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METEOROLOGICAL INSTRUMENTS

INSTRUCTIONS

ResponseONE

MODEL 91500 ULTRASONIC ANEMOMETER w / INTERNAL COMPASS CE

OPERATING INSTRUCTIONS

Model 91500 ResponseONE Ultrasonic Anemometer

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MODEL 91500 ResponseONE OUNG ULTRASONIC ANEMOMETER



1.0 INTRODUCTION

The Model 91500 ResponseONEtm Ultrasonic Anemometer is a 2-axis, no-moving parts wind sensor equipped with an internal compass. It is ideal for general meteorological applications requiring accurate and reliable measurement.

The sensor features wide operating range, compact size, easy installation, low power operation and durable corrosion-resistant construction throughout. The internal compass provides wind direction orientation and is suitable for mobile and portable applications.

The sensor features durable corrosion-resistant construction throughout. An internal compass provides wind direction orientation when needed.

The ResponseONE installs on readily-available 1 inch (IPS) pipe. Wiring connections are made in a convenient, weatherproof junction box; special connectors and custom cables are not needed.

Measured data is output in a serial format. NMEA. SDI-12. RMYT. and ASCII protocols are available to suit many applications. Continuous serial output or polled operation may be used.

RS-232 or RS-485 serial format options allows direct connection to YOUNG displays, marine NMEA systems, data loggers, or other compatible serial devices.

Operating parameters are easily reviewed and changed using the ResponseONE CONFIG program available for download at www. youngusa.com. All settings are stored internally in non-volatile memory.

2.0 SPECIFICATIONS

WIND SPEED

Range: Resolution: Accuracy:

Response Time:

WIND DIRECTION

Azimuth Range: Resolution: Accuracy: Response Time:

COMPASS

Range: Resolution: Accuracy:

SERIAL OUTPUT (Selectable)

Interface Type: Formats:

Baud Rates:

GENERAL Output rate:

Power Supply:

Protection Class: EMC Compliance:

Dimensions: Weight: Shipping Weight: **Operating Temperature:** 0 - 70 m/s (156 mph) 0.01 m/s 0 - 30 m/s ±2% or 0.3 m/s 30 - 70 m/s ±3% <0.25 seconds

0 - 360 degrees 0.1 degree ± 2 degrees <0.25 seconds

0 - 360 dearees 0.1 degrees

± 2 degrees

RS-232 or RS-485/422, SDI-12

ASCII Text - polled or continuous NMFA - continuous SDI-12 - polled RMYT - continuous 1200, 4800, 9600, 19200 and 38400

0.1 to 10 Hz 10 - 30 VDC, 7 mA typical, 80 mA max IP66 FCC Class A digital device IEC standard 61326-1 23 cm high x 13.5 cm wide 0.5 kg (1.1 lb) 1.4 kg (3.1 lb) -40 - +60°C

3.0 BEFORE INSTALLATION

3.0 UNPACKING THE ResponseONE

The *ResponseONE* comes in a custom shipping carton. Carefully inspect the instrument when first unpacking and report any visible damage to your YOUNG supplier. Be sure to retain the bird spikes and orientation ring for use.

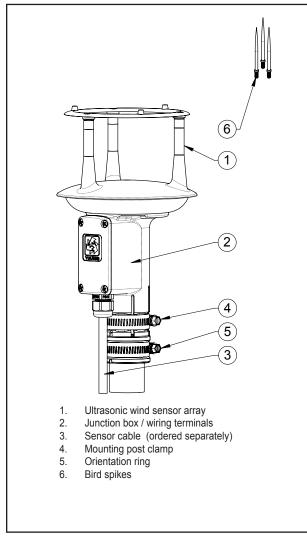


Figure 3.0 ResponseONE Features

The *ResponseONE* arrives fully calibrated and ready to use. As supplied, the sensor is configured as follows:

FACTORY DEFAULT CONFIGURATION				
Protocol:	RS-232 ASCII / RS-485 (Output Only)			
Baud Rate:	9600			
Wind Format:	Polar			
Wind Units:	m/s, Degrees azimuth			
	-			

Default connections are shown in APPENDIX A, FIGURE A1. Other options are also described in APPENDIX A. These are accomplished using the *ResponseONE* CONFIG program which is available at www.youngusa.com. Note: Always connect and bench test a complex system before installation in the field.

4.0 INSTALLATION

4.1 PLACEMENT

Proper instrument placement is important. Eddies from buildings, trees, or other structures can influence measurements. Locate the sensor well away from obstructions. As a general rule, air flow around a structure is disturbed to 10 times the height of the structure downwind and 1-1/2 times the height of the structure above the roof.

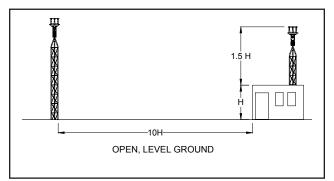


Fig 4.1 Wind Siting Considerations

4.2 MOUNTING AND ALIGNMENT

The *ResponseONE* mounts on standard 1-inch (IPS) pipe. This is commonly available steel pipe with an outside diameter of 1.34 inches (34 mm). The mounting pipe should be installed securely in a vertical orientation.

Most applications require aligning the wind sensor array to geographic north (0 degrees). In this orientation the junction box faces SOUTH (180 degrees). See the diagram in APPENDIX B for details. Two methods are suggested below

4.2.1 ORIENTATION USING BUILT-IN ELECTRONIC COMPASS.

Place *ResponseONE* sensor on mounting pipe, fully seating it on the pipe and allowing for free rotation of the sensor. Connect cable as indicated in APPENDIX A and apply power to the system. Rotate the sensor 1-1/4 rotations (CW or CCW). With junction box cover removed, locate and press and hold the "calibrate" button for 3 seconds; the indicator light will blink rapidly to indicate that calibration mode is active (See Fig 4.2.1). Slowly rotate the sensor in the opposite direction for 1-1/4 rotations (this will also serve to unwind the cable around the mounting pipe). After completing the rotations, press and hold the "calibrate" button again for 3 seconds; the indicator will double blink. Tighten the mounting post band clamp to secure the sensor. DO NOT OVER-TIGHTEN. The *ResponseONE* will output correct wind direction data; the indicator will blink once per second.

To disable the compass, press and hold the button for one second. The indictor light will no longer blink.

Important: Be sure to allow for magnetic declination in your measurement. A declination value can be entered using the *ResponseONE* CONFIG program or it can be compensated in the data-logger program. Please note that declination may change if the sensor is moved to a new location.

http://www.ngdc.noaa.gov/geomag-web/#declination

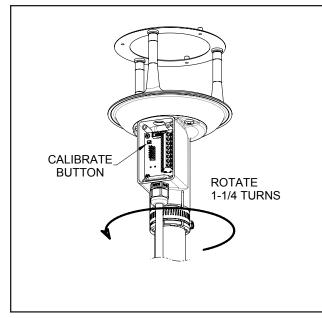


Fig 4.2.1 Orientation of Wind Sensor Using Electronic Compass

4.2.2 ORIENTATION USING KNOWN GEOGRAPHIC DATA Obtain accurate geographic data for the installation site, this can be a topographic map, graphical GPS map or detailed road map.

- 1 Place orientation ring over pipe with guide pin up.
- 2 Place sensor mounting post over pipe.
- 3 Using the transducers as a sighting aid, align the sensor with a remote feature that represents the proper orientation (Fig 4.2.2). After alignment, tighten the mounting post band clamp to secure the position. DO NOT OVER-TIGHTEN.
- 4 Slide the orientation ring up so its guide pin is fully engaged in the sensor mounting post notch (Fig 4.2.3). Tighten the orientation ring band clamp to secure its position. DO NOT OVER- TIGHTEN.

If the *ResponseONE* is later removed, the orientation ring will preserve the sensor alignment.

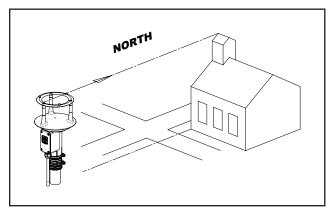


Fig 4.2.2 Sighting of Wind Sensor using Geographic Feature

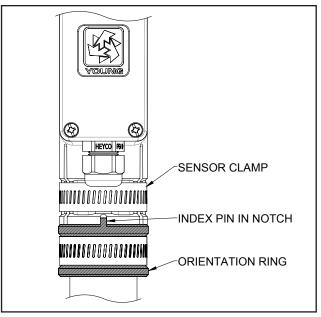


Fig 4.2.3 Proper Engagement of Orientation Ring with Sensor

4.3 WIRING CONNECTIONS

The *ResponseONE* is supplied with RS-232, RS-485 and SDI-12 signal capability. Please select the signal type desired and refer to the appropriate WIRING CONNECTIONS diagram in APPENDIX A for connecting the *ResponseONE* to your serial device. Please note, the *ResponseONE* is not equipped with analog outputs.

5.0 OPERATION

5.1 SERIAL OUTPUT FORMATS

The *ResponseONE* comes standard with the following serial output formats:

Format/Protocol	Wiring Format
ASCII Polled and Continuous	RS-232, RS-485
NMEA 0183 v3.0 Automatic	RS-232, RS-485
SDI-12 Polled	SDI-12
RMYT	RS-485

Detailed information about each protocol is in the following section.

If you wish to change settings from the factory default values shown in Section 3, this is easily done using the *ResponseONE* CONFIG program described in Section 6.0.

5.1.1 ASCII

ASCII output format provides continuous measurement data in text format at any of the available baud rates.

The wind measurement in ASCII output appears either in POLAR (default) or CARTESIAN UV format. With POLAR format, the wind speed threshold and wind speed units are user-selectable. With CARTESIAN the wind threshold is ignored and wind speed units are always meters per second (m/s).

ASCII POLAR FORMAT

a www.ww	ddd.d	ss*cc <cr></cr>
where:		
a		= Sensor address
www.ww		= Wind speed
ddd.d		= Wind direction
SS		= Status code
*		= Asterisk (ASCII 42)
СС		= Checksum
<cr></cr>		= Carriage return (ASCII 13)

ASCII CARTESIAN (UV) FORMAT

a uu.uu vv.vv ss*cc<CR>

where:	
a	= Sensor address
±uu.uu	= U-axis wind speed (m/s)
±vv.vv	= V-axis wind speed (m/s)
SS	= Status code
*	= Asterisk (ASCII 42)
сс	= Checksum
<cr></cr>	= Carriage return (ASCII 13)

CHECKSUM is a two-character hexadecimal value (in printable ASCII format) generated by taking the exclusive-or of all characters up to the asterisk. STATUS CODE shows a non-zero value when the sensor cannot acquire sufficient samples or a measurement error has occurred. See APPENDIX C for more information on status codes.

5.1.2 ASCII POLLED

ASCII POLLED is like ASCII format described above except just one serial output string is sent for each polling command received. The polling command is Ma! where 'a' is the sensor address (valid characters: 0-9, A-Z, a-z). The default address is '0' (ASCII 48).

5.1.3 RMYT

RMYT is a 6-byte binary data format sent at 9600 baud using RS-485 OUTPUT ONLY mode. It is for use with the YOUNG Model 06201 Wind Tracker.

5.1.4 NMEA

NMEA format provides continuous measurements in standard NMEA marine sentences at 4800 baud. The *ResponseONE* must be connected to a NMEA-capable device. Specific details of the NMEA data string are below:

NMEA FORMAT

\$WIMWV,ddd,R,www.w,u,A*cc<CR><LF>

where:

WI	= Device type (weather instrument)
MWV	= Wind direction and speed
ddd	= Wind direction (degrees)
www.w	= Wind speed
u	= Wind speed units
	S = mph
	N = knots
	K = kmph
	M = m/s
А	= Data status code: A=valid, V=invalid
*	= Asterisk (ASCII 42)
сс	= Checksum
<cr><lf></lf></cr>	= Carriage return,Line feed (ASCII 13,10)

CHECKSUM is the two-character printable hexadecimal value generated by taking the exclusive-or of all characters between '\$' and '*'.

5.2 SDI-12

SDI-12 stands for serial data interface at 1200 baud. It is often used to interface battery powered data recorders with microprocessor based devices designed for environmental data acquisition. SDI-12 is typically used when low power usage is required. The SDI-12 device normally remains in a low power, standby state until it is polled at which time a measurement is sent. SDI-12 can effectively address multiple sensors on the same cable.

5.2.1 SDI-12 MEASUREMENT COMMANDS

Model 91000 uses the SDI-12 (v1.3) serial communication protocol to initiate measurements and set sensor operation parameters. The default sensor address is 0 (zero), and can be changed to any valid single-character value if needed. Additional details about the SDI-12 protocol may be found at **www.sdi-12.org**.

After initial power-up with 12 VDC, the sensor is in a lowpower standby state with a quiescent current of 4.2 mA. A valid and properly addressed SDI-12 command wakes the sensor to initiate a measurement, set or check operating parameters. After command processing has finished, the sensor returns to the low-power standby state.

SDI-12 'M' or 'C' commands initiate a measurement. The sensor response message indicates the maximum time needed before the measurement is ready, and data values will be available. The maximum time ranges from 1 to 5 seconds depending on the Sample Count.

If an 'M' command initiates a measurement, the sensor sends a Service Request when the measurement is ready to be retrieved. When the polling device receives the Service Request it then sends a 'D' command to request measurement results from the sensor. With 'C' commands, no Service Request is sent, and the polling device must wait the full delay time before sending the 'D' command to request the measurement.

SDI-12 Measurement commands and responses are listed below.

COMMAND	RESPONSE	DESCRIPTION		
aM!	attts <cr><lf></lf></cr>	Take a measurement		
aMC!	attts <cr><lf></lf></cr>	Take a measurement with CRC		
		checksum		
aC!	atttss <cr><lf></lf></cr>	Take a concurrent measurement		
aCC!	atttss <cr><lf></lf></cr>	Take a concurrent measurement		
		with CRC checksum		
aD0!	a+www.ww+ddd.d<	CRC> <cr><lf> (Polar)</lf></cr>		
	a±uu.uu±vv.vv<0	CRC> <cr><lf> (Cartesian)</lf></cr>		
where:				
a	= Sensor add	dress		
ttt	= Delay time	(seconds)		
s/ss	= Number of	= Number of samples to collect		
WWW.WW	Wind speed (selected units)			
ddd.d	= Wind direc	= Wind direction (degrees)		
±uu.uu	= U-axis wind	= U-axis wind speed (m/s)		
±vv.vv	= V-axis wind	= V-axis wind speed (m/s)		
<crc></crc>	= CRC check	= CRC checksum (only where requested)		
<cr><i< th=""><th>F> = Carriage re</th><th>eturn, line feed (ASCII 13, 10)</th></i<></cr>	F> = Carriage re	eturn, line feed (ASCII 13, 10)		

Wind data format depends on the sensor Output Format parameter setting (Polar or Cartesian).

5.2.2 SDI-12 NON-MEASUREMENT COMMANDS

The SDI-12 protocol includes standard commands for identifying the sensor and changing its address.

COMMAND	RESPONSE	DESCRIPTION
?!	a <cr><lf></lf></cr>	Address Query
a!	a <cr><lf></lf></cr>	Acknowledge Active
aI!	al3 YOUNG	C091000 vvvnnnnn <cr><lf></lf></cr>
		Send Identification
		vvv = Firmware Version
		nnnnnn = Serial Number
aAb!	b <cr><lf></lf></cr>	Change Address
		a = Sensor address
		b = New sensor address
aV!	a0000 <cr></cr>	<lf> Start Verification</lf>

5.2.3 EXTENDED COMMANDS

The SDI-12 command set may be customized with Extended Commands to accommodate manufacturer settings and other functions. Extended Commands are listed below. Where two responses are shown, one is for a valid command, the other is for an invalid (ERR) command.

COMMAND RESPONSE DESCRIPTION

aXB! aXB, OK<CR><LF> Save parameter settings to flash. aXFn! aXF, F=n<CR><LF> n = Output Format code. 0 or 1 (Polar or Cartesian)

aXF,ERR F=0/1<CR><LF>

aXPn! Parameter report, 4 reports needed for all parameters aXP1, F=f, UW=uw, T=t, S=s, W=w, CE=ce<CR><LF>

> a = Sensor address f = Wind Format uw = Polar wind speed units 1=mph 2=knots 3=km/h 4=m/s t = Threshold, polar only (0-150 cm/s) s = Sample count, internal (1-800)

- w = Wait (seconds)
- ce=Compass Enable

aXP2, OD=od, M=m, CD=cd, PWR=v VDC<CR><LF> od=WD Offset m=WS Multiplier cd=Compass Declination v=Supply Voltage

aXPn,ERR n=1/2/3/4 ONLY<CR><LF>

aXSnnn!	<pre>nnn = Sample Count (001-800 samples) aXS,S=nnn<cr><lf> aXS,ERR S=001-800 ONLY<cr><lf></lf></cr></lf></cr></pre>
aXMnnnnn!	<pre>nnnnn=WS multiplier x 10000 (00000 - 30000) aXM,M=nnnnn<cr><lf> aXM,ERR M=00000-30000 ONLY<cr><lf></lf></cr></lf></cr></pre>
aXTnnn!	<pre>nnn = Wind Speed Threshold (000 - 150 cm/s) aXT,T=nnn<cr><lf> aXT,ERR T=000-150 ONLY<cr><lf></lf></cr></lf></cr></pre>
aXUWn!	<pre>n = Wind Speed Units (1=mph, 2=knots, 3=kmph, 4=m/s) aXUW, UW=n<cr><lf> aXUW, ERR UW=1/2/3/4 ONLY<cr><lf></lf></cr></lf></cr></pre>
aXOD±nnnn!	<pre>±nnnn = Wind Direction Offset x 10 (-3600 to 3600)</pre>
aXCEn!	<pre>n = Compass Enable (0=Disable, 1=Enable) aXCE,CE=n<cr><lf> aXCE,ERR CE=0/1 ONLY<cr><lf></lf></cr></lf></cr></pre>
aXCDnddmm!	<pre>nddmm = Declination (n=E/W/0,dd=DEG, mm=MIN) aXCD,CD=nddmm<cr><lf> aXCD,ERR CD=nddmm n=E/W/0, dd=00-</lf></cr></pre>

IMPORTANT! PARAMETER CHANGES MUST BE STORED IN FLASH MEMORY USING THE aXB! COMMAND OR THEY WILL REVERT TO PREVIOUSLY STORED VALUES AT POWER UP. The aXB! command may be sent after all changes have been made, or not sent at all if the changes are temporary.

90, mm=00-60 ONLY<CR><LF>

SAMPLE COUNT (aXSnnn!)

This command sets the number of internal samples used to calculate the median measurement result. More internal samples consume more power while providing greater immunity to conditions like turbulent high-speed wind. Fewer samples consume less power while providing less immunity to disruptive conditions. Default setting is 100.

THRESHOLD (aXTnnn!)

Threshold sets the minimum wind speed needed before a new polar wind direction is calculated. The default value is 25 cm/s (0.25 m/s). A greater-than-zero threshold can help provide more meaningful scalar wind direction averages. The threshold for Cartesian (UV) output format is automatically zero regardless of this setting.

5.3 LOW POWER OPERATION

Average current consumption with default settings is about 7.5 mA. This configuration uses minimal power and enables all features even though they may not be used. This is suitable for many low power applications.

To reduce current consumption further, additional strategies include disabling unused outputs, using polled serial operation, increasing the output interval, and limiting the sample count to the minimum optimal number. Faster baud rates also reduce power by limiting transmit duration.

6.0 SETTING OUTPUTS AND OPERATING PARAMETERS

6.1 SENSOR CONFIGURATION WITH ResponseONE CONFIG PROGRAM (RECOMMENDED)

The YOUNG **ResponseONE** CONFIG program is available from the factory web site: www.youngusa.com. It provides an easy method for checking and configuring sensor operation. Install the program on a Windows 7 or higher PC and follow instructions that appear on the program screen to retrieve current sensor settings or send new settings.

6.1.1 Opening the Program

After installing the program on your PC, click the desktop icon to open the program. The following screen should appear:

ile Commands Help				
ResponseONE Serial Settings				
Output Format	Sensor Baud Rate		RS-232 Enabled	1000 ≑ Output Interva
ASCII	1200		RS-485 Enabled	
ASCII Polled	4800		RS-485 Mode	0 Poll Address
MMEA	9600		Full Duplex	
SDI-12	19200		Half Duplex	
	③ 38400		Output Only	
Wind Settings				
Output Format	1.0	0000 🖨	Wind Speed Multiplier	Compass Enabled
Polar (Speed, Direction)	25		Wind Speed Threshold	
Cartesian (U, V)	0.0		Wind Direction Offset	Magnetic Declination:
	0.		Damping Factor	Direction Degrees Minutes
m/s 👻 Wind Speed U	nits 16	-	Sample Count	
Temperature / Relative Humi				
C Temperature Un	its 0.0) 🔶	Relative Humidity Offset (%)	
0.0 🚔 Temperature Off	set ("C)			
Barometric Pressure Settings				
hPa Barometric Pressu	ure Units 0.0) 🔤	Barometric Pressure Offset	(hPa)
Tipping Bucket Input Settings				
Tipping Bucket Input En	abled			
			Get Parame	sters Send Parameters

Fig 6.1 ResponseONE CONFIG program opening screen

If you are using the *ResponseONE* for the first time, the default settings will appear. For reference these are:

FACTORY DEFAULT CONFIGURATION				
Protocol:	RS-232 ASCII / RS-485 (Output Only)			
Baud Rate:	9600			
Wind Format:	Polar			
Wind Units:	m/s, Degrees azimuth			

If these settings are correct for your application, then you may proceed with operation of the device. If you wish to change any settings, available options can be selected from menu items visible. After changes are made, the **ResponseONE CONFIG** program automatically saves the new settings in flash memory

6.2 SENSOR CONFIGURATION USING A GENERAL PURPOSE COMMUNICATIONS PROGRAM

A general purpose text-based serial communications program like **HyperTerminal** may be used to manually configure the sensor by sending simple text commands. The following guidelines apply:

The YOUNG sensor and communication program must operate at the same baud rate and be properly connected. Sensor RS-232 mode must be enabled. See the RS-232 wiring diagram, FIGURE A1, in APPENDIX A.

Factory default sensor baud rate is 9600, Configure the serial communications program for NO handshaking and 1 start, 8 data, 1 stop bit, no parity, no flow control.

The sensor must be in COMMAND MODE in order to set parameters. Enter COMMAND MODE by sending three ESC characters (ASCII 27) in quick succession while the sensor is running. When the sensor is in COMMAND MODE, it sends a '>' prompt character indicating that it is ready to accept commands.

If the prompt does not appear after sending three indicating characters, re-check wiring and communication program setup. If the sensor baud rate is unknown, try sending the ESC characters at each of the five available baud rates (1200, 4800, 9600, 19200 and 38400). It is also possible that sensor parameters have been purposely configured to disable RS-232 mode. If this is the case, the following method must be used.

In order to provide access under all conditions, the sensor always begins operation at power up with serial communications set to 38400 baud and RS-232 connections enabled. Immediately after power up, there is a short time window in which to send the ESC characters and enter COMMAND MODE.

To use this feature, set your serial communication program baud rate to 38400. Remove power then wait 5 seconds. Re-apply power to the sensor. The sensor will transmit four asterisks immediately after power up. After the asterisks appear, send three ESC characters. The COMMAND MODE '>' prompt should appear. To do this using **ResponseONE CONFIG**, connect the *ResponseONE* to your computer, open the program (make sure the correct serial port is selected), then go to the 'COMMANDS' menu and select 'ACQUIRE *ResponseONE*.

A window will come up telling you that the serial port will be set to 38400 baud. Click 'OK' to continue. Then simply apply power to the *ResponseONE* and the program will connect automatically.

6.3 COMMAND OVERVIEW

After the '>' prompt appears, send ' ??' to display a list of available commands. Send 'RPTV' to report current settings. (Note that some values in the report are for factory settings and cannot be changed by the user.)

Commands are case sensitive and the exact format must be used. For example, the SET01nn command requires two digits for the serial format code. If you send SET014 instead of SET0104 the sensor will reject the command and indicate an error. End all commands with a carriage return (ASCII 13). In HyperTerminal, do this by pressing the ENTER key.

After receiving the carriage return, the sensor will evaluate the command. Valid commands will be executed. Current settings can be evaluated at any time by sending RPTV to get a new report.

IMPORTANT NOTE:

The YOUNG ResponseONE CONFIG program automatically saves all settings to flash memory when they are sent to the sensor. Settings that are changed manually must be saved to flash with the SET77 command.

<u>COMMAND</u>	DESCRIPTION		'Ma!' comm
SET01nn	Set output mode		address. D
SET02n	Set output format	Where a=	0-9, A-Z, or
SET03nn	Set baud rate	Usage example:	
SET04n	Set wind speed units	>SET052	Sets polling
SET05a	Set sensor address		
SET06nnn	Set wind speed threshold	SET06nnn	Set the wind
SET07nnnnn	Set wind speed multiplier		wind direct
SET08±nnnn	Set direction offset		speeds. In
SET09dd	Set damping factor		output to m
SET10nnnn	Set output interval		retains its o
SET12nnn	Set sample count		Default valu
SET13n	Set wind output format	Where nnn=	000-150 cm
SET25n	Turn compass on/off	Usage example:	
SET26nddmm		>SET06025	Sets wind s
SET77	Save settings		
XX	Operate mode	SET07nnnnn	Set wind sp
RPTV	Report current settings		wind speed
??	Display command list		parameter.
HELP	Display command list		of 1.0000.
6.4 COMMAND DI	ETAILS	Where nnnnn=	
COMMAND	DESCRIPTION	Usage example:	
SET01nn	Enable RS-232 and RS-485 output modes.	>SET0709909	Sets multipl
	Default value is 12	>SET0710023	Sets multipl
Where nn=04	Enable RS-232		
08	Enable RS-485 output only	SET08±nnnn	Set wind dir
16	Enable RS-485 half duplex		and may be
24	Enable RS-485 full duplex		is always re
Usage example:			is applied. [
>SET0104	Enables RS-232 only.	Where ±nnnn=	
		Usage example:	
SET02n	Set the serial output format. Default value is 2.	>SET08-0012	
Where n= 1	RMYT	>SET08+0005	Offsets wine
2	ASCII	0.0.0.4.4	Set dampin
3	ASCII POLLED	SET09dd	means no
4	NMEA		values at lo
-			values al lO

SDI-12 5

Usage example:

>SET022 Sets output to ASCII continuous. Note: If SDI-12 is selected, save settings (SET77) then power must be cycled off, then on again to operate properly. SDI-12 automatically sets baud rate to 1200 and disables RS-232 and RS-485.

SET03nn	Set the baud rate for RS-232/RS-485 serial communication. Default value is 96. Note: Baud
Where nn=12 48 96 19 38	9600 baud
Usage example: >SET0338	
SET04n Set	wind speed units (ASCII, ASCII POLLED, NMEA
Where n= 1 2 3	and SDI-12). Default value is 4. mph knots mph
4 Usage example: >SET044	m/s Sets wind speed to m/s.
SET05a Where a=	Set sensor address for ASCII POLLED and SDI-12. Note: This is the address when polling with the "aM!" command (SDI-12) and 'Ma!' command (ASCII Polled) where 'a' is the address. Default value is 0. 0-9, A-Z, or a-z
Usage example: >SET052	Sets polling address to number 2.
SETO6nnn	Set the wind speed threshold. Minimizes erratic wind direction indications at very low wind speeds. In polar mode, this allows the sensor output to mimic a mechanical wind vane that retains its orientation when there is no wind. Default value is 25.
Where nnn= Usage example : >SET06025	000-150 cm/s Sets wind speed threshold to 25 cm/s.
SET07nnnnn Where nnnnn=	Set wind speed multiplier. Value is x10000. All wind speed measurements are multiplied by this parameter. Default value is 10000 for a multiplier of 1.0000. 00000-30000
Usage example: >SET0709909 >SET0710023	Sets multiplier to 0.9909 Sets multiplier to 1.0023
SET08±nnnn Where ±nnnn=	Set wind direction offset. Value is degrees x10 and may be positive or negative. Wind direction is always re-scaled to a 0-360 range after offset is applied. Default value is 00000. -3600 to +3600
Usage example: >SET08-0012 >SET08+0005	
SET09dd Where dd=	Set damping factor. Default value is 00. This means no damping is applied. High damping values at long output intervals can slow the rate at which indicated wind values change. Wind measurement outputs are damped using the following formula: Sdamped = [(dd-1) * Sdamped + Ssample] / dd Damping factor (00-99) Sdamped = New or last damped wind speed
Usage example: >SET0905	Ssample = New wind speed Sets damping factor to 5 (Note: Damping factor only applies to wind reading.)

Continued on next page...

SET10nnnn Where nnnn= Usage example:	Set output interval. Sets the time interval between measurements in one millisecond increments. Lower values increase power consumption when continuous measurements are taken. Default is 1000. 0000-9999
>SET101000	Sets output interval to 1000 milliseconds (1 second) (Note: If output interval is set too low, the <i>ResponseONE</i> will automatically calculate the minimum output interval.)
SET12nnn Where nnn=	Set sample count. The rate at which the sensor internally takes complete sonic wind samples is greater than 200 times per second. This command sets the number of internal samples used to calculate the median measurement result. Default is 100. 000-800
Usage example: >SET12016	Sets sample count to 16. More internal samples consume more power while providing greater immunity to conditions like turbulent high-speed wind. Fewer samples consume less power while providing less immunity to disruptive conditions. This command interacts with the OUTPUT INTERVAL setting. More samples may require a longer output interval.
SET13n Where n= 0 1	Set ASCII output format. Determines whether ASCII and ASCII POLLED serial outputs provide wind data in either Polar (speed and direction) or Cartesian (UV) form. Default is Polar. Polar Cartesian (UV)
Usage example: >SET130	Sets output format to polar.
SET25n Where n= 0 1	Turn compass on or off. Default is 0. Off On
Usage example: >SET251	Turns compass on. Note: This command should only be used if the sensor has been calibrated at current location. Calibration automatically turns on compass.
SET26nddmm Where n= dd= mm=	
Usage example: >SET26W0606	Set declination to West 6° 6' (zip code 49686)
SET77	Save all settings to non-volatile memory. Any settings which have not been saved will be lost when power is removed. Saved settings are loaded at power up. This command may be used any time the sensor is in COMMAND MODE. Note: ResponseONE CONFIG program automatically sends this command when <send parameters=""> button is pressed.</send>
XX RPTV ?? HELP	Returns the sensor to OPERATE MODE Report current settings Display command list Display command list

7.0 EXAMPLE SETTINGS

Suggested settings. Not all possible setting combinations are shown. The *ResponseONE* CONFIG program is recommended for changing setup parameters. See wiring diagrams for jumper settings.

7.1 FACTORY DEFAULT

RS-232	Enabled
RS-485 (Output Only)	Enabled
Serial Output Format:	ASCII
Output Interval	1000
Sample Count:	100
Output Interval	1000

7.2 MINIMUM POWER

RS-232	Enabled
RS-485	Disabled
Serial Output Format:	ASCII
Output Interval	1000
Sample Count:	16

7.3 HIGH WIND

Output Delay:	1000
Sample Count:	200

AVERAGE CURRENT DRAW AT 12V

				Average
	Output	Sample	Baud Rate	Current Draw
Output Format	Interval	Count	(bps)	(mA)
SDI-12 (polled)	5 minutes	16	1200	4.5
	5 minutes	100	1200	4.5
ASCII	1 second	16	9600	8.4
	1 second	100	38400	20.7
ASCII Polled	5 minutes	16	9600	5.8
NMEA	1 second	16	4800	7.4
INIVIEA	1 second	50	4800	12.4
RMYT	0.25 second	16	9600	15.6
	1 second	200	9600	34.2

Average

8.0 EMC COMPLIANCE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada.

EN55011/CISPR 11, Group 1, Class B device.

Class B equipment is suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

9.0 WARRANTY

This product is warranted to be free of defects in materials and construction for a period of 12 months from date of initial purchase. Liability is limited to repair or replacement of the defective item. A copy of the warranty policy may be obtained from R. M. Young Company.

10.0 CE COMPLIANCE

This product has been tested and complies with European CE requirements for the EMC Directive. Please note that shielded cable must be used.

Figure A1: RS-232 SERIAL CONNECTION

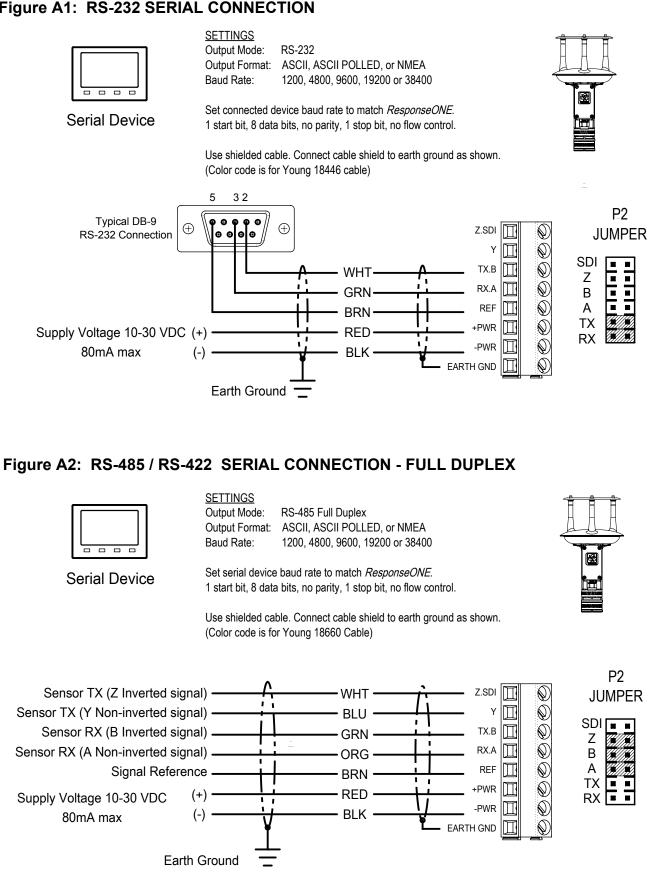
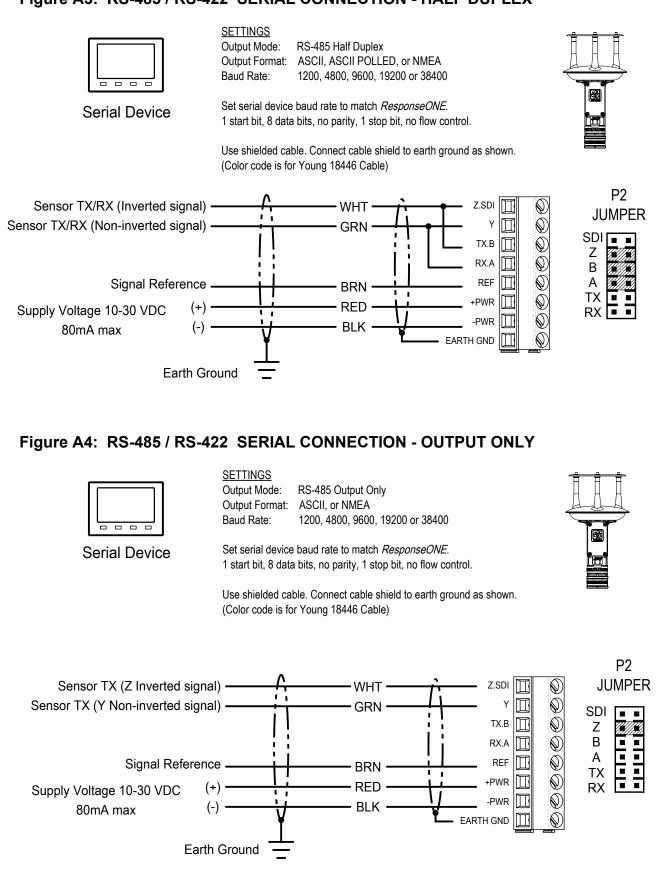


Figure A3: RS-485 / RS-422 SERIAL CONNECTION - HALF DUPLEX



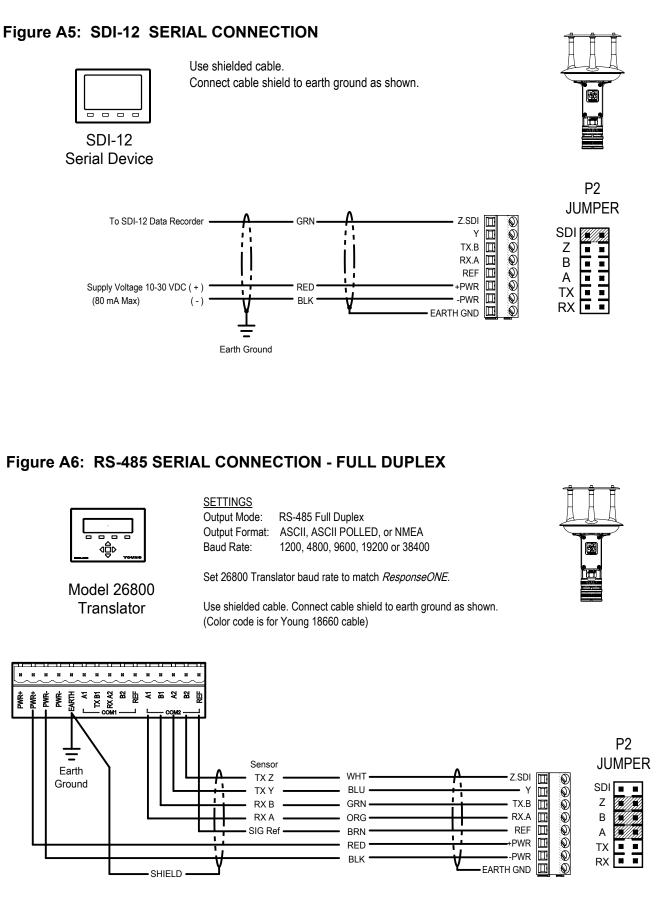
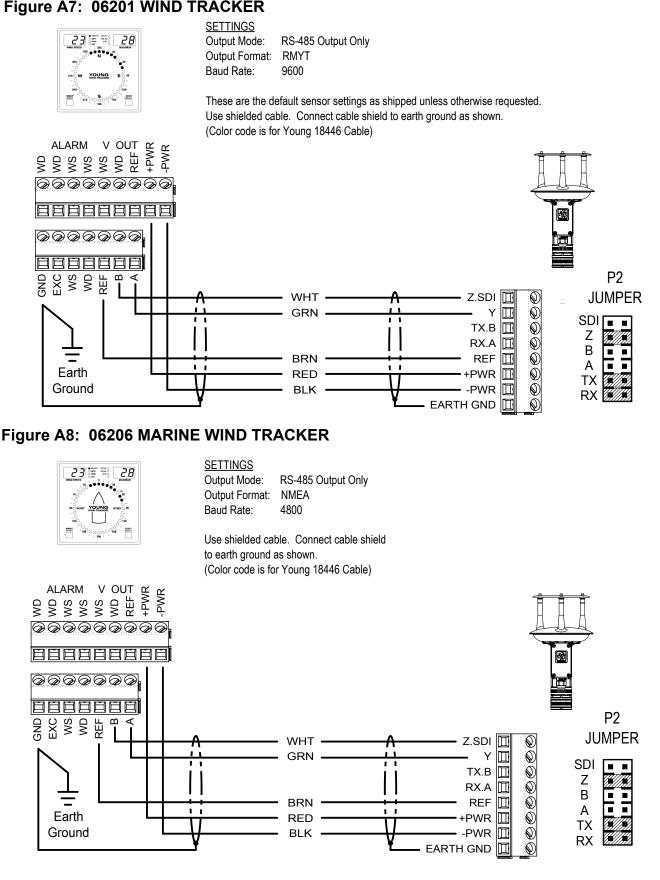
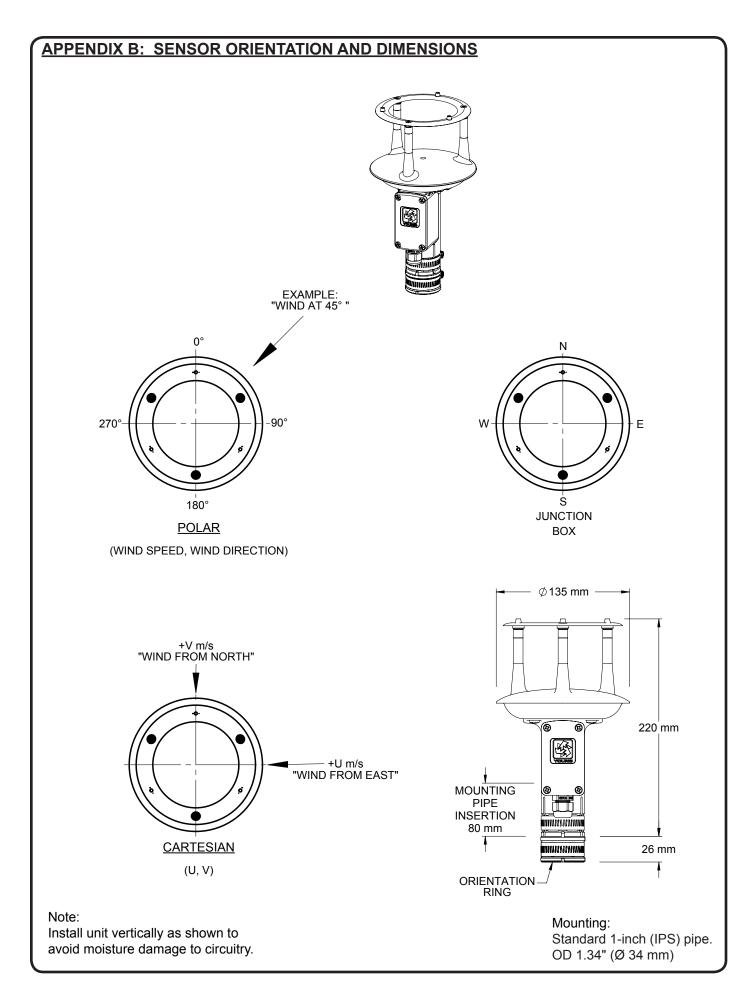


Figure A7: 06201 WIND TRACKER









APPENDIX C: TROUBLESHOOTING

Problem	Solution
No Output	 Check input voltage at sensor (10 – 30 VDC). Check wiring connections. Verify serial settings (baud rate, 1 stop bit, 8 data bits, no parity, no flow control). 'Acquire' the sensor with the <i>ResponseONE</i> CONFIG program (see section 6.2) and verify setup mode.
One-way communication	 Check wiring connections. 'Acquire' the sensor with the <i>ResponseONE</i> CONFIG program (see section 6.2). Change output mode to RS-485 full or half duplex, or RS-232.
Status codes other than 00 appear	• Status codes other than 00 (or 'A' in NMEA mode) mean there is an error. See 'Status Codes' section for details.
No response to poll command	 Check power supply. Check wiring connections. Verify serial settings (baud rate, 1 stop bit, 8 data bits, no parity, no flow control). Verify sensor address (if the sensor's address is '0', then the poll command is '0M!' in SDI-12 mode and 'M0! in ASCII Polled mode.). 'Acquire' the sensor with the <i>ResponseONE</i> CONFIG program (see section 6.2) and verify setup mode.
Direction is incorrect	 If compass is off, make sure junction box is facing south. 'Acquire' the sensor with the <i>ResponseONE</i> CONFIG program (see section 6.2) and verify settings. Enable and calibrate compass if needed, enter compass declination, and set the wind direction offset (default is 0000). Turn compass on and calibrate if needed.

Status codes for ASCII output are hex values added together before output (a status code of 03 would be a code of 01 and 02). NMEA only allows for 'acceptable' or 'void' data. SDI-12 does not show a status code.

Status Code	Meaning
00	Valid data
01	Transducer path A blocked or dirty, clear blockage and clean transducers
02	Transducer path B blocked or dirty, clear blockage and clean transducers
04	Transducer path C blocked or dirty, clear blockage and clean transducers
A	NMEA data acceptable (NMEA wind data only)
V	NMEA data void (NMEA wind data only)