BIJUR DELIMON
INTERNATIONAL

Operators Manual

SC400

Lubrication Controller

35979 r#3

CE

Contents

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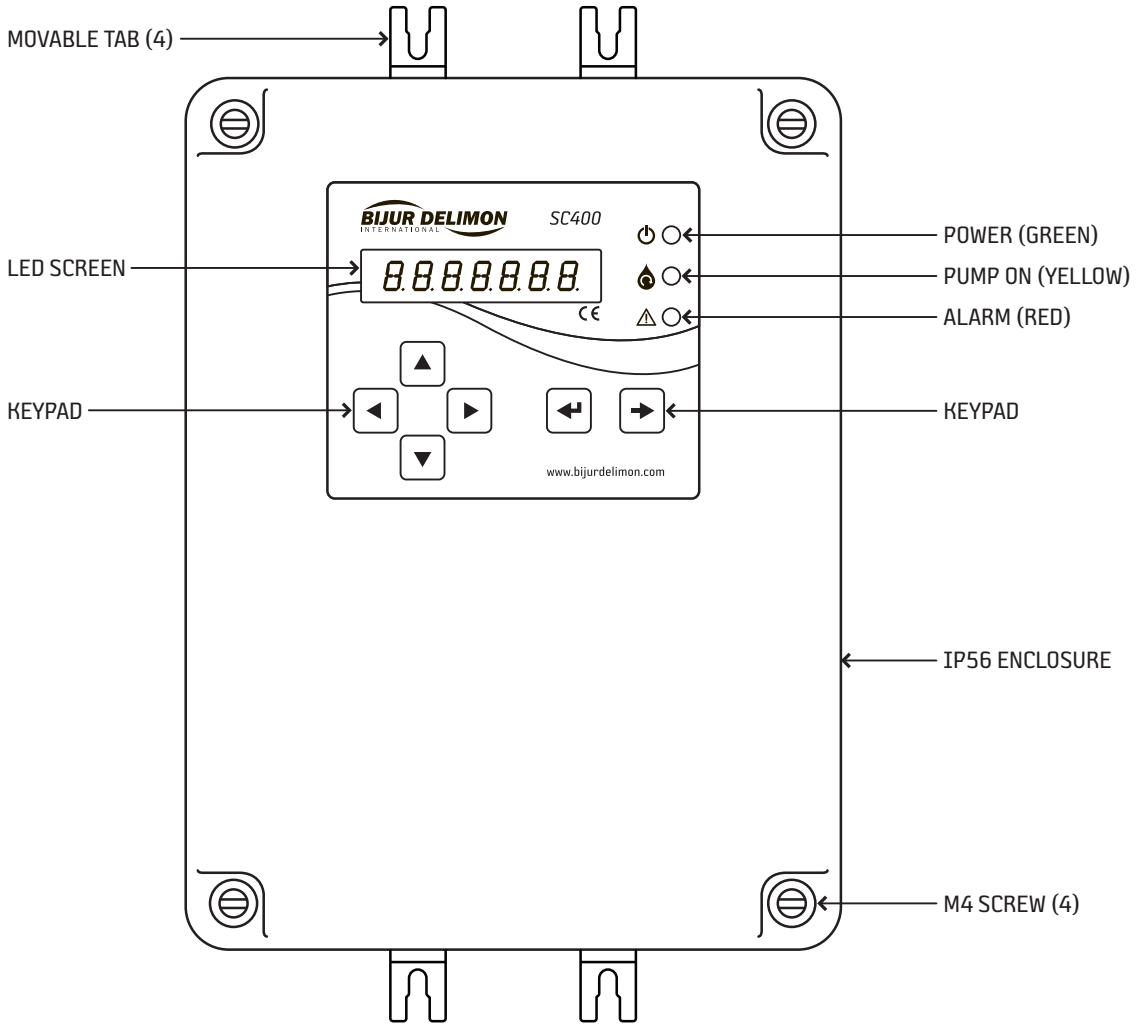
SC400 Controller at a Glance



ATTENTION

Moveable tabs are for external mounting only. See page 6 for detailed mounting instructions.

GENERAL

Prior to start up, we recommend reading these operating instructions carefully. We do not assume any liability for damages and operating issues resulting from failing to follow these operating instructions.

Any use beyond the applications described in these operating instructions is considered to be not in accordance with the product's intended purpose. The manufacturer is not to be held responsible for any damages resulting from this: the user alone bears the corresponding risk.

As to figures and indications in these operating instructions we reserve the right to make technical changes which might become necessary for improvements.

SAFETY

These operating instructions contain fundamental instructions which are to be observed during erection, operation and maintenance. Therefore it is absolutely necessary for the installer and the competent qualified staff/user to read these operating instructions before installation and start-up. The operating instructions must be available at all times at the place of use of the machine/system.

Not only the general safety instructions stated under this main point "safety" are to be observed, but also the other specific safety instructions stated under the other main points.

Identification of safety warnings in the operating instructions

The safety warnings contained in these operating instructions which, if not observed, may cause dangers to people, are specially marked with general danger symbols

safety symbol according to DIN 4844, warning about a danger spot.

Safety symbol according to DIN 4844, warning about dangerous electric voltage.

In case of safety instructions which, if not observed, may cause damage to the machine and its function, the word **ATTENTION** is inserted.

Instructions that are directly attached to the machine must be observed at all events and maintained in a fully legible condition.

Note: There is an increased skid risk in case of spilled/leaked out lubricants. They are to be removed, properly and immediately.

Safety sign according to DIN 4844, warning about skid risk.

Personnel qualification and training

The operating, maintaining, inspecting and erecting personnel must have the appropriate qualification for such work. The scope of responsibility, competence and supervision of the personnel shall to be regulated by the user. If the personnel do not have the necessary knowledge, they must be trained and given instructions. This can be assisted, if necessary, by the manufacturer/supplier on behalf of the user of the machine. Furthermore, the user shall make sure that the contents of the operating instructions are fully understood by the personnel.

Dangers in case of nonobservance of the safety instructions

The nonobservance of the safety instructions may result in hazards to persons, to the environment and to the machine. The nonobservance of the safety instructions may lead to the loss of any claims for damages. In detail, the nonobservance may for instance lead to the following hazards:

- Failure of important functions of the machine/system
- Failure of prescribed methods for maintenance and repair
- Hazard to persons by electrical, mechanical and chemical influences
- Hazard to the environment by the leakage of dangerous substances

Safety conscious working

The safety instructions stated in these operating instructions, the existing national regulations related to accident prevention, as well as possible internal working, operating and safety rules of the user are to be observed.

Safety instructions for the user/operator

- If hot or cold machine parts lead to dangers, these parts shall be protected against touch.
- Protection against touch for moving parts (e. g. coupling) must not be removed when the machine is in operation.
- Leakages (e. g. from the shaft seal) of hazardous goods to be delivered (e. g. explosive, toxic, hot) are to be removed in such a way that there is no danger to persons and environment. Legal rules are to be observed. .
- Hazards caused by electrical power are to be excluded (for details, please refer to local, state and federal regulations).

Safety instructions for maintenance, inspection and installation work

The user shall take care that all the maintenance, inspection and installation work is executed by authorized and qualified skilled personnel who have informed themselves adequately by thoroughly studying these operating instructions.

Installation, operation, and maintenance personnel shall conform to Federal, State, Local and internal safety regulations.

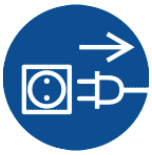
Pumps or pump systems that deliver media being hazardous to health shall be decontaminated.

Immediately after completion of the work, all safety and protective equipment shall be reinstalled and/or reactivated.

Advice: When working with compressed air, hydraulics, or electricity, wear Personal Protective Equipment (PPE).

(DIN 4844 – Use breathing mask)

(DIN 4844 – Use breathing mask)



(DIN 4844 – Pull mains cord before opening)

(DIN 4844 – De-energize before work)

Before recommissioning, observe the points stated in section “initial start-up“.

Unauthorized conversion and manufacture of spare parts

Conversion or modifications to the machine are only permitted when agreed to by the manufacturer. Original spare parts and accessories authorized by the manufacturer serve to ensure safety. The use of other parts may render the liability for consequential losses null and void

Unacceptable modes of operation

The operational reliability of the machine supplied is only guaranteed if the machine is used in accordance with its intended purposes as per APPLICATION section of these operating instructions. The limiting values specified in the data sheet shall not be exceeded.

APPLICATION

The SC400 is a full featured lubrication control, operating in any of five (5) modes:

- Series Progressive
- Singline Injector
- Dualine (Hydraulic Reversing Valve)
- Dualine (Electric Reversing Valve)
- Continuous

Primary features include:

- Spray system support
- Automatic fill pump control
- Four (4) languages supported
- Two (2) zone support (not available for DL electric or Spray systems)

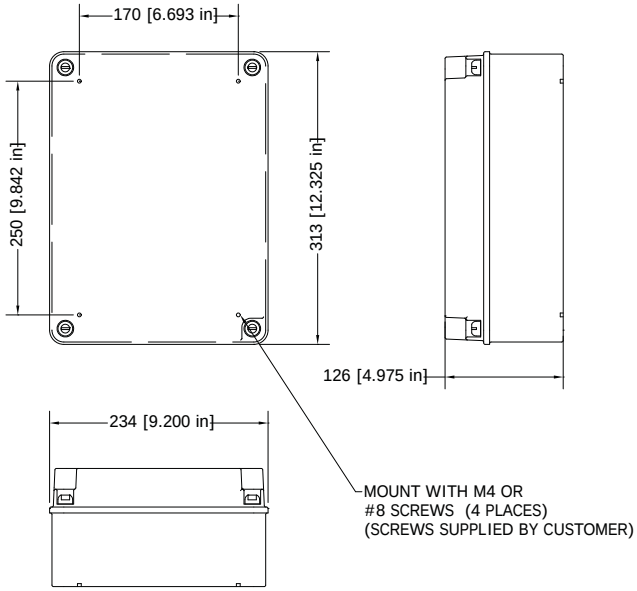
Technical Data

Input Voltage	85 to 265 VAC, 50/60 Hz
Current Consumption	80 mA at 115 VAC (less load) 40 mA at 230 VAC (less load)
Pump Output Rating	8 amp (85 to 265 VAC)
Valve A & Valve B Output Rating	8 amp (85 to 265 VAC) Combined total not to exceed 12A
Enclosure Rating	IP-56
Ambient Temperature Range	14°F to 131°F (-10°C to 55°C)
Fault / Warning Outputs	5 amp
Vibration	2 *g* at resonant (3 axis)
Permanent Memory	FLASH
Fault Relay Contacts	5 amp
Available Current	500mA @ 24VDC
Net Weight	5 lb

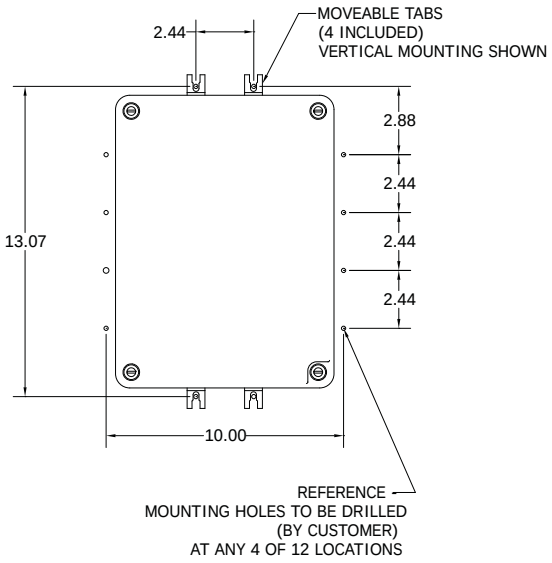
Programming Ranges

Lube Completion	**Cycle Counts**	1 to 999
	Time (HH:MM:SS)	00:00:01 to 23:59:59
	Purge Time (MM:SS)	00:01 to 59:59
	Reversing Valve Hold Time (MM:SS)	00:01 to 59:59
Idle Period	**Time (DD.HH:MM:SS)**	00.00:00:01 to 99.23:59:59
	Machine Cycle Counts	1 to 999999
	Machine Watchdog Timer (MM:SS)	OFF, 00:01 to 59:59
	Cycle Monitor Time (HH:MM:SS)	00:00:01 to 23:59:59
	Overcount	OFF, 1 to 9
Cyclic Pumping	**Pulse On Time**	1 to 59 seconds
	Pulse Off Time	1 to 59 seconds

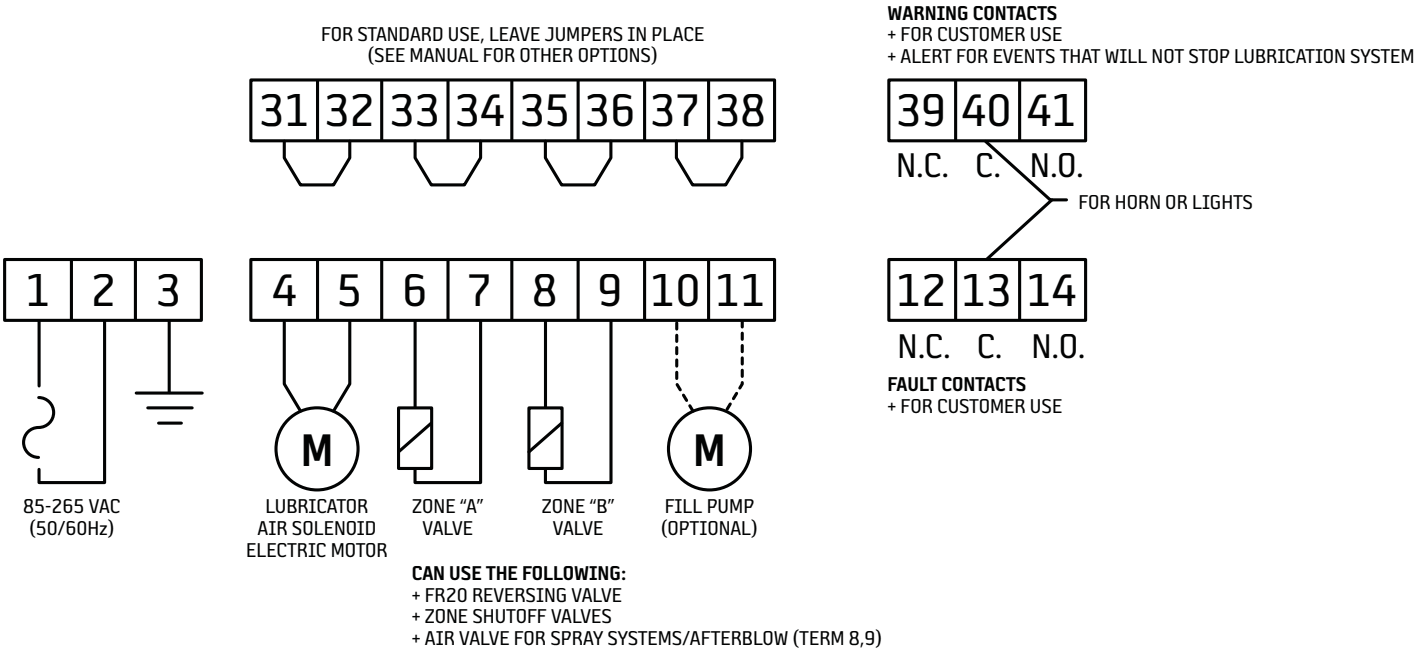
INTERNAL MOUNTING DIAGRAM



EXTERNAL MOUNTING DIAGRAM



WIRING: QUICK GUIDE

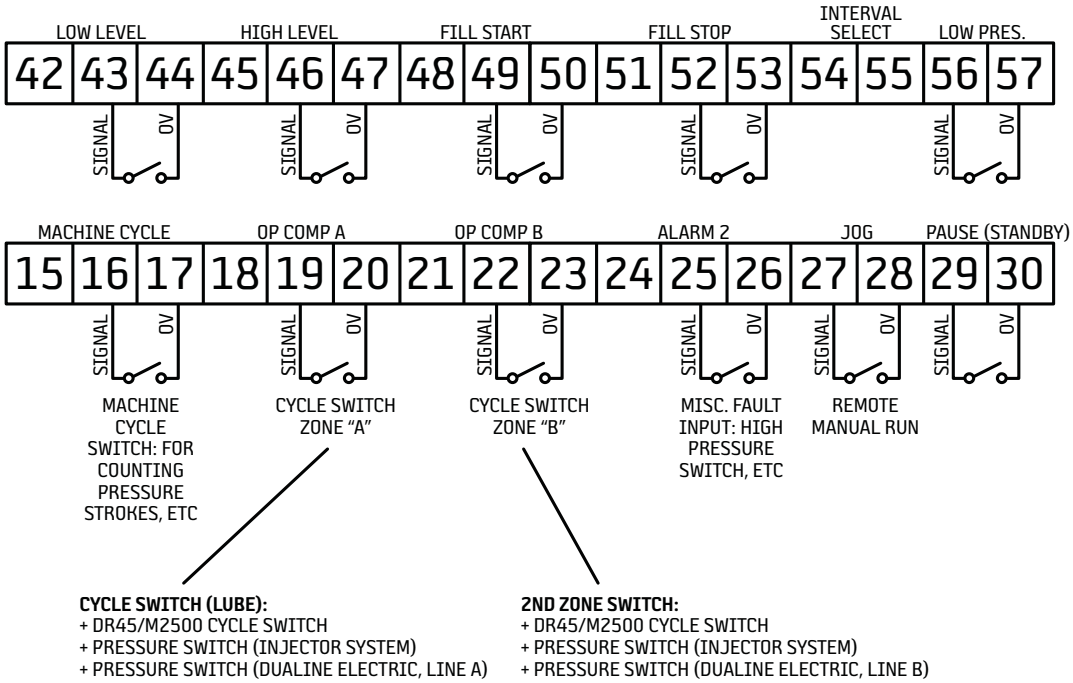


+ STANDARD LOW LEVEL CONNECTION
+ TERM 43, 44

AUTOFILL CONNECTION:
+ FILL START (TERM 49,50)
+ FILL STOP (TERM 52,53)
+ OPTIONAL (TERM 43,44)
+ OPTIONAL (TERM 52,53)

IF TWO (2) DIFFERENT "OFF TIMES" ARE DESIRED:
+ TERM 54,55

LOW PRESSURE SWITCH:
+ TERM 56, 57
+ OPTIONAL



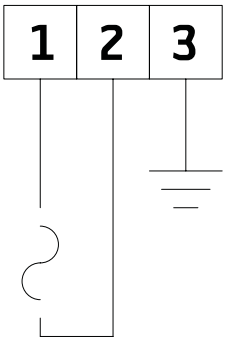
CYCLE SWITCH (LUBE):
+ DR45/M2500 CYCLE SWITCH
+ PRESSURE SWITCH (INJECTOR SYSTEM)
+ PRESSURE SWITCH (DUALINE ELECTRIC, LINE A)

2ND ZONE SWITCH:
+ DR45/M2500 CYCLE SWITCH
+ PRESSURE SWITCH (INJECTOR SYSTEM)
+ PRESSURE SWITCH (DUALINE ELECTRIC, LINE B)

WIRING: SC400 POWER

The SC400 is power through pins 1 and 2. The control should be properly grounded at pin 3 and at the grounding point on the back panel.

Shock Hazard: Disconnect Power from the control prior to any wiring or maintenance.



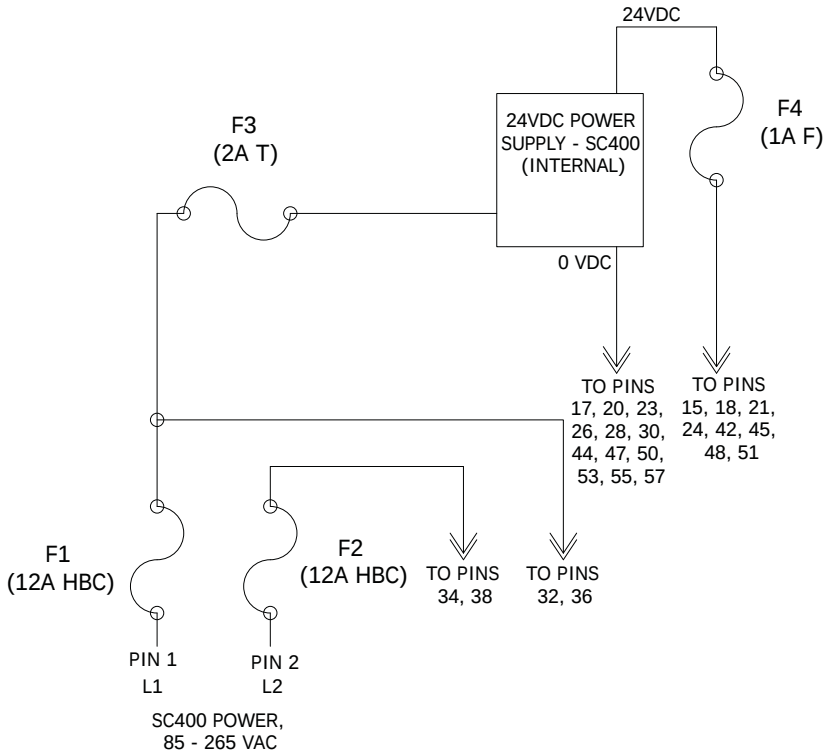
SC400 MAIN POWER connection

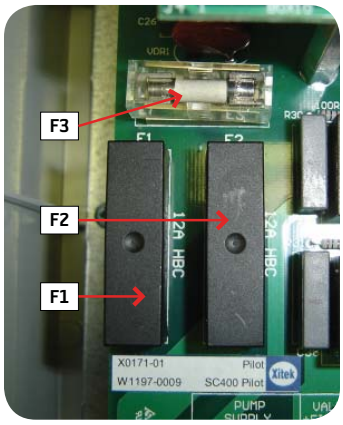
FUSES

There are four (4) fuses located on the SC400 control board.

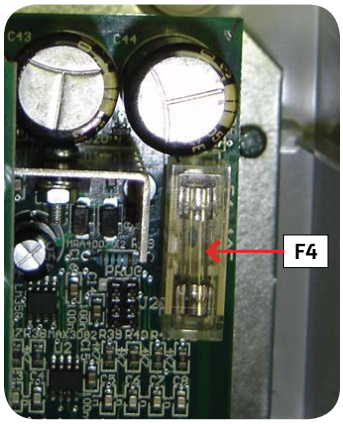
F1 - Fuse for L1 (incoming power). (part # 37317)
F2- Fuse for L2 (incoming power). (part # 37317)
F3- Protects SC400 internal circuitry. (part # 37316)
F4- Fuse for 24VDC power supply. (part # 37315)

SC400 power circuitry and FUSE DIAGRAM:





AC FUSE LOCATIONS

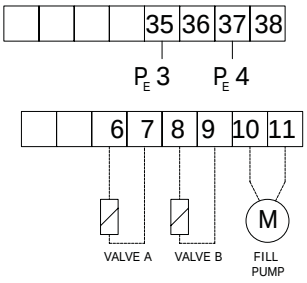


DC FUSE LOCATIONS

WIRING: VALVE A & VALVE B OUTPUTS

Valve A and Valve B are multifunction outputs. The operation of these outputs depends upon the mode of operation: Connect the system's valves to solenoids to Valve A (pins 6 and 7) and to Valve B (pins 8 and 9). The table indicates where valves connect, for various system types.

MODE	Number of Zones	Valve A (pins 6 and 7)	Valve B (pins 8 and 9)
SERIES PROGRESSIVE	Two (2) Zone System	VALVE, ZONE A ENABLE	VALVE, ZONE B ENABLE
	One (1) Zone (2 Interval)	n/a	AIR VALVE (OPT)
SERIES INJECTOR	Two (2) Zone System	VALVE, ZONE A ENABLE	VALVE, ZONE B ENABLE
	Single Zone (2 Interval)	n/a	AIR VALVE (OPT)
DUALINE HYDRAULIC	Two (2) Zone System	VALVE, ZONE A ENABLE	VALVE, ZONE B ENABLE
	Single Zone (2 Interval)	n/a	AIR VALVE (OPT)
DUALINE ELECTRIC	Single Zone (2 Interval)	REVERSING VALVE, LINE A	REVERSING VALVE, LINE B
CONTINUOUS	n/a	n/a	n/a



Output Wiring: OTHER
(Power source = External Power)

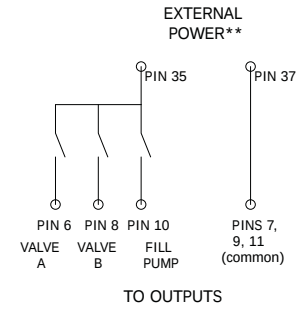
WIRING: AUTOFILL PUMP OUTPUT

The autofill output operates an automatic fill pump. Connect fill pump to pins 10 and 11.

NOTE: THE SC400 CONTROLS FILL PUMP OPERATION. IT IS HIGHLY RECOMMENDED THAT CUSTOMER INSTALL WIRING SUCH THAT FILL PUMP MAY BE DISABLED FOR MAINTENANCE. MANUAL OPERATION IS NOT SUPPORTED THROUGH THE SC400 – CUSTOMER MUST WIRE THIS SEPARATELY.

NOTE: FOR FILL PUMP TO OPERATE PROPERLY, APPROPRIATE LEVEL SIGNALS MUST BE CONNECTED TO THE SC400.

Shock Hazard: Disconnect Power from the control prior to any wiring or maintenance.



EXTERNAL POWER SOURCE:
**Any jumpers must be removed from pins 35 and 37.
Customer power should be fused/ protected to a maximum of 12A

WIRING: INPUTS (GENERAL)

The SC400 has connections for up to 12 inputs. Connections are clearly labeled, and offer convenient 24VDC power for most signals.

NOTE: SC400 offers 500mA of 24VDC, available to power switches. Supply terminals include:

24VDC	**15**	**18**	**21**	**24**	**42**	**45**	**48**	**51**				
0V	**17**	**20**	**23**	**26**	**44**	**47**	**50**	**53**	**28**	**30**	**55**	**57**

Primary Inputs

Eight (8) inputs may be connected to any switch that works with 24VDC. NPN, PNP and mechanical switches are supported.

These inputs include:

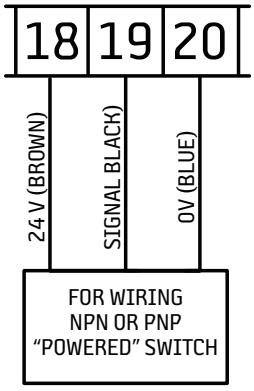
OPERATION COMPLETE A	*OPERATION COMPLETE B*	*MACHINE CYCLE*	*ALARM 2*
LOW LEVEL	*HIGH LEVEL*	*AUTOFILL START*	*AUTOFILL STOP*

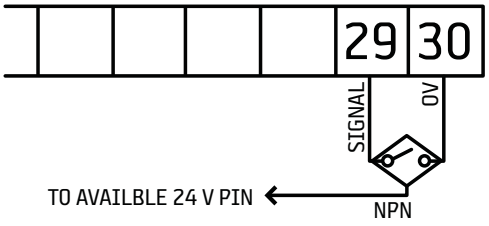
Secondary Inputs

Four (4) inputs may be connected to mechanical or NPN switches only.

These inputs include:

JOG	*PAUSE*	*INTERVAL SELECT*	*LOW PRESSURE*





WIRING: INPUT (DETAILS)

Use the table below to help determine which inputs are required for your system:

Input Terminal	Input	Description
19	OPERATION COMPLETE A	Feedback signal for line A. Depending upon system type, this may be: Cycle Switch / Pressure switch If the system has only one feedback switch, it should be connected here.
22	OPERATION COMPLETE B	Feedback signal for line B or zone 2. Depending upon system type, this may be: Cycle Switch / Pressure switch
16	MACHINE CYCLE	Monitoring of machine to be lubricated
25	ALARM 2	High pressure, motor trip, or misc. alarm input
43	LOW LEVEL	Low level switch (reservoir)
46	HIGH LEVEL	High level switch (reservoir)
49	FILL START	Fill start signal (reservoir)
52	FILL STOP	Fill stop signal (reservoir)
27	JOG	Momentary switch input that resets messages and initiates lubrication.
29	PAUSE	Maintained switch input that causes all lubrication to cease while switch is active.
54	INTERVAL SELECT	Maintained switch input that causes SC400 to use a 2nd set of lubrication parameters.
56	LOW PRESSURE	Low pressure switch from air supply (Spray systems)

WIRING: FAULT SIGNALS

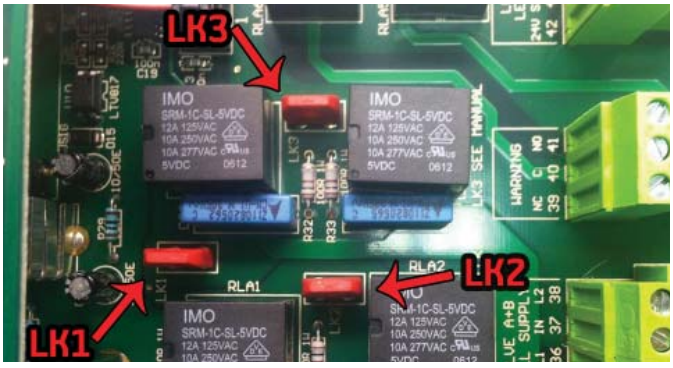
SC400 has two (2) relays, each with N.O. and N.C. contacts.

The first relay is called "WARNING". This relay activates upon ANY message.
The second relay is called "FAULT". This relay activates only for catastrophic events that force lubrication to cease.

JUMPER LINKS: LK1 - LK2 - LK3

The function of these links is to provide suppression to the relay contacts, these should normally be fitted in most applications. However if light AC loads of <10VA are used such as small air pumps and solenoids the links should be removed to prevent the possibility of leakage current holding on the pump or solenoid.

LK1 is for Terminals 4 & 5
LK2 is for Terminals 6 & 7
LK3 is for Terminals 8 & 9.



PROGRAMMING: FIRST TIME START UP/SYSTEM SETUP

There are two (2) programming sections for the SC400. Operation Parameters determine timing for the system. Engineering Parameters define the system itself.

Engineering parameters should be programmed first, followed by operation parameters.

Keypad Operation (Programming)

= **MODE CHANGE** - Press this button to change state of the SC400. Modes include:

- RUN MODE
- PROGRAMMING MODE - OPERATION LEVEL
- PROGRAMMING MODE - ENGINEERING LEVEL

= **PREVIOUS / NEXT** - Parameter. These buttons are used to navigate forward and backward through available parameters.

= **CHANGE PARAMETER VALUE** - Press either of these buttons to change the parameter being viewed.

= **DIGIT SELECT** - For parameters that are TIME based, Press DIGIT SELECT to choose the digit to modify. **Also used to manually start and stop a lube event**.

NOTE: When the SC400 is powered for the first time, the display may show an alarm "PARAMETERS LOST". This is normal.

PROGRAMMING: ENGINEERING PARAMETERS

To begin system setup, go to Engineering parameters by pressing twice. The display should briefly read "programming mode. Engineering level".

Language

Set language for the system. Available languages are English, French, Spanish, and German. To select a language, press ▲ or ▼. Once the proper selection has been made, press ▶ to go to the next parameter.

System Type

The SC400 will operate in any of five (5) operating modes:

- Singline Injector
- Singline Progressive
- Dualine Hydraulic
- Dualine Electric
- Continuous

To select the operating mode, press ▲ or ▼. Once the proper selection has been made, press ▶ to go to the next parameter. Some modes will require additional information. See below.

Secondary Function

The SC400 has the capability of offering two special functions: two zone operation and two interval operation. Only one secondary function may be selected.

- 2nd Zone – Control of two independent systems
- 2nd Interval – Standard system. Timing parameters used are determined by status of an "interval select" switch (customer supplied).
- None – Standard system. (For most applications "none" should be selected)

Select the desired secondary function using ▲ or ▼. If no secondary function is required, select "none". press ▶

Spray System

When controlling a spray system, the SC400 can operate a separate air solenoid for the spray nozzles. If your system is a spray type, select "yes" using ▲ or ▼. Otherwise select "no". press ▶

Spray system functionality is available in Progressive, Injector and Dualine Hydraulic modes only. Spray system is not available for "two zone" systems or Dualine Electric Systems.

Dualine Electric

For Dualine Electric systems, two additional parameters describe operation.

Reversing Valve Feedback
A setting is available to describe the type of switch used to indicate that the cycle has completed. Options are Two Signals or One Signal. Whenever a separate feedback signal (or pressure switch) is used for each line of a Dualine system, select "two signals". For some specialty switches, "one signal" may be required.

Reversing Valve Hold Time
(Set to 00:00, not used on standard systems)
To maintain pressure for an additional period (after pressure switch signal is received), a hold time may be selected. Set hold time desired.

Pump Power

Select how the SC400 shall power the pump. When system utilizes an electric driven or automatic reciprocating pump (drum pump), choose continuous. If pump requires a series of momentary pulses to operate, select cyclic. (Cyclic used for TP type pumps only) Cyclic will cause SC400 to deliver a series of electrical pulses to the pump output. If cyclic operation is chosen, set pump "on time" and "off time" as required.

Select the desired function using ▲ or ▼ and press ► to go to the next parameter.

Input Functions

The following parameters pertain to alarm inputs to the SC400.

Select the desired functions below using ▲ or ▼ and press ► to go to the next parameter.

Low Level Alarm
When the system indicates a low level alarm, the SC400 will react in one of two ways:

Stop pump – All lubrication is halted until the reservoir is filled to a proper level.
Message only – A warning signal is activated, but lubrication continues.

ATTENTION

To prevent potential damage to the pump and to prevent air from getting into the lubrication lines, BDI recommends choosing "stop pump" for this function. If message only is selected, the customer should take separate precautions to prevent the lubrication system from running dry.

PROGRAMMING: ENGINEERING PARAMETERS (Cont)

Low Level Polarity
Select the state of switch that signifies a Low Level alarm. Options are "alarm when open" or "alarm when closed".
Note: If no low level switch is connected to the low level inputs, customer should select "alarm when closed" for this parameter.

Low pressure Polarity
Select the state of switch that signifies a Low Pressure Alarm. Options are "Alarm when open" or "alarm when closed".
Note: If no low pressure switch is connected to the Low Pressure inputs, customer should select "alarm when closed" for this parameter.

Alarm 2 Polarity
Select the state of switch that signifies an alarm from the Alarm 2 input. Options are "Alarm when open" or "alarm when closed".
Note: If no wires are connected to Alarm 2 inputs, customer should select "alarm when closed" for this parameter.

Alarm 2 Message
Select the message to be displayed when a fault occurs as a result of the Alarm 2 input. Options include:

- High Pressure
- Motor Trip
- External Alarm 2

Alarm Polarity (for dry contacts)

Customer may monitor alarms via the use of two (2) sets of dry (potential free) contacts. The Fault contact activates only for events that cause lubrication to be halted. The warning contact activates with any message.

Fault op. Polarity (Terminal 12, 13, 14)
Operation of the fault relay may be selected as:

- Fault = Open (the relay coil is energized during normal operation)
- Fault = Closed (the relay coil is energized during fault)

Warning op. Polarity (Terminal 39, 40, 41)
Operation of the Warning relay may be selected as:

- Warning = Open (the relay coil is energized during normal operation)
- Warning = Closed (the relay coil is energized during warning)

ADVANCED FUNCTIONS ARE OPTIONS MOST SYSTEMS WILL NOT USE. IF NOT REQUIRED PROCEED TO PROGRAMING MODE "OPERATOR LEVEL" BY PRESSING [↵] TWICE.

ADVANCED FUNCTIONS

Input Status

Status of any input may be viewed utilizing this screen.

Output Force

Any output may be energized using this screen. Caution: changing states on this screen will cause outputs to change state. Only authorized personnel should utilize functions on this screen. Failure to follow safety procedures can result in equipment damage, personal injury or death.

LCD Contrast

LCD contrast is modified via this parameter. The contrast has been factory set for optimum viewing – modify only if screen is difficult to see.

Operator Password

[▼] [▼] [▼] [▲] [▲] [▼] [▼] [▼]

Operator password can be enabled or disabled from this screen. Enabling will prevent unauthorized users from modifying timing data within operation parameters.

Engineer Password

[▼] [▲] [▲] [▲] [▲] [▲] [▲] [▼]

Engineer password can be enabled or disabled from this screen. Enabling will prevent unauthorized users from modifying timing data within operation parameters.

ATTENTION

Note: It is recommended that Engineering password be enabled. Engineering parameters contain parameters critical to the operation of the SC400. Modification of these parameters by unqualified personnel can result in equipment damage, personal injury or death.

Reset Lost Parameters

Normally, "no" should be selected. If the SC400 displays an alarm, "System Fault! Parameters Lost", then select "yes". Then exit engineering parameters.

Enter Factory Mode

This function is for internal BDI use only. This parameter setting should remain at "no".

PROGRAMMING MODE OPERATOR LEVEL (TIMING SETUP)

Operation parameters are used to set timing information for the system. Parameters will vary depending on the selections made within engineering parameters. The following sections provide the steps for programming Progressive, Injector, Dualine Hydraulic, Dualine Electric and Continuous modes.

PROGRAMMING SINGLE LINE PROGRESSIVE

Pump Mode 1

Select how the SC400 should determine when lubrication is complete. Options include:

- *Fixed Cycles* – Lubricate for a specified number of switch cycles, as monitored from OP COMP A (terminals 18, 19, 20) input. When the specified value is reached, lubrication will cease.
- *Fixed Time* – Lubricate for a specified amount of time. When specified time has expired, lubrication will cease.

Pump Cycles 1

If "fixed Cycles" is selected for Pump Mode 1, the number of cycles must be specified. Select the desired number of cycles.

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

Pump Time 1

If "fixed Time" is selected for Pump Mode 1, the lubrication time must be specified. Select the length of time for lubrication.

Press [→] to select desired time field, seconds: minutes: hours

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

NOTE: If "fixed time" is selected, Monitor time is not used.

Air Purge Time

(When spray system has been selected in Engineering parameters) For spray systems, an air solenoid is driven by the SC400 (in addition to the lubrication pump). This solenoid may be programmed to remain "on" for a specified period of time after normal lubrication has completed. This time (called air purge time or afterblow time) should be set to the desired value.

Press → to select desired time field, seconds: minutes

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Monitor Time

The SC400 will signal a fault if lubrication is not completed as expected. OPCOMP_A (Terminals 18, 19, 20) is monitored for changes in state during lubrication. If there is no activity from the cycle switch within a specified time frame (Monitor time), a fault occurs. Monitor time is automatically reset upon each cycle switch transaction. Recommended setting is 1.5 times the actual time needed for one transaction.

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Overcount Cycles

In progressive systems, the cycle switch may be monitored while system is idle. If required, a fault will occur if a specified number of cycles are observed after lubrication is completed. Set this parameter to the maximum allowable cycles acceptable, or select DISABLED.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Idle Settings

The idle period can be determined by one of two events: Time or Machine cycles. When Time is selected, the system will remain in a "wait state" for a specified period of time. If Machine Cycles is selected, the system will remain in the wait state until a specified number of pulses are received from the machine count input (MACH CYC).

Idle Mode 1

Press ▲ ▼ to change value to time or machine cycles.

Press ▶ to go to the next parameter

Idle Time 1

If Time is selected for Idle Mode 1, the time to wait (before next lube event) must be specified.

Press → to select desired time field, seconds: minutes: hours: days

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Cycles 1

If Machine Cycles is selected, the number of pulses (before next lube event) must be specified.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog 1

If Machine cycles is selected for Idle Mode 1, the SC400 may (optionally) monitor the machine cycle input for failure. If Machine Watchdog is enabled, the SC400 will monitor (MACH CYC) for changes in state. If a pulse is not received within a specified period of time, a fault will occur.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog Time

If Machine Watchdog has been activated, a time period must be specified. If the machine cycle input does not cycle within the specified period of time, a fault will occur.

Press → to select desired time field, seconds: minutes

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

NOTE: For systems using "secondary functions" (2 interval or 2 zone systems), a second set of pump parameters are available. These parameters may be set appropriately for the second interval or zone using the above instructions.

Autofill Pump

Select Enabled to activate fill pump functionality. If the fill pump needs to be disabled (or if auto-fill system is not connected to the SC400) this parameter should be set as Disabled.

Press ▲ ▼ to change value to time or machine cycles.

Press ▶ to go to the next parameter

Autofill Timeout

If the autofill pump is enabled, a time period must be specified for the fill pump to operate. This period should be set long enough to allow for adequate filling, but short enough to prevent damage to the fill pump in case the fill pump is run "dry".

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Lube at Power Up

Even after power loss, the SC400 retains memory of its current state within the lube cycle. If the customer prefers that lubrication occur immediately after the control receives power, set this parameter to YES. If parameter is set to NO, the SC400 will resume activity at the last known position within the lubrication cycle.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Operation

Once parameters are set, press ↵ to change system to run mode. The system setup is now complete.

PROGRAMMING SINGLE LINE INJECTORS

Monitor Time

The SC400 will signal a fault if lubrication is not completed as expected. OPCOMP_A (Terminals 18, 19, 20) is monitored for changes in state during lubrication. If there is no activity from the pressure switch within a specified time frame (Monitor time), a fault occurs. Recommended setting is 1.5 times the actual time needed for one cycle.

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Idle Settings

The idle period can be determined by one of two events: Time or Machine cycles. When Time is selected, the system will remain in a "wait state" for a specified period of time. If Machine Cycles is selected, the system will remain in the wait state until a specified number of pulses are received from the machine count input (MACH CYC).

Idle Mode 1

Press ▲ ▼ to change value to time or machine cycles.

Press ▶ to go to the next parameter

Idle Time 1

If Time is selected for Idle Mode 1, the time to wait (before next lube event) must be specified.

Press → to select desired time field, seconds: minutes: hours: days

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Cycles 1

If Machine Cycles is selected, the number of pulses (before next lube event) must be specified.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog 1

If Machine cycles is selected for Idle Mode 1, the SC400 may (optionally) monitor the machine cycle input for failure. If Machine Watchdog is enabled, the SC400 will monitor (MACH CYC) for changes in state. If a pulse is not received within a specified period of time, a fault will occur.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog Time

If Machine Watchdog has been activated, a time period must be specified. If the machine cycle input does not cycle within the specified period of time, a fault will occur.

Press → to select desired time field, seconds: minutes

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

NOTE: For systems using "secondary functions" (2 interval or 2 zone systems), a second set of pump parameters are available. These parameters may be set appropriately for the second interval or zone using the above instructions.

Autofill Pump

Select Enabled to activate fill pump functionality. If the fill pump needs to be disabled (or if auto-fill system is not connected to the SC400) this parameter should be set as Disabled.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Autofill Timeout

If the autofill pump is enabled, a time period must be specified for the fill pump to operate. This period should be set long enough to allow for adequate filling, but short enough to prevent damage to the fill pump in case the fill pump is run "dry".

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Lube at Power Up

Even after power loss, the SC400 retains memory of its current state within the lube cycle. If the customer prefers that lubrication occur immediately after the control receives power, set this parameter to YES. If parameter is set to NO, the SC400 will resume activity at the last known position within the lubrication cycle.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Operation

Once parameters are set, press ↵ to change system to run mode. The system setup is now complete.

PROGRAMMING DUALINE HYDRAULIC

Pump Mode 1

Select how the SC400 should determine when lubrication is complete. Options include:

- *Full Cycle* – (Used for standard DR45 type Dual Line Systems) Lubricate for exactly two (2) transitions of the OPCOMP_A (terminals 18, 19, 20) input. After two transitions (in and out), lubrication will cease.
- *Half Cycle* - (Used for standard DR45 type Dual Line Systems) Lubricate for exactly one (1) transition of the OPCOMP_A (terminals 18, 19, 20) input. After one transition (in or out), lubrication will cease.
- *Fixed Cycles* – Lubricate for a specified number of switch cycles, as monitored from OP COMP A (terminals 18, 19, 20) input. When the specified value is reached, lubrication will cease.
- *Fixed Time* – Lubricate for a specified amount of time. When specified time has expired, lubrication will cease.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

If Full Cycle or Half Cycle has been selected, proceed to "Monitor Time" (below).

Pump Cycles 1

If "fixed Cycles" is selected for Pump Mode 1, the number of cycles must be specified. Select the desired number of cycles.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Pump Time 1

If "fixed Time" is selected for Pump Mode 1, the lubrication time must be specified. Select the length of time for lubrication.

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

NOTE: If "fixed time" is selected, Monitor time is not used.

Monitor Time

The SC400 will signal a fault if lubrication is not completed as expected. OPCOMP_A (Terminals 18, 19, 20) is monitored for changes in state during lubrication. If there is no activity from the cycle switch within a specified time frame (Monitor time), a fault occurs. Monitor time is automatically reset upon each cycle switch transaction. Recommended setting is 1.5 times the actual time needed for one transaction.

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Idle Settings

The idle period can be determined by one of two events: Time or Machine cycles. When Time is selected, the system will remain in a "wait state" for a specified period of time. If Machine Cycles is selected, the system will remain in the wait state until a specified number of pulses are received from the machine count input (MACH CYC).

Idle Mode 1

Press ▲ ▼ to change value to time or machine cycles.

Press ▶ to go to the next parameter

Idle Time 1

If Time is selected for Idle Mode 1, the time to wait (before next lube event) must be specified.

Press → to select desired time field, seconds: minutes: hours: days

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Cycles 1

If Machine Cycles is selected, the number of pulses (before next lube event) must be specified.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog 1

If Machine cycles is selected for Idle Mode 1, the SC400 may (optionally) monitor the machine cycle input for failure. If Machine Watchdog is enabled, the SC400 will monitor (MACH CYC) for changes in state. If a pulse is not received within a specified period of time, a fault will occur.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog Time

If Machine Watchdog has been activated, a time period must be specified. If the machine cycle input does not cycle within the specified period of time, a fault will occur.

Press → to select desired time field, seconds: minutes

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

NOTE: For systems using "secondary functions" (2 interval or 2 zone systems), a second set of pump parameters are available. These parameters may be set appropriately for the second interval or zone using the above instructions.

Autofill Pump

Select Enabled to activate fill pump functionality. If the fill pump needs to be disabled (or if auto-fill system is not connected to the SC400) this parameter should be set as Disabled.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Autofill Timeout

If the autofill pump is enabled, a time period must be specified for the fill pump to operate. This period should be set long enough to allow for adequate filling, but short enough to prevent damage to the fill pump in case the fill pump is run "dry".

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Lube at Power Up

Even after power loss, the SC400 retains memory of its current state within the lube cycle. If the customer prefers that lubrication occur immediately after the control receives power, set this parameter to YES. If parameter is set to NO, the SC400 will resume activity at the last known position within the lubrication cycle.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Operation

Once parameters are set, press ↵ to change system to run mode. The system setup is now complete.

PROGRAMMING
DUALINE ELECTRIC

Pump Mode 1

Select how the SC400 should determine when lubrication is complete. Options include:

- *Full Cycle* – Lubricate for exactly two (2) transitions of the OPCOMP_A (terminals 18, 19, 20) input. After two transitions (in and out), lubrication will cease.
- *Half Cycle* - Lubricate for exactly one (1) transition of the OPCOMP_A (terminals 18, 19, 20) input. After one transition (in or out), lubrication will cease.

Press ▲ ▼ to change value to Full Cycle or Half Cycle.

Press ▶ to go to the next parameter

Monitor Time

The SC400 will signal a fault if lubrication is not completed as expected. OPCOMP_A (Terminals 18, 19, 20) & OPCOMP_B (Terminals 21, 22, 23) are monitored for changes in state during lubrication. If there is no activity from the cycle or pressure switch within a specified time (Monitor time), a fault occurs.

Press → to select desired time field, seconds: minutes: hours

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Idle Settings

The idle period can be determined by one of two events: Time or Machine cycles. When Time is selected, the system will remain in a "wait state" for a specified period of time. If Machine Cycles is selected, the system will remain in the wait state until a specified number of pulses are received from the machine count input (MACH CYC).

Idle Mode 1

Press ▲ ▼ to change value to time or machine cycles.

Press ▶ to go to the next parameter

Idle Time 1

If Time is selected for Idle Mode 1, the time to wait (before next lube event) must be specified.

Press → to select desired time field, seconds: minutes: hours: days

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Cycles 1

If Machine Cycles is selected, the number of pulses (before next lube event) must be specified.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog 1

If Machine cycles is selected for Idle Mode 1, the SC400 may (optionally) monitor the machine cycle input for failure. If Machine Watchdog is enabled, the SC400 will monitor (MACH CYC) for changes in state. If a pulse is not received within a specified period of time, a fault will occur.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Machine Watchdog Time

If Machine Watchdog has been activated, a time period must be specified. If the machine cycle input does not cycle within the specified period of time, a fault will occur.

Press → to select desired time field, seconds: minutes

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

NOTE: For systems using "secondary functions" (2 interval only), a second set of pump parameters are available. These parameters may be set appropriately for the second interval or zone using the above instructions.

Autofill Pump

Select Enabled to activate fill pump functionality. If the fill pump needs to be disabled (or if auto-fill system is not connected to the SC400) this parameter should be set as Disabled.

Press ▲ ▼ to change value of desired field.

Press ▶ to go to the next parameter

Autofill Timeout

If the autofill pump is enabled, a time period must be specified for the fill pump to operate. This period should be set long enough to allow for adequate filling, but short enough to prevent damage to the fill pump in case the fill pump is run "dry".

Press [→] to select desired time field, seconds: minutes: hours

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

Lube at Power Up

Even after power loss, the SC400 retains memory of its current state within the lube cycle. If the customer prefers that lubrication occur immediately after the control receives power, set this parameter to YES. If parameter is set to NO, the SC400 will resume activity at the last known position within the lubrication cycle.

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

Operation

Once parameters are set, press [↵] to change system to run mode. The system setup is now complete.

PROGRAMMING CONTINUOUS

Monitor Time

The SC400 will signal a fault if lubrication is not proceeding as expected. OPCOMP_A (Terminals 18, 19, 20) is monitored for changes in state during lubrication. If there is no activity from the cycle switch within a specified time frame (Monitor time), a fault occurs.

Press [→] to select desired time field, seconds: minutes: hours

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

Autofill Pump

Select Enabled to activate fill pump functionality. If the fill pump needs to be disabled (or if auto-fill system is not connected to the SC400) this parameter should be set as Disabled.

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

Autofill Timeout

If the autofill pump is enabled, a time period must be specified for the fill pump to operate. This period should be set long enough to allow for adequate filling, but short enough to prevent damage to the fill pump in case the fill pump is run "dry".

Press [→] to select desired time field, seconds: minutes: hours

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

Lube at Power Up

Even after power loss, the SC400 retains memory of its current state within the lube cycle. If the customer prefers that lubrication occur immediately after the control receives power, set this parameter to YES. If parameter is set to NO, the SC400 will resume activity at the last known position within the lubrication cycle.

Press [▲] [▼] to change value of desired field.

Press [▶] to go to the next parameter

Operation

Once parameters are set, press [↵] to change system to run mode. The system setup is now complete.

SYSTEMS MESSAGES

During operation, the SC400's LCD will display information relating to lubrication. Multiple messages may be in queue, so messages will cycle periodically. Message information includes:

- Timing / Cycle data
- Monitor time remaining
- System specific data

In addition, other information is available. Pressing [▶] will cause the display to the next message. If [▶] is pressed multiple times, additional screens will be displayed:

- Software revision
- Days of operation
- Cycles completed
- Input status (all external inputs)
- Output status (pump, solenoids, etc)

WARNING CONDITIONS

Warning conditions are those events that require user attention, but are minor in nature. These events do not stop lubrication. Warnings are indicated by a solid red LED on the SC400. Warnings also cause activation of the Warning relay. Warnings are "self-clearing" – once the use has rectified the problem, the warning will clear.

High Level

If an input signal is received from the high level input, a message, "Warning! High lubricant level" will be displayed. The reservoir has been overfilled. Stop fill pump immediately.

Call Service

In applicable regions, the SC400 offers a notification to the user when regular system maintenance is required.

Low Level

Low level is user selectable as a warning or as a fault. When selected as a warning, system lubrication continues normally. Customer should take secondary precautions to prevent the system from operating without lubricant.

FAULT CONDITIONS

Fault conditions are those events that cause the SC400 to cease normal operation. These events are critical in nature and require immediate attention. Faults are indicated by a blinking red LED on the SC400. Faults also cause activation of both the Fault and Warning relays.

Low Pressure

If an input signal is received from the low pressure input (LOW PRES) while lubrication is active, a Fault will occur and "Fault! Low pressure" will be displayed. Air system should be verified for proper function. To clear the fault, press → (or remote jog if connected).

AL2 - High Pressure

An input signal has been received from the Alarm 2 input. When a High pressure switch is connected to the Alarm 2 input, a Fault will occur and "Fault! AL2- High Pressure" will be displayed. This indicates excessive pressure was detected within the system. Inspect system for blockages and verify pump is operating properly.
Once the high pressure condition is rectified, the fault may be cleared by pressing → (or remote jog if connected).

AL2 - External Alarm 2

An input signal has been received from the Alarm 2 input. Rectify situation that caused input to trigger alarm. Once the issue is resolved, the fault may be cleared by pressing → (or remote jog if connected).

AL2 - Motor Trip

An input signal has been received from the Alarm 2 input. When a motor thermal circuit is connected to the Alarm 2 input, a Fault will occur and "Fault! AL2- Motor Trip" will be displayed. This indicates motor thermal had deactivated motor starter. Inspect motor and system for conditions that could cause motor to draw excessive current. Reset Motor Thermal unit as required. Once the issue is resolved, the fault may be cleared by pressing → (or remote jog if connected).

Parameters Lost

The SC400 continuously verifies parameter settings to assure safe operation. In the event of memory failure, a fault will occur and "System fault! Parameters lost" will be displayed. To recommission the system, all parameters need to be verified by qualified personnel. Once all parameters are properly set, go to "reset lost parameters" within engineering parameters. Select "yes", then return to run mode. Fault will automatically reset.

Verify control power is clean and nearby equipment is not creating electrical noise.

Low Lubricant Level

Low level is user selectable as a warning or a fault. When selected as a fault, system lubrication ceases once low level is reached and "Fault! Low lubricant level" is displayed. To resume operation, fill reservoir with fluid. Fault will automatically clear once level reaches appropriate level.

Monitor Timeout

During lubrication, a feedback signal (pressure or cycle switch) is expected to change state within a specified period of time (Monitor time). A monitor timeout occurs when lubrication has not seen this signal change as expected. Typical causes are:

- Lack of lubricant flow (Air in lubrication line, pump malfunction, empty reservoir, etc)
- Electrical failure (cycle switch failure, poor electrical connection, blown fuse, etc)

Watchdog Timeout

When selected, SC400 counts pulses from customer's equipment during idle period. If a pulse is not received within a specified period of time (Watchdog Time), a Fault occurs and "watchdog Timeout" is displayed. Examine customer's equipment for cause of failure and rectify. Once completed, press → (or remote jog if connected) to reset fault.

Overcount

When selected, SC400 counts pulses from cycle switch during idle period. If pulses received is greater than the specified limit (Over-count cycles), a fault occurs and "Fault – Overcount" is displayed. Rectify problem and press → (or remote jog if connected) to reset fault. Typical causes include poor electrical connection to cycle switch and malfunctioning solenoid valve / motor starter (to pump).

EEPROM

Periodically, the SC400 will perform a check on its internal EEprom (memory). This is performed to assure safe and reliable operation. In the unlikely event of EEprom failure, a fault will occur and "System Fault! EEPROM" will be displayed. The fault may be cleared by pressing → (or remote jog if connected). If fault repeats or is unable to be cleared, the SC400 circuit board must be replaced.

Autofill Failure

When fill pump is running, SC400 expects the fluid level of the reservoir to rise. If fluid level has not increased within 5 minutes (or Autofill time, if less than 5 minutes), a fault occurs and "Fault! Autofill failure" is displayed.

To rectify, replace fluid in fill pump. Once completed, press → (or remote jog if connected) to reset fault. Autofill pump will restart automatically.

TECH DATA SHEET LIST

For additional information refer to the website for the following data sheets:

35682	SC400 - Two Individual Pump System Wiring Guide
35683	SC400 - Autofill Programming and Installation Guide
35685	SC400 - Converting SS4500 users to SC400

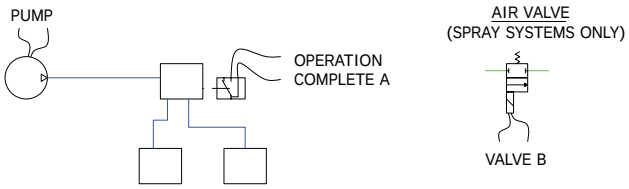
SERVICE PARTS LIST

P.N. 37376	Enclosure with Door and Key Pad
P.N. 37275	Foot mounting kit only
P.N. 37274	PCB Board only (does not include LCD board)
P.N. 37274LCD	LCD Display Board only

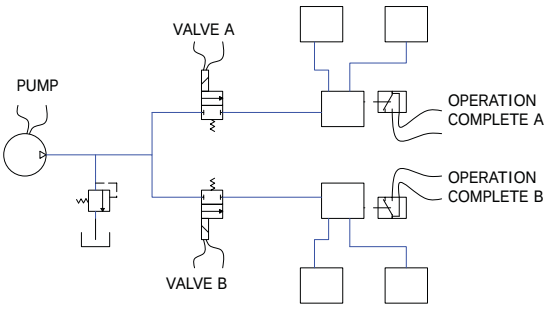
APPENDIX: SYSTEM EXAMPLES

Series Progressive Systems

Single Zone

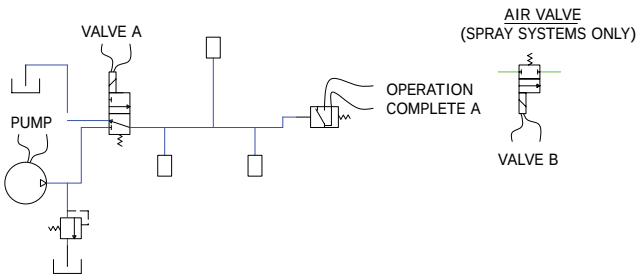


Two (2) Zone

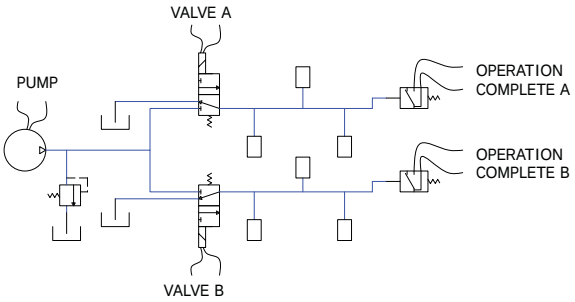


Series Line Injector (Parallel) Systems

Single Zone

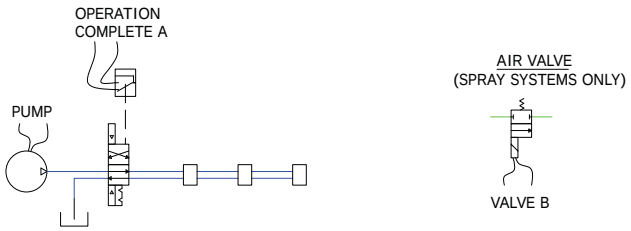


Two (2) Zone

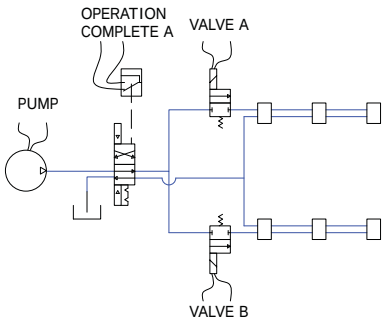


Dualine Systems (with Hydraulic Reversing Valve)

Single Zone

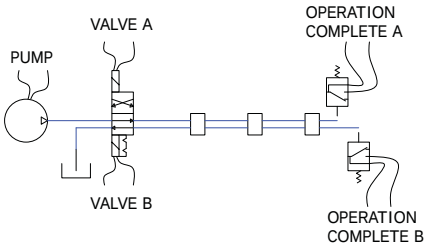


Two (2) Zone

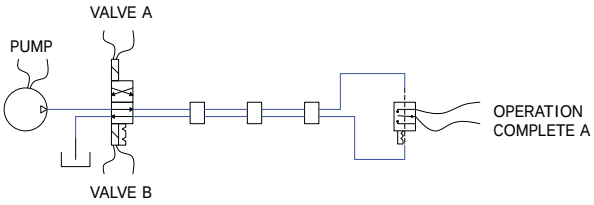


Dualine Systems (with Electric Reversing valve)

With 2 Pressure Switches (or SGA Valve)



With PC5 Pressure Switch (old style Denco)



Notes

Notes

Innovators of engineered lubrication technology **since 1872**

Bijur Delimon International has ISO 9001:2008 and ISO 14000 quality certified manufacturing facilities around the world, so your centralized lubrication system meets the highest industry quality standards. It's all part of our commitment to quality and customer service.

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