LIQUIP SALES PTY LTD ENGINEERING DEPARTMENT 13 HUME RD SMITHFIELD SYDNEY N.S.W. AUSTRALIA 2167
PH +61 2 97251055 FAX +61 2 96096459

TECH TALK NO.41 - OVERFILL PROTECTION

TWO PD100 MONITORS CONTROLLING ONE PUMP

OBJECTIVE

A depot has two loading bays and no preset valves. The Owner wants to control overfill by stopping the single pump which supplies both bays. Each bay has its own "Probe Doctor".

Operational Description

The loading of ordinary road tanker can be split up into four different combinations as follows : (1) Both bays are not in use, pump is off, (2) Bay 1 is in use and bay 2 is not, hence only PD100(1) is controlling the pump, (3) Bay 1 is not in use but bay 2 is, PD100(1) Monitor is thus bypassed and PD100(2) is controlling the pump and (4) Both bays are in use, in this case both Monitors are connected in series and both need to be in Permissive mode for the pump to start. Consequently when either Monitor detects an overfill, the pump will be shut down.

An Emergency button is added for security and this can be done at any time to shut down the pump

A manual START/STOP button is wired up in series to the control logic to provide manual reset of the pump. But this can ONLY be done when the Monitor(s) are in Permissive Mode.

System Setup

Please Refer to Sketch TMCOP-01

1	PD100(1)	: PROBE DOCTOR in BAY 1 - Output contact is normally open when Non-Permissive
2	PD100(2)	: PROBE DOCTOR in BAY 2 - Output contact is normally open when Non-Permissive
3	PARK ADAPTOR 1	: PARKING ADAPTOR in BAY 1, volt-free contacts output - Output contact is normally open when parked ie. not in use
4	PARK ADAPTOR 2	: PARKING ADAPTOR in BAY 2, volt-free contacts output

		- Output contact is normally open when parked ie. not in use
5	INTERFACE RELAY-240V	: 240V Relay which has two (2) change over contacts
		- Coil is ONLY energised when both Arms are in use (loading)
6	EMERGENCY	: Push Button
		- Contact is normally closed on standby mode.
7	STOP/START	: Push Button
		- Contact is normally closed for automatic operation.
8	PUMP	: 415V Three Phase Motor

CASE 1 : Neither bay is in use

In this case neither bay is loading and the pump should be off.
1.1 Park Adaptor 1 is parked, output contact is OPEN,
1.2 Park Adaptor 2 is parked, output contact is OPEN,
1.3 PD100(1) is in Non-Permissive mode, output contact is OPEN
1.4 PD100(2) is in Non-Permissive mode, output contact is OPEN
- Hence Interface Relay is OFF,
- PD100(1) and PD100(2) are actually connected in parallel to the pump and since they are not connected to any tankers therefore pump can not be started.

CASE 2 : BAY 1 is in use and BAY 2 is not.

Bay 1 is loading and Bay 2 is not.
2.1 Park Adaptor 1 is not parked, output contact is CLOSE,
2.2 Park Adaptor 2 is parked, output contact is OPEN,
3.3 PD100(1) is connected to road tanker and based on the assumption that all probes are in working order and dry, the output contact is CLOSE
3.4 PD100(2) is not connected to road tanker, output contact is OPEN
- Similarly the Interface Relay is OFF and both Monitors are connected in parallel to the pump.
- Since only PD100(1) Monitor will be connected to road tanker hence it will be the primary control of the pump.

CASE 3 : BAY 1 is not in use and BAY 2 is loading

Bay 1 is not loading but Bay 2 is.
3.1 Park Adaptor 1 is parked, output contact is OPEN,
3.2 Park Adaptor 2 is not parked, output contact is CLOSE,
3.3 PD100(1) is not connected to road tanker, output contact is OPEN

3.4 PD100(2) is connected to road tanker and based on the assumption that all probes are in working order and dry, the output contact is CLOSE

- Similarly the Interface Relay is OFF and both Monitors are connected in parallel to the pump.

- Since only PD100(2) Monitor will be connected to road tanker hence it will be the primary control of the pump.

CASE 4 : Both BAYS are loading Simultaneously

In this case, both monitors are connected in series to the pump by the action of the Interface relay.

4.1 Park Adaptor 1 is not parked, output contact is CLOSE,

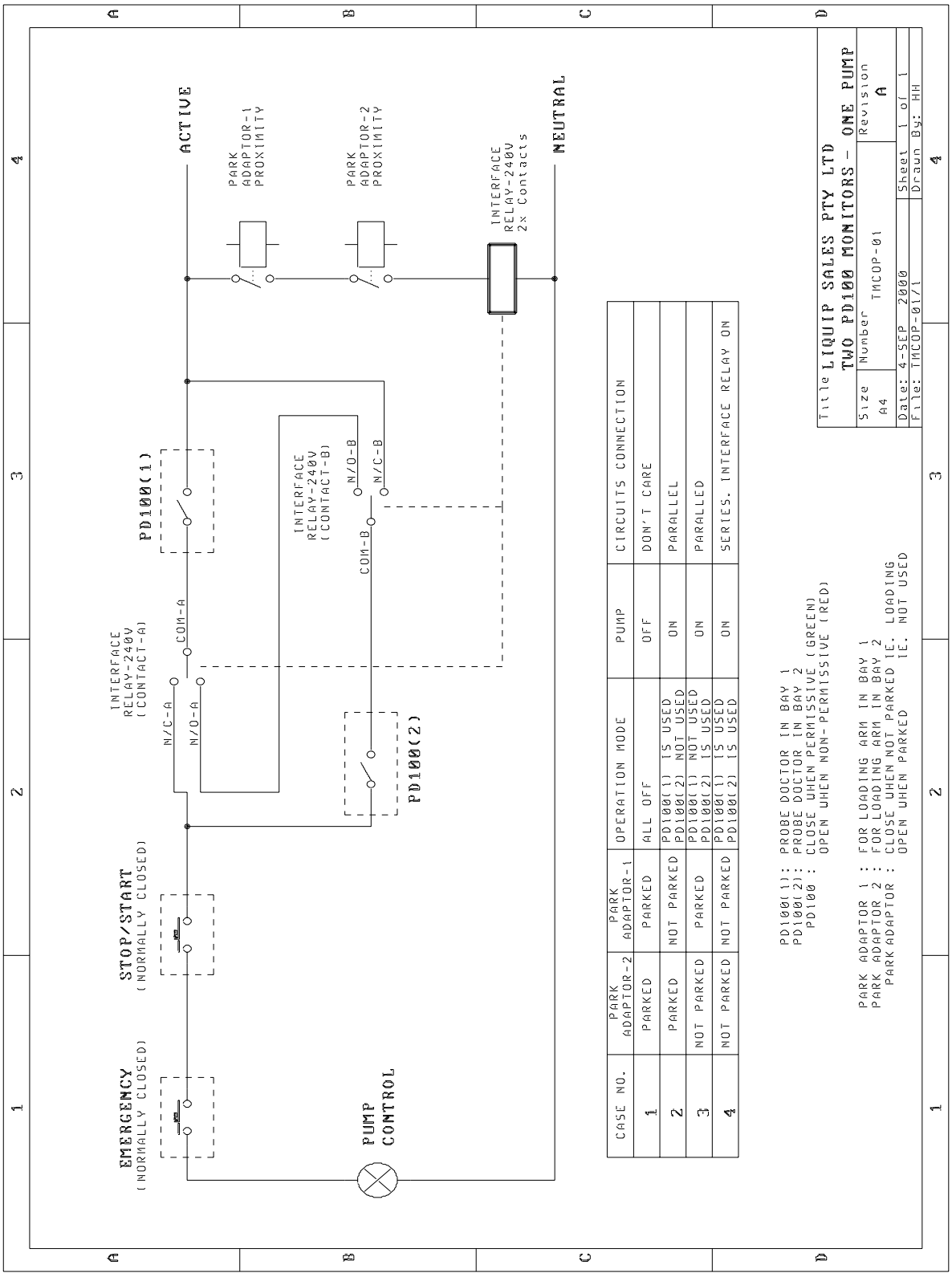
4.2 Park Adaptor 2 is not parked, output contact is CLOSE,

4.3 PD100(1) is connected to road tanker and based on the assumption that all probes are in working order and dry, the output contact is CLOSE

4.4 PD100(2) is connected to road tanker and based on the assumption that all probes are in working order and dry, the output contact is CLOSE

- The Interface Relay is now energised and it connects the two Monitors in series to the pump. The actual series connection is as followed : PD100(1), through CONTACT-A of Interface Relay (COM-A to N/O-A), through CONTACT-B of Interface Relay (N/O-B to COM-B), then PD100(2).

- In this connection, both Monitors become the primary control of the pump hence either Monitor detects an overfill, pump will be stopped.



CASE NO.	PARK ADAPTOR-2	PARK ADAPTOR-1	OPERATION MODE	PUMP	CIRCUITS CONNECTION
1	PARKED	PARKED	ALL OFF	OFF	DON'T CARE
2	PARKED	NOT PARKED	PD100(1) IS USED PD100(2) NOT USED	ON	PARALLEL
3	NOT PARKED	PARKED	PD100(1) NOT USED PD100(2) IS USED	ON	PARALLED
4	NOT PARKED	NOT PARKED	PD100(1) IS USED PD100(2) IS USED	ON	SERIES. INTERFACE RELAY ON