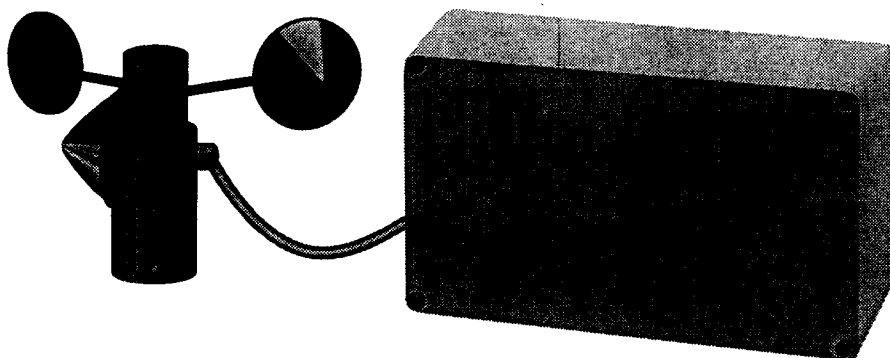
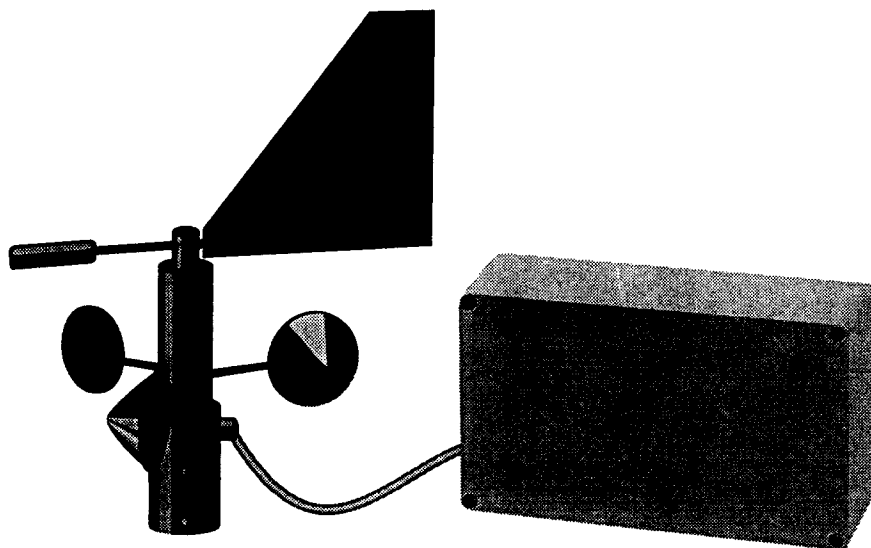


Ω WMS-22A and WMS-22

Ω Current Loop Wind Stations



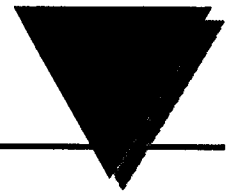
WMS-22A Wind Speed Indicator



WMS-22 Wind Speed and Direction Indicator



Operator's Manual



Remove the Packing List and verify that you have received all equipment, including the following (quantities in parentheses):

- WMS-22A or WMS-22, Wind Sensor
- Transmitter Housing Assembly, with I/O connection terminal strips
- Operator's Manual

If you have any questions about the shipment, please call the OMEGA Customer Service Department. When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.



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OMEGA Engineering

Model WMS-22 and WMS-22A Current Loop WindStations

Instruction Manual

1.0 INTRODUCTION

The WMS-22 Current Loop WindStation measures wind speed and direction and converts each parameter into 4-20 mA output signals for use by process control or monitoring systems. No external power is required since the encoding electronics for wind speed and for wind direction are isolated and powered from their respective 2-wire current loops.

The WMS-22 wind sensor includes a three-cup anemometer and wind vane. The sensor is ruggedly constructed of UV-resistant ABS plastic and anodized aluminum parts. The cable that connects the pole-mounted wind sensor to the encoder electronics package may be extended up to a total of 250 feet. The encoded current loops signals may be transmitted over distances of up to several miles. The electronics package, which is typically mounted in an indoor locations, is supplied in a gasketed, wall-mounted NEMA-4X enclosure.

The measurement time base for the wind speed-to-current conversion in the encoder is crystal controlled for stable long-term accuracy. Likewise, ratiometric signal conditioning is used to the direction measurement circuitry to minimize drift and non-linearity.

Two versions are offered; the WMS-22A measures wind speed only, while the WMS-22 measures both wind speed and direction. The WMS-22 systems consist of two subassemblies: a wind sensor and a signal conditioning electronics assembly.

2.0 PHYSICAL DESCRIPTION

2.1 The Wind Sensor

The rotating assembly containing the three-cup anemometer and wind vane for sensing wind speed and directional information is called the wind sensor. The wind vane is mounted on a common axis with the anemometer and includes a tail fin with a nose weight that provides balance. The wind vane is coupled to an angular encoder which is housed within the cylindrical weather skirt.

2.2 The Encoder

The encoder electronics package is housed in a sealed NEMA enclosure and contains two independent 4-20 mA data channels, one for wind speed and the second for wind direction. Each is powered from its respective 2-wire measurement loop.

2.3 Specifications

Wind Speed	
Measurement Range	0-100 mph
Averaging Interval	2.1 Seconds
Resolution	1 mph
Threshold	≤ 1 mph
Measurement Accuracy	±3% F.S.
Wind Direction	
Range	0-360° Mechanical 350° Electrical
Resolution	2 Degrees
Accuracy	±5 Degrees
Threshold	≤ 1 Mph
Current Loop	
Output Span	4 to 20 mA
Supply Voltage Range	10 to 48 Vdc
2-Wire Loop Interface	Screw Terminal Block

3.0 GENERAL DESCRIPTION

3.1 Wind Speed Measurement

The WMS-22 wind sensor is designed to be mounted on the end of a 1" outside diameter pole. It is supplied with 40 feet of cable for connection to the electronics housing. The anemometer's precision ball bearing is protected from the weather and has lifetime lubrication. The counterweight at the end of the wind vane balances the weight of the moving mass over its supporting bearing. It is important that the wind sensor be installed in a location free from any obstructions that would distort the natural flow of air across the sensor.

The full-scale (20 mA) output of the wind speed channel represents a measured 100 mph wind speed. The full-scale span of the direction channel represents a full 360 degree swing of the wind vane. The potentiometer used as a direction sensor for wind direction has a small arc of resistance discontinuity (typically 5-10°) straddling the North direction (indicated by the set screw in the mounting base). When the wind vane is pointing in this region, the loop current will be encoded as an underscale value of approximately 3.6 mA.

4.0 INSTALLATION

4.1 Unpacking

Empty the loose packing material from the corrugated shipping container and carefully lift out the wind sensor assembly.

List of Enclosed Materials

1. Wind Speed, Wind Direction sensor, with 40 feet of cable
2. Transmitter Housing Assembly with I/O connection terminal strips input receptacle.
3. Instruction Manual.

4.2 Wind Sensor Installation

Choose the mounting location for the wind sensor and temperature sensor unit which is free from obstructions. Use extreme care to prevent contact with electrical power lines while erecting the unit. A typical installation will position the wind sensor approximately 10 meters above the highest obstacle within a 300 meter radius of the mounting locations. Position the WMS-22 sensor on the end of a 1" diameter TV mast tubing or a 3/4" Schedule 40 pipe. If the pole is metal it should be well grounded electrically to minimize the probability of any lightning damage. Turn the anemometer on the pole so that the setscrew on the anemometer base is facing True North. Tighten the setscrew to fix the directional orientation.

4.3 Transmitter Installation

Mount the transmitter assembly in a covered location where it can be conveniently connected to its exterior wind sensor. The six-wire cable to the wind sensor may be extended to up to 250 feet in length without degrading the accuracy of its measurements. Orient the sensor so that the setscrew in its base is pointing to North. Use care not to puncture the jacket of the interconnecting cable if staples are used to secure it. The standard wind sensor is supplied with 40 feet of cable. In the event that the interconnecting cable needs to be extended, use good splicing techniques and waterproof the splice if it will be exposed to the weather.

I/O connection terminal strips are located at the top edge of the printed circuit board. Terminal functions with the corresponding colors of the wind sensor interconnecting cable are as follows:

●1	○	J1	Speed Input + (White)
●2	○		Speed Input - (Black)
●3	○		Direction Excitation + (Green)
●4	○		Direction Sensor (Red)
●5	○		Direction Return - (Yellow)
●6	○		Unused (Blue)
●1	○	J2	Wind Speed plc Loop +
●2	○		Wind Speed plc Loop -
●1	○	J3	Wind Direction plc Loop +
●2	○		Wind Direction plc Loop -

5.0 OPERATIONAL CHECKOUT

Connect the speed and wind direction process control loops to the appropriate locations of the terminal strip of the printed circuit board as shown on the earlier chart. For test purposes, you may wish to use an unregulated but filtered source of 10- to 24-volt DC power having a precision 100 ohm resistor (preferably $\pm 1\%$ accuracy) connected in a series with the supply. The loop powered encoding circuits requires the proper polarity of loop current; however, diodes are included to protect the circuitry against the case of a reversed polarity connection.

Connect the test leads of a digital voltmeter across the resistor to measure the plc loop current. The measured wind speed and direction at several cardinal calibration points should correspond to the following:

Wind Direction	Wind Speed (mph)	Loop Current (mA)	V ₁₀₀₀ (Volts)
N+	0.0	4.0	0.4
NE = 45°	12.5	6.0	0.6
E = 90°	25	8.0	0.8
SE = 135°	37.5	10.0	1.0
S = 180°	50	12.0	1.2
SW = 225°	62.5	14.0	1.4
W = 270°	75	16.0	1.6
NW = 315°	87.5	18.0	1.8
N-	100	20.0	2.0

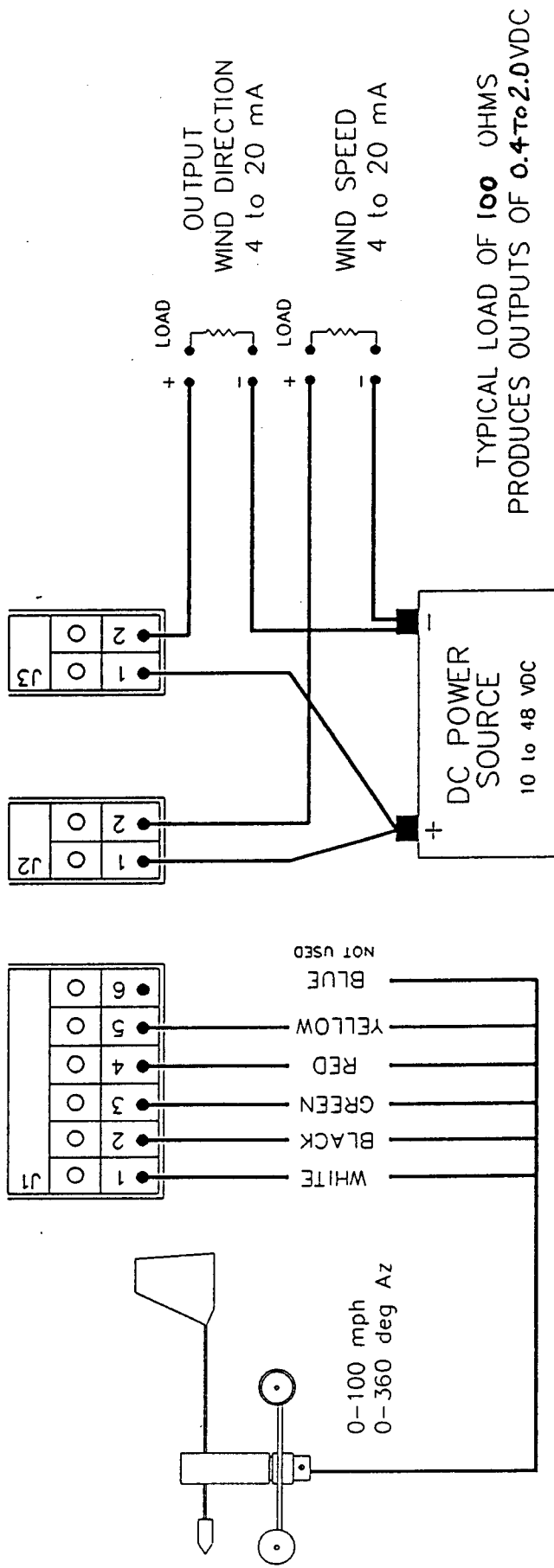
5.1 Circuit Board Adjustments

Multiple turn potentiometers on the printed circuit board are provided for independent gain and offset adjustment of both the speed and direction channels as follows:

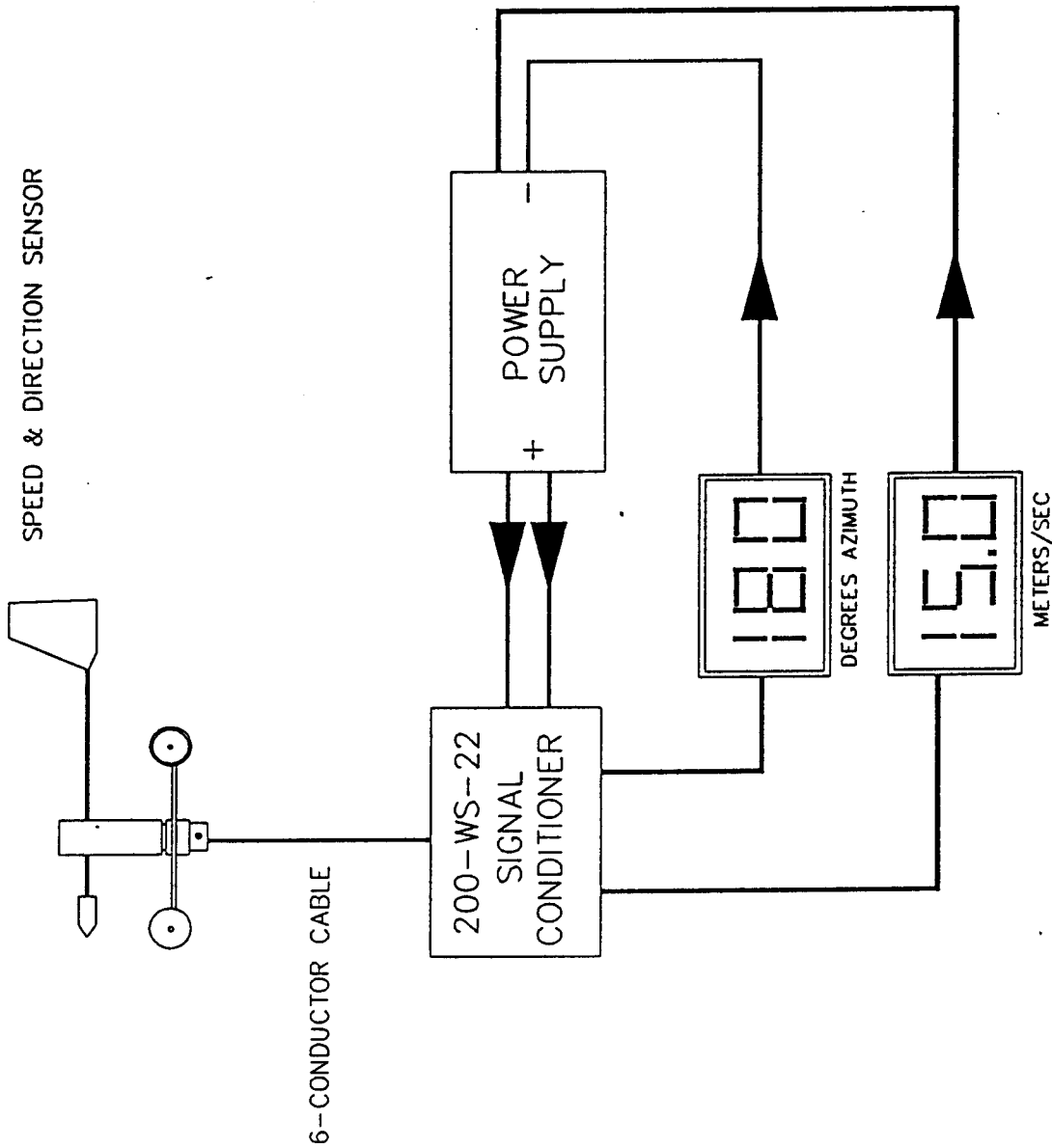
	Offset	Span
Wind Speed	R-7	R-5
Wind Direction	R-25	R-24

The WMS-22 normally should not require adjustment of these controls. An exception occurs if for any reason the wind sensor is changed or if the cabling to the wind sensor exceeds 200 feet in length. In these cases the span control of the direction channel may require a slight adjustment. A movable jumper is included on the PC board direction channel to facilitate checking its offset and span adjustments. To use this feature, remove the jumper normally in place at the "JW" position and move it to the "JO" position. This should force the wind direction loop current to its zero scale or 4 mA level. If necessary, adjust R-25 to obtain this value, noting that counterclockwise rotation of its adjustment screw will cause the offset value to increase. Moving the jumper position to the "JF" location will cause the loop current to its full scale value of 20 mA. If necessary, adjust R-24 to obtain this value noting that counterclockwise rotation of its adjustment screw will cause an increase in the span. If either the span or offset trim are changed, it is suggested that both values be checked, since there is some slight interaction between the two adjustments. Be sure to return the jumper to the JW position at the conclusion of this adjustment procedure.

The Wind Speed channel should not normally require adjustment in the field.



MODEL 200--WS--22
 CURRENT LOOP WINDSTATION
 TYPICAL WIRING WITH A SINGLE POWER SOURCE



Ω OMEGA		C	
TITLE OUTLINE, TYPICAL APPLICATION			
PROCESS CONTROLLER OR INDICATOR			
MODEL USAGE 200-WS-22		SHEET 1 OF 1	
BY RCN	SCALE DIM. NO. NONE	10000339	
DATE 11-5-97			



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FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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