

## MICRO-DCI™ Single-Loop Controller 53SL5100B

- **Four Selectable Control Strategies**
- **Intuitive, High-Visibility Operator Interface**
- **Front-panel configuration & setup**
- **Built-in Transmitter Power Supply**
- **Standard RS485 Datalink Communications**
- **Password Security**
- **Direct replacement for 53SL5100A Single Loop Controller**
- **Compatible with existing installations**



The 53SL5100 features a library of four user-selectable control strategies for advanced single loop control. The high visibility dot matrix display shows process information in a clear and concise manner.

The 53SL5100 capabilities include:

- PID control
- Ratio PID control
- Auto/Manual Station
- Analog Backup Station

The instrument accepts two analog inputs and provides one control output.

The 53SL5100 includes an RS-232 front configuration port and standard RS-458 DataLink serial communications at the rear terminations for connection to a PC and/or other Micro-DCI instruments on a network. The 53SL5 RetroPAK is also supported by the G3 Operator Panel DataLink interface.

53SL5100B is a direct replacement for the 53SL5100A. The standard displays, alarm reporting and alarm acknowledgement are identical, making the transition seamless for operators, and it can be mounted in the same panel cutout.

The 53SL5100 provides two analog inputs and one control output with four selectable control strategies. These strategies are applicable to many advanced processes including distillation column tray temperature control, batch reactors, filter flow control, complex exothermic reactor control and any other industrial application that must be responsive to plant wide process upsets while maintaining consistent product quality. In some cases proportional control only may be used to solve a simple flow rate problem. The EASY-TUNE™ loop tuner can be activated from the front panel.

**Control Strategy 1 - PID Control**

In this strategy the controller accepts an analog input, compares it to the setpoint and generates an output. Its display includes a vertical bargraph indicator for the process variable, a 50 segment scale and setpoint indicator. Percentage output appears at the bottom of the display as a horizontal bar graph. The closed (C) and Open (O) valve indicators at the ends of the horizontal scale can be configured to be displayed at either end to indicate actual valve control direction. Digital values of the setpoint (SP) and process variable (PV) are shown along with auto/manual mode and local/remote setpoint status indication.



Single-Loop PID Control

**Control Strategy 2 - Analog Backup**

This strategy is used in operations where a remote instrument or computer is normally controlling the final element directly. In this

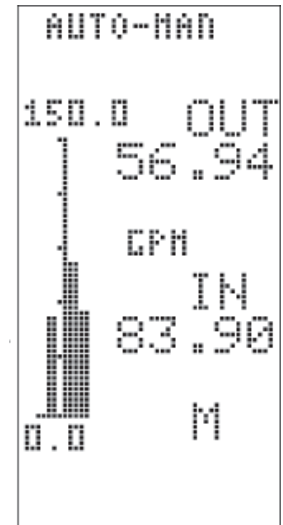
configuration, the controller acts as a control signal selector and as an automatic backup in the event the remote instrument fails. As a backup, the controller will assume control of the process in the event of an indicated primary unit failure. The controller continuously adjusts its output to match the feedback signal from the final element so that transfer is bumpless.

**Control Strategy 3 - Ratio PID Controller**

This strategy is used where one variable must be automatically maintained in direct proportion to another variable. Transmitter signals from the controlled and wild variable are received by the ratio controller which compares the two values and calculates the required correction that is sent to the final element as an output signal. Common applications are in-line blending and metering pump control.



Ratio Control



Auto/Manual Station

**Control Strategy 4 -Automatic/Manual Station**

is a conventional single station selector. In auto, the input is passed directly through the station to the output. In manual, the station functions as a manual loader allowing the output to be controlled from the front panel push-button. If the process variable exceeds user-configurable limits, the station activates a signal to a contact output (CCO) for external annunciation.

The automatic manual station has vertical bar graph indicators for the auto input, process variable and output. Digital values of the output and process variable also appear on the display to the right of the bar graph under the OUT and IN legends respectively.

## Engineering Specifications

### **OPERATING CHARACTERISTICS**

Power Requirements:

21 to 28 VDC  
120 VAC +/- 10%, 50/60 Hz  
220/240 VAC +/- 10%, 50/60 Hz

Power Consumption:

AC Operation: 15 W max

Internal Power Supply

Available Power Output for Transmitters:

24-26V dc, 80 mA, short circuit protected

Output Ripple: 200 mV p-p maximum

### **ENVIRONMENTAL CHARACTERISTICS**

Enclosed temperature controlled locations (class A and B per ISA S71.01 1985)

Ambient Temperature Limits: 4 to 52°C (+40 to 125°F)

Relative Humidity Limits: 10 to 90% maximum

Temp. Effect on Accuracy: +/-0.28% per 28° (50°F) from reference temp. of 25°C (77°F)

Enclosure Classification: NEMA type 1/IEC 529 Type IP20

### **PHYSICAL CHARACTERISTICS**

Case: Steel

Finish: Baked enamel, RAL 9002, Light Gray

Circuit Boards: Glass epoxy

Bezel: ULTEM 1000 (Polyetherimide Resin)  
Flamability-UL94 5V

Dimensions: DIN case  
2 27/32"W x 5 21/32"H x 12 26/32"L  
(72 mm W x 144 mm H x 305 mm L)

Panel Cutout: 2 11/16"W x 5 7/16"H (68 mm W x 138 mm H)

Weight: 5 lbs. (approximate)

Electrical Connections

Rear-of-case compression-type terminal strips

Front Panel

Display: 48 x 96 pixels

Pushbuttons: 10 (membrane type switches)

### **MICROPROCESSOR SAMPLING & UPDATE**

Program scan rate: 100 ms

Input Signal Sampling Rate

Analog: 50 ms for all inputs  
Contact: 50 ms for all inputs

Display Update: 100 ms

### **CONTROL RANGES**

Proportional Band - 2 to 1000% and OFF

Integral - 0.02 - 200 minutes/repeat or Manual Reset  
from 0 - 100%

Derivative - 0.01 - 8 minutes and OFF

### **COMMUNICATIONS**

Standard Micro-DCI DataLink RS-485

Type: RS422/485, four wire, asynchronous

Speed: Selectable - all standard baud rates  
between 300 and 9600: plus 14,400 and 28,800

Mode: Binary

### **INPUT & OUTPUT SIGNALS**

#### **Analog Inputs**

Quantity: 2

Signal Range: 0-5vdc or 1-5 vdc

Input Impedance: 1 megohm minimum for voltage  
inputs; value of ranging resistor for current  
signals.

Measurement Accuracy: +/-0.1% of span

(All analog inputs and outputs are referenced to signal  
common.)

*Note: The standard rear terminal board has the appropriate  
resistors for mA inputs. If the input signal is voltage, the resis-  
tors should be removed.*

#### **Contact Inputs**

Quantity: 1

Type: Discrete input internally powered with 4 volts @ 2  
mA dc maximum (contact inputs are referenced to  
power common.)

Permissible Contact Resistance: 100 ohm maximum

Open/Close Contact Duration:  
for open recognition: 0.05 s minimum  
for close recognition: 0.05 s minimum

Contact Recognition Level

Closed: 1 V dc max or less than 100 ohms  
Open: 4 V dc to 15 v dc or 10 mA max

#### **Analog Outputs**

Quantity: 1

Signal Range: 0 - 21.84 mA dc (4 - 20 mA dc typically)

Load Resistance: 0-750 ohms

Accuracy: +/- 0.2% of span  
(Current output is refreshed every 0.05 seconds.  
Output slew rate is 40 mA/sec)

#### **Discrete Outputs**

Quantity: 2

Type: Unpowered discrete solid state output.

Configuration: Single pole single throw, N.O., or N.C.  
referenced to power common.

Voltage: 30 V dc max.

Current: 50 mA dc max.

Temperature effect on accuracy: +/- 0.28% per 28 degrees  
from reference temp of 25° C.

	53SL51 01 - 06	07	08	A 09	2 10	1 11	A 12	B 13	A 14
Single-Loop Controller	53SL51								
Power Requirement AC 110/120, 220/240 VAC 50-60HZ DC (24 Vdc)		1 2							
Functionality Standard Standard with Factory Configuration (Note 1)			1 2						
Design Level				B					
Enclosure Type DIN 72 x 144mm Bezel					2				
Rear Terminal Board Standard Rear Terminal Board						1			
Chassis Standard Chassis							A		
Safety Classification General Purpose FM Class 1, Div 2, Groups A,B,C,D								A B	
Conformal Coating Standard									A

*Note 1: Configuration consists of entering tags, engineering units alarm limits, and other applicable parameters. If factory configuration is selected, the instrument configuration worksheet must be completed and sent in with the instrument order.*

**The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.**

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