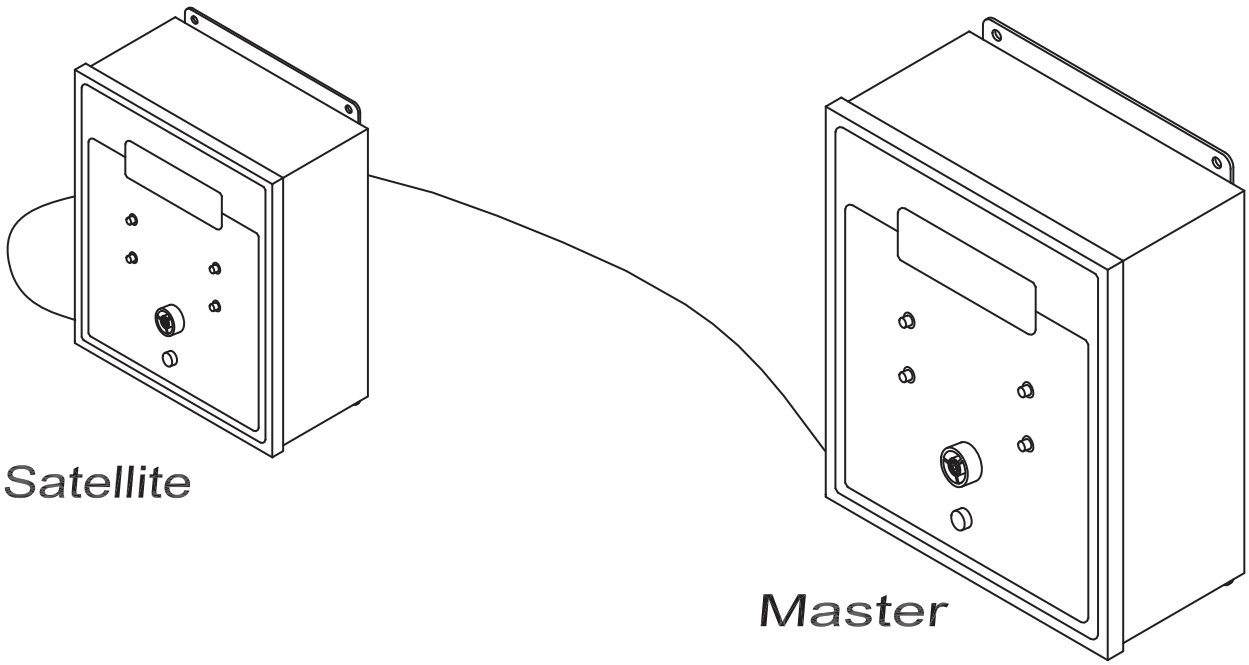
PNEUMERCATOR
Liquid Level Control Systems

Model LDE700/E700-1 Satellite Unit
Instruction Manual



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Model LDE700/E700-1 Satellite Unit

Notice: PNEUMERCATOR CO. reserves the right to make improvements to the product described in these instructions at any time and with no notice.

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his expense will be required to take whatever measures may be required to correct the interference.

Specifications:

Power: 120 VAC ± 10%, 60 hertz, 40 Watts, MOV surge protection, undervoltage detection and protection.

Fuse: 3 A.G. SLO-BLO, 1/4 Amp, 250 VAC or equivalent.

Operating: -40º to 122º F. temperature. (-40º to 50º C.)

Clock: Battery-backed with 10-year data retention.

Display: 0.8" 7-segment Bright Red.

Horn: adjustable - 85 dB at 3 meters on axis (max).

Connecting Cable: Belden #9562 or equivalent from master.

Terminal Blocks: Power (TB7) Position 1 - Black - Hot.
2 - White - Neutral.
3 - Green - Ground.

Applications: The Satellite system is designed to give remote display and annunciation capabilities to the Model LDE-700(P) or E700-1(P). The satellite unit will display the tank levels and alarms that the master displays. The satellite unit polls the master unit once every 40 seconds to update the information it displays. The transfer of data from the master unit to the satellite takes less than 4 seconds at 9600 baud.

The satellite unit connects to the master unit with a cable run of 2 twisted pairs of 24 AWG wire (4 wires total) in an unconditionally dedicated line (Belden #9562 or equivalent). This configuration allows the master unit to be separated from the satellite unit by up to 9.0 miles. The master and satellite units each require a line modem (supplied by PNEUMERCATOR P/N 553006-1) to be attached to their RS-232 ports, with the wiring cable run between line modems.

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Modem Setup: The modem drives your data at various speeds (see table 1) up to 9,600 bps over distances up to 4.0 miles through 300 bps over distances up to 9.0 miles. Set switch to *DCE* as per figure 1.

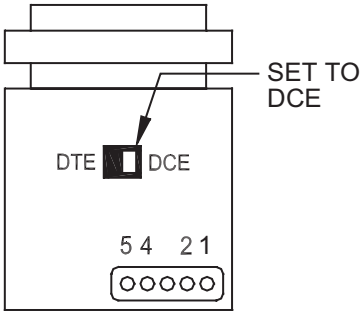

FIGURE 1: SWITCH SETTINGS

Data Rate (bps)	Transmission Distance		Wire Used
	km(s)	mile(s)	
300	14	9.0	24 AWG two twisted pairs
1200	12	7.5	
2400	8.5	5.5	
4800	7.0	4.5	
9600	6.5	4.0	

TABLE 1: DISTANCE AND DATA RATE

Wiring: Run your cable (Belden #9562 or equivalent) from the master unit to the satellite unit and wire as per figure below. Cable wires must be connected as shown, maintaining polarity as shown in the wiring diagram. Run power to TB7.

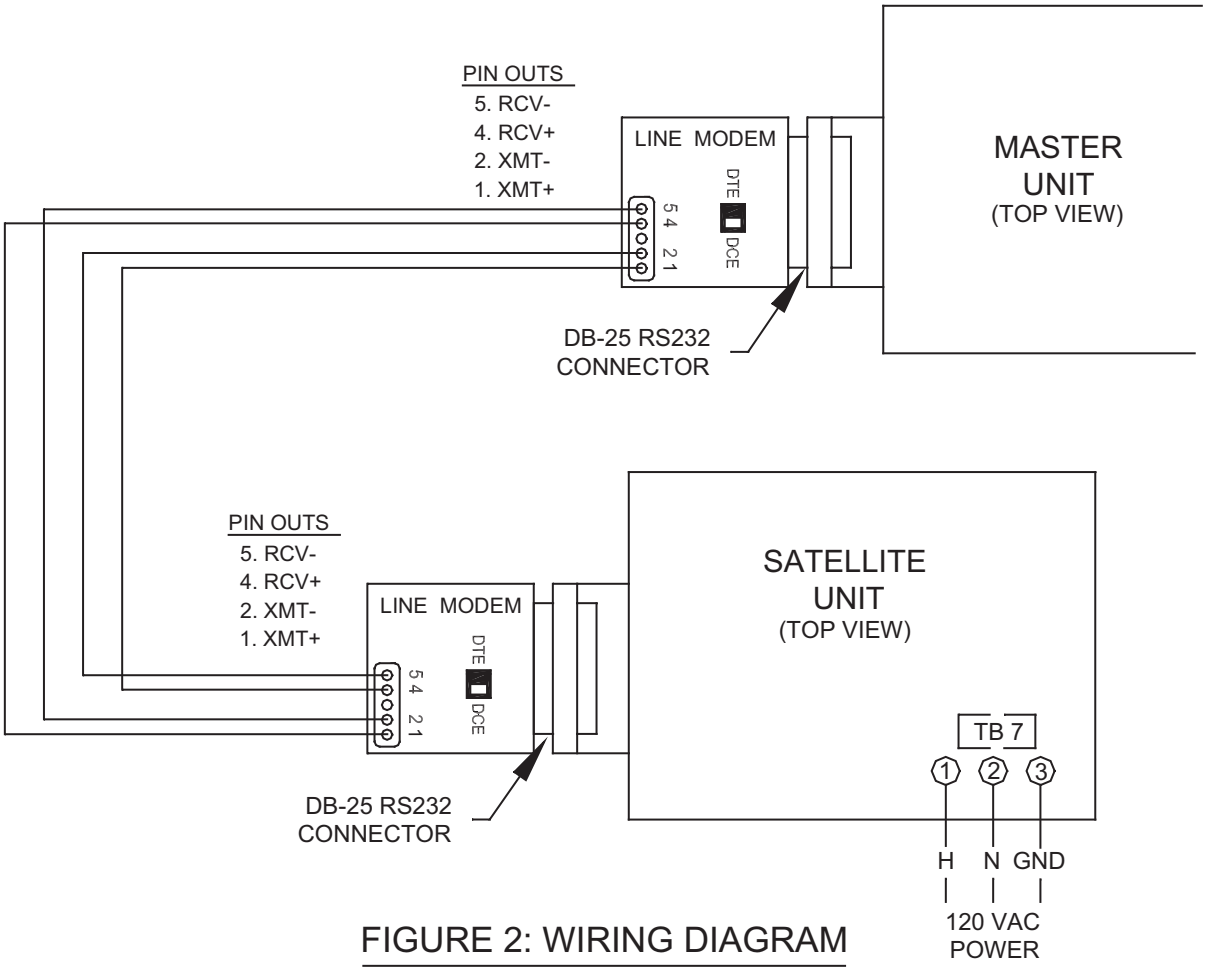

FIGURE 2: WIRING DIAGRAM

Model LDE700/E700-1 Satellite Unit

Programming and Operation:

Display: The Inch/Gallon switch inside the satellite system may be used to select the display mode for the satellite unit. Display selection at the satellite unit has no effect on the display of the master unit.

Audible Alarm: The audible alarm mirrors the programming and state of the audible alarm in the master unit. If the audible alarm in the master unit is reset, either manually or automatically, the satellite audible alarm will be reset also. The satellite alarm may be reset manually independent of the master unit, which will not affect the master unit.

Testing: The system features self-diagnostics that test the audible alarm, visual alarms, clock, and data storage memory. These tests are available from the keypad, and help to ensure reliable and trouble-free operation of the satellite unit.

RS-232 Parameters: The communication parameters of the satellite unit default to 300 baud, 7 bit word length, even parity and 1 stop bit. The baud rate may be changed from the keypad. The RS-232 parameters of the master unit must be programmed to match the setup of the satellite unit.

Output Relays: Supplied with 4 Form C relay output contacts that mirror the programming and state of the 4 relays in the master unit. Relay contacts are rated at 5 Amps at 120 VAC.

System Warm Reset: All system setup parameters are reset to their default conditions. All stored data is cleared from the system memory. Tank charts, tank diameters, tank capacities remain as factory programmed.

System Cold Reset: After cold resetting the system, the system will be in a memory loss state (Error Code 8). This necessitates pressing any key of the keypad to clear ERROR #8, which is displayed on the system front panel display, in order to re-start normal operation.

Keypad Commands: There are 11 commands that may be used from the keypad with the satellite system. All other keypad commands, if entered on the satellite keypad, will return an error code of 1 – Unimplemented Command. Programming of alarm levels, clock setup, offsets, relay states, etc. are done at the master unit.

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KEY COMMAND TABLE: KEYPAD INITIATED COMMANDS

NOTE: ALL OTHER KEYPAD COMMANDS ARE DISABLED IN SATELLITE UNIT

FUNCTION	COMMAND NUMBER
DIAGNOSTICS	
TEST LEDS	17
TEST HORN	18
TEST RAM (Memory)	19
TEST CLOCK	20
TEST RELAYS	21
TEST LEDS AND HORN	53
RS-232	
DISPLAY BAUD RATE	27
ENTER BAUD RATE	29
TEST RS-232 PORT	57
SYSTEM	
WARM RESET SYSTEM	51
COLD RESET SYSTEM	52

Command / Entry

Test Leds (17): F17E
Lights all the system LED's, any key press turns off the LED's.

Test Horn (18): F18E
Turns on the horn, any key press turns off the horn.

Test Ram (19): F19E
Tests the scratchpad memory, if an error is found, an error code is displayed (error code #4). If no error is found, no message is presented.

Test Clock (20): F20E
Tests the clock, if an error is found, an error code is displayed (error code ~2). If no error is found, no message is presented.

Test Relays (21): F21E
Toggles the state of all the relays, any key press toggles the relay states again and ends the test.

Test Leds and Horn (53): F53E
Lights all the system LEDS and turns on HORN, any key press turns them off.

Test RS-232 Port (57): F57E
Sends the word ‘hello’ 25 times to the RS-232 Port. A breakout box or computer set up in terminal mode may then be used to verify data flow through the RS-232 Port.

Display Baud Rate (27): F27E

Displays the baud rate set for the RS-232 communications port until any key press or timeout.

1 = programmed for 300 baud. ---------- * Default
2 = programmed for 1200 baud.
3 = programmed for 2400 baud.
4 = programmed for 4800 baud.
5 = programmed for 9600 baud.

Enter Baud Rate (29): F29nE

n is a number from 1 to 5 for the baud rate desired.

1 = programmed for 300 baud. ---------- * Default
2 = programmed for 1200 baud.
3 = programmed for 2400 baud.
4 = programmed for 4800 baud.
5 = programmed for 9600 baud.

Warm Reset System (51): F51E

Warm resets the system. No system setup parameters are changed by this command. This command is used to return the system to a known state.

Cold Reset System (52): F52E

Cold resets the system and performs all self-diagnostic system checks.

Troubleshooting: If the communications interface between the master and satellite units does not work, check the cabling and connector pin-outs to the line modems and make sure they are correct. Also make sure that all RS-232 setup parameters are the same for the master and satellite units. Make sure that the master unit is programmed for the same baud rate as the slave. If the satellite unit detects communication errors with the master it will show an error code of 7 - Satellite Communication Error.

ERROR CODES:

0 - RESERVED
1 - UNIMPLEMENTED COMMAND
2 - CLOCK HAS LOST TIME (BATTERY FAILURE)
3 - RANGE ERROR
4 - RAM ERROR
5 - KEYPAD BUFFER OVERFLOW
6 - SYNTAX ERROR
7 - SATELLITE COMMUNICATION ERROR
8 - RAM BATTERY ERROR
9 - RESERVED
10 -CLOCK TIMEOUT (BOX IN LOWER PART OF DISPLAY)

*** To cancel the display of an error code, press any key.