

**MODEL 50202/50203
PRECIPITATION GAUGE**

MAY 2002

MANUAL PN 50202-90

R. M. YOUNG COMPANY

2801 AERO PARK DRIVE, TRAVERSE CITY, MICHIGAN 49686, USA
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YOUNG

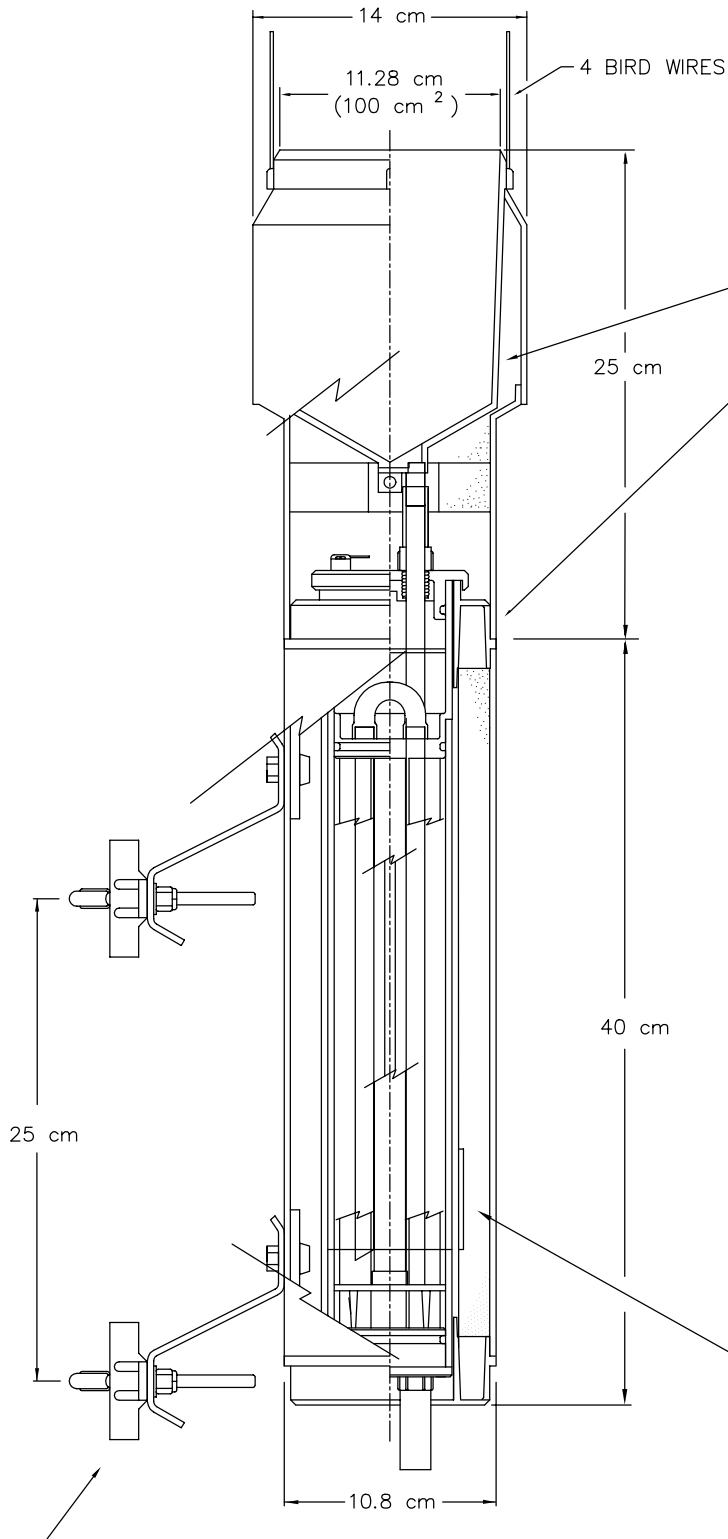
MODEL 50202 PRECIPITATION GAUGE

CAPACITIVE MEASUREMENT
NO MOVING PARTS
AUTOMATIC SELF SIPHONING
LOW POWER MEASURING CIRCUIT

INSULATION JACKET WITH OPTIONAL
20W/24VAC HEATER & THERMOSTAT

DETACHABLE CATCHMENT MAY BE REMOTE
FROM MEASURING SECTION

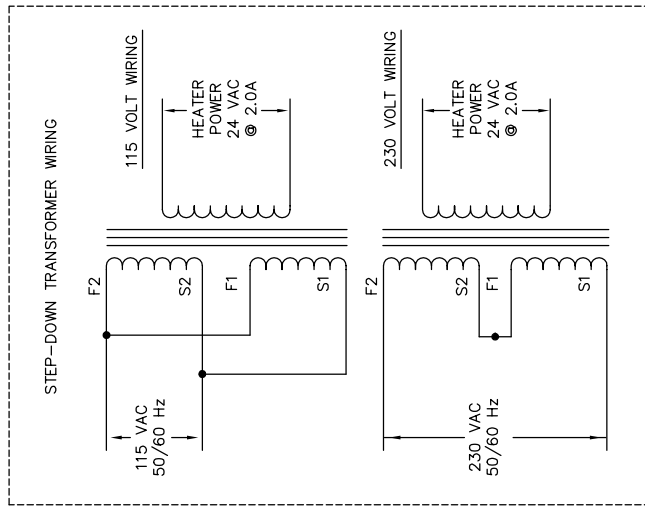
SPECIFICATIONS
MEASURING RANGE: 0 TO 50 mm STANDARD (50202) (AUTOMATICALLY EMPTIES AND REPEATS MEASUREMENT)
THRESHOLD: 1mm (0.05")
ACCURACY: ± 1mm (± 0.1")
OUTPUT SIGNAL: 0 – 5 VDC (ADJUSTABLE – OTHER OUTPUT LEVELS CAN BE PROVIDED.)
CIRCUIT POWER: 8 – 30 VDC (< 3mA) UNREGULATED
OPERATING TEMPERATURE: >0° C TO 50° C -20° C TO + 50° C WITH 24 VAC HEATERS
WEIGHT: 2.5 KG (5.6 LBS)
SHIPPING WT: 4 KG (9 LBS) APPROX.



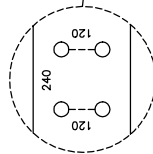
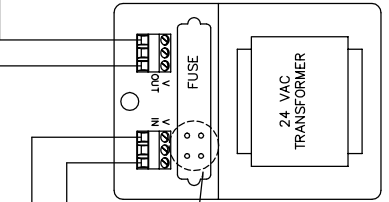
INSULATION JACKET WITH OPTIONAL
26W/24VAC HEATER & THERMOSTAT

UNIVERSAL TYPE MOUNTING BRACKETS
(U-BOLT FITS 25-50mm [1-2 INCH]
DIAMETER MOUNTING PIPE)

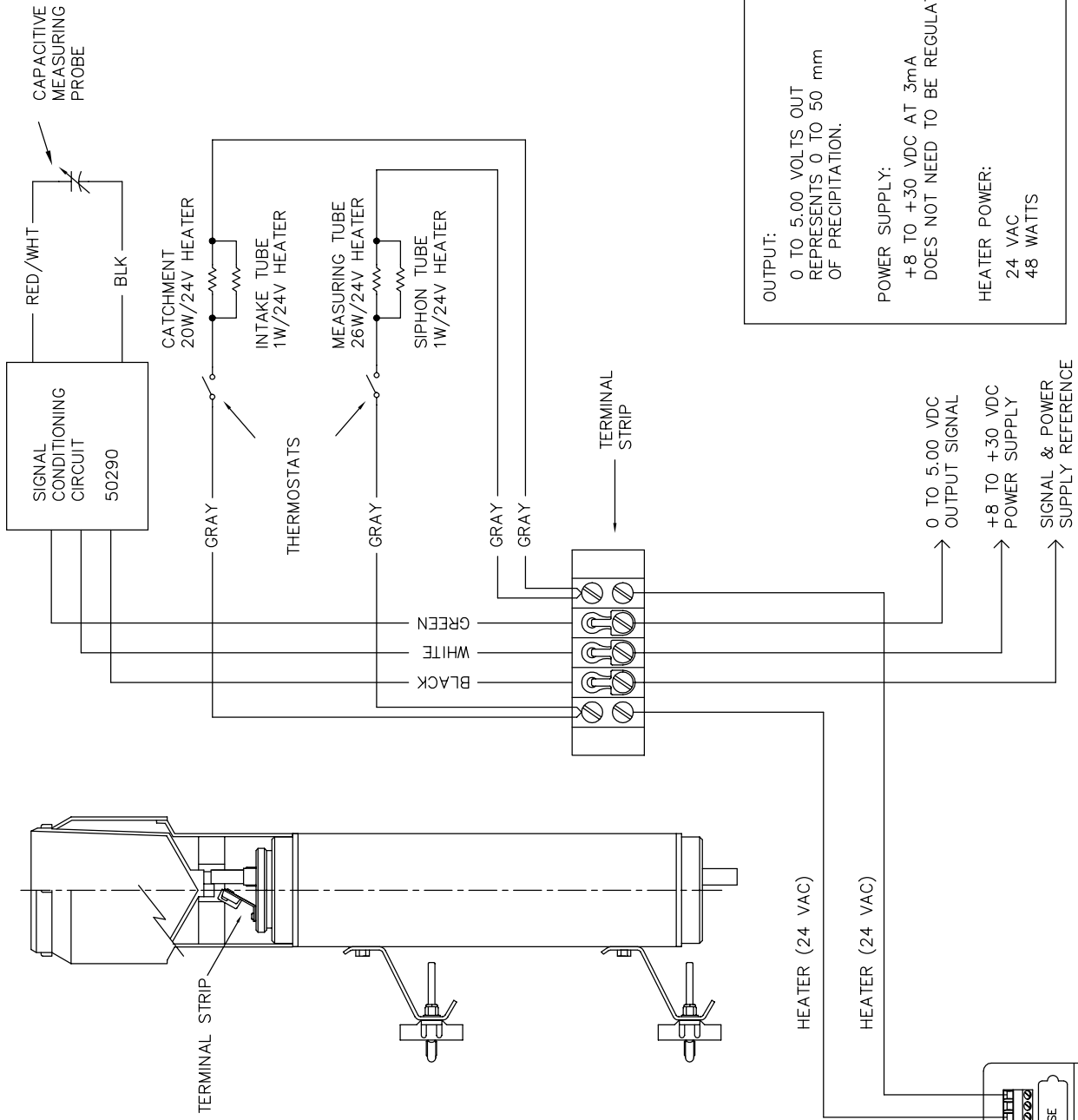
MODEL MODEL 50202 PRECIPITATION GAUGE	DWG DP	PRDATE 08/88
DESC1 SPECIFICATION & OUTLINE DRAWING	DWN KL	DWDATE 11/94
DESC2	CHK KL	FILENAME M50202
R.M. YOUNG CO. TRAVERSE CITY, MI 49686 U.S.A. 231-946-3980		



MODEL 27060
24V TRANSFORMER ASSY



VOLTAGE SELECTED BY JUMPER CONFIGURATION UNDER FUSE COVER



OUTPUT:
0 TO 5.00 VOLTS OUT REPRESENTS 0 TO 50 mm OF PRECIPITATION.

POWER SUPPLY:
+8 TO +30 VDC AT 3mA DOES NOT NEED TO BE REGULATED.

HEATER POWER:
24 VAC
48 WATTS

MODEL 50202	DWG A	PRD 08-88
PRECIPITATION GAUGE	DWN KL	DWG 11-99
WIRING DIAGRAM	CHK	W50202
R.M. YOUNG CO. TRAVERSE CITY, MI 49686 U.S.A. 231-946-3980		

MODEL 50202 PRECIPITATION GAUGE

THEORY OF OPERATION

Model 50202 Precipitation Gauge collects and measures precipitation. Unlike conventional tipping-bucket and weighing gauges the 50202 has no moving parts. Precipitation measurement is made with a capacitive transducer and electronic circuit that produces a calibrated voltage output. Standard output is 0 to 5.00 VDC for 0 to 50mm precipitation with an accuracy of ± 1 mm. The low power signal conditioning circuit requires 8 to 30 VDC at 3mA. Self contained thermostatically controlled heaters allow operation at temperatures as low as -20°C (-4°F). Collected snow is melted and measured as rainfall equivalent. The heaters operate from 28 volts AC at approximately 48 watts.

Precipitation is collected in a catchment funnel which has a cross sectional area of 100 cm^2 . Captured precipitation drains from this funnel into a measuring tube which has a cross sectional area of 20 cm^2 . Since the area of the catchment funnel is 5 times that of the measuring tube, 1mm of captured precipitation produces a 5mm column of water in the measuring tube. A capacitive transducer in the center of the measuring tube senses the water column height. A self contained electronic circuit converts the capacitance value to a calibrated voltage output that is proportional to collected precipitation. Periodic interrogation by a data logging system allows computation of total precipitation and rate.

The full column height of the measuring tube is 250mm representing 50mm of collected precipitation. Additional precipitation starts a self-siphon process which empties the measuring tube in approximately 30 seconds. The water column in the tube returns to a level representing 0mm of precipitation and the voltage output goes to 0 VDC. Additional precipitation begins filling the measuring tube again and the cycle is repeated. Evaporation of water remaining in the measuring tube is negligible between siphoning events.

Universal type mounting brackets permit mounting to a vertical pipe of any diameter between 25-50mm (1-2 in.).



MODEL 50202/50203
PRECIPITATION GAUGE 0 - 50 mm RANGE
CALIBRATION PROCEDURE

1. VOLUME CALIBRATION CHECK

1.1 EQUIPMENT NEEDED

Water
500 ml graduated cylinder
25 ml syringe

1.2 PROCEDURE

1.2.1 PRIME GAUGE

a) Pour water slowly into catchment funnel until unit self siphons.

1.2.2 MEASURE VOLUME

a) Pour 490 ml of water into catchment funnel.
b) Use syringe to add 5 ml of water very slowly. Measuring tube should be nearly full.
c) Use syringe to add more water very slowly. Siphoning should begin before 10 ml is added: tolerance is 495 - 505 ml, ($\pm 1\%$). Catchment funnel is 100 cm² and measuring tube is 20 cm² (5:1 ratio). 1 mm of collected precipitation equals 5 mm of measuring tube depth.

2 ELECTRONIC CALIBRATION

2.1 EQUIPMENT NEEDED

Water
500 ml graduated cylinder
Fixed DC power source (12 to 24 VDC)
Voltmeter
25ml syringe

2.2 PROCEDURE

2.2.1 MAKE ELECTRICAL CONNECTIONS

a) Refer to wiring diagram for proper connections.
b) Connect 12 to 24 VDC to power input.
c) Connect a voltmeter to circuit output.

2.2.2 PRIME GAUGE

a) Pour water slowly into the catchment funnel until the unit self siphons.

2.2.3 CALIBRATE VOLTAGE OUTPUT FOR ZERO

a) Turn ZERO trimpot (R4) on circuit board until a positive change is observed in the voltage output.
b) Then turn trimpot until voltage output just reaches 00.0 volts. Do not turn it any further.

2.2.4 CALIBRATE VOLTAGE OUTPUT FOR FULL SCALE

a) Pour 450 ml into catchment funnel.
b) Adjust GAIN trimpot (R13) for 4.50 VDC on the output. Output voltage is now scaled for 20 mV per millimeter of water depth in the measuring tube which equals 100 mV per millimeter of precipitation.

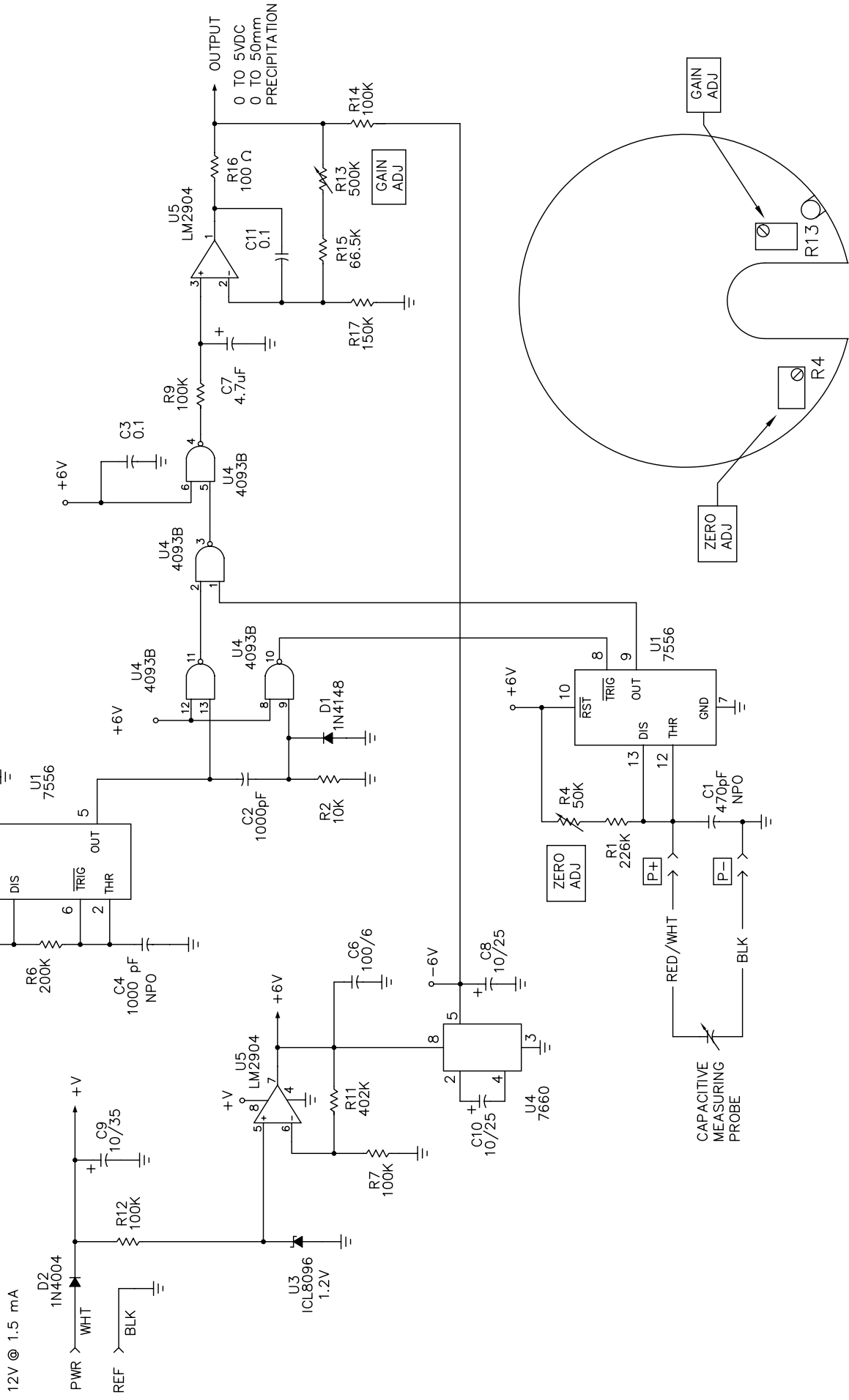
2.2.5 CHECK OUTPUT LINEARITY

a) Pour water slowly into catchment funnel until unit self siphons.
b) Add 50 ml of water and observe output voltage.
c) The output voltage is calculated using the ratio of 500 mV per 50 ml. Gauge accuracy is specified as ± 1 mm of collected precipitation. Measured output voltage should be within ± 100 mV of the calculated value.
d) Continue adding water in 50 ml increments and observing voltage output until measuring tube is full at 500 ml total volume. Measured output voltage should be within ± 100 mV of the calculated value at each 50 ml increment.

R. M. YOUNG COMPANY

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NOVEMBER 1999

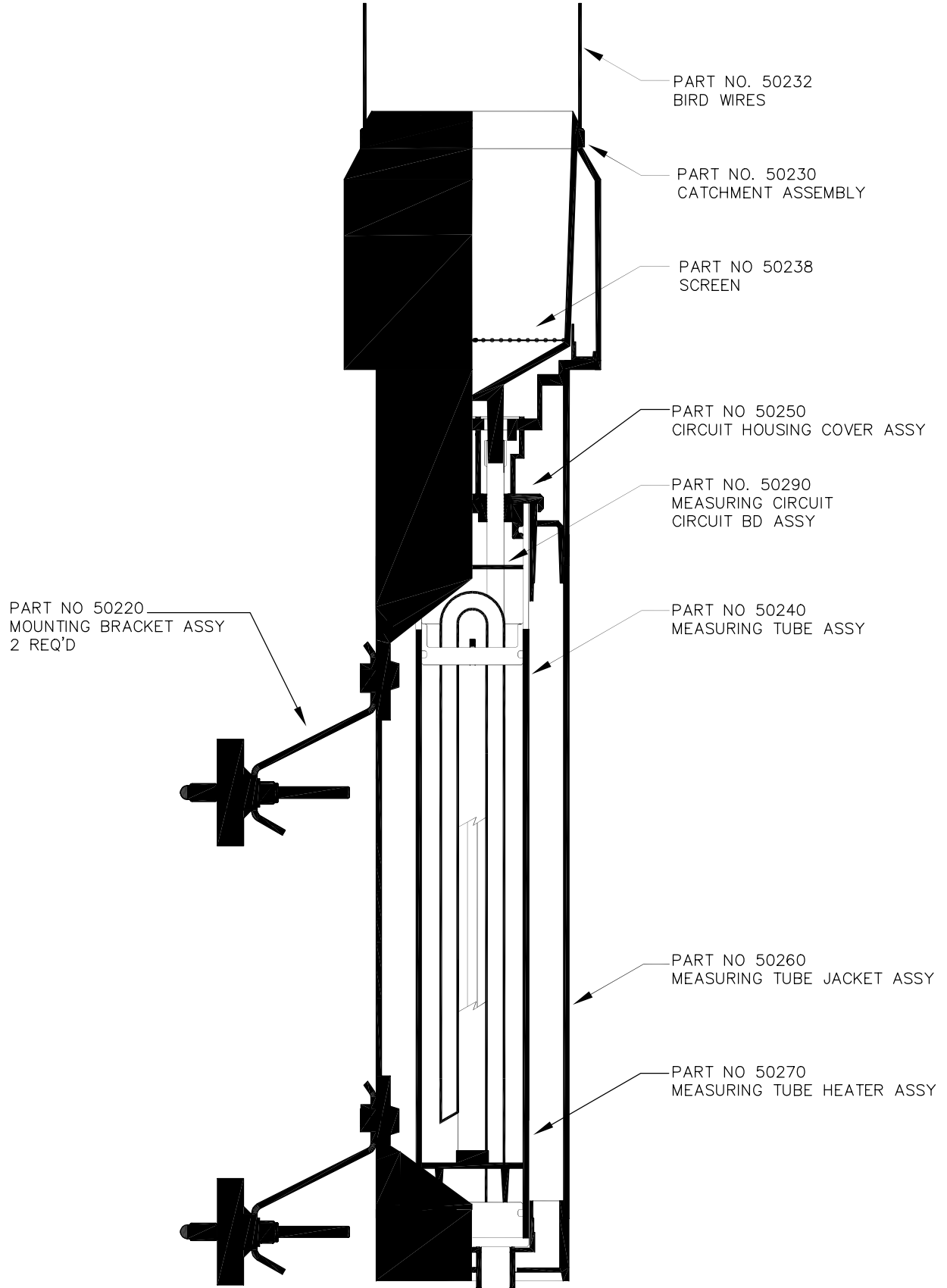


MODEL 50202 (0 - 50 mm RANGE)	DWG A	PRD 08-99
PRECIPITATION GAUGE	DWN KL	DWG 05/02
SIGNAL CONDITIONING CIRCUIT	CHK	C50202
R.M. YOUNG CO. TRAVERSE CITY, MI 49686 U.S.A. 231-946-3980		

- NOTES:
1. ALL RESISTORS ARE 1/4-W, METAL-FILM, 1%, UNLESS OTHERWISE NOTED.
 2. ALL CAPACITORS ARE IN μ F, UNLESS OTHERWISE NOTED.



MODEL 50202
PRECIPITATION SENSOR 0 - 50 MM



MODEL 50202	DWG A	PRD 10-88
PRECIPITATION SENSOR 0-50 MM	DWN KL	DWG 11-99
REPLACEMENT PARTS	CHK	A50202
R.M. YOUNG CO. TRAVERSE CITY, MI 49686 U.S.A. 231-946-3980		