

DESCRIPTION

The SC100 controller is a low cost, simple to use simplex or duplex controller for lift station liquid level control. It operates the pumps based on the selected setup parameter values and the 4-20mA wet well level input signal. The controller has relays for two pump call outputs, and for high and low level alarms outputs. A regulated 24 VDC power supply is provided for powering the pressure transducer circuit. A four digit seven segment red LED display is provided for parameter setup and level display. Red LED's are provided for pump 1 and 2 call and for high and low level alarm indication. Alternation of the pumps is provided, and a fixed 1-2 or 2-1 sequence may also be selected through the menu. The controller can be setup to perform either pump up control (fill a tank) or pump down control (empty a tank). It also has a fixed 10 second power-up delay, and an adjustable lag pump delay to prevent the turning on of one or both of the pumps immediately after a power interruption. Zero and Span parameters are provided for field calibration of the level input for a wide variety of submersible pressure transducers. The level display is made even more flexible by the addition of a parameter to set the decimal point position, and by a parameter to adjust how fast the level display responds to changes in the level input signal, from very slow to fast. A level simulation feature is provided to test the lift station controls and pump operation.

SPECIFICA		
Input Power: Power for Analog Input: Agency Approval: Operating Temperature: Storage Temperature: Display Type: Display Range: Indicators: Relay Outputs: Level Analog Input: Color: Enclosure Material: Dimensions:	120 VAC ±10%, 7.8 VA max 24 VDC ±1V, Transient Protected UL 508, CAN/CSA -20 °C to +65 °C -45 °C to +85 °C 4 Digit, 7 Segment, Red LED 0 - 2310 Feet (Selectable Decimal Point Position) Red LED 10A Resistive @ 120 VAC 3.6 A Inductive @ 120 VAC 4-20 mA, 147 Ω Load, Transient Protected White with Blue Lettering Aluminum 6.10" H x 7.70" W x 2.78" D	ORDERING INFORMATION Part Number: SC100









UL FILE # E101681

STATION CONTROLLER SC1000



TYPICAL APPLICATIONS

Simplex, Duplex, Triplex Single Speed Pump Control Level Pump Down (Empty a Tank) or Pump Up (Fill a Tank) Control

DESCRIPTION

The SC1000 is a SCADA ready pump controller designed to perform level control in a wide range of lift station applications. The SC1000 operates the pumps based on the selected setup values and the wet well level signal. The level input source is menu selectable for either a 4-20 mA pressure transducer, or a conductance probe. The S1000 alternates the pumps, performs lag pump delays, and provides high and low level alarms. The SC1000 has a variety of control options available in the setup menu that may be used to customize the controller for a specific application.

The SC1000 comes standard with 12 Discrete Inputs, 10 Level Probe Inputs, 5 Relay Outputs, an Analog Input for the level input, and an RS232 Serial Port with the Modbus RTU protocol.

The SC1000 can be ordered with the following options:

Isolation of the Analog (4-20mA) Level Input. Ethernet Port with the Modbus TCP protocol.

ORDERING INFORMATION

Part Number: SC1000

To add Isolation to the Analog Level Input, add S to end of part number.

To add an Ethernet Port with the Modbus TCP protocol, add E to end of part number.

STATION CONTROLLER SC1000 STANDARD FEATURES:

- All Setup Parameter Values May be Viewed or Changed From the Front of Unit
- ♦ 120 VAC input power
- Level Input Source Menu Selectable
 - Analog Level Input (4-20mA from Pressure Transducer)
 - Level Probe (Conductance Probe with 10 Electrodes)
- ♦ 20 VDC Power for Analog Level Input Loop
- 6 Amp Relay Outputs for: Pump Call, High Level, and Low Level Alarms
- RS-232 Serial Port, Modbus RTU Protocol
- Optional Ethernet Port for Modbus TCP and Modbus RTU Protocols
- Alternation Modes Menu Selectable
 - Standard Alternation
 - Pump 1 Always Lead Stays On with Other Pumps
 - Pump 1 Always Lead Turns Off with Other Pumps On
 - Pumps 1 & 2 Alternate, and Pump 3 Always Last
 - Fixed Sequence Pump 1 Always Leads
 - Stepped On/Off Only One Pump Runs at a Time
- Alternation First On Last Off or First On First Off
- Alternator Logic Skips Disabled Pumps
- Remembers Lead Pump Position During Power Outage
- Timed [1 minute] Level Simulation
- Plug-in Style Connectors
 - 12 Discrete Inputs that can be Programmed for the Following Functions:
 - Pump Disable with HOA in OFF, or Pump Fault
 - External Lead Pump Selector Switch
 - All Pump Disable for Connection to Phase Monitor
 - Limit Number of Pumps Called While on Emergency Power
 - Alternation by External Time Clock
 - Float Switch Backup
 - A Variety of Telemetry Functions
- Status of Discrete Inputs May Be Viewed From Front of Controller
- Flush Cycle Feature to Reduce Sludge Build-up within the Wetwell
- Flow Calculator Feature for Latest Inflow Rate, Average Daily Flow, Pump Outflow Rate
- Unused Output Relays Programmable via SCADA for Additional Control Uses
- Full manual available in pdf format at our website: www.mpelectronics.com

SPECIFICATIONS

Input Power: Agency Approvals: Ambient Operating Temp:	120VAC ±10%, 13VA max UL 508, CAN/CSA -20°C to +65°C	Power for Discrete Inputs:	24VDC Unregulated Transient Protected
Level Display: Level Display Range:	3 Digit, 7 Segment LED 0 - 999 ft.	Power for Analog Regulated	20VDC ±1V
	Decimal Point Position Menu Selectable	Input:	Transient Protected
Indicators:	LED	Power For Level	±8V Square-Wave,
Color:	White with Blue Lettering	Probe:	60 Hz.
Relays:	6A @250VAC		
Level Analog Input:	4-20mA, 250Ω Load Transient Protected		
External Dimensions:	6.9"H x 8.5" W x 4.1" D		
Cut Out Dimensions:	6.0" H x 7.5" W		



TYPICAL APPLICATIONS

Simplex, Duplex, Triplex or Quadraplex Pump Control Single Speed or Variable Speed Control

DESCRIPTION The SC2000 is a SCADA ready pump controller designed to perform level control in a wide range of lift station applications. The SC2000 operates the pumps based on the selected setup values and the wet well level signal. The level input source is menu selectable for either a 4-20 mA pressure transducer, or a conductance probe. The SC2000 alternates the pumps, performs lag pump delays, and provides high and low level alarms. The SC2000 has a variety of control options available in the setup menu that may be used to customize the controller for a specific application.	ORDERING INFORMATION Part Number: SC2000 - X X Analog Outputs				
The SC2000 comes standard with 18 Discrete Inputs, 10 Level Probe Inputs, 6 Relay Outputs, an Analog Input for the level input, and an RS232 Serial Port with the Modbus RTU protocol. The SC2000 can be ordered with the following options: Up to 4 Isolated Analog Outputs for VFD speed control. Up to 4 Isolated Analog Inputs for collecting analog data. Isolation of the Analog (4-20mA) Level Input. Ethernet Port with the Modbus TCP and DNP3 protocols.					
Order from: C.A. Bringe Company, 200 M. Or . O is 101 M					

59

STATION CONTROLLER SC2000 STANDARD FEATURES:

- All Setup Parameter Values May be Viewed or Changed From the Front of Unit
- ♦ 120 VAC input power
- Level Input Source Menu Selectable
 - Analog Level Input (4-20 mA from Pressure Transducer)
 - Level Probe (Conductance Probe with 10 Electrodes)
- 20 VDC Power for Analog Level Input Loop
- 6 Amp Relay Outputs for: Pump Call, High Level, and Low Level Alarms
- RS-232 Serial Port, Modbus RTU Protocol
- Optional Ethernet Port for Modbus TCP and Modbus RTU Protocols
- Alternation Modes Menu Selectable
 - Standard Alternation
 - Pump 1 Always Lead Stays On with Other Pumps
 - Pump 1 Always Lead Turns Off with Other Pumps On
 - Split Alternation Pumps 1 & 2, and Pumps 3 & 4
 - Fixed Sequence Pump 1 Always Leads
 - Stepped On/Off Only One Pump Runs at a Time
- Alternation First On Last Off or First On First Off
- Alternator Logic Skips Disabled Pumps
- Remembers Lead Pump Position During Power Outage
- Timed [1 minute] Level Simulation
- Security Code Protected Parameter Setup
- 18 Discrete Inputs that can be Programmed for the Following Functions:
 - Pump Disable with HOA in OFF, or Pump Fault
 - External Lead Pump Selector Switch
 - All Pump Disable for Connection to Phase Monitor
 - Limit Number of Pumps Called While on Emergency Power
 - Alternation by External Time Clock
 - Call Pump Last for Connection to VFD/Bypass Logic
 - Float Switch Backup
 - A Variety of Telemetry Functions
- Status of Discrete Inputs May Be Viewed From Front of Controller
- Flush Cycle Feature to Reduce Sludge Build-up within the Wetwell
- Flow Calculator Feature for Latest Inflow Rate, Average Daily Flow, Pump Outflow Rate
- Unused Output Relays Programmable via SCADA for Additional Control Uses
- Plug-In Style Connectors
- Full manual available in pdf format at our website: www.mpelectronics.com

SPECIFICATIONS

Input Power: Agency Approvals: Ambient Operating Temp:	120VAC ±10%, 13VA max UL 508, CAN/CSA	Power for Discrete Inputs:	24VDC Unregulated Transient Protected
Without Analog Outputs: With Analog Outputs:	-20°C to +65°C -20°C to +50°C 3 Digit 7 Segment LED	Power for Analog Input:	20VDC ±1V Regulated Transient Protected
Level Display Range:	0 - 999 ft. Decimal Point Position Menu Selectable	Analog Outputs:	lsolated 4-20mA Maximum Load 600Ω Transient Protected
Indicators:	LED		
Color:	White with Blue Lettering	Aux. Analog Inputs:	Isolated 4-20mA
Relays:	6A @250VAC		250Ω Load
Analog Level Input:	4-20mA, 250Ω Load Transient Protected		Transient Protected
External Dimensions:	6.9"H x 8.5" W x 4.9" D	Power for Level	±8V Square-Wave,
Cut Out Dimensions:	6.0" H x 7.5" W	Probe:	60 Hz



INTRODUCTION

The SC5000 is a Six Pump Controller with Four Control Modes capable of performing:

Level Control Flow Control Pressure Control Booster Control

The four Control Modes are menu selectable and within each Control Mode there are a variety of control options in the setup menu that make the Controller customizable for a large number of applications.

The SC5000 comes with a door mounted HMI, either a **Color Touch Screen HMI** or a **5 Digit Numerical LED HMI**. The HMI makes the Station Status and Setup Parameters readily available to the operator. Dedicated Communication Ports ENET2 or COM1 are provided for connection to the HMI.

A din-rail mounted 24VDC Power Supply is also provided with the Controller.

The Controller alternates the pumps, performs Lag Pump Delays, provides High and Low Level, Flow Rate or Pressure Alarms and many other optional features. It has parameters in the menu that allow the operator to set the Number of Pumps Present, the Maximum Number of Pumps Allowed to Run At the Same Time, and the Maximum Number of Pumps Allowed to Run While On a Generator.

With up to 6 optional Analog Outputs it can also perform VFD speed control.

While the SC5000 functions as a stand alone Pump Controller, it is designed to be easily integrated into a SCADA System. Ethernet Port ENET1 (with Modbus/TCP) is provided on all units for connection to a SCADA system. All units come with 30 Discrete Inputs that may be used to collect discrete telemetry. All units come with 12 Output Relays, any of which can be setup to perform remote control functions. Also available are 8 optional Analog Inputs and 3 optional Pulse Type Flow Meter Inputs for the collection of data. Parameter Security can be enabled to protect the Controller Setup and Remote Control Parameters from being remotely tampered with. The Modbus Registers for all Setup, Status and Remote Control Parameters are fully documented in the manual.

The Controller comes with a USB Host Port for Backup and Restore of Setup Parameters.

LEVEL CONTROL



DESCRIPTION

In the "Level Control" mode, the SC5000 can manage up to 6 pumps and perform in either a Pump Up or a Pump Down application. The Controller turns the pumps on or off based on a comparison of the Level Input with the Pump On/Off Level setup parameters.

The Controller can receive an Analog 4-20mA Level Input from a Transducer or receive a Level Input from a 10 Conductor Level Probe. It can also operate from Float Switches as the primary or backup level input.

The Controller's logic Alternates the pumps, performs Lag Pump Delays, and provides High Level and Low Level alarms.

With optional Analog Outputs, it can provide a pump speed reference for VFD Speed Control.

FLOW CONTROL



DESCRIPTION

In the Flow Control Mode, a PID Controller (Proportional, Integral, Derivative) is provided to regulate the pump speed in order to maintain the Flow Rate at the Flow Rate Setpoint.

The Flow Control logic also determines the number of pumps required to run in order to maintain the Flow Rate at the Flow Rate Setpoint.

The Flow Control logic also Alternates the pumps and provides a Low Level Alarm, High Level Alarm, Low Flow Rate Alarm and a High Flow Rate Alarm.

The Flow Control Mode requires the use of VFDs, so the Controller must be ordered with an optional Analog Output for the speed reference of each pump.

PRESSURE CONTROL



DESCRIPTION

In the Pressure Control Mode, a PID Controller (Proportional, Integral, Derivative) is provided to regulate the pump speed in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Pressure Control logic also determines the number of pumps required to run in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Pressure Control logic also Alternates the pumps and provides a Low Supply Liquid Level Alarm, High Supply Liquid Level Alarm, Low Discharge Pressure Alarm and a High Discharge Pressure Alarm.

The Booster Control Mode requires the use of VFDs, so the Controller must be ordered with an optional Analog Output for the speed reference of each pump.

BOOSTER CONTROL



DESCRIPTION

In the Booster Control Mode, a PID Controller (Proportional, Integral, Derivative) is provided to regulate the pump speed in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Booster Control logic also determines the number of pumps required to run in order to maintain the Discharge Pressure at the Discharge Pressure Setpoint.

The Booster Control logic also Alternates the pumps and provides a Low Supply Pressure Alarm, High Supply Pressure Alarm, Low Discharge Pressure Alarm and a High Discharge Pressure Alarm.

The Booster Control Mode requires the use of VFDs, so the Controller must be ordered with an optional Analog Output for the speed reference of each pump.

CONTROL MODES

- Level Control Mode
- Flow Control Mode
- Pressure Control Mode
- Booster Control Mode

STANDARD I/O

- Ethernet Port ENET1 with Modbus TCP Protocol for connection to: SCADA System Ethernet Port ENET2 with Modbus TCP Protocol - for connection to: SC5000-CTS-HMI RS232 Port COM1 with Modbus RTU Protocol - for connection to: SC5000-LED-HMI
- 1 USB Host Port for Backup and Restore of Setup Parameters
- 1 Analog Output, Isolated 4-20mA (AOX1) May be Assigned to Application Specific Functions
- 2 Analog Inputs, Isolated 4-20mA (AIX1 AIX2) May be Assigned to Application Specific Functions
- 12 Relay Outputs (ROX1 ROX12) May be Assigned to Application Specific Functions
- 30 Discrete Inputs (D1 D30) May be Assigned to Application Specific Functions

OPTIONAL I/O

- 6 Analog Outputs, Isolated 4-20mA (AO1 AO6) May be Assigned to Application Specific Functions
- 8 Analog Inputs, Isolated 4-20mA (A1 A8) May be Assigned to Application Specific Functions
- 3 Discrete Pulse Capture Inputs, Isolated (DPC1 DPC3) Discrete Pulse Capture Input DPC1 - Assigned Function of: Pulse Flow Meter PFM1 Discrete Pulse Capture Input DPC2 - Assigned Function of: Pulse Flow Meter PFM2 Discrete Pulse Capture Input DPC3 - Assigned Function of: Pulse Flow Meter PFM3

SPECIFICATIONS

- Input Power: 24 VDC ±10%, 0.6 A max
- Agency Approvals: UL 508, CAN/CSA
- Dimensions (Width x Height x Depth): 10.340" x 6.750" x 6.208"
- Ambient Operating Temperature: -20°C to +65°C (-4°F to +149°F)
- Color: White with Blue Graphics
- Discrete Inputs: ±6 V, 60 Hz Square Wave ±0.6mA max, Transient Protected
- Relay Outputs: 8A @ 120 VAC Resistive
- Analog Outputs: Isolated 4-20mA, Transient Protected, Maximum Load: 900Ω
- Analog Inputs: Isolated 4-20mA, 100 Ω Load, Transient Protected
- Pulse Capture Inputs: Isolated, Transient Protected
 - Maximum Pulse Frequency: 60kHz (with Duty Cycle Between 40% 60%) Power Supply Options: +5VDC, +12VDC, or +24VDC Pull Up or Pull Down Resistor Supplied with Controller: 5.1KΩ

STATION CONTROLLER SC5000 **ORDERING INFORMATION**



LED = 5 Digit Numerical LED HMI See Section X in Manual

POWER SUPPLY

Part Number: SC5000-PS24

24 VDC 3.8A 35mm DIN Rail Mount