BERGRIVIER MUNICIPALITY

SUPPLY CHAIN MANAGEMENT

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As per e-mail:

Dear Sir /Madam

NOTICE TO BIDDERS

ADDENDUM: 3

TENDER NO: 8/3/35-2021 (MN 150/2021) MANUFACTURE, SUPPLY, DELIVERY AND INSTALLATION OF MOTOR CONTROL CENTRES AT WATER AND SEWER STATIONS IN BERGRIVIER TILL JUNE 2024

ADDENDUM NO. 3:

Smart Controller Specification:

The Smart controller is intended for small or mid-sized wastewater pump stations, with one or two pumps, and different types of level sensors. It monitors the level of a wastewater well and controls and operates the pumps. The smart controller has pre-programmed functions that can easily be configured from the HMI interface.

The controller can communicate with other systems and products.

The installation, operation, and configuration are made through a door mounted HMI, with a wizard that guides through the steps. The configuration is duplicated, upgraded, and maintained through the use of a USB drive.

External interfaces

• USB

• RS-232

• RS-485

1. **Pump control**
Pump activation
Level sensors, or switches, give the signals to start and stop the pumps at different levels.

High Level Runtime
The high-level float switch signals the controller to start all the pumps immediately. After that, they run for a defined period.

Low Level Block Time

The low-level float switch signals the controller to stop all the pumps immediately. After that, they are blocked for a defined minimum period. See also the Inter-Pump Delay function.

Dry Run Protection

This function is used to prevent the pumps from running dry. When activated, the pumps stop at the stop level regardless of any configured delay.

Inter-Pump Delay

This function prevents the pumps from starts and stops in quick successions, which can damage the wastewater piping system and activate the overcurrent protection.

Minimize Fat Build-Up

This function applies a random pump start level, or random start delay, to avoid a fat ring build-up at the start level. The pump then starts at slightly different levels each time. The random start levels are always higher than the configured start level. This function only applies to the duty pump.

Alternation Mode

In a two-pump station, the pumps alternate on each pump cycle by default. The station can instead be configured to run the pump with the shortest total run time, or to not alternate at all. If the duty pump is unavailable, then the standby pump becomes the lead pump, regardless of alternation mode.

Maximum Pumps Running

This function defines the maximum number of pumps that can be run at the same time.

Maintenance Run

This function is used to prevent prolonged periods of inactivity that degrade the pump. The function triggers the pump to run after defined periods of inactivity.

Power On Delay

When multiple pumping stations are powered on at the same time, there is a risk of a main power overload. To avoid the same start time, for example after a power failure, a random start delay is applied to all pumps.

2. **Profiles**

This function requires use of analog sensors. There are four profiles. The profiles activate different behavior of the pumping station depending on the time of day, for example, to take advantage of lower night time energy tariffs. A manually activated profile can be used for site visits or maintenance runs.

The parameters that are included in the profiles are also available in the other levels of the menu system. When these parameters change, for example the stop level, the profile that is active also takes on the same changes.

The parameters for Profile 1 are affected because this default profile is used most frequently. The time parameters define the daily timer that activates and deactivates the profile.

- Profile Name
- Duty Start Level
- Standby Start Level
- Pump Stop Level
- Low Level Activation Level
- High Level Activation Level
- On Time
- Off Time

3. Alarms

The alarm function monitors the status of a pumping station. Severe alarm conditions can start or stop the pumps for protection, and raise alarms.

4. Alarm lamp and buzzer

A +24 V output is provided to control an alarm lamp and/or a buzzer. The alarms that are activated for this function trigger the output signal.

5. Relay output

The control relay is an output that is provided for general purposes. The alarms can be configured to activate the relay.

6. Alarm reset and silencing

Most alarms can be configured to auto-reset when the condition that causes the alarm stops. The alarms are manually reset through the HMI, the digital input, or Modbus. The alarms can also be silenced. When an alarm is silenced only, the HMI alarm LED still flashes and the alarm is still shows on the screen in the Alarms menu.

7. Technical

Power supply: 3-phase: 200-460 VAC with neutral, 400-415 VAC without neutral
                     1-phase: 100-265 VAC

Ports: 1 x USB
                     1 x RS232
                     1 x RS485
                     1 x Display interface
                     1 x 24 VDC output
                     On-board pressure sensor for Open-bell sensor (optional)

Communication: Modbus master or slave

Standard I/O: 2 x Digital outputs
      10 x Digital inputs
      1 x Analog input

Data logging: 1000 data points

Environment class: Protection class: IP 20

Operation Temperature: -20 to +50 °C

Approvals: CE, UL, CSA

Expansion modules: Battery backup module
      Advanced communication Ethernet, incl. DNP3 and webserver interface
      LON communication module
      Relay output module
      WiFi module
      Probe sensor interface module

Unique features: Powerful pre-programmed functionality
      Compact format for small control cabinets
      User-friendly HMI with intuitive user interface
      Built in energy measurement and calculation
      Set-up wizards
      Set point profiles

1. IO Requirements
Outputs

Description	Set = 1	Clear = 0
Reset Alarms	Reset all alarms	No action
Inhibit Station	Inhibit all pumps from operation	Clear inhibit of all pumps from operation
Statistics Reset	Resets all pump statistics	No action
Maintenance Run Enabled	Maintenance run is enabled	Maintenance run is disabled
Maintenance Run Less Than Stop Level	Maintenance run feature will run pumps even if level is less than stop level	Maintenance run feature will not run pumps if level is less than stop level
Fail to Start Enabled	Fail to start alarm is enabled	Fail to start alarm is disabled
Service Interval Enabled	Service interval alarm is enabled	Service interval alarm is disabled
Minimize Fat Build-up Enabled	Minimize fat build-up feature is enabled	Minimize fat build-up feature is disabled
Power On Delay Enabled	Power on delay feature is enabled	Power on delay feature is disabled
Power On Delay Randomize	Power on delay is randomized	Power on delay is not randomized
Low Level Alarm Enabled	Low level alarm is enabled	Low level alarm is disabled
High Level Alarm Enabled	High level alarm is enabled	High level alarm is disabled
Dry Run Protection Enabled	Dry run protection feature is enabled	Dry run protection feature is disabled
Analog Under-Range Enabled	Analog under-range alarm is enabled	Analog under-range alarm is disabled
Analog Over-Range Enabled	Analog over-range alarm is enabled	Analog over-range alarm is disabled
Pump 1 Leakage Alarm Unavailable	Pump 1 will be unavailable for operation when leakage alarm is active	Pump 1 will not be unavailable for operation when leakage alarm is active
Pump 2 Leakage Alarm Unavailable	Pump 2 will be unavailable for operation when leakage alarm is	Pump 2 will not be unavailable for operation when leakage alarm is

	active	active
Pump 1 High Temperature Alarm Unavailable	Pump 1 will be unavailable for operation when high temperature alarm is active	Pump 1 will not be unavailable for operation when high temperature alarm is active
Pump 2 High Temperature Alarm Unavailable	Pump 2 will be unavailable for operation when high temperature alarm is active	Pump 2 will not be unavailable for operation when high temperature alarm is active
Pump 1 Short Circuit Alarm Unavailable	Pump 1 will be unavailable for operation when short circuit alarm is active	Pump 1 will not be unavailable for operation when short circuit alarm is active
Pump 2 Short Circuit Alarm Unavailable	Pump 2 will be unavailable for operation when short circuit alarm is active	Pump 2 will not be unavailable for operation when short circuit alarm is active
Under Voltage Unavailable	Pumps will be unavailable for operation when under voltage alarm is active	Pumps will not be unavailable for operation when under voltage alarm is active
Over Voltage Unavailable	Pumps will be unavailable for operation when over voltage alarm is active	Pumps will not be unavailable for operation when over voltage alarm is active

Discrete Inputs

Description
Pump 1 Call to Run
Pump 2 Call to Run
Pump 1 Unavailable
Pump 2 Unavailable
Pump 1 Run Output
Pump 2 Run Output
Pump 1 Reverse Output
Pump 2 Reverse Output
Float Input 1
Float Input 2
Float Input 3
Float Input 4
General Purpose Input
Silence Input
Alarm Lamp/Buzzer
General Purpose Output
Analog High Level Alarm Active
Analog Low Level Alarm Active
Float High Level Alarm Active
Float Low Level Alarm Active
Analog Under Range Alarm Active
Analog Over Range Alarm Active
Volts Phase Failure Alarm Active
Under Voltage Alarm Active
Over Voltage Alarm Active
Volts Phase Rotation Alarm Active
Pump 1 Over Current Alarm Active
Pump 2 Over Current Alarm Active
Pump 1 Current Phase Imbalance Alarm Active

Pump 2 Current Phase Imbalance Alarm Active
Pump 1 Leakage Alarm Active
Pump 2 Leakage Alarm Active
Pump 1 Thermal Alarm Active
Pump 2 Thermal Alarm Active
Pump 1 Short Circuit Alarm Active
Pump 2 Short Circuit Alarm Active
Pump 1 Max Runtime Alarm Active
Pump 2 Max Runtime Alarm Active
Pump 1 Fail to Start Alarm Active
Pump 2 Fail to Start Alarm Active
Pump 1 Service Interval Alarm Active
Pump 2 Service Interval Alarm Active
Station Inhibit Alarm Active
Personnel Alarm Active
Test Call Alarm Active
Start-up Failure Alarm Active
Overflow Alarm Active
Pump 1 Over Current Alarm Reset Required
Pump 2 Over Current Alarm Reset Required
Pump 1 Current Phase Imbalance Alarm Reset Required
Pump 2 Current Phase Imbalance Alarm Reset Required
Pump 1 Fail to Start Alarm Reset Required
Pump 2 Fail to Start Alarm Reset Required
Pump 1 Service Interval Alarm Reset Required
Pump 2 Service Interval Alarm Reset Required
Start-up Failure Alarm Reset Required

Description	Range	Unit	Additional Information
Number of Pumps	0-2	N/A	
Liquid Level	0-65535	cm / cf	Units defined by Holding Register 30,008
Liquid Level Percent	0-10000	0.01%	
Lead Pump Start Level	0-10000	cm / cf	Units defined by Holding Register 30,008
Stop Level	0-10000	cm / cf	Units defined by Holding Register 30,008
Lag Pump Start Level	0-10000	cm / cf	Units defined by Holding Register 30,008
Level Device	0-3	0 = Analog 1 = Open Bell 2 = Float Switches 3 = Probe	
Level Units	0-1	0 = Meters 1 = Feet	
Power Units	0-1	0 = kW 1 = HP	
Analog Sensor Range	0-65535	N/A	Units by Holding Register 30,008, with 2 decimal places
Overflow Count	0-65535	N/A	

Overflow Duration	0-65535	Hours	
Overflow Duration	0-3599	Seconds	
Voltage Phase 1	0-65535	cV	
Voltage Phase 2	0-65535	cV	
Voltage Phase 3	0-65535	cV	
Voltage Neutral	0-65535	cV	
Voltage Phase Angle 12	0-36000	centi degrees	
Voltage Phase Angle 23	0-36000	centi degrees	
Voltage Phase Angle 31	0-36000	centi degrees	
Analog Input	0-65535	mA	
Cast Bell Pressure	0-65535	cPa	
Cast Bell Temperature	0-65535	centi degree celcius	
System Voltage	0-65535	mV	24V supply, 3 decimal places
System Current	0-65535	dA	DC Current, 1 decimal place
Internal Temperature	0-65535	centi degree celcius	2 decimal places
Serial Number High	0-65535		High order 16-bits
Serial Number Low	0-65535		Low order 16-bits
Firmware Major Version	0-65535		
Firmware Minor Version	0-65535		
Pump 1 Current Phase A	0-65535	mA	
Pump 1 Current Phase B	0-65535	mA	
Pump 2 Current Phase A	0-65535	mA	
Pump 2 Current Phase B	0-65535	mA	
Current Phase Angle 12	0-36000	centi degrees	
Current Phase Angle 34	0-36000	centi degrees	
Pump 1 Power	0-65535	cW	
Pump 1 Apparent Power	0-65535	cVA	

Pump 1 Power Factor	0-100	0.01, no unit	2 decimal places
Pump 2 Power	0-65535	cW	
Pump 2 Apparent Power	0-65535	cVA	
Pump 2 Power Factor	0 - 100	0.01, no unit	
Pump 1 Energy Total	0-65535	kWh	
Pump 1 Energy Today	0-65535	kWh	
Pump 1 Energy Yesterday	0-65535	kWh	
Pump 2 Energy Total	0-65535	kWh	
Pump 2 Energy Today	0-65535	kWh	
Pump 2 Energy Yesterday	0-65535	kWh	
Pump 1 Apparent Energy Total	0-65535	kVAh	
Pump 1 Apparent Energy Today	0-65535	kVAh	
Pump 1 Apparent Energy Yesterday	0-65535	kVAh	
Pump 2 Apparent Energy Total	0-65535	kVAh	
Pump 2 Apparent Energy Today	0-65535	kVAh	
Pump 2 Apparent Energy Yesterday	0-65535	kVAh	
Pump 1 Runtime Total	0-65535	Hours	
Pump 1 Runtime Total	0-3599	Seconds	
Pump 1 Runtime Today	0-24	Hours	
Pump 1 Runtime Today	0-3599	Seconds	
Pump 1 Runtime Yesterday	0-24	Hours	
Pump 1 Runtime Yesterday	0-3599	Seconds	
Pump 2 Runtime Total	0-65535	Hours	

Name	Range	Range2	Units	Notes
Pump 2 Runtime Total	0-3599	Seconds		
Pump 2 Runtime Today	0-24	Hours		
Pump 2 Runtime Today	0-3599	Seconds		
Pump 2 Runtime Yesterday	0-24	Hours		
Pump 2 Runtime Yesterday	0-3599	Seconds		
Pump 1 Starts Total	0-65535			
Pump 1 Starts Today	0-65535			
Pump 1 Starts Yesterday	0-65535			
Pump 2 Starts Total	0-65535			
Pump 2 Starts Today	0-65535			
Pump 2 Starts Yesterday	0-65535			
Pump 1 Runtime Total		0-65535	Hours	
Pump 2 Runtime Total		0-65535	Hours	
Pump 1 Starts Total				0-65535
Pump 2 Starts Total				0-65535
Liquid Level	0-65535	cm / cf	Units defined by Holding Register 30,008	
Liquid Level Percent	0-10000	0.01%		
Voltage Phase 1		0-65535	cV	
Voltage Phase 2		0-65535	cV	
Voltage Phase 3		0-65535	cV	
Pump 1 Power		0-65535	cW	

Pump 2 Power			0-65535	cW	
Pump 1 Mode	0-3	N/A	0 = Auto 1 = Manual 2 = Semi-Auto 3 = Off		
Pump 2 Mode	0-3	N/A	0 = Auto 1 = Manual 2 = Semi-Auto 3 = Off		
Alternation Mode	0-2	N/A	0 = Fixed 1 = Standard Alternation 2 = Alternate on Pump Runtime		

Photo of Smart controller
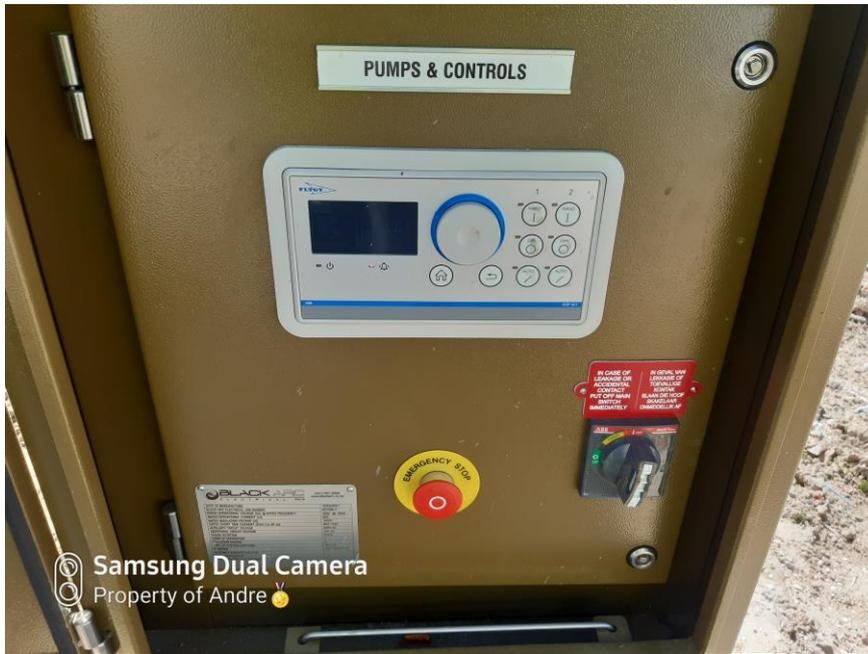
Photo of electrical meter

MUNICIPAL MANAGER 				*DATE: ....*

Note: Confirmation to the addendum

BERGRIVIER MUNICIPALITY

CONFIRMATION

I ………………………………………………………………...….. (Name and Surname of designated person) hereby declare on behalf of ……………………………………………………..………………………... (Company's name),

That I take note of the above changes in the bidding documentation and that my offer will incorporate the changes.

Address: …………………………………… Tel no.: …………………………………

…………………………………… Fax no.: …………………………………

……………………………………

Signature of bidder: …………………………… Date: …………………………………

This document must to be completed by the bidder (above) and submitted with his offer.