



ENGINEERING SPECIFICATION

SYMCOM MODEL PC-105 Pump Control

PART 1 GENERAL

1.1 REFERENCES

- A. UL 913 Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) locations, Sixth Edition – Underwriters Laboratories
- B. CAN/CSA-C22.2 No. 157-1992, "Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations"
- C. UL 508 Industrial Control Equipment – Underwriters Laboratories
- D. IEC 60947 Low Voltage Switchgear and Controlgear – International Electrotechnical Commission
- E. CSA C22.2 No. 14 Industrial Control Equipment – Canadian Standards Association
- F. ANSI/IEEE C62.41 – American National Standards Institute/Institute of Electrical & Electronics Engineers

Relays shall be installed according to the latest version of the National Electrical code.

1.2 WARRANTY

- A. Manufacturer Warranty: The manufacturer shall guarantee the pump control to be free from material and workmanship defects for a period of five years from the date of manufacture when installed and operated according to the manufacturer's requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

The equipment specified shall be the Model PC-105, manufactured by SymCom, Inc.

2.2 DESCRIPTION

- A. Regulatory Requirements:
 - 1. The equipment shall be UL Listed as type NKCR—Industrial Control Equipment-Motor Controllers-Auxiliary Devices.
 - 2. The equipment shall be cUL Listed as type NKCR7—Industrial Control Equipment-Motor Controllers-Auxiliary Devices Certified for Canada.

2.3 PERFORMANCE/DESIGN CRITERIA: DUPLEX, TRIPLEX, AND QUADPLEX PUMP CONTROL

- A. General IO Capability
 - 1. Outputs:
 - a. The equipment shall include 4 SPST output relay contacts pilot duty rated at 480VA at 240VAC.
 - b. The equipment shall include 1 SPDT output relay contact pilot duty rated at 480VA at 240VAC.
 - 2. Inputs
 - a. The equipment shall provide 5 inputs.
 - 3. The equipment shall provide the following external inputs:
 - a. Power Reset
 - b. Alarm Silence/Alarm Reset
 - c. Remote Control 2
 - d. Remote Control 1
- B. Functions
 - 1. The equipment shall have out-of-sequence detection.
 - a. The equipment shall flash the LED of the out-of-sequence input.
 - b. The equipment shall energize the audible alarm relay during an out-of-sequence fault.
 - c. The equipment shall provide a 10 second trip delay on out-of-sequence faults.
 - d. The equipment shall reset out-of-sequence faults with a power-cycle.
 - e. The equipment shall indicate an out-of-sequence fault when a float does not close.
 - 2. The equipment shall provide an adjustable inrush delay that prevents pump 1 and pump 2 from starting simultaneously.
 - 3. The equipment shall provide a minimum fixed 2 second inrush delay on all pumps to prevent the pumps from starting simultaneously.
 - 4. The equipment shall provide jockey/duty pump configuration.
 - a. The equipment shall have a separate input and relay to control the jockey/duty pump.
 - b. The float input shall not be included in the out-of-sequence detection.
 - 5. The equipment shall provide emergency pump configuration:
 - a. The equipment shall have a separate input and relay to control the emergency pump.
 - b. The float input shall not be included in the out-of-sequence detection.
 - 6. The equipment shall provide external alternation control, to configure pump 1, 2, 3 or 4 as the dedicated lead pump.
 - 7. The equipment shall provide float out of sequence alarms, which indicates a float has not closed.



8. The equipment shall provide separate pump stop modes for pump-up and pump-down systems.
 - a. The equipment shall start each pump with its corresponding on float.
 - b. The equipment shall stop each pump with its corresponding off float.
 - c. The equipment shall provide 2 on float inputs.
 - d. The equipment shall provide 2 off float inputs.

9. The equipment shall provide switch mode that includes the following functions and features:
 - a. 2 latching inputs
 - b. 1 SPDT delay-on-make or delay-on-break time delay relay
 - c. Individual channel invert control which causes a relay to function as either normally open or normally closed.
 - d. Adjustable time delay from 2-255 seconds
 - e. 5 inputs
 - f. 5 outputs

10. The equipment shall provide duplex pump-down mode that includes the following functions:
 - a. High, Low level alarm relays
 - b. Pump 1, Pump 2 relays
 - c. Audible alarm relay
 - d. Low, Stop, Lead, Lag, High inputs for normally open floats
 - e. Alternates between Lead and Lag pump every cycle of the stop float
 - f. Pumps shall turn off with a common stop float

11. The equipment shall provide triplex pump-down mode that includes the following functions:
 - a. High or Low level alarm relays
 - b. Pump 1, Pump 2, Pump 3 relays
 - c. Audible alarm relay
 - d. Low or High, Stop, Lead, Lag1, and Lag2 inputs for normally open floats
 - e. Alternate between Pump 1, Pump 2, and Pump 3 every cycle of the stop float
 - f. Pumps shall turn off with a common stop float

12. The equipment shall provide quadplex pump-down mode that includes the following functions:
 - a. Pump 1, Pump 2, Pump 3, Pump 4 relays
 - b. Audible alarm relay
 - c. Stop, Lead, Lag1, Lag2, and Lag3 inputs for normally open floats
 - d. Alternate between Pump 1, Pump 2, Pump 3, and Pump 4 every cycle of the stop float
 - e. Pumps shall turn off with a common stop float

13. The equipment shall provide Duplex SPS (separate pump stop) pump-down mode that includes the following functions:
 - a. Pump 1, Pump 2 relays
 - b. Audible alarm relay
 - c. High or Low level alarm relays
 - d. Low or High, Lead Stop, Lead, Lag Stop, Lag inputs for normally open floats.
 - e. Pumps shall turn off independently with Lead, Lag stop floats

14. The equipment shall provide duplex pump-up mode that includes the following functions:
 - a. High, Low level alarm relays
 - b. Pump 1, Pump 2 relays
 - c. Audible alarm relay
 - d. Low, Stop, Lead, Lag, High inputs for normally open floats
 - e. Alternates between Pump 1 and Pump 2 every cycle of the stop float
 - f. Pumps shall turn off with a common stop float

15. The equipment shall provide triplex pump-up mode that includes the following functions:
 - a. High or Low level alarm relay
 - b. Pump 1, Pump 2, Pump 3 relays
 - c. Audible alarm relay
 - d. Low or High, Stop, Lead, Lag1, and Lag2 inputs for normally open floats
 - e. Alternate between Pump 1, Pump 2, and Pump 3 every cycle of the stop float
 - f. Pumps shall turn off with a common stop float

16. The equipment shall provide quadplex pump-up mode that includes the following functions:
 - a. Pump 1, Pump 2, Pump 3, Pump 4 relays
 - b. Audible alarm relay
 - c. Stop, Lead, Lag1, Lag2, and Lag3 inputs for normally open floats
 - d. Alternate between Pump 1, Pump 2, Pump 3, and Pump 4 every cycle of the stop float
 - e. Pumps shall turn off with a common stop float



17. The equipment shall provide duplex SPS (separate pump stop) pump-up mode that includes the following functions:
 - a. Pump 1, Pump 2 relays
 - b. Audible alarm relay
 - c. High or Low level alarm relay
 - d. Provide Low or High, Lead Stop, Lead, Lag Stop, Lag inputs for normally open floats
 - e. Pumps shall turn off independently with Lead, Lag stop floats
- C. Human Interface Features
 1. The equipment shall provide the following functions controlled from a DIP switch:
 - a. Low Alarm Enable
 - b. High Alarm Enable
 - c. Pump 1 Enable
 - d. Pump 2 Enable
 - e. Pump 3 Enable
 - f. Pump 4 Enable
 - g. Audible Alarm Fail Safe Enable
 - h. Alternation Control
 2. The equipment shall include the following mode settable by a BCD switch:
 - a. Switch mode
 - b. Duplex pump-down mode
 - c. Triplex pump-down mode
 - d. Quadplex pump-down mode
 - e. Duplex pump-down, separate pump stop
 - f. Duplex pump-up mode
 - g. Triplex pump-up mode
 - h. Quadplex pump-up mode
 - i. Duplex pump-up, separate pump stop
 3. The equipment shall include a dial adjustment to set lag pump delay times from 2-255 seconds.
 4. The equipment shall have 10 indicator LEDs. Each LED shall be capable of indicating the status of its corresponding input or output.
- D. Electromagnetic Compatibility
 1. The equipment shall be immune to electrostatic discharge per IEC 61000-4-2, Level 3, 6 kV contact discharge and 8 kV air discharge.
 2. The equipment shall be immune to electrical fast transient bursts exceeding IEC 61000-4-4, Level 3. Specified limits shall be 4 kV input power 2kV inputs/outputs.
 3. The equipment shall be immune to electrical surges per IEC 61000-4-5, Level 4. Specified limits shall be 4kV line-to-line and line-to-ground.
 4. The equipment shall be immune to radiated radio frequency emissions. Specified limits shall be 10V/m at 150 MHz.
- E. Dielectric Isolation: The equipment shall provide 2000VAC dielectric withstand between the AC mains and the relay contacts and between the AC mains and enclosure for 1 minute.
- F. Enclosure Class of Protection: The equipment shall provide IEC IP20 (finger safe) protection.
- G. Environmental Requirements
 1. The equipment shall operate continuously without de-rating in ambient temperatures of -20° to 55°C (-4° to 133°F).
 2. The equipment shall operate continuously without de-rating in relative humidity of up to 95% non-condensing per IEC 68-2-3.
 3. The equipment shall operate properly after storage in ambient temperatures of -40° to 80°C (-40° to 176°F).
- H. Dimensions: The equipment dimensions shall not exceed 3.703" in width X 5.025" in length X 2.35" in height.
- I. Mounting:
 1. The equipment shall be mountable on standard 35 mm DIN rail.
 2. The equipment shall be surface mountable on a backplane using 2 screws, bolts or similar mounting hardware.

End of Section