# SECTION 405040 PROGRAMMABLE LOGIC CONTROLLER AND OPERATOR INTERFACE

## PART 1 - GENERAL

### A. Description

This section includes requirements for materials, testing, and installation of a control system.

## PART 2 - MATERIALS

### A. Designations of Components

1. In these specifications and on the plans, all systems, and other elements are represented schematically and are designated by numbers, as derived from criteria in ISA standards. The nomenclature and numbers designated herein and on the plans shall be employed exclusively throughout shop drawings, data sheets, and the like. Any other symbols, designations, and nomenclature unique to a manufacturer's standard methods shall not replace those prescribed above, as used herein, and on the plans.

### B. Programmable Logic Control System

1. A fully integrated programmable logic control system shall be furnished as specified in this section. The programmable logic control system hardware shall be intelligent process control units with analog and discrete I/O for process interface.

2. The a-c power of the control system will be 120-volt or 220-volt +10% -15% a-c, 50-60 hertz, single phase derived from line power. The system shall be designed to operate satisfactorily from 0 °C to 55 °C ambient temperature for the PLC.

### C. Programmable Logic Controller (PLC) for Santa Maria System

1. Provide the following PLC hardware by Allen-Bradley (to match existing):

   a. PLC – Cat. No. 1766-L32BWA

   b. Analog Input Module - Cat. No. 1762-IF4, 4-Channel Voltage/Current Analog Input Module

   c. Analog Output Module - Cat. No. 1762-OF4, 4-Channel Voltage/Current Analog Output Module.

D. Programmable Logic Controller (PLC) for Nipomo System

1. Provide the following PLC hardware by AutomationDirect (to match existing):

   a. PLC DL06 – P/N D0-06DD

E. PLC Software

1. Software for MicroLogix 1400

   a. Not required

2. Software for Direct Logic DL06

   a. Not required

F. Operator Interface

1. Provide, program, test, fully configure, and place into operation Operator Interface as indicated herein.

2. The operator interface shall be a panel mounted electronic assembly that allows bi-directional communication with a programmable logic controller.

3. The OI shall be a TFT-type and have touch screen capability. The unit shall employ flash memory for storing the application specific symbols and data. The unit shall be capable of handling up to 160 touch areas per screen display and a minimum of 50 screens. Each touch area shall provide audible feedback to the operator.

4. The unit shall meet the following requirements:

   a. Size: 8-in diagonal (nominal)

   b. Display View: 7.5-in diagonal, minimum

   c. Resolution: 640 x 480 pixel, minimum

   d. Brightness: 300 nits, minimum

   e. Ambient temperature rating – 50 °C

5. Screens shall be configured using an off-line PC based software package that operates in the Windows environment. Each display screen shall consist of graphic representations of legend plates, push buttons, pilot lights, numeric data displays, numeric data entry buttons, bar graphs, time displays, text displays, selector switches, illuminated push buttons, counter/timer numeric preset and increment/decrement buttons. Graphics

can be created using any software that produces standard BMP files. Applications shall be downloaded to the operator interface device and stored in flash memory.

6. The unit shall be capable of displaying text messages that can be triggered by the status or values of bits or numeric variables in the programmable logic controller. In addition, the unit shall be capable of accepting and displaying text messages that are stored in programmable controller as ASCII strings.

7. Graphics: The operator shall monitor and control the system using a number of pre-configured graphic displays, which represent the particular equipment and processes being controlled. Minimum of five screens shall be programmed for each process unit shown on a single P&ID. Graphic displays shall be provided illustrating a process flow using symbols to represent equipment with process flow direction lines connecting the symbols. Symbols shall be used for pumps, motors, valves, and primary elements. Adjacent to each discrete graphic symbol, the description shall be included. Adjacent to each analog graphic symbol, the point description, current value, and engineering units shall be displayed. Alarm messages shall flash. All process lines, structures, and equipment shall be identified with the proper nomenclature. The process and instrumentation diagrams (P&IDs) provided under these specifications shall be used to help generate graphics displays.

8. The OI shall communicate with the programmable logic controller in a fashion, as determined by the PLC manufacturer. A communication driver shall be provided with the editing software.

9. All cables for communication between the unit and the PLC shall be provided along with a cable for serially interfacing the device with a personal computer.

10. Provide the following Operator Interface Panels:

    a. At SMICP-100 – PanelView Plus by Allen-Bradley

    b. At NCSD ICP-31 – C-more by AutomationDirect

G. <u>UPS</u>

1. Provide the following UPS by Allen-Bradley

    a. At SMICP-100 – Cat. No. 1609-S350NS

    b. At NCSD ICP-31 – Cat. 1609-U500NH

H. Spare Parts

1. Not required

PART 3 - EXECUTION

A. Refer to Section 405000.

END OF SECTION