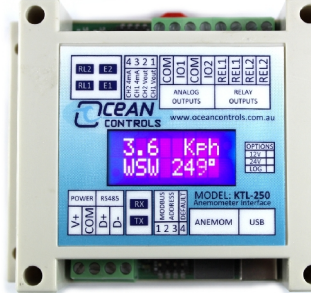
 <p>KTA-250</p>	 <p>KTL-250</p>	<ul style="list-style-type: none"> Connects to Davis Instruments DS7911 Anemometer Monitor both Wind Speed and Direction Interface to PLCs using the Modbus Protocol Communicate via USB or 2-wire RS485 Interface to PLCs/Instruments or other controllers using 4-20mA or 0-5V signals Generate alarms depending on the Wind Speed and Direction Alarms can be monitored by the on board SPST Relays or via the Modbus Protocol DIN Rail or Screw Mounting Enclosure
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Introduction

The KTA-250 is an anemometer monitoring and alarming card. It allows the wind speed and direction to be measured with a Davis Instruments DS7911 Anemometer, without the need for the entire weather station. Monitoring of the wind speed and direction can be done via the analog retransmission channels with 0-5V, 1-5V, 0-20mA or 4-20mA outputs. As well as monitoring the speed and direction, 2 alarm relays can be programmed to activate at a certain speed or wind direction range, or combination of the two. Wind speed and direction can also be monitored using the Modbus protocol with either a USB or 2-wire RS485 connection. Settings are set using the DIP Switches or Modbus protocol and the provided software.

Connections:

Table 1 - Connections

Connection	Description	Connection	Description
V+	DC Power Input	IO1	Wind Speed 0-20mA / 4-20mA / 0-5V / 1-5V Re-Transmission Output
COM	Common Ground Connection	IO2	Wind Direction 0-20mA / 4-20mA / 0-5V / 1-5V Re-Transmission Output
D+	RS485 Data +	REL1	Alarm Relay 1 Contacts
D-	RS485 Data -	REL2	Alarm Relay 2 Contacts
USB	USB Connector		
ANEMOM	Anemometer Connector		

Table 2 - Holding Registers

Holding Reg. No.	Description	Holding Reg. No.	Description
1	Wind Speed	29	Calibration Multiplier
2	Wind Direction	30	Speed Units 0=Mph 1=Km/h 2=Knots 3=m/s Other=Custom Anemometer Calibration
3	Maximum Wind Speed	31	Speed Transmission Low Value
4	Minimum Wind Speed	32	Speed Transmission High Value
10	Relay 1- Wind Speed Alarm On	33	Speed Transmission 0=0-5V/0-20mA 1=1-5V/4-20mA
11	Relay 1- Wind Speed Alarm Limit	34	Direction Offset 0-360
12	Relay 1-Wind Speed Alarm Period	35	Direction Transmission 0=0-5V/0-20mA 1=1-5V/4-20mA
13	Relay 1-Wind Dirn Alarm On	36	Calibrate 1=5V/20mA out on both channels
14	Relay 1-Wind Dirn < Limit	37	Modbus Address 1-243
15	Relay 1-Wind Dirn > Limit	38	Baud Rate 0=9600 1=2400 2=4800 3=9600 4=19200 5=38400 6=57600
16	Relay 1-Wind Dirn Alarm Period	39	Parity 0=None 1=Odd 2=Even
17	Relay 1- Alarm Combination 0=OR, 1=AND	40	Reset Comms 1=Reset
20	Relay 2- Wind Speed Alarm On		
21	Relay 2- Wind Speed Alarm Limit		
22	Relay 2-Wind Speed Alarm Period		
23	Relay 2-Wind Dirn Alarm On		
24	Relay 2-Wind Dirn < Limit		
25	Relay 2-Wind Dirn > Limit		

26	Relay 2-Wind Dirn Alarm Period		
27	Relay 2- Alarm Combination 0=OR, 1=AND		

Table 3 - Coils

Coil No.	Description	Coil No.	Description
1	Relay Output 1	10	SW2-1 State
2	Relay Output 2	11	SW2-2 State
3	Force Relay 1 ON	12	SW2-3 State
4	Force Relay 2 ON	13	SW2-4 State
5	Reset Max and Min Speeds	14	
		15	
		16	SW1-3 State
		17	SW1-4 State

The KTA-250 card only recognises the following Modbus functions:

Table 4 - Recognised Modbus Functions

Function	Purpose
1	Read multiple coils
3	Read multiple Holding registers
5	Write to a single coil
6	Write to a single holding register
15	Write to multiple coils
16	Write to multiple holding registers

When reading multiple holding registers, a maximum of 20 holding registers can be read at one time from the KTA-250.

Communications

The KTA-250 has both a USB and RS485 connection.

USB Virtual COM port drivers can be downloaded from <http://www.ftdichip.com/Drivers/VCP.htm>

If the KTA-250 is used with RS485 and is the last device on a long run a 100Ω termination resistor should be installed across the RS485 lines. It should only be inserted for the last node in the network when using long cable runs and if there are communications problems.

Communications settings of the unit are set by the 4-way DIP switch labelled S2 or Modbus holding registers. SW1-SW3 control the Modbus address of the unit, SW4 sets the default baud rate (57600) and parity (None). Table 5 shows the effects of the switches.

Table 5 - Comms Setting Selection

S2-1	S2-2	S2-3	Address	S2-4	Baud	Parity
OFF	OFF	OFF	Set By Holding Reg 37	OFF	Set By Holding Reg 38	Set By Holding Reg 39
OFF	OFF	ON	1	ON	57600	None
OFF	ON	OFF	2			
OFF	ON	ON	3			
ON	OFF	OFF	4			
ON	OFF	ON	5			
ON	ON	OFF	6			
ON	ON	ON	7			

If the switches are set to OFF, the communications settings are set via the Modbus holding registers, these default to Address = 1, Baud Rate = 9600 and Parity = None.

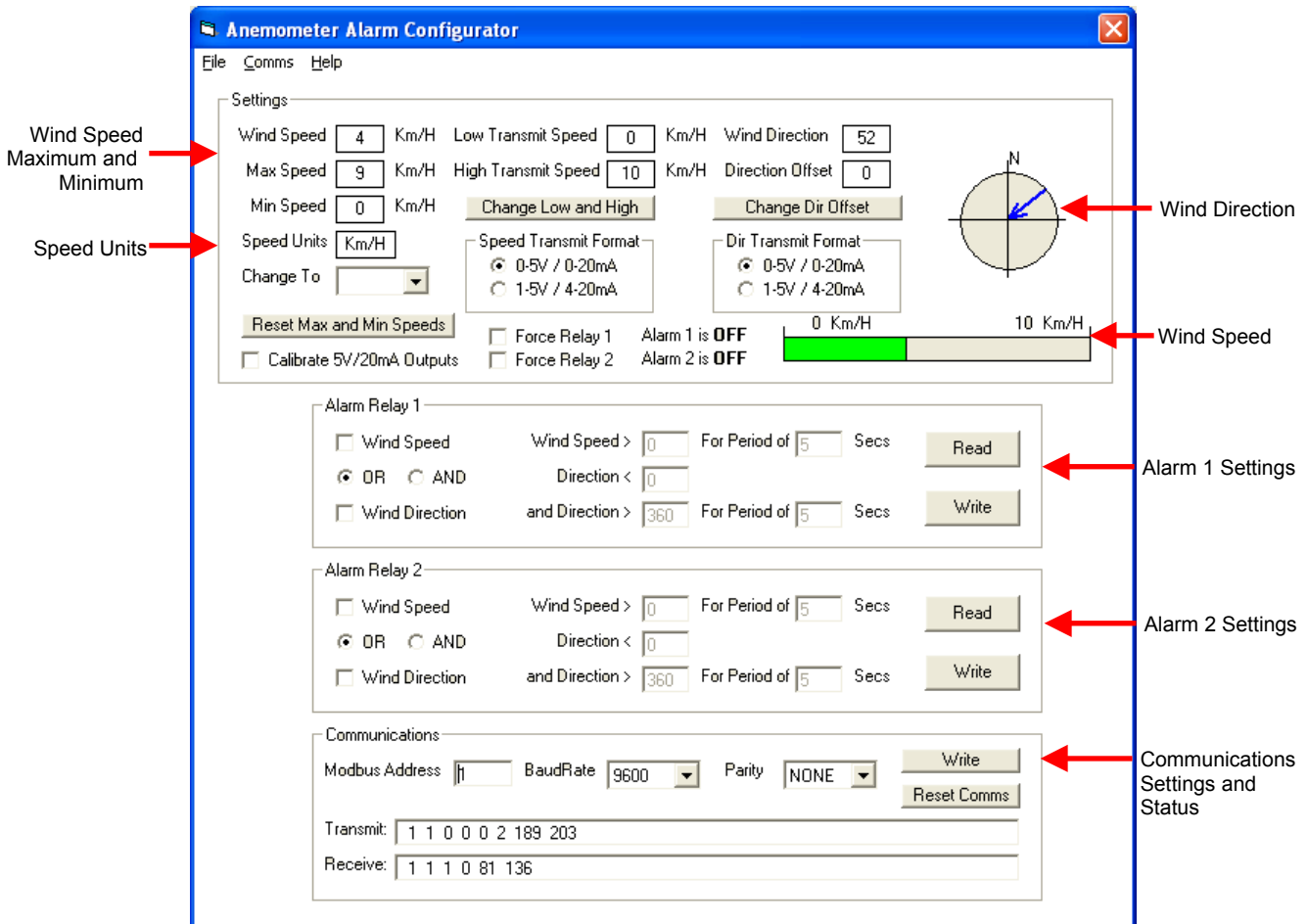
The communications settings are only activated when the unit is first powered up or when a 1 is written to holding register 40.

If the KTA-250 will not respond to communications, power OFF the unit, set the communications settings to Address = 1, Baud Rate = 57600 and Parity = None, in the control software, then turn switches S2-3 and S2-4 ON and S2-1 and S2-2 OFF, after that, turn the power to the unit ON. The control software and the unit should then communicate.

Software

Ocean Controls supply a software configuration package called “KTA-250 Configurator” which is a simple to use program. The configuration software allows the user to monitor the wind speed and direction, as well as the maximum and minimum speeds, and allows the user to set all the available settings. Either through the software or writing to holding register 30 directly the wind speed units can be set. The value by default is Km/H, but can be changed to MPH with a value of 0, Knots with a value of 2 or m/sec with a value of 3, all other values are MPH. When the units are set, all parameters to do with wind speed are displayed in these units and the maximum and minimum speeds are reset.

Figure 2 - Configuration Software



Analog Re-Transmission

The KTA-250 can transmit the wind speed and direction as an analog voltage or current signal. The maximum and minimum wind speeds to transmit are set using holding registers 31 and 32 and the transmission format (0-20mA / 0-5V or 4-20mA / 1-5V) is set using DIP Switches S1-1 and S1-3. By default the KTA-250 will transmit from 0 to 100 in Km/H.

Wind direction is output on channel 2, and DIP Switches S1-2 and S1-4 control the format.

Table 6 - Analog Retransmission DIP Switch Settings

SW1-1	SW1-3	Wind Speed Format	SW1-2	SW1-4	Wind Direction Format
OFF	OFF	0-20mA	OFF	OFF	0-20mA
OFF	ON	4-20mA	OFF	ON	4-20mA
ON	OFF	0-5V	ON	OFF	0-5V
ON	ON	1-5V	ON	ON	1-5V

Current Calibration and Direction Offset

If the anemometer can not be mounted so that the sensor is facing north, or the user does not wish to manually adjust the sensor, a direction offset can be entered to holding register 34 and then this value is added to all direction readings.

If the user wishes to check the calibration of the current loop transmission a value of 1 should be written to holding register 36. This will output the 20mA level to both current channels. If it needs to be adjusted, remove the lid of the KTA-250 case and then a current sensor should be connected to each output and the trimpots near U1 (Channel 1) and U2 (Channel 2) can be adjusted until exactly 20mA is displayed on the current sensor. Once a satisfactory calibration has been achieved, holding register 36 should be written back to 0.

Alarms

There are two alarm relays on the KTA-250, each relay can be activated by either the wind speed going over a certain limit or the direction being within a certain range, or a combination of the two.

The levels and time limits that control the alarms are set using the software or through the Modbus holding registers. Alarm 1 settings begin at holding register 10 and alarm 2 settings begin at holding register 20. Holding register 10 enables alarming on wind speed, register 11 is the speed above which the alarm will become active if it has been above that point for the number of seconds defined by register 12. Register 13 enables alarming on wind direction. The direction must be less than register 14 and greater than register 15 for the time defined by register 16, to activate the alarm. If register 17 is 0, either speed or direction will activate the relay when the limit is reached, but when register 17 is 1, both the speed and direction alarms must be active for the relay to turn on.

Alarm relay 2 has the same functionality as alarm relay 1, except the registers associated with it are 20-27 as opposed to 10-17 for Alarm 1.

Saving Settings to Memory

The KTA-250 has an internal EEPROM memory to store settings even when the unit is not powered. If settings are changed they are automatically saved to memory. The memory save process occurs approximately 5 seconds after settings are changed. If settings are changed, wait 10 seconds before removing power from the unit.

Anemometer Calibration

Holding Registers 29 and 30 relate to the way the pulses from the anemometer translate to wind speed.

If the value in Register 30 is any of the values 0, 1, 2 or 3 the wind speed units are set for for the Davis Instruments 7911 Anemometer for Mph, Km/h, Knots and m/s respectively.

A value of 4 or higher will allow for another anemometer to be used, provided it is wired to the connector correctly. Register 29 is the multiplier that is applied to the speed to allow for a greater resolution if a value of 10 is used then the resolution of the wind speed will be 0.1 of the unit, all the values relating to wind speed will now be a factor of 10 out. I.e, when Register 29 is 10 and Register 30 is 3 a value of 138 in Register 1 will relate to a wind speed of 13.8 m/s.

To create custom calibration units, the value in register 30 should be the number of pulses that the anemometer gives in one hour for that unit.

For the Davis Instruments 7911 anemometer the values used in the KTA-250 are 1602 for Mph, 995 for Km/h, 1843 for Knots and 3578 for m/s.

Indicator LEDs

Various LEDs are used for feedback on the KTA-250, their function is described in Table 7 below.

Table 7 – Indicator LEDs

LED	Description
TX	Transmit LED, Active when data is transmitted out of the KTA-250
RX	Receive LED, Active when data is received by the KTA-250
RL1	Relay 1 LED, Active when Alarm 1 and Relay 1 are ON
RL2	Relay 2 LED, Active when Alarm 2 and Relay 2 are ON
E1	Error 1 LED, Active when analog output 1 is in current mode and the current loop is disconnected or overloaded
E2	Error 2 LED, Active when analog output 2 is in current mode and the current loop is disconnected or overloaded

Logging Version

The KTA-250 is also available with a memory chip for logging wind speed and direction data. Up to approx 65,500 loggings can be made for any combination of “Instantaneous Wind Speed and Direction”, “Average Wind Speed and Direction” and “Maximum and Minimum Wind Speed” with logging periods of 1 second to over 2 hours. The “KTA-250 Log Downloader” software package is used to configure the logging options and download, view and export logged data from the KTA-250. Check the documentation for the “KTA-250 Log Downloader” Software for further information.

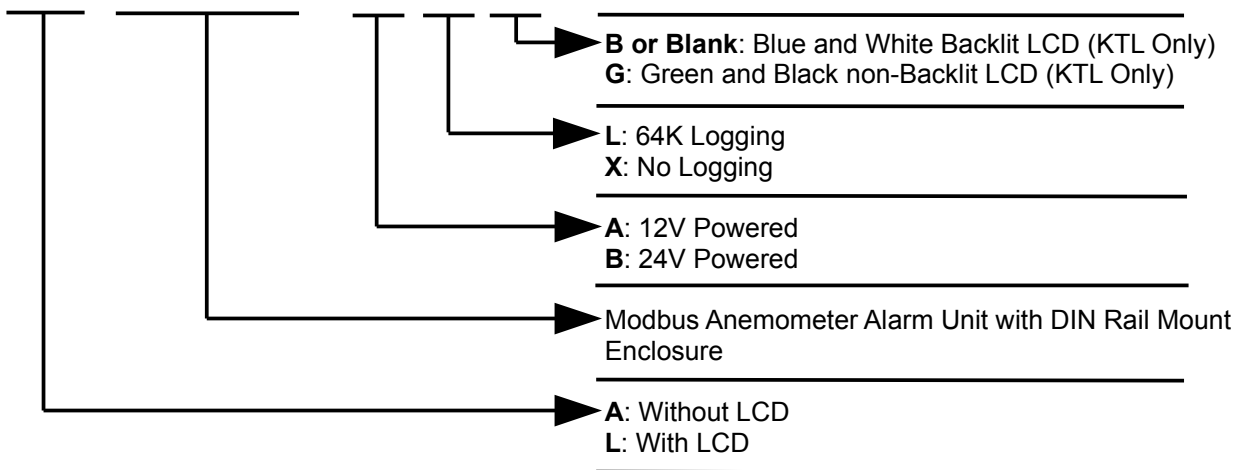
- Logging Memory: 64K loggings
- Wind Speed Logging Range: 0 to 255 Km/H
- Instantaneous and Average Wind Speed Logging Resolution: 0.5 Km/H
- Maximum and Minimum Wind Speed Logging Resolution: 1 Km/H
- Instantaneous and Average Wind Direction Logging Resolution: 2.83°
- Logging Period: 1 to 8192 seconds

Depending on the number of parameters to log and logging period the logging memory can be filled in as little as 6 hours when logging all parameters at 1 second intervals, or 17 years when logging one parameter at 8192 second (approx 2 hrs 16 min) intervals.

The “KTA-250 Log Downloader” software has a built in calculator for how long the device will log for.

Selection Guide

KTA-250-ALB



OLD Part numbers

Old Part No	Description	Replaced With
KTA-250	Anemometer Alarm Card, 12V powered without DIN Rail mounting	KTA-250-AX
KTB-250	Anemometer Alarm Card, 24V powered without DIN Rail mounting	KTA-250-BX
KTE-250	Anemometer Alarm Card, 12V powered with DIN Rail mounting	KTA-250-AX
KTD-250	Anemometer Alarm Card, 24V powered with DIN Rail mounting	KTA-250-BX

Notes

Prior to June 2011 units shipped will have no analog retransmission of wind speed set by default, this must be configured by the user.

After June 2011 units shipped should have the following defaults set:

- Wind Speed Units Km/H
- Wind Speed Transmission Low Value 0
- Wind Speed Transmission High Value 100