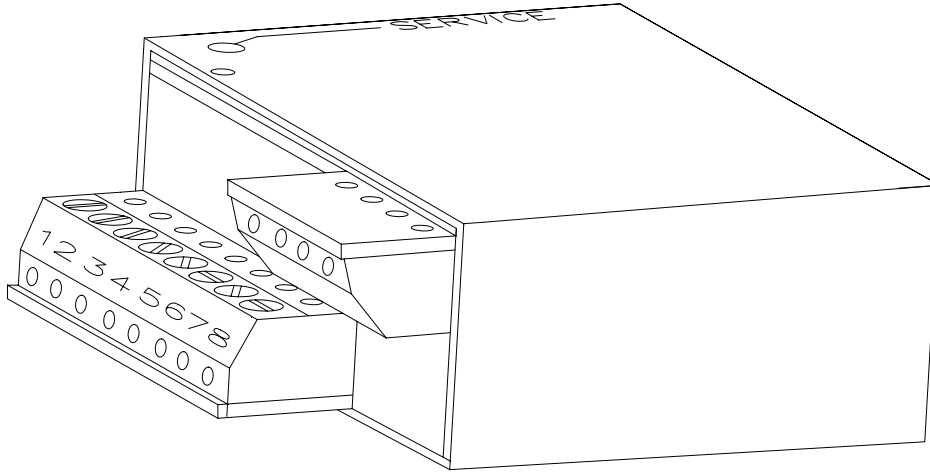# LAKEWOOD INSTRUMENTS

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
h t t p : / / w w w . l a k e w o o d i n s t r u m e n t s . c o m

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)

Table of Contents

N420I

The Model N420I Node is a LONWORKS^{®-}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.

> NOTE: 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.

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.

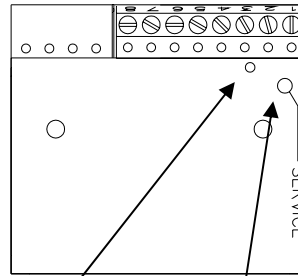LONWORKS is a registered trademark of Echelon Corporation.

Specifications

Inputs   Four 4-20 mA inputs, external loop power required

Network wiring   400 meters from furthest node
 distance

Power   24 VDC
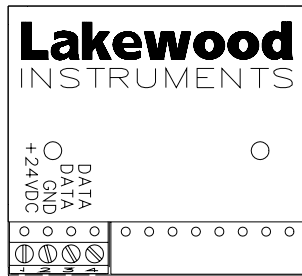
Network and Power connections   **Service Light**   **Service Pin**

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

Indicates node status.

Installs node on network.

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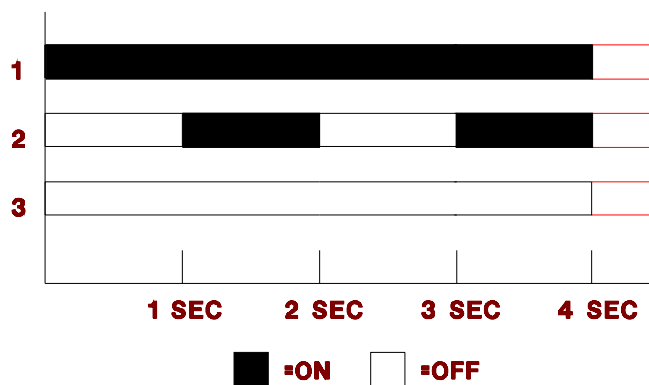
Behavior	Description	Resolution
1	Bad Node	Replace Node
2	Node is unconfigured,	Install Node
3	Node is running normally	none
3	Node does not have power	Check power supply

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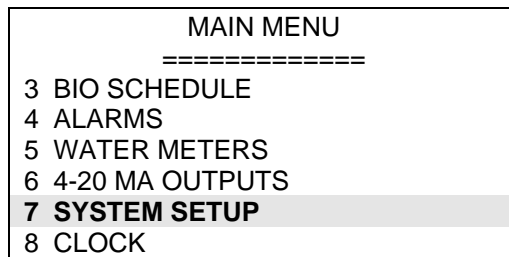
Momentarily press the Service Pin on the node to be installed. The Service Light should turn on while the Service Pin is pressed. After the Service pin is released press any key on the key pad and the node will be installed.
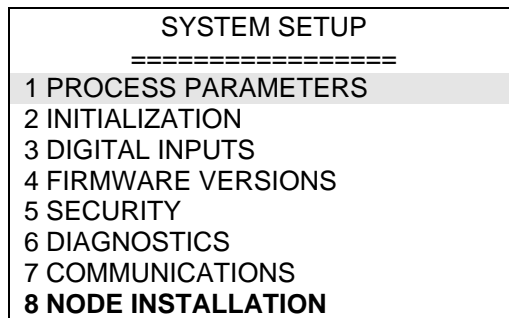
Configuration of Node

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

Under the **Main Menu**,

```
              MAIN MENU
            =============
    3  BIO 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 **PROCESS PARAMETERS**, then press **ENT**.   You should see the following screen:

```
             WHICH PROCESS
            =================
    1  COND
    2  INP1
    3  INP2
    4  INP3
    5  INP4
```
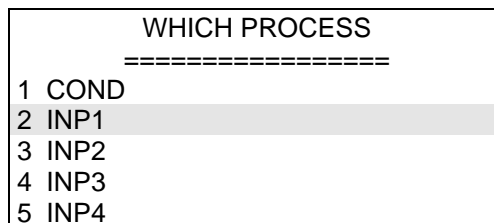
Select which node to set up. pH and COND are not nodes. Highlight the appropriate node and press **ENT**. You should see the following screen:

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

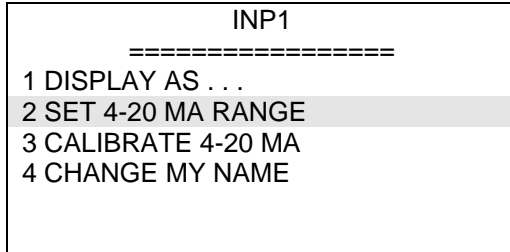Select DISPLAY AS… and press **ENT**. You should see the following screen:

```
                INP1
        ================


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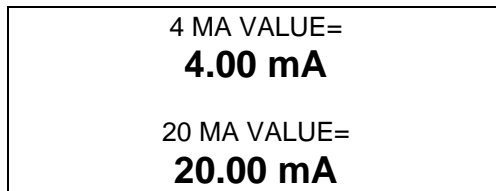
At this point you may configure the node to the scale required for your 4-20 mA input. Here is a list of symbols for configuring the 4-20 mA input.

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^3/H	lpm
	%	NTU

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

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


```

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:

```
              4 MA VALUE=
                4.00 mA

              20 MA VALUE=
               20.00 mA
```

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**.

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

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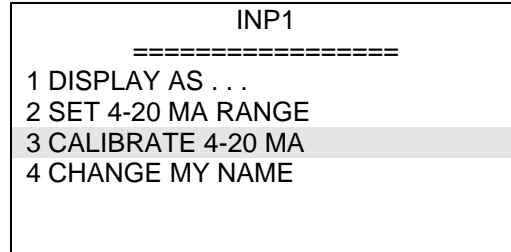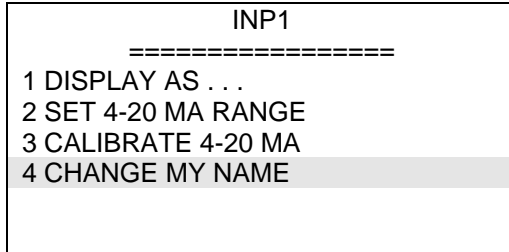
The default current output values of the 4-20 mA node are fairly close and are accurate in most applications. However it may be necessary to calibrate the 4-20 mA current output with a current meter. To do this select CALIBRATE 4-20 MA, then press **ENT**.

```
            SIMULATE 4 MA


               4.00

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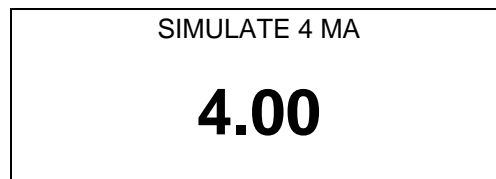
Simply connect a current meter inline with the 4-20 mA device, simulate 4 mA with the external device, then type in the value from the current meter into the 2000 series controller: Press **ENT** when value is entered.

```
            SIMULATE 20 MA


              20.00

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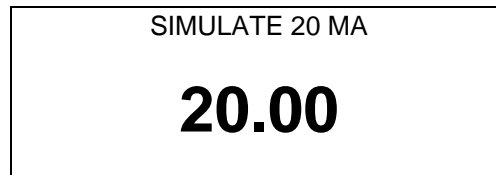
Now you will be propted to simulate 20 mA with the external device, then type in the value from the current meter into the 2000 series controller: Press **ENT** when value is entered. Calibration complete.

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

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

```
               OLD NAME=
                 INP1

               NEW NAME=
                 INP1
```
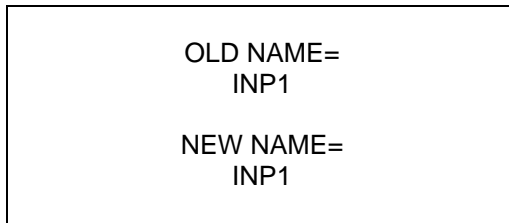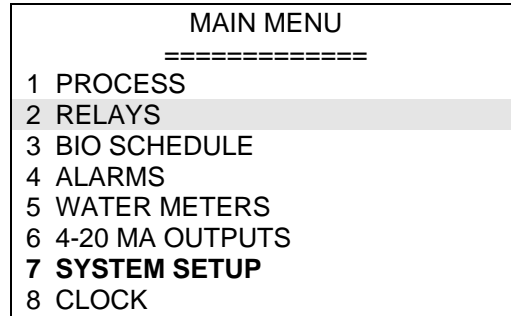
Use the ↑ or ↓ keys to change the character. Press **ENT** to go to the next character.

Configuration of Node with Relays

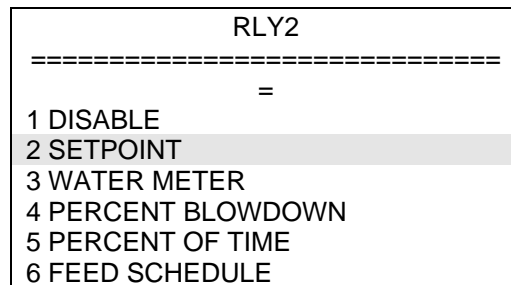The N420I can be used to control relays in the 2000 series controller or the NRLY node.

Under the **Main Menu**,

```
            MAIN MENU
            =============
1  PROCESS
2  RELAYS
3  BIO SCHEDULE
4  ALARMS
5  WATER METERS
6  4-20 MA OUTPUTS
7  SYSTEM SETUP
8  CLOCK
```

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

```
           WHICH RELAY?
===============================
             =
1 BLOW
2 RLY2
3 RLY3
4 RLY4
```
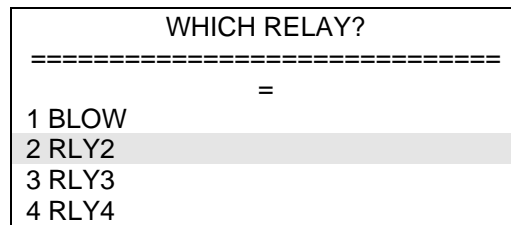
Highlight the appropriate relay , then press **ENT**. You should see the following screen:

```
               RLY2
===============================
             =
1 DISABLE
2 SETPOINT
3 WATER METER
4 PERCENT BLOWDOWN
5 PERCENT OF TIME
6 FEED SCHEDULE
```

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=
            0.00 mA

            DEADBAND
            0.00 mA
```

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.

Technical Service

☎ **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
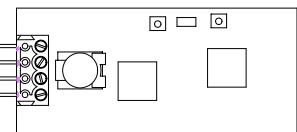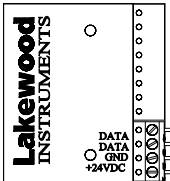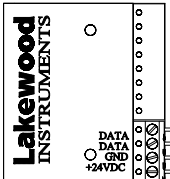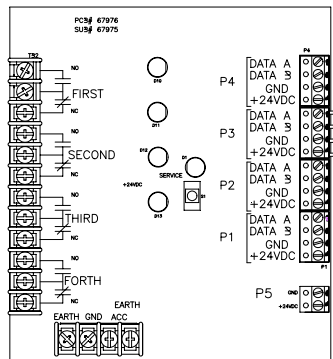
Troubleshooting

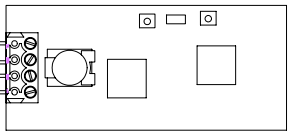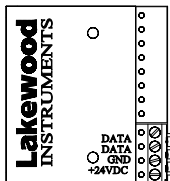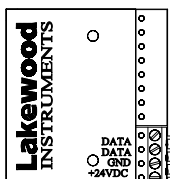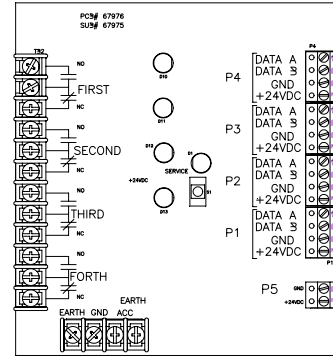| PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
Screen Displays "INPx: LOW ALARM"	The 4-20 mA input device is below the low alarm setting.	Refer to Alarms under the Main Menu in the 2000 series controller.
Screen Displays "INPx: HIGH ALARM"	The 4-20 mA input device is above the high alarm setting.	Refer 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 no be provideing 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 to large	Restore flow to the controller Correct deadband if to large.

NOTES: UNLESS OTHERWISE SPECIFIED;

1. 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

Lakewood INSTRUMENTS

MATERIAL

FINISH

ORDER NO.

CUSTOMER

CUSTOMER LOC.

DO NOT SCALE

FRAC | DECIMALS | ANGLES
TOLERANCES UNLESS NOTED
.X ± .1
.XX ± .03
±1/16 | .XXX ± .010 | ±.5°

DWN EV | DATE 8/5/97
CHKD | DATE
APVD | DATE
APVD | DATE

TITLE
INSTALLATION DRAWING
NIN OPTION

SIZE C | THIRD ANGLE | DWG NO/PN 1167855−1a | REV A

SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

P/N 61677 REV−A PG−1/2

NOTES: UNLESS OTHERWISE SPECIFIED;

1. 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 ∅ST) Y 2 X 2 X .8, UL LEVEL IV 22 AWG, TWISTED PAIR, TYPICALLY SOLID AND UNSHIELDED.
   FOUR WIRE HELICAL TWIST, SOLID, SHIELDED.

2. 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.

3. MAXIMUM POWER REQUIREMENT 23 MA @ 24 VDC.

DEVICE WITH INTERNAL LOOP POWER DEVICE

LOOP POWERED 2 WIRE TRANSMITTER

24 VDC POWER SUPPLY

TOP — SERVICE — N420I

INPUT 1 +
INPUT 1 −
INPUT 2 +
INPUT 2 −
INPUT 3 +
INPUT 3 −
INPUT 4 +
INPUT 4 −

TOP — SERVICE — N420I

BOTTOM

Lakewood INSTRUMENTS

DATA
DATA
GND
+24VDC

TO NETWORK

Lakewood INSTRUMENTS

MATERIAL		TOLERANCES UNLESS NOTED		
	FRAC	DECIMALS	ANGLES	
FINISH		.X ± .1		TITLE
		.XX ± .03		COMPONENT ASSEMBLY
	±1/16	.XXX ± .010	±.5°	WIRING, N420I
ORDER NO.	DWN EV	DATE 8/4/97		
CUSTOMER	CHKD	DATE		SIZE B — THIRD ANGLE
CUSTOMER LOC.	APVD	DATE		
DO NOT SCALE	APVD	DATE		SCALE NONE

DWG NO/PN 1169706-1a   REV A

FILE TYPE .DWG   SHEET 1 OF 1

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

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