SELECTRONIX, INC.
WOODINVILLE, WA

SUPERSTEP SERIES 4060

SLC4060 PROCESS GATEWAY

INSTALLATION & OPERATING

MANUAL

1. **Models: SLC4060-xxx-yyy-zzz**
2. **UL Recognized Component File E124742 (SLC4060)**

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GENERAL INFORMATION

Introduction

The **SELECTRONIX SLC4060, Process Gateway** is an all solid-state, microcontroller-based device which accepts and conditions various industrial control signals, provides 2 PID control loops, and provides relays and an analog output. It provides accessibility to the internal parameters utilizing 2 communications networks.via SLCnet and GWnet.

- 2 fully configurable PID control loops are provided. The output of the PID may be used to send a remote command signal to the SLC4000, to the voltage driver output, to the Building Management System, or a combination of them.

- 2 RTD channels provide temperature sensing between -60 to 260 Deg Fahrenheit. The second channel is typically used for outdoor air reset.

- 2 general purpose analog inputs are compatible with a number of different input signal types, including, 0-10VDC, 2-10VDC, 0-20 ma, and 4-20ma DC. Other input ranges may be accommodated by adding an external voltage dividing resistor. The input signal type is selected with on-board switches.

- 4 Digital inputs are provided that can be ordered for either 120V ac(default) or 24V ac/dc. The inputs may be used to drive the relay and/ or be monitored by the BMS. Each signal polarity may be individually inverted.

- 3 relays are provided which may be assigned to operate from various signal sources and conditions. Pre-defined logic combinations provide 'And' and 'Or' combinations with the 4^{th} input. The logic may be combined with the inverting capability of the inputs. The BMS may set the relays directly or the relays may be assigned to operate when internal fault conditions are set from the SLC4000, SLC4060, or SLC4075 units. Various software-selectable signal sources are defined by the TSGW. The relay outputs have pilot-duty contacts, intended to control interposing relays or contactors. The contacts are wired to a common terminal.

- A 0-10V dc voltage driver output is available for selectable output signals. Either of the 2 PID outputs may be assigned with either a 0-10V or 2-10V output range. The RTD sensor level and analog inputs are examples of signals that may be assigned to the voltage driver output, as well as the ability to be assigned directly by the BMS.

- SLCnet is a Selectronix communication network that connects the SLC4000 units, SLC4060, and the SLC4075, TouchScreen Gateway at J1.

- Connector T1 is an Ethernet bootloader which allows for the field upgrading of the firmware by using a TFTP client.

- Range-checking is provided for the RTD sensors and analog signals configured as offset inputs. Out-of-range signals are annunciated.

- Communication between the SLC4000, SLC4060, and SLC4075 are continually checked to assure operational integrity.

- Many other built-in failsafe features are included in the SLC4060.

- A multi-color LED indicates operational status, as well as annunciating several other operational and error conditions.

- Units connect to SLC4000 units using an SLC4020-xx cascading cable, where xx is the length in feet.
- 1, 2, 3, 6, 10, 20 and 35 feet are standard stocked lengths.

- The SLC4000 is provided with 4 swaged standoffs suitable for mounting to chassis panels using #6 machine screws.

- SLC4011 is a NEMA 4X enclosure is available as an option and is SLC4060-ready..

- The SLC4060 controller is UL Recognized in accordance with UL873 Temperature Indicating and Regulating Equipment (CCN: XAPX2) and is intended for use by Original Equipment Manufacturers (OEM) who will seek overall UL approval for the end-item system. File Number E124742.

Warnings And Advisories

!!! WARNING !!!

This equipment should be installed, adjusted, and serviced by qualified electrical maintenance personnel familiar with the construction and operation of the equipment and the hazards involved.

FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY!

This control is an operating device, not a limiting device. It is the responsibility of the user to install all limiting and safety devices to the end-item system. The system software controls many critical functions, such as maintaining set points, enabling and disabling multiple boilers.

For any critical safety-related limits, or enable/disable functions, the end-user shall install hardware limiting devices and cutout switches, as applicable.

The circuitry in this equipment contains static-sensitive electronic components. Observe proper handling precautions when handling the printed wiring boards. Avoid contacting components without first discharging your body to earth ground. Always disconnect power to any of the electronic assemblies before making electrical interconnect or input/output wiring. Failure to observe this precaution could result in damage to the circuitry.
The printed circuit assemblies contain sharp leads on the back side of the board, which may be avoided by handling the assemblies by the board edges.

PID Operation and Adjustments

The SLC4060 provides 2 PID control loops.

- PID1 uses RTD1 to sense the process variable.
- PID2 uses GPA1, analog channel 1 to sense the process variable.
- The PID parameters Proportion, Integral, and Derivative are all individually accessible and adjustable.

Proportion Parameter ‘P’

The proportion parameter is a multiplier of the error term. The error term is the difference between the process variable and the setpoint. A larger P term causes the PID loop to be more responsive to a given error. As the P factor increases, the throttling range decreases, which means that the modulating range is such that the error in constrained to small values. A large P factor, however, may result in the system ‘hunting’, or oscillating around the setpoint..

Integral Parameter ‘I’

The integral parameter integrates the error term, which means the error is continually accumulated and the output follows the sum. The integral causes the output to settle at the setpoint. A larger integral factor causes the output to approach the setpoint more rapidly, but too large of an integral may result in hunting around the setpoint.

Derivative Parameter ‘D’

The derivative parameter is a multiplier of the rate-of-change of the process variable It is an “anticipator” which operates to slow the effect of the P and I terms. Damping is another term used to describe the action. A critically damped system is one where the response time to setpoint is the minimum without any overshoot. A derivative term is most useful when the controlled system has a large inertial or a large momentum. An example is that a system without a derivative parameter will tend to overshoot the setpoint and oscillate around the setpoint, unless the P and I terms are very low.

PID Presets

PID presets labeled “Slow”, “Medium”, or “Fast” are provided for a quick initial setting. Values are then adjusted as required.

Table 1 OAR Engr Unit Selection

Sensor	Engr Unit	Select
RTD	Deg F	1
RTD	Deg C	2
GPA	Span %	3

Outdoor Air Reset (OAR) or Setpoint Modifier (SPM)

The Outdoor Air Reset function is provided for either or both PID loops. It adjusts the PID setpoint based upon the sensed temperature of the outdoor air. The setpoint adjustment may be adjusted either upwards or downwards in a proportional amount to the outdoor temperature. The OAR parameters provide for a high and low limit to the adjustment amount.
The same concept is applied to create a generic Setpoint Modifier(SPM) input. The term OAR and SPM are used interchangeably. Any analog signal may be used to adjust the companion setpoint.

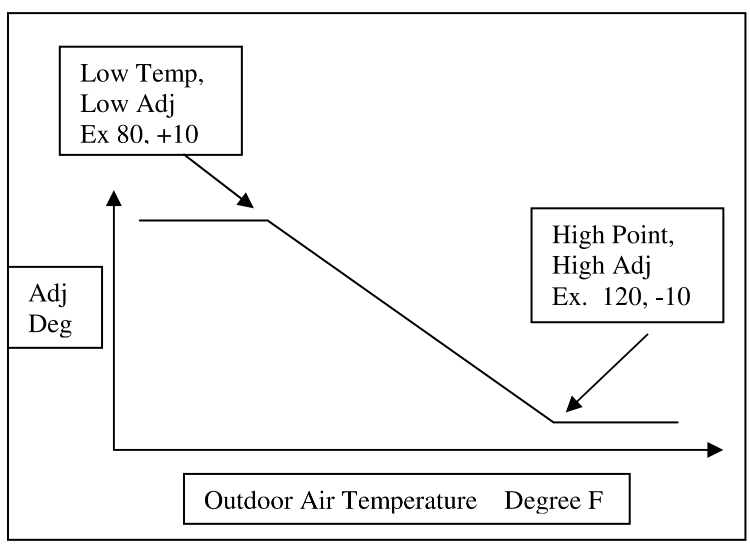
The original setpoint is modified by an amount that is determined by a “scaling line”. This line is created by specifying both a low and high point comprised of :
a) a temperature
b) the amount of adjustment at this temperature.

- The adjustment beyond the temperature points remains at the same value at the temperature limit.
- The adjustment between the temperature points is the scaled amount at the given temperature.

The OAR2/SPM2 operates in the same fashion using either the temperature sensor or a signal from another source.
In the example below:

1. Given the original setpoint is 100 Deg F.
2. The Outdoor Air Temp is measured by RTD2
3. At 75 Deg F, the setpoint is adjusted to 110 Deg. F.
4. At 125 Deg F., the setpoint is adjusted to 90 Deg. F.
5. At 90 Deg F., the setpoint is adjusted to 105 Deg.F.

Figure 1 OAR/SPM Example



Control Power

- 120 V ac @ <= 50 VA.
- 24V ac/ 28V dc available. See "Models and Ordering Part Numbers" to order.

RTD Sensor Electrical Specification

- RTDs that are 1,097 Ohms Positive Temperature Coefficient at 77 Degree F (25 Deg C) with a 2.1 Ohms/Deg F Sensitivity.
- RTD sensor input range: -60 Deg F (-51 Deg C) to 260 Deg F (126.6 Deg C) limited by the temperature range of the selected temperature sensor.

Compatible Temperature Sensors

- Selectronix SLC4053 Standard Sensor with 6" pigtail.
- Selectronix SLC4054 Water-resistant Sensor with 5' leads.
- Selectronix SLC4055 Water-tight Sensor with 6' leads.
- Selectronix SLC4056 Outdoor Air Sensor with enclosure.
- Any other RTD meeting the electrical specification.

GP Analog Input (GPA) Electrical Specification

- **Any source producing a 0-10V dc, 2-10V dc , 0-20 ma or 4-20 ma output.**
- The current input is sensed across a 61.9 ohm resistor.
  - A 4-20ma signal produces 0.25 to 1.24 volts DC at terminals TB5(+) to TB6(-) or TB7(+) to TB8(-).
  - TB6 and TB8 are connected to our signal common.
- The voltage input impedance is 7.9K ohms.

Compatible Differential Pressure Sensors

- Honeywell P7640A and PWT pressure transducer models with selectable pressure ranges.

Compatible Humidity Sensors

- Honeywell H7625, H7635, H7655 models

GP Digital Input (GPDI) Electrical Specification

- 120 V ac (Default configuration)
- 24V AC/DC See "Models and Ordering Part Numbers" to order.

Configuration

- Each input may be logically inverted. This feature is typically used when an active signal is to be considered to be the normal state, and the absence of this signal is an active state, often used as an alarm signal.
- Each input may be individually configured to be an alarm. An alarm, when active, causes:
  - Command to SLC4000 to be 0, while alarm is active
  - Voltage Driver output to be 0 for PID output modes
  - Status LED indicates a fault
  - Alarms are automatically reset
  - The SLC4000 outputs are rapidly cycled off (Version 5.00+)
- Configuration of the GPDI bits are set in the SLC4075, Touchscreen Gateway (TSGW).
  - See "SLC4075 Installation and Operation Manual" for details.
  - Alarms are inhibited for a configurable period (default 15 seconds) to prevent alarms during system setup.

Unit Configuration– Connections and DIP Switch Settings

Configuration Switch Operation

- Turn switch ON by pressing down on the side of the switch closest to the legend number.

Table 2 Switch Settings for SW1 GP Analog Input Type

Command Signal Type	Connect (+)	Connect (-)	SW1-1 61.9 Resistor	SW1-2 Volt Network	SW1-3 61.9 Resistor	SW1-4 Volt Network	SW1-5 GPA1 Offset	SW1-6 GPA2 Offset
GPA1 0-10 V dc	TB5	TB6	OFF	ON			OFF	
GPA1 2-10 V dc	TB5	TB6	OFF	ON			ON	
GPA1 0-20 ma	TB5	TB6	ON	OFF			OFF	
GPA1 4-20 ma	TB5	TB6	**ON**	**OFF**			**ON**	
GPA2 0-10 V dc	TB7	TB8			OFF	ON		OFF
GPA2 2-10V dc	TB7	TB8			OFF	ON		ON
GPA2 0-20 ma	TB7	TB8			ON	OFF		OFF
GPA2 4-20 ma	TB7	TB8			**ON**	**OFF**		**ON**

Bold entries indicates the default setting. Configure the switches for a valid input even if unused.

BACnet MS/TP

BACnet MS/TP is currently provided by installing an optional SLC4082 Protocol converter. The BACnet I/P data points in the TSGW are converted from BACnet I/P to MS/TP. The converter requires an external 24V ac or dc power supply. If the TSGW is a 7" model, the same external power supply may be used to power the converter. The SLC4082 is pre-programmed to map all the data points described in the SLC4075 manual to the RS485 port.

BACnet MS/TP Parameters (Future Use)

Table 3 BACnet Baud Rate Setting

Option	SW1-7	SW1-8
Reserved	**OFF**	
9600 Baud		OFF
38400 Baud		**ON**

BACnet MAC Address (Future Use)

SW2-2 through SW2-8 sets the BACnet device address, with a range of 0 to 127. Press down top of DIP switch for '1'..

Table 4 Switch Settings for SW2 BACnet MSTP Address

Option	SW2-1	SW2-2	SW2-3	SW2-4	SW2-5	SW2-6	SW2-7	SW2-8
Bit Value	**N/A**	**64**	**32**	**16**	**8**	**4**	**2**	**1**
Ex Addr 53		**0**	**1**	**1**	**0**	**1**	**0**	**1**

BACnet Device ID (Future Use)

The Default Device ID is set to **4060.**

- A customer-unique ID is entered from the SLC4075, TSGW.
- A permanently stored ID may be programmed into the PGW firmware by Selectronix. We will provide a custom firmware upgrade version at no charge. The firmware is loaded into the PGW per "Firmware Upgrade via Ethernet Bootloader"

Device Characteristics (Future Use)

- BACnet Smart Actuator (B-SA)
- BACnet Interoperability Building Blocks Supported:
  - DS-RP-B
  - DS-WP-B
- Standard Object Types Supported:
  - Present-value
  - Real
- Data Link Layer Options:
  - MS/TP master and slave baud rate(s): 9600, 38400
- Remote Device Management
  - PGW sends I-Am, device_4060 on power on, and approximately every 15 seconds if no activity has been detected or every 1 minute otherwise.
- **See the SLC4075 Installation And Operating Manual for a listing of the accessible data points.**
- **See "**Physical and Electrical Installation" for RS485 wiring considerations and requirements.

24V dc On-board Auxiliary Power Supply

A 24V dc, Class 2 power supply is provided to power the SLC4075 4", TouchScreen Gateway. The power source is available to provide power to sensors as long as the maximum current is not exceeded. The circuit common of this power source (TB18) is connected to the signal common of the SLC4060. Care must be taken when using the Auxiliary power source with external circuits not to introduce ground loop currents.
For an SLC4075 with 7" screen, an external power supply must be provided. An SLC4076 is a suitable supply.

Relays

- 3 relays are provided which may be assigned to operate from various internal signal sources and conditions.
- Pre-defined logic combinations provide 'And' and 'Or' combinations with the 4th digital input. The logic may be combined with the inverting capability of the inputs,
- The BMS may set the relays directly
- The relays may be assigned to operate when internal fault conditions are set from the SLC4000, SLC4060, or SLC4075 units.
- The contacts are wired with a single common. The contacts are otherwise isolated from each other.
- The relay outputs are pilot-duty contacts, intended to control interposing relays or contactors.
- The relay load is rated at 135 VA maximum, however, the contacts carry a UL rating of 5A resistive @ 125/250 VAC.
- Each output stage has an LED indicator to show output operation.

Voltage Driver

- A 0-10V dc voltage driver output is available for selectable output signals. Either of the 2 PID outputs may be assigned with either a 0-10V or 2-10V output range. The RTD sensor level and analog inputs are examples of signals that may be assigned to the voltage driver output, as well as the ability to be assigned directly by the BMS.

SLCnet J1

SLCnet is the Selectronix communication network that connects the SLC4000 units, SLC4075, TouchScreen gateway, and the SLC4060, Process Gateway.

GWnet J2 (Future Use)

GWnet is the Selectronix Gateway network which is an RS485 half-duplex, non-isolated, communication network intended for BACnet MS/TP connection.

Firmware Upgrade via Ethernet Bootloader

- An integral Ethernet bootloader provides for the field upgrading of the firmware.
  - T1 is the metal RJ45 connector on the right side of the PGW.
- Obtain the firmware *.hex file from Selectronix.
- Download and install TFTPUtil Client GUI from http://sourceforge.net/projects/tftputil/
- Obtain a laptop PC and a **network Hub and *not an Ethernet Switch*.**
- Configure the PC for the 192.168.0.nnn subnet
  - **Windows 7 example** (step-by-step may vary)
    1. Open Control Panel, Network and Sharing Center
    2. Change adapter settings
    3. Check on Local Area Connection
    4. Select “Change settings of this connection”
    5. Continue with Windows 10 example, step 2, below
    6. See “Local Area Connection Properties” dialog box
       a. Click on Internet Protocol Version 4 (TCP/IPv4)
       b. Click on Properties
       c. Most likely the “Obtain an IP automatically” is selected
       d. Change this to “Use the following IP address
          i. IP Address: 192.168.0.10 **(last number just not 100)**
          ii. Subnet mask: 255.255.255.0
          iii. Default gateway: blank
  - **Windows 10 example** (step-by-step may vary)
    1. <Start> <Settings><Network & Internet><Ethernet>Change adapter options>
    2. See “Local Area Connection Properties” dialog box
       a. Click on Internet Protocol Version 4 (TCP/IPv4)
       b. Click on Properties
       c. Most likely the “Obtain an IP automatically” is selected
       d. Change this to “Use the following IP address
       e. IP Address: 192.168.0.200 **(really any number, just not 100)**
       f. Subnet mask: 255.255.255.0
       g. Default gateway: blank
       h. Connection to the Process Gateway Ethernet connector labeled “T1” may be made by:
  - Connection to the Process Gateway Ethernet connector labeled “T1” may be made by:
  - The PGW is not auto-sensing and requires connection using a **Ethernet Hub, Not a Switch.**
    - Connect the PC and PGW to the standard ports of the hub.
- **Verification of setting (Optional)**
  - With the PGW connected and powered
  - Open a command box <Start><Cmd>
    - Ping the IP set in step 2e and verifies it replies.
- Open TFTPUtil Client GUI
    - Host: Enter **192.168.0.100**
    - Filename: Enter the filename or browse using the button to the right
- Note that you have about 5 seconds after the PGW power up to send the file.
    - Power up the PGW and **wait until a yellow LED on the “T1” connector blinks.**
    - In the TFTPUtil Client GUI, press “Put File”
    - On the PGW, **see both green and yellow LEDs on T1 blink**
    - In the TFTPUtil Client GUI, see ***“Successfully sent file …….(nnnnnn bytes) to 192.168.0.100”***
    - Power up the system and verify the new version has been loaded by inspecting the PGW version in the TSGW.

Models and Ordering Part Numbers

- SLC4060 – XXX – YYY – ZZZ
  - XXX is a model variation
    - None or 0, if none
  - YYY is Power input voltage
    - 24 – indicates 24 V ac/ 28 V dc
    - None or 120 – indicates 120 V ac
  - ZZZ is GPDI input voltage
    - 24 – indicates 24 V ac/ 28 V dc
    - None or 120 – indicates 120 V ac

Accessories and Cables

Cascading Cable - SLC4020-x

A separately ordered Cascading Cable is required to connect the SLC4060 to SLC4000 units and to the SLC4075. Alternately, a standard CAT-5 or better Ethernet patch cable may be used.

Resistor Adapter Assemblies – SLC4040-xxx

Resistor adapter assemblies with different resistor values are available for applications that require an externally mounted resistor. The resistors are supplied with female quick-connect terminals and an insulated male quick-connect tab for the field connection. Also included are 2 quick-connect terminal adapters that provide 2 male connections for the single male tab, for a choice of field wiring preferences.

NEMA4X Enclosure – SLC4011

A NEMA4X enclosure which includes mounting studs to accept an SLC4060. The cover is transparent, so the relay and status indicators are readily visible. See SLC4000AddendumNEMA.pdf , available at www.selectronix.us for physical dimensions and other optional items

Status LED Indications and Flash Rates

A single led capable of displaying green, orange, and red indicates various operating conditions.

Table 5 Status LED Indications and Flash Rates

Color	Flashes in 10 Sec	Flash Frequency	Description
Green	5	½ Hz	Quiescent Normal Operating condition – Master Emulation Used in BMI applications that do not need SLC4000 step controls.
Green/Orange	5	½ Hz	Quiescent Normal Operating condition – Expansion Unit ***This is the normal PGW indication***
Red	5	½ Hz	GPDI Limit Fault (automatically reset when resolved)
Red	10	1Hz	RS485 Fault – Expansion Unit has not received a command from Master for over 10 seconds Limit faults automatically reset when resolved
Red	20	2 Hz	Input is out-of-range (valid for 4-20ma, 2-10V, user-defined)
Red	40	4 Hz	Fault Condition

Physical Dimensions and Component Identification

SLC4060 Board Dimensions and Component Identification

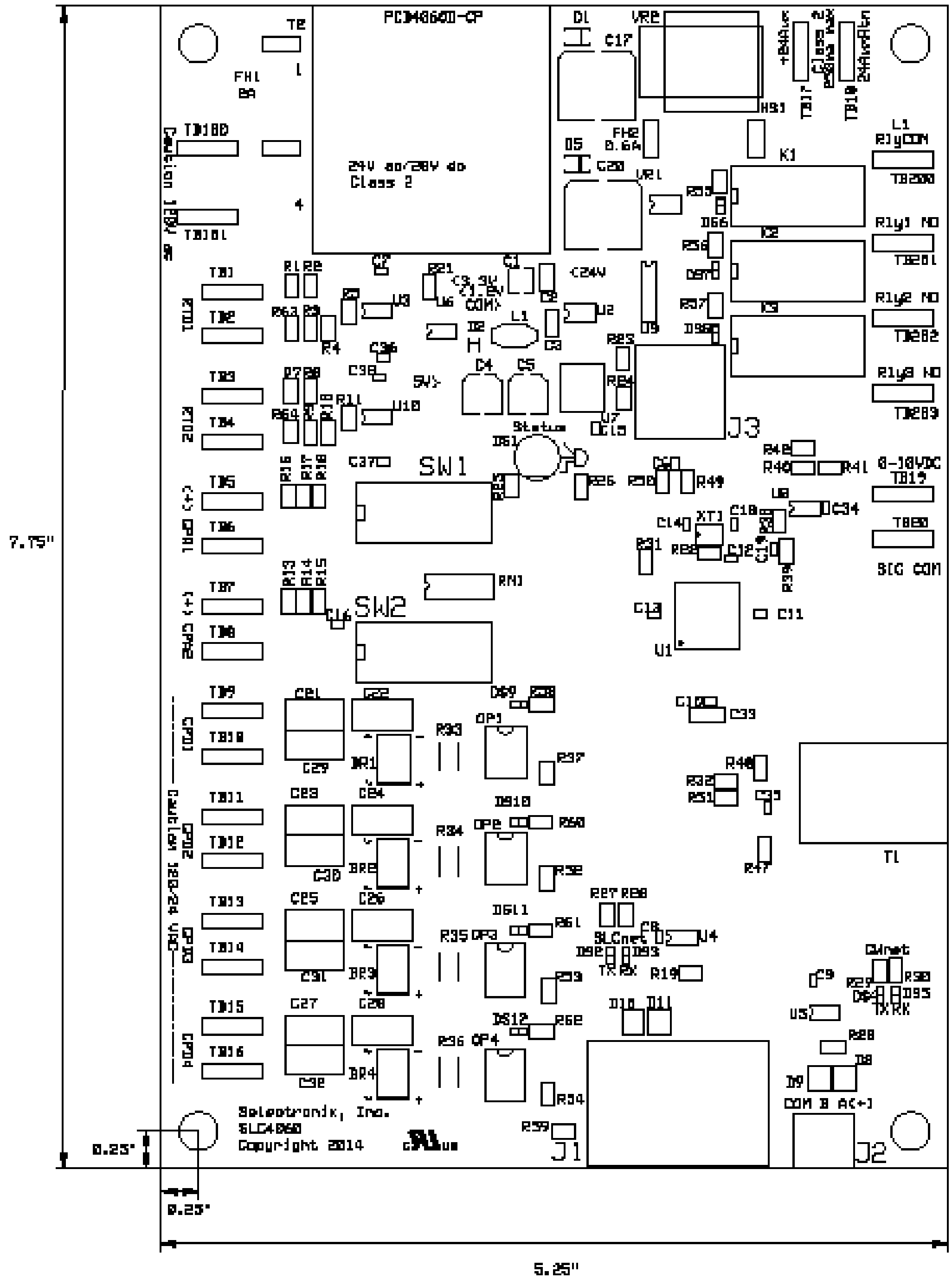


Figure 2 SLC4060 ASSEMBLY

APPLICABLE MODEL NUMBERS: SLC4060-xxx-yyy-zzz

Physical and Electrical Installation

- Review all installation and wiring instructions thoroughly before proceeding.
- Inspect the SLC4060 unit for any physical damage.
- Verify that the operating ambient temperatures will be within -40 to 80 degrees C. (32 to 158 degrees F).
- Mount the unit by using 6-32 machine screws in the standoffs provided. See Figure 1 for the physical mounting dimensions.
- Verify the proper setting of all switches on the controller. See section 'Unit Configuration'
- **DO Route any of the low voltage signal wires that are connected to TB1 through TB8, TB17, TB18, any cascading cables, network connections such that they are physically separated from the any AC power lines.**
- Connect the SLC4060 using either of the J1 ports to any SLC4000 unit's J1 ports, using a Cascading Cable, SLC4020-x or connect to an SLC4075, using the applicable cable.
- Connect the SLC4060 24V dc output to the SLC4075, TouchScreen Gateway, using a minimum 22-gauge or larger twisted-pair wiring.

RS485 (MS/TP) wiring:

The theoretical maximum for the total RS485 span is 4000 feet. For long span distances, the endpoints of the wiring must be terminated at each end with a 120 ohm resistor across the (+) and (-) terminals to prevent transmission line reflections, which will corrupt the communication signal.
Care must be taken to not introduce ground loops between the nodes. Use of an optically isolated connection may be used to prevent ground loops.
Recommended wire for RS485 is Belden 3106A (3 twisted wires with drain wire).

- Verify that all interconnecting wiring is sized and installed in conformance with the National Electrical Code (NEC) and other applicable local codes.
- Connect the appropriate sensor or input signals to the applicable input terminals per the wiring diagram shown in Figure 3 being careful to observe polarity. Shielded wiring is recommended for all low-level signals. The shield should be terminated at the source side to earth ground. Do not terminate the other end of the shield.
- Connect the Voltage Driver Output being careful to observe polarity and wire routing, as these are low voltage signal wires. Twisted-pair wire is recommended.
- Apply AC power and verify that the SLC4000 Master Unit status LED is flashing GRN, and that the SLC4060 and all Expansion Units are flashing GRN/ORG.

Input Terminal Designations

Table 5 shows the terminal designators and signal polarity for the input terminals.

Shielding

Shielded twisted pair wire is recommended for wire runs which are in close proximity to power wiring or other sources of electromagnetic interference (EMI).

When using shielded wiring, the shield should only be terminated at one end to prevent ground loop currents. Preferably terminate the shield at the source end's signal common. 2nd choice is to terminate the source end to earth ground. 3rd choice is to leave both ends of the shield unterminated. EMI may originate from conducted, induced, or capacitive sources.

Route signal wires away from the AC control power and relays outputs.

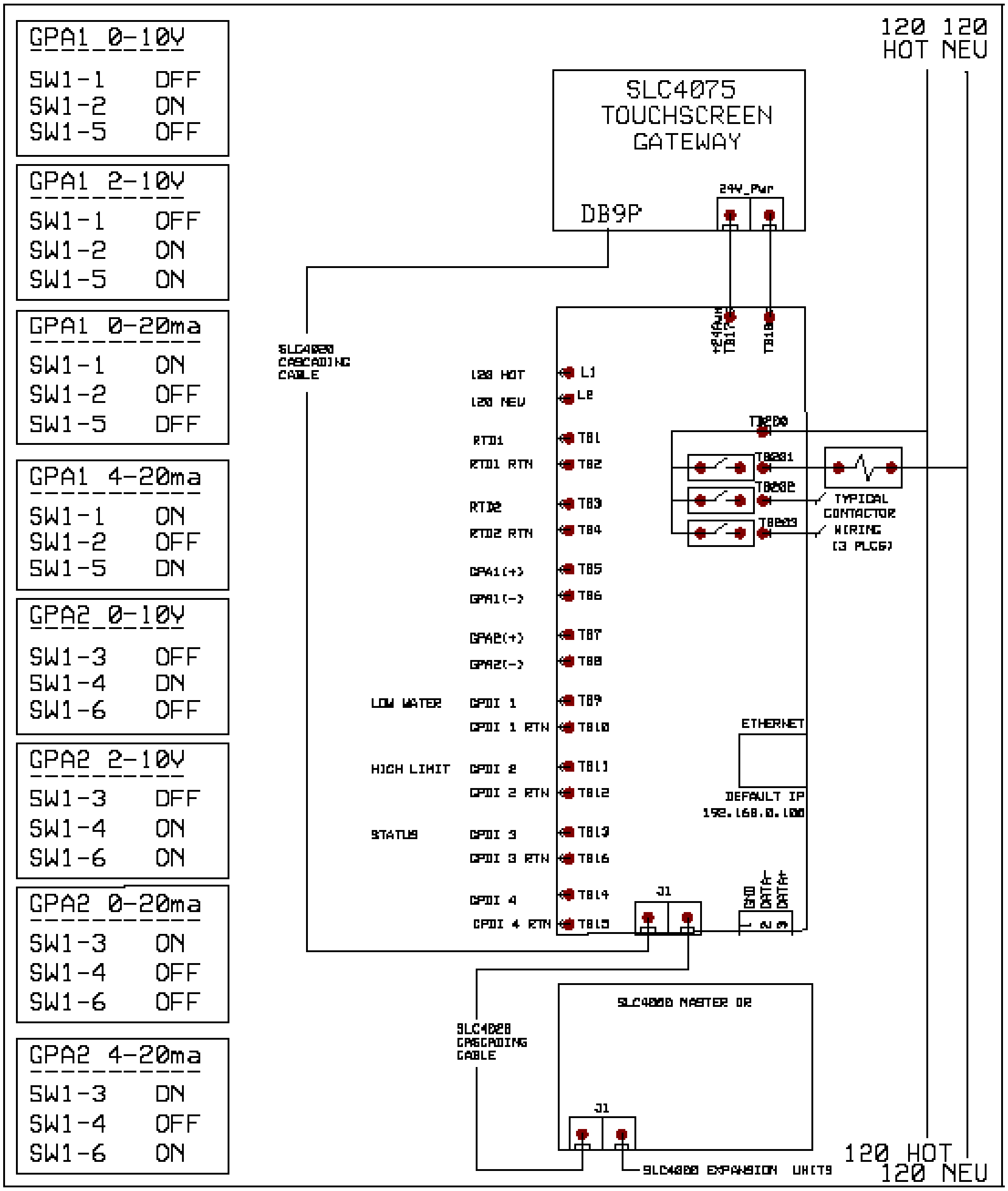
Grounding

The low voltage circuit common on the SLC4060 controllers is TB6, TB8, or TB20. It is isolated from the line control voltage and relay connections.
Connecting the low voltage circuit common to earth ground is optional, however extreme care must be taken not to introduce ground loops. Verify that all field wiring is in accordance with local electrical codes.

Low Voltage Driver Output Wiring

Connect terminals TB19(+) and TB20(-) as desired, to any other device which accepts 0-10 VDC, being careful to observe correct polarity. Refer to Figure 3, Field Wiring Diagram.

Figure 3 FIELD WIRING DIAGRAM



Startup and Adjustments

- Verify that all configuration switches are set as desired.
- Verify that the wiring is in accordance with Figure 4, Field Wiring Diagram.
- Make all connections while the AC power is OFF.
- ***Verify the wiring in the remainder of the Control System before energizing the line power.***
- Apply line power to the Control System.
- If Expansion Units are used in the system, verify that the Master Unit's Status LED blinks Green/Off. Verify the
- SLC4060 and the Expansion Unit's status LED blinks Green/Orange.
- Turn the line power off.

Fuses

- There are 2 fuses on the SLC4060. One is for the control voltage and another is for the auxiliary 24V dc.
- The control voltage fuse is a 2A fast-blow fuse, Littelfuse 0217002HXP, 5 x 20 mm fuse.
- The auxiliary 24V is a 0.6A fast-blow fuse, Littelfuse 0235.600HXP, 5 x 20 mm fuse..

Table 6 Wiring List

Terminal Designation	Short Name	Type	Polarized?	Description	Remarks
TB100	Pwr	Power	Y	120 V ac Hot	
TB101	Pwr return	Power	Y	120 V ac Neutral	
TB1	RTD1	RTD	N		
TB2	RTD1	RTD	N		
TB3	RTD2	RTD	N		
TB4	RTD2	RTD	N		
TB5	GPA1	0-10V dc/4-20 ma	Y	Gen Purp Analog	
TB6	GPA1 return	Signal common	Y		
TB7	GPA2	0-10V dc/4-20 ma	Y	Gen Purp Analog	
TB8	GPA2 return	Signal common	Y		
TB9	GPDI1	120 V ac	N	Gen Purp Digital In	Low Water default
TB10	GPDI1 return	120 V ac return	N		
TB11	GPDI2	120 V ac	N	Gen Purp Digital In	High Limit default
TB12	GPDI2 return	120 V ac return	N		
TB13	GPDI3	120 V ac	N	Gen Purp Digital In	Status default
TB14	GPDI3 return	120 V ac return	N		
TB15	GPDI4	120 V ac	N	Gen Purp Digital In	
TB16	GPDI4 return	120 V ac return	N		
TB17	+24Aux		Y	24V for TSGW	
TB18	+24Aux return		Y		
TB19	VltDrvr	0-10V	Y		
TB20	VltDrvr return	0-10V return	Y		
TB200	L1 RLYCOM	120 V ac Hot			
TB201	RLY1 N.O.				
TB202	RLY2 N.O.				
TB203	RLY3 N.O.				
J1	SLCnet	RS485		SLCnet	
J2	GWnet	RS485		GWnet	
T1	Ethernet	Ethernet		Bootloader	192.168.0.100

TROUBLESHOOTING

Table 7 Troubleshooting

SYMPTOM	POSSIBLE CAUSE	REMEDY
Status LED not flashing	Fuse blown	Replace F1
Status LED flashing red at 20 flashes in 10 seconds.	Input is out-of-range for RTD, or general purpose analog offset inputs, such as 4-20ma or 2-10VDC.	Verify that signal source is providing a signal that matches the input configuration switch settings.
Status LED is flashing red at 10 flashes in 10 seconds	Communication with the master has been interrupted.	Cycle incoming power to all the SLC4000 units. If indication persists, disconnect the faulty unit's power and cascading cables. Re-connect cascading cables to any remaining good units. It is then possible to continue operating with the remaining units without any re-configuration , with a diminished temporary capacity.
Status LED is flashing red at 40 flashes in 10 seconds.	An internal fault has been detected.	Cycle incoming power to the SLC4060. If the indication persists, the unit must be replaced.
Output relays turn on, but the contactors do not energize.	No connection to TB200, which is the common terminal for all the relay contacts. It is normally connected to the coil voltage source.	Wire per Figure 3 verifying a matching contactor coil voltage.
PID1 has no output	• PID Mode Select is Disabled • Engr Unit has not been selected • PID parameters have not been set	• Select desired PID mode • Select desired Engr Unit • Select desired PID parameters. Use PID Preset for various starting values for Slow, Med, Fast
PID2 has no output to SLC4000	• PID1 is enabled • Either Heat Mode Remote or Cool Mode Remotes have not been selected	• Only 1 PID may be used for remote control of SLC4000 • Both PIDs may be used if 1 is assigned to the voltage driver
Setpoint Modifier Not working	• SPM Src Select has not been selected • SPM parameters have not been set	• Select desired SPM source • Set desired SPM parameters. Use SPM Preset for various starting values.
Aux/BMS switch does not stay in BMS position	• If the PGW loses communication with the TSGW with a remote PID mode enabled, the Aux/BMS switch reverts to the Aux position to ensure an invalid PID command value is not used by the SLC4000	• Verify that the PGW is powered, and the status led is flashing Grn/Org.

Troubleshooting Tips

- Isolate the source of the problem to being either internal or external to the controller by disconnecting the external wiring, and driving the controller with a local input source.

- RTD Input Simulation.

    - Use a test potentiometer with a minimum resistance value of 1000 ohms, and a maximum of 2000 ohms, 1/2 watt or greater.
    - Find the terminal that measures 0 ohms between the center terminal with the knob fully CCW.
    - Connect this terminal to TB1.
    - Connect the pot's center terminal to TB2.
    - The pot simulates the RTD

SPECIFICATIONS

Table 8 Electrical and Physical Specifications

Part Numbering	SLC4060-xxx-yyy-zzz : xxx is firmware option yyy is Digital Input voltage option zzz is Control power option
POWER:	SLC4060-xxx-yyy-zzz : Control power option zzz = 120 or none 120 V ac +/- 10% @ 15 VA max., 50/60 Hz. zzz = 24 24V ac/dc +/- 10% 15VA 50/60 Hz/15W max
FUSES:	F1: 2A Fastblow, Littelfuse 0217002HXP or equivalent, 5x20mm . F2: 0.6A Fastblow, Littelfuse 0235.600HXP or equivalent, 5x20mm
TEMPERATURE:	Storage: -55 to +150 Deg C Operating: -40 to +80 Deg C
INPUT:	• RTD1, RTD2 -60 Deg F (-51 Deg C) to 260 Deg F (126.6 Deg C • General Purpose Analog Voltage Input: 0-10VDC, 2-10VDC into 15.7K input impedance. • General Purpose Current Input : 0-20ma, 4-20 ma DC through 62 ohms • General Purpose Digital Input: Digital Input voltage option o SLC4060-xxx-yyy-zzz yyy=120 or none: 120V ac @ < 5 ma o yyy= 24 24V ac/dc @ < 5 ma
RELAY OUTPUT:	Relay Contact, Pilot Duty • Contact Rating: 5A @ 250 VAC, 30 VDC • Limit continuous load to 135VA per relay
VOLTAGE DRIVER OUTPUT:	• 0 to 10 VDC into 1K ohms minimum
FIELD WIRING:	• 1/4" quick-connect male terminals provided for all connections. • J1 RJ-45 type connectors are used for interconnections to SLC4000 units • .J2 is a 3 contact terminal board for RS485 communications • T1 RJ-45 for Ethernet communications.
SIZE:	7.75" height by 5.25" width by 2" max.