

MODEL LNXN2 - SHORT CASE DUAL PRESET COUNTER

- AVAILABLE IN 5 VDC OR 10 to 30 VDC VERSIONS
- 0.3" (7.6 mm) HIGH, 6 DIGIT DISPLAY
- NON-VOLATILE MEMORY (E²PROM)
- DISPLAY SCROLLING (SELECTABLE)
- BI-DIRECTIONAL COUNTING
- PRESCALE CAPABILITY WITH DISABLE SWITCH
- SOLID-STATE CURRENT SINKING OUTPUTS
- PROGRAMMABLE TIMED OUTPUTS
- REMOTE RESET CAPABILITY
- SIMPLIFIED FRONT PANEL PROGRAMMING
- ABILITY TO LOCK OUT FRONT PANEL FUNCTIONS
- ON-LINE SELF-TEST
- ACCEPTS INPUT COUNT RATES UP TO 12 KHz



- FRONT PANEL PROGRAMMABLE DECIMAL POINT
- SEALED FRONT PANEL CONSTRUCTION (NEMA 4X/IP65)

DESCRIPTION

The LNXN presettable counter is an economical and reliable solution to dual preset level requirements. This unit features current sinking input configurations, a high/low count frequency DIP switch, programmable timed outputs, prescale capability with disable switch, non-volatile memory, and many other features which will satisfy most dual preset applications.

The LNXN Counter has two main counting actions, Reset to Zero (RTZ) and Reset to Preset (RTP). There are sixteen modes of operation for the LNXN dual preset unit.

All parameters are programmed through the front panel buttons. The LNXN counter has an internal non-volatile memory device which eliminates the need for battery back-up. When power is removed, this device will maintain all data set-ups necessary for system operation. A Program Disable terminal is provided, which can be used to prevent accidental changes or tampering by unauthorized personnel to the presets, prescale or timed output values. The front panel reset button can also be enabled or disabled by a rear panel DIP switch. This counter also has an on-line self-test, which can be run at any time without missing counts or missing a preset value.

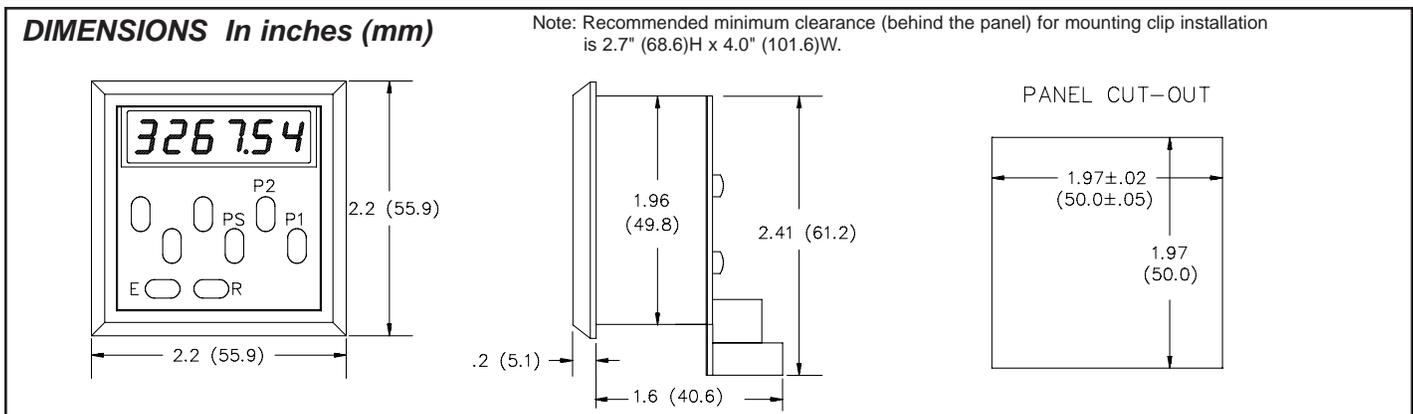
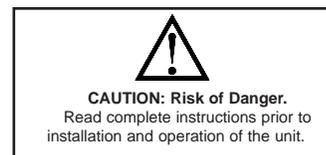
Power, input, and output connections are made via a fixed terminal block at the rear of the unit. DIP switches at the rear of the unit are used to set up the input configuration and to set the desired mode of operation.

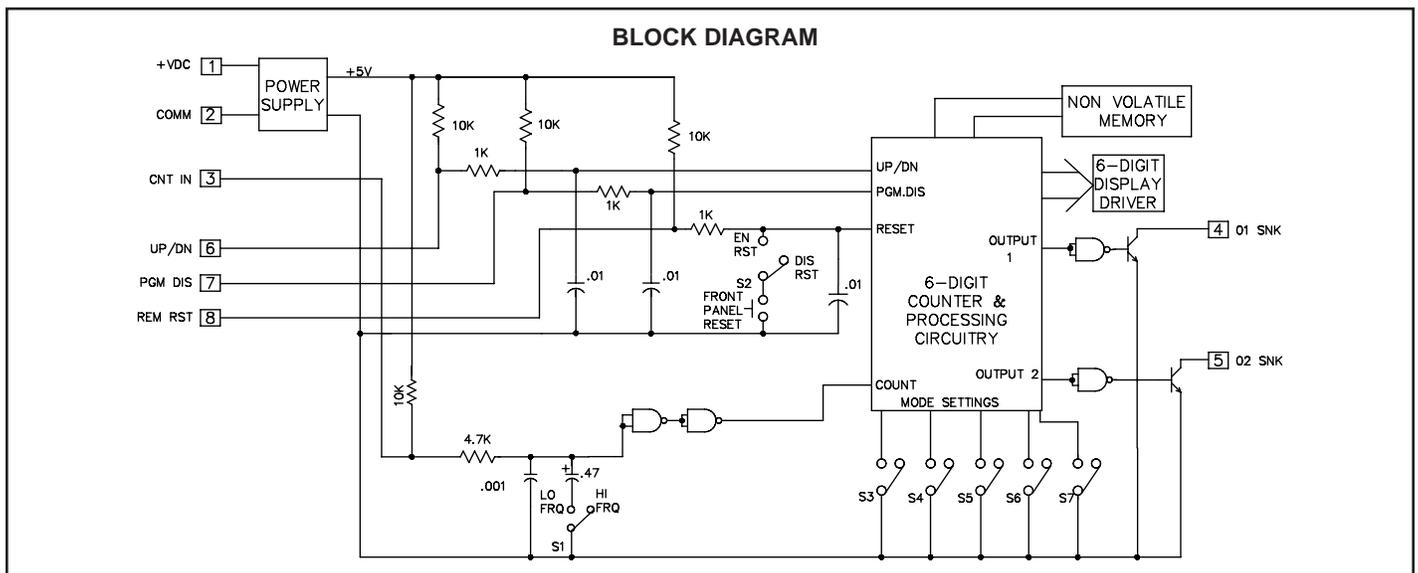
The LNXN has a sealed high impact plastic bezel and meets NEMA 4X/IP65 specifications for wash-down and/or dust, when properly installed.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.





SPECIFICATIONS

- DISPLAY:** 6-digit, 0.3" (7.6 mm) high LCD display.
- POWER REQUIREMENTS:**
25 mA @ 5 VDC ($\pm 5\%$) or
25 mA @ 10 to 30 VDC.
Must use a Class 2 or SELV rated power supply.
- COUNT INPUT:** Accepts count pulses from a variety of sources, including switch contacts and outputs from CMOS or TTL circuits.
Current Sinking: Unit provides 10 K Ω pull-up for sensors with current sinking outputs. ($I_{SNK} = 0.5$ mA; max. input voltage, 28 VDC @ 8 mA.)
Debounce: Switch selectable damping capacitor provided for switch contact debounce. Limits count speed to 50 Hz max. with 50% duty cycle.
Input Trigger levels: $V_{IL} = 2.3$ V, $V_{IH} = 3.1$ V.
- PRESCALE VALUE RANGE:** 0.00001 to 9.99999.
- MAXIMUM COUNT RATES:**

High Frequency: The following chart lists the count rates for all the possible prescale values. (*maximum square wave input for all electronic sensors, under all modes of operation.*)

Prescale Value	Frequency
0.00001 to 1	11.0 KHz
1.00001 to 2	8.0 KHz
2.00001 to 3	6.5 KHz
3.00001 to 4	5.0 KHz
4.00001 to 5	4.5 KHz
5.00001 to 6	4 KHz
6.00001 to 7	3.5 KHz
7.00001 to 8	3 KHz
8.00001 to 9	2.5 KHz
9.00001 to 9.99999	2.0 KHz

Note: For prescale values greater than 7, the timed delay output is affected by the count speed (rate).

Low Frequency: 50 Hz max. for switch contact closures. Note: These units will operate with VCM (E through H) modules.

- CONTROL INPUTS:** Active low ($V_{IL} = 0.5$ V max.), internally pulled up to 5 VDC through a 10 K Ω resistor ($I_{SNK} = 0.5$ mA).
Remote Reset: Response time = 10 msec. A low will reset the unit and deactivate outputs.
Program Disable: A low will inhibit the changing of presets, prescale, and timed outputs, as well as testing outputs in self-test.
Up/Down Control: Response time = 150 μ sec. A low will cause the unit to count down. A high will cause the unit to count up.

7. OUTPUTS:

Solid-State: Current sinking NPN Open Collector Transistors.
 $I_{SNK} = 100$ mA max., $V_{OH} = 30$ VDC max., $V_{OL} = 1$ V @ 100 mA.
One solid-state output for each preset level.

Programmable Timed Output: The timed output can be programmed from 0.01 sec. to 99.99 sec., $\pm 0.1\% + 10$ msec. The timed output is set for 0.1 sec. at the factory.

- MEMORY RETENTION:** Non-volatile E²PROM retains all programmed information when power is removed or interrupted.
Power Cycles(ON/OFF): 100,000 min.
Data Retention: 10 years min.

- INPUT, POWER, AND OUTPUT CONNECTIONS:** Fixed terminal block.
- CERTIFICATIONS AND COMPLIANCES:**

SAFETY

IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
IP65 Enclosure rating (Face only), IEC 529
Type 4X Indoor Enclosure rating (Face only), UL50

EMC EMISSIONS:

Meets EN 50081-2: Industrial Environment.
CISPR 11 Radiated and conducted emissions

EMC IMMUNITY:

Meets EN 50082-2: Industrial Environment.
ENV 50140 - Radio-frequency radiated electromagnetic field
ENV 50141 - Radio-frequency conducted electromagnetic field ¹
EN 61000-4-2 - Electrostatic discharge (ESD)
EN 61000-4-4 - Electrical fast transient/burst (EFT) ¹

Notes:

- Power Lines -** Power lines had an external EMI filter, Schaffner FN610-1 (RLC #LFIL0000) or equivalent, installed.

Refer to EMC Installation Guidelines for additional information.

11. ENVIRONMENTAL CONDITIONS:

Operating Temperature: 0 to 50°C

Storage Temperature: -40 to 70°C

Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from 0°C to 50°C.

Altitude: Up to 2000 meters

- CONSTRUCTION:** Black plastic front bezel with black plastic insert. Front panel meets NEMA 4X/IP65 requirements for indoor use when properly installed. (Panel gasket, mounting clip, nut fasteners, and screws included with unit.) Installation Category I, Pollution Degree 2.

- WEIGHT:** 0.2 lbs (91 g).

INPUT CONFIGURATION, FRONT PANEL RESET, & DIP SWITCH SET-UP

The DIP switches are located at the rear of the unit. DIP switch 1 is used to select high or low frequency. DIP switch 2 is used to enable or disable the front panel reset button. DIP switch 7 is used to enable or disable prescale changes. DIP switches 3 to 6 are used to select the mode of operation. Refer to the block diagram of the unit for the details of count and control circuitry.

SWITCH SET-UP

S1 - HI FRQ.: Removes damping capacitor and allows operation up to the maximum frequency (See max count rates in specifications).

LO FRQ.: Connects damping capacitor for switch contact de-bounce. Limits count speed to 50 Hz. Min. count ON/OFF times - 10 msec.

S2 - DIS.RST.: Disables front panel reset.

EN. RST.: Enables front panel reset.

S3 to S6: These are the mode select DIP switches. See Modes of Operation for the switch settings of a specific mode.

S7 - PRESCALE EN./DIS.: When S7 is in the DOWN position, prescale information can be changed. When S7 is in the UP position, prescale information cannot be changed.

MODES OF OPERATION, DIP SWITCH SET-UP

The DIP switches for the various operating modes are located at the rear of the unit. For Reset to Zero modes, the UP/DN terminal is normally **not** connected to common (count up). For Reset to Preset modes, the UP/DN terminal is normally connected to common (count down). The unit will maintain normal operating functions if the direction is reversed.

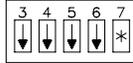
NOTES:

1. During automatic reset, no counts will be missed if the count rate does not exceed the maximum count rate specified. A manual reset, either from the front panel reset (if enabled) or remote reset overrides any condition or state of the counter and begins the cycle again.
2. In modes four, five, twelve, and thirteen the output may appear to be latched if the time delay is longer than the time required to count from the reset condition to the preset point.

MODES OF OPERATION FOR DUAL PRESET LNXN COUNTER

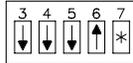
MODE 0 LATCH OUTPUTS AT PRESET, MANUAL RESET TO ZERO

The unit counts from zero, when preset 1 is reached, output 1 turns on and counts continue to accumulate. When preset 2 is reached, output 2 turns on and counts continue to accumulate. When a manual reset is performed, the count resets to zero and the outputs turn off.



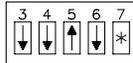
MODE 1 TIMED OUTPUT AT PRESET, MANUAL RESET TO ZERO

The unit counts from zero, when preset 1 is reached, output 1 turns on. When preset 2 is reached, output 2 turns on. Counts continue to accumulate after the preset levels have been reached. The outputs turn off after their respective programmed time values. When a manual reset is performed, the unit resets to zero and starts the cycle again.



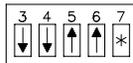
MODE 2 OUTPUT 1 TURN OFF AT PRESET 2, LATCH OUTPUT 2 AT PRESET 2, MANUAL RESET TO ZERO

The unit counts from zero, when preset 1 is reached, output 1 turns on. When preset 2 is reached, output 2 turns on and output 1 turns off. Counts continue to accumulate after the preset levels have been reached. Output 2 remains on until a manual reset occurs. Manual reset turns off both outputs and the count resets to zero.



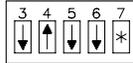
MODE 3 OUTPUT 1 TURN OFF AT PRESET 2, TIMED OUTPUT 2 AT PRESET 2, MANUAL RESET TO ZERO

The unit counts from zero, when preset 1 is reached, output 1 turns on. When preset 2 is reached, output 1 turns off and output 2 turns on for the amount of time programmed. Counts continue to accumulate after the preset levels have been reached. When a manual reset is performed, the count resets to zero.



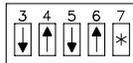
MODE 4 OUTPUT 1 TURN OFF AT PRESET 2, TIMED OUTPUT 2 AT PRESET 2, AUTOMATIC RESET TO ZERO AT PRESET 2

The unit counts from zero, when preset 1 is reached, output 1 turns on. When preset 2 is reached, output 2 turns on for the amount of time programmed. At the beginning of timed output 2, output 1 turns off and the unit automatically resets to zero.



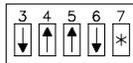
MODE 5 TIMED OUTPUTS AT PRESETS, AUTOMATIC RESET TO ZERO AT PRESET 2

The unit counts from zero, when preset 1 is reached, output 1 turns on, and when preset 2 is reached, output 2 turns on. The outputs turn off at the end of their respective programmed time values. At preset 2, the count automatically resets to zero and starts the cycle over.



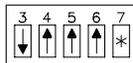
MODE 6 OUTPUT 1 TURN OFF AT PRESET 2, TIMED OUTPUT 2 AT PRESET 2, AUTOMATIC RESET TO ZERO AFTER TIMED OUTPUT 2

The unit counts from zero, when preset 1 is reached, output 1 turns on. When preset 2 is reached, output 2 turns on for the amount of time programmed and output 1 turns off. At the end of timed output 2, the count automatically resets to zero and the cycle starts over.



MODE 7 TIMED OUTPUTS AT PRESETS, AUTOMATIC RESET TO ZERO AFTER TIMED OUTPUT 2

The unit counts from zero, when preset 1 is reached, output 1 turns on, and when preset 2 is reached, output 2 turns on. The outputs turn off at the end of their respective programmed time values. At the end of timed output 2, the unit automatically resets to zero and the cycle starts over.

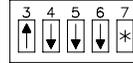


† - When down count is desired, (such as reset to preset modes of operation) the "UP/DN" terminal must be tied to the "COMM." terminal.

* - Prescale EN/DIS. Switch. Switch S7 **must** be in the DOWN (Enable) position for information to be changed.

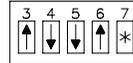
MODE 8 LATCH OUTPUTS AT PRESET 1 AND ZERO, MANUAL RESET TO PRESET 2 †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on, and when zero is reached, output 2 turns on. Counts continue to register after the outputs have turned on. When a manual reset is performed, the count resets to preset 2 and the outputs turn off.



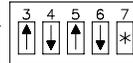
MODE 9 TIMED OUTPUTS AT PRESET 1 AND ZERO, MANUAL RESET TO PRESET 2 †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on, and when zero is reached, output 2 turns on. The outputs turn off at the end of their respective programmed time values. Counts continue to accumulate after the outputs have activated. When a manual reset is performed, the count resets to preset 2 and the cycle starts over.



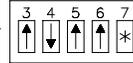
MODE 10 OUTPUT 1 TURN OFF AT ZERO, LATCH OUTPUT 2 AT ZERO, MANUAL RESET TO PRESET 2 †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on. When zero is reached, output 1 turns off and output 2 turns on. Output 2 remains on until a manual reset is performed. Counts continue to accumulate after preset levels have been reached. Manual reset turns off all outputs, and the count resets to preset 2.



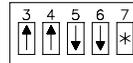
MODE 11 OUTPUT 1 TURN OFF AT ZERO, TIMED OUTPUT 2 AT ZERO, MANUAL RESET TO PRESET 2 †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on. When zero is reached, output 1 turns off and output 2 turns on for the amount of time programmed. Counts continue to accumulate after the preset levels have been reached. When a manual reset is performed, the unit resets to preset 2.



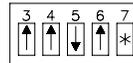
MODE 12 OUTPUT 1 TURN OFF AT ZERO, TIMED OUTPUT 2 AT ZERO, AUTOMATIC RESET TO PRESET 2 AT ZERO †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on. When zero is reached, output 1 turns off, output 2 turns on for the amount of time programmed, and the unit automatically resets to preset 2.



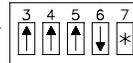
MODE 13 TIMED OUTPUTS AT PRESET 1 AND ZERO, AUTOMATIC RESET TO PRESET 2 AT ZERO †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on. When zero is reached, output 2 turns on and the count automatically resets to preset 2 and the cycle starts over. The outputs turn off at the end of their respective programmed time values.



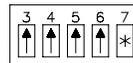
MODE 14 OUTPUT 1 TURN OFF AT ZERO, TIMED OUTPUT 2 AT ZERO, AUTOMATIC RESET TO PRESET 2 AFTER TIMED OUTPUT 2 †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on. When zero is reached, output 1 turns off and output 2 turns on for the amount of time programmed. At the end of timed output 2, the count automatically resets to preset 2 and the cycle starts over.



MODE 15 TIMED OUTPUTS AT PRESET 1 AND ZERO, AUTOMATIC RESET TO PRESET 2 AFTER TIMED OUTPUT 2 †

The unit counts from preset 2, when preset 1 is reached, output 1 turns on, and when zero is reached, output 2 turns on. The outputs turn off at the end of their respective programmed time values. At the end of timed output 2, the count automatically resets to preset 2 and the cycle starts over.



EMC INSTALLATION GUIDELINES

Although this unit is designed with a high degree of immunity to ElectroMagnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the unit may be different for various installations. The unit becomes more immune to EMI with fewer I/O connections. Cable length, routing and shield termination are very important and can mean the difference between a successful installation or a troublesome installation. Listed below are some EMC guidelines for successful installation in an industrial environment.

- Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
 - Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
 - Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
 - Connect the shield to common of the unit and leave the other end of the shield unconnected and insulated from earth ground.
- Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
- Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
- In extremely high EMI environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure. The following EMI suppression devices (or equivalent) are recommended:

Ferrite Suppression Cores for signal and control cables:

Fair-Rite # 0443167251 (RLC #FCOR0000)
 TDK # ZCAT3035-1330A
 Steward #28B2029-0A0

Line Filters for input power cables:

Schaffner # FN610-1/07 (RLC #LFIL0000)
 Schaffner # FN670-1.8/07
 Corcom #1VB3

Note: Reference manufacturer's instructions when installing a line filter.

- Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.
- Switching of inductive loads produces high EMI. Use of snubbers across inductive loads suppresses EMI.
 Snubbers:
 RLC #SNUB0000

WIRING CONNECTIONS

All conductors should meet voltage and current ratings for each terminal. Also cabling should conform to appropriate standards of good installation, local codes and regulations. It is recommended that power supplied to the unit (AC or DC) be protected by a fuse or circuit breaker.

When wiring the unit, use the numbers on the label to identify the position number with the proper function. Strip the wire, leaving approximately 1/4" bare wire exposed (*stranded wires should be tinned with solder*). Insert the wire into the terminal and tighten down the screw until the wire is clamped tightly. Each terminal can accept up to one 14-gage, two 18-gage or four 20-gage wire(s).

INPUT CONNECTIONS

Input connections are made on the terminal block at the rear of the unit, refer to numbers on the label to identify the position number with the proper function.

Terminal 2 - "COMM." (common) Is the common line to which the sensor and other input commons are connected.

Terminal 3 - "CNT.IN" (count input) When the signal is pulled low, a count will be registered. (See *Count Input and Count Rates under the Specifications Section.*)

Terminal 6 - "UP/DN" (count direction control) When this terminal is not connected to common, the count direction is "UP". When connected to common, the count direction is "DOWN".

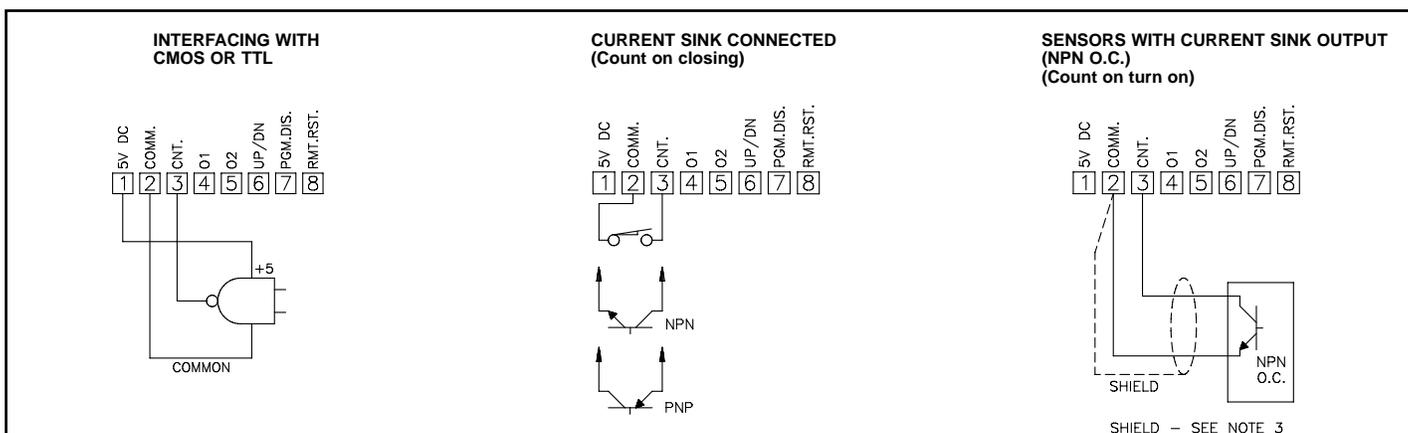
Terminal 7 - "PGM.DIS." (program disable) When this terminal is not connected to common, the following values can be programmed using the front panel buttons:

- Preset Values
- Prescale Value (if S7 is DOWN)
- Decimal Point Position
- Timed Output Values

Outputs can also be tested during self-test under this condition (See Self-Test description for further details). When connected to common, changing these values and testing the outputs is no longer possible.

Terminal 8 - "RMT.RST." (remote reset) When connected to common, a manual reset is performed. The outputs turn off (*if activated*) and the count display is reset. As long as this terminal is low, the unit is held at reset.

CONNECTIONS & CONFIGURATION SWITCH SET-UPS FOR VARIOUS SENSOR OUTPUTS



NOTES:

1. HI/LO FRQ. SELECTION

The "HI/LO FRQ." Selection switch must be set to "LO FRQ." when switch contacts are used to generate count input signals. The "LO FRQ." mode also provides very high immunity against electrical noise pickup. It is recommended that this mode also be used, whenever possible, with electronic sensor outputs. The "LO FRQ." mode can be used with any type of sensor

output, provided count pulse widths never decrease below 10 msecs, and the count rate does not exceed 50 Hz.

- V_{IL} and V_{IH} levels given are nominal values $\pm 5\%$.
- When shielded cable is used, the shield should be connected to "COMM." at the counter and left unconnected at sensor end.

POWER & OUTPUT CONNECTIONS

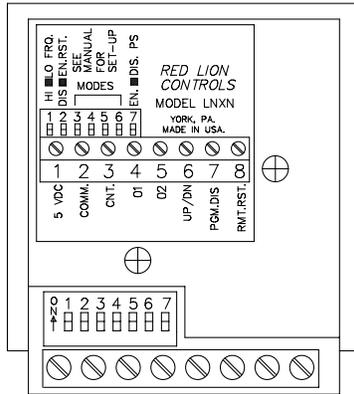
Power and output connections are made to the terminal block, located at the rear of the unit.

The Primary DC power is connected to terminals 1 and 2. DC plus(+) power is connected to terminal 1 and the minus(-) is connected to terminal 2.

Terminals 4 & 5 are used to connect to the solid-state outputs. Terminal 2 is used as common for the solid state outputs.

When switching an inductive load with solid state outputs, it is recommended that an EMI device such as a snubber (RLC #SNUB0000) be installed at the load.

Note: Snubber leakage current can cause some electro-mechanical devices to be held on.



POWER-UP DIAGNOSTICS

Upon applying power, the LNXN counter performs an internal self-diagnostic test of all the stored data. If the data test results do not agree, a “P” appears on the right side of the display. Normal operation of the unit will continue while the “P” is displayed. Press the “E” button to remove the “P” and check all data set-up values to be certain they are correct.

DISPLAY SCROLLING

To set the display to scroll, press and hold the “E” button and then press the left- most button on the front panel. To stop the scrolling, repeat the above step.

DISPLAY SCROLLING SEQUENCE

P1
Value of P1
P2
Value of P2
Count Value

FRONT PANEL FUNCTION DESCRIPTION

The units employ eight front panel buttons for control and data entering. The button functions are as described below:

RESET “R”: Resets the counter to either zero or preset, depending on the mode of operation selected. For this button to operate, the enable/disable reset switch at the rear of the unit must be set to the enable (EN.) position. The reset button is also used in conjunction with the preset buttons, to view and change the timed output values. When reset is activated, all processes are stopped or interrupted (i.e. outputs turn off, display is reset, etc.). This is the case under any mode of operation, in any data entry mode.

PRESET “P1” and “P2”: Labeled P1 and P2. The preset value is displayed when the P1 or P2 button is pressed, and the Preset Value mode is accessed (See Program Preset Value). The value remains displayed for approximately 10 seconds after the button is released.

The preset buttons are also used, in conjunction with the reset button, to view and change the timed output values (See Program Timed Output Value section.)

ENTER “E”: Used when programming the Preset Value or the Timed Output Value. After the desired value is obtained on the display, pressing the E button enters the value into the unit’s internal memory and takes effect immediately. Also the “E” button can be used to exit self-test.

PRESCALE “PS”: When the “PS” button is pressed, the prescale value can be programmed (See Program Prescale Value). This value remains displayed for approximately 10 seconds after the button is released.

PROGRAM PRESET VALUE *

The factory default values are set to 500 for preset 1 and 1,000 for preset 2, but may be programmed from 0.00001 to 999999. To enter a different value, the operator must enter the Preset Value Programming Mode by performing the following steps.

Note: During the displaying, changing, and entering of a new preset value, all functions of the unit are operational (i.e. counting, resetting, outputs activating, etc.)

FIRST: Press “P1” or “P2”. This displays the respective preset value, which remains displayed for approximately 10 seconds after release of the button. At this time, the preset display mode can be exited, without change, by pressing the “E” button.

SECOND: Once the preset value is displayed, a specific digit can be incremented by pressing the button directly beneath that digit. Pressing and holding the button down will continuously scroll the digit from 0 through 9, then back to 0 again. When the desired value for that digit is reached, release the button. Repeat this step until the desired preset value is obtained.

THIRD: Press the “E” button to enter the value into the unit’s memory. **As Soon As** the “E” button is pressed, the new preset value takes effect. If the “E” button is not pressed within 10 seconds, the unit returns to normal display operation with the previous value retained.

PROGRAM TIMED OUTPUT VALUE *

The factory default Timed Output Value is 0.10 seconds, but can be programmed from 0.01 to 99.99 seconds. To enter a different value, the operator must enter the Timed Output Value Programming Mode by performing the following steps.

Note: During the displaying, changing, and entering of a new timed output value, all functions of the unit are operational (i.e. counting, resetting, outputs activating, etc.)

FIRST: Set S2 Reset EN./DIS. switch to the UP position (Enable).

SECOND: Press and hold the “P1”, or “P2” button and then press the “R” button. The respective timed output value is displayed and remains displayed for approximately 10 seconds after release of the button. At this time, the timed output display mode can be exited, without change, by pressing the “E” button.

THIRD: Once the timed output value is displayed, a specific digit can be incremented by pressing the button directly beneath that digit. Pressing and holding the button down will continuously scroll the digit from 0 through 9, then back to 0 again. When the desired value for that digit is reached, release the button. Repeat this step until the desired timed output value is obtained.

FOURTH: Press the “E” button to enter the value into the unit’s memory. **As Soon As** the “E” button is pressed, the new timed output value takes effect. If the “E” button is not pressed within 10 seconds, the unit returns to normal display operation with the previous value retained.

PROGRAM PRESCALE VALUE *

The factory default Prescale Value is 1.00000, but can be programmed from 0.00001 to 9.99999. To enter a different value, the operator must enter the Prescale Value Programming Mode by performing the following steps.

Note: During the displaying, changing, and entering of a new prescale value, all functions of the unit are operational (i.e. counting, resetting, outputs activating, etc.)

FIRST: Set S7 Prescale “EN./DIS.” switch to the “DOWN” position (Enable).

SECOND: Press the “PS” button. This displays the prescale value which remains displayed for approximately 10 seconds after release of the button. At this time, the prescale mode can be exited without change by pressing the “E” button.

THIRD: Once the prescale value is displayed, a specific digit can be incremented by pressing the button directly beneath that digit. Pressing and holding the button down will continuously scroll the digit from 0 through 9, then back to 0 again. When the desired value for that digit is reached, release the button. Repeat this step until the desired prescale value is obtained.

FOURTH: Press the “E” (Enter) button to enter the value into the unit’s memory. **As Soon As** the “E” button is pressed, the new prescale value takes effect. If the “E” button is not pressed within 10 seconds, the unit returns to normal display operation with the previous value retained.

FIFTH: Return S7 to the “UP” position (Disable) if desired.

PROGRAM DECIMAL POINT *

The LNXN has the capability of displaying a decimal point in one of five positions. The decimal point selection can be done at any time without missing counts or preset outputs. The factory default for the Decimal Point Position is none. To program a decimal point, the operator must enter the Decimal Point Selection Mode by performing the following steps.

Note: During the displaying, changing, and entering of a new decimal point value, all functions of the unit are operational (i.e. counting, resetting, outputs activating)

FIRST: Press and release the left- most button on the front panel. This places the LNXN in the decimal point select mode.

SECOND: Press the digit button which corresponds to the desired decimal point position. A decimal point will appear to the right of the digit selected.

If the right-most digit button (P1) is selected, the decimal point is turned off.

THIRD: At the time the decimal point is selected, the unit automatically returns to normal operation. No further action is required by the operator.

* - To enter any new data into the LNXN, the "PGM.DIS." terminal must not be connected to common.

SELF-TEST

The self-test feature can be activated without affecting the count, missing a preset point, affecting the timed output durations, or interfering with control functions. This test verifies that all digits operate. Also, the DIP switch settings and the outputs can be tested.

If the outputs are not tested, the state of the outputs remain the same as they were prior to self-test. If the outputs are tested in self-test, the outputs will be off after exiting self-test.

Rapid advance of the self-test routine can be done by pressing and releasing any of the front panel buttons except for the "R" button. (Pressing "R" at any time, except when entering the timed output mode, resets the unit.)

To enter self-test, press the two left-hand digit buttons (on the front panel) simultaneously. At this time, the display will cycle all the digits on the display each for about half a second and in the sequence shown below.

DIGITS CYCLED ON THE DISPLAY

000000
111111
222222
333333
444444
555555
666666
777777
888888
999999

BLANK DISPLAY

101010
121212
323232
343434
545454
565656
767676
787878
989898

The next portion of self-test displays a group of four ones and zeros. The two left-most digits always appear as zeros. The third digit represents the prescale enable/disable DIP switch setting. With prescale enabled, the digit shows a zero, and with it disabled the digit shows a one. The fourth digit represents program disable (PGM.DIS). A zero represents a high at this terminal and a one represents a low. A second set of digits are the settings of the mode select switches (DIP switches 3 to 6). This pattern directly corresponds to the number representing the mode of operation. If the switches are changed while at this point in the self-test, the settings can be seen to change. These changes do not affect counter operation immediately, but any changes will take effect when self-test is exited. When the switch is "DOWN", the digit shows a one. When the switch is "UP", the digit shows a zero.

During the time the mode switch settings are displayed, the outputs can be tested. To activate the outputs, press "P1" for output 1 or "P2" for output 2. If no testing of the outputs is required, press the "E" button until the unit exits self-test (the unit returns to normal display mode). Also, if no activity occurs on the switches or the front panel button within 18 seconds after the unit pauses at the mode switch display, the unit automatically exits self-test.

Note: The "PGM.DIS." terminal must not be connected to common for the outputs to be activated.

Caution: The operator should use care when testing the outputs, so as not to cause any undesirable or hazardous conditions in the system.

INITIAL POWER-UP & FACTORY SETTINGS

When the unit is shipped from the factory, the values and the following modes are set as shown.

Preset 1	=	500
Preset 2	=	1,000
Prescale Value	=	1.00000
Count Value	=	0
Timed Output Values	=	0.10 second

DIP Switch Settings

All switches are moved to the "DOWN" position except for the reset enable switch, which is moved "UP". With the switches set in these positions, the unit is operating in mode zero (latch-on at preset, manual reset to zero). The input is set for high frequency operation and the prescale can be changed.

PRESCALE ENABLE/DISABLE SWITCH

When this switch (#7) is in the enable position (DOWN), the prescale value can be changed (See Program Prescale Value). When this switch is in the disable position (UP), the prescale value cannot be changed.

The prescale value cannot be changed if Program Disable is activated even though the "PS. EN./DIS." switch is in the Enable position.

CALCULATING THE PRESCALER

The LNXN is factory set to provide 1 count on the display for each pulse that is input to the unit. In many applications, there will not be a one to one correspondence between input pulses and display units. In these applications it will be necessary for the LNXN to scale or multiply the input pulses by a prescaler to achieve the proper display units (feet, meters, gallons, widgets, etc.).

The "Prescale", denoted as "K", is simply the total amount of scaling required. It is obtained by dividing the "Display Units" by the "Number of Pulses" as shown in the Formula below.

$$K = \text{Display Units} / \text{Number of Pulses}$$

WHERE:

DISPLAY UNITS - The number of units (*revolutions, feet, 10ths of feet, meters, etc.*) that would be acquired after the "Number of Pulses" has occurred.

NUMBER OF PULSES - The number of pulses required to achieve the number of "Display Units".

Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

The bezel should be cleaned only with a soft cloth and neutral soap product.

Do NOT use solvents. Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

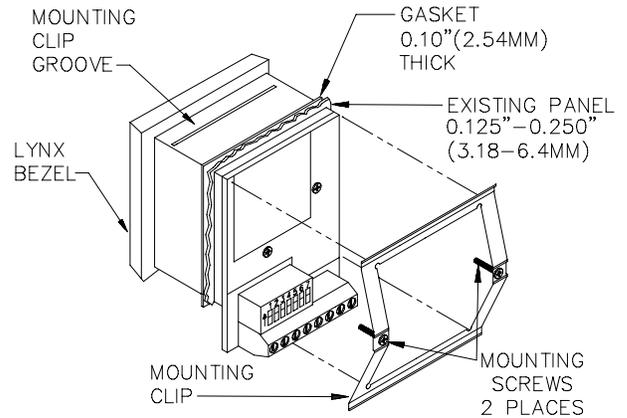
Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

INSTALLATION

The unit meets NEMA 4X/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel, with a gasket to provide a water-tight seal. One mounting clip and two screws are provided for easy installation. Consideration should be given to the thickness of the panel. A panel that is too thin may distort and not provide a water-tight seal. (*Recommended minimum panel thickness is 0.125" [3.18 mm].*)

After the panel cut-out has been completed and deburred, carefully slide the panel gasket over the rear of the counter body to the back of the bezel. Insert the unit into the panel. As depicted in the drawing, install the two tinnerman nuts and two self-tapping screws onto the mounting clip. To install the mounting clip; hold the mounting clip with both hands so that the top corners rest on the index finger of each hand and the bottom corners rest on the middle finger of each hand. While doing this, place the thumb of each hand over the mounting screws. By pressing on the screws, flex the clip enough to slide it over the back end of the LNXN case until the clip snaps into the groove of the bezel. Tighten the two mounting screws.

Caution: Only minimum pressure is required to seal the panel. Do **NOT** overtighten mounting screws.



APPLICATION FOR DUAL PRESET LNXN COUNTER

A pharmaceutical company must run tests of different compounds before the government grants a license to manufacture the product. Many locations will be involved in the testing. Therefore, a portable dispenser is needed to distribute the mixture to the test sites.

This application requires the control of 2 motors which dispense a solute and solvent into a vat for testing of different substances. The ratio of solute to solvent will vary from vat to vat. Also the unit must be portable. A LNXN2 counter is used to satisfy the above requirements. In this application, the LNXN is set to operate in mode 8, Reset to Preset, with both outputs terminating at Manual Reset. Front Panel Reset is disabled. Preset 1 is set for 20, the total amount of solvent needed. Preset 1 controls the amount of solute. This number can range anywhere between 1 and 19 for this application. The solid state outputs are connected to the motor controller which then controls motors 1 and 2.

The system operation is as follows: The Start button is pressed which resets the LNXN and starts both motors running. The LNXN starts counting down from preset 2. When preset 1 is reached, output 1 turns on and stops motor 1 from dispensing solute. When the counter reaches 0, output 2 turns on and stops motor 2 from dispensing any more solvent.

The following is a list of the DIP switch settings and terminal connections to meet the process requirements.

DIP Switches

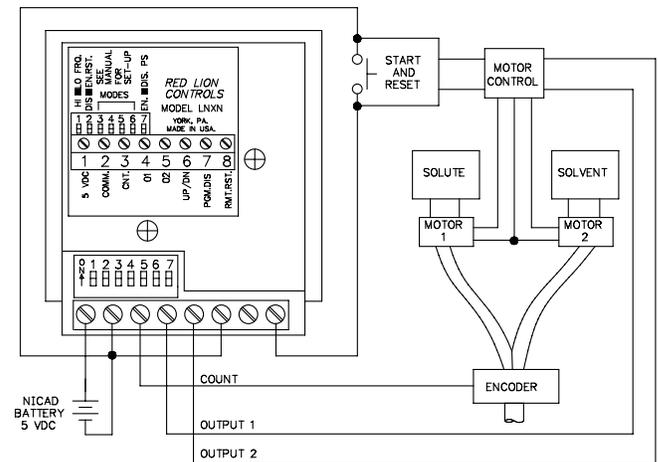
S1	LO FRQ	Up	
S2	DIS.RST	Down	
S3		Up	
S4		Down	Switches 3 to 6 set the mode of operation to Mode 8 (Latch output at Preset 1 and Zero, Manual Reset to Preset 2)
S5		Down	
S6		Down	
S7	PS DIS	Up	

Terminal Connections

Terminal 1 (5VDC)	Positive side of battery
Terminal 2 (Comm)	Negative side of battery
Terminal 3 (CNT.IN)	To Encoder
Terminal 4 (O1)	Motor Control
Terminal 5 (O2)	Motor Control
Terminal 6 (UP/DN)	To Terminal 2 (COMM.)
Terminal 7 (PGM.DIS)	No Connection
Terminal 8 (RMT.RST)	To Start/Reset switch

Front Panel Programming

Preset 1	3
Preset 2	20
Prescale	1.0000



ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBERS FOR AVAILABLE SUPPLY VOLTAGES	
		5 VDC	10 to 30 VDC
LNXXN2	NPN Input/Output Dual Preset Counter	LNXXN2040	LNXXN2050

TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.

LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company's products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.

Red Lion Controls
20 Willow Springs Circle
York PA 17402
Tel +1 (717) 767-6511
Fax +1 (717) 764-0839

Red Lion Controls BV
Basicweg 11b
NL - 3821 BR Amersfoort
Tel +31 (0) 334 723 225
Fax +31 (0) 334 893 793

Red Lion Controls AP
31, Kaki Bukit Road 3,
#06-04/05 TechLink
Singapore 417818
Tel +65 6744-6613
Fax +65 6743-3360