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# Purpose

This document details the design description and specifications of the Exit Manifold Board used in the P5. This board was previously referred to as the Opto Pressure Board.

# Scope

Limited to the electrical design of the Exit Manifold Board, part number A05023 as used in P5.

# References

|  |  |  |
| --- | --- | --- |
| # | **Document Number**  **(Obj ID)** | **Document Name** |
| 1 | A578221 | Electrical Requirements |
| 2 | A543034 | Altium\_Opto\_Pressure Board |
| 3 | A549740 | Pressure Sensor Board BOM |

# Acronyms and Definitions

|  |  |  |
| --- | --- | --- |
| # | **Term** | **Description** |
| 1 |  |  |
| 2 | DC | Direct Current |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 | PWM | Pulse Width Modulation |

# Hardware Block Diagram

Optical sensors

Pressure sensor connectors

Valve connectors

# Connection View

Valve Control

Pressure

Optical Sensors

Exit Manifold Board

Optical

Pressure Sensor 9

Valve 9

Valve 1

Pressure Sensor 1

Main Board

# Functional design description

# Valve Connection

The Exit Manifold Board facilitates the connection of 9 valves that are controlled from the Mainboard.

# Optical Sensors

The Exit Manifold Board has 8 optical sensors that are designed to detect liquid in the tubing used in the Exit Manifold. The control and measurement of these sensors is controlled by the Mainboard.

# Pressure Sensor Connection

The Exit Manifold Board facilitates the connection of 9 pressure sensors which are located on the exit manifold.

# Connector Pin out description

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J11 (Valve 1)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve1 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J12 (Valve 2)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve2 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J13 (Valve 3)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve3 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J14 (Valve 4)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve4 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J15 (Valve 5)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve5 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J16 (Valve 6)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve6 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J17 (Valve 7)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve7 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J18 (Valve 8)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve8 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J19 (Valve 9)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | WDOG-24V | 22 AWG – Red | Power |  |
| Pin 2 | Valve9 | 22 AWG - Black | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J2 (Pressure Sensor 1)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE1 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J3 (Pressure Sensor 2)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE2 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J4 (Pressure Sensor 3)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE3 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J5 (Pressure Sensor 4)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE4 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J6 (Pressure Sensor 5)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE5 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J7 (Pressure Sensor 6)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE6 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J8 (Pressure Sensor 7)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE7 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J9 (Pressure Sensor 8)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE8 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J10 (Pressure Sensor 9)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | 5V\_fil | 26 AWG - Red | Power |  |
| Pin 2 | PR\_SENSE9 | 26 AWG - Yellow | Signal |
| Pin 3 | AN\_GND | 26 AWG - Green | Power |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **J1 (Mainboard Connector)** | | | | |
| **Pin** | **Signal Name** | **Wire/Cable Type** | **Type** | **Wiring Harness** |
| Pin 1 | SENSOR5 | 26 AWG - White | Power | A05084 P5 Opto and Pressure Loom |
| Pin 2 | SENSOR6 | 26 AWG - White | Power |
| Pin 3 | PWM5\_AN | 26 AWG - White | Power |
| Pin 4 | PWM6\_AN | 26 AWG - White | Power |
| Pin 5 | SENSOR4 | 26 AWG - White | Signal |
| Pin 6 | SENSOR7 | 26 AWG - White | Power |
| Pin 7 | PWM4\_AN | 26 AWG - White | Signal |
| Pin 8 | PWM7\_AN | 26 AWG - White | Power |
| Pin 9 | SENSOR3 | 26 AWG - White | Signal |
| Pin 10 | SENSOR8 | 26 AWG - White | Signal |
| Pin 11 | PWM10 | 26 AWG - White | Signal |
| Pin 12 | PWM3\_AN | 26 AWG - White | Signal |
| Pin 13 | SENSOR2 | 26 AWG - White | Signal |
| Pin 14 | PR\_SENSE1 | 26 AWG - White | Signal |
| Pin 15 | 0V | 26 AWG - White | Power |
| Pin 16 | PR\_SENSE2 | 26 AWG - White | Signal |
| Pin 17 | SENSOR1 | 26 AWG - White | Signal |
| Pin 18 | PR\_SENSE3 | 26 AWG - White | Signal |
| Pin 19 | PWM1\_AN | 26 AWG - White | Signal |
| Pin 20 | PR\_SENSE4 | 26 AWG - White | Signal |
| Pin 21 | Valve1 | 26 AWG - White | Power |
| Pin 22 | PR\_SENSE5 | 26 AWG - White | Signal |
| Pin 23 | Valve2 | 26 AWG - White | Power |
| Pin 24 | PR\_SENSE6 | 26 AWG - White | Signal |
| Pin 25 | Valve3 | 26 AWG - White | Power |
| Pin 26 | PR\_SENSE7 | 26 AWG - White | Signal |
| Pin 27 | Valve4 | 26 AWG - White | Power |
| Pin 28 | PR\_SENSE8 | 26 AWG - White | Signal |
| Pin 29 | Valve5 | 26 AWG - White | Power |
| Pin 30 | PR\_SENSE9 | 26 AWG - White | Signal |
| Pin 31 | Valve6 | 26 AWG - White | Power |
| Pin 32 | Valve9 | 26 AWG - White | Power |
| Pin 33 | Valve7 | 26 AWG - White | Power |
| Pin 34 | WDOG-24V | 26 AWG - Red | Power |
| Pin 35 | Valve8 | 26 AWG - White | Power |
| Pin 36 | WDOG-24V | 26 AWG - Red | Power |  |
| Pin 37 | 3.3VAN | 26 AWG - Red | Power |  |
| Pin 38 | 5V | 26 AWG – Red | Power |  |
| Pin 39 | 0V | 26 AWG - Black | Power |  |
| Pin 40 | 0V | 26 AWG - Black | Power |  |