

MYRIAD 'LC1' LEVEL CONTROLLER INSTRUCTION MANUAL



Sigma Controls, Inc.
PROCESS CONTROLS AND INSTRUMENTATION

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INTRODUCTION:

The Sigma Myriad LC1 (Level Controller) is a microprocessor based, state of the art, level controller offering unmatched performance and full user configurability.

The LC1 is used with a primary level measuring device whose output signal is compatible with common analog outputs 4/20MA, 0-5VDC, 1-5VDC, and 0-10VDC.

Level indication is displayed in both numeric and graphic format on the LC1's graphic LCD display along with the current status of the unit's 4 digital outputs.

All aspects of the unit are user configurable through the 'plain English' menus and combinations of the 5 user data key push buttons.

Available in 2 styles of mounting, ¼ DIN (4" x 4" nominal) and wall mounted Nema 4X enclosures, the Myriad LC1 is suitable for installation in all industrial environments.

ORDERING INFORMATION:

- | | |
|----------------------|----------------------|
| ▪ 1/4 DIN Case | Sigma Myriad-LC1 |
| ▪ Wall Mount Nema 4X | Sigma Myriad-LC1-N4X |

SPECIFICATIONS:

- ANALOG INPUT (1 ea.)
Analog, 4/20MA, 0-5V, 1-5V, 0-10VDC, isolated with common negative, +-0.1% accuracy.
- DIGITAL INPUTS (2 ea.)
Digital 10-30V AC or DC, 120 or 240 VAC (requires external resistor).
- ANALOG OUTPUT: (1 ea.)
Analog, with common negative 0-20MA, 4/20MA, 0-5V, 0-10V (voltage output requires a resistor).
- DIGITAL OUTPUTS:
Opto isolated, solid state, open collector, 100MA 30VDC max.
- RELAY OUTPUTS: (2 ea.)
SPDT, Form 'C' 5A Relay
- DISPLAY:
LCD, 128 X 32 pixel bitmapped graphic display
- LOOP POWER:
24VDC regulated output, 100MA max.

- **5 USER KEYS:**
Up, Down, Left, Right, Enter
- **ACCURACY:**
0.1% of calibrated span
- **LOCKOUT:**
User password, user configurable
- **LINEARIZER**
20 point programmable for non-linear inputs
- **INPUT IMPEDANCE:**
Voltage 100K, current 100 OHMS
- **POWER:**
120VAC (230VAC available)
- **ENVIRONMENTAL:**
Operating, 0-65° C
Storage, -40° -80° C
R.H., 0-90% non condensing
- **ENCLOSURE:**
¼ DIN, ABS plastic 96 X 96 X 150MM
- **FRONT PANEL:**
Gasketed Nema 4X
- **ACCESS:**
Chassis & boards remove from front of case.
- **TERMINAL STRIP:**
(40) 'Pluggable' for ease of wiring 28 – 16 AWG
- **CONNECTIONS:**
Removable screw terminal blocks 28 – 16 AWG wire.
- **CONTROL OUTPUTS:**
2 relay outputs, user programmable, SPDT Form 'C' relays 5 AMP.
4 digital outputs, repeat digital inputs.
- **OUTPUT ANNUNCIATION:**
On board piezo buzzer

- **PROGRAMMING:**
Menu based, all parameters and setpoints are user configurable via menu prompts and user keys. The pre-configured screens and 'pull down' sub menus with English prompts assures rapid setup and commissioning.
- **1 YEAR WARRANTY**
- **OPTIONS:**
Include relay output, real time clock, expansion cards.
- **MODBUS® RTU RS485**
Network allows multiple units to be connected together for distributed applications, remote monitoring SCADA applications.
- **EXPANSION CARDS:**
Significant expansion is possible via additional control boards and MODBUS® networking. (Consult factory for details.)

FEATURES:

- Microprocessor Based
- Graphic LCD Display
- 5 Function Keys
- 20 Point Linearization
- Isolated 24VDC Sensor Power
- 4/20MA, 1-5V, 0-5V, 0-10VDC Input
- 1 Analog Input
- 1 Analog Output
- 4 Digital Inputs
- 4 Digital Outputs
- 2 Form 'C' Relay Outputs
- Fully User Programmable in English
- 1 Ea. RS485 Port (Programming and SCADA)

WIRING DETAIL

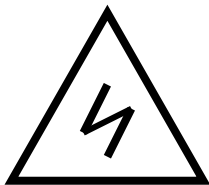
- Input/Output see Dwg # 02-131



CAUTION

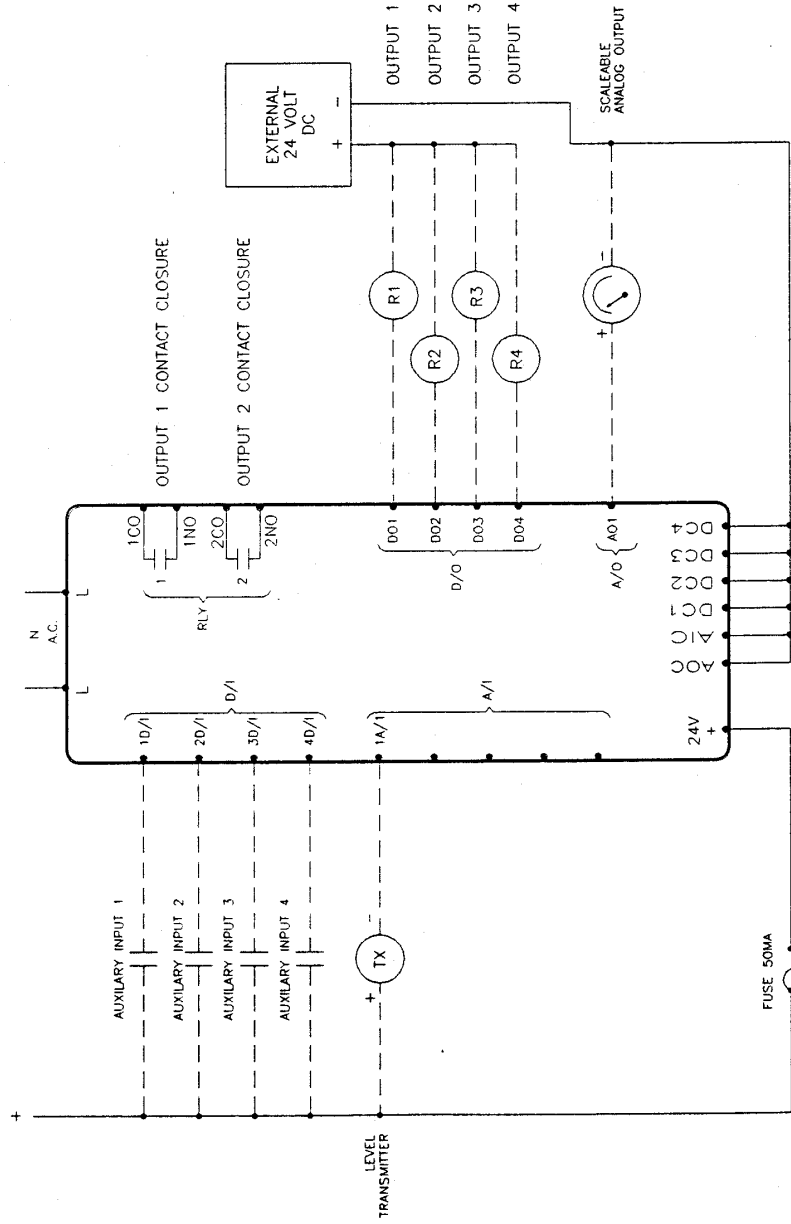
All electrical wiring must be in accordance with all local state and national codes that apply.

Do not exceed the rated current of the D.C. power supply (100MA) or the form 'C' relay outputs (5A/240VAC resistive).



WARNING

Hazardous voltages are present within the enclosure. Installation or service should only be carried out by trained personnel.



Dwg. No. 02-131
 Date: 8-15-02
 Scale: N.T.S.
 Revision:

MYRIAD

SIGMA

Controls, Inc.

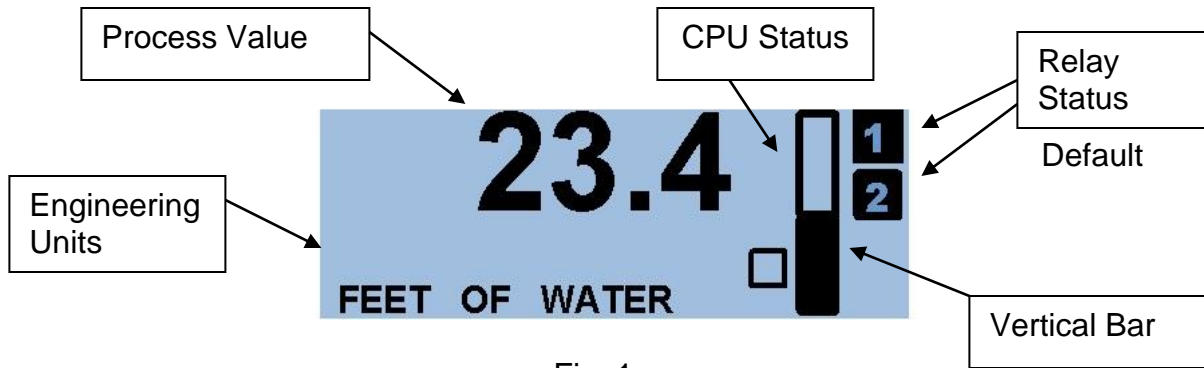
INPUT/OUTPUT BLOCK DIAGRAM
 LEVEL CONTROLLER (LC1)

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PROGRAMMING & SETUP

The Myriad LC1 utilizes 'plain English' menu driven setup screens which are intuitive and easily understood.

From the default screen (Fig. 1), push the 'Enter' button to enter the password protected menus.



↓ ENTER



Enter user selected password (factory default is zero) with the up and down keys, then with → and ← arrow buttons, move cursor to 'next'.

Press 'ENTER' to access menu.

NOTE: Selecting 'VIEW' with the → and ← and then pressing 'ENTER' will allow the user to step through all LC1 settings without having the ability to change any parameter. Parameter changes may only be carried out after entering the user selected password as described above.

INPUT RANGE SELECTION



With the 'SCALE' selection highlighted by the cursor, press 'ENTER' to access the input scale menu.

| | | |
|---------------|------|------|
| INPUT TYPE | | |
| 4-20 MA | | |
| # OF POINTS 2 | | |
| VIEW | NEXT | EXIT |

Use the Up/Down arrow buttons to select the desired analog input range. **NOTE: INPUT TYPE MUST BE COORDINATED WITH INPUT SELECTOR SWITCH LOCATED ON THE BOTTOM OF THE CIRCUIT BOARD** (See Appendix 'A').

NOTE: If the application is linear between minimum input signal and maximum input signal, i.e. "2 point", then scroll the cursor to 'NEXT' and press 'ENTER' to continue the scaling process.

Note on non linear inputs

The Myriad offers a 20 point linearizer which allows the user to customize the indicated display for 20 points of input signal. This feature is often used to read volume in a non-linear vessel such as a horizontal tank with domed end caps. A "strapping table" must be created to allow the display to be linear with the resultant non-linear input signal.

If the user required a non-linear display, scroll the cursor to "# OF POINTS" and use the $\downarrow\uparrow$ arrows to select the number of calibration points required, then select 'NEXT' and press 'ENTER' to continue.

DECIMAL POINT SELECTOR SCREEN

| | | |
|---------------|------|------|
| DECIMAL POINT | | |
| ex. | +++. | |
| | 3.1 | |
| VIEW | NEXT | EXIT |

The cursor will be positioned over the decimal count window, use the Up/Down $\downarrow\uparrow$ arrow buttons to raise or lower the unit number to the left of the decimal point. (The example shown in this window will change with your selection.)

Use the $\rightarrow\leftarrow$ buttons to move the cursor to the number behind the decimal point and the Up/Down $\downarrow\uparrow$ buttons to change this selection. Once again the example will change to confirm your selection.

Use the $\rightarrow\leftarrow$ buttons to highlight the 'NEXT' selection and press 'ENTER' to access the Input Scale Screen.

INPUT SCALING TO ENGINEERING UNITS

| INPUT SCALE | | |
|-------------|------|------|
| 4.00 MA | = | 0 |
| 20.00 MA | = | 144 |
| BACK | NEXT | EXIT |

NOTE: This screen sets what the Myriad LC1 displays in its 'default screen' for the selected input.

The example shown above will display 0.0 units when the input is 4.00 MA. Both the input and the display at that input can be changed for different requirements.

A) With the cursor selecting 'INPUT = 4.00' use the $\downarrow\uparrow$ buttons to change the input value for the required displayed value.

ENGINEERING UNITS SELECTION:

When 'Scale Menu' is complete the 'INPUT TEXT' menu is the last menu in the scaling process.

| INPUT TEXT | | |
|---------------|------|------|
| FEET OF WATER | | |
| BACK | NEXT | EXIT |

This screen allows the selection of several engineering units. With the cursor on the default value as shown, press the Up/Down buttons to select between 'FEET OF WATER'

| | | |
|--------|---------|---------|
| INCHES | INCH Hg | DEG F |
| GPM | MGD | DEG C |
| PSI | NTU | GALLONS |
| LPM | PPM | |

Use the $\uparrow\downarrow$ keys to select the desired engineering units, then with the $\rightarrow\leftarrow$ keys, highlight 'NEXT' and press 'ENTER' to access the "display filter" screen.

DISPLAY FILTER SCREEN

| DISPLAY FILTER | | |
|---------------------------|------|------|
| < 0 = FAST 10 = SLOW > | | |
| 0 | | |
| BACK | NEXT | EXIT |

Use the $\uparrow\downarrow$ keys to change the amount of filtering applied to the input signal. '0' is no filter and '10' is high filter.

ANALOG OUTPUT PROGRAMMING

ANALOG OUTPUT 4 (ANLOUT4) NOTE: Analog output 3 is a nonadjustable retransmitted signal which 'mirrors' the analog input signal.

| | | |
|-----------------------|-------------|-------------|
| AOUT 4 SCALING | | |
| 0 = 4.00Ma | | |
| 144 = 20.00Ma | | |
| BACK | NEXT | EXIT |

NOTE: Analog output 4 is retransmitted output which can be scaled to any value of the display. With the display value highlighted, use the ↑ ↓ buttons to select a display value at which a selectable output occurs. Use → ← buttons to move to the output value for the previously selected display value and adjust as described above.

NOTE: In the example shown 4.00 MA will be output from analog output 4 when the display value is 0 inches.

From menu 2 use the → ← buttons to select 'SETUP' and press 'ENTER' to access the setup menu.

DIGITAL OUTPUT PROGRAMMING

The Myriad LC1 has 2 relay outputs, which can be configured to 'SET' (turn on) and 'RESET' (turn off) at a user defined value of the input. From Menu 1 select 'OUTPUTS' and press 'ENTER'.

| | | |
|--------------------------|-------------|-------------|
| OUTPUT 1 SETPOINT | | |
| SET | 34.5 | |
| RESET | 12.3 | |
| BACK | NEXT | EXIT |

Using the buttons, scroll to the value at which the output 'SETS' or turns on, with this value highlighted, use the Up/Down ↓ ↑ buttons to enter a value of input to activate the output. Scroll down to the 'RESET' point and again change this value to input value, which will turn the digital OUTPUT 1 off.

Once all values are selected, scroll to 'NEXT' press 'ENTER' to move to the #2 setpoint screen and proceed as described above.

When both setpoints are configured, scroll to 'EXIT' and press 'ENTER' to return to the 'Main Menu'.

From Menu 1 scroll to 'DIN' and press 'ENTER' to access the Digital Input/Output programming.

```

DIGITAL INPUT 1
TO DIGITAL OUT      1
INVERT              Y
BACK                NEXT      EXIT

```

NOTE: The LC1 offers the user the ability to select 2 digital inputs DI 1, DI 2 which are “mirrored” by the digital outputs, i.e. when a digital input occurs at the selected ‘DI’ then the opposite ‘DO’ will become active. The only programmability offered in this screen is the ability to invert the output function i.e. when the DI is ‘ON’ the DO may be selected to be ‘ON’ or ‘OFF’.

With the cursor over the ‘Y’ or ‘N’ position use the Up/Down $\downarrow\uparrow$ arrows to select the desired function, scroll to ‘NEXT’ and press ‘ENTER’ to move the DI 2 screen. Repeat the steps described above, scroll to ‘EXIT’ and press ‘ENTER’ to return to the default ‘MAIN’ screen.

```

MENU 2
PEAKS          PASSWORD
DIAGS          VIEW
BACK          NEXT      EXIT

```

MENU 2 ‘PEAKS’

The ‘PEAKS’ feature of the Myriad LC1 records the highest and lowest process values that have occurred since the last ‘CLR’ function.

A second programming menu can be accessed from MENU 1 by selecting ‘NEXT’ and pressing ‘ENTER’. This moves the user to MENU 2.

With the cursor highlighting ‘PEAKS’ press the ‘ENTER’ button to review the PEAK & VALLEY (highest and lowest) values that the Myriad LC1 has seen since last reset.

```

PEAK AND VALLEY
HI  100.0
LO  -25.0
BACK    CLR      EXIT

```

Select the ‘CLR’ to reset these values to the current process value and ‘EXIT’ and ‘ENTER’ to return to the main screen.

MENU 2 'PASSWORD'

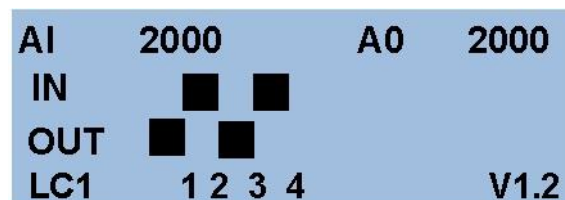
All access to the programmable functions are password protected. To change the unit's access password, Select the 'PASSWORD' block in menu 2, press 'ENTER' and using the Up/Down buttons, enter a new numerical password.



Scroll to 'EXIT' to return to the main screen.

CAUTION: ENSURE THAT A RECORD IS KEPT OF THE PROGRAMMED PASSWORD. ACCESS IS RESTRICTED TO ALL PROGRAMMABLE PARAMETERS WITHOUT THE CORRECT PASSWORD.

MENU 2 'DIAGNOSTICS' (DIAG)



By moving the cursor to the 'DIAG' menu and pressing 'ENTER' a diagnostic screen will be activated. This screen shows the status of the analog input/analog output 'raw' values and the current status of the digital outputs. An active digital output is shown by a rectangular block or blocks. The output is active when the block is present. The model number (e.g. LC1) is shown in the left hand lower corner and the software revision level is shown in the right hand lower corner.

Press 'ENTER' to return to 'MENU 2'.

MAINTENANCE AND TROUBLE SHOOTING

MAINTENANCE:

The Myriad LC1 is a digital solid-state device which requires no periodic maintenance.

Occasional physical checks of the unit should be carried out for physical and mechanical security of mounting, terminal blocks, and electrical wiring.

TROUBLE SHOOTING:

- **UNIT 'LOCKS UP'** – Recycle power to the unit by removing AC power, waiting 10 seconds and reconnecting power.



WARNING

NOTE: This should be done by using the user provided circuit breaker or fuse, not by removing the power wires at the terminal block. **Serious injury or death can occur if contact is made with the incoming ac power.**

- **LCD** display goes dim or contrast is poor. Remove power from the unit, release the 2 rear mounting screws and slide the unit forward in its case approximately 1 inch. On the left side of the circuit board is an adjustable potentiometer. With a small screwdriver adjust this “pot” to alter the contrast to the desired amount. Return the unit to its normal position and secure the rear screws.
- **DISPLAY REMAINS AT ZERO OR SHOWS NO CHANGE** -- If the display remains at zero or shows no change but the process is changing, check for D.C. voltage on the loop. With 2 wire (4/20MA) instruments check with a D.C. voltmeter at the level instrument, by disconnecting the level instrument from its 2 wires and measuring across these 2 wires with a D.C. voltmeter for the presence of 24VDC.

If D.C. voltage is present, reconnect the negative wire of the supply and insert a milliamp meter between the positive wires. The loop should provide a signal between 4 and 20 MA. If no current is present or Y current exceeds 20MA consult the level instrument supplier.

If D.C. voltage is not present check the user supplied power supply or if using the Myriad supply measure across terminals 24VDC and A/C. If no 24VDC is present consult factory. If 24VDC is present check field wiring between the Myriad and the field device and recheck ‘SCALE’ functions to insure correct setup.

APPENDIX 'A'

SWITCH SELECTION OF ANALOG INPUT RANGES (Factory default 4/20mA).

The range dip switches are located on the bottom of the main circuit board. Disconnect power, remove two rear screws, remove terminal strips, and slide the entire unit out of its case. Turn the unit upside down to locate the range dip switches.

| SW1 | SW2 | INPUT 1 | DESCRIPTION |
|-----|-----|---------|-------------------|
| 0 | 0 | | Ain1 range = 5V |
| 0 | 1 | | Ain1 range = 10V |
| 1 | 0 | | Ain1 range = 20Ma |
| 1 | 1 | | Not Used |

| SW3 | SW4 | DESCRIPTION |
|-----|-----|-------------------|
| 0 | 0 | AIn2 range = 5V |
| 0 | 1 | AIn2 range = 10V |
| 1 | 0 | AIn2 range = 20mA |
| 1 | 1 | Not Used |

| SW5 | SW6 | DESCRIPTION |
|-----|-----|-------------------|
| 0 | 0 | AIn3 range = 5V |
| 0 | 1 | AIn3 range = 10V |
| 1 | 0 | AIn3 range = 20mA |
| 1 | 1 | Not Used |

| SW7 | SW8 | DESCRIPTION |
|-----|-----|-------------------|
| 0 | 0 | Ain4 range = 5V |
| 0 | 1 | Ain4 range = 10V |
| 1 | 0 | Ain4 range = 20mA |
| 1 | 1 | Not Used |

ON

| | | |
|---|--|--|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |

EXAMPLE ONLY

(TYPICAL FOR DPC, TPC, QPC)



CAUTION, ENSURE THAT DIP SWITCHES ARE CORRECTLY SET FOR INPUT RANGE REQUIRED.

SIGMA MYRIAD LC1 & LC2 PROGRAMMING RECORD SHEET

Model Number: _____

Serial Number: _____

Vers: _____

Password: _____

- **Scale:**

Input Type _____
Input Points _____
Decimal Point _____

- **Input Scale 1:**

Input = _____
Display = _____

- **Input Scale 2:**

Input = _____
Display = _____
Engineering Units _____
Display Filter # _____

- **Setpoints:**

Output 1 Setpoints
Set _____
Reset _____

Output 2 Setpoints
Set _____
Reset _____

Output 3 Setpoints
Set _____
Reset _____

Output 4 Setpoints
Set _____
Reset _____

} LC1 & LC2

} LC2 Only

- **Analog Output Scale 1:**

Display = _____
Output = _____

- **Analog Output Scale 2:**

Display = _____
Output = _____

- **Setup:**

Trend Speed _____

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WARRANTY

All Sigma Controls, Inc. products are warranted to be free from defective materials and workmanship for one (1) year from date of shipment. Sigma reserves the right to repair or replace at its option any product found to be defective. In no event shall Sigma Controls, Inc. be liable for any consequential, incidental, or special damages and the limit of its liability shall not exceed the purchase price of the supplied equipment.

RETURN FOR REPAIR POLICY (WARRANTY/NON-WARRANTY REPAIR)

Return status can be determined upon factory inspection of returned equipment.

A completed Return Authorization form must accompany all items returned for repair.

Repairs will be evaluated as quickly as possible. Cost for non-warranty repairs will be provided before repairs are initiated and repairs will be completed only after approval by customer.

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