# **LCET Series Reference Manual**



# **Programmable Solenoid Control System**



The Solenoid Control System is designed for **Cycling and Endurance Testing** of electro-mechanical components. The system may be used as both an engineering evaluation and production quality assurance tool. Each system may drive up to thirty two independent devices with different actuation profiles.

The typical applications of the tester is life cycling of the solenoids, electro-magnets, relays, motors, voice coil motors, actuators, valves, keyboards, switches, and other applicable devices. The other applications of the tester is testing and evaluation of shock and vibration systems.

The compact and stand-alone unit consists of controller, drivers, and the power supplies. It conveniently connects to the serial port of the host computer.

The system may be controlled in different ways;

#### 1) Stand-alone

In this mode, the controller does not need an external device such as a PC to operate. The controller is programmed in a simple programming language. The code is developed, downloaded to the controller, run and saved in the controller's non-volatile memory using the supplied Integrated Development Environment (IDE) software.

### 2) Externally Controlled

In this mode, the external host such as a PC, micro-controller or PLC sends a series of commands to the controller via the RS-232 serial port. The controller processes and performs the incoming commands and responds with proper messages.

The system interfaces to a wide variety of analog and digital transducers to monitor the output process. These include LVDTs, RVDTs, Proximity Sensors, Accelerometers, Optical Encoders, Laser Interferometers, Pressure Sensors and other similar devices.

#### **Features**

- Compact
- Plug-and-Play
- Stand-alone
- Runs Multiple Devices Simultaneously
- Complete Unit Integrates Controller, Power Supplies and Drivers
- Quick and Easy to Install
- Very Compact and Easy to Use
- Easy Programming Language, No Compiler or Assembler Required
- Different Modes of Operation:
  - 1) Host Controlled
  - 2) Stand-alone, No PC Required to Operate
- Optical Encoder Feedback
- Totally Integrated Solution
- Free Software Included

#### **Actuators**

- Linear and Rotary Solenoids
- Voice Coil Actuators

#### **Actuator Driver**

- Excellent Linearity
- Pulse Width Modulated (PWM)
- Wide Output Voltage
- High Output Current
- Current Controlled or Voltage Controlled

#### Mechanical

- Size: 10.0" (25.000 mm) W X 10.8" (265.00 mm) D X 4.875.00" (124 mm) H
- Material: Aluminum, 0.09" (2.3 mm) Thickness
- Available in 19" Rack Mount Enclosure

#### **Power Requirement**

- 110 VAC, 50 ~ 60 Hz **Or**
- 220 VAC, 50 ~ 60 Hz **Or**
- +12 VDC to +50 VDC

#### **Typical Applications**

- Life Cycling
- Endurance Testing
- Shock and Vibration Testing
- Vibration Cancellation

# **Software**

- Easy System Setup and Evaluation
- Menu driven, No Programming Required

#### **Communication Interface**

RS-232 Interface

## **Feedback Devices**

- Proximity Sensors
- LVDTs and RVDTs
- Laser Interferometers
- Pressure TransducersAny Analog Signal
- Absolute and Incremental Optical Encoders

#### **General Specifications**

- LED Power Indicator
- High Performance Line Filter
- Compact Industrial Enclosure
- Drives up to 32 Devices Simultaneously

# **PIN ASSIGNMENT AND DESCRIPTION**

### **SOLENOID CONNECTION**

8-pin Circular Connector

Solenoids 1 through 4 should be connected to this connector.

PIN	DESCRIPTION
1	Connect to Solenoid 1
2	Connect to Solenoid 2
3	Connect to Solenoid 2
4	Connect to Solenoid 1
5	Connect to Solenoid 4
6	Connect to Solenoid 4
7	Connect to Solenoid 3
8	Connect to Solenoid 3

8-pin Circular Connector

Solenoids 5 through 8 should be connected to this connector.

PIN	DESCRIPTION
1	Connect to Solenoid 5
2	Connect to Solenoid 6
3	Connect to Solenoid 6
4	Connect to Solenoid 5
5	Connect to Solenoid 8
6	Connect to Solenoid 8
7	Connect to Solenoid 7
8	Connect to Solenoid 7
8	Connect to Solenoid 7

# Z

# 8-pin Circular Connector

Solenoids 9 through 12 should be connected to this connector.

PIN	DESCRIPTION
1	Connect to Solenoid 9
2	Connect to Solenoid 10
3	Connect to Solenoid 10
4	Connect to Solenoid 9
5	Connect to Solenoid 12
6	Connect to Solenoid 12
7	Connect to Solenoid 11
8	Connect to Solenoid 11

8-pin Circular Connector

Solenoids 13 through 16 should be connected to this connector.

PIN	DESCRIPTION
1	Connect to Solenoid 13
2	Connect to Solenoid 14
3	Connect to Solenoid 14
4	Connect to Solenoid 13
5	Connect to Solenoid 16
6	Connect to Solenoid 16
7	Connect to Solenoid 15
8	Connect to Solenoid 15
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# **COMMAND**

9-pin DB-9, male Connector

This port is used for stand-alone operation.

PIN	NAME	DESCRIPTION
1	Spare	SPARE Input
2	RUN*	Connecting the RUN pin to system ground will run the code saved in the permanent memory of the controller.
3	CONT *	Connecting the CONT pin to system ground will continue the execution of the code after execution of a PAUSE command.
4	HI – LO *	Selects the state of the output ports on power-up or reset. Placing a jumper between this pin and system ground will cause the state of the output ports to be high upon power-up or reset.
5	GND	System Ground
6	END *	Connecting the END pin to system ground will end the running program.
7	Spare	SPARE Input
8	Spare	SPARE Input
9	Spare	SPARE Input

<sup>\*</sup> A normally open switch should be placed between this pin and GND, if this operation is required. A 10 KOHM pull-up resistor is placed between all inputs and +5 VDC.

# **INPUT**

9-pin DB-9, male Connector

This port is used to connect and read the state of a TTL / CMOS signal like a sensor, reed switch or other similar devices.

Related commands are IN, IFBIT and IFNOTBIT. Please refer to Operating and Programming Reference Manual.

PIN	NAME	DESCRIPTION
1	INBIT1	TTL / CMOS Input 1
2	INBIT3	TTL / CMOS Input 3
3	INBIT5	TTL / CMOS Input 5
4	INBIT7	TTL / CMOS Input 7
5	GND	System Ground
6	INBIT2	TTL / CMOS Input 2
7	INBIT4	TTL / CMOS Input 4
8	INBIT6	TTL / CMOS Input 6
9	INBIT8	TTL / CMOS Input 8

A 10 KOHM pull-up resistor is placed between all inputs and +5 VDC.

### **JOYSTICK**

25-pin DB-25, female Connector

This port is used to connect three analog signals or potentiometers be connected to this port.

Related commands are RSTSX, RSTSY and RSTSZ. Please refer to Operating and Programming Reference Manual.

PIN	NAME	DESCRIPTION
1	ANALOG-X	Analog-X Input
2	ANALOG-Y	Analog-Y Input
15	ANALOG-Z	Analog-Z Input
16	GND	System Ground
17	GND	System Ground
18	GND	System Ground
19	+5 VDC	+5 VDC
20	+5 VDC	+5 VDC
21	+5 VDC	+5 VDC

# RS-232

9-pin DB-9, Female Connector

This port should be connected to the RS-232 port of the host computer or PLC using the supplied cable.

PIN	NAME	DESCRIPTION
2	DATA-XMT	Data Transmit to PC
3	DATA-RCV	Data Receive from PC
5	GND	System Ground
7	RESET	RESET to Controller, Should Be Set to Clear

Specifications are subject to change without notice.