 would signify 4.9

^[3]Numbers are stored as 16-bit signed values and 10 times the value. Eg. 257 in the register will equate to 25.7°C and 65279 will equate to -25.7°C

