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Microtechnologies' PSA 1 Dual Load Sequencer

Description:

The PSA-1 Dual Load Sequencer is designed to even the wear of pumps, compressors, air conditioners, etc. in redundant systems. This manual will use the word **load** throughout this manual in place of pump, compressor, a/c, etc. The PSA-1 evens the wear on the loads by automatically alternating between the two loads based on running time or on-off cycles. The load that is energized first is referred to as the lead load, and the second load is referred to as the lag load. Pressing the A or B pushbutton selects the lead load.

The ON/OFF CONTROL input is used to energize a load. When the ON/OFF CONTROL input is closed, the lead load is energized. When the input is opened, the lead load is de-energized.

The PSA-1 monitors the FLOW input to verify operation of the load. When the lead load is energized, the PSA-1-1 will wait a selectable period of time. If after this period of time the FLOW input is not closed, indicating that the lead load is not functioning, the lead load is de-energized and the alarm relay is turned on. This load will no longer be energized and the lag load will become the new lead load.

A closure of the AUX input turns on the AUX OUTPUT relay. The user as required can utilize the AUX output relay.

The ALARM relay is energized when a load fails. Pressing the ALARM OFF button turns off the ALARM relay.

PSA-1 I/O Definitions

Flow	Input	24vac sourced	
ON/OFF CONTROL	Input	24vac sourced	
AUX	Input	24vac sourced	
AUX OUTPUT	Output	Isolated dry contact	Omron LY-2 (JOAW) 24 V dc
ALARM	Output	Isolated dry contact	Omron LY-2 (JOAW) 24 V dc
LOAD 2	Output	Isolated dry contact	Omron LY-2 (JOAW) 24 V dc
LOAD 1	Output	Isolated dry contact	Omron LY-2 (JOAW) 24 V dc

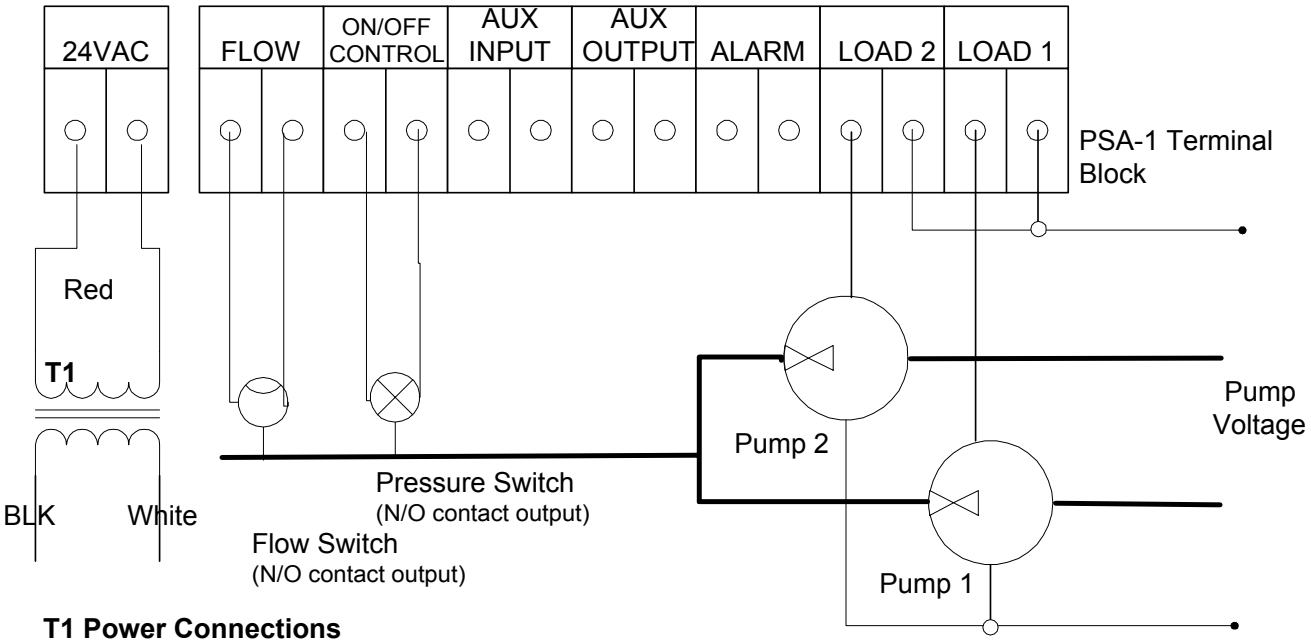
Dip Switch Settings
The PSA-1 has eight dips switches to custom configure the control to any application. The dip switches are described below.

Dip Switch #	Function
1	45 second ALARM time delay (note 1 and 2 off: 20 second delay)
2	5 minute ALARM time delay
3	7 day load alternation
4	14 day load alternation
5	30 day load alternation
6	Alternate load on every on-off cycle
7	Both loads are energize if both loads fail
8	Aux relay is energized if load B fails

PSA-1 Power Requirements
- Panel supply: 120 VAC
- Control power: 24VAC

Example applications are shown below.

Example 1: Wiring the PSA-1 for use in dual pump systems



T1 Power Connections
Connect black wire to line hot fused
Connect white wire to line neutral

Example
The PSA-1 alternates operation between pump 1 and pump 2 to maintain 45psi in a tank. When the pressure drops below 45psi, the contacts of the pressure gauges closes and the PSA-1 starts a pump.

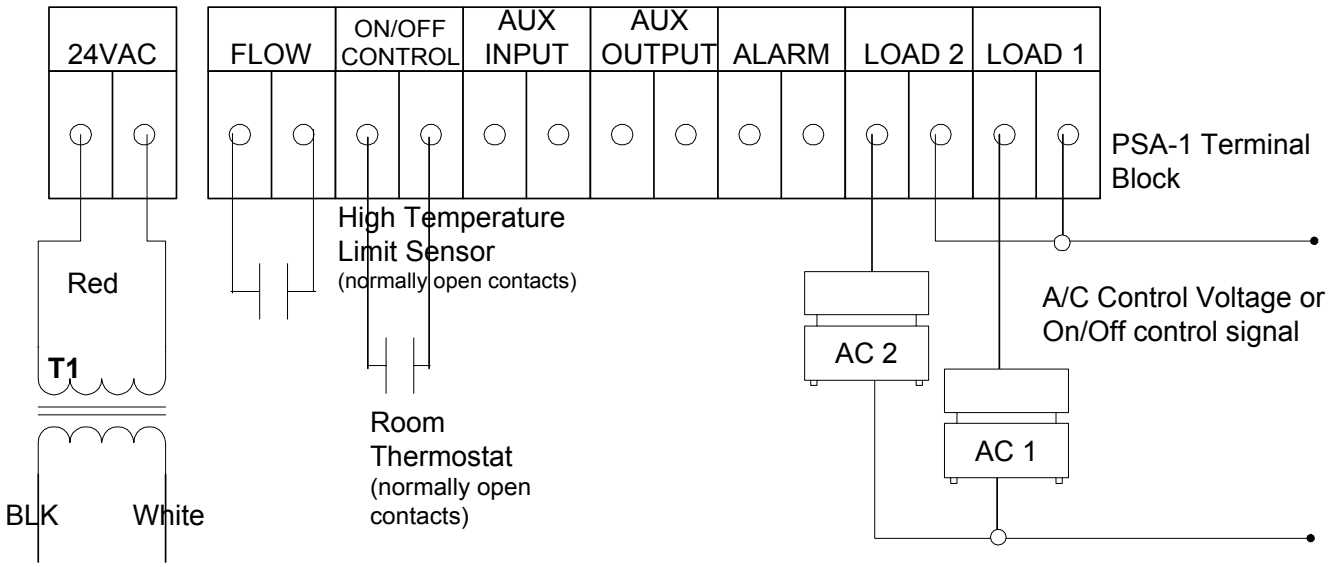
Configuration
Pump 1 is the lead pump, Pump 2 is the lag pump. A pressure switch is wired to the ON/OFF CONTROL input and a flow switch is wired to the FLOW input. The FLOW input verifies the operation of the pumps.The dip switch setting on the PSA-1 are set to alternate the pumps on every on-off cycle. The alarm time delay is set to 5 minutes.

Normal Operation
The PSA-1 starts the lead pump when system pressure drops below 45psi and the contacts of the pressure switch close. The lead pump will remain on until system pressure raises above 45psi and the pressure switch opens. When system pressure once again falls below 45psi, the lag pump is turned on and will remain on until system pressure raises above 45psi. Each pump is run on alternate cycles.

What happens if a pump fails?
When the system pressure falls below 45psi, the lead pump is turned on. If after 5 minutes of operation, flow switch does not close indicating that the pump is operating, the lead pump is turned off and the lag pump is turned on. The alarm relay is also turned on. The pump that has failed is no longer used and will not be used until the ALARM OFF push-button is pressed.

What happens if both pumps fail?
When the system pressure falls below 45psi, the lead pump is turned on. If after 5 minutes of operation, the flow switch does not close, the lead pump is turned off and the lag pump is turned on. The alarm relay is also turned on. This pump is no longer used. If after 5 minutes with the lag pump on and the flow switch is not closed, the lag pump will also be turned off and the alarm relay will be turned on. Both pumps will not be engergized until the ALARM OFF push-button is pressed.

Example 2: Wiring the PSA-1 for use in dual A/C systems



T1 Power Connections
Connect black wire to line hot fused
Connect white wire to line neutral

Example 2
The PSA-1 alternates operation between the two air conditioners to maintain an equipment room at 72 degrees. When the temperature drops below 72, the contacts of the room thermostat closes and the PSA-1 starts A/C 1.

Configuration
A/C 1 is the lead A/C, and A/C2 is the lag A/C. A room thermostat is set 72 degrees and is wired to the ON/OFF CONTROL input. The normally closed contacts of a high temperature limit sensor is set to 80 degrees and is wired to the FLOW input to verify the operation of the A/C units. The dip switch setting on the PSA-1 are set to alternate the air conditioners every 5 days. The alarm time delay is set to 30 seconds.

Normal Operation
The PSA-1 starts the lead A/C when the room thermostat contacts close (the temperature of the room raises above 72 degrees) and will remain on until the room thermostat contact open (temperature falls below 72 degrees). After 5 days of operating the lead A/C, the PSA-1 will use the lag A/C to cool the room.

What happens if an A/C fails?
Room temperature raises above 72 degrees the lead A/C is started. After 30 seconds the PSA-1 looks at the high temperature limit sensor input. If the contacts are open, indicating that the room temperature is above 80 degrees, the PSA-1 will turn off the lead A/C and turn on the lag A/C. The lead A/C will no longer be used in the system until the air conditioner is repaired and the PSA-1 alarm is cleared by pressing the ALARM OFF push-button.

What happens if both A/C fail?
Room temperature raises above 72 degrees and the lead A/C is started. After 30 seconds the PSA-1 looks at the high temperature limit sensor input. If the contacts are open, indicating that the room temperature is above 80 degrees, the PSA-1 will turn off the lead A/C and turn on the lag A/C. Only the lag A/C will be used in the system until A/C 1 is repaired and the PSA-1 alarm is cleared. If while the lag A/C is on and the contacts of the high temperature limit sensor opens, indicating that the lag A/C has failed to cool the room, the lag A/C will also be turned off and no longer used until the alarm condition is cleared.

In the case of a dual failure of both A/C units, the PSA-1 can be configured to turn on both units at the same time. It is possible that the load that the A/C's are seeing are too high to cool the room. With both A/C units on it may over come this load.