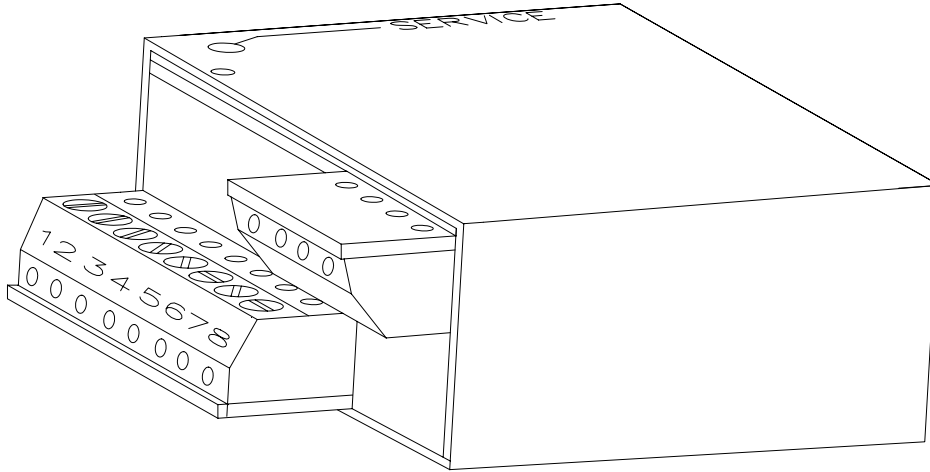


**LAKWOOD INSTRUMENTS**  
**4-20 MA INPUT NODE (N420I)**  
**INSTALLATION & OPERATION MANUAL**

SERIAL #: \_\_\_\_\_



**Lakewood Instruments**

*7838 North Faulkner Road, Milwaukee, Wisconsin 53224 USA*  
*Phone (800) 228-0839 • Fax (414) 355-3508*  
*<http://www.lakewoodinstruments.com>*



## Lakewood Instruments

We thank you for your selection and purchase of a Lakewood Instruments product.

With proper care and maintenance, this device should give you many years of trouble-free service. Please take the time to read and understand this Installation and Operation Manual, paying special attention to the sections on **OPERATION** and **MAINTENANCE**.

If, in the future, any parts or repairs are required, we strongly recommend that only original replacement parts be used. Our Customer Service Department is happy to assist you with your parts or service requests.

 **Lakewood Instruments Customer Service and Technical Support Departments can be reached by calling (800) 228-0839 or faxing (414) 355-3508, Monday through Friday, 7:30 a.m. - 5:00 p.m. CST.**

 **Mail should be sent to:**

**Lakewood Instruments  
7838 North Faulkner Road  
Milwaukee, WI 53224 USA**



# 4-20 MA INPUT NODE (N420I)

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# INTRODUCTION

## N420I

The Model N420I Node is a LONWORKS<sup>®</sup> compatible node that uses twisted pair communications. It accepts four 4-20 mA inputs which can be tied into most 2000 series controllers. Up to two N420I nodes may be installed on the 2000 series controller for a total of eight 4-20 mA inputs.

<p><b>NOTE:</b> To use the N420I with a 2000 series controller it must have the NIN option and contain Rel 98 Firmware. All controllers shipped after 1 June 98 will have Rel 98 firmware.</p>
--

### Relay configuration and datalogging

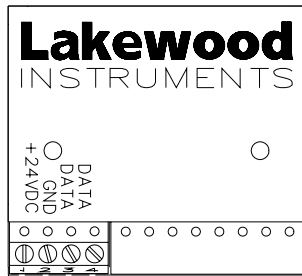
After a N420I is installed, not only will you be able to view external 4-20 mA inputs you will also be available to datalog information and control relays based on the external device.

LONWORKS is a registered trademark of Echelon Corporation.

# Specifications

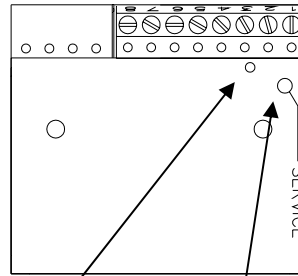
---

Inputs	Four 4-20 mA inputs, external loop power required
Network wiring distance	400 meters from furthest node
Power	24 VDC



**Network and Power connections**

Connection to NIN and other nodes as well as 24 VDC.



**Service Light**

**Service Pin**

Indicates node status. Installs node on network.

---

# INSTALLATION

---

## Checking

Inspect the shipping carton for obvious external damage. Note on the carrier's bill-of-lading the extent of the damage, if any, and notify the carrier. Save the shipping carton until your Node is started up.

**📞 If shipping damage has occurred, call the Lakewood Instruments Customer Service Department at (800) 228-0839 and return the controller to the factory in the original carton.**

---

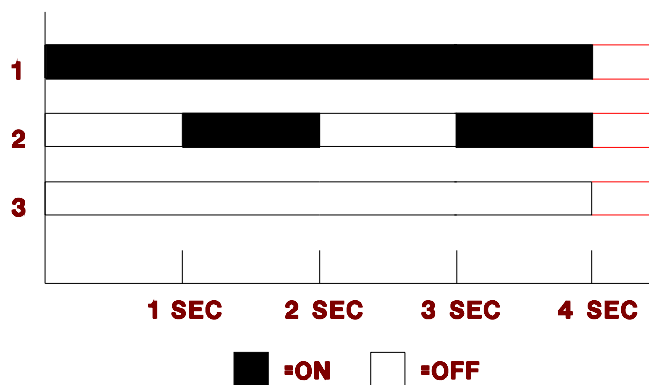
## Connections

The NIN option is required on the 2000 series controller for the N420I to operate. The NIN option provides power and two way communications to the N420I. Refer to the drawings in the back of this manual for wiring details.

---

## Service Light

The service light is used for installation of the node and for troubleshooting. Below is a chart of what the service light might indicate during operation.



Behavior	Description	Resolution
1	Bad Node	Replace Node
2	Node is unconfigured,	Install Node
3	Node is running normally	none
3	Node does not have power	Check power supply

Light will also be on while the service button is pressed.

## Operation with 2000 Series Controllers

---

Before it can be used, the N420I must be installed into the software of the controller.

Under the **Main Menu**,

```
          MAIN MENU
          =====
3 FEED SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
8 CLOCK
```

highlight **SYSTEM SETUP**, then press **ENT**. You should see the following screen:

```
          SYSTEM SETUP
          =====
1 PROCESS PARAMETERS
2 INITIALIZATION
3 DIGITAL INPUTS
4 FIRMWARE VERSIONS
5 SECURITY
6 DIAGNOSTICS
7 COMMUNICATIONS
8 NODE INSTALLATION
```

Highlight **NODE INSTALLATION**, then press **ENT**. You should see the following screen:

```
          NODE INSTALLATION
          =====
1 INSTALL A NEW NODE
2 DE-INSTALL A NODE
```

Highlight **INSTALL A NEW NODE**, then press **ENT**. You should see the following screen:

```
INSTALL A NEW NODE
=====
1 RELAYS 5-8
2 RELAYS 9-12
3 MAKEUP COND
4 REMOTE SENSOR
5 REMOTE SENSOR
6 REMOTE SENSOR
7 REMOTE SENSOR
8 ANOLOG INPUTS (4)
9 ANOLOG INPUTS (4)
10 DIGITAL INPUTS (4)
11 DIGITAL INPUTS (4)
```

Select which node to install.

**NOTE: YOU MUST ASSIGN YOUR N420I TO ANOLOG INPUTS (4).**

The following screen should appear:

```
PRESS SERVICE PIN

PRESS ANY KEY
```

Momentarily press the Service Pin on the node to be installed. The Service Light should turn on while the Service Pin is pressed. After the Service pin is released press any key on the key pad and the node will be installed.

---

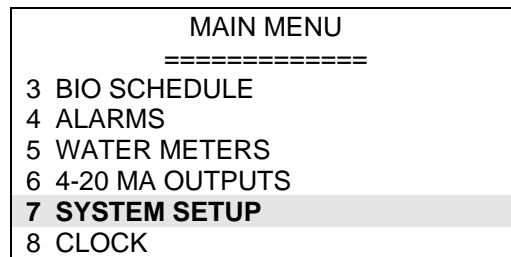
# CONFIGURATION

## Configuration of Node

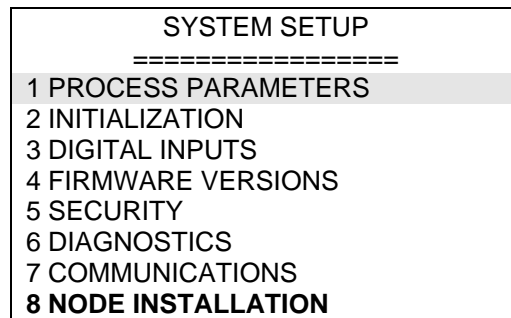
---

For the N420I to work properly with different sensors it must be configured properly.

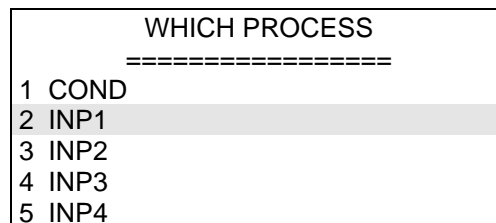
Under the **Main Menu**,



highlight **SYSTEM SETUP**, then press **ENT**. You should see the following screen:



Highlight **PROCESS PARAMETERS**, then press **ENT**. You should see the following screen:



Select which node to set up. pH and COND are not nodes. Highlight the appropriate node and press **ENT**. You should see the following screen:

```

      INP1
      =====
1 DISPLAY AS . . .
2 SET 4-20 MA RANGE
3 CALIBRATE 4-20 MA
4 CHANGE MY NAME
    
```

Select DISPLAY AS... and press **ENT**. You should see the following screen:

```

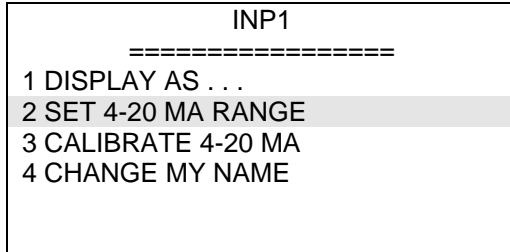
      INP1
      =====

      DISPLAY AS . . .
      99.99 mA
    
```

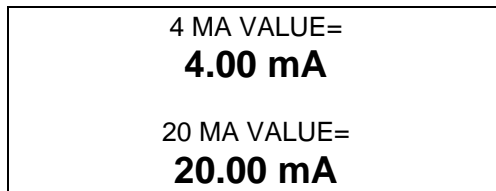
At this point you may configure the node to the scale required for your 4-20 mA input. Here is a list of symbols for configuring the 4-20 mA input.

Range	Symbols	Symbols
99999	m/y	mA
9.999	uA	gal
99.99	pH	l
999.9	μS	°F
	ppm	psi
	mV	ppb
	MΩ	Ω
	°C	gpm
	M <sup>3</sup> /H	lpm
	%	NTU

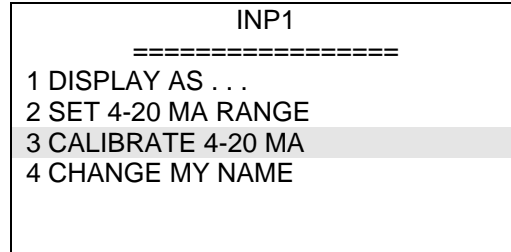
To make changes use ↑ or ↓, then press **ENT**.



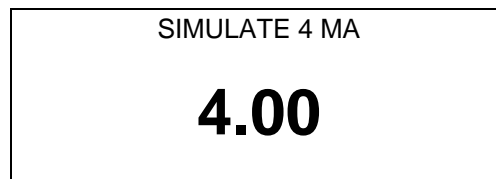
To accurately read and display the information from the external 4-20 mA input device we will need to scale the input of the node to match the scale of the external device. To do this select SET 4-20 MA RANGE then press **ENT**. You should see the following screen:



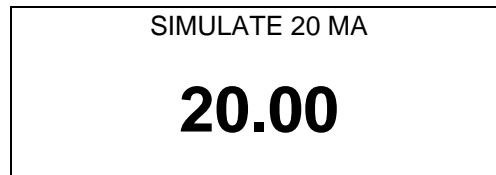
At this point you may configure the node to the scale required for your 4-20 mA input. Enter in the proper values and then press **ENT**.



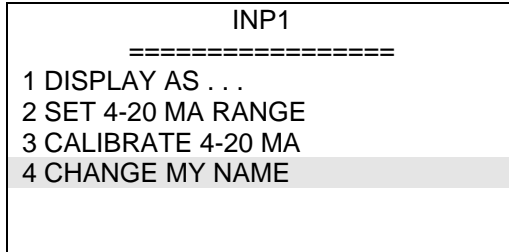
The default current output values of the 4-20 mA node are fairly close and are accurate in most applications. However it may be necessary to calibrate the 4-20 mA current output with a current meter. To do this select CALIBRATE 4-20 MA, then press **ENT**.



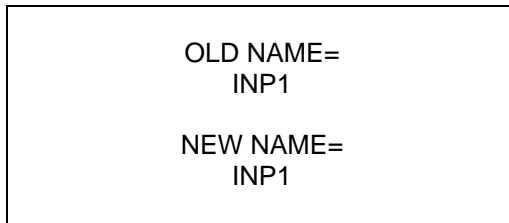
Simply connect a current meter inline with the 4-20 mA device, simulate 4 mA with the external device, then type in the value from the current meter into the 2000 series controller: Press **ENT** when value is entered.



Now you will be prompted to simulate 20 mA with the external device, then type in the value from the current meter into the 2000 series controller: Press **ENT** when value is entered. Calibration complete.



You may change the name of the input to be something other than INP1. To do this select CHANGE MY NAME then press **ENT**.



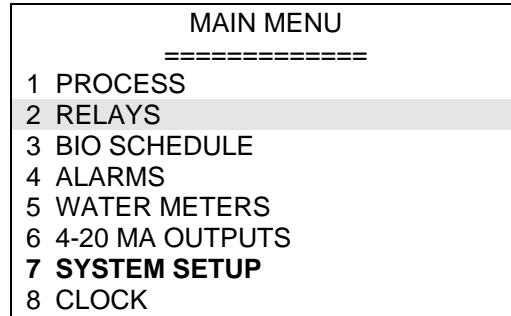
Use the ↑ or ↓ keys to change the character. Press **ENT** to go to the next character.

## Configuration of Node with Relays

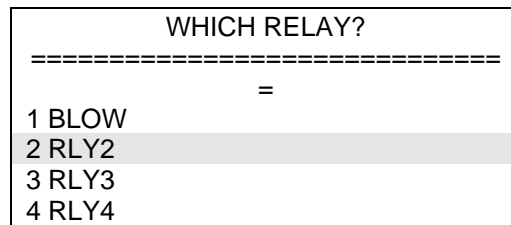
---

The N420I can be used to control relays in the 2000 series controller or the NRLY node.

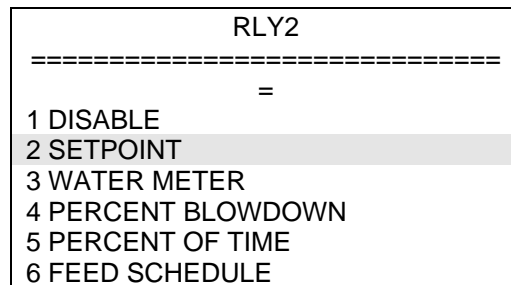
Under the **Main Menu**,



highlight **RELAYS**, then press **ENT**. You should see the following screen:



Highlight the appropriate relay , then press **ENT**. You should see the following screen:



Highlight **SETPOINT** , then press **ENT**. You should see the following screen:

WHICH PROCESS	
=====	
1	COND
2	INP1
3	INP2
4	INP3
5	INP4

Highlight the appropriate Input , then press **ENT**. You should see the following screen:

SETPOINT	
=====	
1	SETPOINT VALUES
2	WHEN TO ACTIVATE

Highlight **SETPOINT VALUES**, then press **ENT**. You should see the following screen:

SETPOINT=
<b>0.00 mA</b>
DEADBAND
<b>0.00 mA</b>

Type in the appropriate setpoint and deadband for when the relay should be activated. Press **ENT** to save setpoint and deadband values.

SETPOINT	
=====	
1	SETPOINT VALUES
2	WHEN TO ACTIVATE

Highlight the appropriate **WHEN TO ACTIVATE** , then press **ENT**. You should see the following screen:

WHEN TO ACTIVATE	
=====	
1	*ABOVE SETPOINT
2	BELOW SETPOINT

This screen configures the relay to turn on above or below the setpoint. Press **1** or **2** to make selection. \* indicates current selection.

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## Maintenance and Technical Service

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### Technical Service

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-  Technical Support for Lakewood Instruments can be reached by calling (800) 228-0839 or faxing (414) 355-3508, Monday through Friday, 7:30 a.m. – 5.00 p.m. CST.

***NOTE: IF YOU CALL FOR TROUBLESHOOTING HELP, PLEASE HAVE THE MODEL NUMBER, SERIAL NUMBER, AND ANY OPTIONS PERTAINING TO YOUR UNIT AVAILABLE FOR REFERENCE.***

-  Mail and returns should be sent to:

**Lakewood Instruments  
7838 North Faulkner Road  
Milwaukee, WI 53224 USA**

When any merchandise is to be returned to the factory, please call and obtain a Return Goods Authorization (RGA) number and have the following information available:

- Customer's name, address, telephone and fax numbers (shipping and billing).
- A hard copy purchase order number for cases where repairs or parts are required that are not under warranty.
- A contact person's name and telephone number to call if the equipment is beyond repair or to discuss any other warranty matter.
- Equipment model and serial numbers.
- Reason for return, e.g., repair, warranty, incorrect part, etc.

We will then fax to your attention an RGA form that must accompany the returned item.

***NOTE: THE RGA NUMBER MUST BE CLEARLY WRITTEN ON THE OUTSIDE OF THE PACKAGE(S) BEING RETURNED.***

**ANY ITEMS SENT BACK TO THE FACTORY  
WITHOUT AN RGA NUMBER WILL BE REFUSED  
AND RETURNED TO SENDER**

## Troubleshooting

<b>PROBLEM</b>	<b>WHAT THIS MEANS</b>	<b>CORRECTIVE ACTION</b>
Screen Displays "INPx: LOW ALARM"	The 4-20 mA input device is below the low alarm setting.	Refer to Alarms under the Main Menu in the 2000 series controller.
Screen Displays "INPx: HIGH ALARM"	The 4-20 mA input device is above the high alarm setting.	Refer to Alarms under the Main Menu in the 2000 series controller.
Service light flashes	Node is not installed	Install the node.
Values do not change	N420I is not seeing a change in current from the external device	The external device may not be providing loop power. An external 24VDC power supply may be required.
	4mA range = 20 mA range	Make sure the 4 mA range and 20 mA range values are different and properly configured in the menu of the controller.
Relay does not activate when set up for set point.	There may be no flow to the controller or deadband too large	Restore flow to the controller Correct deadband if too large.

4

3

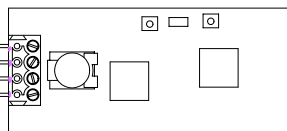
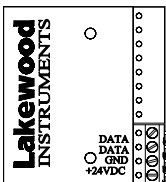
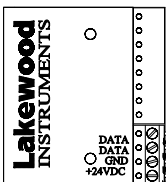
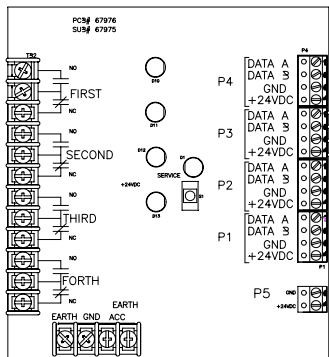
2

1

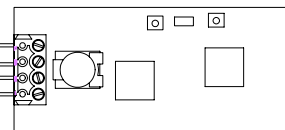
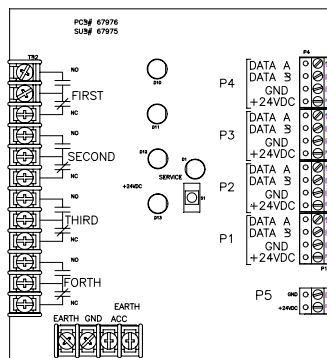
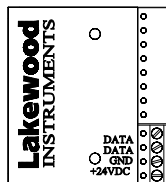
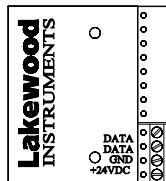
REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	1045	EV	8/5/97	

NOTES: UNLESS OTHERWISE SPECIFIED;

- NIN OPTION PROVIDES +24 VDC TO ALL NODES. IF USING MORE THAN 3 NODES AN EXTERNAL +24 VDC POWER SUPPLY IN PARALLEL IS RECOMMENDED.



OR



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MATERIAL	FRAC	TOLERANCES UNLESS NOTED	ANGLES
		DECIMALS	
		.X ± .1	
FINISH		.XX ± .03	
	±1/16	.XXX ± .010	±.5'
ORDER NO.	DWN EV	DATE 8/5/97	
CUSTOMER	CHKD	DATE	
CUSTOMER LOC.	APVD	DATE	
DO NOT SCALE	APVD	DATE	



TITLE		INSTALLATION DRAWING	
		NIN OPTION	
SIZE	C	DWG NO/PN	1167855-1a
THIRD ANGLE		REV	A
SCALE	NONE	FILE TYPE	.DWG
		SHEET	1 OF 1

4

3

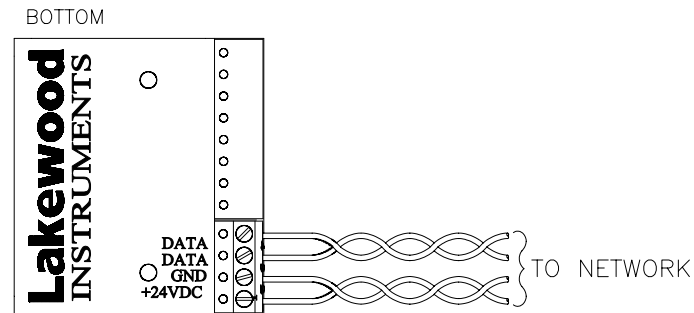
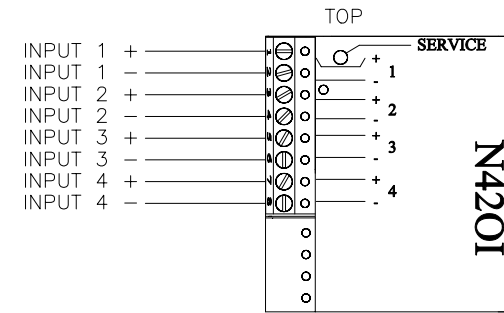
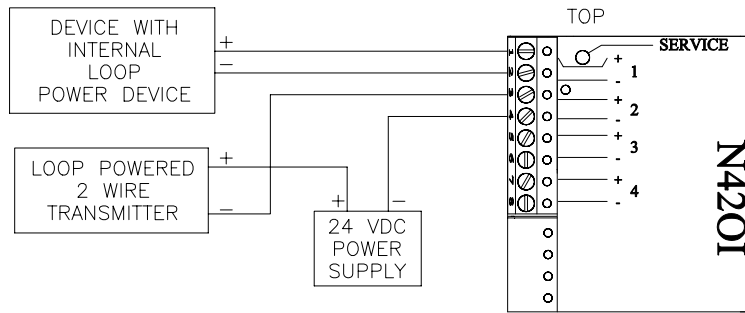
2

1

NOTES: UNLESS OTHERWISE SPECIFIED;

- DATA TWISTED PAIR SPECIFICATIONS:  
 BELDON 85102, SINGLE TWISTED PAIR, STRANDED 9/29, UNSHIELDED, PLENUM.  
 BELDON 8471, SINGLE TWISTED PAIR, STRANDED 9/29, UNSHIELDED, NONPLENUM.  
 JY ØST) Y 2 X 2 X .8, UL LEVEL IV 22 AWG, TWISTED PAIR, TYPICALLY SOLID AND UNSHIELDED.  
 FOUR WIRE HELICAL TWIST, SOLID, SHIELDED.
- IF SHIELDED CABLE IS USED, THE SHIELD SHOULD BE CONNECTED TO EARTH GROUND VIA A 470K OHMS, .25 WATT, METAL FILM RESISTOR TO PREVENT STATIC CHARGE BUILD-UP.
- MAXIMUM POWER REQUIREMENT 23 MA @ 24 VDC.

REVISION HISTORY					
REV	DESCRIPTION	ECO	DWN	DATE	APVD
1	RELEASE	0902	EV	8/4/97	



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MATERIAL	TOLERANCES UNLESS NOTED		
	FRAC	DECIMALS	ANGLES
FINISH		.X ± .1	
		.XX ± .03	
	±1/16	.XXX ± .010	±.5°
ORDER NO.	DWN EV	DATE 8/4/97	
CUSTOMER	CHKD	DATE	
CUSTOMER LOC.	APVD	DATE	
DO NOT SCALE	APVD	DATE	

TITLE		COMPOnent ASSEMBLY WIRING, N420I	
SIZE		DWG NO/PN	REV
B	THIRD ANGLE	1169706-1a	A
SCALE	NONE	FILE TYPE .DWG	SHEET 1 OF 1



**For more information call toll free in the USA (800) 228-0839**

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**Manufactured in the USA**

## Lakewood Instruments

*7838 North Faulkner Road, Milwaukee, WI 53224 USA  
Phone (800) 228-0839 • Fax (414) 355-3508  
<http://www.lakewoodinstruments.com>*