KTA-288 Modbus TCP/IP Gateway with 8 Current Retransmission Channels

- Power Supply: 24VDC
- 8 x 10-bit Analog Outputs (4-20mA)
- 3 different sets of common weather-based data for analogue retransmission, DIP switches configurable
- Various selectable metric and imperial unit conversions
- Easy Modbus TCP/IP configuration via webpage, Modbus registers or onboard switches.
- Compatible with new Davis firmware
- DIN rail mountable

The product consists of two separate devices with a different firmware loaded into the KTA-282. Each of these products can be found individually on the Ocean Controls website (oceancontrols.com.au). User manuals and specifications are available for download.

AKC-203 Modbus Output Module

KTA-282 Modbus TCP/IP Gateway

The KTA-288 is a combination of an our popular KTA-282 Modbus TCP/IP Gateway and an Analog Output Module. It interfaces a Davis Instrument Weather Station to a Modbus TCP/IP network, and retransmits 8 selected variables as 4-20mA outputs. Each analogue output has a resolution of 10 bits. An external voltage source for the analogue outputs is required, and it must not exceed 36VDC.

Three different sets of common weather-based variables are available for the re-transmission. They can be configured with the DIP switch located next to the DE9 connector.

Cases	Switch 1	Switch 2
1	OFF	OFF
2	OFF	ON
3	ON	OFF

Table 1. DIP Switches for Retransmission Data

For more information, including connecting the weather station or configuring Modbus TCP/IP, please refer to **KTA-282 manual**.

Communication Parameter

By default, the gateway and the output module communicate at:

Address: 16
Baud Rate: 9600
Parity: None

Please Note: This is not changeable as it is set internally.

The LEDs next to the RS-485 terminal on the KTA-288 indicates the status of data update. They should be light up all the time with slight fluctuation.

Holding Registers Table for Three Cases

The output module has 8 analogue outputs, each with 10-bit resolution and 4-20mA. The following table indicates the corresponding data that are chosen for retransmission. Each of them will have a Modbus Command of 1000 for 20mA and 0 for 4mA.

Holding Registers Address for Output Module	Case 1	Case 2	Case 3
1	Day Rain	Day Rain	Day Rain
2	Outside Temperature	Outside Temperature	Outside Temperature
3	Outside Humidity	Outside Humidity	Outside Humidity
4	Wind Speed	Wind Speed	Wind Speed
5	Wind Direction	Wind Direction	Day ET
6	Barometer	Barometer	Barometer
7	Inside Temperature	Month Rain	Month Rain
8	Inside Humidity	Storm Rain	Month ET

Table 2. Holding Register List

Measurement Range

Each parameter has a different measurement range based on the units.

Parameters	Units	Range	Decimals stored in Gateway register
Day Rain	Inches	0 – 2	2 decimals
	mm	0 – 50	1 decimal
Month Rain	Inches	0 – 15	2 decimals
	mm	0 – 400	int
Storm Rain	Inches	0 – 2	2 decimals
	mm	0 – 50	int
Day ET	Inches	0 – 2	3 decimals
	mm	0 – 50	1 decimal
Month ET	Inches	0 – 15	2 decimals
	mm	0 – 400	int

Inside Temperature	°F	30 – 150	1 decimal
	°C	0 – 60	1 decimal
Outside Temperature	°F	-30 – 150	1 decimal
	°C	-35 – 65	1 decimal
Wind Speed	mph	0 – 65	int
	kph	0 – 100	int
	knots	0 – 55	int
	m/s	0 – 30	int
	ft/s	0 – 100	int
Wind Direction	°	0 – 360	Int
Barometer	inHg	25 – 35	3 decimals
	mmHg	700 – 800	1 decimal
	mbar	950 – 1050	1 decimal
	atm	0.95 – 1.05	3 decimals
Inside Humidity	%	0 – 100	int
Outside Humidity	%	0 – 100	int

Table 3. Measurement Range

Here is an example for converting the inside temperature sensor value to 4-20mA signal:

Real Value (°C)	Reading on Gateway Register	Reading on Output Module Register	Analog Output (mA)
0°C	0	0	0
25°C	250	416	10.67
29.5°C	295	491	11.87
45.2°C	452	753	16.05
60°C	600	1000	20

Unit Conversions

The unit of the readings can be changed by writing to the Modbus Holding Register of the Gateway or using the KTA-282 PC Application.

- Writing to Gateway Holding Register

Holding Registers	Variable Type	Conversion	Register Affected
105	Temperature	0 = 0.1 °F 1 = 0.1 °C	- Inside Temperature - Outside Temperature
106	Pressure	0 = 0.001 inHg 1 = 0.1 mmHg 2 = 0.1 mbar 3 = 0.001 atm	- Barometer
107	Wind Speed	0 = 1 mph 1 = 1kph 2 = 1 knots 3 = 1 m/s 4 = 1 ft/s	- Wind Speed

108	Rain	0 = 0.01 inch 1 = 1mm	- Day Rain[1] - Month Rain - Storm Rain - Day ET[2] - Month ET

Table 4. Unit Conversion Modbus Register Listing (for KTA-288)

Notes:

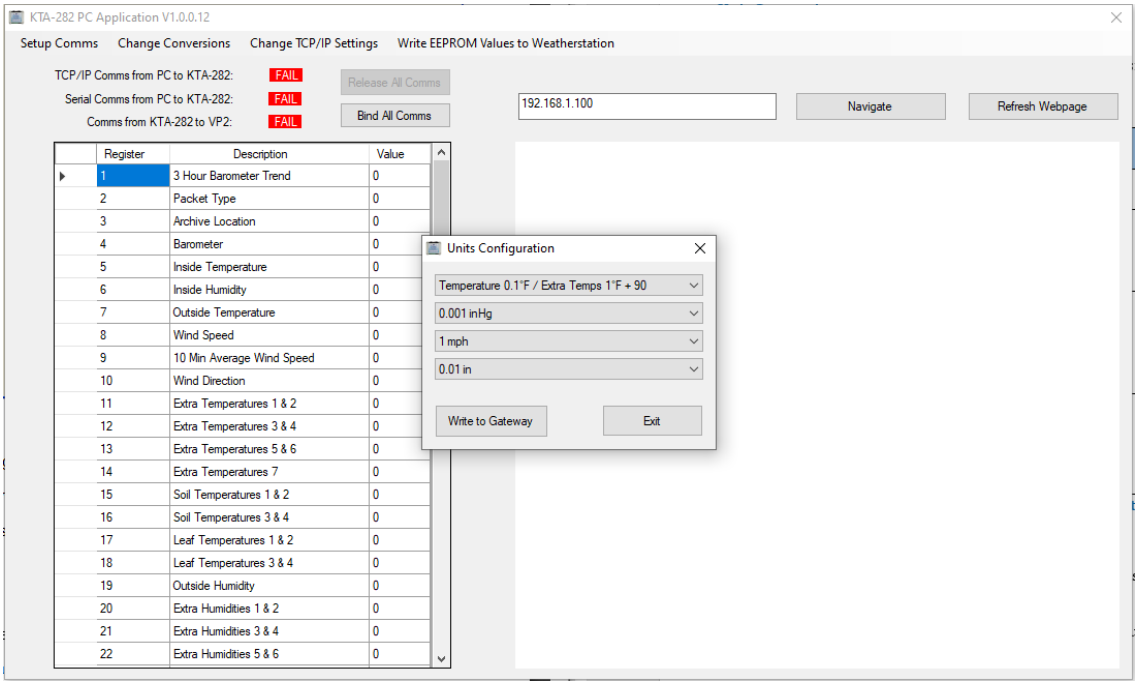
1. The resolution of the metric unit for Day Rain is set to 0.1mm, so a value of 239 on the register means that day rain is 23.9mm.

2. Day ET is reduced by a factor of 10; the readings returned will be 0.0001 inch or 0.1 mm

- PC Application

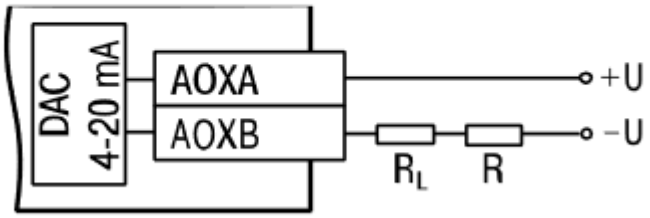
Note: The KTA-288 can use the same PC application as the KTA-282. It is available for download on our website.

To change the unit (conversion), run the "KTA-282 PC Application" and set up the TCP/IP communication, then click on "Change Conversions" tab on the top left-hand side of the window.



Output Wiring Diagram

The voltage of an external auxiliary voltage source may not exceed 36 V.



Appendix

Complete Holding Register Listing for the **Gateway**

Holding Register Address 40,000+	No. of Registers	Description	Multiplier	Units
1	1	Indicates the current 3-hour barometer trend.		
2	1	Packet Type , always 0		
3	1	Location in the archive memory where the next data packet will be written. This can be monitored to detect when a new record is created.		
4	1	Barometer	0.001	inHg
5	1	Inside Temperature	0.1	°F
6	1	Inside Humidity	1	%
7	1	Outside Temperature	0.1	°F
8	1	Wind Speed	1	mph
9	1	10Min Average Wind Speed	1	mph
10	1	Wind Direction	1	degrees
11	4	7 Extra Temperatures	1	°F
15	2	4 Soil Temperatures	1	°F
17	2	4 Leaf Temperatures	1	°F
19	1	Outside Humidity	1	%
20	4	7 Extra Humidities	1	%
24	1	Rain Rate	0.01	Inches/hour
25	1	UV Index	0.1	
26	1	Solar Radiation	1	W/m^2
27	1	Storm Rain	0.01	Inches
28	1	Current Date Of Storm Rain	1	
29	1	Day Rain	0.01	inches
30	1	Month Rain	0.01	inches
31	1	Year Rain	0.01	inches
32	1	Day ET	0.001	inches
33	1	Month ET	0.01	inches

34	1	Year ET	0.01	inches
35	2	4 Soil Moistures	1	centibar
37	2	4 Leaf Wetnesses, 0 to 15, 0 = Very Dry, 15 = Very Wet	1	
39	1	Inside Alarms	1	
40	1	Rain Alarms	1	
41	1	Outside Alarms	1	
42	4	Extra Temp Hum alarms	1	
46	2	Soil and Leaf Alarms	1	
48	1	Transmitter Battery Status	1	
49	1	Console Battery Voltage	0.01	Volts
50	1	Forecast Icons	1	
51	1	Forecast Rule Number	1	
52	1	Time of Sunrise	1	HHMM
53	1	Time of Sunset	1	HHMM
54	1	Wet Bulb	0.1	°F
55	1	Unused		
56	1	Unused		
57	1	Unused		
58	1	Unused		
59	1	Unused		
60	1	Comms status between KTA-282 and weather station (1=OK, 0=Fault)	1	
61	1	2Min Wind Speed	0.1	mph
62	1	10Min Wind Gust	0.1	mph
63	1	Wind Direction for 10Min Gust	1	degrees
64	1	Dew Point	1	°F
65	1	Heat Index	1	°F
66	1	Wind Chill	1	°F
67	1	THSW Index	1	°F
68	1	Last 15Min Rain	0.01	Inches
69	1	Last Hour Rain	0.01	Inches
70	1	Last 24 Hours Rain	0.01	Inches
71	1	Barometric Reduction Method		
72	1	User Entered Barometric Offset	0.001	Inches
73	1	Barometric Calibration Number	0.001	Inches
74	1	Barometric Sensor Raw Reading	0.001	Inches
75	1	Absolute Barometric Pressure	0.001	Inches
76	1	Altimeter Setting	0.001	Inches
77	1	Index to Minute Within the Hour		
78	1	Loop 2 Comms Status		
79	1	Unused		
80	1	IP Address 1st octet	Note	
81	1	IP Address 2nd octet	Note	
82	1	IP Address 3rd octet	Note	
83	1	IP Address 4th octet	Note	
84	1	Subnet Mask 1st octet	Note	
85	1	Subnet Mask 2nd octet	Note	

86	1	Subnet Mask 3rd octet	Note	
87	1	Subnet Mask 4th octet	Note	
88	1	Default Gateway 1st octet	Note	
89	1	Default Gateway 2nd octet	Note	
90	1	Default Gateway 3rd octet	Note	
91	1	Default Gateway 4th octet	Note	
92	1	Commit IP values to Gateway (write a 1 to send values)		
93	1	Unused		
94	1	Unused		
95	1	Unused		
96	1	Unused		
97	1	Unused		
98	1	Unused		
99	1	Unused		
100	1	Product Code		
101	1	Firmware Version		
102	1	Modbus RTU address		
103	1	Modbus RTU baudrate		
104	1	Modbus RTU parity: 0 = None 2 = Even 3 = Odd		
105	1	Temperature Conversion setting		
106	1	Pressure Conversion setting		
107	1	Wind speed conversion		
108	1	Rain and rain rate conversion		
109	1	Weather station polling period (default: 25 = 2.5 seconds)	0.1	Seconds
110	1	Weather station EEPROM write: address		
111	1	Weather station EEPROM write: payload		
112	1	Weather station EEPROM write: send (write to 1 to send EEPROM write command)		
113	1	Weather station elevation & barometer write: barometer argument		
114	1	Weather station elevation & barometer write: elevation argument		
115	1	Weather station elevation & barometer write: send (write to 1 to send elevation and barometer write command)		
116	1	Weather station memory write success (will be written to a 1 if either weather station memory write command is successful)		
117	1	Open Collector 1 register to monitor		
118	1	Open Collector 1 threshold		
119	1	Open Collector 1 Direction. 0 = down, 1 = up		

120	1	Open Collector 1 register to monitor		
121	1	Open Collector 1 threshold		
122	1	Open Collector 1 Direction. 0 = down, 1 = up		
123	1	Unused		
124	1	Unused		
125	1	Modbus Manually Sever Sockets		

Note: These values are the TCP/IP configuration currently loaded into memory. If TCP/IP switch 1 is set to load from switches, the KTA-288 Gateway will be on a different IP address to what is displayed.