TEM587

WATER BOOSTER STATION WITH GRUNDFOS HYDRO MPC PUMP SET

SITE SPECIFIC FUNCTIONAL SPECIFICATION

VERSION H - PRELIMINARY / FOR COMMISSIONING / AS COMMISSIONED

**Approvals**

|  |  |  |  |
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Revision Control

|  |  |  |  |
| --- | --- | --- | --- |
| Revision Number | Date | Revision Details | Responsible Officer |
| A | 27 Mar 2017 | Initial Draft of Template  Template developed to correspond to the  TMS1649 Standard Functional Specification Rev 1.00) | Alex Witthoft |
| B | 29 Mar 2017 | Added Site Specific Variable Tables | Alex Witthoft |
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| E | 29 Jan 2018 | Added section to capture required number of pumps to run at what speed if Genibus comms between CU352 and pump VSDs fail. | James Morrison |
| F | 31 Jan 2018 | Added suction pressure low low alarm (pump run interlock.) | James Morrison |
| G | 14 Sep 2018 | Updated to align with TMS1649 MPC Water Booster Standard Functional Specification v6.0 | James Morrison |
| H | 22 Oct 2018 | Updated following QUU Review of *TMS1649 MPC Water Booster Standard Functional Specification v6.0* | James Morrison |
|  |  |  |  |

Document Consultation

|  |  |  |  |  |  |  |
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Acronyms

|  |  |
| --- | --- |
| RTU | **R**emote **T**elemetry **U**nit |
| SCADA | **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition |
| mAHD | **M**etres above **A**ustralia **H**eight **D**atum |
| TWL | **T**op **W**ater **L**evel |
| BWL | **B**ottom **W**ater **L**evel |
| UUTS | **U**rban **U**tilities **T**elemetry **S**ystem |

# Introduction

Control system functionality for is based on the standard functional specification

*TMS1649 Standard MPC Water Booster - Functional Specification v6.0* [[1]](#endnote-1)

which was developed for QUU as part of the contract *C1392 Design & Construction of Brisbane Water Booster Upgrades and Replacement.* The functionality for this site adheres to this standard unless specifically stated otherwise in this document.

This specification contains site-specific details and describes any non-standard functional requirements for control, monitoring and telemetry at the station.

All standard design options that are applicable are detailed in this specification along with site-specific values required for operation of this station.

## Capture of Site Parameter Values

Throughout this document, various site operating parameters and other details are captured, which may come from various sources at various stages of the project. To remove confusion about what values/information is to be displayed by who and when, each section or field will have a symbol adjacent showing who is responsible for providing the information , and whether it is required during design, or is a parameter decided upon at commissioning.

|  |  |
| --- | --- |
| Who? | Symbol |
| Process/Operations Engineer | POE |
| Mechanical Designer | MD |
| Civil Designer | CD |
| Electrical Designer | ED |
| Control System Designer | CSD |
| Civil Contractor | CC |

|  |  |
| --- | --- |
| When? | Symbol |
| Design | D |
| Commissioning | C |

## Document Revision Phase

The Revision Phase of this document shall be shown on the title page. Possible revision phases are:

* Preliminary
* For Commissioning
* As-Commissioned

# Water Network Overview

INSERT WATER NETWORK DIAGRAM HERE

QUU to provide Network Overview Diagram.

Figure 1 - Network Overview

# Site Location

This station is located at

Figure 2 - Location Map

# Standard Design Options

The standard design options checked in the table below have been included in the design for . The functional detail of each option is specified in the standard specification and the options have also been incorporated into the electrical schematics for this site (See Appendix A Drawing List).

Table 1 - Standard Options for an MPC Water Booster Site

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Option ID** | **Selected Option** | **Description** | **Available Options** | **Who** | **When** |
| A |  | Auto Transfer Switch & Generator | YES / NO | POE | D |
| B |  | CT Metering | YES / NO | ED | D |
| C |  | RTU Type | SCADAPack 535e | CSD | D |
| D1 |  | Pump 3 Installed | YES / NO | MD | D |
| D2 |  | Pump 4 Installed | YES / NO | MD | D |
| D3 |  | Pump 5 Installed | YES / NO | MD | D |
| D4 |  | Jockey Pump Installed | YES / NO | MD | D |
| E1 |  | Discharge Flowmeter Installed | YES / NO | POE | D |
| E2 |  | Bypass Flowmeter Installed | YES / NO | POE | D |
| E3 |  | Redundant Discharge Pressure Transmitter Installed | YES / NO | POE | D |
| F |  | Radio Type | Trio / Other | CSD | D |
| G |  | Modem | 3G / 4G / Other / None | CSD | D |
| H |  | PSTN Modem | YES / NO | CSD | D |
| I |  | Fire Mode Switch | YES / NO | POE | D |
| J |  | Card Reader | NO (NOT USED) | POE | D |
| K1 |  | Pump Box Sump Pump | YES / NO | CD | D |
| K2 |  | Flow Meter Pit Sump Pump | YES / NO | CD | D |
| L1 |  | Pump Box Sump Pit Level Probe | YES / NO | CD | D |
| L2 |  | Flow Meter Pit Level Probe | YES / NO | CD | D |
| M |  | Pump Box Ventilation Fan | YES / NO | MD | D |
| N |  | Area Lighting | YES / NO | POE | D |
| O |  | Dual 24VDC Power Supplies | YES / NO | ED | D |
| P |  | Power Meter | NO (NOT USED) | ED | D |
| Q |  | Pressure Vessel | YES / NO | MD | D |
| R1 |  | Peer Pressure Mode Enabled | YES / NO | POE | D |
| R2 |  | Scheduled Delivery Pressure Mode Enabled | YES / NO | POE | D |
| R3 |  | Flow Modulation Mode Enabled | YES / NO | POE | D |
| U |  | Emergency Stop Installed | YES / NO | POE | D |
| V |  | Emergency Stop Safety Function Failure Monitoring | YES / NO | POE | D |

NOTE: Grey options are hardware options and do not alter the RTU code functionality.

For a full list of equipment installed on site refer to the equipment list in the site electrical drawings.

# Site Equipment

## Pumps

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Booster Pumps  (Grundfos) | Option | Make / Model | Power (kW) | FLC (A) | Install Date |
| Pump 1 | - |  |  |  |  |
| Pump 2 | - |  |  |  |  |
| Pump 3 | D1 |  |  |  |  |
| Pump 4 | D2 |  |  |  |  |
| Pump 5 | D3 |  |  |  |  |
| Jockey Pump | D4 |  |  |  |  |

## Instrumentation

### Flow Meters

|  |  |  |
| --- | --- | --- |
| Instrument | Option | Make / Model |
| Flowmeter 1 – Delivery | E1 |  |
| Flowmeter 2 – Bypass | E2 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Value | Value | Who | When |
| Delivery Flow Meter Asset ID | F#### | POE | D |
| Low Zone/Bypass Flow Meter Asset ID | F#### | POE | D |

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Delivery Flow Meter Range |  | mAHD | POE | D |
| Low Zone/Bypass Flow Meter Range |  | mAHD | POE | D |

### Pressure Gauges

|  |  |  |
| --- | --- | --- |
| Instrument | Option | Make / Model |
| Pressure Gauge 1 – Suction | - |  |
| Pressure Gauge 2A – Main Discharge | - |  |
| Pressure Gauge 2B – Backup Discharge | - |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Value | Value | Who | When |
| Suction Pressure Gauge Asset ID | P#### | POE | D |
| Main Discharge Pressure Gauge Asset ID | P#### | POE | D |
| Backup Discharge Pressure Gauge Asset ID | P#### | POE | D |

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Suction Pressure Gauge Elevation |  | mAHD | POE | D |
| Suction Pressure Gauge Range |  | m | POE | D |
| Main Discharge Pressure Gauge Elevation |  | mAHD | POE | D |
| Main Discharge Pressure Gauge Range |  | m | POE | D |
| Backup Discharge Pressure Gauge Elevation |  | mAHD | POE | D |
| Backup Discharge Pressure Gauge Range |  | m | POE | D |

### Level Probes

|  |  |  |
| --- | --- | --- |
| Instrument | Option | Make / Model |
| Pump Box Pit Level Probe | L1 |  |
| Flow Meter Pit Level Probe | L2 |  |

## Ancilliary Drives

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ancillary Drives | Option | Make / Model | Power (kW) | FLC (A) |
| Sump Pump 1 – Pump Box | K1 |  |  |  |
| Sump Pump 2 – Flowmeter | K2 |  |  |  |
| Pump Box Ventilation Fan | M |  |  |  |

## Pressure Vessel

|  |  |  |  |
| --- | --- | --- | --- |
| Pressure Vessel | Option | Make / Model | Settings |
| Pressure Vessel | Q |  |  |

## Generator

|  |  |  |  |
| --- | --- | --- | --- |
| Equipment | Option | Make / Model | Power (kW) |
| Generator | A |  |  |
| ATS | A |  |  |

## Non-standard Equipment

<< provide details of non-standard equipment here.>>

# Site Information and Operating Parameters

## Site and Zone Information

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Value | Who | When |
| Water Booster Asset Name | << SITE NAME >> | POE | D |
| Water Booster Asset ID | << WB### >> | POE | D |
| Water Booster Suction Zone |  | POE | D |
| Water Booster Zone (Discharge) |  | POE | D |
| Related Sites |  | POE | D |

## Zone Pressures

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Maximum Delivery Pressure |  | mAHD | POE | D |
| Default Zone Fire Pressure |  | mAHD | POE | D |
| Default Zone Pressure |  | mAHD | POE | D |
| Minimum Delivery Pressure |  | mAHD | POE | D |

## Manual Mode

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Manual Mode System Performance Setpoint Min |  | % | POE | C |
| Manual Mode System Performance Setpoint Max |  | % | POE | C |

## Fixed Speed Mode

Fixed Speed Mode allows the station to operate in open loop control without discharge pressure feedback. The pump set is run at a system performance setpoint (%), selected by the RTU based on flow.

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Default Fixed Speed - Normal System Performance |  | % | POE | C |
| Default Fixed Speed - Fire System Performance |  | % | POE | C |
| Fire Flow Threshold |  | l/s | POE | D |
| Fixed Speed Mode Return to Normal System Performance Delay | 300 | s | POE | D |

## Peer Pressure Mode (Option R1)

Peer Pressure Mode requires a peer pressure gauge site (remote to the water booster) to measure and send the pressure at the critical point for the boosted zone to the water booster at regular intervals. The control room operator will be able to control the pressure at this critical pressure point using the booster.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Equipment | Site ID | Site Name | Asset ID | Who | When |
| Peer Pressure Gauge | N/A | N/A | N/A | POE | D |

These values are site constants, and can only be changed in the RTU

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Peer Pressure Set Point – Maximum | N/A | mAHD | POE | D |
| Peer Pressure Set Point – Default | N/A | mAHD | POE | D |
| Peer Pressure Set Point – Minimum | N/A | mAHD | POE | D |
| Discharge Pressure Deviation | 1 | m | POE | D |
| Peer Communications Timeout Delay | 30 | min | POE | D |

## Scheduled Delivery Pressure Mode (Option R2)

Scheduled Delivery Pressure Mode allows the station to automatically modify its discharge pressure setpoint based on time of day, to handle varying network flow demands.

Each booster site will have a site specific time versus pressure lookup table which is operator configurable. The lookup table will have 5 rows (0-4) that allow the operator to set up 5 discrete time windows and 5 discrete pressures for a 24hr period.

The table below contains the default setpoint values for Scheduled Delivery Mode. The scheduled delivery setpoint values can be changed from SCADA.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Row** | **Enabled** | **Start Time (24 hr time HHMM)** | **Required Pressure Setpoint (RPS3)**  **(mAHD)** | **Who** | **When** |
| 0. | Y | 0000 | #.### | POE | D |
| 1. | Y | #### | #.### | POE | D |
| 2. | Y/N | #### | #.### | POE | D |
| 3. | Y/N | #### | #.### | POE | D |
| 4. | Y/N | #### | #.### | POE | D |

Table 2 - Pressure versus Time Lookup Table

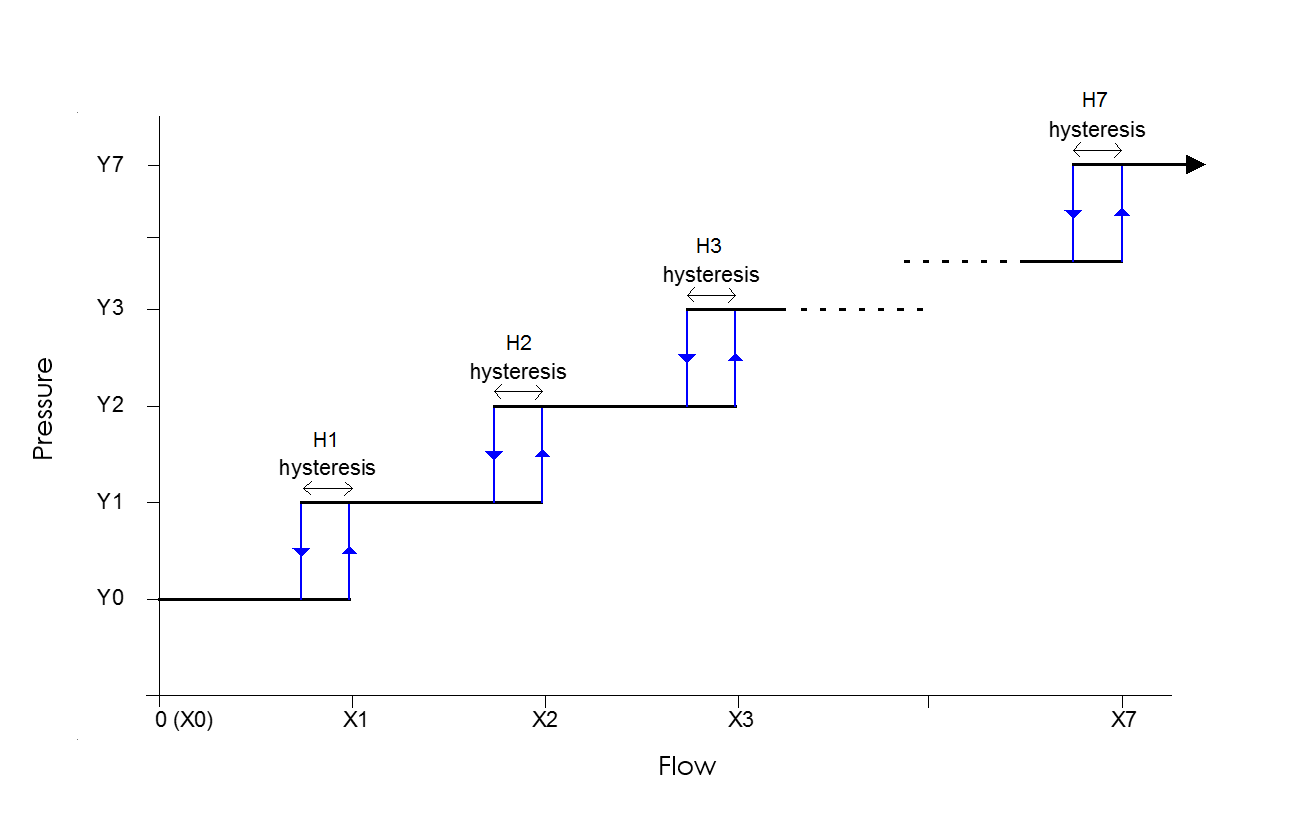
The first two rows (0 and 1) are always enabled. Time window 0 always starts at 0000hrs. Only contiguous rows can be enabled. Once a row is disabled, all rows below are automatically disabled by the RTU. Note that the first enabled row follows the last enabled row, since the time windows operate in a daily cycle.

## Flow Modulation Mode (Option R3)

Each booster site will have a site-specific flow versus pressure lookup table which is operator configurable and validated by the RTU. The lookup table will have 8 rows. The first two rows (Rows 0 and 1) of the table are always enabled. The operator may choose to enable and populate the remaining rows to set up to 8 discrete pressures for 8 flow ranges. Only contiguous rows can be enabled. If a row is disabled, all rows below are automatically disabled by the RTU.

In addition to the flow and pressure value, each row has a deadband or hysteresis value defined so that the flow must fall significantly for the pressure setpoint to revert to the previous band. Also, the flow must remain below the hysteresis level for the row’s hysteresis delay before the step down in pressure occurs.

Figure 3 - Flow Modulation Setpoint Diagram



The table below contains the default setpoint values for Flow Modulation Mode. The flow modulation setpoint values can be changed from SCADA.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Row** | **Enabled** | **Flow Rate (l/s)** | **Required Pressure Setpoint (RPS4)**  **(mAHD)** | **Flow Hysteresis (l/s)** | **Hysteresis Time Delay (s)** | **Who** | **When** |
| 0. | Y | 0.0 | #.### | N/A | N/A | POE | D |
| 1. | Y | #.### | #.### | #.### | #### | POE | D |
| 2. | Y/N | #.### | #.### | #.### | #### | POE | D |
| 3. | Y/N | #.### | #.### | #.### | #### | POE | D |
| 4. | Y/N | #.### | #.### | #.### | #### | POE | D |
| 5. | Y/N | #.### | #.### | #.### | #### | POE | D |
| 6. | Y/N | #.### | #.### | #.### | #### | POE | D |
| 7. | Y/N | #.### | #.### | #.### | #### | POE | D |

Table 3 - Flow versus Pressure Lookup Table

The parameter values below are site constants, and can only be changed in the RTU

| Parameter | Value | Units | Who | When |
| --- | --- | --- | --- | --- |
| Flow Modulation Mode Maximum Flow | #.### | l/s | POE | D |
| Flow Modulation Mode Minimum Flow | #.### | l/s | POE | D |
| Flow Modulation Mode Maximum Hysteresis | #.### | l/s | POE | D |
| Flow Modulation Mode Minimum Hysteresis | #.### | l/s | POE | D |
| Flow Modulation Mode Maximum Hysteresis Delay | #### | s | POE | D |
| Flow Modulation Mode Minimum Hysteresis Delay | #### | s | POE | D |

## Instrumentation Alarms

### Analog Alarms

The table below contains the default, min and max setpoint values for analog alarms. These values are site constants, and can only be changed in the RTU. The setpoint values themselves can be changed from SCADA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Description | Default Setpoint | Min Setpoint | Max  Setpoint | Units | Who | When |
| Suction Pressure High Alarm | #.### | #.### | #.### | mAHD | POE | D |
| Suction Pressure Low Alarm | #.### | #.### | #.### | mAHD | POE | D |
| Suction Pressure Low Low Alarm (Pump run interlock) | #.### | #.### | #.### | mAHD | POE | D |
| Delivery Pressure High Alarm | #.### | #.### | #.### | mAHD | POE | D |
| Delivery Pressure Low Alarm | #.### | #.### | #.### | mAHD | POE | D |
| Peer Pressure High Alarm | #.### | #.### | #.### | mAHD | POE | D |
| Peer Pressure Low Alarm | #.### | #.### | #.### | mAHD | POE | D |
| Delivery Flow High Alarm | #.## | #.## | #.## | l/s | POE | D |
| Delivery Flow Low Alarm | #.## | #.## | #.## | l/s | POE | D |
| Low Zone/Bypass Flow High Alarm | #.## | #.## | #.## | l/s | POE | D |
| Low Zone/Bypass Flow Low Alarm | #.## | #.## | #.## | l/s | POE | D |

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | **Who** | **When** |
| Pressure Alarm Inhibit Delay | 15 | s | POE | D |
| Flow Alarm Inhibit Delay | 30 | s | POE | D |

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Description | On Delay (s) | Off Delay (s) | Who | When |
| Suction Pressure High Alarm | 5 | 5 | CSD | D |
| Suction Pressure Low Alarm | 5 | 5 | CSD | D |
| Suction Pressure Low Low Alarm (Pump Run Interlock) | 30 | 5 | POE | D |
| Delivery Pressure High Alarm | 5 | 5 | CSD | D |
| Delivery Pressure Low Alarm | 5 | 5 | CSD | D |
| Peer Pressure High Alarm | 0 | 0 | CSD | D |
| Peer Pressure Low Alarm | 0 | 0 | CSD | D |
| Delivery Flow High Alarm | 5 | 5 | CSD | D |
| Delivery Flow Low Alarm | 5 | 5 | CSD | D |
| Low Zone/Bypass Flow High Alarm | 5 | 5 | CSD | D |
| Low Zone/Bypass Flow Low Alarm | 5 | 5 | CSD | D |

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | **Who** | **When** |
| Site Invalid Hysteresis Percentage | 1 | % | CSD | D |
| Site Invalid Alarm On Delay | 2 | s | CSD | D |
| Site Invalid Alarm Off Delay | 5 | s | CSD | D |
| Site Alarm Hysteresis Percentage | 1 | % | CSD | D |

### Digital Alarms

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Pit Flooded Alarm On Delay | 10 | s | CSD | D |
| Pit Flooded Alarm Off Delay | 10 | s | CSD | D |
| Supply Authority Power Fail Alarm Delay | 75 | s | CSD | D |
| Mains Power Fail Alarm Delay | 75 | s | CSD | D |
| Surge Diverter and Filter Fault Alarm Delay | 2 | s | CSD | D |
| RTU Power Fail Alarm Delay | 15 | s | CSD | D |
| RTU Battery Fail Alarm Delay | 15 | s | CSD | D |
| Intruder Alarm Delay | 5 | min | POE | D |

## Generator / ATS

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| Delay between Energex fail and Generator Start | 30 | s | ED | D |
| Delay between Gen start and ATS Transfer to Generator | 120 | s | ED | D |
| Delay between Gen start and Pump Run | 120 | s | ED | D |
| Delay between Energex Restore and ATS Transfer to Normal | 120 | s | ED | D |
| Pre ATS changeover pump lockout delay before transfer | 25 | s | ED | D |
| Delay between ATS return to Normal and Pump Run | 30 | s | ED | D |
| PFSR locked out if Energex fails within this time after ATS returns to normal | 600 | s | ED | D |
| PFSR Lockout duration | 600 | s | ED | D |
| Delay between ATS return to Normal and generator stop | 300 | s | ED | D |
| Gen Test Pump Startup Time | 60 | s | CSD | D |
| Gen Test Generator Run Time | 1800 | s | POE | D |

## MPC

These values are site constants, and can only be changed in the RTU.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Value | Units | Who | When |
| MPC Communications Fault Delay | 15 | s | CSD | D |
| MPC controller hardwired fault delay | 2 | s | CSD | D |
| MPC/RTU Control Mode and Setpoint Mismatch Alarm Delay | 30 | s | CSD | D |

## VSD Setup

Pump behaviour on loss of Genibus comms with CU352

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pump | Run/Stop | Speed (%) | Who | When |
| Pump 1 |  |  | POE | C |
| Pump 2 |  |  | POE | C |
| Pump 3 |  |  | POE | C |
| Pump 4 |  |  | POE | C |
| Pump 5 |  |  | POE | C |
| Jockey Pump |  |  | POE | C |

## Analog Event Logging

The table below contains the sample rate and deviation values for analog event logging. These values are site constants, and can only be changed in the RTU.

| Analog Value | Units | Sample Rate (s) | Deviation | Who? | When |
| --- | --- | --- | --- | --- | --- |
| Peer Mode System Loss | m | 60 | 1 | POE | D |
| Peer Mode Required Pressure Setpoint (RPS2) | mAHD | 60 | 1 | POE | D |
| MPC Inlet Pressure | mAHD | 60 | 1 | POE | D |
| MPC Outlet Pressure | mAHD | 60 | 1 | POE | D |
| MPC Setpoint mAHD | m | 15 | 1 | POE | D |
| MPC Setpoint % | % | 15 | 1 | POE | D |
| MPC Actual Setpoint mAHD | m | 15 | 1 | POE | D |
| MPC Actual Setpoint % | % | 15 | 1 | POE | D |
| MPC Relative Performance | % | 60 | 1 | POE | D |
| MPC Pump X Speed | % | 60 | 1 | POE | D |
| MPC Pump X Current | A | 60 | 0.1 | POE | D |
| MPC Pump X Power | kW | 60 | 0.1 | POE | D |
| MPC Pump X Run Hours\* | hours | - | 0.25 | POE | D |
| Suction Pressure | m | 60 | 1 | POE | D |
| Suction Pressure mAHD | mAHD | 15 | 1 | POE | D |
| Differential Pressure | m | 60 | 1 | POE | D |
| Peer Pressure mAHD | mAHD | 15 | 1 | POE | D |
| Delivery Flow | L/s | 15 | 1 | POE | D |
| Delivery Flow kL/day | kL/day | 60 | 86.4 | POE | D |
| Delivery Flow Volume\* | kL | - | 1 | POE | D |
| Low Zone/Bypass Flow | L/s | 15 | 1 | POE | D |
| Low Zone/Bypass Flow kL/day | kL/day | 60 | 86.4 | POE | D |
| Low Zone/Bypass Flow Volume\* | kL | - | 1 | POE | D |
| Generator Fuel Level | % | 15 | 2 | POE | D |
| Wire to Water Efficiency | % | 60 | 0.01 | POE | D |
| Main Delivery Pressure | m | 60 | 1 | POE | D |
| Main Delivery Pressure mAHD | mAHD | 15 | 1 | POE | D |
| Backup Delivery Pressure | m | 60 | 1 | POE | D |
| Backup Delivery Pressure mAHD | mAHD | 15 | 1 | POE | D |

\*These totaliser values do not use RTU parameters. Rather, the deviation settings are entered in the E-configurator file.

# Non-Standard Design

The following sections will define any non-standard requirements for the site.

## Control Functions

### Alarms and Events

| SCADA Status | Alarm Priority | Description |
| --- | --- | --- |
| NIL |  |  |

### Parameters and Setpoints

**Parameters (Site-Specific Constants)**

| Parameter | Default | Units |
| --- | --- | --- |
| NIL |  |  |

**Setpoints**

| Setpoint | Type | Min | Max | Default | Units |
| --- | --- | --- | --- | --- | --- |
| NIL |  |  |  |  |  |

### Calculations and Statistics

|  |  |
| --- | --- |
| Point | Description |
| NIL |  |

### SCADA Points

| Point | Type | Units | Alarm/Event | Trending |
| --- | --- | --- | --- | --- |
| NIL |  |  |  |  |

## Equipment

### Physical I/O

|  |  |  |
| --- | --- | --- |
| **Name** | **Description** | **Type** |
| NIL |  |  |

### Alarms and Events

| SCADA Status | Alarm Priority | Description |
| --- | --- | --- |
| NIL |  |  |

### Parameters and Setpoints

**Parameters (Site-Specific Constants)**

| Parameter | Default | Units |
| --- | --- | --- |
| NIL |  |  |

**Setpoints**

| Setpoint | Type | Min | Max | Default | Units |
| --- | --- | --- | --- | --- | --- |
| NIL |  |  |  |  |  |

### Calculations and Statistics

|  |  |
| --- | --- |
| Point | Description |
| NIL |  |

### SCADA Points

| Point | Type | Units | Alarm/Event | Trending |
| --- | --- | --- | --- | --- |
| NIL |  |  |  |  |

## Instrumentation

### Physical I/O

|  |  |  |
| --- | --- | --- |
| **Name** | **Description** | **Type** |
| NIL |  |  |

### Alarms and Events

| SCADA Status | Alarm Priority | Description |
| --- | --- | --- |
| NIL |  |  |

### Parameters and Setpoints

**Parameters (Site-Specific Constants)**

| Parameter | Default | Units |
| --- | --- | --- |
| NIL |  |  |

**Setpoints**

| Setpoint | Type | Min | Max | Default | Units |
| --- | --- | --- | --- | --- | --- |
| NIL |  |  |  |  |  |

### Calculations and Statistics

|  |  |
| --- | --- |
| Point | Description |
| NIL |  |

### SCADA Points

| Point | Type | Units | Alarm/Event | Trending |
| --- | --- | --- | --- | --- |
| NIL |  |  |  |  |

## Control System Hardware

### Brisbane Sites (DNP3 Communications)

The main control system hardware components for a standard MPC-based water booster site in the Brisbane Region are listed in the table below:

Table 4 - Control System Hardware Components

|  |  |  |  |
| --- | --- | --- | --- |
| **Device** | **Make** | **Model** | **Catalog Number** |
| MPC Controller | Grundfos | CU 352 |  |
| RTU | Schneider | SCADAPack 535e with 6601 IO Expansion Module | TBUP535‐EA56‐AB10S & TBUX297585S |
| Radio | Trio | D Series | TBUR-DR900-06A02D00 |
| 4G Modem | Cybertec | Model 2455 |  |

These devices and their interfaces to the RTU can be seen on Sheet 09 “24VDC Distribution & RTU Layout” of the standard electrical drawing set.

## RTU

## RTU Program

## RTU Communications

## SCADA

1. Drawing List

To determine the latest revision of each drawing, refer to the drawing index – SHEET 00.

Insert Drawing Index here following creation of FOR CONSTRUCTION drawings.

1. Physical I/O List
2. Pump Curves
3. CU352 and VFD Configurations

To be included following site commissioning.

1. Non-standard Alarm Instructions

To be included following site commissioning.

# References

1. |  |  |
   | --- | --- |
   | TITLE | TMS1649 Standard MPC Water Booster - Functional Specification |
   | Document ID | TMS1649 |
   | Version | 6.1 |
   | Author | James Morrison |
   | Document owner | QUU |

   [↑](#endnote-ref-1)