

# NL-5551A & NL-5551AP IGNITRONS

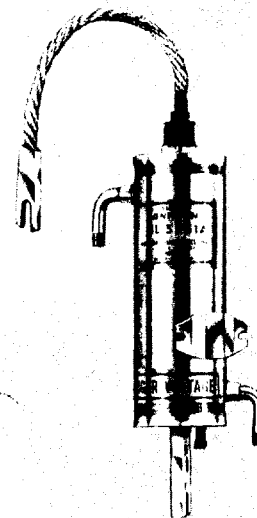
5551A555

## Size B — 56 Amperes DC

**NATIONAL IGNITRON NL-5551A** is a stainless-steel jacketed, water-cooled, mercury-pool tube designed especially for welder control and similar AC control application. Its rating is approximately equivalent to a 300 ampere magnetic contactor.

**NL-5551A** has a copper thermostat mounting plate attached to the outside cylinder of the tube in such a manner that it makes thermal contact with the inner cylinder. The temperature of this copper plate is essentially the same as that of the inner cylinder and is slotted so that it can accommodate the standard ignitron thermostat mounting. This plate can be used either for the protection or the water-saver thermostat. One each of these thermostats mounted on a pair of these ignitrons can provide both protection against over heating and water saving.

**NL-5551AP** is the plastic coated version of the NL-5551A.



### TECHNICAL INFORMATION

**AC CONTROL APPLICATIONS** — Ratings are based on full-cycle conduction (no phase delay) regardless of whether or not phase control is used, on frequencies from 25 to 60 Hz, and any voltage between 250 and 600 volts rms. Ratings are for two tubes in inverse parallel, curve (S-50). Higher voltage ratings available.

<sup>1</sup> Maximum demand — kva .....	600
<sup>1</sup> Corresponding maximum average anode current per tube — amps DC .....	30.2
<sup>1</sup> Maximum average anode current per tube — amps DC .....	56
<sup>1</sup> Corresponding maximum demand — kva .....	200

<sup>1</sup> Maximum averaging time — seconds at 600 volts rms .....	7.5
at 250 volts rms. ....	18
Maximum surge current — peak amps .....	280%
of max. rms. demand current allowed at system voltage.	

**RECTIFIER APPLICATIONS** — Ratings are based on intermittent duty, on no phase delay, and on frequencies from 50 to 60 Hz. When phase control is used, current ratings are reduced as per phase control current rating curve. Values are for one tube, curve (S-69).

Maximum peak anode voltage — volts .....	500	1200	1500
Maximum peak anode current — amps. ....	700	600	480
Corresponding average current — amps DC —	5	4	
Maximum average anode current amps — DC ..	40	22.5	18
Corresponding peak current — amps. ....	—	135	108
Maximum averaging time, sec. ....	6	10	10

Max. ratio of average to peak current, maximum averaging time 0.2 seconds .....	—	.166	.166
Max. ratio of peak fault current to peak anode current .....	12.5	12.5	12.5
Maximum duration time of surge current — sec. ....	.15	.15	.15

**IGNITOR REQUIREMENTS** — (Same for both applications.)

**Ignitor Voltage**

Maximum instantaneous allowed, ignitor positive .....	anode voltage
<sup>2</sup> Maximum instantaneous required, ignitor positive — volts .....	200
Maximum instantaneous allowed, ignitor negative — volts .....	5

**Ignitor Current**

Maximum instantaneous allowed — amperes .....	100
<sup>2</sup> Maximum instantaneous required — amperes .....	30
Maximum rms allowed — amperes .....	10
Maximum average allowed — ampere .....	1
<sup>2</sup> Ignitor ignition time maximum — microseconds .....	100
Ignitor current max. averaging time — seconds .....	5

### COOLING REQUIREMENTS

Type of Cooling .....	Water
Inlet Water Temperature, minimum .....	0°C
Inlet Water Temperature, maximum .....	30°C
Outlet Water Temperature, maximum .....	40°C
Water Flow, minimum, solenoid water valve open .....	1.0 Gallons per Minute

Characteristics for Water Cooling at Rated Minimum Flow

Water Temperature Rise, maximum .....	4°C
Pressure Drop at 1 Gallon per Minute .....	1.8 Pounds per Square Inch

### GENERAL CHARACTERISTICS

Number of Anodes .....	1
Number of Ignitrons .....	1
Mounting Position .....	Vertical
Peak arc drop at 3500 peak amps — approx. volts .....	26

Peak arc drop at 176 peak amps. — approx. volts .....	13
Net weight — lbs. ....	3.6
Approx. shipping weight — lbs. ....	6

<sup>1</sup>Using log-log paper, straight line interpolation of RMS Demand Current vs. Average Anode Current and Maximum Averaging Time vs. Anode Voltage may be used to determine intermediate ratings.

<sup>2</sup>Using log-log paper, straight line interpolation of Peak Anode Current vs. Average Anode Current may be used to determine intermediate ratings. See curves for details.

<sup>3</sup>Ignition will occur if either maximum required instantaneous potential is applied or maximum required instantaneous current flows for the rated maximum ignitor ignition time.

<sup>4</sup>When separate excitation is used, the recommended Electronic Industries Association Standards for capacitor firing apply.

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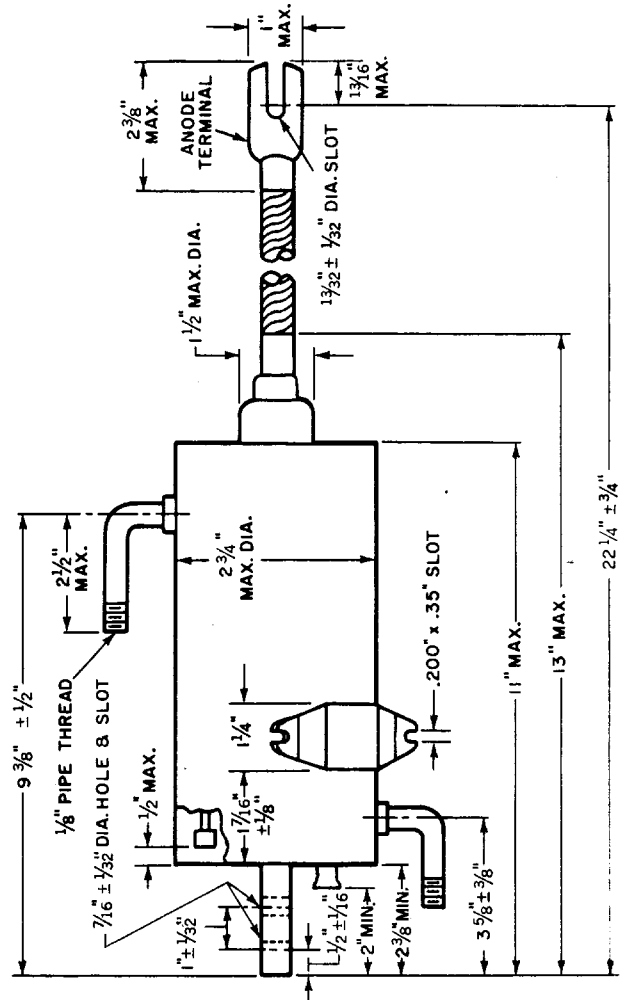
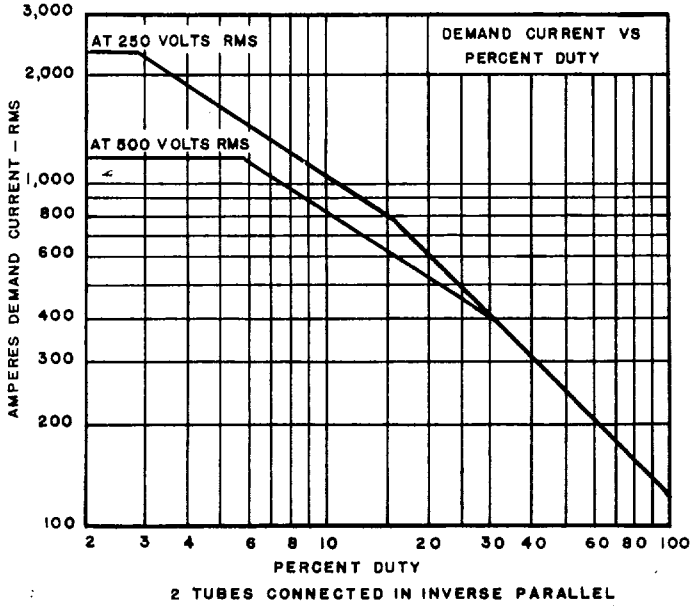
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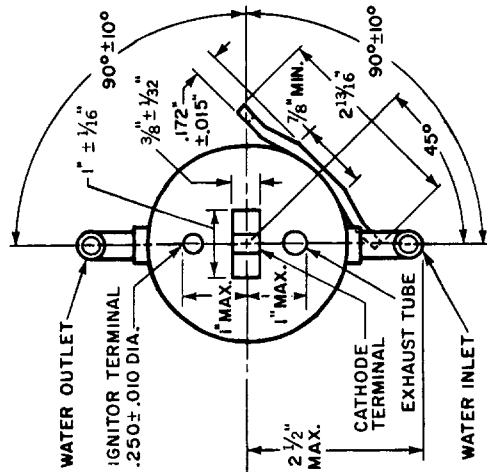
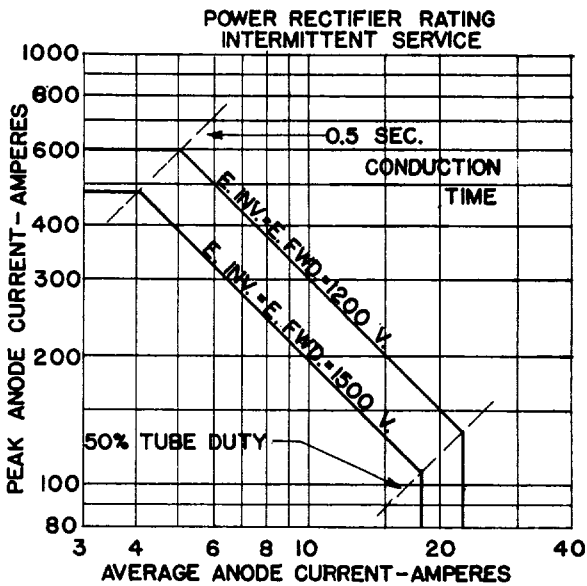
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NOTE: ENVELOPE IS AT CATHODE POTENTIAL



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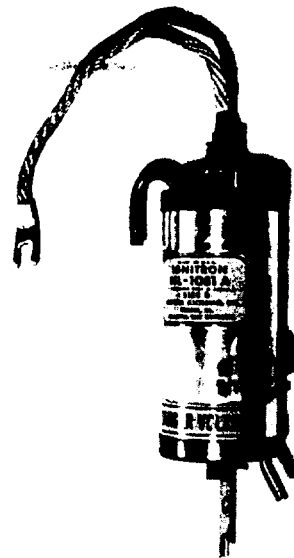
# NL-1051A & NL-1051AP IGNITRONS

## Size B 56 Amperes dc

**National Ignitron NL-1051A** is a metal, water-cooled, mercury pool tube designed especially for welder control and similar AC control applications. Its rating is approximately equivalent to a 300 ampere magnetic contactor.

**NL-1051A** utilizes a thermostat mount brazed to an all-copper cooling system that provides exceptional cooling efficiency. The inner can, copper cooling coil, and thermostat mount being brazed together in a single unit assures a rugged, dependable, and adjustable free temperature control system that operates directly on inner can temperature.

**NL-1051AP** is the plastic coated version of the NL-1051A.



### TECHNICAL INFORMATION

**AC Control Applications** — Ratings are based on full-cycle conduction (no phase delay) regardless of whether or not phase control is used, on frequencies from 25 to 60 cycles, and any voltage between 250 and 600 volts rms. Ratings are for two tubes in inverse parallel, curve (S-50). Higher voltage ratings available.

<sup>1</sup> Maximum demand — kva	600	<sup>1</sup> Corresponding maximum demand — kva	200	Maximum surge current — peak amps	.280% of max. rms. demand current allowed at system voltage.
<sup>1</sup> Corresponding maximum average anode current per tube — amps DC	30.2	<sup>1</sup> Maximum averaging time — seconds* at 600 volts rms	11.25		
<sup>1</sup> Maximum average anode current per tube — amps DC	56	at 250 volts rms	27		

**Rectifier Applications** — Ratings are based on intermittent duty, on no phase delay, and on frequencies from 50 to 60 cycles. When phase control is used, current ratings are reduced as per phase control current rating curve. Values are for one tube, curves (S-69) and (S-69).

Maximum peak anode voltage — volts	500	1200	1500	Max. ratio of average to peak current, maximum averaging time 0.2 seconds	.166	.166
Maximum peak anode current — amps	700	600	480			
Corresponding average current — amps DC	—	5	4	Max. ratio of peak fault current to peak anode current	12.5	12.5
Maximum average anode current — amps DC	40	22.5	18			
Corresponding peak current — amps	—	135	108	Maximum duration time of surge current — sec.	.15	.15
Maximum averaging time, sec.	6	10	10			

**Ignitor Requirements** — (Same for both applications.)

<b>Ignitor Voltage</b>	<b>Ignitor Current</b>	<b>Maximum average allowed</b>
Maximum instantaneous allowed, ignitor positive — anode voltage	Maximum instantaneous allowed — amperes	— ampere
<sup>3</sup> Maximum instantaneous required, ignitor positive — volts	<sup>3</sup> Maximum instantaneous required — amperes	<sup>3</sup> Ignitor ignition time maximum — microseconds
Maximum instantaneous allowed, ignitor negative — volts	Maximum rms allowed — amperes	Ignitor current max. averaging time — seconds
5	10	100
		5

**Cooling Requirements** — (Same for both applications.)

Type of cooling	Water	Typical cooling requirements at 500 volts rms operation for AC control applications.			
Minimum inlet water temperature, °C	0	100% Load		50% Load	
Maximum cooling system temperature (measured at thermostat mount), °C		Inlet Water Temp. °C	Water flow required G.P.M.	Water flow required G.P.M.	Pressure drop per tube lbs. per sq. in.
Rectifier applications	45	15	1.4	1/16	.1
AC control applications		30	1.2	1/8	.2
At 600 volts rms	45	40	1 1/2	1/4	.3
At 500 volts rms	50	More water is required at 600 volts* to maintain cooling system temperature within limits and less at 250 volts.			
At 250 volts rms	55	Water temperature rise at 1 G.P.M., full load, °C			
Water flow may be reduced at light loads if cooling system temperature (measured at thermostat mount) is maintained within limits.		Approximate temperature rise inlet water to thermostat, (at 1 G.P.M., full load) °C			
		2			
		4			

### GENERAL CHARACTERISTICS

Number of Anodes	1	Peak arc drop at 176 peak amps. — approx. volts	13
Number of Ignitrons	1	Net weight — lbs.	4 1/2
Mounting Position	Vertical	Approx. shipping weight — lbs.	7
Peak arc drop at 3400 peak amps — approx. volts	26		

<sup>1</sup>Using log-log paper, straight line interpolation of RMS Demand Current vs. Average Anode Current and Maximum Averaging Time vs. Anode Voltage may be used to determine intermediate ratings.

<sup>2</sup>Using log-log paper, straight line interpolation of Peak Anode Current vs. Average Anode Current may be used to determine intermediate ratings. See curves for details.

<sup>3</sup>Ignition will occur if either maximum required instantaneous potential is applied or maximum required instantaneous current flows for the rated maximum ignitor ignition time.

<sup>4</sup>When separate excitation is used, the recommended Electronic Industries Association Standards for capacitor firing apply.

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