

## KTA-382 Weather Station Gateway



- Connects a Davis VantagePro2 or VantageVue to a Modbus Network
- 2 x Modbus RTU over RS485/232 ports. Also, TCP/IP configuration over ethernet and Wi-Fi
- Simple Modbus RTU and TCP/IP configuration using webpage or desktop application
- Supports up to 5 simultaneous Modbus TCP masters and 2 simultaneous RTU masters
- Various metric/imperial unit conversion settings
- Allows for direct weather station configuration

### Overview

The KTA-382 Modbus TCP Weather Station Gateway allows the easy connection of a PLC (Programmable Logic Controller), RTU (Remote Telemetry Unit) or SCADA System to a Davis Instruments Weather Station. Using the Modbus RTU (Binary), or Modbus TCP/IP (Ethernet & Wi-Fi) protocols, it enables a programmable controller to monitor and carry out actions based on wind speed, wind direction, temperature and many other weather-based variables.

The KTA-382 Modbus TCP+RTU Weather Station Gateway is a major upgrade to our popular GWY-141 and KTA-282 Modbus- VantagePro2 Gateway. It provides all the functionality of the GWY-141 and KTA-282, with the following additions:

- Supports LOOP1, LOOP2 and HILOWS command – over 120 Weather data registers
- Addition of extra serial RTU port. Able to be polled simultaneously with pre-existing port.
- Simultaneous TCP/IP polling over Wi-Fi and Ethernet.
- Provides a method to set up weather station for first use via the gateway
- Build in cloud upload capability (WeatherUnderground by default – custom cloud upload available on request for custom firmware)
- Logging and PoE (power over ethernet) variants (available upon request)

### Variants

- **KTA-382S** – Standard version
- **KTA-382L** – Standard + datalogging (upcoming)
- **KTA-382P** – Standard + PoE (power over ethernet)
- **KTA-382LP** – Standard + datalogging + PoE (upcoming)

### Quick Access

Complete Holding-Register listing (Page 14)

Unit Conversion-

Configuration (Pages 5-9)

Webpage Access (Page 7)

### Device Compatibility

**6152C** Cabled VantagePro2

**6162C** Cabled VantagePro2 Plus

**6152** Wireless VantagePro2

**6162** Wireless VantagePro2 Plus

**6153** Wireless Vantage Pro 2

Fan Aspirated

**6163** Wireless Vantage Pro 2

Plus Fan Aspirated

**6250** Vantage Vue

**6316** Wireless Weather Envoy

**6316C** Cabled Weather Envoy

## Contents

Overview.....	1
Variants.....	1
Quick Access.....	1
Device Compatibility.....	1
Getting Started.....	3
Weather Station Set-up.....	3
Configuring Modbus.....	5
1. Modbus RTU.....	5
2. Modbus TCP/IP - Ethernet.....	6
3. KTA-382 Webpage.....	6
WIFI .....	8
Ethernet.....	8
KTA-382 PC Application.....	9
Weather Station Data .....	10
LOOP 1 Data .....	10
LOOP 2 Data .....	12
Functionality .....	12
Unit Conversions.....	12
DI/O (Digital IN/OUT) .....	13
Factory Reset.....	14
Troubleshooting .....	14
IP Issue.....	14
Modbus RTU Issue.....	14
Complete Holding Register Listing .....	15
<b>Appendix B.....</b>	<b>19</b>
<b>Leaf/Soil Stations (Register 15-18, and 35-38).....</b>	<b>19</b>
<b>Extra Humidity Stations (Register 20-23) .....</b>	<b>20</b>
<b>Forecast Icon (Register 50).....</b>	<b>20</b>
<b>Forecast Rule Number (Register 51) .....</b>	<b>20</b>

## Getting Started

Terminology	Reference To
"Weather station"	<ul style="list-style-type: none"> <li>• Vantage Pro 2 console</li> <li>• Vantage Vue console</li> <li>• Envoy (Wired or Wireless)</li> </ul>
"Sensors"	<p>Any weather sensors your weather station communicates with. This is commonly a variety of sensors packaged together as an <b>Integrated Sensor Suite (ISS)</b> but can also include:</p> <ul style="list-style-type: none"> <li>• ISS Plus (ISS + UV &amp; Solar Radiation)</li> <li>• Wireless Temperature Sensor</li> <li>• Temp/Humidity Sensor</li> <li>• Leaf &amp; Soil Moisture/Temp</li> </ul> <p>Or individual sensors (not an exhaustive list):</p> <ul style="list-style-type: none"> <li>• Leaf Wetness</li> <li>• Solar Radiation</li> <li>• UV</li> <li>• Anemometer</li> <li>• Rain Collector</li> </ul>
"Weatherlink"	The serial WeatherLink expansion cable. Allows for weather station connection to the KTA-382. Can also be used to update the firmware of your console.
"Gateway"	The KTA-382 Modbus Weather Station Gateway
"Controller"	The Modbus device you are using to poll the KTA-382.
"Weather station EEPROM"	Persistent memory held inside the weather station used to store factory calibration values, location specific data, and other configuration values. It is this memory that is set during the setup of your weather station for first use (latitude, longitude, elevation, etc).

Table 1: Davis Instruments Terminology

## Weather Station Set-up

Begin by assembling your weather station and sensors, using the documentation provided by Davis. You will need to fit the **WeatherLink** in this step – [see figure 1](#).

This is now the best time to setup your weather station for the first use. The Davis documentation will detail this process. If you have a weather station with a screen you can follow the prompts after entering "setup" mode, otherwise the setup process can be done by connecting to a PC. The KTA-382 also offers a method to setup your weather station by directly writing to registers. However, it is designed for advanced users to alter calibration values and is not recommended for first use configuration. The following values are typically set during this procedure:

- IDs, and retransmission of wireless sensors (if applicable).
- Date and time
- Latitude and longitude
- Daylight savings
- Elevation
- Wind cup size (large is standard)
- Rain collector size (US models: 0.01 in, UK models: 0.2 mm. This will typically only need to be changed if a metric adapter is fitted to a US unit)
- Rain season start
- Serial Baud Rate (ensure it is at default: 19200.)

Continue the set-up process by connecting all necessary cabling. A generic set up is shown in the diagram below (depending on your particular product, connections may differ slightly).

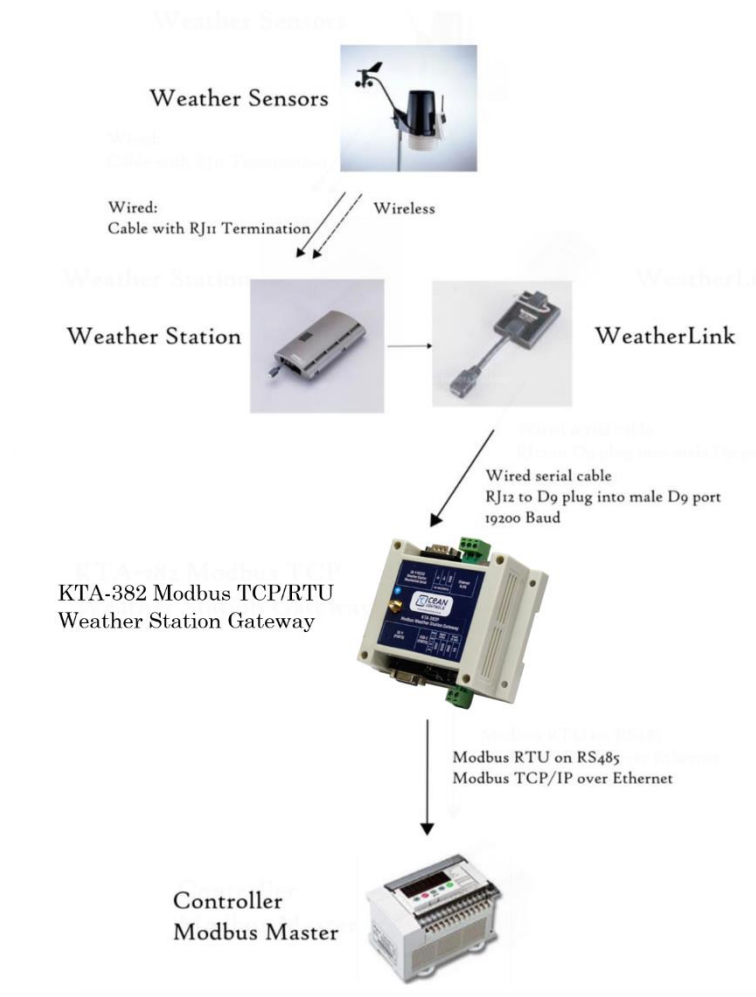


Figure 1: Typical Hardware Set-up

Connection	Description
VIN Power +	Power supply Positive: 9-36VDC
GND Power -	Power supply Negative: 0V (Ground)
DIO0	Digital In/Out 1
DIO1	Digital In/Out 2
USB-C & Female DE-9	Serial/RTU communication port 1 (DE-9 and USB-C are mirrored); <b>USB-C can be used as Power</b>
D+	Serial port 2 – RS-485 Data +
D-	Serial port 2 – RS-485 Data
Male DE-9	Connection to Davis Weather Station
Ethernet Port	Port for TCP/IP polling over ethernet

Table 2: Connections to KTA-382

LEDs	Description
PORT0	Port 0 Communication Status LED <ul style="list-style-type: none"> <li><b>Startup</b> – Flash green then red once, indicating the device initialization has done</li> <li><b>GREEN</b> – Indicates good communication</li> <li><b>RED</b> – Push button is pressed and held for more than 5s (release the button to active the WiFi network)</li> </ul>
PORT1	Port 1 Communication Status LED <ul style="list-style-type: none"> <li><b>Startup</b>: Flash green then red once, indicating the device initialization has done</li> <li><b>GREEN</b> – Indicates good communication</li> <li><b>RED</b> – Push button is pressed and held for more than 10s (release the button to active Factory Reset Process)</li> </ul>

<b>VP2</b>	Weather Station Communication Status LED <ul style="list-style-type: none"> <li>• <b>Startup</b>: Flash green then red once, indicating the device initialization has done</li> <li>• <b>GREEN</b> – Indicates good communication</li> <li>• <b>RED</b> – Push button is pressed and held for more than 10s (release the button to active Factory Reset Process)</li> </ul>
<b>STA</b>	Status LED <ul style="list-style-type: none"> <li>• <b>OFF</b>: During Startup</li> <li>• <b>Solid ON</b>: Normal Operation</li> <li>• <b>Flash every 1s</b>: Webpage Configuration Mode Enabled</li> </ul>

Table 3: KTA-382 LED Functions

Provide power to the KTA-382 via the VIN and GND pins or by the USB-C port. With nothing else connected, the green LEDs will flash, then the initialization checks will commence. LEDs, 1, 2 and 3 should light up green in succession if all initializations are successful. Once the gateway begins main function (post initialization) the blue LED will turn on to indicate initialization is finished.

Ensure you have connected the Davis Weather Station via the male DE-9 connector, then LED 3 will begin flashing if communication to the weather station has been successfully established.

## Configuring Modbus

### Modbus RTU

The Modbus serial settings can be adjusted from within the KTA-382 webpage. Each method allows you to live update the baud-rate, parity, data-bits and stop-bits without a power cycle. Both serial ports are customizable to allow you to interface communication between any desired, serial capable devices.

**How to access the webpage is detailed on page 8.**

As seen in figure 2. Each serial port is configurable via the menu on the webpage. Ensure ALL of the values you have input are as desired, then press the “Write Serial settings to gateway” button. Give the gateway a few moments to receive the request, then the serial settings will be set (and stored for next power cycles) to the desired values.

Holding Register Address 40,000+	No. of Registers	Description	Notes
<b>190</b>	1	Serial Port RS232 USB Address Register	<b>0 - 247</b>
<b>191</b>	1	Serial Port RS232 USB Baud Rate	<b>0 = 9600</b> <b>1 = 19200</b> <b>2 = 38400</b> <b>3 = 57600</b> <b>4 = 115200</b>
<b>192</b>	1	Serial Port RS232 USB Data Type	<b>8N1 = 0</b> <b>8N2 = 1</b> <b>8E1 = 2</b> <b>8E2 = 3</b> <b>8O1 = 4</b> <b>8O2 = 5</b>
<b>193</b>	1	Serial Port RS232 USB Commit New Values	<b>Note 1</b>
<b>194</b>	1	Serial Port RS485 Address Register	<b>See above (Note 2)</b>
<b>195</b>	1	Serial Port RS485 Baud Rate	<b>See above</b>
<b>196</b>	1	Serial Port RS485 Data Type	<b>See above</b>
<b>197</b>	1	Serial Port RS485 Commit New Values	<b>See above</b>

Table 3: Serial Parameters from Modbus Registers

1. The commit serial params registers act the same as the commit IP register. Using the serial data stored in registers 190-192, these will be mapped to the relevant serial port of the gateway. These are stored in EEPROM, and will persist a power cycle.
2. Registers 190-197 contain the individual serial parameters for each port. Both port 0 and 2 store the serial parameters identically. However, they can be configured separately.

## Modbus TCP/IP - Ethernet

The KTA-382 can be polled via Ethernet (port 502). By the default, the device is set as below:

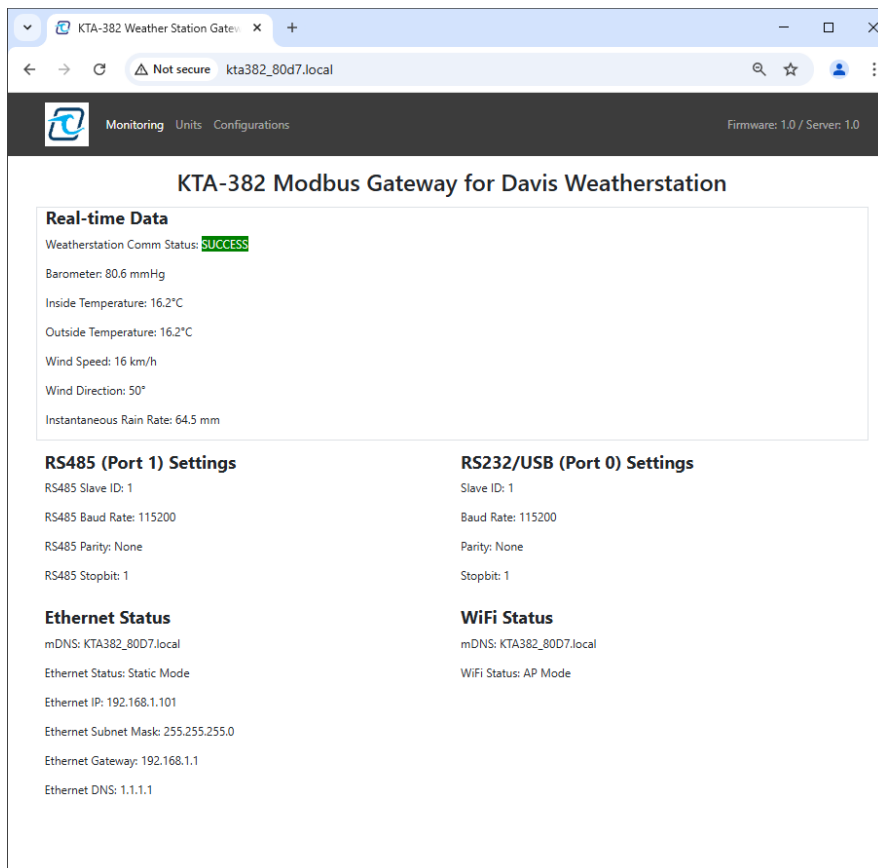
- Ethernet Mode: Static
- IP Address: 192.168.1.101
- Subnet Mask: 192.168.1.1
- DNS: 1.1.1.1

The Ethernet Mode, IP, subnet mask, gateway and DNS are all configurable from PC Application or Webpage.

## KTA-382 Webpage

The KTA-382 comes with a webpage as a method of wireless configuration. Due to certain limitations, some configurations are limited to the webpage, and some to the PC application. The main configurations limited to the webpage are:

- Unit Conversion
- Ethernet Setup
- Serial Port Parameters




The screenshot displays the KTA-382 Modbus Gateway for Davis Weatherstation webpage. The browser address bar shows 'kta382\_80d7.local'. The page has a dark header with the CEAN logo, navigation links (Monitoring, Units, Configurations), and firmware/server version (1.0 / 1.0). The main content area is titled 'KTA-382 Modbus Gateway for Davis Weatherstation' and contains several sections:

- Real-time Data:** Weatherstation Comm Status: SUCCESS, Barometer: 80.6 mmHg, Inside Temperature: 16.2°C, Outside Temperature: 16.2°C, Wind Speed: 16 km/h, Wind Direction: 50°, Instantaneous Rain Rate: 64.5 mm.
- RS485 (Port 1) Settings:** RS485 Slave ID: 1, RS485 Baud Rate: 115200, RS485 Parity: None, RS485 Stopbit: 1.
- RS232/USB (Port 0) Settings:** Slave ID: 1, Baud Rate: 115200, Parity: None, Stopbit: 1.
- Ethernet Status:** mDNS: KTA382\_80D7.local, Ethernet Status: Static Mode, Ethernet IP: 192.168.1.101, Ethernet Subnet Mask: 255.255.255.0, Ethernet Gateway: 192.168.1.1, Ethernet DNS: 1.1.1.1.
- WiFi Status:** mDNS: KTA382\_80D7.local, WiFi Status: AP Mode.

KTA-382 Weather Station Gateway x +

← → ↻ ⚠ Not secure kta382\_80d7.local/units 🔍 ☆ 👤 ⋮

 Monitoring Units Configurations Firmware: 1.0 / Server: 1.0

## KTA-382 Modbus Gateway for Davis Weatherstation

### Unit Conversions

Temperature Unit:

Pressure Unit:


Wind Speed Unit:

Rain Unit:

Submit new changes

KTA-382 Weather Station Gateway x +

← → ↻ ⚠ Not secure kta382\_80d7.local/configs 🔍 ☆ 👤 ⋮

 Monitoring Units Configurations Firmware: 1.0 / Server: 1.0

## KTA-382 Modbus Gateway for Davis Weatherstation

### RS485 Settings

Slave ID (1-255):

Baud Rate:

Data Config:

Submit new changes

### RS232/USB Settings

Slave ID (1-255):

Baud Rate:

Data Config:

Submit new changes

### Ethernet Settings

Connection Mode:

IP Address:

Subnet Mask:

Gateway:

DNS:

Submit new changes

Users can access the webpage via WiFi or Ethernet connections.

## WiFi

Follow the following steps to connect to the KTA-382 network:

- **Enable the KTA-382 WiFi Network:** Press and hold the push button for 3s (until the PORT0 LED turns RED) then release it.
- **Activate Network Mode:** The status LED will start flashing every second, indicating that the network mode is active. This mode stays active for 30 minutes.
- **Connect to the Network:** On your laptop or mobile device, search for the WiFi network named “KTA382\_XXXX” (where “XXXX” is the MAC address).
- **Join the Network:** Connect using the default password: “password”
- **Access the Web Interface:** Open a web browser and go to “KTA382\_XXXX.local” or “192.168.4.1”.
- **Configure and Monitor:** The web interface will allow you to adjust Modbus settings and view the current status of the KTA-382.

## Ethernet

The webpage server is hosted on the device’s IP address, hence if the IP address is 192.168.1.101, the URL is <http://192.168.1.101>. Any changes to the IP configuration will automatically update the web server’s IP address.

The IP settings are stored and accessed directly from the Modbus registers, as detailed in Table 7.

By default, the device is configured as below:

- Ethernet Mode: Static
- IP Address: 192.168.1.101
- Subnet Mask: 192.168.1.1
- DNS: 1.1.1.1

Register	IP Octet
79	Network ETH DHCP Static Mode
80	Network ETH IP1
81	Network ETH IP2
82	Network ETH IP3
83	Network ETH IP4
84	Network ETH Submask1
85	Network ETH Submask2
86	Network ETH Submask3
87	Network ETH Submask4
88	Network ETH Gateway1
89	Network ETH Gateway2
90	Network ETH Gateway3
91	Network ETH Gateway4
92	Network ETH DNS1
93	Network ETH DNS2
94	Network ETH DNS3
95	Network ETH DNS4
96	Network ETH Settings Commit

Table 4: Modbus TCP/IP, Wi-Fi and Ethernet Configuration Registers

1. Registers 80-83 contain the **Ethernet IP** – This is the address that the webpage is hosted on, and the IP for Modbus TCP over Ethernet
2. Registers 84-87 contain the octets of the **subnet mask** for the Ethernet network.
3. Registers 88-91 contain the octets of the **default gateway** for the Ethernet network.
4. Registers 92-95 contain the **DNS IP**.
5. If the ETH commit register (Holding Register 96) is written 1, then all the current values within the IP registers will be set to the config of the gateway, storing the new IP’s after new power cycles.



## KTA-382 PC Application

Ocean Controls - KTA-382 Configurator

Device Tools

1.

2.

**CONNECTION SETTINGS:** Serial RTU Port: COM3 Slave Address: 1 Disconnect Autoconnect Poll ☐ Continuous Polling

### HOLDING REGISTER TABLE

3. Search:

	1	2
4. 1	BAROMETER_TREND	0
2	PACKET_TYPE	0
3	NEXT_DATA_LOCATION_IN_ARCHIVE...	0
4	BAROMETER	0
5	IN_TEMPERATURE	0
6	IN_HUMIDITY	0
7	OUT_TEMPERATURE	65535
8	WIND_SPEED	114
9	WIND_SPEED_AVERAGE_10MIN	114
10	WIND_DIRECTION	65535
11	EXT TEMPS 1&2	42662
12	EXT TEMPS 3&4	42662
13	EXT TEMPS 5&6	42662
14	EXT TEMP 7	0
15	SOIL TEMPS 1&2	0
16	SOIL TEMPS 3&4	0
17	LEAF TEMPS 1&2	0
18	LEAF TEMPS 3&4	0
19	OUT_HUMIDITY	0
20	EXT HUMIDITIES 1&2	0
21	EXT HUMIDITIES 3&4	0
22	EXT HUMIDITIES 5&6	0
23	EXT HUMIDITY 7	0
24	RAIN_RATE	645
25	UV_INDEX	0
26	SOLAR_RADIATION	0

### COMMUNICATION STATUS

TCP/IP Comms (PC to KTA-382): N/A  
 Comms to Station (VP2 to KTA-382): SUCCESS  
 Serial/RTU Comms (PC to KTA-382): SUCCESS  
 Cloud Upload Status: Not Configured

5.

### UNIT CONVERSION SETTINGS

Temperature: Temperature 0.1F°/Extra Temps 1°F + 90  
 Pressure: 0.001 atm  
 Wind-speed: 1 m/s  
 Rain-fall: 0.1 mm  
 Set Conversions

6.

### INTERNET SETTINGS

☐ Edit IP Values Ethernet  
 1st Octet 2nd Octet 3rd Octet 4th Octet  
 IP Address: 192 . 168 . 1 . 100  
 Subnet Mask: 255 . 255 . 255 . 0  
 Default Gateway: 192 . 168 . 1 . 1  
 DNS IP: 1 . 1 . 1 . 1  
 Set Internet Settings

7.

### SERIAL SETTINGS Baud-rate (Bps) Stop-Bits Parity Address

Port 0 (USB) 115200 1 None 1 Commit USB Settings  
 Port 2 (RS485) 38400 1 Even 1 Commit RS485 Settings

8.

### COLLECTORS Register Address Threshold

Collector 1: Active Low Enable C1  
 Collector 2: Active Low Enable C2

9.



**OCEAN CONTROLS**

Technical Support:

(03) 9708 2390

info@oceancontrols.com.au

oceancontrols.com.au

Read response error: Request timeout. (code: 0x5)

10.

Figure 2: KTA-382 PC Application

Index	Description
1 – Connection Settings	Connection settings. Here you can configure to use RTU or TCP/IP comms. Also you can select the COM port, IP address and device address. At the end is the connect, and autoconnect buttons to open/close communication. <b>You can manually choose parameters in tools -&gt; communication options</b>
2 – Polling	Polling. Press the poll button to poll a single time. Check the continuous polling box to poll at a defined interval (check 10 to configure interval)
3 – Search bar	The search bar will narrow relevant cells in the register table to your search query
4 – Register Table	Holding Register table. Here you will be able to see all the registers with a description and value attached. This table will be blank until a successful poll has occurred.
5 – Communication Status	Communication status. Here you can see the TCP/IP or RTU status. As well as the communication status to the weather station and the cloud upload status.
6 – Unit Conversion Settings	Here you can configure the desired units to be written to the registers.
7 – IP settings	Here you can manually select all the relevant IP addresses of the KTA-382. This will survive a power cycle.
8 – Serial settings	Here you can configure each of the 2 modbus ports.
9 – DI/Os	Here you can configure the conditions for the O/C outputs. These are located on the DIO pins. Select a register address, threshold and active high or low, then press the button to write.
10 – Status Bar	The status bar will show any error indication with the communication from your PC to the KTA-382. This can include Modbus error codes and more to help with troubleshooting an invalid connection.

Table 5: KTA-382 PC Application Explanation

## Weather Station Data

The gateway operates as a Modbus slave. **To access the holding registers in the gateway, the PLC or RTU/TCP device must be configured as a Modbus Master.** Using Modbus Function 0x03, the master can read the Holding Registers. If you want to manually configure parameter registers (such as IP or serial settings) you can use Modbus functions 0x06 to write single registers, or 0x10 to write multiple registers.

## LOOP 1 Data

Data returned by the loop 1 command. All supported Davis Instruments hardware will populate these fields.

Holding Register Address 40,000+	No. of Registers	Description	Notes
1	1	Barometer Trend	1
2	1	Packet Type	
3	1	Next Data Location In Archived Memory	
4	1	Barometer	
5	1	In Temperature	
6	1	In Humidity	
7	1	Out Temperature	
8	1	Wind Speed	
9	1	Wind Speed Average 10min	
10	1	Wind Direction	
11	4	7 Extra Temperature	
15	2	4 Soil Temperature	
17	2	4 Leaf Temperature	
19	1	Out Humidity	
20	4	7 Extra Humidity	
24	1	Rain Rate	
25	1	UV Index	

26	1	Solar Radiation	
27	1	Storm Rain	
28	1	Current Date of Storm Rain	2
29	1	Day Rain	
30	1	Month Rain	
31	1	Year Rain	
32	1	Day ET	
33	1	Month ET	
34	1	Year ET	
35	2	4 Soil Moisture	
37	2	4 Leaf Wetness	
39	1	Inside Alarms	
40	1	Rain Alarms	
41	1	Outside Alarms	
42	1	Extra Temperature Humidity Alarms	
46	1	Soil Leaf Alarm	
48	1	Transmitter Battery Status	
49	1	Current Console Battery Level	
50	1	Forecast Icons	
51	1	Forecast Rule Number	
52	1	Time Sunrise	
53	1	Time Sunset	
54	1	Wet Bulb	4
55	1	DIO0 State	
56	1	DIO1 State	
57	1	DIO Mode	
58	1	Unused	
59	1	Unused	
60	1	Loop1 Comm Status	3

Table 6: Loop 1 Data Register Mapping

1. The three-hour barometer trend will show one of the following:

Value	Meaning
-60 (196 as an unsigned byte)	Falling Rapidly
-20 (236 as an unsigned byte)	Falling Slowly
0	Steady
20	Rising Slowly
60	Rising Rapidly
80 (ASCII 'P')	Rev A firmware; no trend info is available. The WeatherLink cable can be used to update the weather station to the latest firmware
Any other value	The weather station doesn't have the 3 hours of barometer data required to calculate trend data

Table 7: 3-Hour Barometer Trend Description

2. The start date of current storm is represented as follows, bit 15 to bit 12 is the month, bit 11 to bit 7 is the day and bit 6 to bit 0 is the year offset by 2000.
3. Holding Register 60 contains the communications status, which indicates if the Gateway is receiving data from the Weather Station.
4. Wet bulb is not NOAA accurate, but rather an estimation based on temperature and dewpoint. Use as an indication only.

## LOOP 2 Data

Only recent Davis Instruments hardware (Vantage Pro 2 firmware V1.9 or later, Vantage Vue) will return the loop 2 command with valid data. Older hardware will either not respond or respond with invalid values. The WeatherLink cable can be used to update an older weather station with this recent firmware.

Holding Register Address 40,000+	No. of Registers	Description	Multiplier	Units	Notes
61	1	Wind Speed Average 2min	0.1	kph	
62	1	Wind Gust 10min	1	kph	
63	1	Wind Gust Direction 10min	1	degrees	
64	1	Dew Point	1	°C	
65	1	Heat Index	1	°C	
66	1	Wind Chill	1	°C	
67	1	THSW Index	1	°C	
68	1	Rain Last 15min	0.1	mm	
69	1	Rain Last Hour	0.1	mm	
70	1	Rain Last 24hour	0.1	mm	
71	1	Barometric Reduction Method			1
72	1	User Entered Barometric Offset	0.1	mbar	
73	1	Barometric Calibration Number	0.1	mbar	
74	1	Barometric Sensor Raw Reading	0.1	mbar	
75	1	Barometric Pressure Absolute Reading	0.1	mbar	
76	1	Altimeter Setting	0.1	mbar	
77	1	Index To Minute Within the Hour			2
78	1	Loop2 Comm Status			3

Table 8: Loop 2 Data Register Mapping

1. The barometric reduction method applies corrections to the barometer to get a more accurate reading. The raw pressure is affected by other weather events such as temperature, humidity, and elevation. The options are:
2. Index to the minute within the hour holds the current progress of the hour used for rain rate calculations – from 0 to 59.
3. Holding register 78 contains the status of the loop 2 command. If 1, loop 2 is being successfully received. To obtain the loop 2 data, the hardware must be either a Vantage Pro2 (Firmware revision 1.90 or later) or a Vantage Vue.

Reading	Barometric Reduction Method
0	User offset
1	Altimeter Setting
2	NOAA Bar Reduction (for Vantage Pro 2 this is the default and cannot be changed)

Table 9: Barometric Reduction Method Description

## Functionality

### Unit Conversions

The units of the readings can be changed by writing to the Modbus holding registers shown in table 13. The following table shows the multiplier and unit. For example, if a 1 was written to holding register 108 then the atmospheric pressure readings would be in mmHg and have to be multiplied by 0.1.

You can set the conversions via the PC application, webpage, or by manually manipulating the modbus registers. After power cycle, write the new conversion settings in the “conversion registers” (108-111), then write 1 to the “commit conversions” register. This will save the new values in EEPROM.

Holding Register Address 40,000+	No. of Registers	Description	Conversion	Registers Affected
105	1	Temperature Conversion setting	0 = 0.1°C 1 = 0.1°F	5, 7
106	1	Pressure Conversion setting	0 = 0.001 inHg 1 = 0.1 mmHg 2 = 0.1 mb 3 = 0.001 atm	4
107	1	Wind speed conversion	0 = 1 mph 1 = 1 kph 2 = 1 knots 3 = 1 m/s 4 = 1 ft/s	8, 9
108	1	Rain and rain rate conversion	0 = 0.01 in 1 = 0.1 mm	24, 27, 29, 30, 31, 32, 33, 34

Table 13: Unit Conversion Modbus Register Mapping

## DI/O (Digital IN/OUT)

**NOTE: The standard KTA-382 ONLY comes with Open Collector OUTPUTs by default. Call or email us for digital INPUT capability**

Holding Register Address 40,000+	No. of Registers	Description	Default	Note
55	1	DIO0 State		0 – LOW 1 – HIGH
56	1	DIO1 State		0 – LOW 1 – HIGH
57	1	DIO Mode	1	0 – INPUT 1 – OUTPUT
117	1	Output 1 Alarm Monitor Register	0	Holding Register that is monitored for triggering alarm output 1
118	1	Output 1 Alarm Threshold	0	
119	1	Output 1 Alarm Direction	0	Active alarm when: 0 – Smaller than Threshold 1 – Greater than Threshold
120	1	Output 2 Alarm Monitor Register	0	Holding Register that is monitored for triggering alarm output 2
121	1	Output 2 Alarm Threshold	0	
122	1	Output 2 Alarm Direction	0	Active alarm when: 0 – Smaller than Threshold 1 – Greater than Threshold

Table 10: DI/O Port Modbus Configuration Registers

1. The two digital I/Os can be configured as INPUTs/OUTPUTs upon request. **By default, both are set to Open Collector OUTPUTs.**
2. When the IO is set to be INPUT (contact us for the INPUT Type), **leaving them floating might result in a HIGH value** on register 55 and 56. So, make sure they are connected to a ground for a valid LOW state.
3. Held in register 117 and 120 are the target registers you want to monitor, in order to set alarms if the monitor value is above or below the threshold (stored in register 118 and 121). So, if a 6 is written to register 117, that means Alarm Output 1 is set by the Inside Humidity reading.

## Factory Reset

To factory reset the KTA-382, *press and hold the push button for more than 10s until **the PORT0, PORT1 and VP2 LEDs are all light up RED**, then release the button.*

The factory reset sequence will reset all settings. They will be set to default:

- **Serial Setup:** Baud = 115200, Stop-bits = 1, Data-bits = 8, Parity = None
- **Unit Conversions:** C, mmHg, kph, mm
- **Ethernet Setup:** Mode = Static IP, IP = 192.168.1.101, Subnet = 255.255.255.0, Gateway = 192.168.1.1, DNS = 1.1.1.1

## Troubleshooting

### IP Issue

If you are unable to navigate to the webpage or poll using Modbus TCP/IP follow the below methodology to diagnose the issue.

1. Open the KTA-382 PC application (**see page 10**)
2. Connect a computer to the KTA-382 via the USB-C port
3. In the PC application, connect to the valid COM port, and poll the device.
4. Located in the “Internet Settings” you will see the currently assigned IP’s
5. Check all the IP’s match the network you have connected the gateway to

### Modbus RTU Issue

1. In the event you have an RTU issue, try to connect with the other port, using factory settings.
2. Read the “Port Settings in the Modbus registers” via the PC application.

## Complete Holding Register Listing

Holding Register Address	No. of Registers	Description	Multiplier	Unit
40,000+				
1	1	Barometer Trend		
2	1	Packet Type		
3	1	Next Data Location In Archived Memory		
4	1	Barometer	0.1	mmHg
5	1	In Temperature	0.1	°C
6	1	In Humidity	1	%
7	1	Out Temperature	0.1	°C
8	1	Wind Speed	1	kph
9	1	Wind Speed Average 10min	1	kph
10	1	Wind Direction	1	°
11	4	7 Extra Temperature	1	°C
15	2	4 Soil Temperature	1	°C
17	2	4 Leaf Temperature	1	°C
19	1	Out Humidity	1	%
20	4	7 Extra Humidity	1	%
24	1	Rain Rate	0.1	mm/hour
25	1	UV Index	0.1	
26	1	Solar Radiation	1	W/m <sup>2</sup>
27	1	Storm Rain	0.1	mm
28	1	Current Date of Storm Rain		
29	1	Day Rain	0.1	mm
30	1	Month Rain	0.1	mm
31	1	Year Rain	0.1	mm
32	1	Day ET	0.1	mm
33	1	Month ET	0.1	mm
34	1	Year ET	0.1	mm
35	2	4 Soil Moisture	1	centibar
37	2	4 Leaf Wetness	1	
39	1	Inside Alarms	1	
40	1	Rain Alarms	1	
41	1	Outside Alarms	1	
42	4	Extra Temperature Humidity Alarms	1	
46	2	Soil Leaf Alarm	1	
48	1	Transmitter Battery Status	1	
49	1	Current Console Battery Level	0.01	Volts
50	1	Forecast Icons	1	
51	1	Forecast Rule Number	1	
52	1	Time Sunrise	1	HHMM
53	1	Time Sunset	1	HHMM
54	1	Wet Bulb	0.1	°C
55	1	DIO0 State		
56	1	DIO1 State		
57	1	DIO Mode		
58	1	Unused		
59	1	Unused		
60	1	Loop1 Comm Status		
61	1	Wind Speed Average 2min	0.1	kph
62	1	Wind Gust 10min	1	kph
63	1	Wind Gust Direction 10min	1	°
64	1	Dew Point	1	°C
65	1	Heat Index	1	°C
66	1	Wind Chill	1	°C
67	1	Thsw Index	1	°C

68	1	Rain Last 15min	0.1	mm
69	1	Rain Last Hour	0.1	mm
70	1	Rain Last 24hour	0.1	mm
71	1	Barometric Reduction Method		
72	1	User Entered Barometric Offset	0.1	mmHg
73	1	Barometric Calibration Number	0.1	mmHg
74	1	Barometric Sensor Raw Reading	0.1	mmHg
75	1	Barometric Pressure Absolute Reading	0.1	mmHg
76	1	Altimeter Setting	0.1	mmHg
77	1	Index To Minute Within The Hour		
78	1	Loop2 Comm Status		
79	1	Network ETH DHCP Static Mode		
80	1	Network ETH IP1		
81	1	Network ETH IP2		
82	1	Network ETH IP3		
83	1	Network ETH IP4		
84	1	Network ETH Submask1		
85	1	Network ETH Submask2		
86	1	Network ETH Submask3		
87	1	Network ETH Submask4		
88	1	Network ETH Gateway1		
89	1	Network ETH Gateway2		
90	1	Network ETH Gateway3		
91	1	Network ETH Gateway4		
92	1	Network ETH DNS1		
93	1	Network ETH DNS2		
94	1	Network ETH DNS3		
95	1	Network ETH DNS4		
96	1	Network ETH Settings Commit		
97	1	Network Cloud Status		
98	1	Unused		
99	1	Unused		
100	1	HR Product Code		
101	1	HR Product Revision		
102	1	HR Firmware Version		
103	1	Unused		
104	1	Unused		
105	1	Conversion Temperature Setting		
106	1	Conversion Pressure Setting		
107	1	Conversion Wind Speed Setting		
108	1	Conversion Rain Setting		
109	1	Weatherstation Polling Interval	0.1	seconds
110	1	Weatherstation Write EEPROM Address		
111	1	Weatherstation Write EEPROM Payload		
112	1	Weatherstation Write EEPROM Send		
113	1	Weatherstation Write Barometer Argument		
114	1	Weatherstation Write Elevation Argument		
115	1	Weatherstation Write Barometer Elevation Send		
116	1	Weatherstation Write Success		
117	1	Output 1 Alarm Monitor Register		
118	1	Output 1 Alarm Threshold		
119	1	Output 1 Alarm Direction		
120	1	Output 2 Alarm Monitor Register		
121	1	Output 2 Alarm Threshold		
122	1	Output 2 Alarm Direction		
123	1	Rainfall Resolution		
124	1	Rainfall Result		
125	1	Network Eth Automatic Severing		



126	1	Unused		
127	1	Unused		
128	1	Daily Low Barometer		
129	1	Daily High Barometer		
130	1	Month Low Barometer		
131	1	Month High Barometer		
132	1	Year Low Barometer		
133	1	Year High Barometer		
134	1	Time Of Day Low Barometer		
135	1	Time Of Day High Barometer		
136	1	Daily High Wind Speed		
137	1	Time Of High Speed		
138	1	Month High Wind Speed		
139	1	Year High Wind Speed		
140	1	Day High In Temperature		
141	1	Day Low In Temperature		
142	1	Time Day High In Temperature		
143	1	Time Day Low In Temperature		
144	1	Month Low In Temperature		
145	1	Month High In Temperature		
146	1	Year Low In Temperature		
147	1	Year High In Temperature		
148	1	Day High In Humidity		
149	1	Day Low In Humidity		
150	1	Time Day High In Humidity		
151	1	Time Day Low In Humidity		
152	1	Month High In Humidity		
153	1	Month Low In Humidity		
154	1	Year High In Humidity		
155	1	Year Low In Humidity		
156	1	Day Low Out Temperature		
157	1	Day High Out Temperature		
158	1	Time Day Low Out Temperature		
159	1	Time Day High Out Temperature		
160	1	Month High Out Temperature		
161	1	Month Low Out Temperature		
162	1	Year High Out Temperature		
163	1	Year Low Out Temperature		
164	1	Day Low Dew Point		
165	1	Day High Dew Point		
166	1	Time Day Low Dew Point		
167	1	Time Day High Dew Point		
168	1	Month High Dew Point		
169	1	Month Low Dew Point		
170	1	Year High Dew Point		
171	1	Year Low Dew Point		
172	1	Day Low Wind Chill		
173	1	Time Day Low Wind Chill		
174	1	Month Low Wind Chill		
175	1	Year Low Wind Chill		
176	1	Day High Heat Index		
177	1	Time Day High Heat Index		
178	1	Month High Heat Index		
179	1	Year High Heat Index		
180	1	Day High THSW		
181	1	Time Day High THSW		
182	1	Month High THSW		
183	1	Year High THSW		

184	1	Day High Solar Radiation		
185	1	Time Day High Solar Radiation		
186	1	Unused		
187	1	Unused		
188	1	Unused		
189	1	Unused		
190	1	Serial Port RS232 USB Address Register		
191	1	Serial Port RS232 USB Baud Rate		
192	1	Serial Port RS232 USB Data Type		
193	1	Serial Port RS232 USB Commit		
194	1	Serial Port RS485 Address Register		
195	1	Serial Port RS485 Baud Rate		
196	1	Serial Port RS485 Data Type		
197	1	Serial Port RS485 Commit		
198	1	Unused		
199	1	Unused		
200	1	Network WiFi Mode		
201	1	Network WiFi IP1		
202	1	Network WiFi IP2		
203	1	Network WiFi IP3		
204	1	Network WiFi IP4		
205	1	Network WiFi Submask1		
206	1	Network WiFi Submask2		
207	1	Network WiFi Submask3		
208	1	Network WiFi Submask4		
209	1	Network WiFi Gateway1		
210	1	Network WiFi Gateway2		
211	1	Network WiFi Gateway3		
212	1	Network WiFi Gateway4		
213	1	Network WiFi DNS1		
214	1	Network WiFi DNS2		
215	1	Network WiFi DNS3		
216	1	Network WiFi DNS4		
217	1	Network WiFi Settings Commit		

*Table 11: Complete Modbus Holding Register Listing*

Note that the addresses in table 16, as per the Modbus protocol, begin from 40,000+ inclusive of 0. Meaning register 10 for example (in the PC application), is a system address of 40,009.

## Appendix B

If there is a communication problem, the sensor is unplugged or failed, you would see the reading of 255 (0xFF) for the extra temperature/humidities/soil/leaf stations. The “extra” stations have each datapoint stored in the respective 8-bits of each register, hence will read 65535 (0xFFFF).

11	Extra Temperatures 1 & 2	65535	→ 0xFFFF
12	Extra Temperatures 3 & 4	65535	
13	Extra Temperatures 5 & 6	65535	
14	Extra Temperatures 7	255	→ 0xFF
15	Soil Temperatures 1 & 2	65535	
16	Soil Temperatures 3 & 4	65535	
17	Leaf Temperatures 1 & 2	65535	
18	Leaf Temperatures 3 & 4	65535	
19	Outside Humidity	255	
20	Extra Humidities 1 & 2	65535	
21	Extra Humidities 3 & 4	65535	
22	Extra Humidities 5 & 6	65535	
23	Extra Humidities 7	255	

## Leaf/Soil Stations (Register 15-18, and 35-38)

Description	16-bit signed value	In HEX	Explanation
Both Sensors (wet and dry) connected	15	0x000F	<ul style="list-style-type: none"> <li>• 0x00 is 0, this means sensor 2 is connected and very dry</li> <li>• 0x0F is 15, this means sensor 1 is connected and very wet</li> </ul>
Left (wet) sensor disconnected, right (dry) connected	255	0x00FF	<ul style="list-style-type: none"> <li>• 0x00 is 0, this means sensor 2 is connected and very dry</li> <li>• 0xFF is 255, this means sensor 1 is not connected, an error value is shown</li> </ul>
Right (dry) disconnected, left (wet) connected	-241	0xFF0F	<ul style="list-style-type: none"> <li>• 0xFF is 255, error, sensor 2 is not connected</li> <li>• 0x0F is 15, sensor 1 is connected and very wet</li> </ul>
Both sensors disconnected	-1	0xFFFF	<ul style="list-style-type: none"> <li>• 0xFF is 255, error, sensor 2 is not connected</li> <li>• 0xFF is 255, error, sensor 1 is not connected</li> </ul>
Both connected and both wet	3855	0x0F0F	<ul style="list-style-type: none"> <li>• 0x0F is 15, sensor 2 is connected and very wet</li> <li>• 0x0F is 15, sensor 1 is connected and very wet</li> </ul>

## Extra Humidity Stations (Register 20-23)

This field supports seven extra humidity stations, the humidity readings of each station would be one byte in length in %RH.

Description	16-bit signed value	In HEX	Explanation
Extra Humidities 1&2	2650	0x0A5A	Sensor 2: 10%RH Sensor 1: 90%RH

## Forecast Icon (Register 50)

Field	Bit#
Rain	0
Cloud	1
Partly Cloudy	2
Sun	3
Snow	4

Here are some possible examples forecast icon values:

Decimal Value	Hex Value	Segments Shown	Forecast
2	0x02	Cloud	Mostly Cloudy
3	0x03	Cloud + Rain	Mostly Cloudy, rain within 12 hours
6	0x06	Partial sun + Cloud	Partly Cloudy
7	0x07	Partial sun + Cloud + Rain	Partly Cloudy, rain within 12 hours
8	0x08	Sun	Mostly Clear
18	0x12	Cloud + Snow	Mostly Cloudy, snow within 12 hours
19	0x13	Cloud + Rain + Snow	Mostly Cloudy, rain or snow within 12 hours
22	0x16	Partial Sun + Cloud + Snow	Partly Cloudy, snow within 12 hours
23	0x17	Partial Sun + Cloud + Rain + Snow	Partly Cloudy, rain or snow within 12 hours

## Forecast Rule Number (Register 51)

See the "Forecast Rule Number.pdf", which can be downloaded from [https://oceancontrols.com.au/KTA-382.html?category\\_id=499#product-details-tab-Downloads\\_1](https://oceancontrols.com.au/KTA-382.html?category_id=499#product-details-tab-Downloads_1)

