SS2200 Remote Controller
General Purpose, AC Voltage

BIJUR DELIMON
INTERNATIONAL

General

The SS2200 Remote Controller is a microprocessor-based programmable controller specifically designed to control single line and dual line centralized lubricating systems. The remote controller will operate on time or machine cycles and will control electric or motor-driven lubricators. The controller is housed in a NEMA 4X polycarbonate enclosure with a clear front cover. Precise LED indicators clearly display idle, lube or fault modes, and a three-digit numerical display used during both programming and lube system operation.

The SS2200 Remote Controller is easy to program. Simply advance through the programming steps with the **select** key, increasing or decreasing the displayed value for each step with the **+** and **−** keys. The program is permanently stored by EEPROM permanent memory.

⚠ *Power must be off when making any connections.*

Technical Data

Input Voltage	115 VAC, 50/60 Hz (Over voltage protected)
Pump Output	Pulsed or continuous, Form A, 115 VAC, 5 amps inrush, 2 amps continuous
Cycle Switch	12-16 VDC, 12-16 mA DC
Fault Switch	12-16 VDC, 12-16 mA DC
Fault Relay Contacts	2 amps, 125 VAC (dry contacts)
Enclosure	NEMA 4X Polycarbonate
Ambient Temperature	20°F to 120°F
Vibration	1.5 g
Permanent Memory	EEPROM (No Battery)

HOT
120 VAC INPUT
NEUTRAL

NEUTRAL
120 VAC PUMP
HOT

RELAY
N.O.
N.C.

+ CYCLE
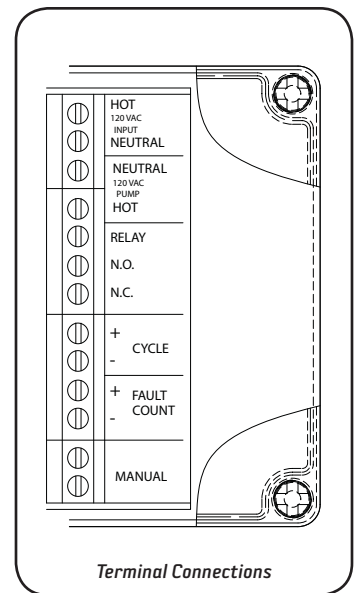-

+ FAULT
- COUNT

MANUAL

Terminal Connections

Installation and Connections

Before making any connections, make sure they are within the rating given shown in the *Terminal Connections* schematic on right.

1. **Input:** The controller operates on 115 VAC 50/60 Hz electrical power, connected to the terminals labeled "Hot, Neutral, 120 VAC Input." These terminals are overvoltage protected. The controller does not contain a power switch, and means of quick disconnecting electrical power to a unit should be easily accessible for installation, troubleshooting, and emergency shutoff.
2. **Pump:** The controller supplies output power for operating pumps as Form A, 115 VAC, 5 amp, inrush, 2 amp continuous from the terminals labeled "Neutral, Hot, 120 VAC Pump." This output can be programmed (step #P6 and P7) to be continuous or pulsed.
3. **Relay:** The controller contains a fault relay which is programmed to be normally open or normally closed (step #P9) and which changes state when a fault is detected. The relay has a normally open and a normally closed contact rated at 2 amp 125 VAC. The relay terminals are labeled "Relay, N.O., N.C."
4. **Cycle:** The cycle switch which counts divider valve or reversing valve cycles must be connected to the terminals labeled "+, −, cycle." Power through the switch will be 12-16 VDC, 12-16 mA DC. If a cord containing an LED is used, power polarity must be observed.
5. **Fault Count:** The terminals labeled "+, −, Fault Count" can be programmed for one of two outputs (step #P1) system fault or machine cycle count.

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6. **System Fault:** If the controller is used in time base, one or more system fault switches can be connected to the "+, –, Fault Count" terminals. If two or more switches are used, they are connected in parallel. The switches must be normally open and close when a fault occurs, such as reservoir low level or system high pressure. Power through the switches will be 12-16 VDC, 12-16 mA DC.

7. **Machine Count:** If the controller is operated by machine count, the machine cycle count switch is connected to the "+, –, Fault Count" terminals. Power through the switch will be 12-16 VDC, 12-16 mA DC.

8. **Manual:** A remote manual lube cycle switch can be connected to the terminals labeled "Manual." The switch must be a normally open, momentary contact type. Power through the switch will be 12-16 VDC, 12-16 mA. The remote switch is connected in parallel to the switch in the unit and either switch will perform the same function.

Operation

1. **Idle (Green LED):** When the controller is in the idle mode, the green LED will be on. The numerical display will count down the idle units remaining before lubrication begins. Idle units may be minutes, hours, machine cycle counts or machine cycle counts x10 as programmed in step #'s P1, P2, and P3. If units other than minutes are used, the marking on the front panel "Minutes" can be changed with the labels provided.

2. **Lube (Amber LED):** When the controller is in the lube mode, the amber LED will be on. The numerical display will count down the cycle switch transitions remaining before lubrication is stopped and the idle mode begins. If the "–" key is held down during lube mode, the numerical display will change to show the fault time in minutes remaining.

3. **Fault (Red LED):** When the controller detects a fault, the red LED will turn on and the fault code will appear in the numerical display. Apply power to the controller within the limits outlined in *Installation and Connections* on page 1. Ensure proper connections or damage to the controller may result.

4. **Automatic Shut-off:** If the controller is left in the programming mode for 4 minutes without a key being pressed, the controller will automatically turn OFF. Any changes which may have been made will be lost. To turn the controller on, make any required programming changes, reset step #10 to "1" and then save the program.

Programming

Idle Time	1-999 minutes, 1-999 hours, 1-999 or 10-9990 machine counts
Cycle Completion Time	1-999 minutes
Cycle Switch Counts	1-99 counts
Pulsed Output On Time	1-99 seconds
Prelube On Power-Up	Yes/No
Fault Relay	Normally energized/normally de-energized
Controller	On/Off

Note: When the unit is programmed for machine counts, the fault switch input is used for a machine count switch input and fault switches (low level, high pressure, etc.) cannot be used.

Programming the remote controller is simple and easy to accomplish. The numerical display will be illuminated with the program step being performed (P1 through P10) followed by the present setting for that step. All programming step information is outlined on the face of the controller. There are

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four keys on the controller face, located below the numerical display. They are labeled "Manual Lube Cycle", "+", "–" and "Select." Key descriptions are as follows:

1. **Manual Lube Cycle:** Pressing this key clears fault codes and starts a lube cycle. A lube cycle can be started manually without removing the front cover or from a remote location by connecting a normally open momentary contact switch to the terminals labeled "Manual."

2. **(+) Plus:** Used to increase the programmed numerical data in each programming step. Pressing the (+) key during idle or lube modes turns on all display LEDs for function test.

3. **(–) Minus:** Used to decrease the programmed numerical data in each programming step. Pressing the (–) key during lube mode displays the fault time remaining in minutes.

4. **Select:** Used to enter programming mode and move from one programming step to the next. This requires pressing the select key for 3 seconds. In programming mode, pressing the select key momentarily will display the step number for 2 seconds and then return to the present setting for that step.

Steps

Step #1 – Idle Mode (P1)
a. Press the (Select) key until the numerical display reads "P1."
b. Determine method of measurement to be used:
   0 = Time (minutes or hours)
   1 = Machine Counts
c. Use the (+) or (–) key to display the determined value.

Step #2 – Idle Unit (P2)
a. Press the (Select) key until the numerical display reads "P2."
b. Determine the units of measurement required, based on time or machine count operation programmed in step #1.

Time	Machine Counts
0 = Minutes	0 = Counts x 1
1 = Hours	1 = Counts x 10

c. Use the (+) or (–) key to display the determined value.
d. If units other than minutes are used, place the unit label hours, counts x 1, or counts x 10 over "Minutes" above the numerical display on the front panel.

Step #3 – Idle Time/Counts (P3)
a. Press the (Select) key until the numerical display reads "P3."
b. Determine the number of minutes, hours, counts x 1 or counts x 10 required from 1-999.
c. Use the (+) or (–) key to display the determined value.

Step #4 – Fault Time (P4)
a. Press the (Select) key until the numerical display reads "P4."
b. Determine the number of minutes from 1-999 of fault time desired. The recommended value of most applications is 130% of the time the system is normally in the lube mode.
c. Use the (+) or (–) key to display the determined number of minutes.

Step #5 – Cycle Switch (P5)
a. Press the (Select) key until the numerical display reads "P5."
b. Determine the number of switch transitions from 1-99 required for the lubrication cycle. Example: For a single line system with the cycle switch mounted on a divider valve manifold, two switch transitions are required for one complete cycle of the manifold.
c. Use the (+) or (-) key to display the determined number of switch transitions.

Step #6 – Pump Output (P6)
a. Press the (Select) key until the numerical display reads "P6."
b. Determine the correct setting for the type of pump being used.

0 = Pulsed Pump (TP)

1 = Continuous Pump (electric, motor-driven/ or air barrel)

c. Use the (+) or (-) key to display the determined setting.

Step #7 – Pulsed Time (P7)

a. Press the (Select) key until the numerical display reads "P7."

b. If step #6 is set for pulsed pump output "0" determine the power on time from 1-99 seconds required. Power off time is fixed at 3 seconds. If step #6 is set for continuous pump output "1" the setting for step #7 is ignored and may be any value.

c. Use the (+) or (–) key to display the determined setting.

Step #8 – Prelube (P8)

a. Press the (Select) key until the numerical display reads "P8."

b. Determine if, when power is applied to the controller, the cycle should begin in:

0 = Idle Mode (No Prelube)

1 = Lube Mode (Prelube)

c. Use the (+) or (-) key to display the determined setting.

Step #9 – Relay – Normally (P9)

a. Press the (Select) key until the numerical display reads "P9."

b. Determine the normal state the fault relay is to be in:

0 = Normally de-energized

1 = Normally energized (this is the failsafe setting; normally open contacts will open with a loss of power). Set to (0) if relay is not being used.

c. Use the (+) or (-) key to display the determined setting.

Step #10 – Controller (P10)

a. Press the (Select) key until the numerical display reads "P10."

b. Determine if the complete lubrication system is ready to be operated.

0 = Place controller in OFF mode

1 = Place controller in operate mode (ON)

c. Use the (+) or (-) key to display the determined setting.

WARNING   *Step #10 does not turn on or off electrical power to the controller.*

Saving the Program

Press the (Select) key until the controller enters the idle mode. The program has been saved and the controller will operate as programmed.

To Change Programming

To find out the current setting of any program step or to make changes, enter the programming mode by pressing the (Select) key until the desired step number is displayed. Verify setting or make changes, then press the (Select) key until the controller enters the idle mode.

Troubleshooting

1. See the Fault Codes Section below for an explanation of each code and possible causes and corrective actions.

2. To test the three LED indicators and the numerical display, press the (+) key when the controller is idle, lube or fault mode.

3. If the electrical power has been supplied to the unit and the numerical display is blank, check the internal fuse located under the front panel.

4. To clear a fault code from the controller, press the manual lube key.

Fault Codes*

F1 – System Fault Switch

A normally open switch which has been connected to the fault terminals is closed. Typical installations may use low level reservoir switch or high system pressure switch. This feature is not available if the controller is operated based on machine counts.

F2 – Fault Time Reached

The fault timer has counted down before the programmed number of cycle switch transactions have been completed. Possible causes are:

+ Blocked lubrication line (single line system only).

*Fault codes F1, F2, and F3 are system faults and require identification and correction of the source of the fault. Once the fault has been corrected, pressing the Manual Lube key will clear the fault code from the controller and begin a new lube cycle.

Fault codes F4, F5, and F6 are internal controller faults. If the fault resulted from low input voltage, voltage spikes or line noise, the corrective actions described above may correct and clear the fault. If the fault remains, the unit must be replaced.

+ Incorrect fault time or cycle switch setting in programming steps 4 & 5.
+ Loose or broken electrical connections to cycle switch or switch failure.
+ Low output from pump.
+ Pump is not operating.
+ Lubrication leak in system.
+ Reservoir is empty.

F3 – Cycle Switch Over Count
(3 over counts = fault)
The cycle switch has continued to open and close in idle mode. Possible causes are:
+ Pump has continued to run in idle mode.
+ Loose electrical connection to cycle switch.

F4 - Controller Fault
(EEPROM data checksum error)
A fault has occurred in the pertinent memory which stores the programming. Re-program each step and re-save programming.

F5 - Controller Fault (watchdog time out)
The controller's internal watchdog circuit has found a fault with the operation of the microprocessor. Disconnect 110V AC power from the controller and then re-connect power to reset microprocessor.

F6 - Controller Fault (RAM test error)
During power-up, an error was found in the controller's random access memory. Disconnect power from the controller and then re-connect power to reset memory.

Definitions

Operating Mode: The controller will be in the operating mode if the controller is turned on (programming step #P10), not placed in programming mode, and no fault condition is present. During operating mode, the controller will use the current program settings.

On/Off: Programming step #10 is used to turn the controller on and off. When the controller is turned off, the display will read "OFF."

WARNING *Turning the controller off does not disconnect electrical power to the controller.*

Pump Output: The pump output from the controller can be programmed to be either continuous or pulsed (programming step #P6). Continuous output is used to actuate a motor starter for an electric, motor-driven pump. Pulsed output is used to actuate an air solenoid valve for an air driven piston pump. The on time for pulsed output is programmable in step #P7 from 1-99 seconds. The off time is fixed at 3 seconds.

Prelube: When electrical power is supplied to the controller, the controller can enter the idle mode (no prelube) or the lube mode (prelube). This choice is made in programming step #P8.

Fault Relay: The controller contains a fault relay with normally open and normally closed contacts. The relay can be programmed in step #P9 to be normally energized or normally de-energized. The relay will change state whenever the fault mode is entered. If the relay is programmed to be normally energized, a loss of electrical power to the controller will also cause the relay to change state (de-energize). If the fault relay is not being used, it should be programmed to be normally de-energized.

Cycle Switch: For single line systems, the cycle switch is located on one of the divider valves. The switch opens and closes as the piston in the valve cycles back and forth.

Lubrication Cycle: A lubrication cycle is divided into two parts:

1. **Idle Mode:** During idle mode, the pump is not running and the controller is counting down the time or machine cycles until lube mode is to begin.
2. **Lube Mode:** During lube mode, the pump is running and lubricant is being delivered. Lube mode will continue until the controller counts the programmed number of cycle switch transitions or the fault time is reached.

Fault Time: For a correctly operating lubrication system, each lube portion of the lubrication cycle will be completed in the same length of time. This time is based on pump output, the

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number of points being lubricated and the amount of lubricant going to each point. Various conditions such as blocked lines, leaks, or a faulty cycle switch circuit, will cause the lube mode to be extended.

These faults can be detected by placing a limit on the amount of time allowed to complete the lube mode. This limit time is the fault time and should be programmed in step #P4 to be 1.3 times and the normal amount of time required to complete the lube portion of the lubrication cycle. For example, if the normal lube cycle takes 90 seconds, set the fault time to 120 seconds.

Fault Mode: When the controller detects one of six types of faults it will enter the fault mode. The red fault LED will turn on, the fault code will be displayed, the pump output will be turned off, and the fault relay will change state.

Time Base: Time base operation is when minutes or hours are used to determine the length of time the controller is to stay in the idle mode.

Machine Count: Machine count operation is when an external switch is connected to the controller to measure the number of machine cycles the controller is to stay in the idle mode. The controller only counts the number of times the switch opens. Example: A normally open microswitch located on a press cylinder will close and open during one machine cycle.

Programming Mode: Pressing the select key during the idle or lube modes places the controller in programming mode. During programming mode, all indicator LEDs are off, pump output power is off, and either programming step numbers or the current settings are displayed.
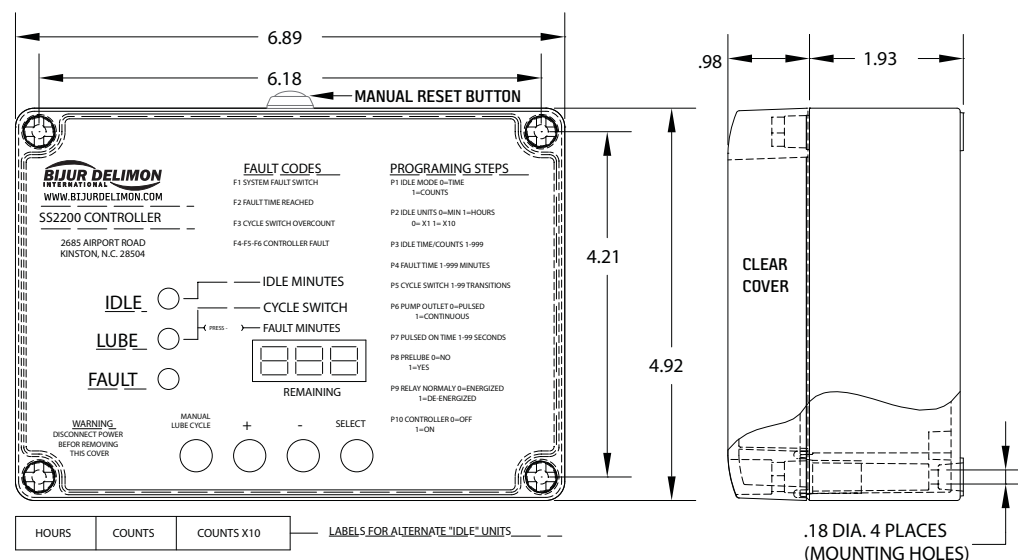
How to Order

Name	Voltage	Part #
SS2200 Remote Controller	115 VAC (50/60 Hz)	SS2200*
Replaces Part #24975		

When ordering, specify by name, description and part number, e.g. SS2200 Remote Controller, 115 VAC (50/60 Hz), Part #SS2200.

Dimensional Schematics

6.89

6.18 — MANUAL RESET BUTTON

.98   1.93

BIJUR DELIMON INTERNATIONAL
WWW.BIJURDELIMON.COM
SS2200 CONTROLLER
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FAULT CODES
F1 SYSTEM FAULT SWITCH
F2 FAULT TIME REACHED
F3 CYCLE SWITCH OVERCOUNT
F4-F5-F6 CONTROLLER FAULT

PROGRAMING STEPS
P1 IDLE MODE 0=TIME 1=COUNTS
P2 IDLE UNITS 0=MIN 1=HOURS 0= X1 1= X10
P3 IDLE TIME/COUNTS 1-999
P4 FAULT TIME 1-999 MINUTES
P5 CYCLE SWITCH 1-99 TRANSITIONS
P6 PUMP OUTLET 0=PULSED 1=CONTINUOUS
P7 PULSED ON TIME 1-99 SECONDS
P8 PRELUBE 0=NO 1=YES
P9 RELAY NORMALY 0=ENERGIZED 1=DE-ENERGIZED
P10 CONTROLLER 0=OFF 1=ON

IDLE MINUTES
CYCLE SWITCH
FAULT MINUTES

IDLE
LUBE   PRESS
FAULT

REMAINING

WARNING
DISCONNECT POWER
BEFOR REMOVING
THIS COVER

MANUAL LUBE CYCLE   +   –   SELECT

4.21

4.92

CLEAR COVER

.18 DIA. 4 PLACES (MOUNTING HOLES)

HOURS | COUNTS | COUNTS X10 | LABELS FOR ALTERNATE "IDLE" UNITS

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