MPA

Functional Design Specification

**FDS revision history:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision** | **Description** | **Sign** | **Date** |
| **0.0.0** | **First** | **MOJO** | **29. Feb. 2016** |
| **0.0.1** | **Lab 2** | **MOJO** | **04. Mar. 2016** |
| **0.1.0** | **New lab. New functionality.** | **MOJO** | **10. Aug. 2016** |

Total number of pages: <number of pages>

# Introduction

This document will describe the designed functionality of MPA.

# Document Status

|  |  |  |  |
| --- | --- | --- | --- |
| Approved | For Approval | Issued for comments | Sign |
| x |  |  | MOJO |

Contents

[Introduction 2](#_Toc458605891)

[Document Status 2](#_Toc458605892)

[List of Figures 4](#_Toc458605893)

[**No table of figures entries found.** 4](#_Toc458605894)

[List of Tables 4](#_Toc458605895)

[**No table of figures entries found.** 4](#_Toc458605896)

[Related Documentation 5](#_Toc458605897)

[HMI Design 5](#_Toc458605898)

[Pump Mode Function 5](#_Toc458605899)

[Safeguarding 5](#_Toc458605900)

[Automatic mode 6](#_Toc458605901)

[Manual mode 6](#_Toc458605902)

[Outside mode 6](#_Toc458605903)

[Auto Level Function 6](#_Toc458605904)

[Run Hours Function 6](#_Toc458605905)

[Emergency Stop Function 6](#_Toc458605906)

# List of Figures

# **No table of figures entries found.**

# List of Tables

# **No table of figures entries found.**

# Related Documentation

* <Contract reference>
* <GA reference>
* PandID\_MPA
* <Electrical drawings reference>
* IOlist\_MPA
* <TD reference>

# HMI Design

The following guidelines shall be used for HMI screen colors

* Grey (RGB 192,192,192) shall be used as default background to minimize glare and maximize consistency.
* Use of colors is preferred to be minimized to decrease operator fatigue and let alarm colors stand out.
* Alarm color is 1Hz flashing red with cross (not flashing if confirmed).
* Warning color is 1Hz flashing yellow (not flashing if confirmed).
* Grey/White is used for low/high, off/on, 0/1 etc.

The following applies for texts

* Preferred font is 13pt Calibri

The following applies for detail levels of screens

* A top level screen with plant status is optional. There are three additional screen layers
  + Process overviews
  + Process detail views
  + Equipment detail views

Moving between screens using a screen hierarchy is optional.

Separate alarm view screen is optional.

# Pump Mode Function

All three pumps P01, P02 and P03 can be controlled by the following modes:

* Automatic mode
* Manual mode
* Outside mode

The current active mode shall be shown on HMI screen. Outside mode shall additionally also be indicated on local remote.

## Safeguarding

All modes are subject to the following safeguardings:

* Stop pumps if LSL1 signals low water level in tank 1.
* Sensor fault indicated from logics

Safeguardings are subject to suppression.

## Automatic mode

Automatic mode allows the PLC to control the pump in automatic operation. This mode shall be selectable from HMI screen.

## Manual mode

Manual mode lets the operator control the pump manually from the HMI screen. This mode shall be selectable from HMI screen.

Manual mode is the default mode.

## Outside mode

Outside mode lets the operator control the pump manually from local remote. This mode shall be selectable from local remote.

Selection of outside mode overrides any other mode selection.

De-selection of outside mode triggers a return to default mode.

# Auto Level Function

The Auto Level Function (ALF) uses all three pumps P01, P02 and P03 to achieve and maintain a water level.

ALF is controlled from HMI screen.

To start ALF, all three pumps must be in automatic mode.

To keep executing ALF no alarms can be present.

If ALF is canceled, all pumps will return to default mode with their current state.

ALF is canceled if any fault is detected.

# Run Hours Function

All three pumps have timers that record how many hours the pump has been active. The run hours for each pump is displayed on HMI screen.

Reset of timers is possible from HMI.

# Emergency Stop Function

The emergency stop (E-Stop) function will stop all pumps and prevent them from being started from any mode in any state.

The E-Stop function is activated if any of the following is true:

* The local E-Stop button is pressed
* The local E-Stop button is not receiving supply voltage

Supply voltage to the E-Stop button is received from PLC outputs if the PLC is started and healthy.

The E-Stop function is not subject to any suppression. It shall not be possible to override this function in any way.

An alarm is generated on the HMI screen if the E-Stop function is active. This alarm must be acknowledged before the pumps can be started again.

The E-Stop function is reset if all of the following is true

* It is no longer active
* Alarm has been acknowledged