

# SERIES 700 LM, LC1, LC2 LEVEL CONTROLLER INSTRUCTION MANUAL



**Sigma Controls, Inc.**  
PROCESS CONTROLS AND INSTRUMENTATION

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**VISIT OUR WEBSITE [SIGMACONTROLS.COM](http://SIGMACONTROLS.COM)**

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## **INTRODUCTION:**

The Sigma 700 Series (Level Controllers) are microprocessor based, state of the art, controllers offering unmatched performance and full user configurability.

The 700 Series is used with a primary measuring device whose output signal is compatible with 4/20MA.

Process indication is displayed in alpha/numeric format on the LC's two line, alphanumeric, backlit LCD display along with the current status of the unit's relay outputs. Six digital LED indicator lights (3 red and 3 green) are provided for alarm and status indication.

All aspects of the unit are user configurable through the 'plain English' menus and combinations of the 3 user data key push buttons.

Available in 2 styles of mounting, ¼ DIN (4" x 4" nominal) and wall mounted Nema 4X enclosures, the 700 Series is suitable for installation in all industrial environments.

## **ORDERING INFORMATION:**

- 1/4 DIN Case
- Wall Mount Nema 4X

## **SPECIFICATIONS: (Base Unit)**

- ANALOG INPUT 1 ea. (1 Additional with Option Board)  
Analog, 4/20MA isolated with common negative, +-0.1% accuracy.
- DIGITAL INPUTS (8 ea.)  
Digital Form 'C' dry contact
- ANALOG OUTPUT: 1 ea. (1 Additional with Option Board)  
Analog, with common negative 4/20MA
- INDICATOR LIGHTS (6 ea)  
6 LED status lights (3 red and 3 green) provided for status and alarm notification.
- RELAY OUTPUTS: (up to 4 ea.)  
SPDT, Form 'C' 5A Relay
- DISPLAY:  
2 line, 40 character backlit LCD.

- **LOOP POWER:**  
24VDC regulated output, 100MA max. (Only with 110VAC power option)
- **3 USER KEYS:**  
Up, Down, Enter
- **ACCURACY:**  
0.1% of calibrated span
- **LOCKOUT:**  
User password, user configurable
- **INPUT IMPEDANCE:**  
Voltage 100K, current 100 OHMS
- **POWER:**  
24VDC std (120VAC optional)
- **ENVIRONMENTAL:**  
Operating, 0-65° C  
Storage, -40° -80° C  
R.H., 0-90% non condensing
- **ENCLOSURE:**  
¼ DIN, ABS plastic 96 X 96 X 110MM or Optional FRP wall mount enclosure
- **FRONT PANEL:**  
Gasketed Nema 4X
- **ACCESS:**  
Chassis & boards remove from front of case without tools.
- **TERMINAL STRIP:**  
2 ea. 12-position, compression style, removable for ease of wiring 28 – 16 AWG
- **CONNECTIONS:**  
Removable screw terminal blocks 28 – 16 AWG wire.
- **CONTROL OUTPUTS:**  
Up to 4 relay outputs, user programmable, SPDT Form 'C' relays 5 AMP.  
8 ea. relay driver outputs (optional).
- **OUTPUT ANNUNCIATION:**  
Piezo buzzer driver (optional)
- **'WATCHDOG' CPU ACTIVITY MONITOR**

- **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 assure rapid setup and commissioning.
- **1 YEAR WARRANTY**
- **OPTIONS:**  
I/O board includes an additional 110VAC power supply, 1 AI, 1 AO, 8 relay drivers
- **MODBUS®**  
Network allows multiple units to be connected together for distributed applications, remote monitoring SCADA applications (optional)

### **FEATURES:**

- Microprocessor Based
- Alpha Numeric 40 Character LCD Display
- 3 Function Keys
- Isolated 24VDC Sensor Power (with 110VAC power option)
- 4/20MA Input
- 1 Analog Input, 1 Additional (with option board)
- 1 Analog Output, 1 Additional (with option board)
- 8 Digital Inputs, standard
- 8 Digital Outputs, (with option board)
- 4 Form 'C' Relay Outputs
- Fully User Programmable in English
- 2 Ea. RS485 Ports, MODBUS® (option)

## WIRING DETAIL

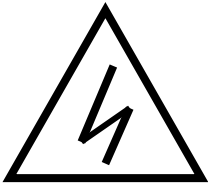
- Inputs/Output see Dwg # 10-139, 10-140, 10-141



CAUTION

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

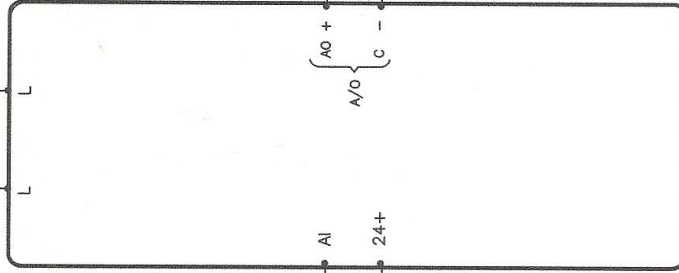
**Do not exceed the rated current of the D.C. power supply (100MA) or the form 'C' relay outputs (5A/240VAC resistive).**



WARNING

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

24VDC SUPPLY  
(110VAC OPTIONAL)



\* NOTE: FOR POWERED ANALOG INPUT  
CONNECT POSITIVE TO AI AND  
NEGATIVE TO ACO (ANALOG COMMON).

Dwg. No. 10-139

Date: 5-24-10

Scale: N.T.S.

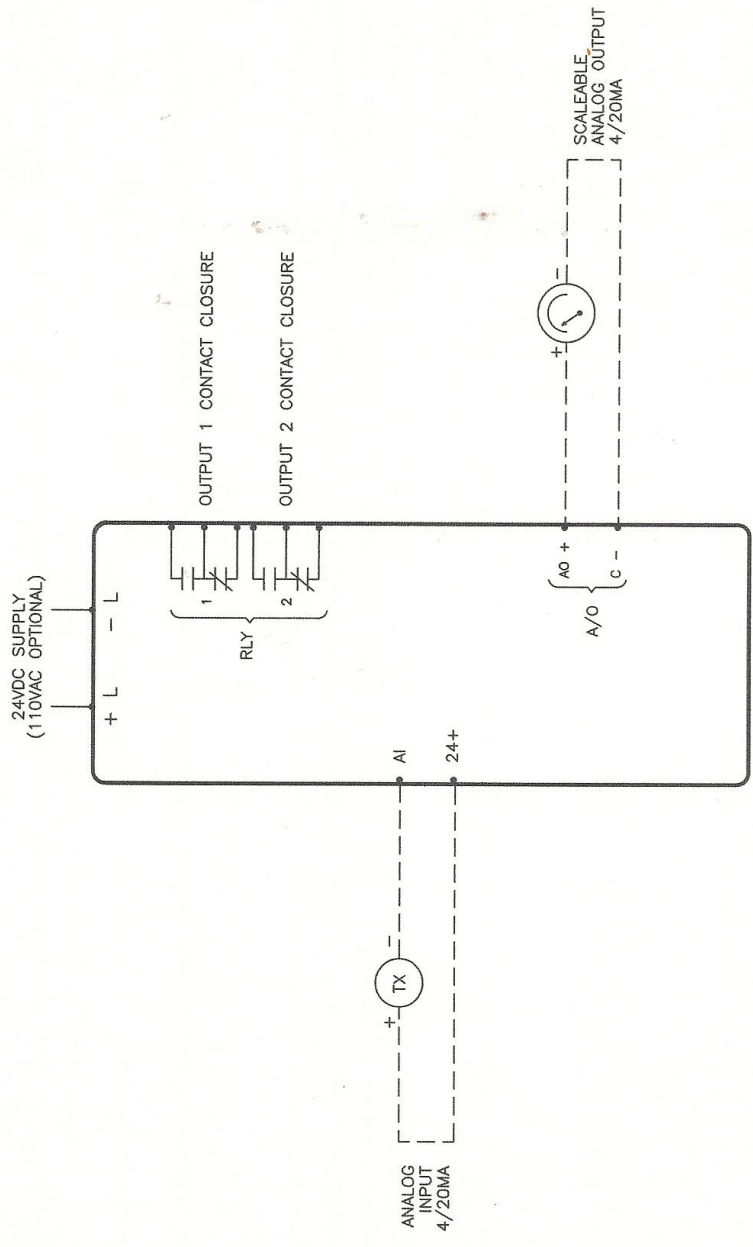
Revision: "A" 7-29-11  
(MISC.)

**SIGMA**

Controls, Inc.

700 SERIES LEVEL METER (LM)  
INPUT/OUTPUT BLOCK DIAGRAM

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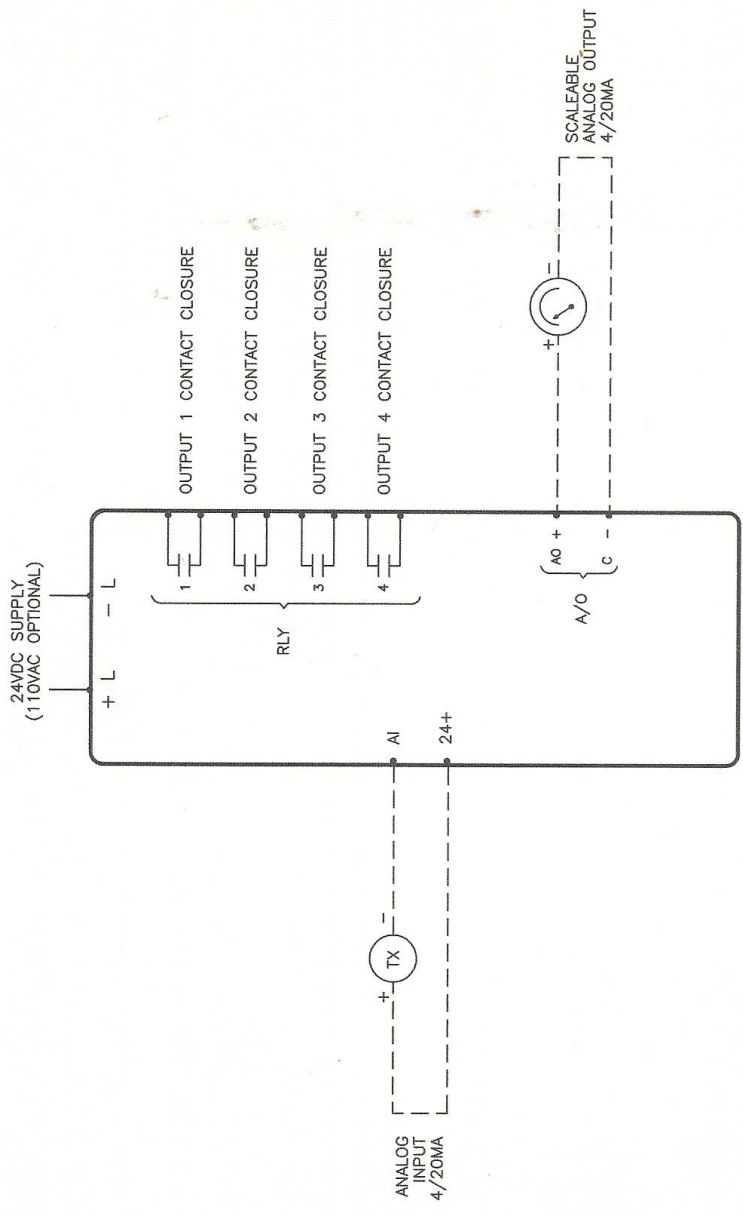
\* NOTE: FOR POWERED ANALOG INPUT  
CONNECT POSITIVE TO AI AND  
NEGATIVE TO ACO (ANALOG COMMON).

**SIGMA**  
Controls, Inc.

Dwg. No. 10-140  
Date: 5-24-10  
Scale: N.T.S.  
Revision: "A" 7-29-11  
(Misc.)

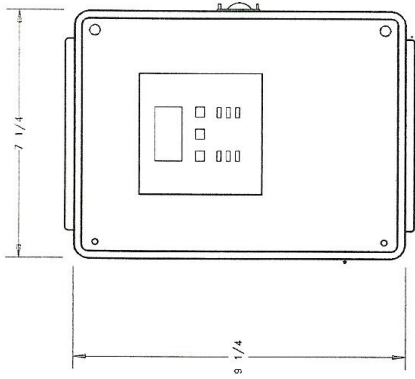
700 SERIES LEVEL CONTROLLER (LC1)  
INPUT/OUTPUT BLOCK DIAGRAM

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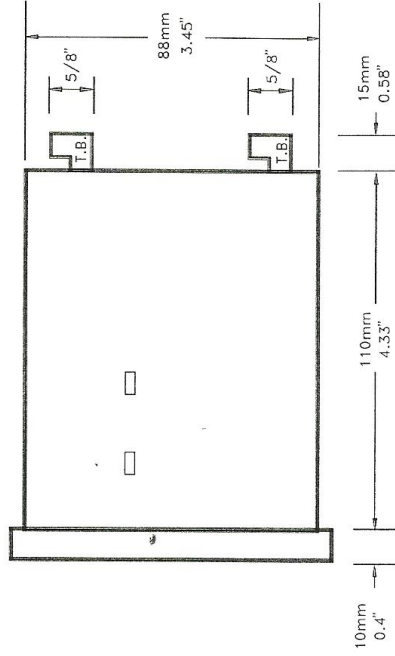
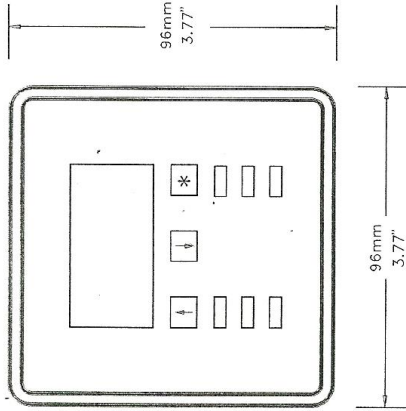


\* NOTE: FOR POWERED ANALOG INPUT  
CONNECT POSITIVE TO AI AND  
NEGATIVE TO ACO (ANALOG COMMON).

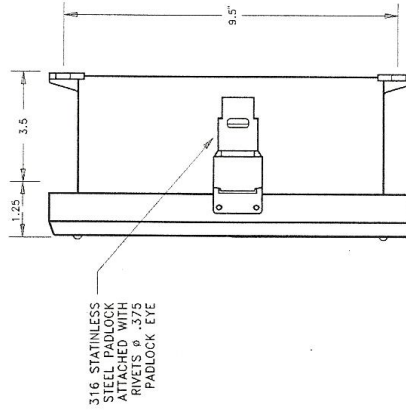
<h1 style="margin: 0;">SIGMA</h1> <p style="margin: 0;">Controls, Inc.</p>	Dwg. No. 10-141	<p style="margin: 0;"><b>700 SERIES LEVEL CONTROLLER (LC2)</b></p> <p style="margin: 0;">INPUT/OUTPUT BLOCK DIAGRAM</p> <p style="margin: 0;">1 AI, 1 AO, 4 RELAY OUTPUT</p>
	Date: 5-24-10	
	Scale: N.T.S.	
	Revision: "A" 7-29-11 (MISC.)	
<p style="margin: 0;">217 S. 5th STREET, Perkasie, Pa. 18944 --- (215) 257-3412</p>		



FRONT VIEW



RIGHT SIDE VIEW



SIGMA CONTROLS, INC.	217 South 5th Street, Portage, Pa. 16944 Phone: (215) 257-3412 Fax: (215) 257-3416		
	700 SERIES NEMA 4X AND PANEL MOUNT DIMENSIONS		
Client:	SIGMA STANDARD DRAWING		
Dwg. No.: 10-179	Date: 6-6-10	Rev: "A"	12-1-11 (MISC)
Sheet 1 of 1	Scale: N.T.S.	P.O. #	JOB #

**PROGRAMMING & SETUP**

1) Upon power up, the opening screen shows the model number and the current revision level.



2) After the unit has completed its startup procedure, the current status screen will automatically appear.



3) To begin the programming sequence, press the \* button and the password screen appears:



Use the **↑** **↓** buttons to enter the access password and to view a programming menu item such as "SETPOINTS".



4) Press the \* button to access the 'SETPOINTS' menu.

**RELAY 1 ON SETPOINT**

**18.09**

**RELAY 1 ON SETPOINT**

**16.95**

Use the **↑ ↓** buttons to change the relay 1 'on' setpoint value

Press **\*** to save and advance to relay 1 off setpoint and change the value as with **↑ ↓** buttons.

Continue through the relay setpoints as shown above. 700 LM's have no relay setpoint screens, 700 LC1's have 2 and 700 LC2's have 4 relay setpoint screens. Press **\*** to save and exit.

5) Press the up **↑** button to advance to the 'SCALING' screen to program, the displayed value for the 4-20MA input.

**HINT: HOLDING THE \* KEY FOR 3 SECONDS WILL SHOW THE PREVIOUS SCREEN.**

**\*\*\*MENU SELECTION\*\*\***

**SCALING**

Press **\*** to enter the 'SCALING' menu.

**LOCATE DECIMAL POINT**

**.00**

4 digits are available for the process value display. Use the **↑ ↓** buttons to select the number of decimal points required after the whole number, e.g. – 6.000, 60.00, 600.0, etc. Press **\*** to advance to the following scaling items and change as required.

**ANALOG INPUT LOW**

**.00 = 4.00MA**

**ANALOG INPUT HIGH**

**100.00 = 20.00MA**

**ANALOG OUTPUT LOW**

**.00 = 4.00MA**

**ANALOG OUTPUT HIGH**

**75.00 = 20.00MA**

This completes the scaling programming, press \* to save and exit.

6) As described previously, select the 'SET UP' menu to access the global settings.

**\*\*\*MENU SELECTION\*\*\***

**SETUP**

Press \* to enter the setup area. The first screen is password.

**CAUTION: PLEASE MAKE A NOTE OF THE PASSWORD IF YOU ELECT TO USE ONE.**

**PASSWORD (MAKE NOTE)**

**0**

Press \* to advance to the 'INPUT FILTER' screen.

**INPUT FILTER UP = SLOW**  
**0**

The INPUT FILTER provides a way to 'dampen' a noisy process; increasing the value slows down the process response.

**UNIT TEXT**  
**FEET**

Advance to 'UNIT TEXT' screen, press ↑ ↓ to review and select an engineering unit. Choices include Feet, inches, liters, PSI, gallons, PPM, NTU, MGD, inch Hg, and blank (no units).

7) The final menu item is "DIAGNOSTICS". This screen provides real time information about the current status of both inputs and outputs.

**\*\*\*MENU SELECTION\*\*\***  
**DIAGNOSTICS**

Press \* to enter the diagnostic display.

<b>INPUTS</b>		<b>400</b>
<b>OUTPUTS</b>	<b>12</b>	<b>400</b>

This is the Current Value of the Analog Inputs in Ma. This Value Shown is 4.00Ma

This is the Value of the Analog Output. The Value is in this Example is 4.00Ma

This is the Relay Output Status. Shown is Relay 1 and Relay 2 Active

**SIGMA 700 SERIES LM, LC1 AND LC2**  
**PROGRAMMING RECORD SHEET**

MODEL NUMBER: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

VERSION: \_\_\_\_\_

PASSWORD: \_\_\_\_\_

**SETPOINTS (LC1 AND LC2 ONLY)**

**SETPOINT**

RELAY 1 ON AT \_\_\_\_\_

RELAY 1 OFF AT \_\_\_\_\_

RELAY 2 ON AT \_\_\_\_\_

RELAY 2 OFF AT \_\_\_\_\_

RELAY 3 ON AT \_\_\_\_\_

RELAY 3 OFF AT \_\_\_\_\_

RELAY 4 ON AT \_\_\_\_\_

RELAY 4 OFF AT \_\_\_\_\_

LC1 & LC2

LC2 ONLY

PASSWORD: \_\_\_\_\_

INPUT FILTER \_\_\_\_\_

UNIT TEXT \_\_\_\_\_

**SCALING**

DECIMAL POINT \_\_\_\_\_

ANALOG INPUT LOW \_\_\_\_\_

ANALOG INPUT HIGH \_\_\_\_\_

ANALOG OUTPUT LOW \_\_\_\_\_

ANALOG OUTPUT HIGH \_\_\_\_\_

## SERIES 700 RETURN AUTHORIZATION FORM

User Company Name & Address:	Name & Phone # to contact for information:

Reason for Return:	Possible Cause of Problem:

Model #:	Serial #:
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Application:

Urgency of Repair:
Calibration desired for meter:
PO # for Non-Warranty Repairs:
M.S.D.S. if applicable:

**NOTE: PLEASE PACK IN ANTI STATIC PROTECTION SUITABLE FOR SENSITIVE ELECTRONIC DEVICES.**



## 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.

**\*\*\*\*\*IMPORTANT\*\*\*\*\***

**SENSORS AND CABLE THAT HAVE BEEN USED IN WASTE WATER OR HAZARDOUS LIQUIDS MUST BE THOROUGHLY CLEANED BEFORE RETURNING. UNITS RETURNED UNCLEANED WILL BE CONSIDERED UNREPAIRABLE AND RETURNED TO SENDER OR DISCARDED. NOTE: DO NOT SUBMERGE UNITS FOR CLEANING WITH CABLE CUT OR REMOVED. THIS WILL ALLOW CLEANING FLUID TO ENTER HOUSING, DAMAGING ELECTRONICS AND VOIDING THE WARRANTY.**

**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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