

260-2501

User Manual

260-2501-A

260-2501M-A

8" Tipping Bucket Rain Gauge



Phone (530) 823-7185

Email nova@novalynx.com Website www.novalynx.com

Receiving and Unpacking

Carefully unpack all components and compare to the packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

Returns

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage during the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with the packaging. Please write the RA# on the outside of the box.

Warranty

NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation's liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

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1 FORWARD

Thank you for purchasing NovaLynx products. NovaLynx has been designing and manufacturing weather instruments since 1988. NovaLynx represents several well-known brands of quality manufacturers, including Gill Instruments, RM Young, Kipp & Zonen, and Vaisala. It is our hope that our products will meet all your monitoring requirements.

2 INTRODUCTION

NovaLynx **260-2501 Tipping Bucket Rain Gauges** are constructed of high quality materials and are designed to provide years of trouble-free operation with a minimum of maintenance. Each rain gauge is factory calibrated for accuracy.

- Model 260-2501-A 0.01" / tip
- Model 260-2501M-A 1 mm / tip
- Model 260-2501M-A.5 0.5 mm / tip
- Model 260-2501M-A.25 0.25 mm / tip
- Model 260-2501M-A.2 0.2 mm / tip

The 8" inlet is protected by two screens to keep debris out of the main funnel. Inside, a secondary funnel system helps smooth and direct the flow of water into the tipping buckets. The tipping buckets are balanced on nylon bearings for smooth operation.

The electrical output of the rain gauge is a momentary dry contact switch closure.* The signal is compatible with many electronic measurement devices such as data loggers or event counters that include a weak pull-up voltage on their digital inputs. Each tip of the bucket mechanism can be counted and totaled in inches or millimeters depending on the rain gauge's calibration factor.

The 260-2501 series rain gauges include a bubble level and adjustable leveling feet to aid in proper installation. The gauge can be mounted on the optional **260-950 Mounting Plate** or **260-2501MB Side Mounting Bracket**.

* A transient voltage suppressor is connected to the switch assembly for static discharge protection.

3 SPECIFICATIONS

Model	260-2501-A	260-2501M-A
Orifice	8" (20 cm)	8" (20 cm)
Calibration	0.01"	0.2mm, 0.25mm, 0.5mm, 1 mm
Accuracy	±2% at 5.1"/hour	±2% at 130mm/hour
Capacity	Unlimited - self emptying	
Leveling	Bubble level / adjustable leveling feet	
Electrical		
Switch	Magnetic reed, SPST normally open	
Output	0.1 second switch closure	
Contact maximum rating	10 watts, 0.5 amps, 200 Vdc	
Static discharge protection	Transient voltage suppressor, 27V nom, 16A	
Cable	PVC Jacket, 2 conductor, 20 AWG, 25 feet	
Materials		
Outer cover	Aluminum, white powder coat	
Funnel, base, bucket & support hdw.	Aluminum, black anodized	
Fasteners	Stainless steel	
Shipping		
Dimensions	8"Ø x 15" (20 x 38 cm)	
Weight / Shipping	4 lb / 5.5 lb (1.8 kg / 2.5 kg)	

4 OPTIONAL ACCESSORIES

Rain Gauge Accessories	
Mounting plate	260-950
Side Mounting Bracket	260-2501MB
Bird spike kit	260-957 (4/set)
48" Dia. wind screen (Alter type)	260-952 (24" legs) or 260-953 (36" legs)
Rain logger with display	260-2103
Precipitation gauge calibrator	260-2595
Pocket-size digital event counter	260-2598 or 260-2599

5 SITE SELECTION

The location of the rain gauge is very important to the successful operation of the instrument. The most accurate measurements are made in relatively sheltered areas protected from gusts and turbulent wind. Open spaces between buildings and trees offer some shelter from wind effects; however, the rain gauge should be situated at least twice the distance from such objects as their

height. In locations with heavy snowfall, the gauge should be mounted well above the average local snow level.

Wind effects on catch losses are more pronounced during snow storms than during rain storms. Where snowfall constitutes more than 80% of annual precipitation, and in areas that are open with no nearby structures, a wind screen such as the **260-952 Alter-Type Wind Screen** is recommended to minimize wind effects.



260-952 Wind Screen

The screen consists of 32 free-swinging metal leaves evenly spaced around a 48" diameter ring. The ring is divided into four quadrants, one of which swings open to permit access to the rain gauge.

Good locations do not always remain obstruction free. Vegetation can grow quickly, changing an excellent exposure into a poor one. Sites should be inspected regularly in order to properly maintain the exposure of the gauge.

6 MOUNTING OPTIONS

To ensure best accuracy the rain gauge must be mounted as level as possible on a solid platform free from vibration.

The **260-950 Mounting Plate** (sold separately) simplifies installation and can be supported on a pipe anchored in a cement base or firmly attached to a stable structure. The mounting plate includes all the hardware necessary to attach the rain gauge.



The **260-2501MB Side Mounting Bracket** (sold separately) clamps to a vertical mast up to 1.25" inches in diameter.



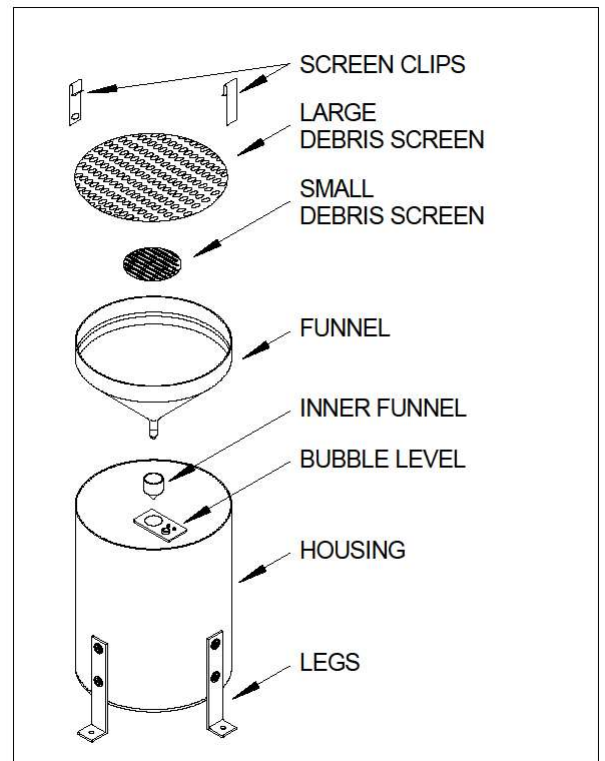
If you prefer to make your own mounting platform, refer to Appendix A for dimensions.

7 UNPACKING AND ASSEMBLY

Set aside the accessory bag containing a small screen and inner funnel. Remove the screen clips and lift out the large screen. Lift the funnel upwards. You will find a large cable tie protruding through the funnel – placed there to keep the buckets from tipping during shipment. Remove the cable tie. Remove the manual from the inside of the rain gauge.

Place the rain gauge on your mounting platform and check the level by viewing the bubble level inside the gauge. If there is a significant tilt add extra washers (not supplied) under one or two legs of the rain gauge as you assemble it to the support. Fine-tune the level of the rain gauge after the legs have been secured to the mounting plate. To adjust, loosen the two screws holding the leg to the gauge, and raise the gauge as needed.

Check the tipping mechanism by using your finger to tilt the buckets back and forth. The operation should be smooth and the buckets should rest on the nylon bumpers at the end of their swing.



260-2501 Rain Gauge

Route the output cable to your monitoring equipment and connect the red wire to the input channel and the black to ground. Tip the buckets a few times and verify the counts are registered.

Place the inner funnel on the top of the tipping bucket support structure next to the bubble level. This funnel smooths the flow of water into the buckets. Replace the large funnel, screens, and screen clips. Secure the output cable with cable ties to complete the assembly.

8 ROUTINE MAINTENANCE

WARNING: Be aware that spiders or insects may be nesting inside the rain gauge. Disassemble with caution to avoid being bitten or stung.

Annual maintenance is recommended for all 260-2501 rain gauges. More frequent check-ups are needed in locations where debris are likely to fall into the funnel and clog the screens.

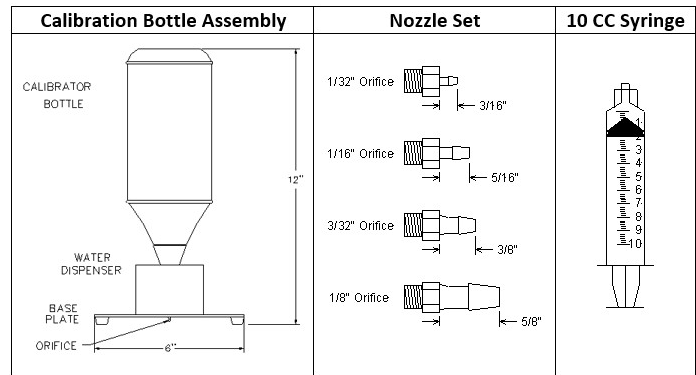
1. Inspect the cable for damage. Make sure the cable is secured properly.
2. Remove the clips holding the top screen and remove both screens. Clear out any debris that may have collected in the funnel or on the screens.

3. Remove the funnel and inspect the screens at the bottom of the rain gauge below the tipping buckets. Clear any debris that may have collected on the screens.
4. Check the inner funnel and clean it if necessary.
5. Check the tipping mechanism by using your finger to tilt the buckets back and forth. The operation should be smooth and the buckets should rest on the nylon bumpers at the end of their swing.
6. Verify the monitoring equipment registers a count for each tip of the buckets.
7. Check the level of the rain gauge using the bubble level. Adjust the legs as necessary.
8. Replace the inner funnel, main funnel, screens and clips.

9 CALIBRATION

Each rain gauge is thoroughly tested and calibrated before being shipped to the customer. The calibration can be field-tested as part of a yearly maintenance cycle or the unit can be returned to NovaLynx for re-calibration as needed.

Complete details for calibration using the NovaLynx **260-2595 Rain Gauge Calibrator** are available to download from the NovaLynx website (www.novalynx.com).



260-2595 Rain Gauge Calibrator

NovaLynx calibrates series 2501 rain gauges using the 1/16" orifice, which delivers 70 cc / minute into the gauge during testing. The calibrator kit includes additional nozzles so that the gauge can be tested at different rates of flow, as shown in the chart below:

Rain Gauge Inlet Diameter		Orifice Diameter				Rain Intensity
		1/32"	1/16"	3/32"	1/8"	
8	inch	1.75	5.10	11.51	26.30	inches/hour
8	inch	44	130	292	668	mm/hour

To verify the calibration of your rain gauge, first do the routine maintenance procedure (Section 8). Run your first calibration check to determine whether adjustment is necessary. If the unit is out of calibration, locate the calibration screws that are directly below the buckets. Adjustments are made by first loosening the jam nut underneath the rain gauge, then turning the screw in small increments to raise or lower the tipping point. Tighten the jam nut before running the calibration check so that no further adjustment is needed when a successful test is run.

NovaLynx recommends using the **260-2595 Rain Gauge Calibrator** with 1/16" nozzle and 260-2598 Digital Event Counter for performing dynamic testing. If the calibrator is not available one can measure the amount of water for each tip and perform a static test. The chart below gives the cc/tip required for each model of 2501 Rain Gauge. A tolerance of $\pm 2\%$ or better should be obtained.

Models	Inlet Diameter		Calibration Factor		cc / tip	Tips per test volume			
						150 cc	450 cc	750 cc	946 cc
260-2501-A	8	inch	0.01	inch/tip	8.24	18.2	54.6	91.1	114.8
260-2501M-A	8	inch	1	mm/tip	32.43	4.6	13.9	23.1	29.2
260-2501M-A.5	8	inch	0.5	mm/tip	16.21	9.3	27.8	46.3	58.3
260-2501M-A.25	8	inch	0.25	mm/tip	8.11	18.5	55.5	92.5	116.7
260-2501M-A.2	8	inch	0.2	mm/tip	6.49	23.1	69.4	115.6	145.9

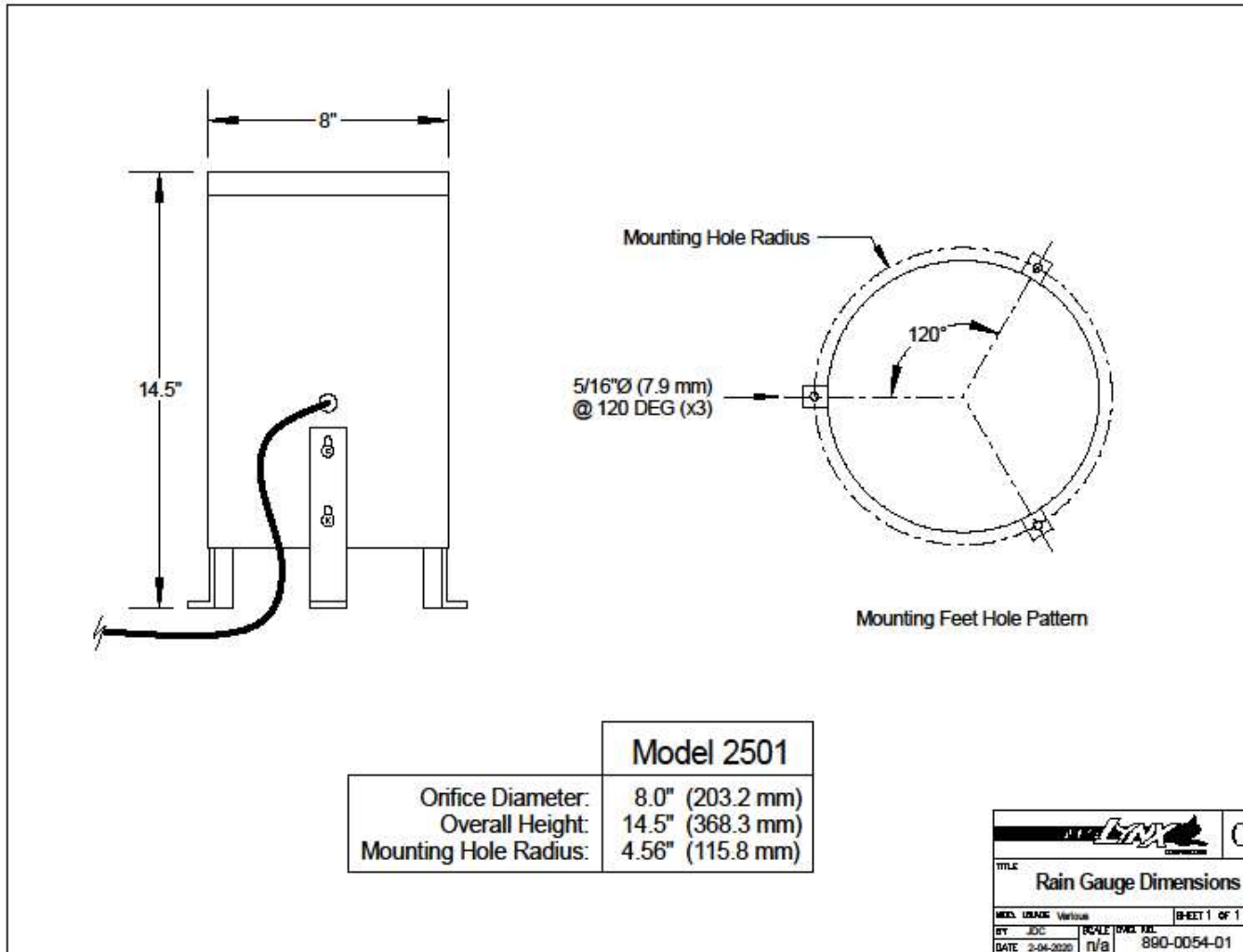
10 TROUBLESHOOTING

Most mechanical problems can be resolved by following the routine maintenance procedures. To resolve electrical problems you will need a multimeter which can measure ohms.

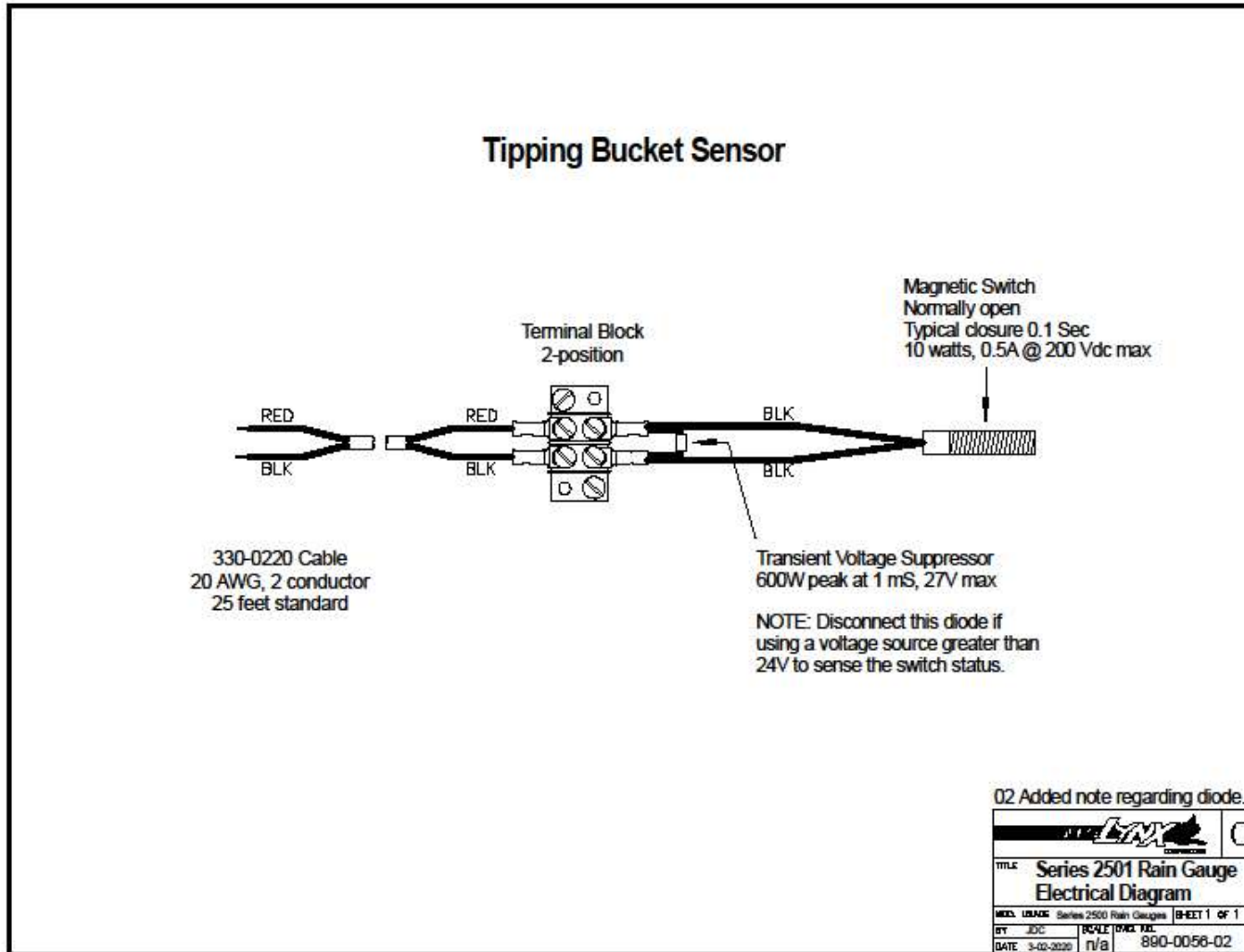
Disconnect the rain gauge from your monitoring equipment and connect your multimeter (set to ohms) to the red and black wires. The meter should show a high resistance, meaning the reed switch in the rain gauge is open. Use your finger to tip the bucket slowly towards the mid-point. The meter should now read a low resistance (<100 ohms). Tip the bucket further to verify the switch opens and the meter shows a high resistance again.

NOTE: If the reed switch does not activate and the switch seems to be short-circuited, it may be due to failure of the transient voltage suppressor (TVS) diode. The diode can short-circuit if hit with too much energy. Disconnect the diode and test it with an ohm-meter. If the resistance is low then replace the reed switch / diode assembly (NovaLynx Part# 10000160).

APPENDIX A RAIN GAUGE DIMENSIONS



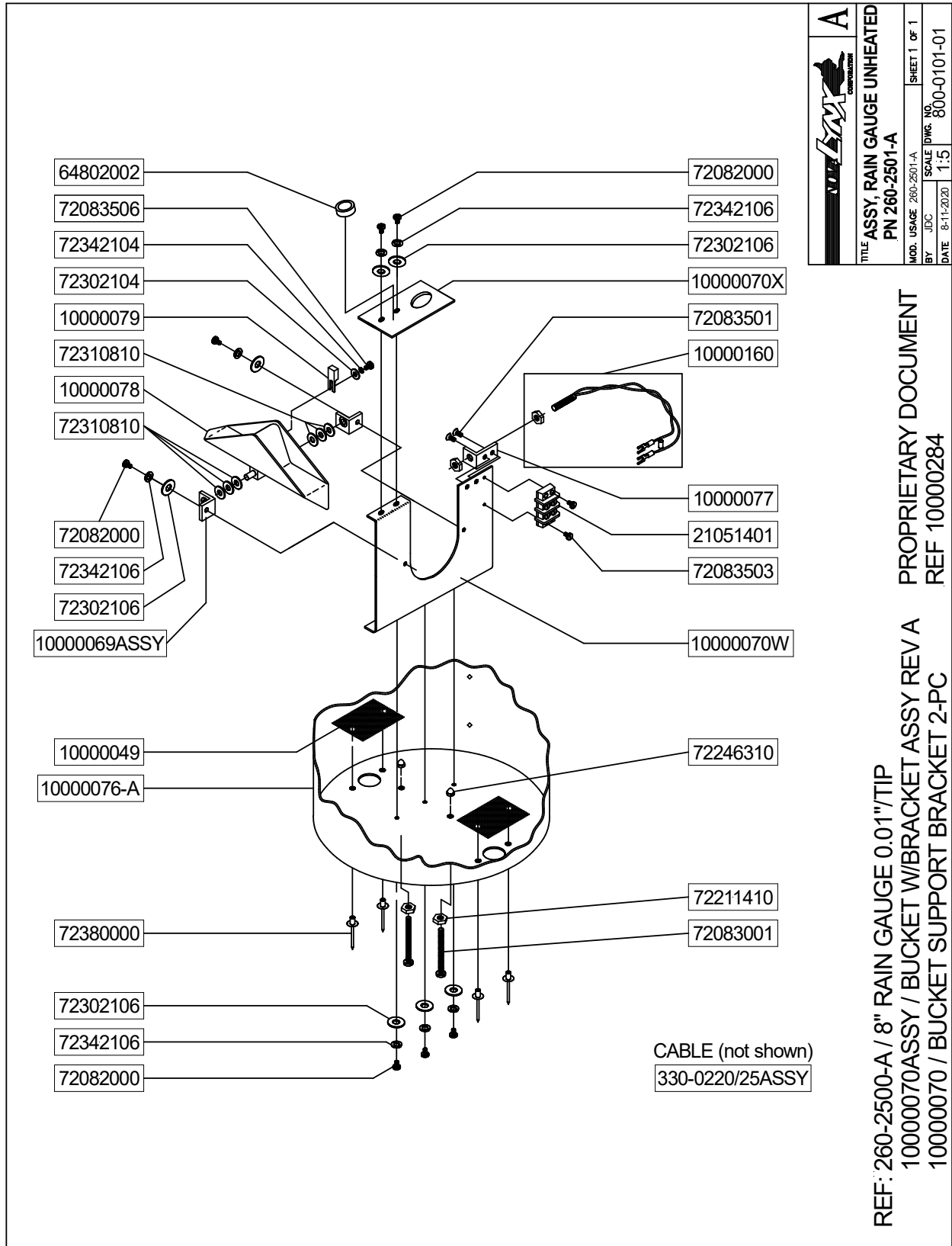
APPENDIX B WIRING DIAGRAM

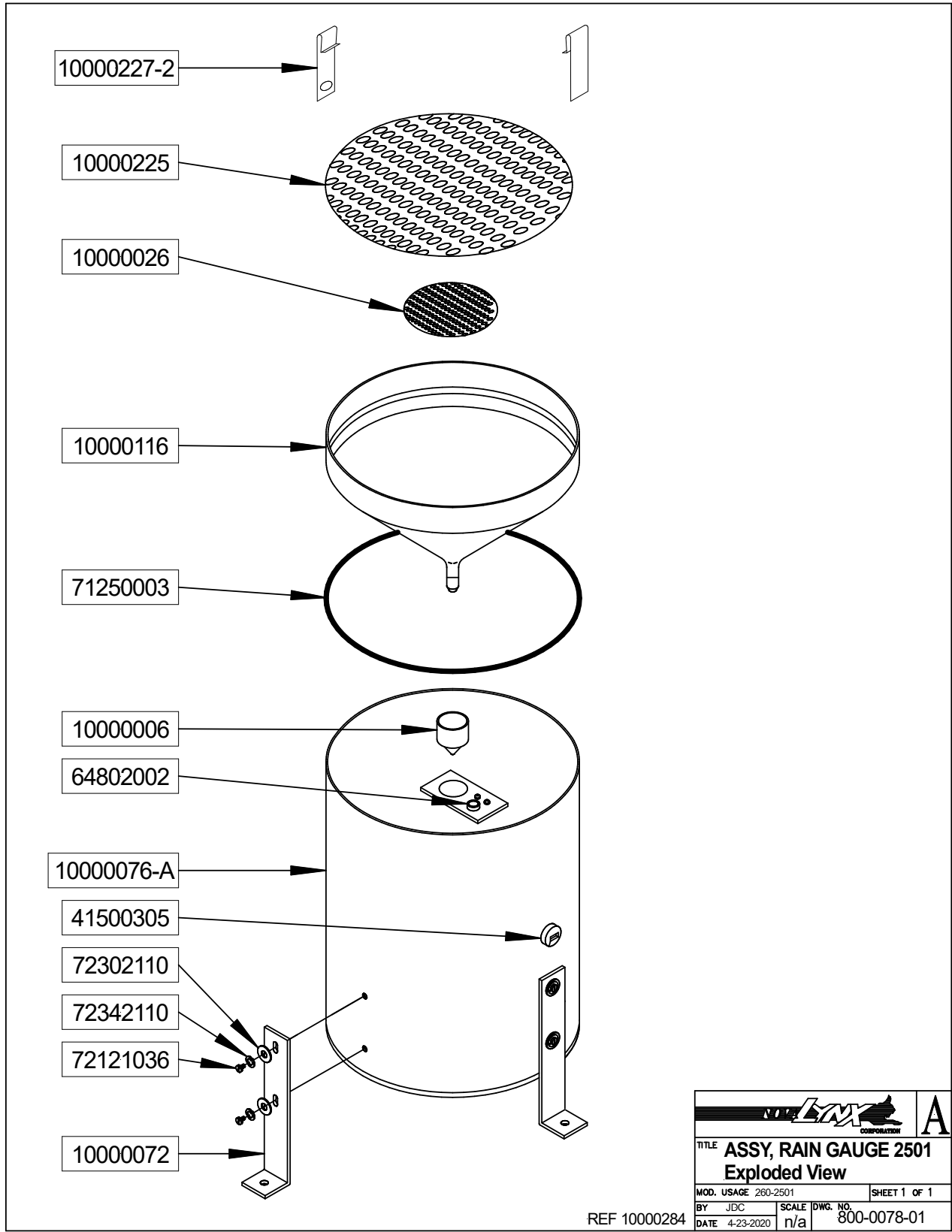


APPENDIX C PARTS LIST

260-2501 RAIN GAUGE

1	10000006	INNER FUNNEL 2500 2501	
1	10000026	LOWER SCREEN 2" 2500 2501	
2	10000069ASSY	BUCKET SHAFT SUPPORT BRACKET	10000069 BRKT & 71010100 NY INSERT
1	10000070W	BUCKET SUPPORT BRACKET	FOR 260-2501-A
3	10000072	MOUNTING FOOT 2501	
1	10000076-A	RAIN GAUGE BODY WHITE 2501	REV A
1	10000077	BARREL SWITCH BRACKET	
1	10000078	BUCKET ASSY .01" FOR 2501	
1	10000079	MAGNET WITH BRACKET ASSY	10000071 BRKT & 25000004 MAGNET
1	10000116	FUNNEL 8" 2500 2501	
1	10000160	REED SWITCH ASSY WITH DIODE	
1	10000225	UPPER SCREEN 8" 2500 2501	
2	10000227-2	HOLD DOWN CLIP NO PEM NUT	FOR 8" FUNNEL
1	21051401	BARRIER TERM BLOCK 2-141	
1	41500305	STRAIN RELIEF .500 STRAIGHT	FOR ROUND CABLE
4	41900610	FLANGED SPADE TERM RED #6	
1	64802002	ACRYLIC CIRCULAR VIAL 15M	YELLOW-GREEN W/ADHESIVE B
1	71010100	SHAFT SUPPORT, NYLON INSERT	
1	71250003	BUNA-N O-RING #163 6X3/32	
7	72082000	SCREW 6-32X5/16 PAN PH SS	
2	72083001	SCREW 10-32X2-1/2 PAN PH	
2	72083501	SCREW 4-40X5/16 FLT SOC S	
2	72083503	SCREW 4-40X3/8 PAN PH SS	
1	72083506	SCREW 4-40X1/4 PAN PH SS	
6	72121036	SCREW 10-32X5/8 RD PH SS	
2	72211410	NUT 10-32 SS	
2	72246310	ACORN NUT 10-32 HEX NYLON	
1	72302104	WASHER #4 FLAT SS	
7	72302106	WASHER #6 FLAT SS	
6	72302110	WASHER #10 FLAT SS	
6	72310810	WASHER #10 FLAT NYLON	
1	72342104	LOCK WASHER #4 SS	
7	72342106	LOCK WASHER #6 SS	
6	72342110	LOCK WASHER #10 SS	
25'	330-0220	CABLE 2C 20AWG UNSHIELDED	





		A
TITLE ASSY, RAIN GAUGE 2501 Exploded View		
MOD. USAGE	260-2501	SHEET 1 OF 1
BY	JDC	SCALE DWG. NO.
DATE	4-23-2020	n/a 800-0078-01