



OPERATIONS AND MAINTENANCE MANUALS

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

Builder Thomas Coffey

> Compiled Feb 03, 2015



Table of Contents

Reg	ional Lagoons Manuals	1
ST	56 Boonah STP	2
Е	Electrical	3
	Introduction	4
	Assets	5
	Maintenance	6
	Operations & Tech Data	7
	Warranties	8
	Commissioning Information	9
	Help & Contact	10
	As Built Drawings	11
F	lydraulic	12
	Introduction	13
	Assets	14
	Maintenance	15
	Operations & Tech Data	16
	Warranties	17
	Certificates	18
	Commissioning Information	19
	Help & Contact	20
	As Built Drawings	21
<u>F</u>	ormwork/Reinforcement and Concrete	22
	Certificates	23
C	hemical dosing equipment	24
	Introduction	25
	Maintenance	26
	Operations & Tech Data	27
	Warranties	28
	Certificates Commissioning Information	29
	Commissioning Information Spares	30 31
	Help & Contact	32
	As Built Drawings	33
	Documents	34
S	heds	35
	Introduction	36
	Maintenance	37
	Operations & Tech Data	38
	Warranties	39
	Certificates	40
	Help & Contact	41
	As Built Drawings	42
В	affles	43
	Introduction	44
	Assets	45
	Maintenance	46
	Warranties	47
	Commissioning Information	48

	Spares	49
	Help & Contact	50
	As Built Drawings	51
E	Effluent storage tank	52
	Introduction	53
	Assets	54
	Maintenance	55
	Operations & Tech Data	56
	Warranties	57
	Certificates	58
	Commissioning Information	59
	Spares	60
	Help & Contact	61
	As Built Drawings	62
	Documents	63
7	homas Coffey Finalisation documents	64
	Introduction	65
	Warranties	66
	Commissioning Information	67
	Help & Contact	68
	As Ruilt Drawings	60

Introduction

Sodium Hypochlorite Dosing System Introduction

This operation and maintenance manual presents information required for installation, operation, and maintenance of the Boonah Chlorine Storage Tank and Bund Area supplied to Thomas & Coffey for the Boonah Regional Lagoon Upgrade Project.

The Grundfos Chlorine Storage Tank and Bund Area is a low maintenance liquid feed dosing system, designed to provide continuous supply of chemical from the chemical storage tank to the dosing skid.

This document is intended as a guide to assist Operators in understanding and operating the Chlorine Storage Tank and Bund Area. This document contains information regarding the Chlorine Storage Tank and Bund Area only within the scope of supply of Grundfos.

Carbon Dioxide Dosing System Introduction

This operation and maintenance manual presents information required for installation, operation, and maintenance of the CO2 Gas Control system supplied to Thomas & Coffey for the Boonah Regional Lagoon Upgrade Project.

The Grundfos CO2 Gas Control system is a low maintenance liquid feed dosing system, designed to provide continuous supply of chemical from the dosing skid to the dosing points.

This document is intended as a guide to assist Operators in understanding and operating the CO2 Gas Control system. This document contains information regarding the CO2 Gas Control system only within the scope of supply of Grundfos.

Maintenance

Boonah - Chlorine Dosing Skid

1 - Daily

SECTION 5: ROUTINE MAINTENANCE

- 5.1 Cleaning the Equipment
- 1. The pipe work and hardware on the skid should be cleaned only with mild detergent and damp cloth. No solvents or abrasive cleaners should be used.
- 5.3 Routine Maintenance Schedules

Visual inspection for leaks - Daily

1 - Weekly

SECTION 5: ROUTINE MAINTENANCE

5.3 Routine Maintenance Schedules

Pumps - Calibrate Pump (See Pump O&M Manual)

Service Water line - Check for leaks, faulty valves etc.

Unions - Inspect for leaks

Check valve configurations

1 - Monthly

SECTION 5: ROUTINE MAINTENANCE

Line strainers - these will require frequent cleaning during the first 3-4 months of operation due to contaminants in the tank and pipe work. Frequency during this period should be weekly. After this time, as required - approximately monthly.

5.3 Routine Maintenance Schedules

Calibration cylinder - Clean calibration cylinder

Strainers - Check for debris / clean out

All equipment - Physically check for vibration and security of mounting

Calibration of DDA Pumps using the Calibration Cylinder

- 1.Make sure the pump is in stop mode for pump draw down calibration, by selecting Play / stop button.
- 2. Rotate the function dial to setup then press function button.
- 3. Scroll function button to calibrate and press function button.
- 4. Scroll function button to start.
- 5. Slowly open diaphragm valve to fill calibration cylinder to 0 mL (Full mark)
- 6. Turn off tank supply valve to skid.
- 7.Isolate the inlet and outlet of the other pump/s
- 8.Press the function to start the calibration cylinder draw down. Run until the last volume mark on the calibration cylinder or until 200 strokes. (The pump will only operate for 200 stokes maximum in calibration mode)
- 9. The pump digital display will indicate the estimated pumped volume. Adjust the estimated valve if it does not match the calibration cylinder volume by scrolling function button to the valve shown on the calibration cylinder. Press function button to set the valve.
- 10. Press function button to save the setting (Select tick to save)
- 11.Repeat the calibration cylinder draw down again to confirm valves. Adjust if necessary.
- 12. Return to home screen.
- 13.Ensure the calibration cylinder is empty, then close diaphragm valve, and reset valves to original status.

1 - Yearly

SECTION 5: ROUTINE MAINTENANCE

5.3 Routine Maintenance Schedules

Pumps - Replace pump kit - 2 Year

Linked Documents

Calibration of DDA Pumps using the Calibration Cylinder.pdf

Visio-Troubleshooting Flowchart - chemical systems - chlorine system (2).pdf

📆 0060A-Boonah - Chlorine Dosing Skid - OM-Rev A (2).pdf

📆 Sodium Hypochlorite Dosing Equipment Photos.pdf

Boonah Sodium Hypochlorite storage tank and Bund Area

1 - Daily

5.3 Routine Maintenance Schedules

Equipment

OperationDescriptionWhen

All equipmentVisual inspectionPhysically check for leaksDaily

1 - Weekly

Line strainers - these will require frequent cleaning during the first 3-4 months of operation due to contaminants in the tank and pipe work. Frequency during this period should be weekly. After this time, as required - approximately monthly

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

1 - Monthly

SECTION 5: ROUTINE MAINTENANCE

Equipment

Line strainers - These will require frequent cleaning during the first 3-4 months of operation due to contaminants in the tank and pipe work.

5.3 Routine Maintenance Schedules

All equipmentPhysically check for vibration and security of mountingMonthly

CO2 GAS CONTROL

1 - Daily

SECTION 5: ROUTINE MAINTENANCE

Cleaning the Equipment

1. The pipe work and hardware on the panel should be cleaned only with mild detergent and damp cloth. No solvents or abrasive cleaners should be used.

Routine Maintenance Schedule

Equipment

Remove dirt and debris build up - As required

All equipment - Visual inspection - Physically check for leaks - Daily

1 - Monthly

SECTION 5: ROUTINE MAINTENANCE

Routine Maintenance Schedule

pH Dosing Panel - Line strainers - these will require frequent cleaning during the first 3-4 months of operation due to contaminants in the tank and pipe work. Frequency during this period should be weekly. After this time, as required - approximately monthly.

Equipment

Physically check for vibration and security of mounting - Monthly

1 - Yearly

SECTION 5: ROUTINE MAINTENANCE

Routine Maintenance Schedule

Yearly

Equipment

Replace pump kit - Refer to Grundfos Installation & Maintenance Manual - Section 9 - Yearly

Suction and Discharge Valve Cleaning / Replacement -

- 1. Unscrew the valves.
- 2. Unscrew the screw parts and valve set using round nose pliers.
- 3. Dismantle the inner part (seat, O-ring, balls, ball cages and, if present, spring).
- 4. Clean all parts. Replace faulty parts by new ones.
- 5. Re-assemble the valve.
- 6. Replace the O-rings by new ones. Refit the valve.

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

Injection Quill Cleaning -

- 1. Remove the Injection Quill
- 2. Clean the submersed tip with mild detergent and damp cloth.
- 3. Reinstall.

CO2 Purifier Cartridge Replacement -

- 1. Unscrew every cylinder connection hose on the CO2 Gas manifold from the cylinder.
- 2. Bleed off the retained manifold pressure by loosening the hose to manifold fitting (verify pressure drop on regulator gauge) Caution: The system pressure has potential to reach approximately 75 Bar. Full PPE should be used.
- 3. Loosen M3 set screw on the filter assembly near the hose hand wheel.
- 4. Dismantle cartridge holder and replace with new CO2 Purifier Cartridge

Calibrate pH Sensor - Follow instructions in the Dia 2Q manual -

- 1. Isolate both valves on either side of the sensor.
- 2. Unscrew the sensor and insert into the Buffer calibration solution.
- 3. Calibrate the sensor using the 4.01 pH buffer valve as per instructions for the DIA-2Q (CONEX Instruction Manual 11.9.2 Calibrating the pH value) Rinse sensor in water before next step.
- 4. Calibrate the sensor using the 7.5 pH buffer valve as per instructions for the DIA-2Q (CONEX Instruction Manual 11.9.2 Calibrating the pH value)
- 5. Replace sensor and open valves to operation position

Linked Documents



Replace pH Preamplifier

5 - Yearly

Replace pH Preamplifier

Disconnect the pH Preamplifier BNC connectors, replace complete sealed unit and reconnect BNC connectors.

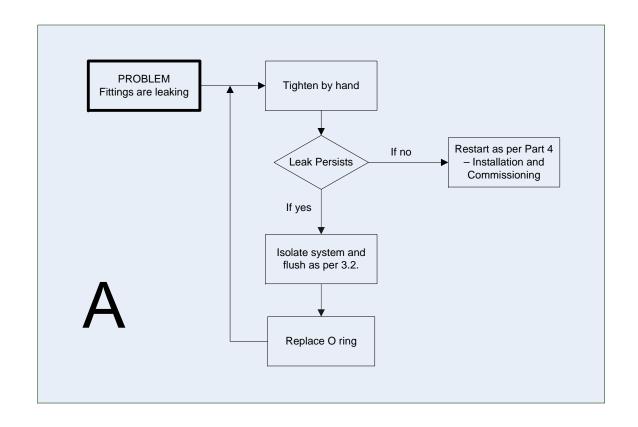
Linked Documents

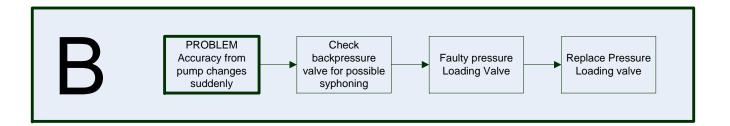


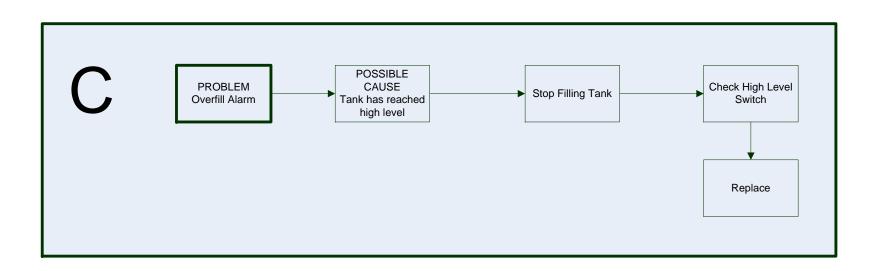
Calibration of DDA Pumps using the Calibration Cylinder

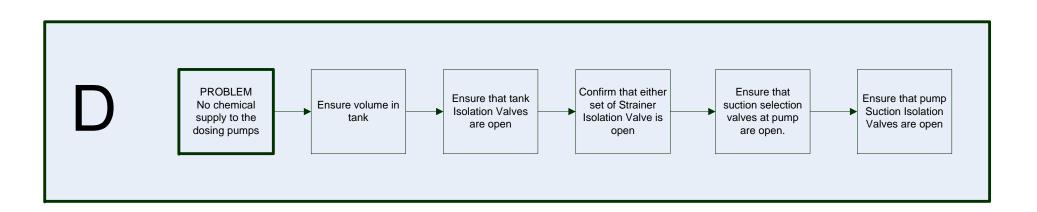
- 1. Make sure the pump is in stop mode for pump draw down calibration, by selecting Play / stop button.
- 2. Rotate the function dial to setup then press function button.
- 3. Scroll function button to calibrate and press function button.
- 4. Scroll function button to start.
- 5. Slowly open diaphragm valve to fill calibration cylinder to 0 mL (Full mark)
- 6. Turn off tank supply valve to skid.
- 7. Isolate the inlet and outlet of the other pump/s
- 8. Press the function to start the calibration cylinder draw down. Run until the last volume mark on the calibration cylinder or until 200 strokes. (The pump will only operate for 200 stokes maximum in calibration mode)
- 9. The pump digital display will indicate the estimated pumped volume. Adjust the estimated valve if it does not match the calibration cylinder volume by scrolling function button to the valve shown on the calibration cylinder. Press function button to set the valve.
- 10. Press function button to save the setting (Select tick to save)
- 11. Repeat the calibration cylinder draw down again to confirm valves. Adjust if necessary.
- 12. Return to home screen.
- 13. Ensure the calibration cylinder is empty, then close diaphragm valve, and reset valves to original status.

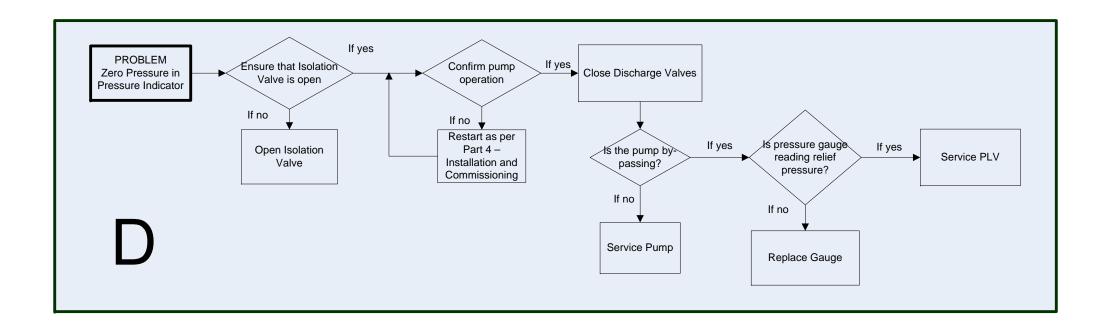
Troubleshooting Flowchart

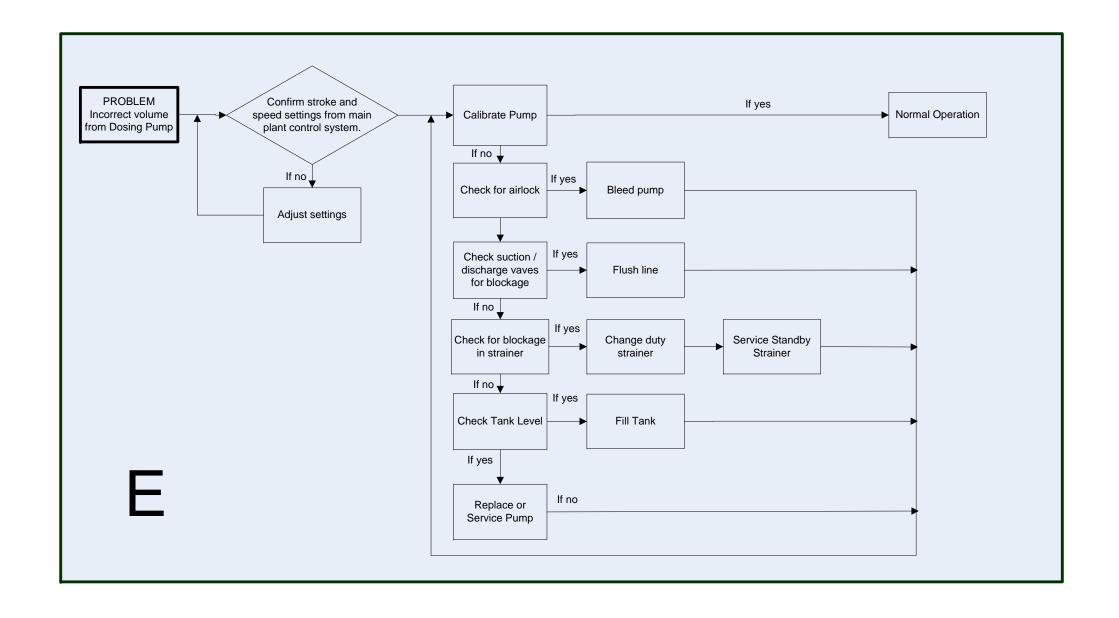




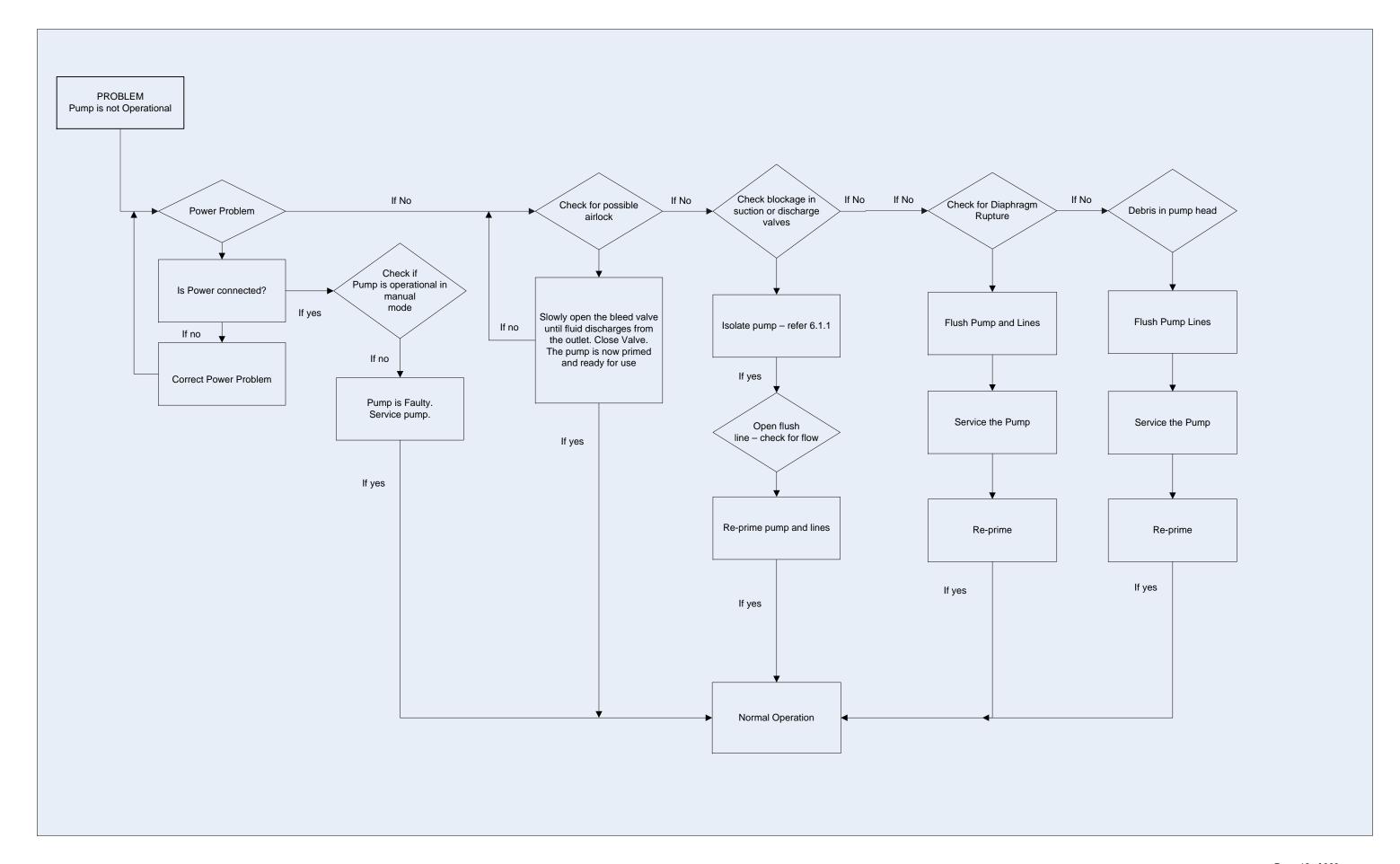








Common Faults and Symptoms



GRUNDFOS Instructions

DSS

Installation and Operation Manual



NOTES

REVISION PAGE

PROJECT NAME: BOONAH REGIONAL LAGOON UPGRADE

CUSTOMER: THOMAS & COFFEY

LOCATION: GORKOW ROAD,

BOONAH QLD, 4310

CLIENTS REF: 6232240/003

GRUNDFOS PART CODE: 98386271

EQUIPMENT: BOONAH CHLORINE DOSING SKID

DATE: 13TH MAY 2013

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Contents

SECTION 1: DESCRIPTION	1
1.1 Introduction	
1.2 DESCRIPTION OF EQUIPMENT	
1.2.1 Equipment Overview	
1.2.2 Equipment Description	
1.2.3 Equipment Key	
1.2.4 Equipment ID	4
SECTION 2: PRINCIPLE OF OPERATION	5
2.1 System Working Description	5
2.1 EQUIPMENT LAYOUT	
2.2 EQUIPMENT DESCRIPTION	7
2.2.1 Equipment Listing	
SECTION 3: OPERATING INSTRUCTIONS	9
3.1 Operational Procedures	9
3.1.1 Prior to Start-up	g
3.1.2 Pump Priming	
Dosing Pump Priming Procedure:	
3.1.3 Normal Pump Operation	10
3.1.4 Pump Calibration Procedure	
3.2 Post Start Checks	
3.3 CONTINUOUS OPERATION.	12
3.4 Flushing the Dosing System / Pump Prior to Maintenance	13
3.4.1 Flushing Pump No. 1 - PMP-01	
3.4.2 Flushing Pump No. 2 – PMP-02	
3.5 Flushing Strainers	
3.5.1 Flushing strainer STN-01	
3.5.2 Flushing strainer STN-02	
3.5 SAFETY ASPECTS	15
SECTION 4: INSTALLATION & COMMISSIONING	
4.1 STANDARDS AND PROCEDURES - MECHANICAL EQUIPMENT	
4.2 Standards and Procedures for Wiring the Equipment	
4.3 STANDARDS AND PROCEDURES FOR LUBRICATING THE EQUIPMENT	
4.4 Installation and Commissioning Instructions	
4.4.1 Installation Instructions	
4.4.2 Commissioning Instructions	
SECTION 5: ROUTINE MAINTENANCE	19
5.1 CLEANING THE EQUIPMENT	19
5.2 Lubrication	
5.2.1 Equipment Lubrication	
E 2 POLITIME MAINTENANCE COMPOUNES	20

SECTION 6: REPAIR AND MAINTAINENCE	21
6.1 Corrective Maintenance	21
6.1.1 Replacement of non-consumable parts	21
6.2 Isolating and Removing Dosing Pump	21
6.3 SERVICING THE SUCTION LINE STRAINERS	
6.3.1. To Service Strainer STN-01	
6.3.2. To Service Strainer STN-02	
6.4 Installation of a removed Dosing Pump and Priming	22
SECTION 7: TROUBLESHOOTING	23
7.1 MANUFACTURER'S MANUAL TROUBLESHOOTING REFERENCE TABLE	23
7.2 FAULT FINDING CHART	
SECTION 8: DRAWINGS, TEST SHEETS & ITP'S	25
8.1 DIMENSIONS DSS CHAIR	26
8.2 DIMENSIONS DSS CABINET	27
8.3 COMPONENTS	
8.4 GENERAL DATA	
8.5 PUMP TECHNICAL DATA	30
8.7 PUMP LIQUIDS GUIDE	
SECTION 9: STORAGE AND PRESERVATION	33
9.1 Storage Prior to Installation	
9.2 STORAGE AFTER CHEMICAL COMMISSIONING	33
SECTION 10. ADDITIONAL INFORMATION	34

SECTION 1: DESCRIPTION

1.1 Introduction

This operation and maintenance manual presents information required for installation, operation, and maintenance of the **DSS Dosing Standard Skid** system.

The Grundfos **DSS Dosing Standard Skid** is a low maintenance liquid feed dosing system, designed to provide continuous supply of chemical from the dosing skid to the dosing points.

This document is intended as a guide to assist Operators in understanding and operating the **Dosing Standard Skid**. This document contains information regarding the Chemical Dosing System only within the scope of supply of Grundfos.

1.1.1 Training Program

The main training tool for the **DSS** is this Operation and Instruction Manual. The manual essentially contains all necessary information to familiarise the operators with individual equipment and the overall system operation. Individual equipment manuals should also be included to assist the operators.

Emphasis should be placed on the following:

- ♦ Plant and Equipment Operating Hazards.
- ♦ Operating Parameters/Limits.
- Equipment Limits.
- Operating Requirements.
- ♦ Maintenance Requirements.
- ♦ Location of Emergency Stops.
- Familiarity with Plant Facilities Management Program.
- ♦ Plant Controls.
- Equipment operation, calibration, maintenance, cleaning etc.

1.2 Description of Equipment

1.2.1 Equipment Overview

Each DSS Dosing System consists of one only chemical dosing skid.

The Dosing Pumps operate in a duty/standby arrangement. They draw chemical from the Storage tank and pump it to the chemical injection point. Chemical piping and electrical connection to and from the DSS are not included as part of the skid system.

Digital diaphragm dosing pumps with stepper/EC motors, allow adjustment of the chemical solution flow rate.

One online calibration tube is provided for pump calibration.

Chemical storage tanks and injection point connections are NOT included.

1.2.2 Equipment Description

1) Chemical Dosing Skid

This system comprises the following major items of equipment.

- 2 x Grundfos digital diaphragm pumps
- 2 x Grundfos sets of input and output cables.
- ♦ 2 x Grundfos pressure relief valves.
- ♦ 1 x Grundfos pressure sustaining valve.
- ♦ 1 x Grundfos graduated calibration cylinder.
- ♦ 1 x Stubee 63mm 10bar diaphragm separated pressure indicator.
- 2 x Georg Fischer chemical inline strainers.
- ♦ 18 x Georg Fischer isolation valves
- ♦ 2 x Clipsal IP 66 240V electrical GPO's
- ♦ 1 x Grundfos electrical junction box and emergency stop switch.

1.2.3 Equipment Key

Example	: DSS	2	2	1	1	L2	P2	Х	1	X	2	Х	DDA7.5-16FCM
Type Rai	nge												Pump Model
DSS		J											Extras
Style												Х	None
1	Duty pum	р										1	Chemical flow meter
2	Duty/star	ndby										2	2 x Chemical Flow meter
3	Duty/Dut	y										3	Dilution/carrier water
												4	2 x Dilution/carrier water
Frame						ļ						5	FM + carrier water
1	Chair SS											6	2 x FM + carrier water
2	Chair PC											7	2 x FM + 2 x carrier water
3	Cabinet S												
4	Cabinet P	С		J									x, cables & GPO
											1	-	oump
Material											2	2 x p	oumps
1	uPVC/Vito												
2	uPVC/EPD									.,			damper
3	cPVC/Vito	n								X		Dampe	
_	CC /\/:+									1		Dampo	
5	SS/Viton				J					2	2 X L	Dampe	ers
										Pres	sure		
Valve Ty										Gau	ge		
1	Ball valve								x	No	7 0		
1	valve								^	Gau			
2	Diaphragi	m valv	⁄e						1	bar			(16 bar for DDA 7.5-16)
										2 x			(461 6 554 7546)
c 11 .									2	10ba	ar		(16 bar for DDA 7.5-16)
Suction i	manifold	ninor:	with C	al cyli	ndor				Char	k valv	o afte	r n	nn.
L1 L2	Single stra Double st			_				Х		heck v		ı pun	·γ
LZ	Double St	aniel	VVILII	Lai. Cy	muer		J	1		le exti		ck	
Pressure	manifold							2	_	extra			·\$
P1	Duty - Rel	ief and	d Load	ing va	lve					CALITA	STICEN	V41VC	
P2	Duty/Star			_		ding va	lve						
P3	Duty/Dut	_				_							
		,		<u>-</u>		J							
P6	Duty - RV, valve	PV + .	Auto E	egas									
P7	Duty/star Duty/Dut					gas val	ve						
P8	valve												

3

1.2.4 Equipment ID

Chem. group	Frame	Pumps	Configuration	Material -size	Valve Type	Description	Code
1	Chair PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386271
1	Chair PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386272
1	Chair PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386273
1	Chair PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386274
1	Chair PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDI150-4AF	98386275
1	Cabinet PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386276
1	Cabinet PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386277
1	Cabinet PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386278
1	Cabinet PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386279
1	Cabinet PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDI150-4AF	98386280
2	Chair SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98347262
2	Chair SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386281
2	Chair SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386282
2	Chair SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386283
2	Chair SS	DDI 150-4 AF	Duty/Standby	uPVC/E –DN20	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDI150-4AF	98386284
2	Cabinet SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98347856
2	Cabinet SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386285
2	Cabinet SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386286
2	Cabinet SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386287
2	Cabinet SS	DDI 150-4 AF	Duty/Standby	uPVC/E –DN20	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDI150-4AF	98386288
3	Chair SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386289
3	Chair SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386290
3	Chair SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386291
3	Chair SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386292
3	Chair SS	DDI 150-4 AF	Duty/Standby	uPVC/E –DN20	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDI150-4AF	98386293
3	Cabinet SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386294
3	Cabinet SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386295
3	Cabinet SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386296
3	Cabinet SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386297
3	Cabinet SS	DDI 150-4 AF	Duty/Standby	uPVC/E –DN20	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDI150-4AF	98386298
4	Chair PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386299
4	Chair PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386300
4	Chair PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386301
4	Chair PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386302
4	Chair PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDI150-4AF	98386303
4	Cabinet PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386304
4	Cabinet PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386305
4	Cabinet PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386306
4	Cabinet PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386307
4	Cabinet PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDI150-4AF	98386308

Chemical Groups	
1	Sodium Hypochlorite. All acids to 96% solution. General chemicals.
2	Ammonia, Alum, Antiscalant, SMBS
3	Sodium Hydroxide, Soda ash, Copper sulphate
4	Calcium Hypochlorite, Sodium Hypochlorite, Ferric & Ferrous solutions.

SECTION 2: PRINCIPLE OF OPERATION

2.1 System Working Description

The DSS Chemical Dosing System is designed to meter accurate quantities of chemical to a dosing point in the plant. It is configured in a duty/standby arrangement. Two positive displacement variable frequency metering pumps are supplied, one duty and one standby to ensure continuity of supply.

Both pumps are capable of running in parallel, if necessary.

Pump flow can be regulated within this specified range with a repeatable accuracy of ± 1 per cent of the set rate. The dosing flow rate in is displayed on the pump screen (adjustable 0-800, 0-1000 or 0-3000 turndown range depending on pump selected) to facilitate pre-setting and is capable of adjustment while the pump is either running or stationary. DDA-FCM and DDI-AF dosing pumps monitor and measure the dosing flow during operation.

The rate of injection is automatically controlled by the "flow" and "no flow" signals from the plant PLC via the SCADA.

The metering pumps have indication of set rate in L/hr.

Pumps have been provided with suction strainers of uPVC with a maximum opening of 1 mm in duty/standby configuration so that one strainer can be cleaned while the other is working.

Each pump has been fitted with a pressure relief valve with a return line to the suction side. Appropriate isolation valves have been included. Whenever the pressure relief valve operates, there is obvious audible indication.

A back pressure valve has been installed on the discharge line from the dosing system to maintain dosing accuracy at various depths in the chemical storage tank. This also prevents chemical siphoning when the dosing point is lower than the chemical tank and it maintains the accuracy of the dose rate when system pressures are below 2 bar. The back pressure setting is able to be set externally without dismantling the valve, but should never be adjusted above 4 bar.

A PVC calibration tube has been included adjacent to the metering pumps as a reference to check the pump output flows.

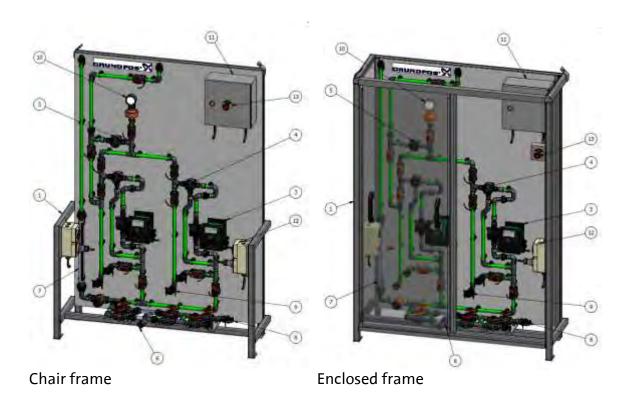
The calibration tube has a diameter of 50 mm and is graduated in one (1) litre and decilitre marks. The top of the calibration tube must be extended at least 500 mm above the overflow pipe of the chemical storage tank.

The DSS system is plumbed to facilitate manual selection of duty and standby pumps. Valves are located to allow drain and flushing of the suction manifold, pumps and discharge manifold so that a dosing pump or filter can be drained and cleaned before being removed for service.

Camlock connections are included on all flush and drain points to allow containment of drained chemicals and flushing water.

A pressure gauge with diaphragm gauge protector provides visual indication of the system operating pressure.

2.1 Equipment Layout



Pos. Key Specification...... 1 Free-standing open Chair frame or Cabinet enclosure with bolt down feet & lifting lugs. 2 Doors. Clear uPVC. Lift-in Type. (For Cabinet frame only) Grundfos Digital Diaphragm dosing pump/s - DDA - FCM, DDI - AF series 3 4 Pressure Relief Valve/s, hard plumbed into the discharge manifold 5 Pressure loading valve 6 Suction manifold with suction strainer/s and selection/isolating valves 7 Calibration cylinder. (Always with Diaphragm valve for slow release.) 8 Flush valves with camlock connection. 9 Drain valves with camlock connection. 10 Pressure gauge & chemical barrier block 11 Signal junction box. SS (Plus input signal cable, Alarm output cable, 4-20mA output cable) 12 General Power Outlet IP56 AU/NZ 1-phase **13 Emergency Shutdown button**

2.2 Equipment Description

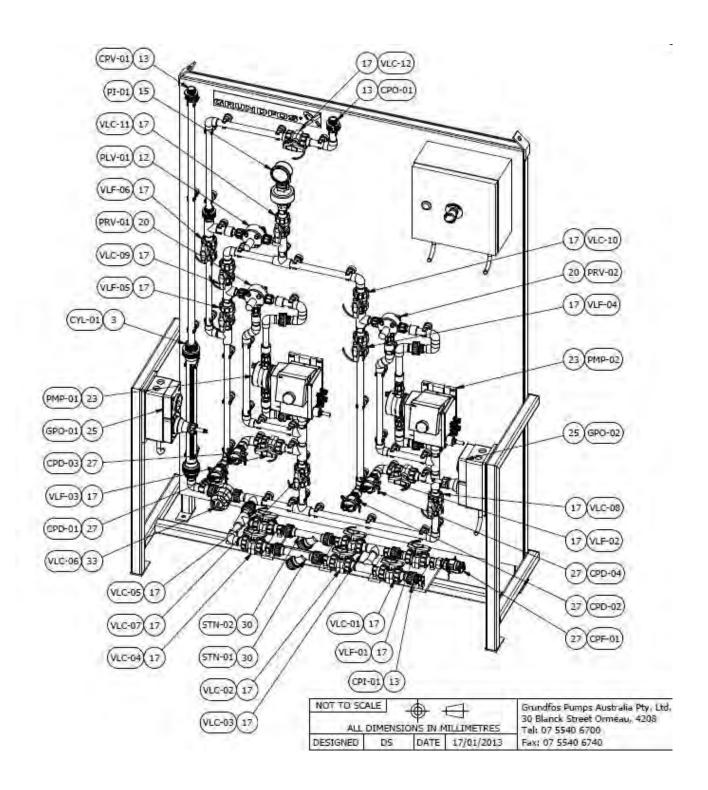
The following are the main equipment installed in the DSS Dosing System:

2.2.1 Equipment Listing

1. DSS Dosing Skid.

Dosing Skid equipment details are summarised below:

Equipment	Tag No.	Qty	Model/Size	Supplier
Dosing Pump	PMP-01 PMP-02	2	DDA/DDI / (as per model)	Grundfos
Calibration Cylinder	CYL-01	1	1L 501-01000-1A PVC; 95714471	Grundfos
Pressure Loading Valve	PLV-01	1	DN8 PVC/V or EPDM	Grundfos
Pressure Relief Valve	PRV-01 PRV-02	2	DN8 PVC/V or EPDM	Grundfos
Strainer	STN-01 STN-02	2	1/2" Type 305 Spigot Clear uPVC/V or EPDM	Georg Fischer
Control Valve	VLC-	12	1/2" Type 546 Ball or 514 Diaphragm Grey uPVC/V or EPDM	Georg Fischer
Flush Valve	VLF-	6	1/2" Type 546 Ball or 514 Diaphragm Grey uPVC/V or EPDM	Georg Fischer
Chemical Inlet	CPI-01	1	½" Barrel Union uPVC/V or E	Georg Fischer
Chemical Outlet	CPO-01	1	½" Barrel Union uPVC/V or E	Georg Fischer
Chemical Flush	CPF-01	1	½" Camlock PP	
Chemical Drain	CPD-	4	½" Camlock PP	
Vent Point	CPV-01	1	½" Barrel Union uPVC/V or E	Georg Fischer
Power Point	GPO-01 GPO-02	2	240V, 1-phase power outlet	Clipsal
Pressure Gauge	PI-01	1	63mm + PVC/PTFE Protector	A&H
Tressure Gauge	PI-01	1	1/4" BSPM 63mm 10 or 16bar	A&H



SECTION 3: OPERATING INSTRUCTIONS

3.1 Operational Procedures

Danger: Moving Parts

Potential Slip Hazard Chemical Contact

3.1.1 Prior to Start-up

Prior to Start-up, the following items need to be checked:

- a) Ensure adequate supply of chemical is available to the dosing system.
- b) Isolation Valves are configured correctly as set out in tables below. (Refer to the P&IDs)
- c) Ensure adequate flush water (if applicable) is available to the dosing system
- d) Ensure adequate chemical available.
- e) Check tightness of all union connections.
- f) Ensure that no alarms are activated.
- g) Ensure that Pumps are primed and calibrated. refer to 3.1.2 and 3.1.4

3.1.2 Pump Priming

Dosing Pump Priming Procedure:

1. Prime pump No.1 - PMP-01:

- 1. Open and close valves as per section 3.1.3
- 2. Select Manual mode on Pump 1.
- 3. Uncap CPD-03 then open Chemical tank valve to flood Suction of Pump and bleed air from the system through VLF-03. Then close VLF-03. Replace cap on CPD-03
- 4. Slightly Open drain/flush valve VLF-05 and uncap CPD-01.
- 5. Start pump No. 1.
- 6. Let pump run in continuous operation.
- 7. Leave the pump running until a continuous stream of fluid flows from the drain/flush valve VLF-05 on the pressure side.
- 8. Close drain/flush valve VLF-05 opened during step #5
- 9. Keep pump running to fill the discharge line to the doing point and turn off pump.
- 10. The pump is now ready to operate.

2. Prime pump No.2 - PMP-02:

- 1. Open and close valves as per section 3.1.3
- 2. Select manual mode on Pump 2.
- 3. Uncap CPD-04 then open Chemical tank valve to flood Suction of Pump and bleed air from the system through VLF-02. Then close VLF-02. Recap CPD-04
- 4. Slightly Open drain/flush valve VLF-04 and uncap CPD-02
- 5. Start pump No. 2.
- 6. Let pump run in continuous operation.
- 7. Leave the pump running until a continuous stream of fluid flows from the drain/flush valve CLF-04 on the pressure side.
- 8. Close drain/flush valve VLF-04 opened during step #5
- 9. Keep pump running to fill the discharge line to the doing point and turn off pump.
- 10. The pump is now ready to operate.

3.1.3 Normal Pump Operation

1. To run pump No.1 – PMP-01

Valve Numbers	Configuration
VFL-01; VLF-02; VLF-03; VLF-04; VLF-05; VLF-06; VLC-03; VLC-05; VLC-06	Closed
VLC-01; VLC-02; VLC-04; VLC-07; VLC-09; VLC-11; VLC-12	Open

- 1. Ensure that adequate chemical is within Tank.
- 2. Ensure that no alarms are activated.
- 3. Ensure that pumps are primed and calibrated.
- 4. Ensure that all piping and connections are connected

2. To run pump No.2 - PMP-02

Valve Numbers.	Configuration
VFL-01; VLF-02; VLF-03; VLF-04; VLF-05; VLF-06; VLC-03; VLC-05; VLC-06	Closed
VLC-01; VLC-02; VLC-04; VLC-08; VLC-10; VLC-11; VLC-12	Open

- 1. Ensure that adequate chemical is within Tank.
- 2. Ensure that no alarms are activated.
- 3. Ensure that pumps are primed and calibrated.
- 4. Ensure that all piping and connections are connected

Note

To operate the pumps in automatic duty / standby change over system valves VLC-07, VLC-08, VLC-09 and VLC-10 must remain open.

3.1.4 Pump Calibration Procedure

It is recommended that the pumps are calibrated on a monthly basis.

Note: On-the-fly calibration is not recommended by Grundfos

1. Dosing Pump No.1 - PMP-01:

- 1. Ensure manual mode is enabled on the dosing pump. Ensure the pump is primed and the system up to normal working pressure.
- 2. Open and close valves as per section 3.1.1-1
- 3. Open VLC-01 Isolation Valve
- 4. Open Calibration Cylinder isolation valve VLC-06 and fill Calibration tube to the top Zero mark.
- 5. Close Valve VLC-01
- 6. Open Calibration cylinder isolation Valve VLC-06
- 7. Enter Calibration mode on pump No1.
- 8. Run pump and note drawdown from Calibration Cylinder over 60 seconds
- 9. Stop pump
- 10. Record results and cross reference with pump calibration figure. Adjust pump calibration setting and repeat steps 2-10 to ensure accuracy.
- 11. Start pump
- 12. Allow calibration Cylinder to empty.
- 13. Stop pump.
- 14. Close Calibration Cylinder isolation valve VLC-06
- 15. Open valve VLC-01.
- 16. Return system to normal operation.

2. Dosing Pump No. 2 - PMP-02:

- 1. Ensure manual mode is enabled on the dosing pump as for PMP-01.
- 2. Open and close valves as per section 3.1.1-2
- 3. Open VLC-01 Isolation Valve
- 4. Open Calibration Cylinder isolation valve VLC-06 and fill Calibration tube to top Zero mark.
- 5. Close isolation valve VLC-06
- 6. Enter calibration mode on pump No. 2
- 7. Run pump and note drawdown from Calibration Cylinder over 60 seconds
- 8. Stop pump
- 9. Record results and cross reference with pump calibration figure.
- 10. Adjust calibration setting and repeat steps 2-10 to ensure accuracy
- 11. Start pump
- 12. Allow calibration Cylinder to empty.
- 13. Stop pump.
- 14. Close Calibration Cylinder isolation valve VLC-06
- 15. Open valve VLC-01.
- 16. Return system to normal operation.

3.2 Post Start Checks

- 1. Check for leaks and fix if necessary. Wash away any chemical residue.
- 2. Ensure pump is running normally and dosing chemical at the set rate.
- 3. Visually and audibly check the dosing skid for abnormal sound and vibration.

3.3 Continuous Operation

The Chemical Dosing system is designed for continuous operation. For continuous operation the following procedures should be followed:

- 1. Refer to start-up procedures
- 2. Ensure all of the valves specified remain open refer to 3.1.3.

3.4 Flushing the Dosing System / Pump Prior to Maintenance

• Flushing of the system is required whenever equipment is out of service for more than one week.

3.4.1 Flushing Pump No. 1 - PMP-01

- 1. Close Valves VLC-01; VLC-09
- 2. Connect drain hose to CPD-01 then open Valve VLF-05 to relieve discharge pressure.
- 3. Connect flushing supply line CPF-01 and open valve VLF-01.
- 4. Run the Pump No.1 and flush the pump through for 30 seconds.
- 5. Stop the pump.
- 6. Close valve VLF-01
- 7. Close valve VLF05
- 8. Remove Pump refer 6.2

3.4.2 Flushing Pump No. 2 - PMP-02

- 1. Close Valves VLC-01; VLC-07; VLC-10
- 2. Connect drain hose to CPD-02 then open Valve VLF-04 to relieve discharge pressure.
- 3. Connect flushing supply line CPF-01 and open valve VLF-01.
- 4. Run the Pump No.2 and flush the pump through for 30 seconds.
- 5. Stop the pump.
- 6. Close valve VLF-01
- 7. Close valve VLF-04
- 8. Remove Pump refer 6.2

3.5 Flushing Strainers

3.5.1 Flushing strainer STN-01

- 1. Close valves VLC-01, VLC-03, VLC-05, VLC-09, VLC-10
- 2. Open valves VLF-01, VLF-03
- 3. Uncap CPF-01 and attach drain hose
- 4. Uncap CFD-03 and attach flush hose
- 5. Flush until strainer is clear
- 6. Remove hoses and recap CPF-01 and CPD-03
- 7. Close valves VLF-01 and VLF-03
- 8. Restore system to normal operation refer 3.1.3

3.5.2 Flushing strainer STN-02

- 1. Close valves VLC-01, VLC-02, VLC-04, VLC-09, VLC-10
- 2. Open valves VLF-01, VLF-03
- 3. Uncap CPF-01 and attach drain hose
- 4. Uncap CFD-03 and attach flush hose
- 5. Flush until strainer is clear
- 6. Remove hoses and recap CPF-01 and CPD-03
- 7. Close valves VLF-01 and VLF-03
- 8. Restore system to normal operation refer 3.1.3

3.5 Safety Aspects

- "Always" wear protective clothing when operating or undertaking any maintenance on the chemical systems. i.e. clothing, eye protection, gloves.
- "Always" ensure you isolate the power to the equipment you are about to work on, to avoid the risk of the equipment starting up without warning.
- "Always" ensure you isolate the suction and discharge of each pump before attempting to do any service work or repairs.
- "Always" relieve the back pressure in the discharge line between the isolation valve and the pump, prior to attempting to work on the pump, or remove any fittings, unions, or connections.
 - Chemical dosing skids require established safety guidelines for plant operation and maintenance.
 - Note: These procedures do not address all of the safety concerns associated with operating this system and do not replace a properly designed and implemented facility safety program. It is the responsibility of the user to establish appropriate safety and health practices and ensure that they are implemented.
 - Operators should be familiar with chemicals being utilised (Refer to Material Data Sheets supplied by Chemical Manufacturers/Suppliers) and all hazards associated with the equipment provided (Refer to the Manufacturers' Literature).
 - Equipment warranty can be voided due to inappropriate operation eg:
 - 1. running the pump with the suction/isolation valve closed
 - 2. not performing routine maintenance refer to individual manuals
 - 3. Knot keeping strainers clear failing to do so will destroy diaphragm valves
 - 4. Over tightening PVC fittings hand tighten only.

The following safety pre-cautions should be followed during plant operation:

- DO NOT operate any rotating equipment without the protective guards in place.
- DO NOT attempt to dismantle any pipe work and fittings, prior to relieving the system pressure within all of the lines.
- Warning: All electrical work must be carried out by a qualified electrician.

Established facility safety procedures should be followed during maintenance:

Local isolators and motors should be properly locked and/or tagged out according to plant safety procedures. A facility policy should be in place and followed to prevent unauthorised maintenance on the skids, including pipe work dismantling and testing.

- 1. Maintenance may require use of multiple tools, disassembly of equipment, and/or removal of guards normally in place when equipment is operating.
- 2. Eye protection should be worn at all times when operating, or adjusting any equipment on the dosing skids, whilst systems are operational, or stationary, due to pressure and possible corrosive nature of fluids contained within the pipe work and fittings.
- These measures should be outlined in facility manuals, and addressed in personnel training.
- It is the responsibility of the end-user to establish safe work-practices for Plant operation.

16

SECTION 4: INSTALLATION & COMMISSIONING

4.1 Standards and Procedures - Mechanical Equipment

AS2032: Installation for PVC Pipe Systems

AS1554.6: Welding Stainless Steel for structural purposes

AS1345: Identification of the contents of pipes, conduits and ducts

AS3780: The Storage and Handling of Corrosive Substances AS1692: Steel Tanks for flammable and combustible liquids

AS1940: The Storage and handling of flammable and combustible liquids

AS1657: Fixed Platforms, walkways, stairways and ladders – Design, construction and installation

4.2 Standards and Procedures for Wiring the Equipment

AS3000: Electrical Installations (wiring rules)

AS3008: Electrical Installations – Selection of Cables

4.3 Standards and Procedures for Lubricating the Equipment

Please refer to Manufacturer's O&M Manuals.

4.4 Installation and Commissioning Instructions

4.4.1 Installation Instructions

- 1. Ensure the site civil works have been completed and all services are available.
- 2. Identify any hazards or safety issues before installation proceeds by completing site relative workplace risk assessment and job safety analysis sheets.
- 3. Mark out site to ensure correct location, orientation and levels as per site requirements and design.
- 4. Ensure all plant components have arrived to site ready for the installation.
- 5. Use a crane to lower the dosing station into the final position.
- 6. Mark and drill the DSS mount pattern to the footings.
- 7. Carefully unpack all crates and lift the dosing skid panels into the correct position ensuring the inlet and outlet of the dosing skid are correct to the desired layout.
- 8. Fix the dosing skid into position using chemical anchors, making sure it is level and plumb before final lockdown.
- 9. Mark out the route for the suction line from the storage tank to the inlet of the dosing skid then cut, glue and fix the pipework into final position.
- 10. Cut, glue and fit the calibration tube vent assembly and chemical lines to the storage tank.
- 11. Mark out and fit pipework from service water line to the flush water circuit inlet. Define the drain and flush collection system.
- 12. Connect the outlet of the dosing skid to the dosing point carrier lines
- 13. Connect services and complete all wiring to the dosing system and conduct all testing before commissioning.

4.4.2 Commissioning Instructions

- 1. Ensure services are available.
- 2. Visually inspect all plumbing and Electrical Equipment.
- 3. Physically examine all valves, unions etc.
- 4. Proceed as per Commissioning Test Sheet.
- Note: Operators should be aware of updated Site Dosing Specifications and adjust test procedures / values accordingly.

SECTION 5: ROUTINE MAINTENANCE

5.1 Cleaning the Equipment

- 1. The pipe work and hardware on the skid should be cleaned only with mild detergent and damp cloth. No solvents or abrasive cleaners should be used.
- 2. Line strainers these will require frequent cleaning during the first 3-4 months of operation due to contaminants in the tank and pipe work. Frequency during this period should be weekly. After this time, as required approximately monthly.

5.2 Lubrication

5.2.1 Equipment Lubrication

Equipment	Recommended Lubricant	Required Volume
DDA/DDI Series dosing pumps.	No lubrication is required for these	e pumps

5.3 Routine Maintenance Schedules

Footoment	Ou surel's an	Dana	24/1-		2
Equipment	Operation	Day	Wk	Mth	2 year
Calibration cylinder	Clean calibration cylinder			Х	
Pumps	Calibrate Pump (See Pump O&M Manual)		Х		
'	Replace pump kit				Х
Service Water line	Check for leaks, faulty valves etc.		Х		
Strainers	Check for debris / clean out			Х	
Unions	Inspect for leaks		Х		
All equipment	Physically check for vibration and security of mounting			Х	
Visual inspection for leaks		Х			
Check valve configurations			Х		

SECTION 6: REPAIR AND MAINTAINENCE

6.1 Corrective Maintenance

Prior to any equipment maintenance:

- Ensure that equipment is isolated from the system refer 6.2
- All Electrical work is carried out by a qualified electrician.
- Refer to the Manufacturer's Literature for corrective maintenance procedures for individual equipment refer section 8.

For corrective maintenance on the Alum Dosing System:

- 1. Isolate the Chemical Storage Tank
- 2. Electrically isolate the pump.
- 3. Flush and drain the system as per section 3.4
- 4. Individual pieces of equipment can now be repaired or replaced, as required.
- 5. Hand tighten PVC fittings only do not over-tighten

6.1.1 Replacement of non-consumable parts

♦ Please refer to manufacturer's manuals.

6.2 Isolating and Removing Dosing Pump

- 1. To remove the dosing pump, firstly ensure power supply is disconnected from the pump, including all signal cables.
- 2. Close the pump suction isolation valve, followed by the pump discharge isolation valve.
- 3. Once both valves are closed, slowly open the bleed valve between the pump and the isolation valve and drain to a suitable container. This is to relieve any residual pressure between the pump and the back pressure valve.
- 4. Flush refer 3.4
- 5. Disconnect the unions and flanges on the dosing pump/s to disconnect the pump from the pipe work. Once this has been done, the pump can be removed from service to carry out any required maintenance.

6.3 Servicing the Suction Line Strainers

• The two strainers – STN-01 and STN-02 - operate in Duty/Standby arrangement to ensure continuity of supply of chemical to the dosing pumps

6.3.1. To Service Strainer STN-01

- 1. Close Valves VLC-02 and VLC-04
- 2. Remove and clean STN-01 strainer screen
- 3. Return screen to strainer
- 4. Open Valves VLC-02 and VLC-04

6.3.2. To Service Strainer STN-02

- 1. Close Valves VLC-03 and VLC-05
- 2. Remove and clean STN-02 strainer screen
- 3. Return screen to strainer
- 4. Open Valves VLC-03 and VLC-05

Note: Appropriate personal safety equipment must be used when handling chemicals.

6.4 Installation of a removed Dosing Pump and Priming

- 1. Installation is a reversal of the process in section 6.2.
- 2. Reconnect the power supply.
- 3. To re-prime the pump when the tank level is above the skid, open the suction and discharge isolation valves, then slowly open bleed / drain valves until fluid discharges from the outlet, then close the valve. The pump is now primed ready for use. Refer 3.1.1.
- 4. Start the pump in manual mode to ensure functionality and bleed again if necessary, however, this should not be required.
- 5. To re-prime when the tank level is lower than pump height run the pump manually until air is discharged from the outlet.
- 6. Stop the pump close valve pump is ready for use. Refer 3.1.1.

SECTION 7: TROUBLESHOOTING

7.1 Manufacturer's Manual Troubleshooting Reference Table

• Refer to the below table to reference the section and page number for the listed equipment located in Section 8: Supplier Operations Manuals.

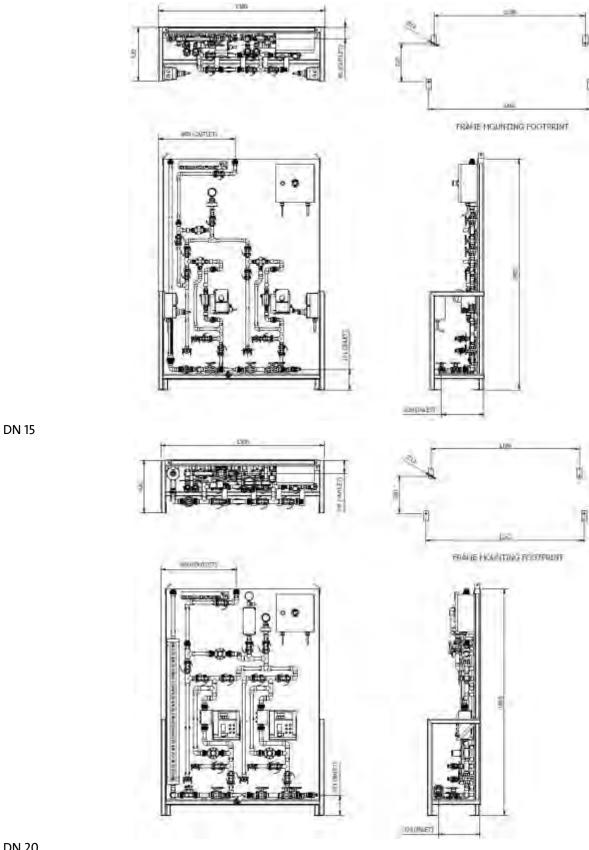
<u>Equipment</u>	<u>Manufacturer</u>	<u>Document</u>	Section	<u>Page</u>
Grundfos DDA digital dosing pump	os DDA digital dosing Grundfos Pumps Operat Manua		11	46
Grundfos DDI 209 digital dosing pump	Grundfos Pumps	Operation & Installation Manual	11	67
Grundfos DDI 222 digital dosing pump	Grundfos Pumps	Operation & Installation Manual	11	48
Grundfos 525 PLV	Grundfos Pumps	Operation Manual	7	16
Grundfos 525 PRV	Grundfos Pumps	Operation Manual	7	18

7.2 Fault finding chart

Fault	Cause	Remedy
Pump does not start or	a) No power supply	Re-establish power supply, release emergency
stops without visible		stop, check circuit breaker
cause	\5	
Incorrect or no flow from	a) Pump not running	Press start button on pump
the dosing pump		Check control signal is available
		Check signal cable
		Check pump is in correct operating mode
	b) Pump Running	Check correct flow path valve selection
		Check pump prime
		Check strainers are clean
		Check for air lock
		Check Suction / discharge valves for blockages
		Check tank level
	c) Low system pressure	Check and clean Pressure Loading Valve
		Check Pressure relief valve is not bypassing
		Check strainers are clean
		Check for air lock
		Flush suction manifold
		Check dosing valves are fully open
		Check drain / flush valves are closed
	d) High system pressure	Check and clean Pressure Loading Valve
		Check discharge valves are open
		Check injection point quill
		Check for blockages
No indication on pressure	a) Pump not running	Restart pump
indicator	b) Isolation valve closed	Open isolation valve
	c) Faulty gauge	Replace gauge

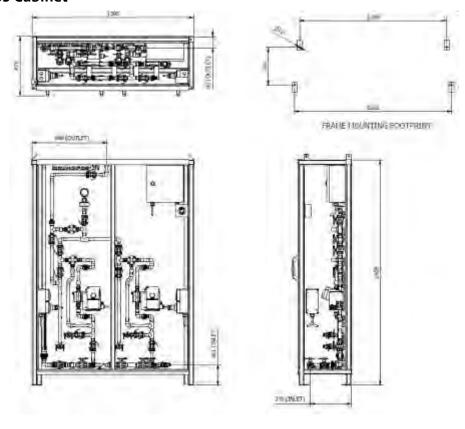
For Test sheets and ITP's pleases see appendices.

8.1 Dimensions DSS Chair

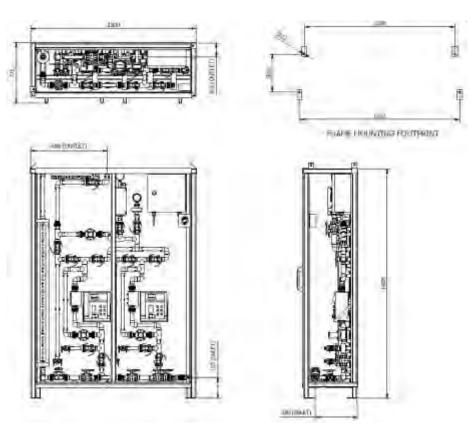


DN 20 Weight: 92 – 95kg

8.2 Dimensions DSS Cabinet



DN 15



DN 20

Weight: 97 – 100Kg

8.3 Components

Supplier list	Product manufacturer	15mm	20mm
Skid frame	Grundfos	Х	Х
Suction manifold, suction strainer, selection/isolating valves, fittings & pipe. Material: Pipe Sched. 80, uPVC UV resist Grey.	George Fischer	х	x
Calibration cylinder	Grundfos	х	Х
Digital Diaphragm dosing pumps	Grundfos	Х	Х
Pressure manifold, drain/flush valves, fittings and pipe. Material: Pipe Sched. 80 uPVC, UV resistant Grey.	George Fischer	х	X
Pressure Relief Valve	Grundfos	Х	х
Pressure loading valve	Grundfos	Х	х
Pulsation Damper	Hidracar/Grundfos	Х	х
Junction box	Grundfos	Х	х
GPO & E-stop	Schneider	Х	х
Signal cables & terminal junction box	Grundfos	Х	Х
Documentation: 3d CAD as built P&ID drawing. Operation manual. Performance test certificates	Grundfos	х	Х

8.4 General Data

Performance range

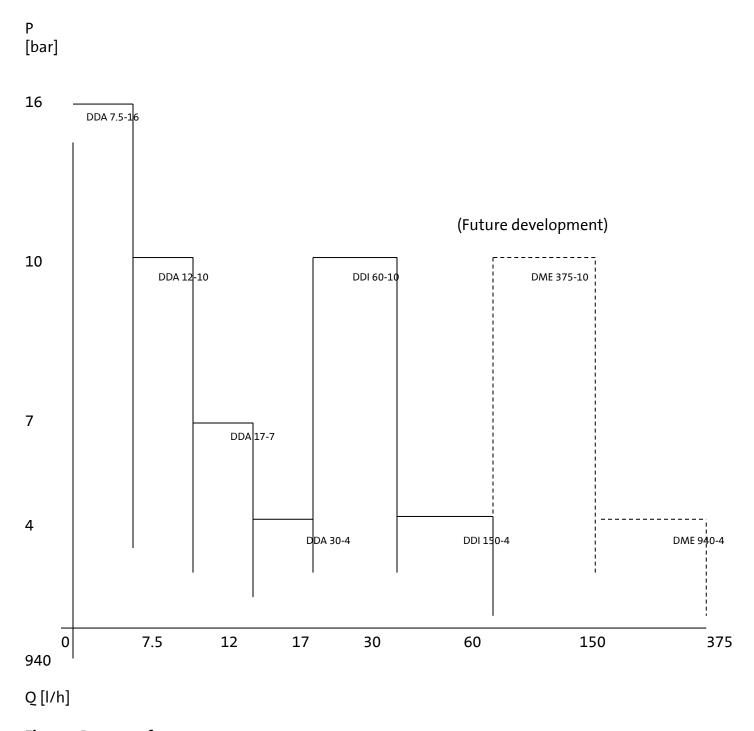


Fig. 1 Pump performance range

Active 15/05/2015

8.5 Pump Technical Data

DDA

Data			7.5-16	12-10	17-7	30-4	
	Turndown ratio (setting range)	[1:X]	3000	1000	1000	1000	
		[l/h]	7.5	1000 1000 12.0 17.0 3.1 4.5 6.00 8.50 1.55 2.25 3.00 4.25 0.78 1.13 0.0120 0.0170 0.0031 0.0045 10 7 150 100 155 205 1.45 1.55 ± 1 6 3 3 3 1 (FC and FCM: 2 2 2500 2000 1300 1300 500 500 300 300 6 6 9 -10/45 0/45 00-240 V, 50/60 H 1.5 8 25 24 5) IP 65, Nema 4X II 12 V, 5 mA 5 1000 0.5 30 VDC/30 VAC 5000 2.4 3.2 50 60	30.0		
	Max. dosing capacity	[aph]	2.0	3.1	4.5	8.0	
			3.75	6.00	8.50	15.00	
	Max. dosing capacity with SlowMode 50 %					4.00	
						7.50	
	Max. dosing capacity with SlowMode 25 %					2.00	
						0.0300	
	Min. dosing capacity					0.0080	
			16			4	
	Max. operating pressure		230		_	60	
	May stroke frequency 1)					180	
						3.10	
Mechanical data Electrical data Signal input Signal output			0.74			0.10	
			_			-	
						2	
	Min. pressure difference between suction and discharge side						
	Max. viscosity in SlowMode 25 % with spring-loaded valves 3)	[mPas] (= cP)	2500	2500	2000	1500	
	Max. viscosity in SlowMode 50 % with spring-loaded valves 3)	[mPas] (= cP)	1800	1300	1300	600	
	Max. viscosity without SlowMode with spring-loaded valves 3)	[mPas] (= cP)	600	500	500	200	
	Max. viscosity without spring-loaded valves 3)	[mPas] (= cP)	50	300	300	150	
	Min. internal hose/pipe diameter suction/discharge side ^{4), 2)}	[mm]	4	6	6	9	
	Min. internal hose/pipe diameter suction/discharge side (high viscosity) 4)	[mm]	9				
	Min./Max. liquid temperature	[°C]		-10)/45		
	Min./Max. ambient temperature	[°C]		0/	45		
	Voltage	[V]		100-240 V	/, 50/60 H:	z	
	Length of mains cable	[m]		1	.5		
	Max. inrush current for 2 ms at 100 V	[A]			В		
Electrical data	Max. inrush current for 2 ms at 230 V	[1:X] 3000 1000 [I/h] 7.5 12.0 [gph] 2.0 3.1 [I/h] 3.75 6.00 [I/h] 3.75 6.00 [I/h] 1.00 1.55 [I/h] 1.88 3.00 [I/h] 1.89 1.80 1.00 [I/h] 1.89 1.80 1.00 [I/h] 1.89 1.80 1.80 [I/h] 1.89 1.80 1.80 [I/h] 1.80 1.80 [I/h] 1.80 1.80 [I/h] 1.	5				
	Max. power consumption P ₁	[W]		24	5)		
	Enclosure class			IP 65, N	lema 4X		
Mechanical data Electrical data Signal input Signal output	Electrical safety class		II				
	Max. load low-level / empty tank / pulse / external stop input			12 V,	5 mA		
Mechanical data Electrical data Signal input Signal output Veight/size	Min. pulse length	[ms]			5		
	Max. pulse frequency	[Hz]	100				
	Impedance at analog 0/4-20 mA input	[Ω]	15				
	Max. resistance in level/pulse circuit	[Ω]	1000				
	Max. ohmic load on relay output	[A]		0	.5		
Signal output	Max. voltage on relay/analog output	[V]		30 VDC	/30 VAC		
Max. dosing capacity Max. dosing capacity with SlowMode 50 Max. dosing capacity with SlowMode 25 Min. dosing capacity Max. operating pressure Max. stroke frequency 1) Stroke volume Accuracy of repeatability Max. suction lift during operation 2) Max. suction lift when priming with wet will will be made in the suction of the max. inlet pressure, suction side Max. viscosity in SlowMode 25 % with side. Max. viscosity in SlowMode 25 % with side. Max. viscosity without SlowMode with side. Max. viscosity without spring-loaded valing internal hose/pipe diameter suction Min. Max. liquid temperature Woltage Length of mains cable Max. inrush current for 2 ms at 100 V Max. inrush current for 2 ms at 230 V Max. power consumption P1 Enclosure class Electrical safety class Max. load low-level / empty tank / pulse Min. pulse length Max. pulse frequency Impedance at analog 0/4-20 mA input Max. resistance in level/pulse circuit Max. ohmic load on relay output Max. voltage on relay/analog output Impedance at 0/4-20 mA analog output Weight (PVC, PP, PVDF) Weight (stainless steel) Diaphragm diameter	Impedance at 0/4-20 mA analog output	[Ω]		5	00		
	Weight (PVC, PP, PVDF)	[kg]	2.4	2	.4	2.6	
Weight/size	Weight (stainless steel)	[kg]	3.2	3	.2	4.0	
	Diaphragm diameter	[mm]	44	5	0	74	
Sound pressure	Max. sound pressure level	[dB(A)]		6	10		
	•						

¹⁾ The maximum stroke frequency varies depending on calibration

²⁾ Data is based on measurements with water

³⁾ Maximum suction lift: 1 m, dosing capacity reduced (approx. 30 %)

⁴⁾ Length of suction line: 1.5 m, length of discharge line: 10 m (at max. viscosity)

⁵⁾ With E-box

8.6 Pump Technical Data

DDI

	Normal operation			Slow Mode step 1					Slow Mode step 2			V _{stroke}	
Q [l/h]	P _{max} [bar]	Q [USg/h]	P _{max} [psl]	Q [l/h]	P _{max} [bar]	Q [USg/h]	P _{max} [psl]	Q [l/h]	p _{max} [bar]	Q [USg/h]	p _{max} [psl]	[ml] (p = 3 bar)	DDI model
60	10	15.87	145	40	10	10.58	145	24.7	10	6.53	145	6.63	222-60D
150	4	39.68	58	100	4	26.46	58	62	4	16.40	58	13.9	222-150D

Input of the dosing capacity		Digital – by regulation of the dosing stroke speed adjustment range: from 0.125% to 100% of the maximum dosing capacity								
	Material of connection	DDI model 222-60D	(DN 8)	DDI model 222-150D						
Connections	PVC	PVC hose 6/12 (pressure side) PE hose 9/12 (suction side) *) or PVC tube 10/12 or PE hose/2" (USA)		PVC hose 13/20 PVC tube 20/25 PVC hose 19/27 PVC tube 3/4" NPT (USA)						
	PP	PE hose 9/12 *) PP tube 12/16		PP tube	20/25					
	PVDF	PTFE hose 9/12 PVDF tube 12/16		PVDFti	ube 20/25					
	Stainless steel	Stainless steel tube 1/4" NPT (USA)	R 1/4"	Stainless steel tube R 3/4" 3/4" NPT (USA)						
Accuracy	Dosing flow < ± 1.5%, line	earity < ± 1.5 %								
Noise level	65 ± 5 dB (A), tested according to DIN 45635-01-KL3									
Max. suction height	6 m Water Column for liquids with viscosity similar to water									
Max. viscosity (HV version) at operating temperature	DDI model 222-60D 222-150D	Normal operation 200 mPa s 500 mPa s	Slow Mode 1 1000 mPa s 800 mPa s		1000 mPa s		Slow Mode 2 2600 mPa s 2000 mPa s			
Max. admission pressure	2 bar on the suction side		122							
Min. backpressure	1 bar (pressure difference	with the suction side)								
Max, temperature	max. ambient and ope storage temperature -		0°C							
Max. relative air humidity	up to 92 %, no condensat	tion								
Motor, motor voltage	AC 110 - 240 V ±10%, 50/	60 Hz, power consump	otion 50 W (includ	ing all sen	sors)					
Material of enclosure	Pump and electronics, PP Option: flame-proof encl		einforced							
Protection	IP 65									
Weight		VC, PP, PVDF: 5 kg / st VC, PP, PVDF: 7.5 kg / st								

^(*) max. backpressure 9 bars

8.7 Pump Liquids Guide

The resistance table below is intended as a general guide for material resistance (at room temperature), and does not replace testing of the chemicals and pump materials under specific working conditions.

The data shown are based on information from various sources available, but many factors (purity, temperature, abrasive particles, etc.) may affect the chemical resistance of a given material.

Note: Some of the liquids in this table may be toxic, corrosive or hazardous.

Note: Please be careful when handling these liquids.

Pumpe	d liquid (20 °C)	_	Material								
· ampe	aqu.u (20 °0)			Dosin	g head			Gasket		Ball	Ac
Description	Chemical formula	Concentration %	М	PVDF	SS 1.4401	PVC	FKM	EPDM	PTFE	Ceramic	PE
		25	•	•	•	•	-	•	•	•	•
Acetic acid	CH ₃ COOH	60	•	•	•	•	-	•	•	•	•
		85	•	•	0	-	-	-	•	•	_
Aluminium chloride	AICI ₃	40	•	•	-	•	•	•	•	•	•
Aluminium sulphate	Al ₂ (SO ₄) ₃	60	•	•	•	•	•	•	•	•	•
Ammonia, aqueous	NH ₄ OH	28	•	•	•	•	_	•	•	•	•
Calcium hydroxide ★ ⁷	Ca(OH) ₂		•	•	•	•	•	•	•	•	•
Calcium hypochlorite	Ca(OCI) ₂	20	0	•	-	•	•	•	•	•	•
		10	•	•	•	•	•	•	•	•	•
opper sulphate erric chloride ** erric sulphate ** erric sulphate ** errous chloride errous sulphate	H ₂ CrO ₄	30	-	•	-	•	•	0	•	•	•
		50	-	•	-	•	•	-	•	•	•
Copper sulphate	CuSO ₄	30	•	•	•	•	•	•	•	•	•
	FeCl ₃	100	•	•	-	•	•	•	•	•	•
Ferric sulphate★ ³	Fe ₂ (SO ₄) ₃	100	•	•	0	•	•	•	•	•	•
Ferrous chloride	FeCl ₂	100	•	•	-	•	•	•	•	•	•
Ferrous sulphate	FeSO ₄	50	•	•	•	•	•	•	•	•	•
Fluosilicic acid	H ₂ SiF ₆	40	•	•	0	•	-	0	•	•	•
	HCI	< 25	•	•	-	•	•	•	•	•	•
Hydrochloric acid	HCI	25-37	•	•	-	•	•	0	•	•	•
Hydrogen peroxide	H ₂ O ₂	30	•	•	•	•	•	•	•	•	•
		30	•	•	•	•	•	•	•	•	•
Nitric acid	HNO ₃	40	0	•	•	•	•	-	•	•	•
		70	-	•	•	-	•	-	•	•	0
Peracetic acid	CH3COOOH	5-15	0	•	0	0	_	0	•	•	0
Potassium hydroxide	KOH	50	•	-	•	•	-	•	•	•	•
Potassium permanganate	KMnO ₄	10	•	•	•	•	0	•	•	•	•
Sodium chlorate	NaClO ₃	30	•	•	•	•	•	•	•	•	•
Sodium chloride	NaCl	30	•	•	-	•	•	•	•	•	•
Sodium chlorite	NaClO ₂	20	•	•	-	0	•	•	•	•	•
Sodium hydroxide	NaOH	30	•	•	•	•	0	•	•	•	•
		50	•	•	•	•	-	•	•	•	•
Sodium hypochlorite	NaOCI	12-15	-	•		•	•	•	•	•	•
Sodium sulphide	Na ₂ S	30	•	•	•	•	•	•	•	•	•
Sodium sulphite	Na ₂ SO ₃	20	•	•	•	•	•	•	•	•	•
Sodium thiosulfate	Na ₂ S ₂ O ₃	10	•	•	•	•	•	•	•	•	•
Sulphurous acid	H ₂ SO ₃	6	•	•	•	•	•	•	•	•	•
		< 80	•	•	_	•	•	0	•	•	•
Sulphuric acid★ ⁴	H ₂ SO ₄	80-96	0	•	-	•	•	-	•	•	-
		98	-	•	•	-	0	-	•	•	_

^{★&}lt;sup>3</sup> Risk of crystallisation.

O Limited resistance

^{★&}lt;sup>4</sup> Reacts violently with water and generates much heat. (Pump should be absolutely dry before dosing sulphuric acid.)

⁻ Not resistant

^{★&}lt;sup>7</sup> Once the pump is stopped, calcium hydroxide will sediment rapidly.

SECTION 9: STORAGE AND PRESERVATION

9.1 Storage Prior to Installation

- ◆ Equipment is transported in wooden crates.
- ◆ Fork lift or crane will be required to move crates due to weight and size constraints.
- ◆ Open wooden crate carefully and check for transit damage immediately report to Grundfos if any.
- ◆ Re-pack dosing skid in wooden crate and store in enclosed building out of direct exposure from the environment
- ◆ Store in such a place to prevent damage from moving plant.
- ◆ Remove equipment from wooden crates when ready to install.

9.2 Storage after Chemical Commissioning

- ◆ Drain all chemicals from all pipe work and flush refer to section 3.4.
- ♦ Drain all water from system then isolate suction and discharge valves.
- ♦ Isolate power from system and lock out as per site specifications and procedures.
- ◆ Ensure all inlets and outlets are isolated to reduce the chance of external contaminations or ingress.

SECTION 10: ADDITIONAL INFORMATION

WebCAPS



WebCAPS is a Web-based Computer Aided Product Selection program available on www.grundfos.com. WebCAPS contains detailed information on more than 185 000 Grundfos products in more than 20 languages. In WebCAPS, all information is divided into 6 sections:

- Catalogue
- Literature
- Service
- Sizing
- Replacement
- · CAD drawings.



Catalogue

With a starting point in areas of applications and pump types, this section contains

- technical data
- curves (QH, Eta, P1, P2, etc) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- · quotation texts, etc.



Literature (M)

In this section you can access all the lastest documents of a given pump, such as

- · data booklets
- Installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- · product brochures, etc.



Service (3)

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and cancelled Grundfos pumps. Furthermore, this section contains service videos showing you

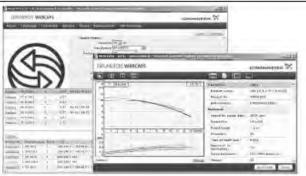
how to replace service parts.



Sizing (

With a starting point in different application areas and installation examples, this section gives easy step-by-step instructions in how to

- select the most suitable and efficient pump for your installation
- carry out advanced calculations based on energy consumption, payback periods, load profiles, lifecycle costs,
- · analyse your selected pump via the built-in lifecycle cost tool
- determine the flow velocity in wastewater applications, etc.



Replacement (5)



In this section you find a guide to select and compare replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump. The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. After having specified the installed pump, the guide suggests a number of Grundfos pumps which can improve both comfort and efficiency.



CAD drawings (15)



In this section it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

The following formats are available in WebCAPS:

2-dimensional drawings

- .dxf. wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings

- dwg, wireframe drawings (without surfaces)
- stp, solid drawings (with surfaces)
- eprt, E-drawings.

WinCAPS



Fig. 58 WinCAPS CD-ROM

WinCAPS is a Windows-based Computer Aided Product Selection program containing detailed informtion on more than 185,000 Grundfos products in more than 22 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no Internet connection is available.

WinCAPS is available on CD-ROM and updated once a year.

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www.grundfos.com

pH PRE-AMPLIFIER



AREAS TO CLEAN (SODIUM HYPOCHLORITE DOSING)







UNIONS/ CONNECTIONS TO CHECK FOR LEAKS





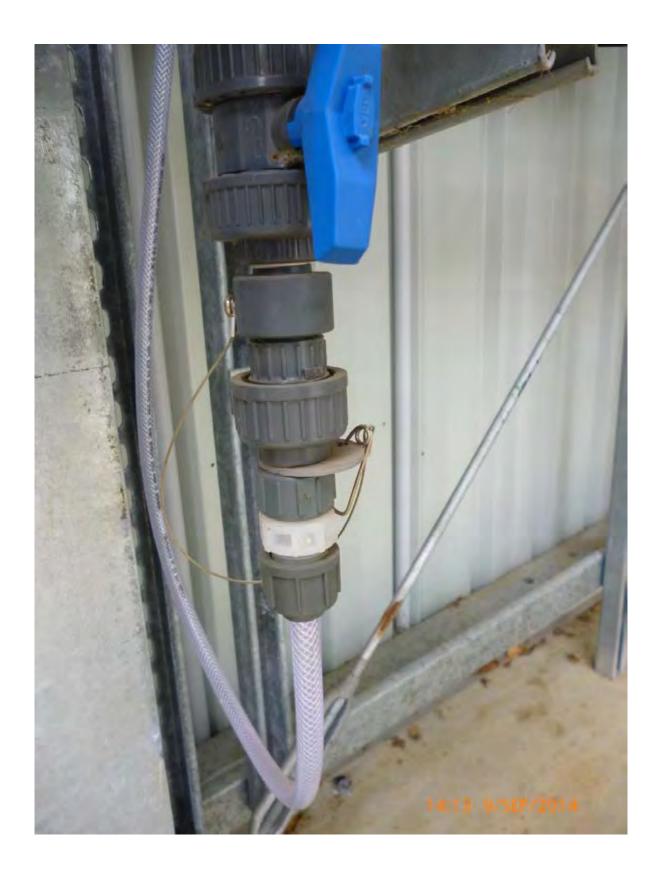


LINE STRAINER





INJECTION QUILL



INJECTION QUILL PARTIALLY WITHDRAWN



INJECTION QUILL GAS ISOLATION



pH PROBE (BLACK UNIT)



pH PRE-AMPLIFIER



AREAS TO CLEAN (CO2 DOSING)

GAS FILTER



INJECTION QUILL



CO2 CONTROL PANEL



Operations & Tech Data

Sodium Hypochlorite Dosing Control Functional Description

Service: (1.0) Site, Process or Subprocess

Subservice: (SP_) SEWER_PS

The Boonah Sodium Hypochlorite Dosing Skid will receive a run signal from plant control via a volt free contact to start dosing. The dosing rate of the pumps (PD-0710-001 & PD-0710-002) are flow paced controlled by the 4 – 20 mA signal being supplied from the Magflow meter (FIT-0108-001) to terminals 806 & 807 in the Dosing Skid Control Panel.

The design specification states a maximum flux of MF Filtrate past the NaOCI dose point is 11.8 L/s with a maximum dosing capacity of 15mg/L at 12.5% NaOCI concentration. Based upon these specifications, the dosing pumps should be set to dose 4.6 L/h. However since the Magflow meter is only rated at 10L/s with a maximum output of 20 mA, the solution flow rate will be set to dose at 3.9 L/h at maximum dosing rate to maintain the 15 mg/L.

The dosing pump flow rate can be changed to suit the concentration via the pump control panel (PD-0710-001 & PD-0710-002).

Once the Magflow meter sends the actual flow rate of the MF Filtrate via a 4-20 mA signal, the pump will automatically adjust the NaOCI dose accordingly. The dosing pump receives the 4 mA signal, it will cause the pump to stop dosing. The 4-20 mA signal from the Magflow meter will give a smooth control of the dosing pump as the pump has a 1:3000 turn down ratio.

The electrical control panel will need to be powered at all times, even if the NaOCI is not required, as the Magflow signal runs through the dosing skid panel and is then split to run the DIA 2Q – CO2 system. This is to ensure that all systems are operational and is designed to send fault signals to the plant control room.

Sodium Hypochlorite Duty/ Standyby

Service: (1.0) Site, Process or Subprocess

Subservice: (SP_) SEWER_PS

The Boonah Sodium Hypochlorite Duty / Standby Control Panel has a control system which monitors the pumps (PD-0710-001 & PD-0710-002) and automatically changes the duty pump on a preset time basis. This is factory set at 24 hours actual run time. (If the pump is stopped & started, the changeover will take longer than 24 hours) It will also change the duty pump if the current duty pump faults.

(To see the actual run time of the current pump, press Z3 button on the zelio processor)

Included is the option to monitor flow, separately from the pumps own flow monitor functions via two digital flow switches. To use this option the terminal links must be removed, and flow sensors attached to the system.

Also included is the option to monitor the level of the dosing tank (TK-0710-001), and warn the plant of low level and tank empty situations. When optioned, the Tank Low gives a warning to plant, and the tank empty input will stop the pumps to avoid a run dry situation. To use this option the terminal links must be removed and optional level sensor attached to the system

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

The system will run the Duty Pump when:

- A run signal is received from plant control or (Via volt free contact)
- The system is put into manual run.

In these scenarios the system requires either a 4-20mA speed reference, a pulse, or to have the dose rate preset and the pump in manual mode. In this case the 4-20mA signal will come from the Magflow sensor (FIT-0108-001), via the chlorine dosing skid.

The Duty Pump can be manually selected. This forces the selected pump to run at whatever speed it is receiving from the Magflow sensor (FIT-0108-001). In this mode the system will NOT automatically change duty, even if the selected pump faults.

The system is designed to send fault signals to the plant control room. These consist of the following signals:

- One Pump Fault
- System Failed
- Chemical Tank Low (Only if optional level sensor is connected)

One pump fault occurs when the duty pump fails. This can be due to a problem with the pump, or the flow sensor if used. In this case the standby pump is made the Duty pump, and dosing continues as normal.

System Failed alarm means both pumps (PD-0710-001 & PD-0710-002) have tried to continue dosing, but have failed for some reason. It may mean there is a break or blockage in the chemical line, or that there is a local power failure. (In the case of a power failure, all alarms will be on.) When optioned with the tank level sensor, it will also be on when the tank is empty.

When using a pump in manual duty and that pump faults, the system will report a System Failed alarm, as it cannot start the standby pump.

Chemical tank Low / Empty only occur if the optional level sensor is installed.

If the sensors are installed:

When a low level is reached the system sends the Tank Low signal to plant. The dosing continues as normal until the Tank Empty level is reached, whereupon the dosing pumps will stop. A System Failed alarm will be set at this time.

Carbon Dioxide Dosing Functional Description

Service: (1.0) Site, Process or Subprocess

Subservice: (SP_) SEWER_PS

The Carbon Dioxide (CO2) system starts when it receives a signal from the Magflow meter (FIT-0108-001) via the DIA-2Q pH Meter (PHT-0740-001) to inputs 800 & 801. The control of the CO2 dosing is the DIA 2Q pH Meter which monitors the pH of the MF Filtrate water by the pH Probe. The feedback from the probe then regulates the proportional control valve on the CO2 Dosing Panel to open proportionally to the 4-20 mA signal. In order for the 4-20 mA signal to be sent from the DAI 2Q, it must meet certain conditions:

- 1. A run signal is received from plant control via volt free contact.
- 2. The sample water flow switch (FS-0740-001) is closed to indicate that there is water flowing over the pH sensor (AE-0740-001).
- 3. The flow meter is sending a 4-20 mA signal indicating that there is water flowing in the MF Filtrate line.

Once these conditions are met, the DAI 2Q pH Meter will send the 4-20 mA run signal to the CO2 Dosing Panel. For the Dosing panel to operate there are certain conditions that it needs to meet:

- 1. The high pressure switches (PSL-0740-001 & PSL-0740-002) must indicate that the duty bank pressure is closed to run.
- 2. The motorised Ball valve (MV-0740-001) is in the correct position for the duty bank to run.
- 3. The low pressure switch is not activated indicating the system is ready to run.

Once these conditions are meet, the signal from the pH meter will open the shut off solenoid valve (SV-0740-001) and control the proportional control solenoid valve SV-0740-002.

The maximum amount of CO2 gas is regulated via the manual flow meter (FL-0740-001) and set to the maximum usage as per specifications. Boonah peak usage is 1.1 Kg/h.

This given peak usage rates translate to peak usage of 3.4 L/min at 3 bar back pressure for Boonah. The back pressure is factory set and does not need to be adjusted.

Factory tests prove that the 4-20 mA signal controlling the proportional control vale will give a lineal flow rate of CO2 gas into the injection quill.

The CO2 system is also a flow paced system, which means that if the water flow rate is increased, the CO2 gas rate is increased proportionally, and then monitored and adjusted via the pH sensor probe feedback.

If the Injection Quill diffuser blocks, then the back pressure will increase and activate the alarm on the low pressure side resulting in shutting off the CO2 Gas dosing system. This meets the specifications and is designed to send fault signals to the plant control room.

The automatic CO2 cylinder bank changeover is controlled by the PLC within the CO2 control electrical panel. The conditions that are required to change form duty bank 1 to standby bank 2 are:

- The high pressure switch will close to activate a low gas pressure condition.
- The PLC sends the run signal to the L Port Motorised ball valve (MV-0740-001) to change to standby bank 2.
- Once the ball valve is in the correct position, the switch integral within the motorised ball valve will signal back to the PLC.
- The system will continue to dose CO2, but a Red light will remain on the CO2 panel to indicate that bank 1 is in a low pressure state and needs to be replenished.
- The duty 2 bank will show a Green light to indicate that it is in use.
- The Red light will remain illuminated until the pressure is restored within bank 1. Note: There is no need to shut off system to replenish the empty gas bottles, as each flexible hose has a non-return valve fitted at each bottle connection, allowing a seamless change-over process.
- All bottles need to be replaced within each bank when the empty light is illuminated, as they are connected via each bank manifold. As soon as one cylinder is replaced, there is sufficient pressure to turn off the empty bank light, although the other bottles have not yet been replaced.

There is a fault light on the control panel that will illuminate if any of the below conditions are met:

Low pressure switch activated on the high pressure supply side from switches (PSL-0740-001 and PSL-

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

0740-002)

• The motorised ball valve (MV-0740-001) has reached the correct position in the allocated time.

There is a separate alarm light for the low pressure switch indicating a blocked injector.

BOONAH CHLORINE STORAGE TANK AND BUND AREA

Service: (7.0) Civil and Storage

Subservice: (TK_) TANK

SECTION 3: OPERATING INSTRUCTIONS

3.1 Operational Procedures DANGER! Moving Parts

Potential Slip Hazard

Chemical Contact

3.1.1. Tank Fill Operation

Prior to Commencing Tank Fill Operation, the following items need to be checked:

- · Isolation Valves are configured correctly as set out in tables below. (Refer to the P&IDs)
- 1. To Fill Tank TK-0710-001:

Configuration of Valves

Close - BV-0710-002; BV-0710-003

Open-BV-0710-001

Connect pump hose to mechanical tank fill station, the connectelectrical pump lead to electrical Tank Fill panel. Start the pump by turning on the connected electrical pump GPO and fill the tank until the warning lamp is illuminated on the electrical tank fill panel. This will give a warning of 30 seconds before the power is turned off to the GPO's. There is a digital display on the electrical tank fill panel showing the level of chemical in the tank. Note: The display will read95% when it is full which equates to 1200 Ltrs.

The tank ultrasonic has a backup sensor in case of instrument failure. The tank is fitted with a high level sensor which will shut off the GPO power if the chemical reaches this level before overflowing the tank. The filling pump must be only powered by the tank fill electrical panel for these safety features to work.

- 3.2 Prior to Start-up
- · Prior to Start-up, the following items need to be checked:
- · Ensure adequate supply of chemical is available to the dosing system.
- · Isolation Valves are configured correctly as set out in tables below. (Refer to the P&IDs)
- · Ensure Tank Isolation Valves are open refer 3.1.1.2
- · Ensure that no alarms are activated.
- · Ensure that Pumps are primed and calibrated. refer DSS O & M manual
- 3.2.1 To put Storage Tanks into Service:-

Tank Number

Valve No.

Configuration

Tk-0710-001

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

BV-0710-001; BV-0710-002; BV-0710-003

Closed

BV-0710-004

Open

- 3.3 Safety Aspects
- "Always" wear protective clothing when operating or undertaking any maintenance on the chemical systems, i.e. clothing, eye protection, gloves, etc.
- "Always" ensure you isolate the power to the equipment you are about to work on, to avoid the risk of the equipment starting up without warning.
- "Always" ensure you isolate the suction and discharge of each pump before attempting to do any service work or repairs.
- "Always" relieve the back pressure in the discharge line between the isolation valve and the pump, prior to attempting to work on the pump, or remove any fittings, unions, or connections.
- · Chemical dosing skids require established safety guidelines for plant operation and maintenance.
- · Note: These procedures do not address all of the safety concerns associated with operating this system and do not replace a properly designed and implemented facility safety program. It is the responsibility of the user to establish appropriate safety and health practices and ensure that they are implemented.
- Operators should be familiar with chemicals being utilised (Refer to Material Data Sheets supplied by Chemical Manufacturers/Suppliers) and all hazards associated with the equipment provided (Refer to the Manufacturers' Literature).
- Equipment warranty can be voided due to inappropriate operation e.g.:
- 1. running the pump with the suction/isolation valve closed
- 2. perform routine maintenance refer to individual manufacturer manuals
- 3. Keep strainer clear failing to do so will destroy the diaphragm valves
- 4. Hand tighten PVC fittings only do not over-tighten

The following safety pre-cautions should be followed during plant operation:

- \cdot DO NOT operate any rotating equipment without the protective guards in place.
- · DO NOT attempt to dismantle any pipe work and fittings, prior to relieving the system pressure within all of the lines.
- · Warning: All electrical work must be carried out by a qualified electrician.

Established facility safety procedures should be followed during maintenance:

Local isolators and motors should be properly locked and/or tagged out according to plant safety procedures. A facility policy should be in place and followed to prevent unauthorised maintenance on the skids, including pipe work dismantling and testing.

- 1. Maintenance may require use of multiple tools, disassembly of equipment, and/or removal of guards normally in place when equipment is operating.
- 2. Eye protection should be worn at all times when operating, or adjusting any equipment on the dosing skids, whilst systems are operational, or stationary, due to pressure and possible corrosive nature of fluids contained within the pipe work and fittings.
- 3. These measures should be outlined in facility manuals, and addressed in personnel training.
- 4. It is the responsibility of the end-user to establish safe work-practices for Plant operation.

BOONAH CHLORINE DOSING SKID

Service: (9.0) Other Equipment Subservice: (CHL) CHORINATOR

SECTION 3: OPERATING INSTRUCTIONS

3.1 Operational Procedures

Danger: Moving Parts
Potential Slip Hazard

Chemical Contact

3.1.1 Prior to Start-up

Prior to Start-up, the following items need to be checked:

- a) Ensure adequate supply of chemical is available to the dosing system.
- b) Isolation Valves are configured correctly as set out in tables below. (Refer to the P&IDs)
- c) Ensure adequate flush water (if applicable) is available to the dosing system
- d) Ensure adequate chemical available.
- e) Check tightness of all union connections.
- f) Ensure that no alarms are activated.
- g) Ensure that Pumps are primed and calibrated. refer to 3.1.2 and 3.1.4
- 3.1.2 Pump Priming

Dosing Pump Priming Procedure:

1. Prime pump No.1 – PMP-01:

- 1. Open and close valves as per section 3.1.3
- 2. Select Manual mode on Pump 1.
- 3. Uncap CPD-03 then open Chemical tank valve to flood Suction of Pump and bleed air from the system through VLF-03. Then close VLF-03. Replace cap on CPD-03
- 4. Slightly Open drain/flush valve VLF-05 and uncap CPD-01.
- 5. Start pump No. 1.
- 6. Let pump run in continuous operation.
- 7. Leave the pump running until a continuous stream of fluid flows from the drain/flush valve VLF-05 on the pressure side.
- 8. Close drain/flush valve VLF-05 opened during step #5
- 9. Keep pump running to fill the discharge line to the doing point and turn off pump.
- 10. The pump is now ready to operate.

2. Prime pump No.2 – PMP-02:

- 1. Open and close valves as per section 3.1.3
- 2. Select manual mode on Pump 2.

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

- 3. Uncap CPD-04 then open Chemical tank valve to flood Suction of Pump and bleed air from the system through VLF-02. Then close VLF-02. Recap CPD-04
- 4. Slightly Open drain/flush valve VLF-04 and uncap CPD-02
- 5. Start pump No. 2.
- 6. Let pump run in continuous operation.
- 7. Leave the pump running until a continuous stream of fluid flows from the drain/flush valve CLF-04 on the pressure side.
- 8. Close drain/flush valve VLF-04 opened during step #5
- 9. Keep pump running to fill the discharge line to the doing point and turn off pump.
- 10. The pump is now ready to operate.

3.1.3 Normal Pump Operation

1. To run pump No.1 – PMP-01

Valve Numbers

Configuration

VFL-01; VLF-02; VLF-03; VLF-04; VLF-05; VLF-06; VLC-03; VLC-05; VLC-06

Closed

VLC-01; VLC-02; VLC-04; VLC-07; VLC-09; VLC-11; VLC-12

Open

- 1. Ensure that adequate chemical is within Tank.
- 2. Ensure that no alarms are activated.
- 3. Ensure that pumps are primed and calibrated.
- 4. Ensure that all piping and connections are connected

2. To run pump No.2 - PMP-02

Valve Numbers.

Configuration

VFL-01; VLF-02; VLF-03; VLF-04; VLF-05; VLF-06; VLC-03; VLC-05; VLC-06

Closed

VLC-01; VLC-02; VLC-04; VLC-08; VLC-10; VLC-11; VLC-12

Open

- 1. Ensure that adequate chemical is within Tank.
- 2. Ensure that no alarms are activated.
- 3. Ensure that pumps are primed and calibrated.
- 4. Ensure that all piping and connections are connected

<u>Note</u>

To operate the pumps in automatic duty / standby change over system valves VLC-07, VLC-08, VLC-09 and VLC-10 must remain open.

3.1.4 Pump Calibration Procedure

It is recommended that the pumps are calibrated on a monthly basis.

Note: On-the-fly calibration is not recommended by Grundfos

- 1. Dosing Pump No.1 PMP-01:
- 1. Ensure manual mode is enabled on the dosing pump. Ensure the pump is primed and the system up to normal working pressure.
- 2. Open and close valves as per section 3.1.1-1
- 3. Open VLC-01 Isolation Valve
- 4. Open Calibration Cylinder isolation valve VLC-06 and fill Calibration tube to the top Zero mark.
- 5. Close Valve VLC-01
- 6. Open Calibration cylinder isolation Valve VLC-06
- 7. Enter Calibration mode on pump No1.
- 8. Run pump and note drawdown from Calibration Cylinder over 60 seconds
- 9. Stop pump
- 10. Record results and cross reference with pump calibration figure. Adjust pump calibration setting and repeat steps 2-10 to ensure accuracy.
- 11. Start pump
- 12. Allow calibration Cylinder to empty.
- 13. Stop pump.
- 14. Close Calibration Cylinder isolation valve VLC-06
- Open valve VLC-01.
- 16. Return system to normal operation.

2. Dosing Pump No. 2 - PMP-02:

- 1. Ensure manual mode is enabled on the dosing pump as for PMP-01.
- 2. Open and close valves as per section 3.1.1-2
- 3. Open VLC-01 Isolation Valve
- 4. Open Calibration Cylinder isolation valve VLC-06 and fill Calibration tube to top Zero mark.
- 5. Close isolation valve VLC-06
- 6. Enter calibration mode on pump No. 2
- 7. Run pump and note drawdown from Calibration Cylinder over 60 seconds
- 8. Stop pump
- 9. Record results and cross reference with pump calibration figure.
- 10. Adjust calibration setting and repeat steps 2-10 to ensure accuracy
- Start pump
- 12. Allow calibration Cylinder to empty.
- 13. Stop pump.

- 14. Close Calibration Cylinder isolation valve VLC-06
- 15. Open valve VLC-01.
- 16. Return system to normal operation.

3.2 Post Start Checks

- 1. Check for leaks and fix if necessary. Wash away any chemical residue.
- 2. Ensure pump is running normally and dosing chemical at the set rate.
- 3. Visually and audibly check the dosing skid for abnormal sound and vibration.

3.3 Continuous Operation

The Chemical Dosing system is designed for continuous operation.

For continuous operation the following procedures should be followed:

- 1. Refer to start-up procedures
- 2. Ensure all of the valves specified remain open refer to 3.1.3.

3.4 Flushing the Dosing System / Pump Prior to Maintenance

Flushing of the system is required whenever equipment is out of service for more than one week.

- 3.4.1 Flushing Pump No. 1 PMP-01
- 1. Close Valves VLC-01; VLC-09
- 2. Connect drain hose to CPD-01 then open Valve VLF-05 to relieve discharge pressure.
- 3. Connect flushing supply line CPF-01 and open valve VLF-01.
- 4. Run the Pump No.1 and flush the pump through for 30 seconds.
- 5. Stop the pump.
- 6. Close valve VLF-01
- 7. Close valve VLF05
- 8. Remove Pump refer 6.2

3.4.2 Flushing Pump No. 2 – PMP-02

- 1. Close Valves VLC-01; VLC-07; VLC-10
- 2. Connect drain hose to CPD-02 then open Valve VLF-04 to relieve discharge pressure.
- 3. Connect flushing supply line CPF-01 and open valve VLF-01.
- 4. Run the Pump No.2 and flush the pump through for 30 seconds.
- 5. Stop the pump.
- 6. Close valve VLF-01
- 7. Close valve VLF-04
- 8. Remove Pump refer 6.2

3.5 Flushing Strainers

3.5.1 Flushing strainer STN-01

- Close valves VLC-01, VLC-03, VLC-05, VLC-09, VLC-10
- 2. Open valves VLF-01, VLF-03
- 3. Uncap CPF-01 and attach drain hose
- 4. Uncap CFD-03 and attach flush hose
- 5. Flush until strainer is clear
- 6. Remove hoses and recap CPF-01 and CPD-03
- 7. Close valves VLF-01 and VLF-03
- 8. Restore system to normal operation refer 3.1.3

3.5.2 Flushing strainer STN-02

- 1. Close valves VLC-01, VLC-02, VLC-04, VLC-09, VLC-10
- 2. Open valves VLF-01, VLF-03
- Uncap CPF-01 and attach drain hose
- 4. Uncap CFD-03 and attach flush hose
- 5. Flush until strainer is clear
- 6. Remove hoses and recap CPF-01 and CPD-03
- 7. Close valves VLF-01 and VLF-03
- 8. Restore system to normal operation refer 3.1.3
- 3.5 Safety Aspects
- "Always" wear protective clothing when operating or undertaking any maintenance on the chemical systems. i.e. clothing, eye protection, gloves.
- "Always" ensure you isolate the power to the equipment you are about to work on, to avoid the risk of the equipment starting up without warning.
- "Always" ensure you isolate the suction and discharge of each pump before attempting to do any service work or repairs.
- "Always" relieve the back pressure in the discharge line between the isolation valve and the pump, prior to attempting to work on the pump, or remove any fittings, unions, or connections.
- " Chemical dosing skids require established safety guidelines for plant operation and maintenance.
- " Note: These procedures do not address all of the safety concerns associated with operating this system and do not replace a properly designed and implemented facility safety program. It is the responsibility of the user to establish appropriate safety and health practices and ensure that they are implemented.
- " Operators should be familiar with chemicals being utilised (Refer to Material Data Sheets supplied by Chemical Manufacturers/Suppliers) and all hazards associated with the equipment provided (Refer to the Manufacturers' Literature).
- " Equipment warranty can be <u>voided</u> due to inappropriate operation eg:

- 1. running the pump with the suction/isolation valve closed
- 2. not performing routine maintenance refer to individual manuals
- 3. Knot keeping strainers clear failing to do so will destroy diaphragm valves
- 4. Over tightening PVC fittings hand tighten only.

The following safety pre-cautions should be followed during plant operation:

- DO NOT operate any rotating equipment without the protective guards in place.
- DO NOT attempt to dismantle any pipe work and fittings, prior to relieving the system pressure within all
 of the lines.
- Warning: All electrical work must be carried out by a qualified electrician.

•

• Established facility safety procedures should be followed during maintenance:

Local isolators and motors should be properly locked and/or tagged out according to plant safety procedures. A facility policy should be in place and followed to prevent unauthorised maintenance on the skids, including pipe work dismantling and testing.

- 1. Maintenance may require use of multiple tools, disassembly of equipment, and/or removal of guards normally in place when equipment is operating.
- 2. Eye protection should be worn at all times when operating, or adjusting any equipment on the dosing skids, whilst systems are operational, or stationary, due to pressure and possible corrosive nature of fluids contained within the pipe work and fittings.
- These measures should be outlined in facility manuals, and addressed in personnel training.
- " It is the responsibility of the end-user to establish safe work-practices for Plant operation.

CO2 GAS CONTROL

Service: (8.0) Energy Transfer

Subservice: (BRN) WASTE_GAS_FLARE SECTION 3: OPERATING INSTRUCTIONS

3.1 Operational Procedures

DANGER! Moving Parts

Potential Slip Hazard

Chemical Contact

3.1.1 Prior to Start-up

- Prior to Start-up, the following items need to be checked:
- Ensure adequate supply of chemical is available to the dosing system.
- Isolation Valves are configured correctly as set out in tables below. (Refer to the P&IDs)
- Ensure that no alarms are activated.

3.2 Safety Aspects

- "Always" wear protective clothing when operating or undertaking any maintenance on the chemical systems. i.e. clothing, eye protection, gloves.
- "Always" ensure you isolate the power to the equipment you are about to work on, to avoid the risk of the equipment starting up without warning.

- "Always" ensure you isolate the suction and discharge of each pump before attempting to do any service work or repairs.
- "Always" relieve the back pressure in the discharge line between the isolation valve and the pump, prior to attempting to work on the pump, or remove any fittings, unions, or connections.
- · Chemical dosing skids require established safety guidelines for plant operation and maintenance.
- Note: These procedures do not address all of the safety concerns associated with operating this system and do not replace a properly designed and implemented facility safety program. It is the responsibility of the user to establish appropriate safety and health practices and ensure that they are implemented.
- Operators should be familiar with chemicals being utilised (Refer to Material Data Sheets supplied by Chemical Manufacturers/Suppliers) and all hazards associated with the equipment provided (Refer to the Manufacturers' Literature).
- Equipment warranty can be voided due to inappropriate operation e.g.:
- 1. running the pump with the suction/isolation valve closed
- 2. perform routine maintenance refer to individual manufacturer manuals
- 3. Keep strainer clear failing to do so will destroy the diaphragm valves
- 4. Hand tighten PVC fittings only do not over-tighten

The following safety pre-cautions should be followed during plant operation:

- DO NOT operate any rotating equipment without the protective guards in place.
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- · Warning: All electrical work must be carried out by a qualified electrician.

Established facility safety procedures should be followed during maintenance:

Local isolators and motors should be properly locked and/or tagged out according to plant safety procedures. A facility policy should be in place and followed to prevent unauthorised maintenance on the skids, including pipe work dismantling and testing.

- 1. Maintenance may require use of multiple tools, disassembly of equipment, and/or removal of guards normally in place when equipment is operating.
- 2. Eye protection should be worn at all times when operating, or adjusting any equipment on the dosing skids, whilst systems are operational, or stationary, due to pressure and possible corrosive nature of fluids contained within the pipe work and fittings.
- These measures should be outlined in facility manuals, and addressed in personnel training.
- 4. It is the responsibility of the end-user to establish safe work-practices for Plant operation.

Sodium Hypochlorite Dosing Calculator

Service: (2.0) Material Displacement and Direction

Subservice: (PU_) PUMP

This excel sheet is used to calculate the flow rate of the NaOCI dosing pumps based upon two variables of change of Filtrate Water Flow or change in Required NaOCI Dose Concentration.

The Flowmeter is rated at 10 L/s maximum flow rate which equals 20 mA output to the NaOCI dosing pumps speed control.

	Α	В	С	D	E	F
1	NaOCI Concentration in we	ight/weight (Chemicals)	Grundfos: Maximum flov	v rate of Flowme	ter
2	MF Filtrate Flow	10.00	L/s	(B2)		
3	Required Dose	15.00	mg/L	Grundfos:		
4	Solution Concentration	12.50	% w/w	•	se concentration	•
5	100% Solution Density	1.11	g/cm3	' '	adjustment, then s maximum dosir	
6	100% Solution Dose Rate	540.00	g/h	•	need to be adjus	
7	Solution Max. Flow Rate	3.89	L/h	the value in C		
8						
9	Calibration of Pumps usir	ng Calibration	Cylinder			
10	Cal Cyl pumped valve (mL)	Time - (Sec)	L/Hour			
11	50	47	3.83			

The NaOCI Specification flow rate is 15 mg/L. If this concentration rate needs to be adjusted by the operator based upon field testing, then input the required dosing rate into the excel cell B3. The valve will update in cell B7. This valve will need to be manually entered into the dosing pumps based upon maximum pump speed control of 20 mA.

Linked Documents



Calibration of Sodium Hypochlorite Dosing Pumps

Service: (2.0) Material Displacement and Direction

Subservice: (PU_) PUMP

Calibration of DDA Pumps using the Calibration Cylinder

- 1. Make sure the pump is in stop mode for pump draw down calibration, by selecting Play / stop button.
- 2. Rotate the function dial to setup then press function button.
- 3. Scroll function button to calibrate and press function button.
- 4. Scroll function button to start.
- 5. Slowly open diaphragm valve to fill calibration cylinder to 0 mL (Full mark)
- 6. Turn off tank supply valve to skid.
- 7. Isolate the inlet and outlet of the other pump/s
- 8. Press the function to start the calibration cylinder draw down. Run until the last volume mark on the calibration cylinder or until 200 strokes. (The pump will only operate for 200 stokes maximum in calibration mode)
- 9. The pump digital display will indicate the estimated pumped volume. Adjust the estimated valve if it does not match the calibration cylinder volume by scrolling function button to the valve shown on the calibration cylinder. Press function button to set the valve.
- 10. Press function button to save the setting (Select tick to save)
- 11. Repeat the calibration cylinder draw down again to confirm valves. Adjust if necessary.
- 12. Return to home screen.
- 13. Ensure the calibration cylinder is empty, then close diaphragm valve, and reset valves to original status.

Dia 2Q Settings

Service: (6.0) Control and Instrumentation Subservice: (CTI) CONTROL_&_INSTR

Linked Documents

DIA 2Q Setings - Boonah.pdf

Queensland Urban Utilities - Regional Lagoons | Feb 03, 2015 | Page 43

Page 78 of 363

			Boonah - DIA	2Q settings				
		set point	7.5 pH					
		prop. band xp	XP = 156.4 %					
		reset time TN	TN = 113 sec					
		constant load	0%					
		max. dosing flow	100%					
	Controller pH	dosing coeffic.	7					
	, ,		Start					
		Adaption	Stop		-			
			Adapt.result	XP: 156.4 % TN: 113 sec				
		Cton	N.O.		•			
		Stop	N.C.	1				
			alarm on	1				
		alarm values	alarm off	1				
	Alarm pH		on	1				
		dos.time monit.	off	1				
			CalData/LogBook	1				
		рН	measured value	Current data values				
	Service	controller pH	Summary of Controller pH settings					
		test current	N/a	_				
		test relay	N/a					
		test display	N/a					
		Language	English (Deutsch is default)					
		parameter 1	Turn off		Ī			
Main Menu		parameter 2	select pH	select temp. meas. to off				
		measuring ranges	select pH	select 2.00- 12.00 pH				
		controller pH	Select combined contrl	Select cont.	select downward	select PI	Select others	Adjust Low m/ 4mA
		wat. def. sensor	select on	controller	control	Select F1	Select others	Adjust High m 9mA
		date/time	set correct date & time		·			
	Setup	code function	leave at full rights	Contact Grundfos for code if error message is displayed				
		display	set to suit operators - default is 50 %		-			
				save	Must do after e adjustment	very Conex		
		setup	activate	Resets device to settings	o last saved			
		factory setting	reset	Contact Grundfos for code as this will wipe all previous	Use only in an e	emergency		
				settings				
		current output	select control 2	I.	Drives the CO2 proportional co	ntant 1		

 $Don't\ forget\ to\ save\ the\ latest\ settings\ every\ time\ before\ exiting\ -\ Setup\ -\ Factory\ settings\ -\ Setup\ -\ Save.$



www.harrisproductsgroup.com.au

July 2013

Co2 Grundfos Manifolds Compliance details

The manifolds are made using items of high quality and are backed by our US\$ 20,000,000 products liability policy.

Max inlet pressure from a CO2 cylinder that is sun affected would be 8000kpa, all items are rated in excess of this pressure.

Components:-

Hylok fittings Made in Sth Korea, rated to 3000psi/21,000kpa.

Cylinder fittings Made in Australia to AS 2473.2-2007.

High pressure Hoses Made in USA rated to 20,000kpa with a 4x safety margin

Fittings Made in Australia rated to 24,000kpa+

Copper tube Made in Australia by Kembla.

High Purity Multi-Stage regulators Made by Harris USA compliance to CGA standard and exceeds requirements of AS 4267.

Please contact us if you have a query.

David Chadkirk MBA

Managing Director

HGE PTY LTD

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T/A -Harris Products Group Australia & New Zealand

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Warranties

Grundfos Sales and Warranty Statement

Linked Documents



BOONAH CHLORINE STORAGE TANK AND BUND AREA

Equipment warranty can be voided due to inappropriate operation - e.g.:

- 1. running the pump with the suction/isolation valve closed
- 2. perform routine maintenance refer to individual manufacturer manuals
- 3. Keep strainer clear failing to do so will destroy the diaphragm valves
- 4. Hand tighten PVC fittings only do not over-tighten

BOONAH CHLORINE DOSING SKID

Equipment warranty can be voided due to inappropriate operation - eg:

- 1. Running the pump with the suction/isolation valve closed
- 2. Not performing routine maintenance refer to individual manuals
- 3. Not keeping strainers clear failing to do so will destroy diaphragm valves
- 4. Over tightening PVC fittings hand tighten only.

BOONAH CO2 GAS CONTROL

Equipment warranty can be voided due to inappropriate operation - e.g:

- 1. Operating the equipment with the isolation valve closed
- 2. Perform routine maintenance refer to individual manufacturer manuals
- 3. Keep CO2 strainer clear failing to do so will destroy the solenoid valves and equipment
- 4. Hand tighten CO2 Gas hose handwheels and PVC fittings only do not over-tighten

Harris Letter of Compliance

Linked Documents



Terms & Conditions of Sale

1. Interpretation

- (a) 'claim' means any claim, action, proceeding, loss, damage, cost, expense or liability whatsoever incurred or suffered by or brought or made or recovered against any person and however arising (whether or not presently ascertained, immediate, future or contingent).
- (b) 'customer' means the person(s) or body(ies) corporate to whom these terms and conditions are directed.
- (c) 'goods' means all goods ordered from Grundfos by the customer.
- (d) 'Grundfos' means Grundfos Pumps Pty Ltd (ACN 007 920 765, ABN 90 007 920 765).
- (e) 'GST Law' means A New Tax System (Goods & Services Tax) Act 1999 (Cth) and Regulations and any other similar or related Act or Regulation.
- (f) 'Corporations Act' means the Corporations Act 2001 (Cth)
- (g) 'PPSA' means the Personal Property Securities Act 2009 (Cth) and Regulations.

terms' means these terms and conditions of sale. Nothing in these conditions shall be read or applied so as to exclude, restrict or modify or have the effect of excluding, restricting or modifying any condition, warranty, guarantee, right or remedy implied by law (including the *Australian Consumer Law*) and which by law cannot be excluded, restricted or modified.

2. Ouotations

Unless previously withdrawn Grundfos' quotations are valid for a period of 30 days from the date of issuance.

Prices

All prices in the Price Book are current at the time of issue, however Grundfos reserves the right to vary these prices at any time with 7 days prior written notice.

An Order Processing charge of \$15 per order applies. Orders received via the Grundfos Extranet are exempt of the Order Processing Fee.

A call out fee of \$300 will apply for goods dispatched outside of normal working hours.

Customer changes to specifications, after acceptance of order may incur additional design costs.

Grundfos reserves the right to introduce other charges and fees and to vary these at any time with 7 days prior written notice.

4. Goods and services tax

All prices included in Price Books will include a 'GST' exclusive price and a 'GST' inclusive price (as defined in the GST Law). The customer must pay GST on all Grundfos' products and services in addition to any other amount that is required to be paid by the customer to Grundfos under these terms. The GST payable by the customer will appear as a separate line on the invoice.

5. Payment

The customer must make payment for goods by the last day of the month following the month in which the goods have been invoiced (due date).

A settlement discount as specified on the invoice is offered for payments which are received by the due date, provided that there are no overdue amounts owed. Payments for overdue amounts or payments received after the last day of the month are not eligible for settlement discount.

Grundfos reserves the right to commence recovery action on any overdue amount without notice to the customer. Any legal or collection costs incurred in the recovery of any overdue amounts will be recoverable from the customer.

If the customer fails to pay Grundfos any sum when due, Grundfos shall be entitled to charge interest at the rate of 1.5% per month on the overdue amount after the due date.

6. Delivery

The delivery date quoted is an estimate only based upon information available at the time of quoting and Grundfos shall not be liable for late delivery or non-delivery

Delivery of goods will be to the customer's address or outlet identified by the customer and accepted by Grundfos.

Request for split deliveries may be accepted at Grundfos' discretion but may incur an extra fee.

If the customer fails to take delivery of goods supplied, unless there is agreement to the contrary the customer must make payment as if delivery has been made.

The customer shall at its expense be responsible for all costs associated with the unloading of goods.

Grundfos may refuse to deliver further product/s where the customer is in default of Grundfos' payment terms.

7. Acceptance

Upon delivery of the goods to the customer, the customer shall be deemed to have accepted the goods.

Immediately on receipt of the goods, the customer must make sure that all parts are intact and in compliance with their order.

8. Retention of Title

- (a) Title in and to any goods will not pass to the customer until all amounts owed by the customer to Grundfos in respect of those goods have been paid in full.
- (b) The customer acknowledges that until title in and to the goods passes to the customer in accordance with this clause 8:
 - (i) the customer holds the goods as bailee for Grundfos;
 - the customer must store the goods separately and in such a manner that they are clearly identified as the property of Grundfos;
 - (iii) Grundfos is entitled at any time to demand the return of the goods and, except where the customer is an individual, Grundfos is entitled without notice to the customer and without liability to the customer to enter (or have its representatives enter) the customer's premises (or the premises of any 'related body corporate' (as defined in the Corporations Act) or agent) where the goods are located, without liability for trespass or any resulting damage in order to search for and retake possession of the goods; and
 - (iv) to keep or re-sell any goods repossessed pursuant to paragraph 8(b)(iii) above.
- The customer acknowledges that if the goods or products incorporating the goods are sold, leased or otherwise dealt with before title in and to the goods passes to the customer in accordance with this clause 8, the customer must hold the proceeds of any such sale, lease or dealing on trust (as represents the invoice price of the goods sold, leased or dealt with) in a separate identifiable account as the beneficial property of Grundfos and must pay such amount to Grundfos upon request by Grundfos. Notwithstanding the provisions above, Grundfos is entitled to maintain an action against the customer for any amounts owing by the customer to Grundfos under these terms.
- (d) Without limiting the generality of clause 10 of these terms, if title in and to the goods has not passed to the customer in accordance with this clause 8, the customer's implied right to sell, lease or deal with the goods will immediately terminate upon the happening of any of the following events in respect of the customer:
 - the customer makes default in any payment or is unable or states that it is unable to pay its debts as they fall due; or
 - (ii) where a corporation, if under administration, provisional liquidation or liquidation as if a 'controller' (as defined in the Corporations Act) has been appointed; or
 - (iii) if an individual, being an 'insolvent under administration' (as defined in the Corporations Act).
- (e) The customer acknowledges that Grundfos has a security interest (for the purposes of the PPSA) in the goods and any proceeds described in subclause 8(c) until title passes to the customer in accordance with this clause 8
- (f) The customer acknowledges that each security interest over the goods (or their proceeds) arising under this clause 8 is a "purchase money security interest" under the PPSA to the extent that it secures payment of the amounts owing in relation to those particular goods. The security interests arising under this clause 8 attach to the goods when the customer obtains possession of the goods.
- (g) The customer agrees, at its cost, to do anything (such as obtaining consents, signing and producing documents, getting documents completed and signed and supplying information) which Grundfos asks and considers required for the purposes of:
 - ensuring that the security interest is enforceable, perfected and otherwise effective, including, if applicable, as a purchase money security interest;
 - (ii) enabling Grundfos to apply for any registration, complete any financing statement or give any notification, in connection with the security interest, so that Grundfos has the priority it requires; or
 - (iii) enabling Grundfos to exercise rights in connection with the security interest. The customer agrees to pay or reimburse the reasonable costs of Grundfos in connection with anything required to be done under this clause 8.
- (h) The customer agrees to pay or reimburse the reasonable costs of Grundfos in connection with anything required to be done under this clause 8.
- Grundfos does not need to give any notice under the PPSA (including notice of a verification statement) unless notice is required under the PPSA and cannot be excluded.
- The parties agree that they are not required to disclose any information of the kind referred to in section 275(1) of the PPSA.
- (k) If there is any inconsistency between the rights of Grundfos under this clause 8 and Grundfos' rights under the PPSA, this clause prevails.
- Terms used in this clause 8 but not defined have the same meaning as in the PPSA.

9. Passing Risk

Risk in the goods shall pass to the customer upon delivery of the goods to the customer or collection of the goods by the customer's agent or courier. The customer shall insure the goods for their full replacement value from the time that risk in the goods passes to the customer until the time that title to the

Terms & Conditions of Sale

goods passes to the customer. The customer shall hold the goods as bailee but shall not be entitled to receive any remuneration in respect of that bailment.

Unloading of goods is the customer's, or the customer's agent's responsibility.

10. Default

If the customer makes default in payment or otherwise fails to carry out the terms or repudiates this or any other contract with Grundfos, or if the customer stops payment, calls a meeting of its creditors or becomes insolvent or subject to bankruptcy laws, or being a company calls a meeting for the purpose of or goes into liquidation or has a winding up summons presented against it or has a receiver, controller or administrator appointed, Grundfos at its option and notwithstanding the waiver of such default or failure (and without prejudice to its rights under the contract), may suspend or cancel any contract with the customer or require payment in cash before or on delivery. Grundfos may take possession of the goods and dispose of the same in its own interest, without prejudice to any claim it may have for any loss resulting from such re-sale and all credit facilities available to the customer may be withdrawn by Grundfos at any time thereafter.

11. Cancellation

No order of goods may be cancelled except with consent in writing and on terms which will indemnify Grundfos against all losses. Grundfos shall be entitled to cancel the order by notifying the customer in writing if fulfillment is impossible within a reasonable period of time because of war, strike, lockout, political conditions or other incidents of force majeure beyond Grundfos' control. The same applies in the case of delayed or faulty delivery from a sub-supplier, in the event of such incidents; Grundfos will not be liable to pay damages to the customer.

12. Privacy Act

The customer acknowledges that credit information may be given to a credit reporting agency, on the customer's understanding that the Privacy Act allows Grundfos to give a credit reporting agency certain information about the customer.

To enable Grundfos to assess the customer's application for commercial credit, the customer authorises Grundfos to obtain from a credit reporting agency a credit report containing personal and commercial credit information about the customer. In accordance with the Privacy Act, the customer authorises Grundfos to give and receive from any credit provider information in Grundfos' possession or the credit provider's possession about the customer's credit worthiness, credit standing, credit history and credit capacity. The customer understands that the information may be used to assess an application for credit by the customer and assess the customer's credit worthiness.

13. Returns

Unless there is a major failure to comply with a consumer guarantee:

- Grundfos will not be under any obligations to accept goods returned by a customer. Prior approval must be obtained before any goods will be accepted for return.
- (ii) Grundfos will only consider the return of standard goods listed in Grundfos' current published Price Book and where those goods are in their original packaging, unsoiled, undamaged and in an immediate resalable condition. Standard goods returned will be accepted if returned within 60 days from date of delivery, and Grundfos will charge the customer \$75 + 15% of invoice value for the goods.
- (iii) If Grundfos accepts the return of goods, the goods returned must be accompanied by a Goods Return Advice (GRA) stating the original invoice number, date of purchase, customer order number and reason for return. Freight and insurance for goods to be returned to Grundfos must be pre-paid by the customer.
- (iv) Goods not in the published Price Book are non standard and are non returnable.
- (v) Requests for exemptions to the above must be agreed jointly with Grundfos' Market Segment Manager and Manufacturing Manager (or equivalent position from time to time).

14. Liability

To the extent that these terms and conditions provide for a supply of goods or services to a consumer (as defined in the *Australian Consumer Law*), that supply will be subject to consumer guarantees which are not excluded, restricted or modified. In all other respects and to the extent permitted by the law:

- (a) all terms, conditions, warranties and representations, express or implied by statute or otherwise, as to the description, acceptable quality or fitness for any purpose of goods supplied under these terms are excluded (except such as may be provided for under these terms);
- (b) Grundfos excludes all liability in statute, equity or common law (including, but not limited to, liability in negligence) and any loss and damage consequential or otherwise arising in any way from the supply of, delay in supplying or failure to supply goods or services under these terms;
- any liability of Grundfos which cannot be lawfully excluded in relation to the supply of goods is limited to;
 - the replacement of the goods or supply of equivalent goods to those that gave rise to the liability;
 - (ii) the repair of the goods that gave rise to the liability; or
 - the payment of the cost of replacing the goods that gave rise to the liability;

- (d) Grundfos will not accept claims for liquidated damages; and
- (e) Grundfos expressly disclaims responsibility for goods manufactured or supplied by it that:
 - (i) are damaged by accident;
 - (ii) are damaged by abnormal operating conditions, war, violence, storm, cataclysm or other acts of God;
 - (iii) are damaged by equipment being used for any application for which the product is not manufactured or recommended;
 - (iv) are damaged caused by sand, abrasive materials, corrosion due to saline water, hazardous liquid, electrolytic action, liquid temperature beyond the recommended range, cavitation, lightning strike, improper supply voltage or insufficient liquid to enable the product to perform;
 - (v) are damaged by not being installed in accordance with Grundfos installation instructions and accepted codes of good practice; or
 - (vi) are subject to incorrect maintenance or mishandling.

Any contaminated goods returned to Grundfos, must be sent in compliance with the Grundfos guidelines for handling grey contaminated waste. Goods not sent in accordance with these guidelines are considered possibly dangerous and will be returned to the sender.

If the customer re-sells the goods, the customer must limit its liability to enduser purchasers of commercial goods to the repair, replacement or payment of the cost of repairing or replacing the goods.

15. Warranty

Any warranty provided by Grundfos in respect of the goods is provided with the goods and detailed in the applicable Grundfos' Warranty Document. If no Grundfos Warranty Document is provided with the goods, no manufacturer's warranty applies to those goods.

The customer must provide the Grundfos Warranty Document to any purchaser or end-user for any Grundfos product sold or installed.

The customer acknowledges that any warranty given by the customer in relation to the goods (other than the warranty provided in Grundfos' Warranty Document) is not Grundfos' warranty. Grundfos will not accept claims under any such warranty.

The customer acknowledges that it understands what a 'duty point' is insofar as it relates to the goods. The customer must explain what a 'duty point' is to any end-user to whom it supplies goods.

16. Commissioning

Unless specifically included in the Grundfos offer, commissioning is not included. Commissioning can be requested from Grundfos and will be charged at a fee.

Any commissioning is to be done after installation is complete, power and water is available and the specified duty can be achieved

Commissioning test equipment (gauges, flow meters etc) is to be installed and operating by the customer before commissioning.

Commissioning will be to determine the correct operation of the Grundfos supplied equipment, not the whole system.

The customer's failure to meet these commissioning terms may incur an extra fee to the customer. $\label{eq:commission}$

17. Freight charges

Standard domestic products and spares in the Price Book will be delivered Free in Store (FIS).

A freight charge of 0.5% of the product price will apply to the larger/bulkier product covered under discount codes A0, A4, A8, D2, D3, D4, D5, E1, E3, H1, H3, H4. L1. S2 and 72.

A freight charge of 1.0% of the price will apply to spare parts and service kits under the discount code M2.

For SQ Flex product freight charges also apply at rates designated in the Price Book based on product and destination zone (discount code A2 and A7).

18. Drawings

All drawings and descriptions supplied shall remain the property of Grundfos and may not be copied, reproduced, passed onto or in any other way communicated to a third party without permission from Grundfos. The ownership of descriptions necessary for the proper installation, starting, operation and maintenance of the supplied products shall pass to the customer upon payment. However, Grundfos may demand that this data is treated as confidential information.

19. Documentation

Unless otherwise agreed upon by Grundfos in writing, standard Grundfos operating documentation shall be provided in all cases. A variation to standard operating documentation requires prior written approval and may be subject to additional costs.

20. Applicable Law

Any agreement or contract made between Grundfos and the customer, including any contract made pursuant to these terms shall be deemed to have been made in South Australia and shall be governed by the laws of South

Certificates

Commissioning Check Sheets

Linked Documents

- GRUNDFOS-COMM-CHK-003-2.pdf
- GRUNDFOS-COMM-CHK-014.pdf
- GRUNDFOS-COMM-CHK-003-1.pdf
- GRUNDFOS-COMM-CHK-002.pdf
- GRUNDFOS-COMM-CHK-001.pdf

Site Acceptance tests (SAT)

Linked Documents

- 98456864-SAT-BO.pdf
- 98418722-SAT-BO.pdf
- 98437842-SAT-BO.pdf
- 98439300-SAT-BO.pdf
- 98439300 SPT Boonah 4 Bar.pdf
- 98439300 SPT Boonah 10 Bar.pdf
- 98418722 SPT Boonah 10 Bar.pdf
- 98386271-SAT.pdf

Factory Acceptance Tests (FAT)

Linked Documents

- 98456864-FAT.pdf
- 98439300 FAT pH Panel.pdf
- 98386271-FAT.pdf

Inspection and Test Plan (ITP)

Linked Documents

- 98456864-ITP-BO.pdf
- 98386271-ITP-BO.pdf

Water pH Data Log - Boonah

Linked Documents

- Boonah Tank pH Log data 31012014.pdf
- Boonah Filtrate Water pH Log data 20012014.pdf

Form 15 & 16

Linked Documents

- Boonah Form 15.pdf
- Boonah Form 16.pdf

GRU	NOFOS-COMM-CHK-014 Rev 02		LEV	EL TE	RANSMI	TTER	TEST SHEET	T	G	RUNDE	os X
NETRUCTIONS attraction will be	Tris text elimet is used to check co performed. If a section of this text is	priest installation, function	sality and oper	netion of ass	eta Eactory ca	ibinton cen	Heaton will be assepted	i II performance non	distant and not	пят жина счиня	seiciving, hero addriumi
CLIENT	Thomas & Coffsy	CHAIRTS LINE AND MANAGEMENT OF	-		giorial Lagricon	WIP		PHOJEQT No:	DORDA		
SUTY. SYSTEM No.	Sodium Hypochlorius	_	TAG No -	LIT-0710-00	11			DW3 No -	486/5/0-0108	1-200	
(1 ST EM 110)	arsanian (Mondaseine		Is a tele	1910				-			
VANUFACTURE	n-	Vega	-		TRANSMI	ITER DAT			JULTRASON	ic	
MERIAL No		24 3 66 0 8N61 XXAGHKM	41			RANGE IP RATING			1966/67	25-5M	rR
OWER SUPPLY		24vV DC Tank - 11C-0710-001				VOLTAGE			4-20 mA		
			PRESS	URE LEVI	EL TRANSM	ITTER PE	RFORMANCE TES				0.834
Church file and	neel operation wogse output signel against fallare (when applica	Description big)						Test			Value
Calibration vi	erfication alteration will be verified by filling ter	di with a known column o	f median						===		
Approx Fill Le	yel 16 Volume Younderrook	L) Expected level (L)	Instament	invol (i.)	Pass	trail					
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75%					1						
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	- 12.5% Bodium Hypochiorita										
IC.											
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-											
40-	Parameter			RASONIC	LEVEL TRA	NSMITTE	R PARAMETERS			-	
SEDIEN		Operation Material	Namo			POLL A	Value FINGE	level (How full the		Description	
PATRE		Units						injuid or flat solid meters distance from to		bottises	
		Span Mepping required				33.50 Y		distance from to Yes / No	r liqued level to	tank bottom	
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T.C. William	ctur iv		MENTS	- 79							RECTIFIED Tick box
WORK	LING VOLUME A	BOUCED TO	1.20	0 10							-
										V-1	
	COMPANY	+		FED BY	_				APPROVED B		
	SHGNATURE	40	-	COLUMN TO SERVICE SERV					TOTAL SECTION		
	PRIVI NAME	IAN 6	in								
	DATE	1/07/1	213								

GRUNDFO	N.Sc	PROJE	ECT COMM	ISSIONING RECORD
FORM TYPE:	COMMISSIONING CHECKSHEET			
FORM NAME:	DOSING SKI	D COMM	DOC ID:	GRUNDFOS-COMM-CHK-003
PROJECT:	NAME OF PR	OJECT BOOM	AH REGIONA	IL LAGOONS WIP
SYSTEM:	NAME OF CHEMICAL SODIOM HYPOCHLORITE DOSING SKID			

1. TEST INFORMATI	ON P+ID# PD-07/0-001	Date of Test:	1/7/2013
Skid Number	98386271-08042013	Pump Model:	DDA 7.5-16
Pump Manufacture:	GALLOROS	Rated Capacity:	7.5 L/h
Serial Numbers:	100007518111243	Stroke Range:	N/A %
Storage Tank Level:	%	Test Medium:	WATER
Flow Meter Number:	41-0710-001	Calibration Cylinder	200 m
VSD Range:	NIA %	Volume:	Developed to
Pressure Relief Valve Setting:	/000 kPa	Pressure Loading Valve Setting:	200 kPa

Z. PUIVI	P SITE TEST	-A district At At A -	Carrier of the State	minute Artic		
SPEED %	/ Hz STROKE %	PUMP DRAW DOWN VOLUME (mL)	PUMP DRAW DOWN TIME (secs)	PUMP DRAW DOWN FLOW RATE (L/hr)	FLOWMETER FLOW (L/hr)	
1	100%	100 nL	47-17	7.63	1	
/	75 %	160 ML	62.75	5.73		
/	50%	50 ML	46-95	3.73		
/	10%	00 mL	50.70	0.71		
Variation	against rated capacity	- 04				
at maxim	ium speed and stroke	%	Pump performa	nce acceptable?	YES / NO	
	Any unusual noise or vibration observed?					
3 OUTS	TANDING ITEMS (10)	ne added to "Outstar	dias them y posts	Louis Anna Carlo		
3. OUTS	TANDING ITEMS (to DESCRIPTION	be added to "Outstar	nding Items Regis	ter")	REGISTER ENTRY	
ITEM	TANDING ITEMS (to DESCRIPTION ESS SIGN-OFF: NAME	POS	nding Items Regis SITION NING ENGINEER			

Page 1 of 1

File name:

Page 86 of 363

GRUNDF	N.So	PROJEC	ст сомм	ISSIONING RECORD	
FORM TYPE:	PRE-COMMISSIONING CHECKSHEET			G CHECKSHEET	
FORM NAME:	DOSING SKI	DOSING SKID PRE-COMM		GRUNDFOS-COMM-CHK-002	
PROJECT:	0060A Boonah Regional Lagoon STP				
SYSTEM:	Carbon Dioxide Dosing System (CO2)				

OF OF prices for June	COMMISSIONING INSPECTION AND CHECKS	Transfer St.
ITEM	PRE-COMMSSIONING CHECK	COMPLETE
1.	Check hardcopy of O&M Manual received	N/A
2.	Check electronic copy of O&M Manual received (format Word / PDF)	MA
3.	Check all electrical items, excluding the motorised storage tank isolation valve, are installed above the bund wall height.	W/A
4.	Check pump installation:	N/A
5.	Installed as per drawings and vendor installation manual	~
6.	Nuts and bolts secure to correct torque	~
7.	Pipework, valve, instrumentation installation as per drawings and vendor installation manual	V
8.	Flange gasket material of compatible type? Note: Sodium Hypochlorite – use Viton.	V
9.	Verify that ALL Pipework Pressure Testing has been completed for the system	~
10.	Confirm electrical installation and testing is completed, including all safety switches and settings	V
11.	Check Loading / Anti-syphon Valves set for 2 bar back pressure.	3 BAR.
12.	Check Dosing Pump Pressure Relief Valves set for min. 5 bar.	6 BAR
13.	P&ID labels in place on equipment	V
14.	Pipe Marker Chemical labels install and flow direction is correct?	
15.		
16.	General Comment/Observations	

ITEM DESCRIPTION	
Control Marine Control	

COMMISSIONING ENGINEER:

DATE: 2/7/2013

GRUNDFOS		PROJECT COMMISSIONING RECORD			
FORM TYPE:		PRE-COMM	IISSIONIN	G CHECKSHEET	
FORM NAME:	M NAME: DOSING SKI		DOC ID:	GRUNDFOS-COMM-CHK-001	
PROJECT:	0060A Boonah Regional Lagoon STP				
SYSTEM:	Sodium Hyp	ochlorite Dosin	g System		

ITEM	PRE-COMMSSIONING CHECK	COMPLETE
1.	Check hardcopy of O&M Manual received	
2.	Check electronic copy of O&M Manual received (format Word / PDF)	
3.	Check all electrical items, excluding the motorised storage tank isolation valve, are installed above the bund wall height.	/
4.	Check pump installation:	V
5.	Installed as per drawings and vendor installation manual	V
6.	Nuts and bolts secure to correct torque	V
7.	Pipework, valve, instrumentation installation as per drawings and vendor installation manual	V
8.	Flange gasket material of compatible type? Note: Sodium Hypochlorite – use Viton.	V
9.	Verify that ALL Pipework Pressure Testing has been completed for the system	V
10.	Confirm electrical installation and testing is completed, including all safety switches and settings	~
11.	Check Loading / Anti-syphon Valves set for 2 bar back pressure.	~
12.	Check Dosing Pump Pressure Relief Valves set for min. 5 bar.	10 BAR
13.	P&ID labels in place on equipment	~
14.	Pipe Marker Chemical labels install and flow direction is correct?	-
15.		
16.	General Comment/Observations	
	A STORY OF THE STO	

2. OUT	STANDING ITEMS
ITEM	DESCRIPTION

COMMISSIONING ENGINEER:

DATE: 2/7/2013

GRUNDE	N.SO	PROJ	ECT COMM	ISSIONING RECORD
FORM TYPE:	COMMISSIONING CHECKSHEET			CHECKSHEET
FORM NAME:	DOSING SKI	D COMM	DOC ID:	GRUNDFOS-COMM-CHK-003
PROJECT:	NAME OF PROJECT BOOMAH REGIONAL LAGOONS WTP			
SYSTEM:	NAME OF CH	HEMICAL SOO	sium Hypoca	HLORITE DOSING SKID

1. TEST INFORMATI	ON 1+ID# PD-0710-002	Date of Test:	1/7/2013	
Skid Number	98386271-08042013	Pump Model:	00975-16	
Pump Manufacture:	GRUNDFOS	Rated Capacity:	7.5	L/hr
Serial Numbers:	10000 638P111227	Stroke Range:	W/H	%
Storage Tank Level:	%	Test Medium:	WATER	-
Flow Meter Number:	41-0710-001	Calibration Cylinder		mt
VSD Range:	V/A %	Volume:	200	10.00
Pressure Relief Valve Setting:	1000 kPa	Pressure Loading Valve Setting:	200	kPa

SPEED % / I	Hz STROKE %	PUMP DRAW DOWN VOLUME (mL)	PUMP DRAW DOWN TIME (secs)	PUMP DRAW DOWN FLOW RATE (L/hr)	FLOWMETER FLOW (L/hr)
1	100%	ICOML	4831	745	
/	70590	10000	64-71	5 56	
1	50%	SOUL	4888	3.2	
/	10%	20ml	4891	.74	
/		100	N	Letter Airborn	
at maximum	gainst rated capacity m speed and stroke	%	Pump performa	nce acceptable?	YES / NO
Any unusu	al noise or vibration	observed?			YES / NO
comment	s / Observations;				
3. OUTST/	ANDING ITEMS (to	be added to "Outstar	nding Items Regist	er")	REGISTER
3. OUTST/	ANDING ITEMS (to	be added to "Outstar	nding Items Regisi	ter")	REGISTER ENTRY
3. OUTST/	ANDING ITEMS (to	be added to "Outstar	nding Items Regist	er")	125 - 26 - 262 - 242 - 212 - 212
3. OUTST/ ITEM DE	ANDING ITEMS (to ESCRIPTION	POS	iding Items Regist		125 - 26 - 265 - 240 - 115 - 115 - 115

Page 1 of 1

File name:



Page 1 of 3

System Pressure Test Sheet

Hydrostatic Test

PROJECT:	QUU Regional Lagoons WWTP - Boonah	DOC ID:	98439300 - SPT
SYSTEM:	CARBON DIOXIDE	CLIENT:	Thomas & Coffey
DATE:	03/05/2013	TESTED BY:	Grundfos Pumps Pty Ltd
NOTE:	AS2032:2006 Cl 7.2 Test procedure		
	All piping and pressure pipelines ins maximum normal operating pressure gauge shall be installed to show the	e of the system with r	er pressure of a minimum of 1.25 times the no visible leaks for 15 minutes. A pressure

DESCRIPTION	PRESSURE (BAR)	TIME (MINUTES)	PASS	FAIL
All pipe work from the Filtrate Line outlet to the pH Panel outlet valve	10	15	/	
ADDITIONAL INFORMATION	REFE	RENCE		



Page 2 of 3

DESCRIPTION	PRESSURE (BAR)	TIME (MINUTES)	PASS	FAIL



Page 3 of 3

GRUNDFOS REPRESENTATIVE

Signature Andrew Dunnett

Title Fitter

Date 27-5-2813

THOMAS & COFFEY REPRESENTATIVE

Name Mark Ferris
Title Site Manager
Date 27/5/13



Page 1 of 2

System Pressure Test Sheet

Hydrostatic Test

PROJECT:	QUU Regional Lagoons WWTP - Boonah	DOC ID:	98418722 - SPT
SYSTEM:	SODIUM HYPOCHLORITE	CLIENT:	Thomas & Coffey
DATE:	03/05/2013	TESTED BY:	Grundfos Pumps Pty Ltd
NOTE:	AS2032:2006 Cl 7.2 Test procedure All piping and pressure pipelines in		er pressure of a minimum of 1.25 times the
	maximum normal operating pressur gauge shall be installed to show the		no visible leaks for 15 minutes. A pressure

DESCRIPTION	PRESSURE (BAR)	TIME (MINUTES)	PASS	FAIL
All pipe work from the Tank Fill Panel to the Tank	10	15	V	
All pipe work the Tank to the Dosing Skid	10	15	V	
All pipe work within the Dosing Skid	10	15	V	
All pipe work from the Dosing Skid to the Injection Quill	10	15	1	
ADDITIONAL INFORMATION	REFE	RENCE		



Page 2 of 2

DESCRIPTION	PRESSURE (BAR)	TIME (MINUTES)	PASS	FAIL
All		1		

GRUNDFOS REPRESENTATIVE

Signature August

Name Andrew Durnett

Title Filer

Date 27: 5: 2013

THOMAS & COFFEY REPRESENTATIVE

Signature.	_
Name Mork Ferris	
Title SUR Manager	
Date 27/5//3	



Grundfos Pumps Pty Ltd SITE ACCEPTANCE TEST			SAT NO.: DATE:	98386271-SAT 05/04/2013
			PREPARED BY:	I.Ginn
CLIENT:	Thomas & Coffey	CONTRACT NO.:	0060A	
QUOTATION NO. :	20227-JKJ99	PROJECT:	Boonah Regional La	goons
ORDER NO. :	6232240/003	DRAWING NO.:	486/5/5-0108-259 P&ID - 486/5/5-01	
SYSTEM DESCRIPTION:	Sodium Hypochlorite Dosing Skid	EQUIPMENT/TAG NO.:	98386271-0804201	13



NO.	ACTIVITY	ACTIVITY ACCEPTANCE CRITERIA GRUNDFOS CLIENT		ACCEPTANCE CRITERIA	ON BY	
				CLIENT	NOTES / DOCUMENTS	
1	Dosing Skid Construction and Assembly (Pumps)	As per approved P&ID 486/5/5-0108-251 As per approved GA 486/5/5-0108-259 to 262	2/7/2013		 P01 Serial number: 10000 751P11 243 P02 Serial number: 10000 638 P11227 Ensure process connections and orientations are as per P&ID and GA drawing. 	
2	Dosing Skid Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-251 As per approved GA 486/5/5-0108-259 to 262	g. S. 2/7/2013		 Visual inspection of all components to check correct / satisfactory installation. Ensure Pressure Regulating Valves, Solenoid Valves, Pressure Loading Valves are installed in the correct direction. Check alignment of all equipment. Check overall dimensions. Check for correct nozzle locations. 	
3	Operational Check	All isolation valves are free in movement and in correct position.	4.5-		Open and close all valves to ensure there is no binding. Close all drain/flushing isolation valves. Open pump suction and discharge isolation valves. Ensure all valves are open/closed as per the P&ID.	

Site Acceptance Test

Page 2

Only valid on day of printing

28/06/2013



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS CLIENT		NOTES / DOCUMENTS
4	Prime Pumps	Remove air from system.	3.5° 2/7/2013		Priming Pumps 1. Flood suction of dosing pump using skid inlet connection. 2. Close dosing system. 3. Slightly open pump discharge drain/flushing valve. 4. Run dosing pump until water is discharged to drain. 5. Close all drain/flushing isolation valves and open system isolation valves.
5	Pressure test – Pipework	As per test procedure. AS2032:2006 Cl. 7.2	SJ- COMPLETED		1. Connect auxiliary pump to skid inlet. Close skid outlet. 2. Using the auxiliary pump, pressurise to 10 bar as per skid pressure indicator, and hold for 15 minutes. 1. Visually inspect all pipework to ensure no leakage
6	Check operation of Pressure Loading Valves	PLV set to correct pressure.	4. 5- 2/7/2013		1. Run dosing pump. 2. Using the skid pressure indicator, set loading valve to operate to 2.0 bar. 3. Repeat for each valve.



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
7	Pump Operation: P01: DDA 7.5-16 Tag # PD-67/0-001 S/N 1090075/P11243 100% 7.63 L/h 75% 5.73 L/h 50% 3.83 L/h	As per test procedure	4.8-	MAR 2/07/13.	 Close the suction and discharge isolation valves for pumps not being calibrated. Open skid inlet isolation valve and fill calibration cylinder. Close skid inlet isolation valve. Run pump and record drawdown from calibration cylinder. Pump Flow: 100% - 150 L/h Record results at left and cross reference with pump curves. Allow calibration cylinder to empty. Stop pump. Close calibration cylinder isolation valve. Open skid isolation inlet valve. Repeat for each pump.



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
8	Pump Operation: P01: DDA 7.5-16 Tag # PD-07/0-002 S/N 10000638P11227 100% 7:45 L/h 75% 5:56 L/h 50% 3:2 L/h	As per test procedure	3.8-	MAR 72/07/13.	Test Procedure 11. Close the suction and discharge isolation valves for pumps not being calibrated. 12. Open skid inlet isolation valve and fill calibration cylinder. 13. Close skid inlet isolation valve. 14. Run pump and record drawdown from calibration cylinder. 15. Pump Flow: 100% - L/h 16. Record results at left and cross reference with pump curves. 17. Allow calibration cylinder to empty. 18. Stop pump. 19. Close calibration cylinder isolation valve. 20. Open skid isolation inlet valve. 1. Repeat for each pump.



e Relief Valves	As per test procedure.	3.8- 2/7/2013	CLIENT	Test Procedure 1. Close the pump discharge isolation valve. 2. Using the skid pressure indicator, set the PRV to 3 bar 3. Visually / Audibly check PRV and system pressure spikes on discharge pressure gauge. 4. P01 Relief Pressure: 10 BAR
e Relief Valves	As per test procedure.	3.8	A A	 Close the pump discharge isolation valve. Using the skid pressure indicator, set the PRV to 3 bar Visually / Audibly check PRV and system pressure spikes on discharge pressure gauge.
		7.12.7	2/07/17.	5. PO2 Relief Pressure: 10 / B AC
eration	As per test procedure	\$5- 2/7/2013		 Test Procedure Close all drain/flushing isolation valves. Open pump suction and discharge isolation valves. Ensure all valves are open/closed as per the P&ID. Open dilution water isolation valves. Run pumps as per standard operation for approximately 30 minutes. Visually and audibly check system. Check operation of degassing solenoid. — N/A
e	ration	ration As per test procedure	ration As per test procedure 43	ration As per test procedure \$\frac{4}{7/2013}

Site Acceptance Test

Page 6

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28/06/2013



NOTES:		

	Name	Designation	Signature	Date	
Grundfos Representative:	IAN GiNA	PROJECT ENGINEER	9 5 -	2/2/2002	
Client Representative:	HATOEN BRAY	THEMAN & CUPERT	MIR	2/7/17	



Page 1 of 3

System Pressure Test Sheet

Hydrostatic Test

PROJECT:	QUU Regional Lagoons WWTP - Boonah	DOC ID:	98439300 - SPT				
SYSTEM:	CARBON DIOXIDE	CLIENT:	Thomas & Coffey				
DATE:	03/05/2013 TESTED BY: Grundfos Pumps Pty Ltd						
NOTE:	AS2032:2006 CI 7.2 Test procedure All piping and pressure pipelines installed shall hold water pressure of a minimum of 1.25 times the maximum normal operating pressure of the system with no visible leaks for 15 minutes. A pressure gauge shall be installed to show the pressure reading.						
	maximum normal operating pressur	e of the system with r					

DESCRIPTION	PRESSURE (BAR)	(MINUTES)	PASS	FAIL
All pipe work from the Filtrate Line outlet to the pH Panel outlet valve	4	15	1	
ADDITIONAL INFORMATION	REFE	RENCE		



Page 2 of 3

DESCRIPTION	PRESSURE (BAR)	TIME (MINUTES)	PASS	FAIL



Page 3 of 3

GRUNDFOS REPRESENTATIVE

Signature Andrew Dunnett

Title Fitter

Date 27: 5 2013

THOMAS & COFFEY REPRESENTATIVE

Name Mult Puns

Title Side Munique

Date 27/5//3



	Grundfos Pumps Pty Ltd FACTORY ACCEPTANCE TEST	SAT NO.: DATE:	98456864-FAT 05/04/2013	
	TACTOR! ACCE! TARGE TEST	PREPARED BY:	I.Ginn	
CLIENT:	Thomas & Coffey	CONTRACT NO.:	0060A	
QUOTATION NO. :	20227-JKJ99	PROJECT:	Boonah Regional La	goons
ORDER NO.:	6232240/003	DRAWING NO.:	486/5/5-0108-276 to 278 P&ID - 486/5/5-0108-251 to 252	
SYSTEM DESCRIPTION:	Carbon Dioxide (CO2) Dosing System - Boonah	EQUIPMENT/TAG NO.:	98456864-2904201	.3



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS CLIENT		NOTES / DOCUMENTS
1	CO2 Gas Construction and Assembly (Manifold Assemblies)	As per approved P&ID 486/5/5-0108-252 As per approved GA 486/5/5-0108-253 to 258	4-5-2013		PR-0740-001 Serial number:
2	Dosing Panel Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-252 As per approved GA 486/5/5-0108-276 to 277	9.2-		 Visual inspection of all components to check correct a satisfactory installation. Ensure Pressure Regulating Valves, Solenoid Valves, Pressure Relief Valve are installed in the correct direction. Check alignment of all equipment. Check overall dimensions. Check for correct nozzle locations.
3	Operational Check	All isolation valves are free in movement and in correct position.	4 1-5-2013		1. Open and close all valves to ensure there is no binding. 2. Close all drain/bleed isolation valves. 3. Open / close all system isolation valves. 4. Ensure all valves are open/closed as per the P&ID.

Factory Acceptance Test

Page 2

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NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY			
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS	
4	Pressure test – Pipework	As per test procedure. AS2032:2006 Cl. 7.2	4.5- 14-5-2013		1. Connect the compressed air to a regulator and to the skid inlet. Ensure the compressed air supply is above 6 Bar. 2. Using the regulator, pressurise the low pressure side to 5 bar as per regulator pressure gauge, and hold for 15 minutes. 3. Apply soapy water to all connections using appropriate PPE for compressed air. 1. Visually inspect all pipework to ensure no leakage.	
5	Check operation of Blocked Nozzle Pressure Switch	As per test procedure.	4.5-2013		1. While the electrical panel is live, isolate the outlet valve on the low Pressure side 4. Using the regulator pressure gauge set the downstream pressure to 4 Bar. Adjust the pressure switch until it operates the alarm.	
6	Pressure Relief Valve	As per test procedure.	3.5-14-5-2013		1. Close the isolation solenoid valve. 2. Using the skid pressure indicator, check the pre-set PRV opens at 6 bar. 3. Visually / Audibly check PRV and system pressure spikes on the Regulating pressure gauge. 1. PRV-0740-001 Relief Pressure: 6 Bal.	

Factory Acceptance Test

Page 3

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NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
7	Panel Operation	As per test procedure	3.5-		 Close all isolation valves. Set the operating pressure at 4.5 Bar Check that the 3 bar spring non return valve (P/n 95730332) is installed in the Dosing Quill. Ensure all valves are open/closed as per the P&ID. Calibrate the Proportional Control valve to operate at 900 Hz at 600 mA for the 20 mA setting and 800 Hz at 520 mA for the 4 mA setting. (Settings to be adjusted at commissioning) Set the flow meter to 3.5 L/min and operate the proportional control valve through the full range of 4 – 20 mA to confirm a lineal response of the valve flow rate. Run the system as per standard operation for approximately 30 minutes. Visually and audibly check system. Check the operation of the shut off and proportional control solenoid. Check the operation of the L Port valve.

Page 4

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NOTES:		

	Name	Designation	Signature	Date
Grundfos Representative:	IAN GINN	PROSECT ENGINEER	45.	14-5-2013
Client Representative:		7,500	2.0	14-5-2017

Page 5

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FACTORY ACCEPTANCE			
FACTORY ACCEPTANCE	DATE: 05.04.2013		
	PREPARED BY:	1.Ginn	
Thomas & Coffey	CONTRACT NO.:	0060A	
20227-JKJ99	PROJECT:	Boonah Regional Lagoons	
6232240/003	DRAWING NO.:	486/5/5-0108-270 to 272 P&ID - 486/5/5-0108-251 to 252	
pH Monitor Panel - Boonah	EQUIPMENT/TAG NO.:	98439300-15042013	3
-	20227-JKJ99 6232240/003	20227-JKJ99 PROJECT: 6232240/003 DRAWING NO.:	20227-JKJ99 PROJECT: Boonah Regional La 6232240/003 DRAWING NO.: 486/5/5-0108-270 to P&ID - 486/5/5-010



NO.	ACTIVITY	Y ACCEPTANCE CRITERIA	INSPECTI	ION BY	
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
1	Panel Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-251 to 252 As per approved GA 486/5/5-0108-251 to 252	27-5-13		 Ensure components installed as per GA. Ensure process connections and orientations are as per P&ID and GA drawing. Visual inspection of all components to check correct / satisfactory installation. Ensure Valves are installed in the correct direction. Check overall dimensions.
2	Operational Check	All isolation valves are free in movement and in correct position.	J. J. 27-5-13		Open and close all valves to ensure there is no binding. Isolate process drain valves. Open all process valves.
3	Pressure test – Pipework	As per test procedure. AS2032:2006 Cl. 7.2	4.5- 27-5-13 REFER TO 98439300-SM		 Test Procedure Ensure a minimum of 24h curing time for all solvent welded joints before test. Ambient temperatures Hold 5 bar pressure for 15 minutes. Visually monitor pipework and joints for leaks for 15 minutes to ensure there is no leakage. Drain the test water out of the pipework. Fill the pipework with distilled water and close valves so the sensor tip remains submerged at all times. Label both valves clearly with the above information until connected to the Filtrate Water Line onsite.

Page 2

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13/05/2013

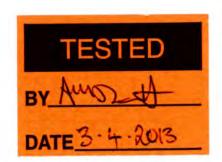


NOTES:		

	Name	Designation	Signature	Date
Grundfos Representative:	TAN GINN	PROJECT ENGINEER	4 0-	27.5.263
Client Representative:		14.52.1.66	5. 6	87.2.4013



	Grundfos Pumps Pty Ltd FACTORY ACCEPTANCE TEST	•	FAT NO.: DATE:	98386271-FAT 03.04.2013
	TACTORT ACCEPTANCE TEST	PREPARED BY:	I.Ginn	
CLIENT:	Thomas & Coffey	CONTRACT NO.:	0060A	
QUOTATION NO.:	20227-JKJ99	PROJECT:	Boonah Regional La	goons
ORDER NO.:	6232240/003	DRAWING NO.:	0060A-01-G01 P&ID - 486/5/5-01	08-107
SYSTEM DESCRIPTION:	Sodium Hypochlorite Dosing Skid - Boonah	EQUIPMENT/TAG NO.:	98386271-0804201	.3





NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
1	Dosing Skid Construction and Assembly (Pumps)	As per approved P&ID 486/5/5-0108-107 As per approved GA 0060A-01-G01	Aug 3-4-13		 Ensure pumps installed as per GA. P01 Serial number: 1000638 P02 Serial number: 1000638 Ensure process connections and orientations are as per P&ID and GA drawing.
2	Dosing Skid Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-107 As per approved GA 0060A-01-G01	Aug 3-4-13		 Visual inspection of all components to check correct / satisfactory installation. Ensure Pressure Regulating Valves, Solenoid Valves, Pressure Loading Valves are installed in the correct direction. Check alignment of all equipment. Check overall dimensions. Check for correct nozzle locations.
3	Operational Check	All isolation valves are free in movement and in correct position.	Ans 3.4.13		 Test Procedure Open and close all valves to ensure there is no binding. Isolate process drain valves. Open pump suction and discharge process valves. Open all process valves.

Page 2

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3/04/2013



NO.	ACTIVITY	ACTIVITY ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
4	Prime Pumps	Remove air from system.	Aus 3-4-13		Priming Pumps 1. Flood suction of dosing pump. 2. Isolate dosing system. 3. Slightly open drain valve on discharge. 4. Run pump until fluid is discharged to drain. 5. Close drain valves and open system isolation valves.
5	Hydrostatic test - Pipework	As per test procedure. AS2032:2006 Cl. 7.3	Aug 3-4-13	**	 Test Procedure Ensure a minimum of 24h curing time for all solvent welded joints before test. Ambient temperatures during this period shall not drop below 0°C. Blank pipework outlet, fill pipework with water and bleed air from system. Fill system to rise 3m above ground level to provide sufficient head. Visually monitor pipework and joints for leaks for 15 minutes.
6	Pressure test – Pipework	As per test procedure. AS2032:2006 Cl. 7.2	Aug. 3-4-13		Test Procedure1. Hold 10 bar pressure for 15 minutes.2. Visually inspect all pipework to ensure no leakage
7	Check operation of Pressure Loading Valves	PLV set to correct pressure.	AMD 3.4.13		 Test Procedure Run dosing pump. Set loading valve to operate at approximately 2.0 bar. Repeat for each valve.



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
8	Pump Operation: P01: DDA 7.5-16 S/N 1000751 100% 9 1 L/h 75% 6 9 L/h 10% 92 L/h	As per test procedure	Amo 3-4-13		 Isolate pumps not being calibrated. Ensure manual model is enables on the selected dosing pump. Open isolation valve and fill calibration cylinder. Close skid isolation valve. Run pump and record drawdown from calibration cylinder. Record results at left and cross reference with pump curves. Allow calibration cylinder to empty. Stop pump. Close calibration cylinder isolation valve. Open skid isolation valve. Repeat for each pump.



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
9	Pump Operation: P02: DDA 7.5-16 S/N 1960638 100% 9.05 L/h 75% 6.8 L/h 50% 4.6 L/h	As per test procedure	Anos 3-4-13		 Isolate pumps not being calibrated. Ensure manual model is enables on the selected dosing pump. Open isolation valve and fill calibration cylinder. Close skid isolation valve. Run pump and record drawdown from calibration cylinder. Record results at left and cross reference with pump curves. Allow calibration cylinder to empty. Stop pump. Close calibration cylinder isolation valve. Open skid isolation valve. Repeat for each pump.
10	Pressure Relief Valves	As per test procedure.	A-4-13		 Isolate pump discharge. Set the PRV to 7 bar. Visually / Audibly check PRV and system pressure spikes on discharge pressure gauge. PSV-0710-001 Relief Pressure: 7 PSV-0710-001 Relief Pressure: 7

Page 5

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3/04/2013



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
11	Skid Operation	As per test procedure	Aur. 3.4.13		 Test Procedure Isolate drain valves. Open pump suction and discharge valves. Open process valves. Run pumps as per standard operation for approximately 30 minutes. Visually and audibly check system.
12					
13					



NOTES:		

	Name	Designation	Signature	Date
Grundfos Representative:	traver Junet	Tesler	tuo ste	3.1.2013
Client Representative:			7 "2"	7723



	Grundfos Pumps Pty Ltd SITE ACCEPTANCE TEST	DATE: PREPARED BY:	98437842-SAT - 80 23/04/2013 I.Ginn	
CLIENT:	Thomas & Coffey	CONTRACT NO.:	0060A	
QUOTATION NO. :	20227-JKJ99	PROJECT:	Boonah Regional La	goons
ORDER NO.:	6232240/003	DRAWING NO.:	486/5/5-0108-253 P&ID - 486/5/5-01	
SYSTEM DESCRIPTION:	Carbon Dioxide (CO2) Storage and Installation – Boonah	EQUIPMENT/TAG NO.:	98437842-2904201	13



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECT	ION BY	
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
1	Dosing System Layout and Connections	As per approved P&ID 486/5/5-0108-251 to 252 As per approved GA 486/5/5-0108-253 to 259	8.5- 30/61/14	7.2	 Visual inspection of installed Bottle assemblies, panels and sundry for correct location to GA, conformance to P&ID and any damage. Check hold down bolts - correct installation Check installation of regulators and valves. Check installation of pressure switches and manifold assemblies. Check dosing line installation, pipe supports, valves and general alignment
2	Dosing Panel Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-251 to 252 As per approved GA 486/5/5-0108-253 to 259	£8- 30/01/14	7.2	 Visual inspection of all components to check correct / satisfactory installation. Ensure Pressure Regulating Valves, Solenoid Valves, Pressure Relief Valve are installed in the correct direction. Check alignment of all equipment. Check for correct nozzle locations.
3	Operational Check	All isolation valves are free in movement and in correct position.	30/01/14	T.2	 Test Procedure Open and close all valves to ensure there is no binding. Close all drain/bleed isolation valves. Open / close all system isolation valves. Ensure all valves are open/closed as per the P&ID.

Page 2

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30/01/2014



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
	N. C. A. S. S.		GRUNDFOS	CLIENT	NOTES / DOCUMENTS
4	Safety inspection	As per inspection procedure.	30/01/14	T.Z	 Inspection Procedure Are cylinders stored and secured correctly? Is the Pressure Relief vent line directed outside and in a safe position? Is the Pressure Relief vent line fitted with an insect screen? Are the PPE, Hazard signs installed? Are the Pipe Marker signs installed?
5					



NOTES:		

	Name	Designation	Signature	Date 30/01/2014	
Grundfos Representative:	IAN GINN	PROJECT ENGINEER	3. 5		
Client Representative:	TAKWER ZMAMER	PROJECT MANAGER	When	3/01/14	



	Grundfos Pumps Pty Ltd		PAT NO.:	98418722-SAT - BO 04/04/2013
	SITE ACCEPTANCE TEST		PREPARED BY:	I. Ginn
CLIENT:	Thomas & Coffey	CONTRACT NO.:	0060A	
QUOTATION NO.:	20227-JKJ99	PROJECT:	Boonah Regional La	goon
ORDER NO.:	6232240/003	DRAWING NO.:	486/5/5-0108-252 P&ID - 486/5/5-010	
SYSTEM DESCRIPTION:	Sodium Hypochlorite Storage and Installation - Boonah	EQUIPMENT/TAG NO.:	98418722	



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
1	Dosing System Layout and Connections	As per approved Bund Layout 486/5/5-0108-252 to 256	\$ J- 2/7/2013	7.7	 Visual inspection of installed skids, tanks, panels and sundry for correct location to GA, conformance to P&ID and damage. Check hold down bolts - correct installation Check installation of ball valves. Check installation of level switches, pressure transducers Check fill line installation, pipe supports, valves, alignment
2	Tank Skid Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-251 As per approved GA 486/5/5-0108-257 to 258	J. j. 2/7/2013	T. 2	 Visual inspection of fitting arrangements Check hold down bolts - correct installation Check installation of level switches, pressure transducers Check fill line installation, pipe supports, valves, alignment Check for swarf and foreign materials inside tank – remove if necessary – No 7 Possicce
3	Dosing Skid Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-251 As per approved GA 486/5/5-0108-259 to 262	47/2013	T.7	 Visual inspection of all components to check correct / satisfactory installation. Ensure Pressure Regulating Valves, Solenoid Valves, and Pressure Loading Valves are installed in the correct direction. Check alignment of all equipment. Check overall dimensions. Check for correct nozzle locations.

Page 2

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NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECT	ION BY	
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
4	Level Element – Ultrasonic Vegason S 61	As per Calibration Procedure and GRUNDFOS-COMM- CHK-014 Check Sheet	38-	2/07/13.	 Calibration Procedure Complete GRUNDFOS-COMM-CHK-014 Check Sheet Program the tank measurement height level data into the level element. Fill the tank to just above the Outlet Nozzle and set Ultrasonic Low Level. (Empty = 4 mA) Fill the tank to full working volume and set the level element to 100%. (Full = 20 mA) Ensure readout on the electrical panel display indicates a smooth progression from 0% to 100%. Map out any false reading via the HART Software. Calibrate the High/High (NC) Level IFM sensor by filling the tank to overflow. Confirm the High/High level sensor switches correctly.



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
5	Tanker Unloading Station – Check Control Functionality	As per test procedure.	2/7/2013	7.7	 Switch tank selector switch to tank 1. The pump outlet should be powered. Pump outlet should "power off" automatically after 30 minutes. Turn on analog generator. Check Red Lion displays operate from 0% - 100%, and the set point triggers the input at 95% (5 second delay). The Zelio should display tank 1 Hi fault and remove power from the pump outlet after 30 seconds. The tank high level lamp should be on. Switch high/high level switch off to check input. The siren and strobe light should be set (5 second delay). Press the reset button briefly to silence alarm. Zelio unit should display high/high level tank 1 fault. Power should be removed from pump outlet immediately. Press and hold the reset button for 5 seconds to shut off the strobe light. Leave the high/high level switch for tank 1 off (alarmed).

Page 4

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NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY			
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS	
6	Tanker Unloading Station – Check Emergency Stop Functionality	As per test procedure.	5.5- 2/7/2013	TZ	 Test Procedure Reset the high level alarms, & select tank 1 Press the emergency stop button. The pump power outlet should be disabled. The zelio unit should display a fault message that the emergency stop is activated. Release the emergency stop. The pump power outlet should not re-enable until the reset button is pressed. 	
7	Tanker Unloading Station Operation	As per test procedure	3.5-2/7/2013	13	 Test Procedure Ensure suction line valves are closed Connect tanker / pump to fill line and power outlet on loading panel Commence fill operation for 30seconds Activate latch stop – ensure operation is terminated, (no outlet power) check other loading panels for no power on outlet power Check fill line for leaks Re-commence fill operation Simulate high level – ensure operation is terminated (no outlet power) Re-commence fill operation – ensure approx. 2000lt total in tank and stop operation 	

Page 5

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NO.	ACTIVITY	ACCEPTANCE CRITERIA	CRITERIA INSPECTION BY			
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS	
8	Hydrostatic test – Tank & Pipework	As per test procedure. AS2032:2006 Cl. 7.3	To be completed by site installer. Verify by sighting a signed certificate.	て.そ	 Test Procedure Ensure a minimum of 24h curing time for all solvent welded joints before test. Ambient temperatures during this period shall not drop below 0°C. Bleed air from system. Visually monitor pipework and joints for leaks for 15 minutes. 	
9	Pressure test – Skid Pipework	As per test procedure. AS2032:2006 Cl. 7.2	J. J.	7.2	 Test Procedure Hold 10 bar pressure for 15 minutes. Visually inspect all pipework to ensure no leakage 	
10	Dosing Quill Inspection	As per test procedure	47/2013	2/07/17.	 Isolate Dosing Line Valve. Remove Quill to confirm Static Mixer Ball Valve seals under Filtrate Water Pressure Confirm the diffuser is not installed in the Hypo Quill Reassemble and visually monitor pipework and joints to ensure there are no leaks. 	



NOTES:	

	Name	Designation	Signature	Date
Grundfos Representative:	IAN GINN	PROJECT ENGINEER	58-	2/7/2013
Client Representative:	HMOEN BRA-1	THOMAS + COFFET	Mitty	2/7/17

Page 7

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	Grundfos Pumps Pty La SITE ACCEPTANCE TES	SAT NO.: DATE:	98439300-SAT- \$ 0 05/04/2013	
	SITE ACCEPTANCE TES		PREPARED BY:	I.Ginn
CLIENT:	Thomas & Coffey	CONTRACT NO.:	0060A	
QUOTATION NO.:	20227-JKJ99	PROJECT:	Boonah Regional La	goons
ORDER NO.:	6232240/003	DRAWING NO.:	486/5/5-0108-270 P&ID - 486/5/5-01	
SYSTEM DESCRIPTION:	pH Monitoring Panel - Boonah	EQUIPMENT/TAG NO. :	98439300-1504201	3



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
1	Monitoring Panel Construction and Assembly	As per approved P&ID 486/5/5-0108-251 to 252 As per approved GA 486/5/5-0108-270 to 272	3.5-2/7/2013	T.2	 Ensure process connections and orientations are as per P&ID and GA drawing. Visual inspection of all components to check correct / satisfactory installation. Ensure Valves are installed in the correct direction. Check alignment of all equipment. Check overall dimensions. Check for correct nozzle locations.
2	Operational Check	All isolation valves are free in movement and in correct position.	3.2-	TZ	 Test Procedure Open and close all valves to ensure there is no binding. Close all drain/flushing isolation valves. Open inlet and discharge isolation valves. Ensure all valves are open / closed as per the P&ID.
3	Pressure test – Pipework	As per test procedure. AS2032:2006 Cl. 7.2	Completed 4)	T,2	 Test Procedure Connect the test pump to the panel inlet. Close skid outlet. Using the test pump, pressurise the pipes to 4 bar and hold for 15 minutes. Visually inspect all pipework to ensure no leakage.

Page 2

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NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
4	Calibrate the M10 Sensor	As per procedure	2/9/2013	7.2	 Isolate both valves on either side of the sensor. Unscrew the sensor and insert into the Buffer calibration solution. Calibrate the sensor using the lower pH buffer valve as per instructions for the DIA-2Q (Page 46) Rinse sensor in water before next step. Calibrate the sensor using the upper pH buffer valve as per instructions for the DIA-2Q (Page 46) Replace sensor.
5	Prime the System	Remove air from system.	\$ }- 9/7/2013	1.5	 Priming System Purge water inlet and outlet connections. Unsure there is no trapped air left within the pipes. Regulate the flow on the discharge ball valve to ensure the M10 Sensor is fully immersed in water at all times.
6	Panel Operation	As per test procedure	\$)- 2/7/2013	2/7/13	 Test Procedure Ensure all valves are open/closed as per the P&ID. Run the system as per standard operation for approximately 30 minutes. Visually and audibly check system. Check that the temperature of the water displayed on the panel is accurate using the handheld digital laser temperature gun. Adjust if required. (Page 47)

Page 3

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NOTES:		

	Name	Designation	Signature	Date
Grundfos Representative:	IAN GONN	120 JECT ENGINEER	45-	2/7/201
Client Representative:	HATTEN BRATI	THOMAS + CONSTET	Miles	2/7/17



	Grundfos Pumps Pty Ltd SITE ACCEPTANCE TEST	SAT NO.: DATE:	98456864-SAT -B 0 05/04/2013	
	SHE ACCEL TARGETEST		PREPARED BY:	I.Ginn
CLIENT:	Thomas & Coffey CONTRACT NO.:		0060A	
QUOTATION NO.:	20227-JKJ99	PROJECT:	Boonah Regional La	goons
ORDER NO.:	6232240/003	DRAWING NO.:	486/5/5-0108-276 P&ID - 486/5/5-010	
SYSTEM DESCRIPTION:	Carbon Dioxide (CO2) Dosing System - Boonah	EQUIPMENT/TAG NO.:	98456864-2904201	.3
				,



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECT	ION BY	
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
1	Dosing Panel Construction and Assembly (Regulator Assemblies)	As per approved P&ID 486/5/5-0108-251 to 252 As per approved GA 486/5/5-0108-253 to 259	4-5- 2/7/2013	T.2	 PR-0740-001 Serial number: MA PR-0740-002 Serial number: MA Ensure process connections and orientations are as per P&ID and GA drawing. If different mark up for As Built drawings
2	Dosing Panel Construction and Assembly (General)	As per approved P&ID 486/5/5-0108-251 to 252 As per approved GA 486/5/5-0108-276 to 278	1.8° 2/7/2013	T.2	 Visual inspection of all components to check correct / satisfactory installation. Ensure Pressure Regulating Valves, Solenoid Valves, Pressure Relief Valve are installed in the correct direction. Check alignment of all equipment. Check overall dimensions. Check for correct nozzle locations.
3	Operational Check	All isolation valves are free in movement and in correct position.	3.5- 2/7/2013	TR	 Test Procedure Open and close all valves to ensure there is no binding. Close all drain/bleed isolation valves. Open / close all system isolation valves. Ensure all valves are open/closed as per the P&ID.

Page 2

Only valid on day of printing



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECT	TION BY	
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
4	Purge the System	Remove air from system.	35-2/7/2013	TZ	Priming Pumps 1. Purge the Gas inlet and outlet connections. 2. Close the isolation valves in the system. 3. Unsure there is no water/condensation left within the lines.
5	Pressure test – Pipework	As per test procedure. AS2032:2006 CI. 7.2	KARY 8/7/13.	8/1/13.	 Test Procedure Connect the CO2 Gas to the skid inlet. Close skid outlet. (Caution – High Pressure side of system can reach up to 70 Bar) Using the regulator, pressurise the low pressure side to 5.5 bar as per regulator pressure gauge, and hold for 15 minutes. Apply soapy water to all connections using appropriate PPE for CO2 Gas. Visually inspect all pipework to ensure no leakage.
6	Check operation of Pressure Switches (High pressure)	As per test procedure.	1. J= 2/7/2013	7.2	 Test Procedure While the electrical panel is live, bleed out the pressure on the High Pressure side Using the regulator pressure gauge, ensure the regulator change over operates at approximately 5.0 bar by adjusting the switch setting to activate changeover. Repeat for each Bank of CO2 cylinders.

Page 3

Only valid on day of printing



NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
7	Check operation of Blocked Nozzle Pressure Switch	As per test procedure.	9.2	TZ	 Test Procedure While the electrical panel is live, isolate the outlet valve on the low Pressure side Using the regulator pressure gauge set the downstream pressure to 4 Bar. Adjust the pressure switch until it operates the alarm.
8	Pressure Relief Valve	As per test procedure.	17/2013	T.Z	 Close the isolation solenoid valve. Using the skid pressure indicator, confirm factory setting of the PRV operates at 6 bar. Visually / Audibly check PRV and system pressure spikes on the Regulating pressure gauge. PRV-0740-001 Relief Pressure: 407613312.
9	Dosing Quill Inspection	As per test procedure	3.5-2/2013	217/15	 Isolate Dosing Line Valve. Remove Quill to confirm Static Mixer Ball Valve seals under Filtrate Water Pressure Check that the 3 bar spring non return valve (P/n 95730332) is installed in the Dosing Quill. Confirm the diffuser is installed in the CO2 Quill Reassemble and visually monitor pipework and joints to ensure there are no leaks.

Page 4

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NO.	ACTIVITY	ACCEPTANCE CRITERIA	INSPECTION BY		
			GRUNDFOS	CLIENT	NOTES / DOCUMENTS
10	Panel Operation	As per test procedure	3.5-2/7/2013	413-7 2/7/13.	 Close all isolation valves. Set the supply pressure at 5 Bar Check that the 3 bar spring non return valve (P/n 95730332) is installed in the Dosing Quill. Remove the quill from the static mixer and place into a bucket of water. Calibrate the Proportional Control valve to operate at 900 Hz at 600 mA for the 20 mA setting and 800 Hz at 520 mA for the 4 mA setting. (Settings to be adjusted at commissioning) Set the flow meter to 3-5 t/min at 3 Bar and operate the proportional control valve through the full range of 4 - 20 mA to confirm a lineal response of the valve flow rate. Run the system as per standard operation for approximately 5 minutes. Visually and audibly check system. Check the operation of the shut off and proportional control solenoid. Check the operation of the L Port valve. Return the quill to the static mixer and run and observe system for 30 minutes.

Page 5

Only valid on day of printing



OTES:	REPLACEING 1 OFF NON RETURN VALUE REPUBLED 8-7-2013. 5-5-	
	KETCHCEINO I OFF 10 ON NETURN VALUE. KETONICEO 0 = 1-2013. J.J.	

	Name	Designation	Signature	Date
Grundfos Representative:	IAN GINN	PROJECT ENGINEER	1 \-	2/7/200
Client Representative:	LATOEN BRAY	THOMAS + COTFET	MB	0/7/17



	Grundfos Pumps Pty Ltd		ITP NO.:	98386271-ITP-BO	
	INSPECTION AND TEST PLAN	DATE:	27.03.2013		
	INSPECTION AND TEST PLAN	M	PREPARED BY:	lan Ginn	
CLIENT: Thomas & Coffey		CONTRACT NO.:	0060A		
QUOTATION NO.:	20227-JKJ99	PROJECT:	Boonah Regional Lagoons		
ORDER NO.:	6232240/003	DRAWING NO.:	0060A-01-G01 P&ID - 486/5/5-0108-107 98386271-08042013		
SYSTEM DESCRIPTION:	Sodium Hypochlorite Dosing Skid - Boonah	EQUIPMENT/TAG NO.:			
			Sec.		

	LEGEND						
R	Review	Н	Hold Point				
1	Inspection Point	M	Monitor				
W	Witness Point	S	Subcontractor				
С	Certificate	V	Verified				



NO	ACTIVITY	CONTROLLING PROCEDURE	ACCEPTANCE CRITERIA		INSPECTION & VERIFICATION POINTS	(SIGN, DATE)	
				VERIFYING DOCUMENTS		GRUNDFOS	CLIENT
1	Skid Fabrication	AS 1554.6	Construction Drawings Compliance to AS1554.6	As built drawings Approved weld procedures Approved weld qualifications	M	The same	TZ
2	Skid Assembly	FAT	Construction Drawings Approved P&IDs	As built drawings Approved P&IDs Signed ITP	M	M. Tary	T.7
3	Factory Acceptance Testing	Approval of Factory Acceptance Test sheet.	Approved Factory Acceptance Test sheet.	Signed Factory Acceptance Test sheet.	W	Aug 3.4.13	T-2
4	Equipment Photographs	ITP	Photographs transferred to server.	Signed ITP	1	28/3/2013	T.Z



	ACTIVITY	CONTROLLING			INSPECTION & VERIFICATION POINTS	(SIGN, DATE)	
NO		PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENTS		GRUNDFOS	CLIENT
5	Crating and Delivery	Ensure skid is adequately packed and labelled for storage and transport. Ensure all loose items are adequately packaged and labelled for transport. Check items against BOM	Checked by Project Engineer	Signed ITP	Н	3.5- 8/4/2013	
6	Documentation	Compilation and delivery of MDR	MGL approved.	MGL Approval	M	15/7/2013	
7	Site Acceptance Testing	Approval of Site Acceptance Test sheet.	Approved Site Acceptance Test sheet.	Signed Site Acceptance Test sheet.	Н	2/7/2013	44B) 2/7/15.



NO	ACTIVITY	ACTIVITY CONTROLLING PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENTS	INSPECTION & VERIFICATION POINTS	(SIGN, DATE)	
NO						GRUNDFOS	CLIENT
8	Commissioning Acceptance Testing	Approval of Commissioning Acceptance Test sheet.	Approved Commissioning Acceptance Test sheet.	Signed Commissioning Acceptance Test sheet.	Н	3,5-	The state of the s
							1

	Name	Designation	Signature	Date
Prepared by:	lan Ginn	Project Engineer	4 f.	15-7-2013
Approved by:	Martin Simms	Projects Engineering Manager - Dosing	111	15-7-2013
Client Approval by:	Toby Grayson	Civil Project Manager	- Die	22-713



	Grundfos Pumps Pty Ltd	ITP NO.:	98456864-ITP ~B 0		
		DATE:	27.03.2013		
INSPECTION AND TEST PLAN			PREPARED BY:	lan Ginn	
CLIENT:	Thomas & Coffey CONTRACT NO		0060A		
QUOTATION NO.:	20227-JKJ99	PROJECT:	Boonah Regional Lagoons		
ORDER NO. :	6232240/003	DRAWING NO.:	P&ID - 486/5/5-0108-251-252 486/5/5-0108-270 to 272 - pH Monitor panel 486/5/5-0108-276 to 278 - CO2 Dosing Panel		
SYSTEM DESCRIPTION:	Carbon Dioxide (CO2) Dosing System - Boonah	EQUIPMENT/TAG NO.:	98456864-0804201	3	

	LEGEND						
R	Review	Н	Hold Point				
1	Inspection Point	M	Monitor				
W	Witness Point	S	Subcontractor				
С	Certificate	V	Verified				



		CONTROLLING		INSPECTION &	INSPECTION BY (SIGN, DATE)		
NO	ACTIVITY	PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENTS	VERIFICATION POINTS	GRUNDFOS	CLIENT
1	Frame Fabrication	AS 1554.6	Construction Drawings Compliance to AS1554.6 486/5/5-0108-276 to 278	As built drawings Approved weld procedures Approved weld qualifications	М	1.4-5-2013	TR
2	Panel Assembly	FAT	Approved P&ID- 486/5/5-0108-251-252 Construction Drawings 486/5/5-0108-270 to 272 486/5/5-0108-276 to 278	As built drawings Approved P&IDs Signed ITP	M	1.95- 4-5-2013 2.9.5- 14-5-2013 3.4.8-2013	7.8
3	Factory Acceptance Testing	Approval of Factory Acceptance Test sheet.	Approved Factory Acceptance Test sheets. 98456864-FAT 98439300-FAT	Signed Factory Acceptance Test sheet.	W	1.5 J 14-5-2013 2.5 J 27-5-2013	72
4	Equipment Photographs	ITP	Photographs transferred to server.	Signed ITP	I	1. £ 6- 1-5-2013 1. 5-2013 2. 1-5-2013	+7



		CONTROLLING			INSPECTION &	INSPECTION BY (SIGN, DATE)	
NO	ACTIVITY	PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENTS	VERIFICATION POINTS	GRUNDFOS	CLIENT
5	Crating and Delivery	Ensure skid is adequately packed and labelled for storage and transport. Ensure all loose items are adequately packaged and labelled for transport. Check items against BOM	Checked by Project Engineer	Signed ITP	Н	1. \$ 5 15-5-2013 2. \$ 5. 15-5-2013	1
6	Documentation	Compilation and delivery of documentation	T&C approved.	T&C Approval	M	15-7-2013	



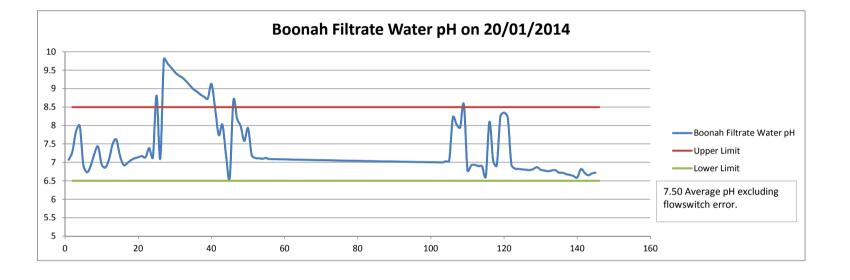
110		CONTROLLING		INSPECTION &	(SIGN, DATE)		
NO	ACTIVITY	PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENTS	VERIFICATION POINTS	GRUNDFOS	CLIENT
7	Site Acceptance Testing	Approval of Site Acceptance Test sheet. 98456864-SAT 98437842-SAT 98439300-SAT	Approved Site Acceptance Test sheet.	Signed Site Acceptance Test sheet.	Н	1. 2/7/263 2. 1/263	2/7/17
8	Commissioning Acceptance Documents	Approval of Commissioning Acceptance Test Documents- COMM-CHK-002 COMM-CHK-003	Approved Commissioning Acceptance Test sheet.	Signed Commissioning Acceptance Test sheet.	Н	1. 7/2013	2/1/3.



NOTES:			

	Name	Designation	Signature	Date
Prepared by:	lan Ginn	Project Engineer	J 5.	15-7-2013
Approved by:	Martin Simms	Projects Engineering Manager - Dosing	1/2.	15-7-203
Client Approval by:	Toby Grayson	Civil Project Manager	The	15-7-2013

Date	Time	Log No.	pH Value
20/01/2004	12:49	1	7.07
20/01/2004	12:50	2	7.3
20/01/2004	12:51	3	7.85
20/01/2004	12:52	4	7.99
20/01/2004	12:53	5	6.92
20/01/2004	12:54	6	6.73
20/01/2004	12:55	7	6.91
20/01/2004	12:56	8	7.23
20/01/2004	12:57	9	7.43
20/01/2004	12:58	10	6.94
20/01/2004	12:59	11	6.86
20/01/2004	13:00	12	7.08
20/01/2004	13:01	13	7.5
20/01/2004	13:02	14	7.62
20/01/2004	13:03	15	7.18
20/01/2004	13:04	16	6.93
20/01/2004	13:05	17	6.98
20/01/2004	13:06	18	7.06
20/01/2004	13:07	19	7.11
20/01/2004	13:08	20	7.14
20/01/2004	13:09	21	7.17
20/01/2004	13:10	22	7.14
20/01/2004	13:11	23	7.39
20/01/2004	13:12	24	7.14
20/01/2004	13:13	25	8.81
20/01/2004	13:14	26	7.1
20/01/2004	13:15	27	9.8
20/01/2004	13:16	28	9.68
20/01/2004	13:17	29	9.57
20/01/2004	13:18	30	9.45
20/01/2004	13:19	31	9.36
20/01/2004	13:20	32	9.3
20/01/2004	13:21	33	9.21
20/01/2004	13:22	34	9.1
20/01/2004	13:23	35	8.99
20/01/2004	13:24	36	8.92
20/01/2004	13:25	37	8.84
20/01/2004	13:26	38	8.78
20/01/2004	13:27	39	8.73
20/01/2004	13:28	40	9.13
20/01/2004	13:29	41	8.47
20/01/2004	13:30	42	7.74
20/01/2004	13:31	43	8.02
20/01/2004	13:32	44	7.19
20/01/2004	13:33	45	6.59



20/01/2004	13:34	46	8.67
20/01/2004	13:35	47	8.19
20/01/2004	13:36	48	7.98
20/01/2004	13:37	49	7.58
20/01/2004	13:38	50	7.93
20/01/2004	13:39	51	7.2
20/01/2004	13:40	52	7.12
20/01/2004	13:41	53	7.11
20/01/2004	13:42	54	7.1
20/01/2004	13:43	55	7.12
20/01/2004	13:44	56	7.09
20/01/2004	13:45	57	6.76
20/01/2004	13:46	58	6.96
20/01/2004	13:47	59	6.76
20/01/2004	13:48	60	6.59
20/01/2004	13:49	61	6.74
20/01/2004	13:50	62	6.36
20/01/2004	13:51	63	6.52
20/01/2004	13:52	64	6.36
20/01/2004	13:53	65	6.15
20/01/2004	13:54	66	6.55
20/01/2004	13:55	67	6.58
20/01/2004	13:56	68	6.59
20/01/2004	13:57	69	6.6
20/01/2004	13:58	70	6.49
20/01/2004	13:59	71	6.61
20/01/2004	14:00	72	6.66
20/01/2004	14:01	73	6.72
20/01/2004	14:02	74	6.75
20/01/2004	14:03	75	6.7
20/01/2004	14:04	76	6.74
20/01/2004	14:05	77	6.77
20/01/2004	14:06	78	6.79
20/01/2004	14:07	79	6.79
20/01/2004	14:08	80	6.77
20/01/2004	14:09	81	6.81
20/01/2004	14:10	82	6.8
20/01/2004	14:11	83	6.86
20/01/2004	14:12	84	6.9
20/01/2004	14:13	85	6.88
20/01/2004	14:14	86	6.88
20/01/2004	14:15	87	6.94
20/01/2004	14:16	88	6.92
20/01/2004	14:17	89	6.91
20/01/2004	14:18	90	6.93
20/01/2004	14:19	91	6.91

20/01/2004	14:20	92	6.91
20/01/2004	14:21	93	6.93
20/01/2004	14:22	94	7
20/01/2004	14:23	95	6.96
20/01/2004	14:24	96	6.94
20/01/2004	14:25	97	6.98
20/01/2004	14:26	98	6.98
20/01/2004	14:27	99	6.99
20/01/2004	14:28	100	7
20/01/2004	14:29	101	6.98
20/01/2004	14:30	102	7
20/01/2004	14:31	103	7
20/01/2004	14:32	104	7.03
20/01/2004	14:33	105	7.05
20/01/2004	14:34	106	8.22
20/01/2004	14:35	107	8.03
20/01/2004	14:36	108	7.95
20/01/2004	14:37	109	8.57
20/01/2004	14:38	110	6.78
20/01/2004	14:39	111	6.92
20/01/2004	14:40	112	6.93
20/01/2004	14:41	113	6.9
20/01/2004	14:42	114	6.89
20/01/2004	14:43	115	6.62
20/01/2004	14:44	116	8.1
20/01/2004	14:45	117	7.06
20/01/2004	14:46	118	6.92
20/01/2004	14:47	119	8.25
20/01/2004	14:48	120	8.35
20/01/2004	14:49	121	8.22
20/01/2004	14:50	122	6.94
20/01/2004	14:51	123	6.83
20/01/2004	14:52	124	6.82
20/01/2004	14:53	125	6.81
20/01/2004	14:54	126	6.8
20/01/2004	14:55	127	6.79
20/01/2004	14:56	128	6.82
20/01/2004	14:57	129	6.87
20/01/2004	14:58	130	6.8
20/01/2004	14:59	131	6.78
20/01/2004	15:00	132	6.76
20/01/2004	15:01	133	6.78
20/01/2004	15:01	134	6.79
20/01/2004	15:02	135	6.79
20/01/2004	15:03	136	6.72
20/01/2004	15:04	137	6.68
20/01/2004	13.03	137	0.08

Flowswitch issue.

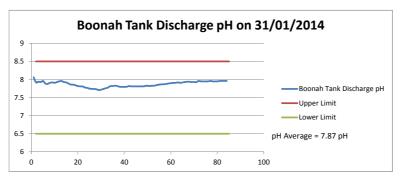
Disregard pH reading

20/01/2004	15:06	138	6.66
20/01/2004	15:07	139	6.63
20/01/2004	15:08	140	6.59
20/01/2004	15:09	141	6.82
20/01/2004	15:10	142	6.72
20/01/2004	15:11	143	6.65
20/01/2004	15:12	144	6.7
20/01/2004	15:13	145	6.72

Date	Time	Log No.	pH Value
31/01/2004 31/01/2004	9:07 9:08	1 2	8.06 7.92
31/01/2004	9:09	3	7.94
31/01/2004	9:10	4	7.93
31/01/2004	9:11	5	7.96
31/01/2004 31/01/2004	9:12 9:13	6 7	7.89 7.88
31/01/2004	9:14	8	7.91
31/01/2004	9:15	9	7.92
31/01/2004	9:16	10	7.91
31/01/2004 31/01/2004	9:17 9:18	11 12	7.93 7.95
31/01/2004	9:19	13	7.96
31/01/2004	9:20	14	7.93
31/01/2004	9:21	15	7.92
31/01/2004	9:22 9:23	16 17	7.89 7.86
31/01/2004 31/01/2004	9:24	18	7.86
31/01/2004	9:25	19	7.84
31/01/2004	9:26	20	7.82
31/01/2004	9:27	21	7.81
31/01/2004 31/01/2004	9:28 9:29	22 23	7.81 7.78
31/01/2004	9:30	24	7.77
31/01/2004	9:31	25	7.75
31/01/2004	9:32	26	7.74
31/01/2004 31/01/2004	9:33 9:34	27 28	7.74 7.73
31/01/2004	9:35	29	7.73
31/01/2004	9:36	30	7.72
31/01/2004	9:37	31	7.74
31/01/2004	9:38	32	7.76
31/01/2004 31/01/2004	9:39 9:40	33 34	7.78 7.82
31/01/2004	9:41	35	7.82
31/01/2004	9:42	36	7.83
31/01/2004	9:43	37	7.82
31/01/2004 31/01/2004	9:44 9:45	38 39	7.8 7.8
31/01/2004	9:46	40	7.8
31/01/2004	9:47	41	7.8
31/01/2004	9:48	42	7.82
31/01/2004 31/01/2004	9:49 9:50	43 44	7.81 7.81
31/01/2004	9:51	45	7.81
31/01/2004	9:52	46	7.81
31/01/2004	9:53	47	7.81
31/01/2004 31/01/2004	9:54 9:55	48 49	7.81 7.82
31/01/2004	9:56	50	7.83
31/01/2004	9:57	51	7.82
31/01/2004	9:58	52	7.83
31/01/2004	9:59	53	7.83
31/01/2004 31/01/2004	10:00 10:01	54 55	7.85 7.86
31/01/2004	10:02	56	7.87
31/01/2004	10:03	57	7.87
31/01/2004	10:04	58	7.88
31/01/2004 31/01/2004	10:05 10:06	59 60	7.89 7.9
31/01/2004	10:07	61	7.91
31/01/2004	10:08	62	7.91
31/01/2004	10:09	63	7.92
31/01/2004 31/01/2004	10:10 10:11	64 65	7.91 7.92
31/01/2004	10:12	66	7.93
31/01/2004	10:13	67	7.94
31/01/2004	10:14	68	7.94
31/01/2004 31/01/2004	10:15 10:16	69 70	7.93 7.93
31/01/2004	10:17	71	7.93
31/01/2004	10:18	72	7.96
31/01/2004	10:19	73	7.95
31/01/2004 31/01/2004	10:20 10:21	74 75	7.95 7.95
31/01/2004	10:21	75 76	7.95 7.95
31/01/2004	10:23	77	7.96
31/01/2004	10:24	78	7.95
31/01/2004 31/01/2004	10:25 10:26	79 80	7.95 7.95
31/01/2004	10:26	80 81	7.95 7.96
31/01/2004	10:28	82	7.96
31/01/2004 31/01/2004	10:29 10:30	83 84	7.96 7.96
J1/U1/2004	TO:20	04	1.30

7.96

31/01/2004 10:30



Compliance Certificate for building Design or Specification

15

Postcode

4310

NOTE:

This is to be used for the purposes of section 10 of the Building Act 1975 and/or section 46 of the Building Regulation 2006.

RESTRICTION: A building certifier (class B) can only give a compliance certificate about whether building work complies with the BCA or a provision of the QDC. A building certifier (Class B) can not give a certificate regarding QDC boundary clearance and site cover provisions.

1. Property description

This section need only be completed if details of street address and property description are applicable.

EG. In the case of (standard/generic) pool design/shell manufacture and/or patio and carport systems this section may not be applicable.

The description must identify all land the subject of the application.

The lot & plan details (eg. SP / RP) are shown on title documents or a rates notice.

If the plan is not registered by title, provide previous lot and plan details.

2. Description of component/s certified

Clearly describe the extent of work covered by this pertitional, e.g. all structural aspects of the steel roof beams. Street address (include no., street, suburb / locality & postcode)

Boonah Water Treatment Facility

Gorkow Road, Boonah, QLD. Lot & plan details (attach list if necessary)

In which local government area is the land situated?

The Carbon Dioxide Dosing System consisting of - CO2 Gas 2 off - CO2 Gas Manifolds, Wall Mounted CO2 Control Panel, Wall Mounted DIA 2Q CONEX Controller, Injection Quill, Static Mixer and pH Enclosure.

The Sodium Hypochlorite Dosing System consisting of - 3000 Ltr Hypom Storage

The Sodium Hypochlorite Dosing System consisting of - 3000 Ltr Hypom Storage Tank, Tank Fill Electrical Panel, Tank Fill Mechanical Panel and the DDA Dosing Skid.

3. Basis of certification

Detail the basis for giving the certificate and the extent to which tests, specifications, rules, standards, codes of practice and other publications, were relied upon. The Carbon Dioxide and Sodium Hypochlorite dosing systems are covered under the Grundfos Warranty as free from defects in material and workmanship and are covered for 12 months from date of installation. All installations have been inspected and passed the Factory Acceptance Tests, Site Acceptance Tests and Commissioning Tests and have been approved by the principle Contractor.

LOCAL GOVERNMENT USE ONLY

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Paremonie Numbers

Approved from 15 Version 2, 11/11 Page 156 of 363

Form 15 continued					
Reference documentation Clearly identify any relevant documentation, e.g. numbered structural engineering plans.	486_5_5-0108-270 to 2	258, 486_5_5-0108 271, 486_5_5-0108 d 486_5_5-0108-2	-260 to 261 -273 to 275 81. In addit	, 486_5_5-0108-265 to 268, 6, 486_5_5-0108-276 to 277, ion to the drawings there are	
5. Building certifier reference number	Building certifier reference numi	ber			
6. Competent person details	Name (in full)				
A competent person for building work, means a person who is assessed by the building certifier	lan John Ginn				
for the work as competent to practise in an	Company name (if applicable)		Contact pe	Contact person	
aspect of the building and specification design, of the building work because of the individual's	Grundfos Pumnps Australia		lan Ginn		
skill, experience and qualifications in the aspect. The competent person must also be	Phone no. business hours	Mobile no.		Fax no.	
registered or licensed under a law applying in the State to practice the aspect.	07 5540 6743	0400 799 138		07 5540 6740	
	Email address				
If no relevant law requires the individual to be licensed or registered to be able to give the	iginn@grundfos.com				
help, the certifier must assess the individual as having appropriate experience qualifications or	Postal address				
skills to be able to give the help.	30 Blanck Street, Ormeau, QLD. Australia				
If the chief executive issues any guidelines for assessing a competent person, the building certifier must use the guidelines when assessing the person.	Licence or registration number	(if applicable)		Postcode 4208	
7. Signature of competent person	Signature		Da	ite	

This certificate must be signed by the individual assessed by the building certifier as competent.

I. Ginn

10/02/2014

The Building Act 1975 is administered by the Department of Local Government and Planning



Inspection Certificate / Aspect Certificate / QBSA Licensee Aspect Certificate

16

NOTE	This form is to be used for the purposes of section sections 32, 35B, 43, 44 and 47 of the Building Regu	
Indicate the type of certificate	Inspection Certificate for	
The stages of assessable building work are listed in section 24 of the <i>Building</i> <i>Regulation 2006</i> or as conditioned by the building certifier.	Stage of building work (for single detached class (indicate the stage)	ss to or class 10 building or structure)
An aspect of building work is part of a stage (e.g. waterproofing).	Aspect of building work (indicate the aspect) Completed in	stallation of CO2 and NaOCI systems
	QBSA Licensee Aspect Certificate Scope of the work Scope of the work covered by the licence class under th Regulation 2003 for the aspect being certified, e.g. scop waterproofing materials or systems for preventing moist include "wet area sealing to showers".	e of work for a waterproofing licence is "installing
	N/a	
2. Property description	Street address (nclude no., street, suburb / locality & postco	ode)
The description must identify all land the subject of the application.	Boonah Water Treatment Facility	
The lot & plan details (eg. SP / RP) are	Gorkow Road, Boonah, QLD	Postcode 4310
shown on title documents or a rates notice. If the plan is not registered by title, provide previous lot and plan details.	Lot & plan details (Attach list if necessary)	1
	In which local government area is the land situated?	i
3, Building/structure description	Building/structure description	Class of building / structure
	Existing industrial structure	
Description of component/s certified Clearly describe the extent of work covered by this certificate, e.g. all structural aspects of the steel roof beams.	The Carbon Dioxide Dosing System consis Wall Mounted CO2 Control Panel, Wall Mou Injection Quill, Static Mixer and pH Enclosu System consisting of 3000 Ltr Hypo Storag Fill Mechanical Panel and the DDA Pump Do	unted DIA 2Q CONEX Controller, ure. The Sodium Hypochlorite Dosing pe Tank, Tank Fill Electrical Panel, Tank

LOCAL GOVERNMENT USE ONLY

Q-Pulse Id TM\$1163

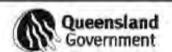
DEFENDICE MUNICIPAL

Page 158 of 363

Form 16 continued Basis of certification. Grundfos have issue this certificate of equipment compliance based upon the Detail the basis for giving the certificate and the QUU Tender Document. extent to which tests, specifications, rules. standards, codes of practice and other publications, were relied upon Reference documentation Technicial Specification 20120801_AU1-706290-Construct Contract Clearly identify any relevant documentation. e.g. numbered structural engineering plans. Building certifier reference number Building certifier reference number Development approval number and development approval number N/a N/a 8. Building Certifier, competent person Name (in full) or QBSA licensee details lan John Ginn A competent person must be assessed as Company name if applicable Contact person competent before carrying out the inspection. The builder for the work cannot give a stage Grundfos Pumnps Australia lan Ginn certificate of inspection. Phone no. business hours Mobile no. Fax no. A competent person is assessed by the 0400 799 138 07 5540 6740 building certifier for the work as competent to 07 5540 6743 practice in an aspect of the building and Email address specification design, because of the individual's skill, experience and qualifications. The iginn@grundfos.com competent person must be registered or licensed under a law applying in the State to Postal address practice the aspect. 30 Blanck Street, Ormeau, QLD. Australia If no relevant law requires the individual to be licensed or registered, the certifier must assess Postcode 4208 the individual as having appropriate experience, qualifications or skills to be able to Licence class Licence number give the help. If the chief executive issues any guidelines for assessing a competent person, the building Date approval to inspect received from building certifier certifier must use the guidelines when assessing the person. Signature of building certifier, competent person or QBSA licensee Signature Date Note: A building certifier must sign this form for temporary swimming pool fencing under I. Ginn 10/02/2014

Active 15/05/2015

The Building Act 1975 is administered by the Department of Local Government and Planning



section 4 of Schedule 1 of QDC MP 3.4.

Commissioning Information

BOONAH CHLORINE STORAGE TANK AND BUND AREA

SECTION 4: INSTALLATION & COMMISSIONING

4.1 Standards and Procedures - Mechanical Equipment

AS2032: Installation for PVC Pipe Systems

AS1554.6: Welding Stainless Steel for structural purposes

AS1345: Identification of the contents of pipes, conduits and ducts

AS3780: The Storage and Handling of Corrosive Substances

AS1692: Steel Tanks for flammable and combustible liquids

AS1940: The Storage and handling of flammable and combustible liquids

AS1657: Fixed Platforms, walkways, stairways and ladders - Design, construction and installation

4.2 Standards and Procedures for Wiring the Equipment

AS3000: Electrical Installations (wiring rules)

AS3008: Electrical Installations – Selection of Cables

4.3 Standards and Procedures for Lubricating the Equipment

Please refer to Manufacturer's O&M Manuals - section 9.

4.4 Installation and Commissioning Instructions

4.4.1 Installation Instructions

- 1. Ensure the site civil works have been completed and all services are available.
- 2. Identify any hazards or safety issues before installation proceeds by completing site relative workplace risk assessment and job safety analysis sheets.
- 3. Mark out site to ensure correct location and orientation as per site requirements and design.
- 4. Ensure all plant components have arrived to site ready for the installation.
- 5. Using a crane, lower the storage tanks into the final position.
- 6. Fix the tank to the footings with chemical anchors.
- 7. Cut, glue and fit the vent assembly, overflow/drain, and truck fill lines to the storage tank.
- 8. Carefully unpack all crates and lift the dosing skid and unloading panels into the correct position ensuring the inlet and outlet of the dosing skid are correct to the desired layout.
- 9. Fix the dosing skid and unloading panels into position using chemical anchors, making sure it is level and plumb before final lockdown.

- 10. Mark out the route for the suction line from the storage tank to the inlet of the dosing skid then cut, glue and fix the pipework into final position.
- 11. Mark out and fit pipework from service water line to the flush water circuit inlet.
- 12. Connect the outlet of the dosing skid to the dosing point carrier lines
- 13. Connect services and complete all wiring to the dosing system and conduct all testing before commissioning.
- 4.4.2 Commissioning Instructions
- 1. Ensure services are available.
- 2. Visually inspect all plumbing and Electrical Equipment.
- 3. Physically examine all valves, unions etc.
- 4. Proceed as per Commissioning Test Sheet.

<u>Note:</u> Operators should be aware of updated Site Dosing Specifications and adjust test procedures / values accordingly.

Chlorine Dosing Skid

SECTION 4: INSTALLATION & COMMISSIONING

4.1 Standards and Procedures - Mechanical Equipment

AS2032: Installation for PVC Pipe Systems

AS1554.6: Welding Stainless Steel for structural purposes

AS1345: Identification of the contents of pipes, conduits and ducts

AS3780: The Storage and Handling of Corrosive Substances

AS1692: Steel Tanks for flammable and combustible liquids

AS1940: The Storage and handling of flammable and combustible liquids

AS1657: Fixed Platforms, walkways, stairways and ladders - Design, construction and installation

4.2 Standards and Procedures for Wiring the Equipment

AS3000: Electrical Installations (wiring rules)

AS3008: Electrical Installations - Selection of Cables

4.3 Standards and Procedures for Lubricating the Equipment

Please refer to Manufacturer's O&M Manuals.

4.4 Installation and Commissioning Instructions

4.4.1 Installation Instructions

1. Ensure the site civil works have been completed and all services are available.

- 2. Identify any hazards or safety issues before installation proceeds by completing site relative workplace risk assessment and job safety analysis sheets.
- 3. Mark out site to ensure correct location, orientation and levels as per site requirements and design.
- 4. Ensure all plant components have arrived to site ready for the installation.
- 5. Use a crane to lower the dosing station into the final position.
- 6. Mark and drill the DSS mount pattern to the footings.
- 7. Carefully unpack all crates and lift the dosing skid panels into the correct position ensuring the inlet and outlet of the dosing skid are correct to the desired layout.
- 8. Fix the dosing skid into position using chemical anchors, making sure it is level and plumb before final lockdown.
- 9. Mark out the route for the suction line from the storage tank to the inlet of the dosing skid then cut, glue and fix the pipework into final position.
- 10. Cut, glue and fit the calibration tube vent assembly and chemical lines to the storage tank.
- 11. Mark out and fit pipework from service water line to the flush water circuit inlet. Define the drain and flush collection system.
- 12. Connect the outlet of the dosing skid to the dosing point carrier lines
- 13. Connect services and complete all wiring to the dosing system and conduct all testing before commissioning.
- 4.4.2 Commissioning Instructions
- 1. Ensure services are available.
- 2. Visually inspect all plumbing and Electrical Equipment.
- 3. Physically examine all valves, unions etc.
- 4. Proceed as per Commissioning Test Sheet.
 - Note: Operators should be aware of updated Site Dosing Specifications and adjust test procedures / values accordingly.

CO2 GAS CONTROL

SECTION 4: INSTALLATION & COMMISSIONING

4.1 Standards and Procedures - Mechanical Equipment

AS2032: Installation for PVC Pipe Systems

AS1554.6: Welding Stainless Steel for structural purposes

AS1345: Identification of the contents of pipes, conduits and ducts

AS3780: The Storage and Handling of Corrosive Substances

AS1692: Steel Tanks for flammable and combustible liquids

AS1940: The Storage and handling of flammable and combustible liquids

AS1657: Fixed Platforms, walkways, stairways and ladders - Design, construction and installation

4.2 Standards and Procedures for Wiring the Equipment

AS3000: Electrical Installations (wiring rules)

AS3008: Electrical Installations - Selection of Cables

4.3 Standards and Procedures for Lubricating the Equipment

Please refer to Manufacturer's O&M Manuals - section 9.

4.4 Installation and Commissioning Instructions

4.4.1 Installation Instructions

- 1. Ensure the site civil works have been completed and all services are available.
- 2. Identify any hazards or safety issues before installation proceeds by completing site relative workplace risk assessment and job safety analysis sheets.
- 3. Mark out site to ensure correct location and orientation as per site requirements and design.
- 4. Ensure all plant components have arrived to site ready for the installation.
- 5. Using a crane, lower the storage tanks into the final position.
- 6. Fix the tank to the footings with chemical anchors.
- 7. Cut, glue and fit the vent assembly, overflow/drain, and truck fill lines to the storage tank.
- 8. Carefully unpack all crates and lift the dosing skid and unloading panels into the correct position ensuring the inlet and outlet of the dosing skid are correct to the desired layout.
- 9. Fix the dosing skid and unloading panels into position using chemical anchors, making sure it is level and plumb before final lockdown.
- 10. Mark out the route for the suction line from the storage tank to the inlet of the dosing skid then cut, glue and fix the pipework into final position.
- Mark out and fit pipework from service water line to the flush water circuit inlet.
- 12. Connect the outlet of the dosing skid to the dosing point carrier lines
- 13. Connect services and complete all wiring to the dosing system and conduct all testing before commissioning.

4.4.2 Commissioning Instructions

- 1. Ensure services are available.
- 2. Visually inspect all plumbing and Electrical Equipment.
- 3. Physically examine all valves, unions etc.
- 4. Proceed as per Commissioning Test Sheet.

Note: Operators should be aware of updated Site Dosing Specifications and adjust test procedures / values accordingly.

Spares

BOONAH CHLORINE STORAGE TANK AND BUND AREA

Service: (7.0) Civil and Storage

Subservice: (TK_) TANK

1.4 Parts Listing and special Tools

1.4.1 Recommended Spare Parts and Special Tools

• The following Table contains a list of recommended spare parts that are to be kept onsite for the Chlorine Storage Tank and Bund Area.

Supplier - Harris Products Group

Description-CO2 Gas Purifier Cartridge

Part No. - 4CG002

Quantity - 4

Supplier - Grundfos

Description-Strainer Screen 1/2" GF 305 Strainer 0.8mm UPVC

Part No. - 97629387

Quantity - 1

Supplier - Grundfos

Description-Solution Buffer pH 4.05 250ml

Part No. - 95714999

Quantity - 1

Supplier - Grundfos

Description-Solution Buffer pH 7.5 250ml

Part No. - 95713955

Quantity - 1

For spare parts please contact Grundfos on (07) 5540 6700.

No special tools are required to be kept onsite for the Chlorine Storage Tank and Bund Area

Help & Contact

BOONAH CHLORINE STORAGE TANK AND BUND AREA

Trade or Product: Spare Parts Contact & Address Details:

For spare parts please contact Grundfos on (07) 5540 6700.

BOONAH CHLORINE STORAGE TANK AND BUND AREA

Trade or Product: Manufacturer and Supplier details

Contact & Address Details:

1.5 Supplier Details

1.5.1 List of Manufacturer and Supplier Details

The table below contains a list of Manufacturer and Supplier details for the Chlorine Storage Tank and Bund Area.

MANUFACTURER/ SUPPLIER

ADDRESS

PHONE

Grundfos Service Department

30 Blanck Street

Ormeau QLD 4208

07 5540 6710

Georg Fischer

7/30 Raubers Road Banyo QLD 4014

07 3221 7503

Air & Hydraulics

3/7 Clearview Place

(PO Box 419)

Brookvale NSW 2100

02 9939 6199

BVCI Pty Ltd

Stradbroke Street

Heathwood QLD 4110

07 3714 0444

Vega Australia Pty Ltd

398 The Boulevard

Kirrawee NSW 2234

02 9542 6662

Process Pumps (Australia) Pty. Ltd.

Unit 5, 385 Dorset Road,

Boronia, Victoria, 3155

03 9762 9222

RS Components Pty Ltd

PO Box 6864

Wetherill Park NSW 2164

1300656636

CO2 GAS CONTROL

Trade or Product: Manufacturer and Supplier details

Contact & Address Details:

1.5.1 List of Manufacturer and Supplier Details

The table below contains a list of Manufacturer and Supplier details for the Carbon Dioxide Dosing System.

MANUFACTURER/ SUPPLIER

ADDRESS

PHONE

Georg Fischer

7/30 Raubers Road Banyo QLD 4014

07 3221 7503

Air & Hydraulics

3/7 Clearview Place

(PO Box 419)

Brookvale NSW 2100

02 9939 6199

Burkert

Unit 3/43 Sandgate Road

Albion Qld 4010

1300 888 868

Convergent Water Controls

2/4 Huntley Street Alexandria NSW 2015 1800 137 954

Kelco Engineering

9/9 Powells RdBrookvale NSW 210002 99056425

RS Components

PO Box 6864

Wetherill Park NSW 2164

quotesandtenders@rs-components.com

As Built Drawings

Mechanical Drawings

Site: (ST056) Boonah

Process: (1100.0) GENERAL Sub: (1150) SEWERAGE

NaOCI and CO2 Mechanical General Assembly Drawings (GA)

Linked Documents

486_5_5-0108-251.pdf

486_5_5-0108-250.pdf

486_5_5-0108-265 to 268.pdf

486_5_5-0108-253 to 258.pdf

486_5_5-0108-270 to 271.pdf

486_5_5-0108-260 to 261.pdf

486_5_5-0108-273 to 275.pdf

486_5_5-0108-276 to 277.pdf

486_5_5-0108-279.pdf

486_5_5-0108-281.pdf

Electrical Drawings

Site: (ST056) Boonah

Process: (1100.0) GENERAL Sub: (1150) SEWERAGE

NaOCI and CO2 Electrical General Assembly Drawings (GA)

Note - These are our Grundfos Standard Electrical Drawings

Linked Documents

98159253 Truck fill 1Tank Manual Vavle IFIO - As Constructed (2).pdf

DDA PUMPS- Boonah Control Panel - As Constructed.pdf

CO2 Control Panel Boonah Rev C AB.pdf





BOONAH REGIONAL LAGOONS SEWAGE TREATMENT PLANTS ENHANCEMENT

DRAWING NUMBERS 486/5/5-0108-251 TO 486/5/5-0108-252 BOONAH NaOCI & CO2 PROCESS & INSTRUMENT DIAGRAM DRAWING NUMBERS 486/5/5-0108-253 TO 486/5/5-0108-258 BOONAH NaOCI & CO2 INSTALLATION GA - STORAGE & DOSING DRAWING NUMBERS 486/5/5-0108-260 TO 486/5/5-0108-264 BOONAH NaOCI STORAGE TANK GA DRAWING NUMBERS 486/5/5-0108-265 TO 486/5/5-0108-269 BOONAH NaOCI DOSING SKID GA DRAWING NUMBERS 486/5/5-0108-270 TO 486/5/5-0108-272 BOONAH CO2 pH MONITOR PANEL GA DRAWING NUMBERS 486/5/5-0108-273 TO 486/5/5-0108-275 BOONAH NaOCI & CO2 4" STATIC MIXER GA DRAWING NUMBERS 486/5/5-0108-276 TO 486/5/5-0108-278 BOONAH CO2 GAS CONTROL PANEL GA DRAWING NUMBERS 486/5/5-0108-279 TO 486/5/5-0108-280 BOONAH NaOCI SINGLE TANK FILL PANEL GA DRAWING NUMBERS 486/5/5-0108-281 TO 486/5/5-0108-282 BOONAH NaOCI SINGLE TANK ELECTRICAL FILL PANEL GA



No. DATE AMENDMENT

ESIGN W.O. No

 DRAFTING CHECK
 SB
 DESIGN

 CAD FILE
 550108250
 SHAUN BELLAMY
 18/06/201

 IAL ()
 Q.U.U. FILE No.
 DESIGN CHECK
 DATE

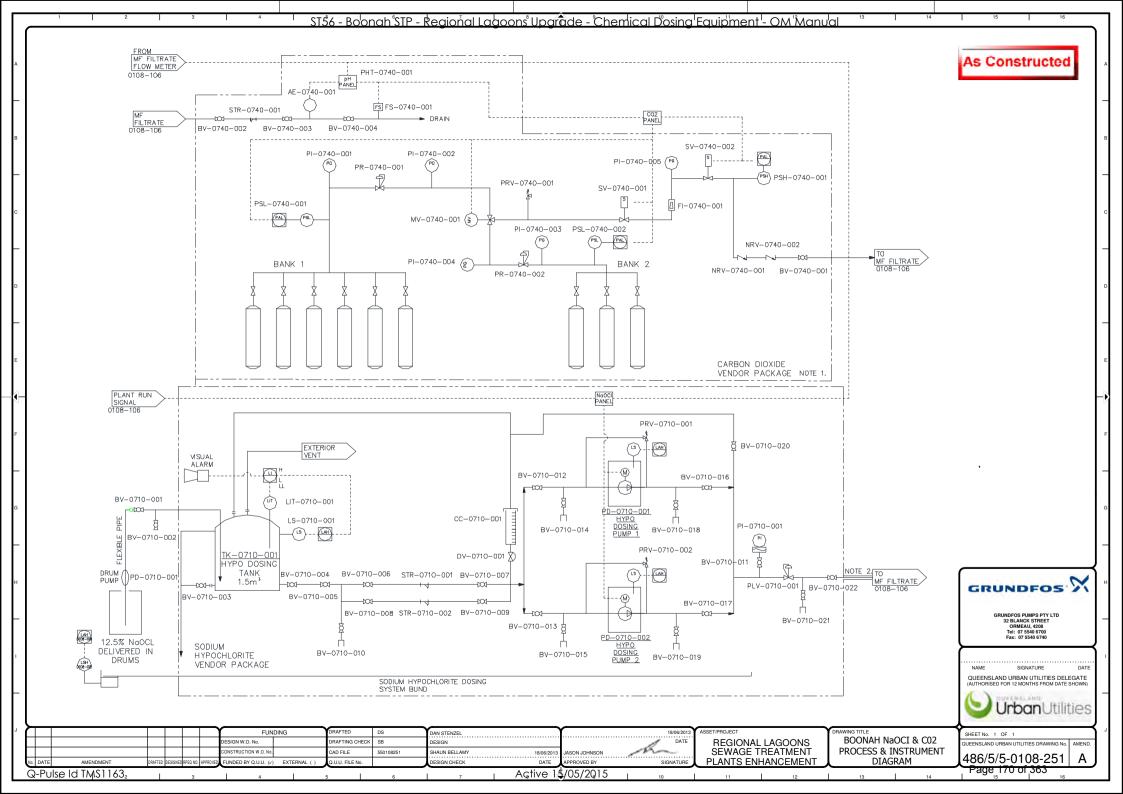
2013 JASON JOHNSON

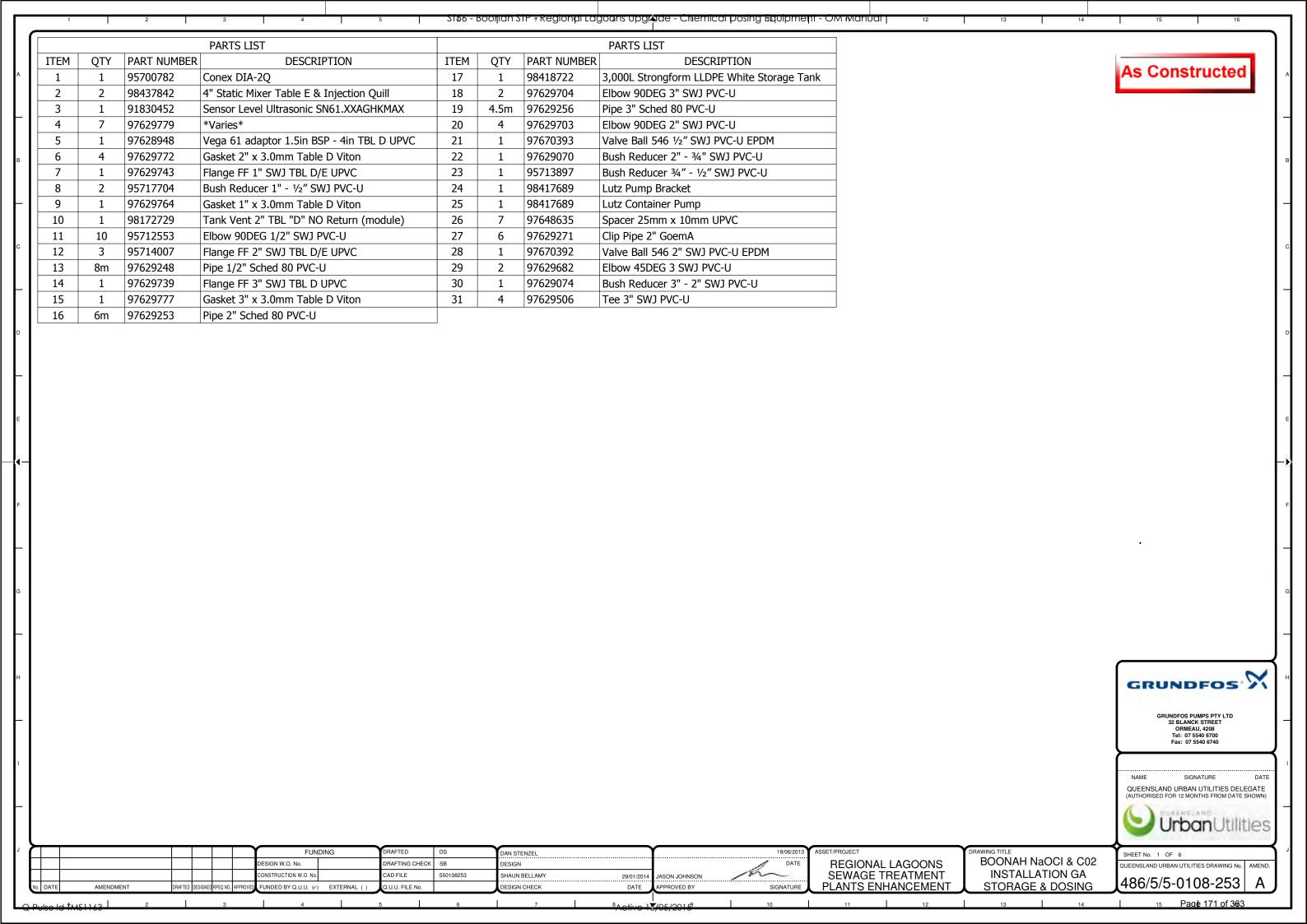
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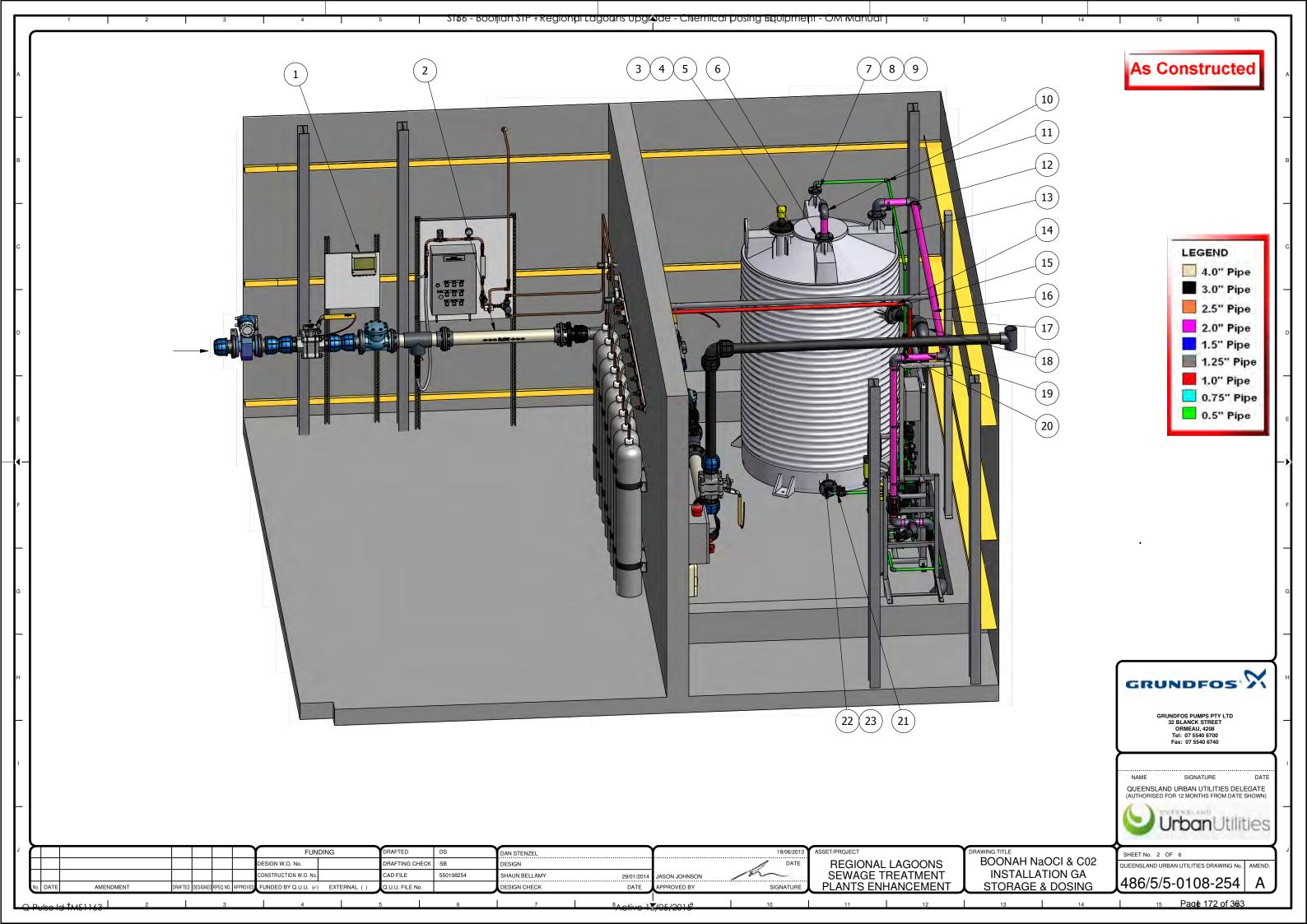
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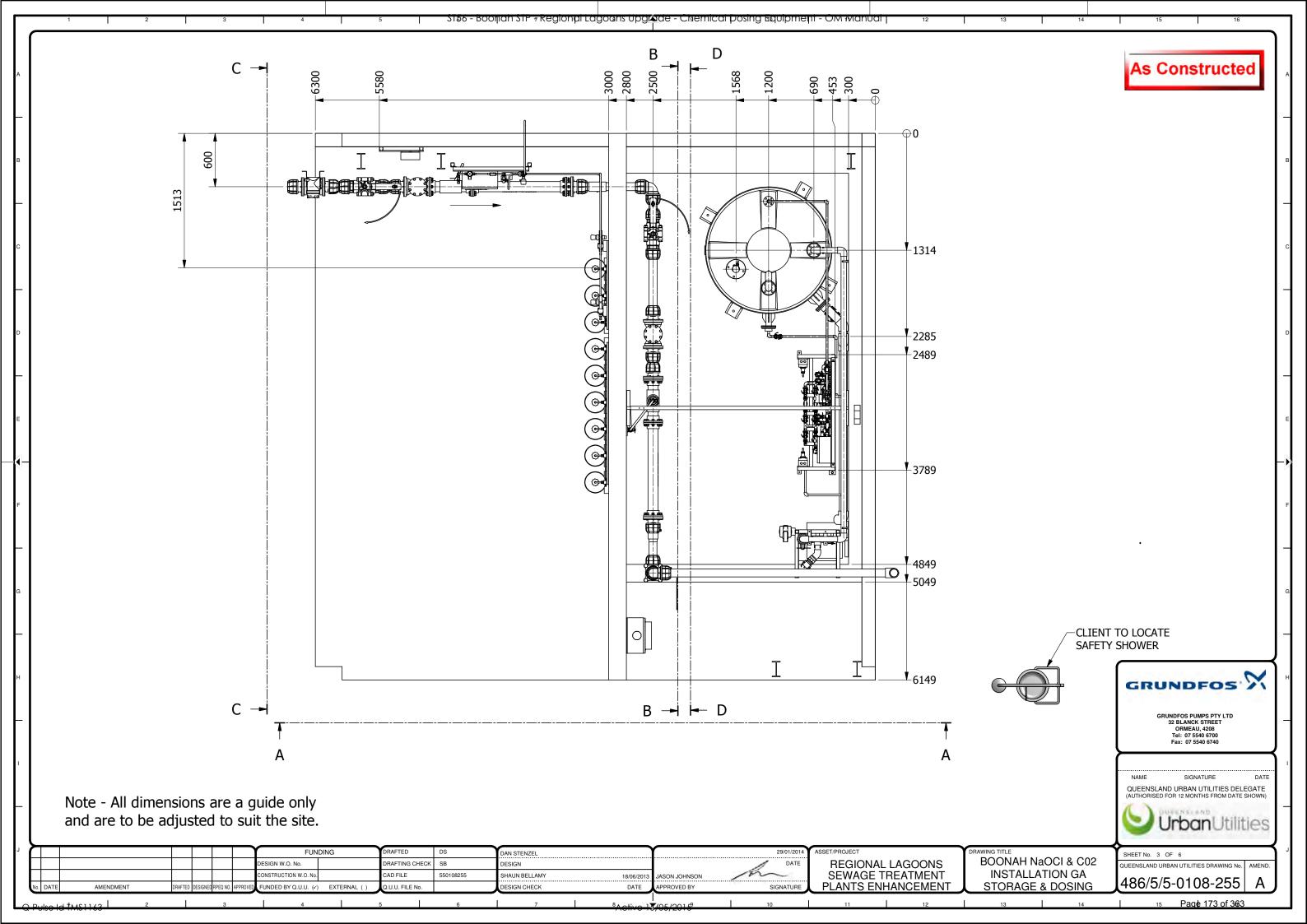
REGIONAL LAGOONS SEWAGE TREATMENT PLANTS ENHANCEMENT BOONAH NaOCI & C02 TITLE PAGE SHEET No. 1 OF 1
QUEENSLAND URBAN UTILITIES DRAWING No. AM
486/5/5-0108-250

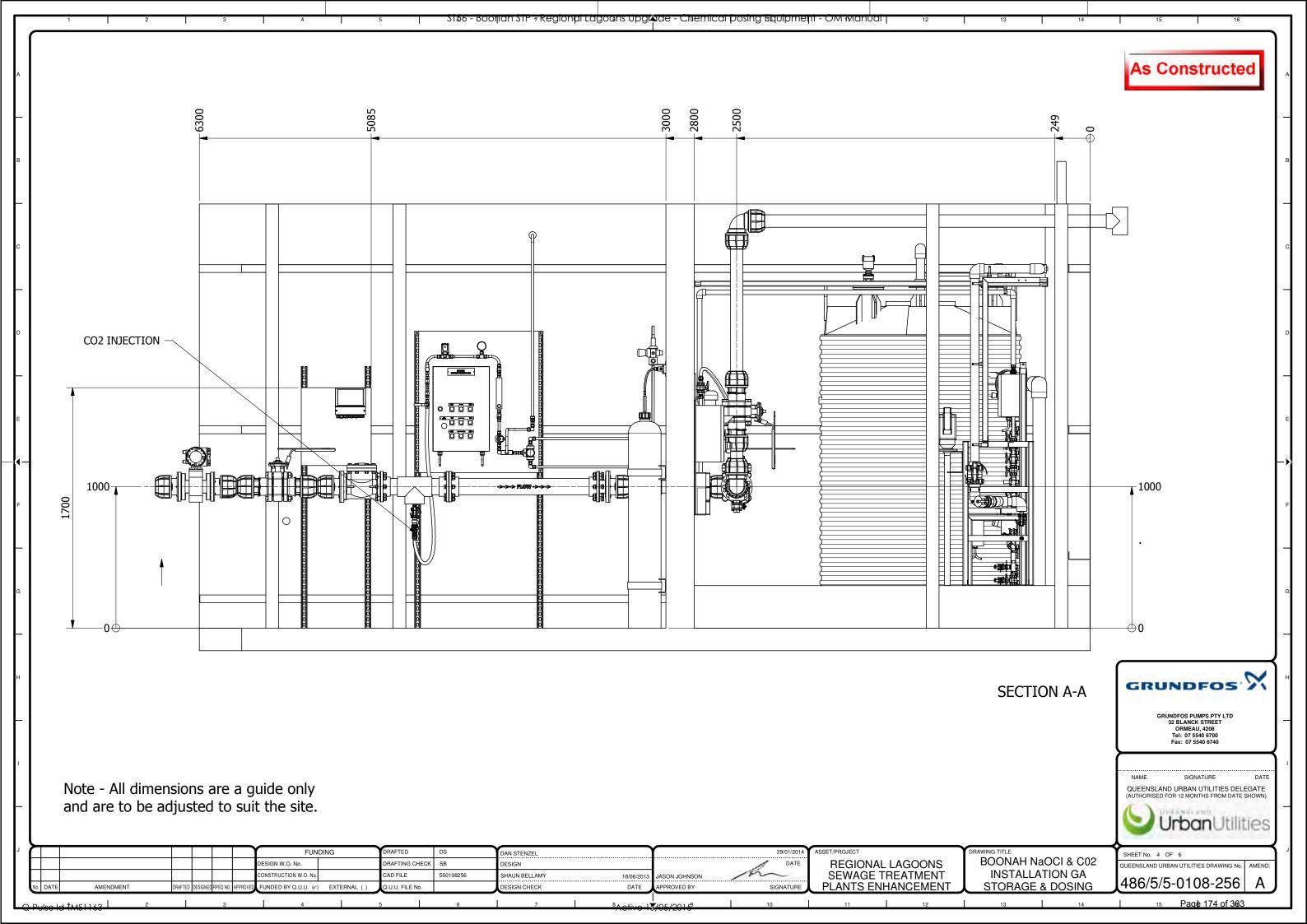
Page 169 of 363

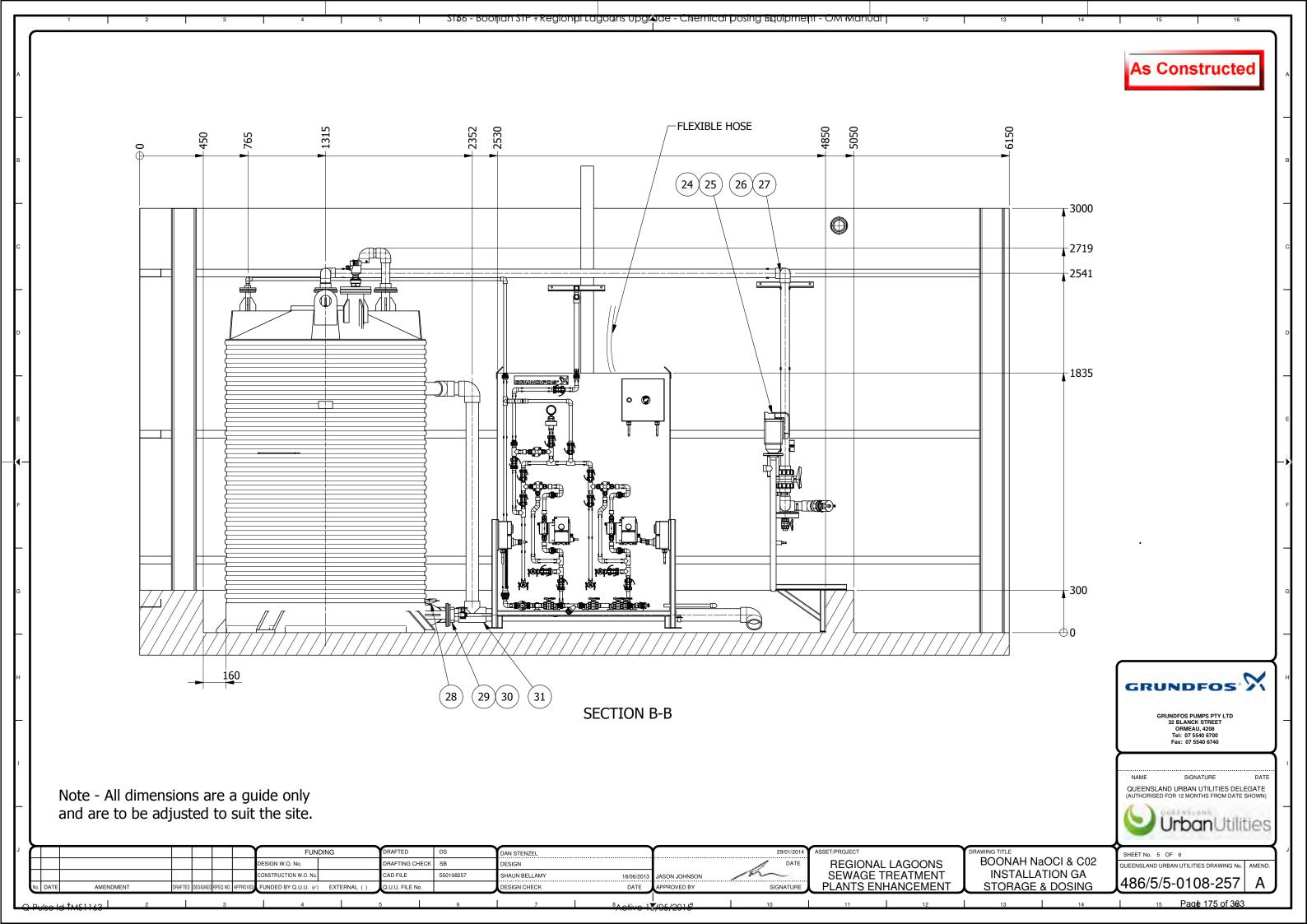


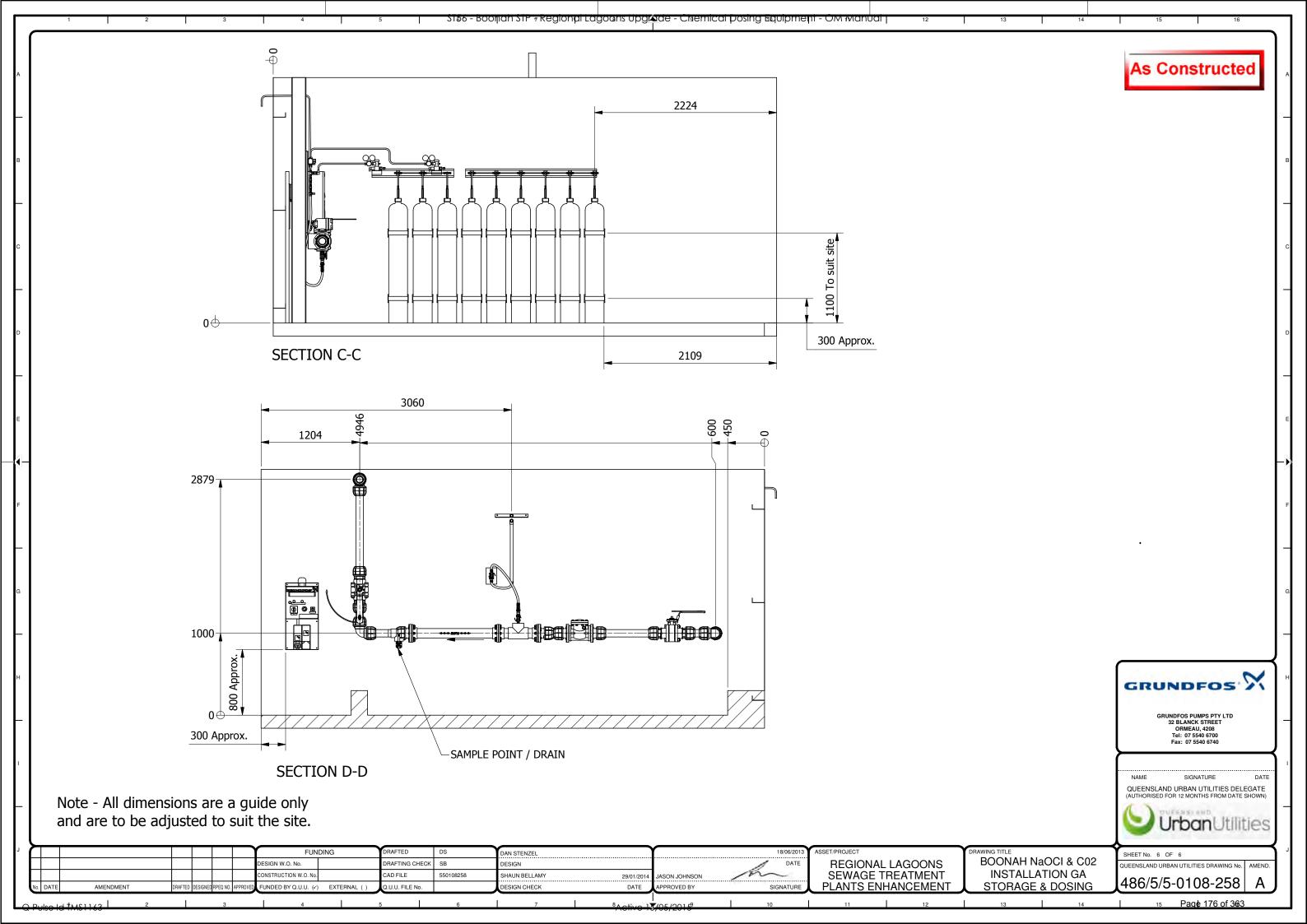










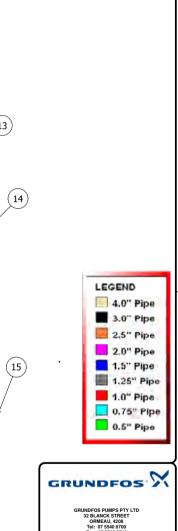


	1	2	3	ST56 - Boonah STP	- Regional Lagoons Uparade - Chemical Dosina Equipment - OM Manual
			PAI	RTS LIST	
IT	EM	QTY	PART NUMBER	DESCRIPTION	
	1	1	98418722	3,000L Strongform LLDPE White Storage Tank	
	2	1	97629779	Gasket 4" x 3.0mm Table D Viton	$\binom{4}{4}$ $\binom{5}{5}$ $\binom{6}{6}$ $\binom{7}{7}$ $\binom{8}{8}$
	3	1	97628948	Adaptor Plate 4 Table E Flange x 11/2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
4	4	1	97629743	Flange FF 1" SWJ TBL D/E UPVC	
	5	1	97629764	Gasket 1" x 3.0mm Table D Viton	
	6	1	97707410	Sensor Level Ultrasonic SN61.XXAGHKMXX	
	7	1	98172729	Tank Vent 2" TBL "D" NO Return (module)	
	8	3	95714007	Flange FF 2" SWJ TBL D/E UPVC	
9	9	4	97629772	Gasket 2" x 3.0mm Table D Viton	
1	.0	1	97629777	Gasket 3" x 3.0mm Table D Viton	
1	.1	1	97629739	Flange FF 3" SWJ TBL D UPVC	
1	.2	2	97629682	Elbow 45DEG 3 SWJ PVC-U	
1	.3	1	97629704	Elbow 90DEG 3" SWJ PVC-U	
1	.4	2m	97629256	Pipe 3" Sched 80 PVC-U	
1	.5	1	97629506	Tee 3" SWJ PVC-U	
1	.6	0.5m	97629253	Pipe 2" Sched 80 PVC-U	
1	.7	1	97670392	Valve Ball 546 2" SWJ PVC-U EPDM	
1	.8	1	97629074	Bush Reducer 3" - 2" SWJ PVC-U	



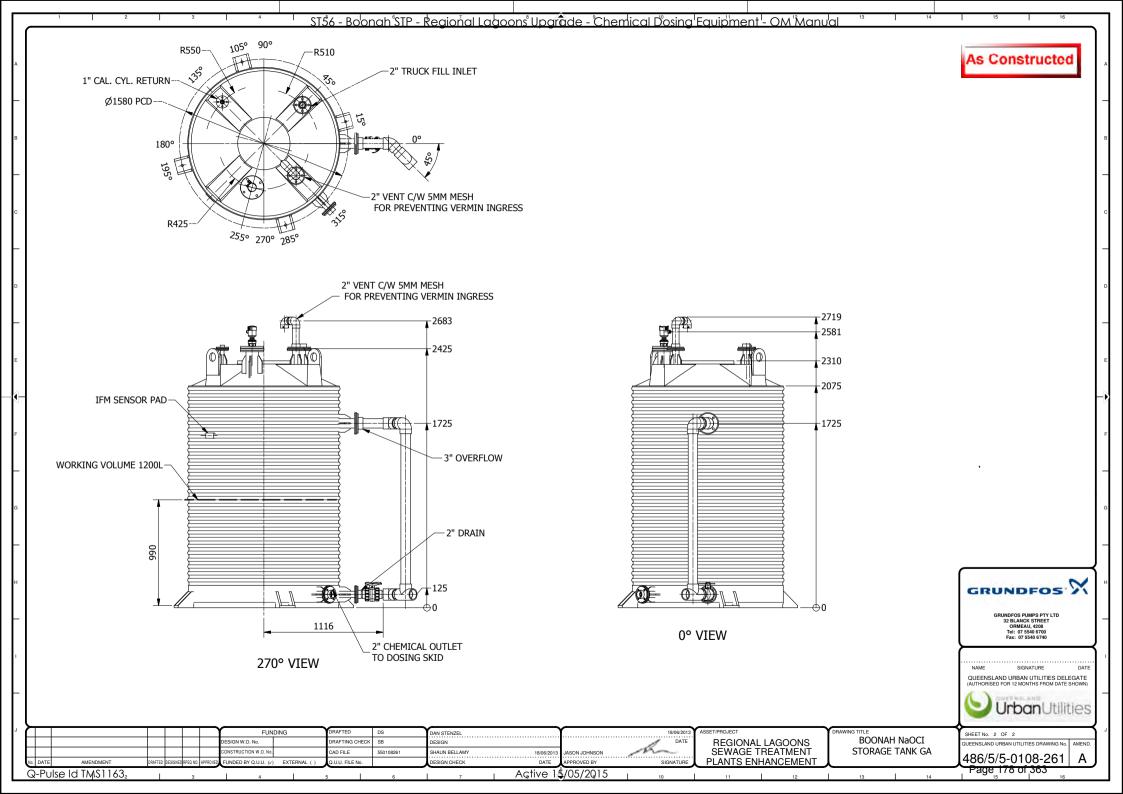
16 GRUNDFOS PUMPS PTY LTD 32 BLANCK STREET ORMEAU, 4208 Tel: 07 5540 6700 Fax: 07 5540 6740 1. QUANTITY: 1 OFF REQUIRED. SIGNATURE 2. SEALS: VITON. 3. WORKING VOLUME: 1200 Ltr 4. ALL FLANGES TO BE TABLE D WITH BACKING RINGS FUNDING SHEET No. 1 OF 2 **BOONAH NaOCI** REGIONAL LAGOONS SEWAGE TREATMENT ESIGN W.O. No. RAFTING CHEC DESIGN QUEENSLAND URBAN UTILITIES DRAWING No. AMEND. STORAGE TANK GA AD FILE HAUN BELLAMY 550108260 18/06/201 JASON JOHNSON 486/5/5-0108-260 PLANTS ENHANCEMENT Page_177 of 363 Q-Pulse Id TMS11632 Active 15/05/2015





As Constructed





			Parts List
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	98431877	0060A-01-G01 Frame
2	3	97629267	Clip Pipe 1" GoemA
3	1	97767501	Calibration Cyl 200ML PVC 1" union
4	2	95717704	Bush Reducer 1" - 1/2" SWJ PVC-U
5	56	97648635	Spacer 25mm x 10mm UPVC
6	53	97629446	Spacer 25mm x 6mm UPVC
7	63	97629270	Clip Pipe 1/2" GoemA
8	7	97629683	Elbow 45DEG 1/2" SWJ PVC-U
9	1	98416055	Sheet - White UPVC 2400x1200x10mm
10	10m	97629248	Pipe 1/2" Sched 80 PVC-U
11	17	95712552	Tee 1/2" SWJ PVC-U
12	1	95730745	PLV-G5/8-3 PV/T U2
13	10	97629528 + 95715032	Union 1/2" SWJ PVC-U VITON
14	25	95712553	Elbow 90DEG 1/2" SWJ PVC-U
15	1	95719775	Gauge Pressure 63mm + PVC/PTFE Protector
16	1	95712551	Socket Adaptor 1/2"SWJ - 1/2"BSPM PVC-U
17	18	97629003	Valve Ball 546 1/2" SWJ PVC-U Viton
18	1	98173510	Junction Box 300 x 300 SS316 c-w E-Stop
19	2	95730759	PRV-G5/8-10 PVC/T U2
20	9	95710924	Connector DN8 Cap x 1/2" SWJ Socket UPVC
21	3	95714411	Connector DN8 Cap x 1/2" SWJ Spigot UPVC
22	2	97722862	DDA 7.5-16 FCM-PV/T/C-F-31U2U2IG
23	4	98176085	Insert for square tube 38x38 black
24	2	91343128	Socket Switched 240V 56 Series 10A IP66
25	2	97629285	Plugtop 240V 56 Ser 10A IP66 3-Pin Flat
26	5	97629670	Dust Cap Camlock 3/4" 159/019P Type DC PP
27	5	97643622	Camlock 1/2" Male x BSPM 157/012P Type F PP
28	5	97629416	Socket Adaptor 1/2"SWJ - 1/2"BSPF PVC-U
29	2	97629851	Strainer 1/2" Typ305 Spig Clr UPVC Vit
30	4	97628950 + 95715032	Union Adapt 1/2" GF 305 Strainer SWJ EPDM + O-Ring Vit BS210V - 1/2"
31	2	97629387	Screen 1/2" GF 305 Strainer 0.8mm UPVC
32	1	97783463	Valve Diaphragm 1/2" SWJ Type 514 PVC V
33	2.1sqm	98429221	Sheet - White UPVC 2400x1200x3mm

DRAFTED

CAD FILE

DRAFTING CHECK SB

DAN STENZEL

SHAUN BELLAMY

18/06/2013

JASON JOHNSON

DESIGN

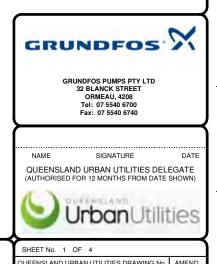
FUNDING

DESIGN W.O. No.

ONSTRUCTION W.O. No.

NOTES:

- 1. QUANTITY: 1 OFF REQUIRED
- 2. FRAME MATERIAL: SHS 38×1.6 THK, SS316 U.N.O.
- 3. SEALS: VITON
- 4. FRAME TO BE POWDER COATED

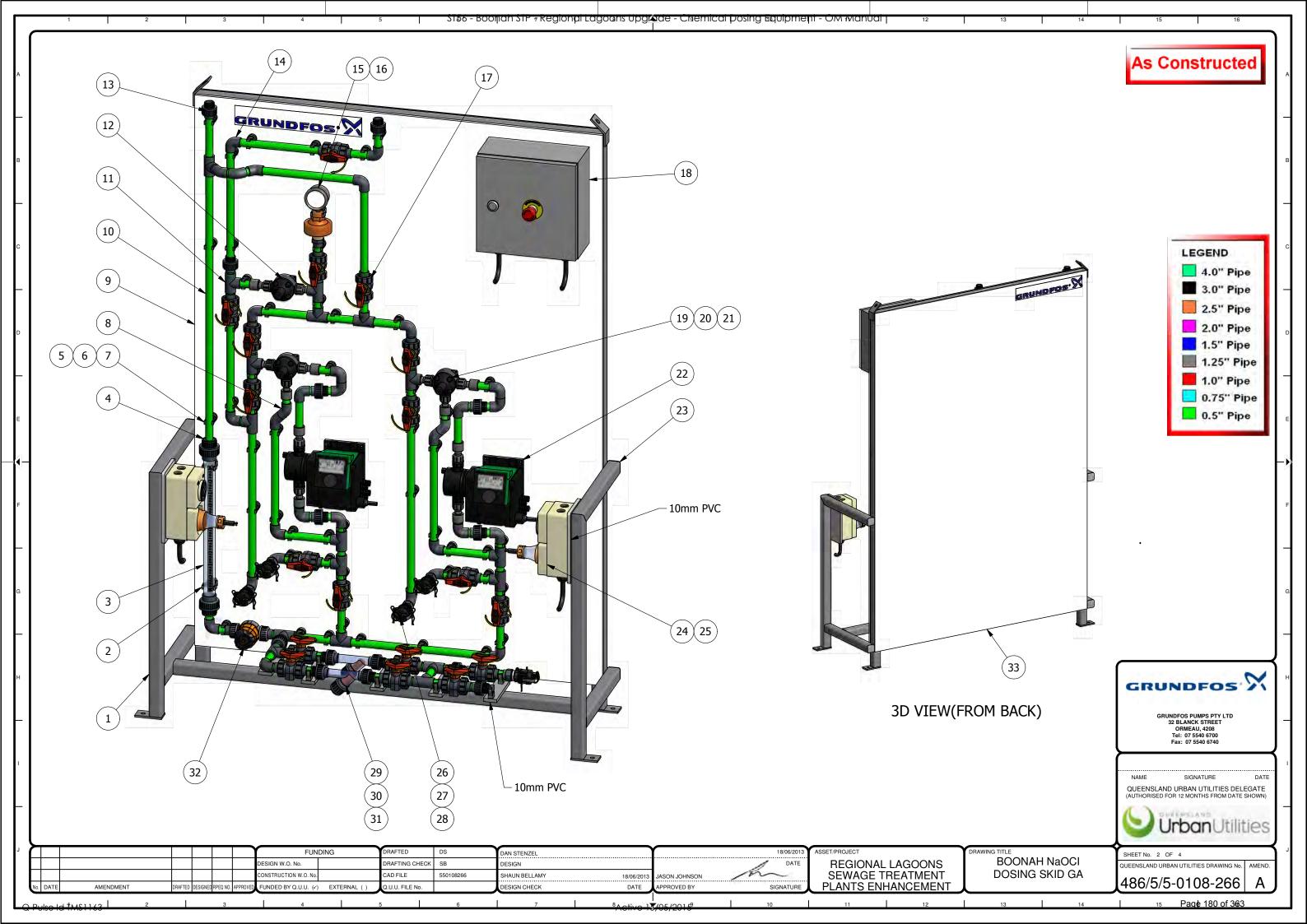


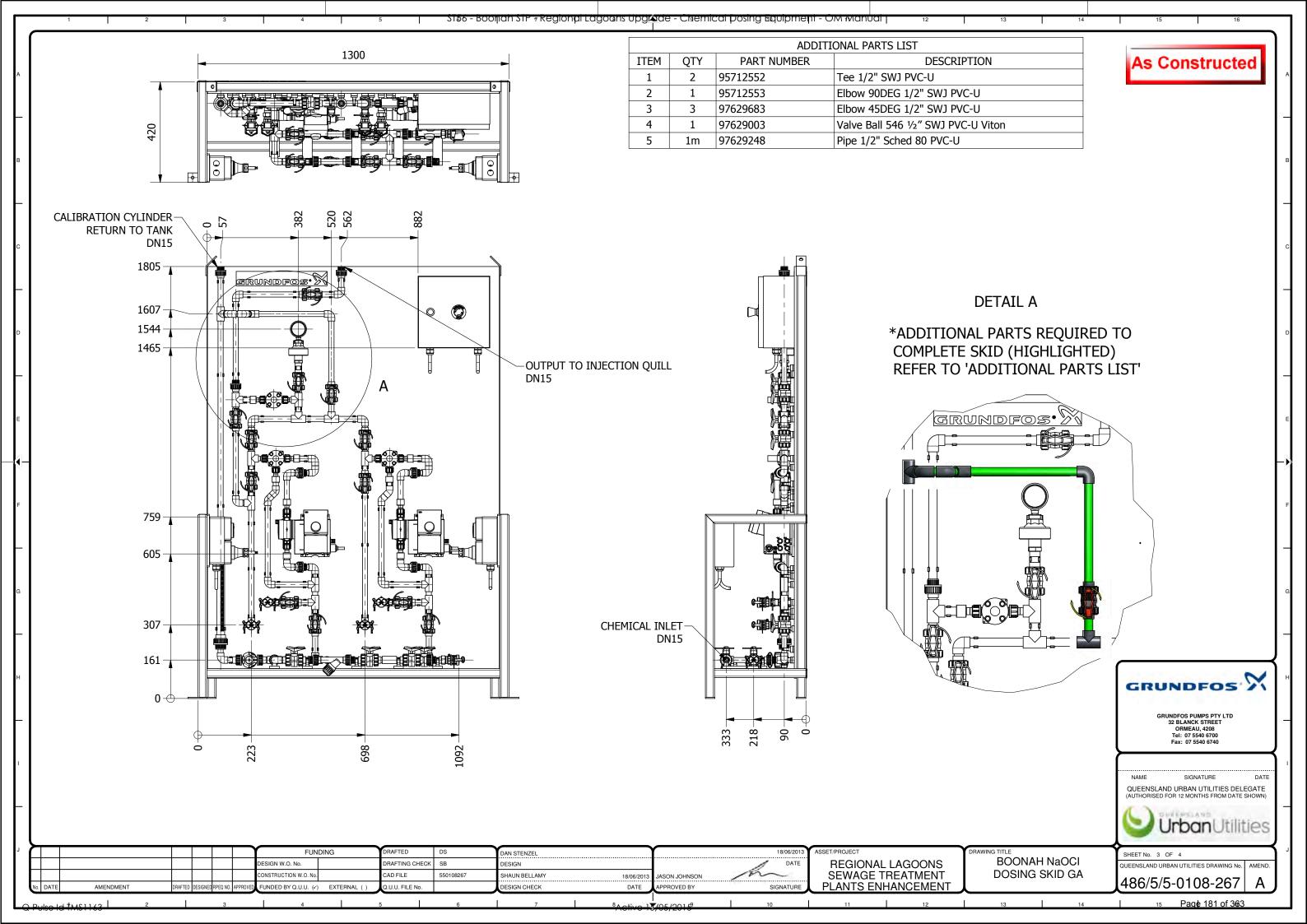
As Constructed

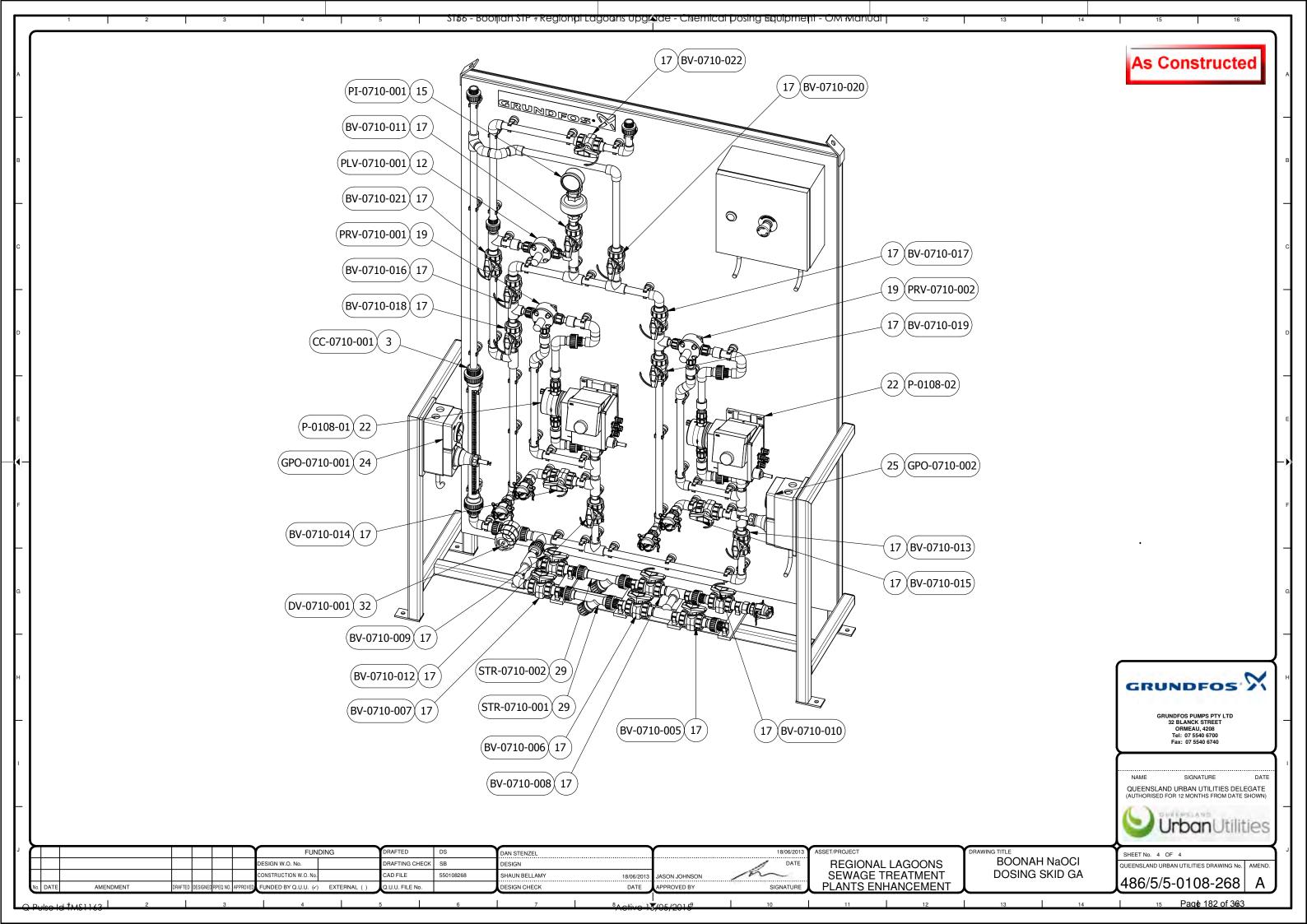
BOONAH NaOCI REGIONAL LAGOONS QUEENSLAND URBAN UTILITIES DRAWING No. AMEND. SEWAGE TREATMENT PLANTS ENHANCEMENT DOSING SKID GA 486/5/5-0108-265 Page 179 of 363

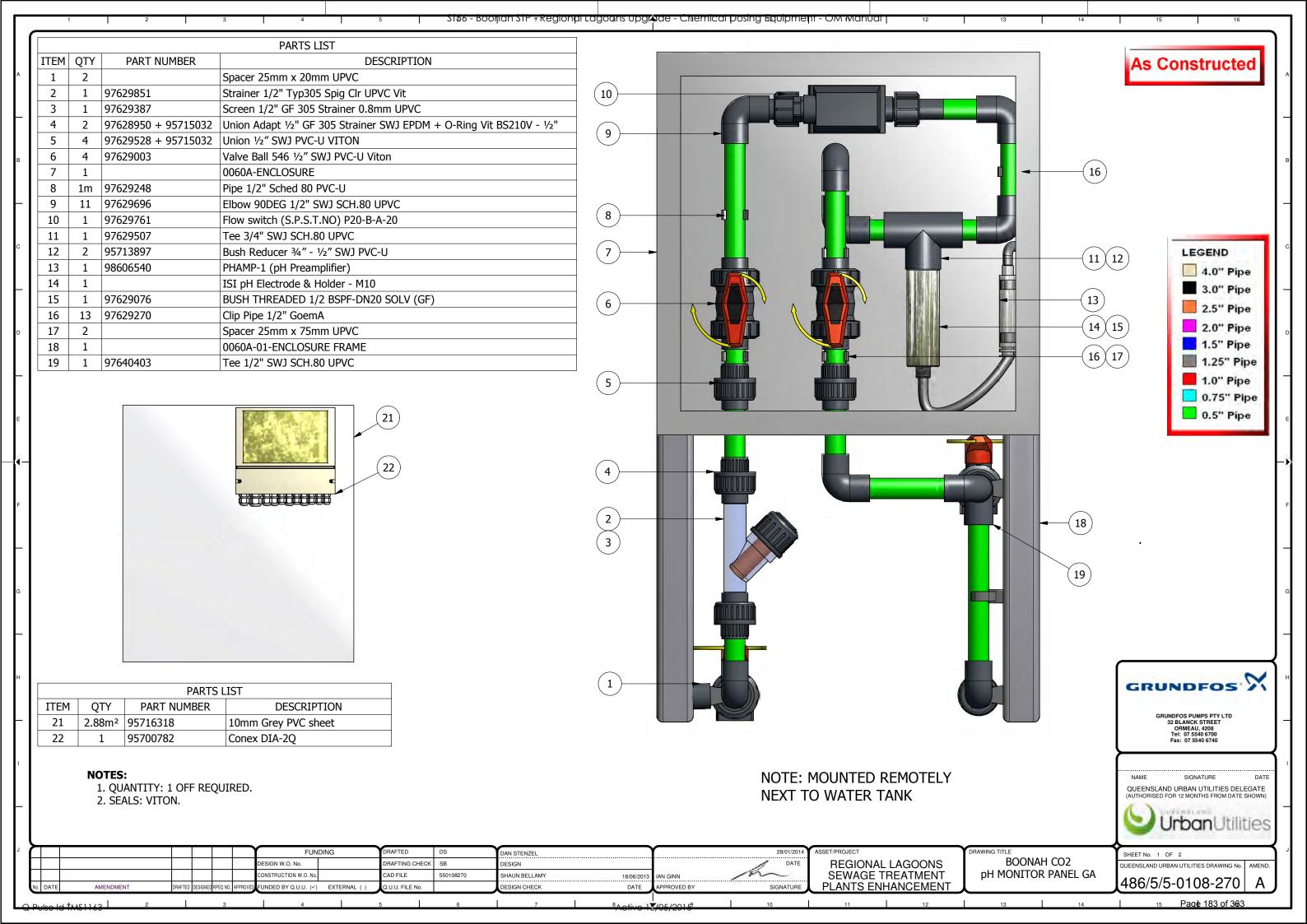
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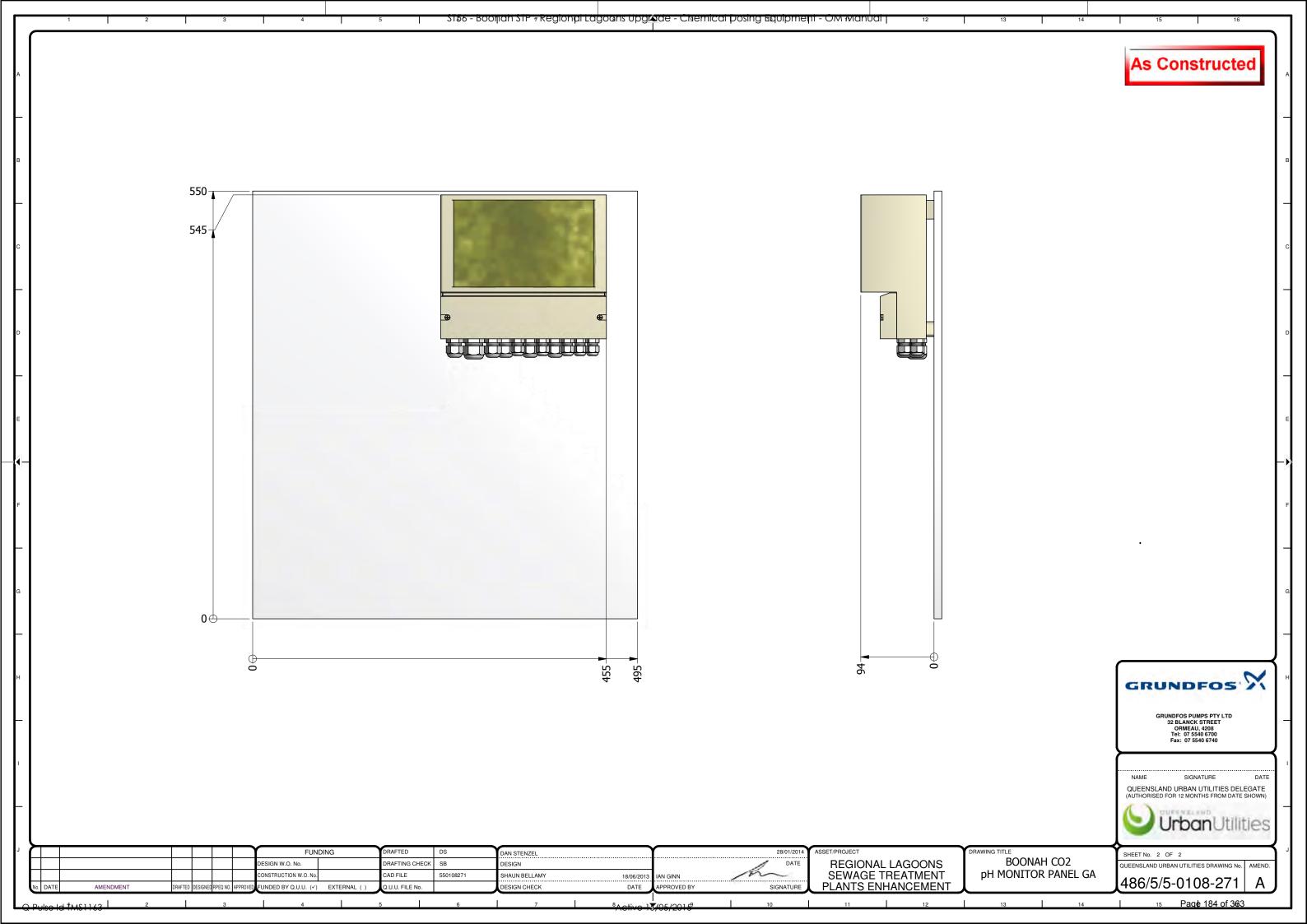
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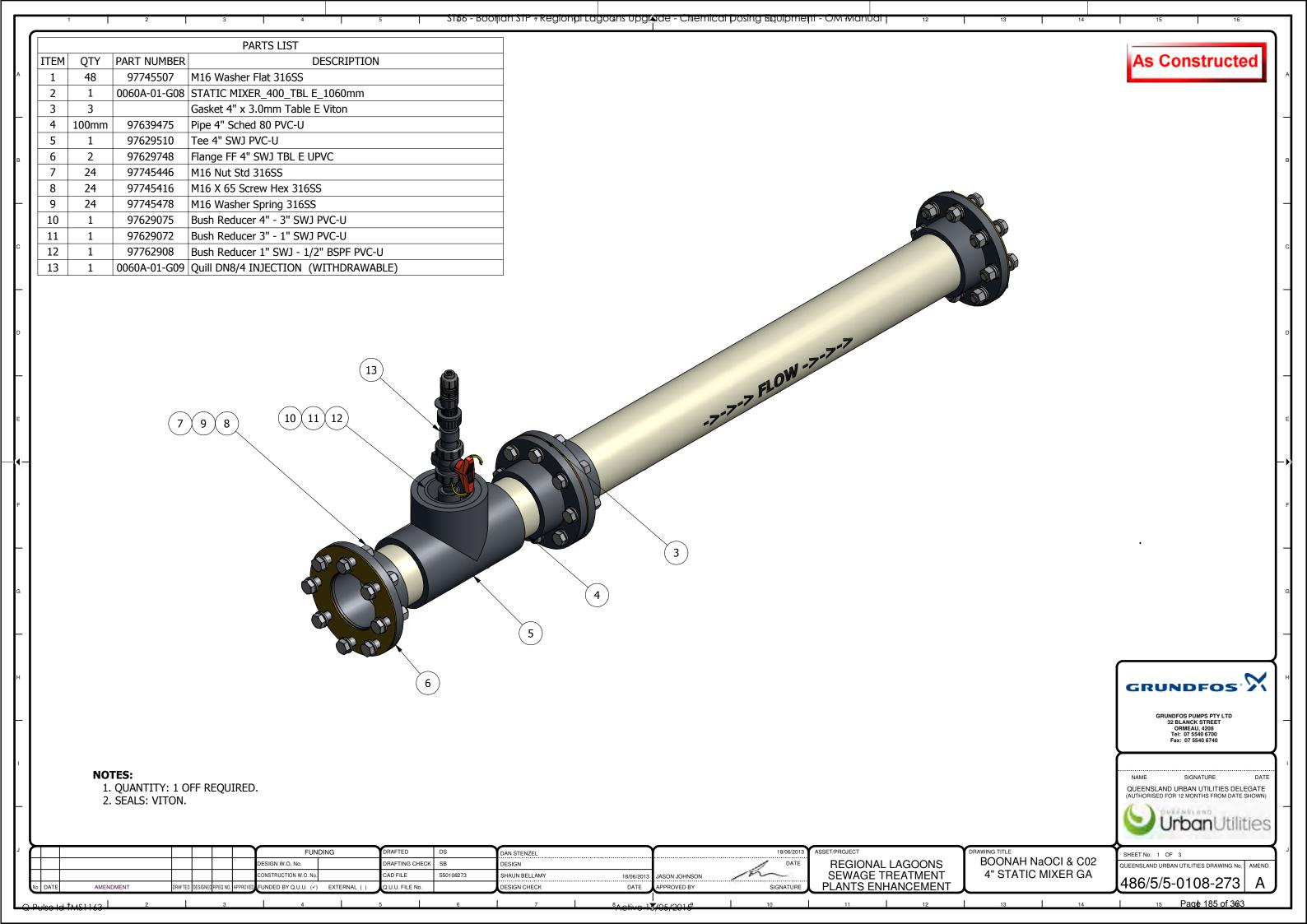


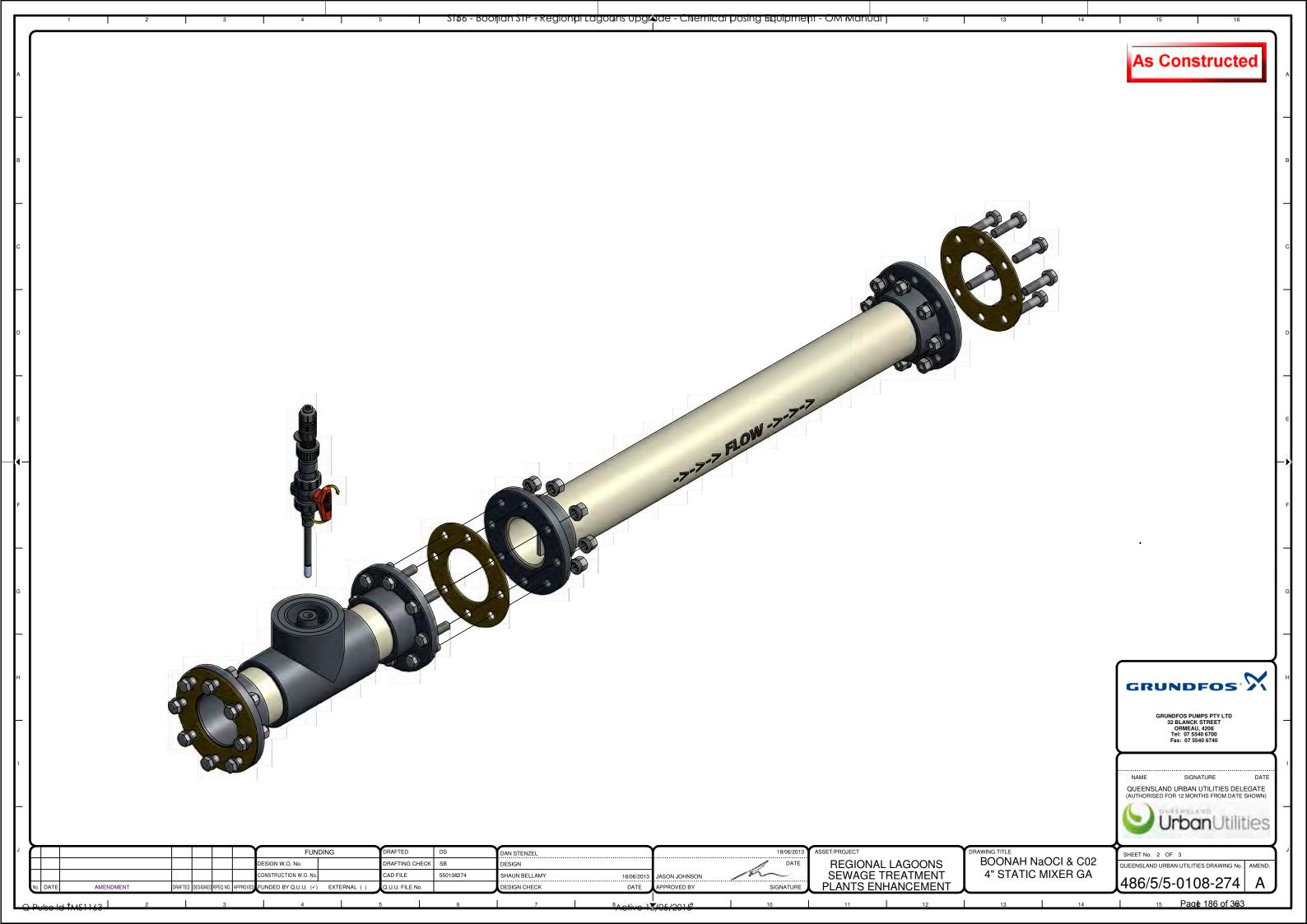


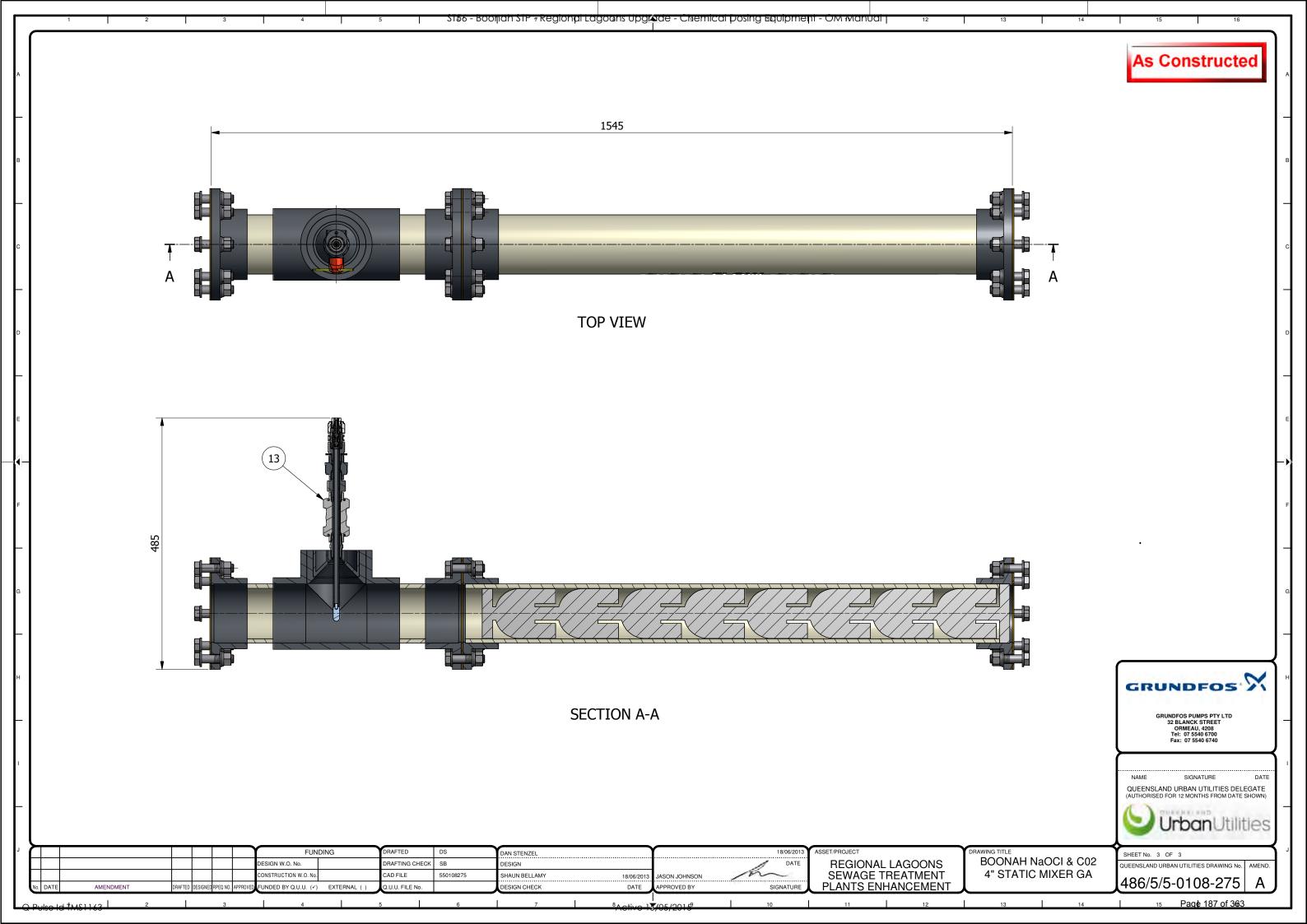


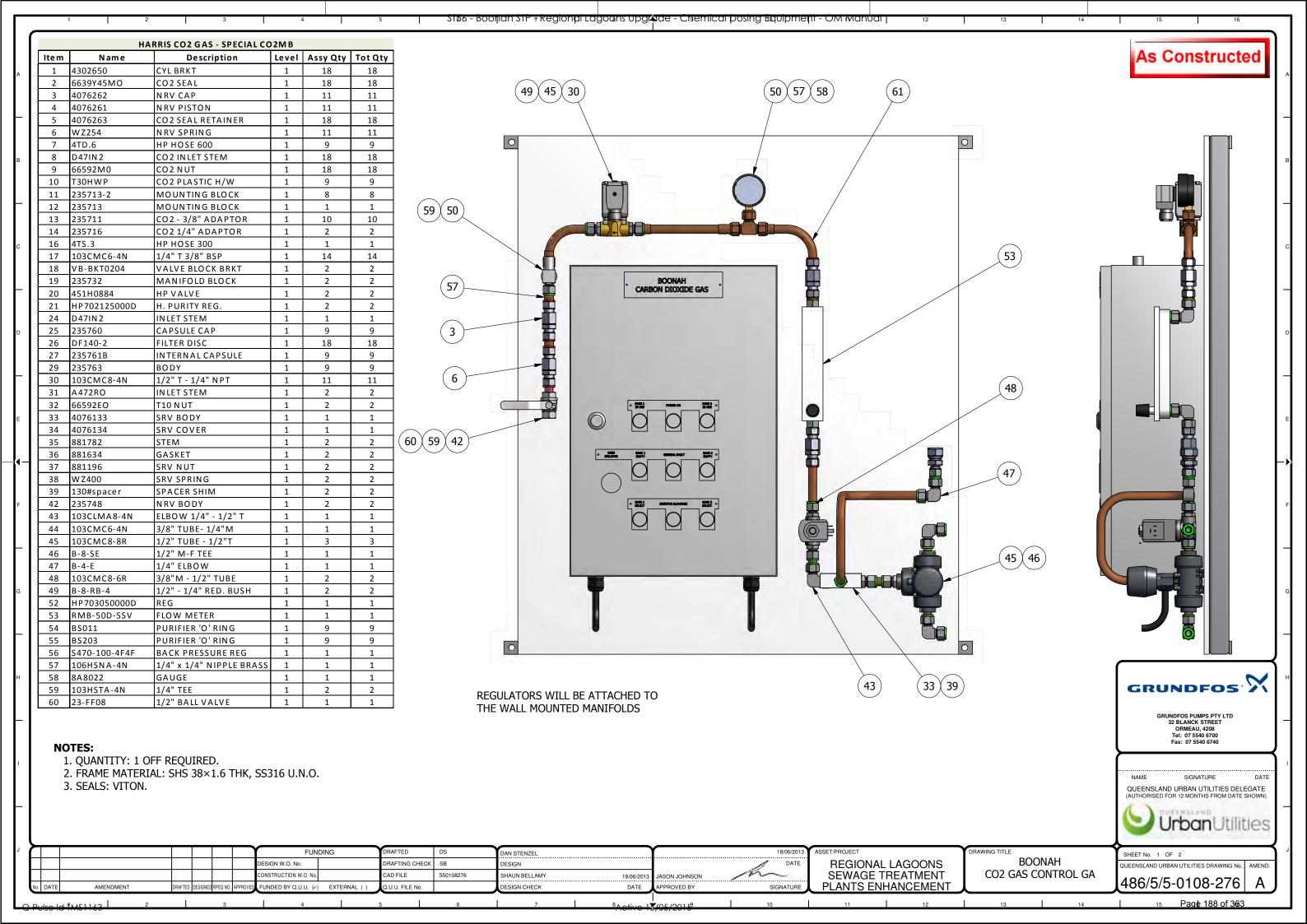


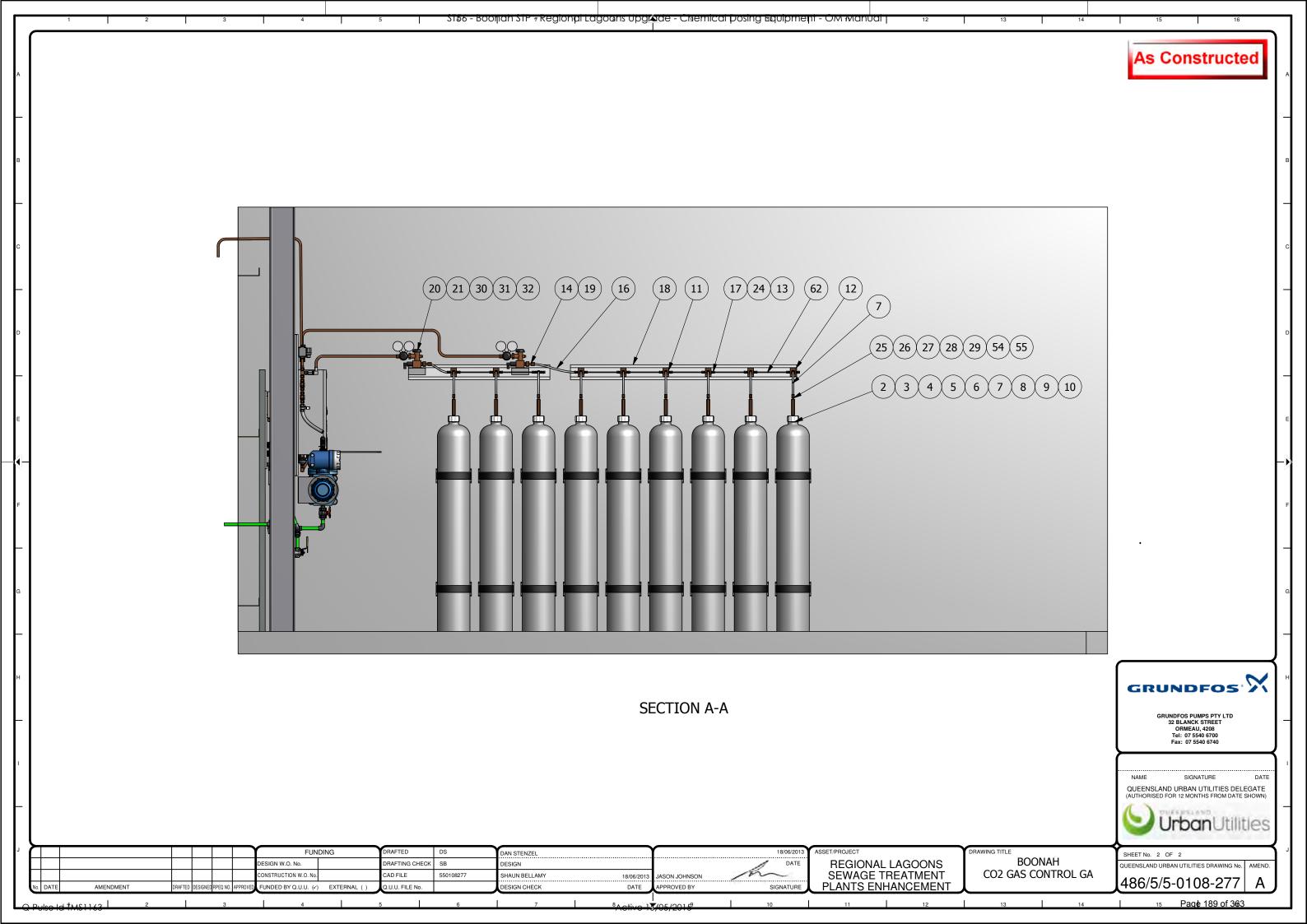


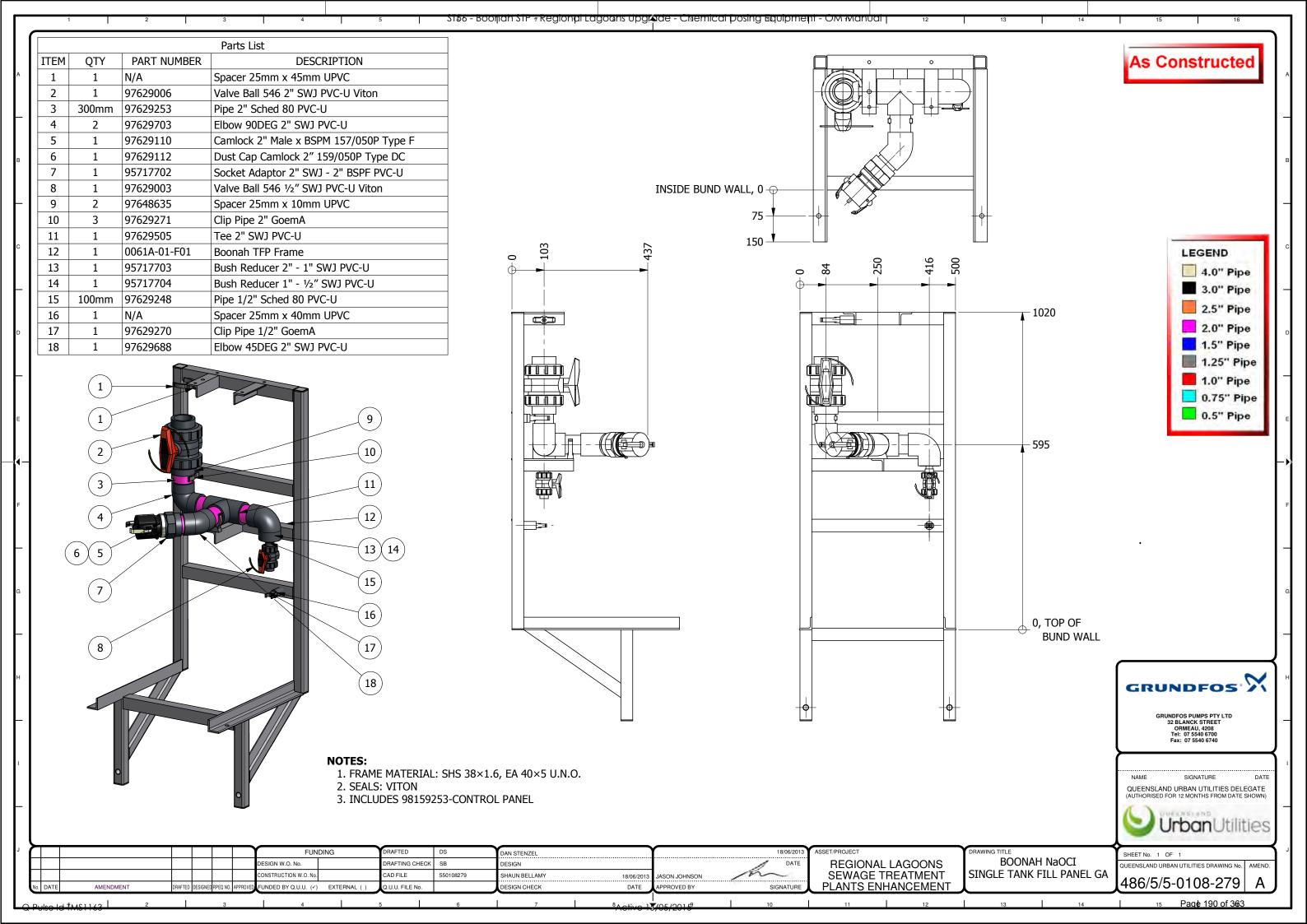


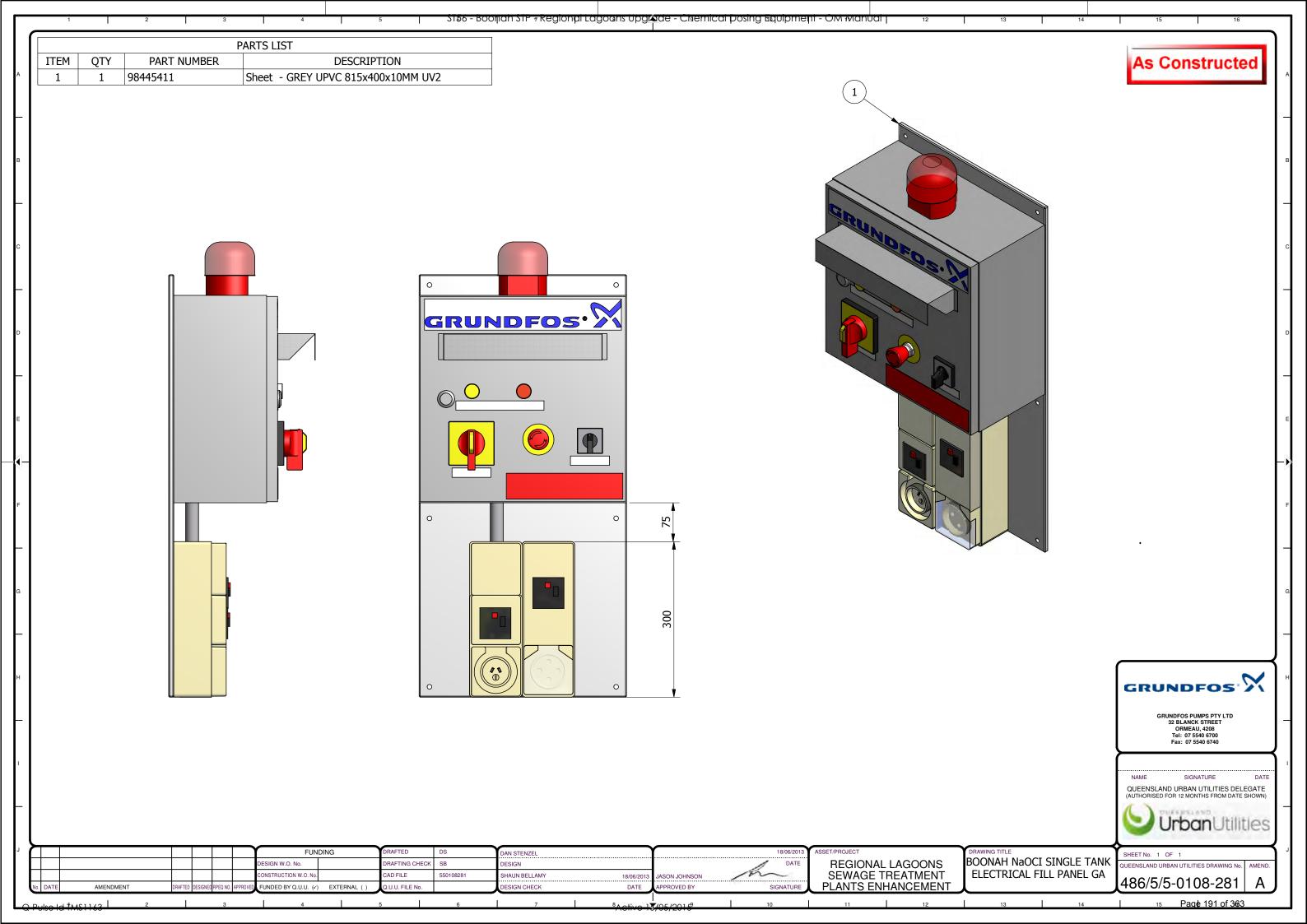


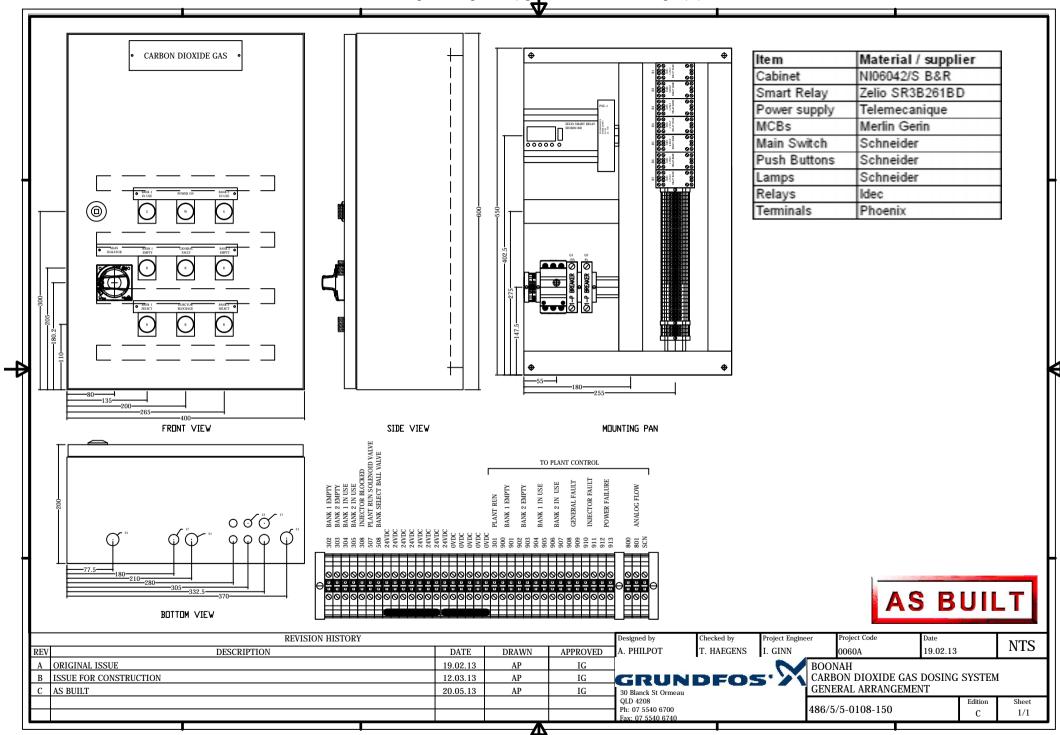


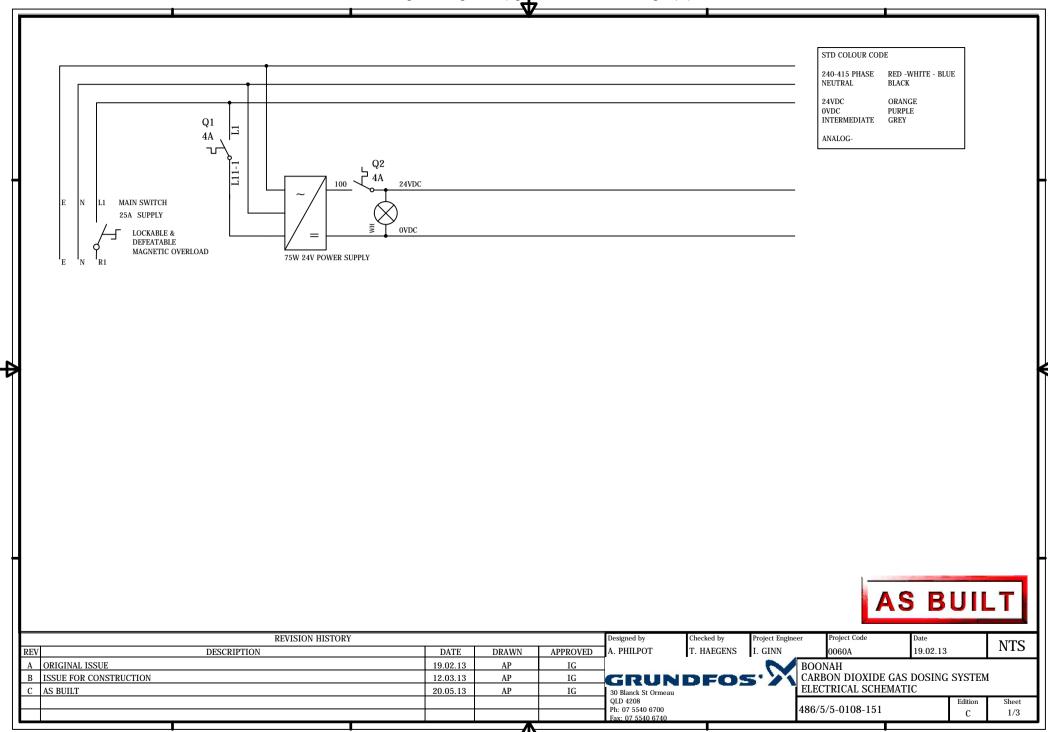


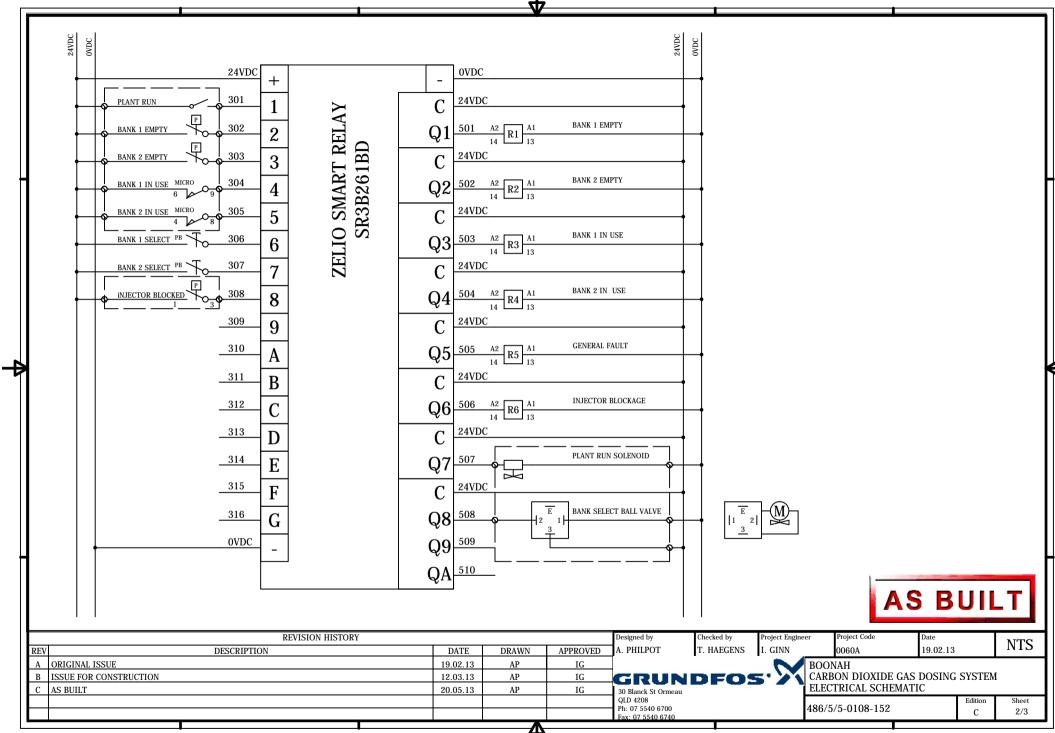


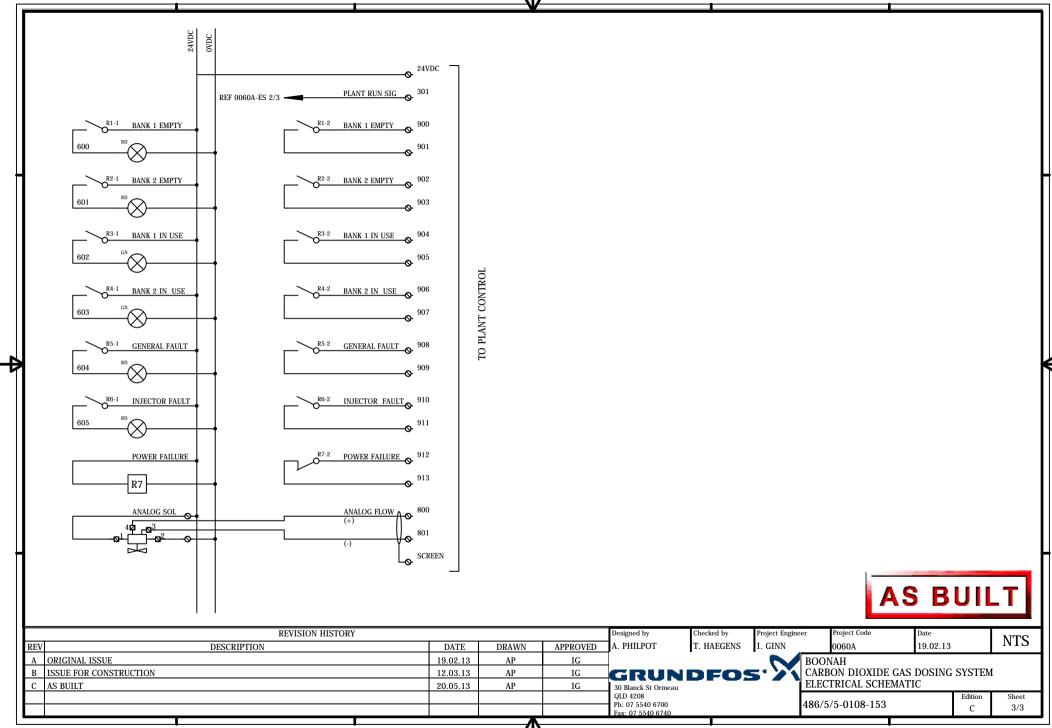


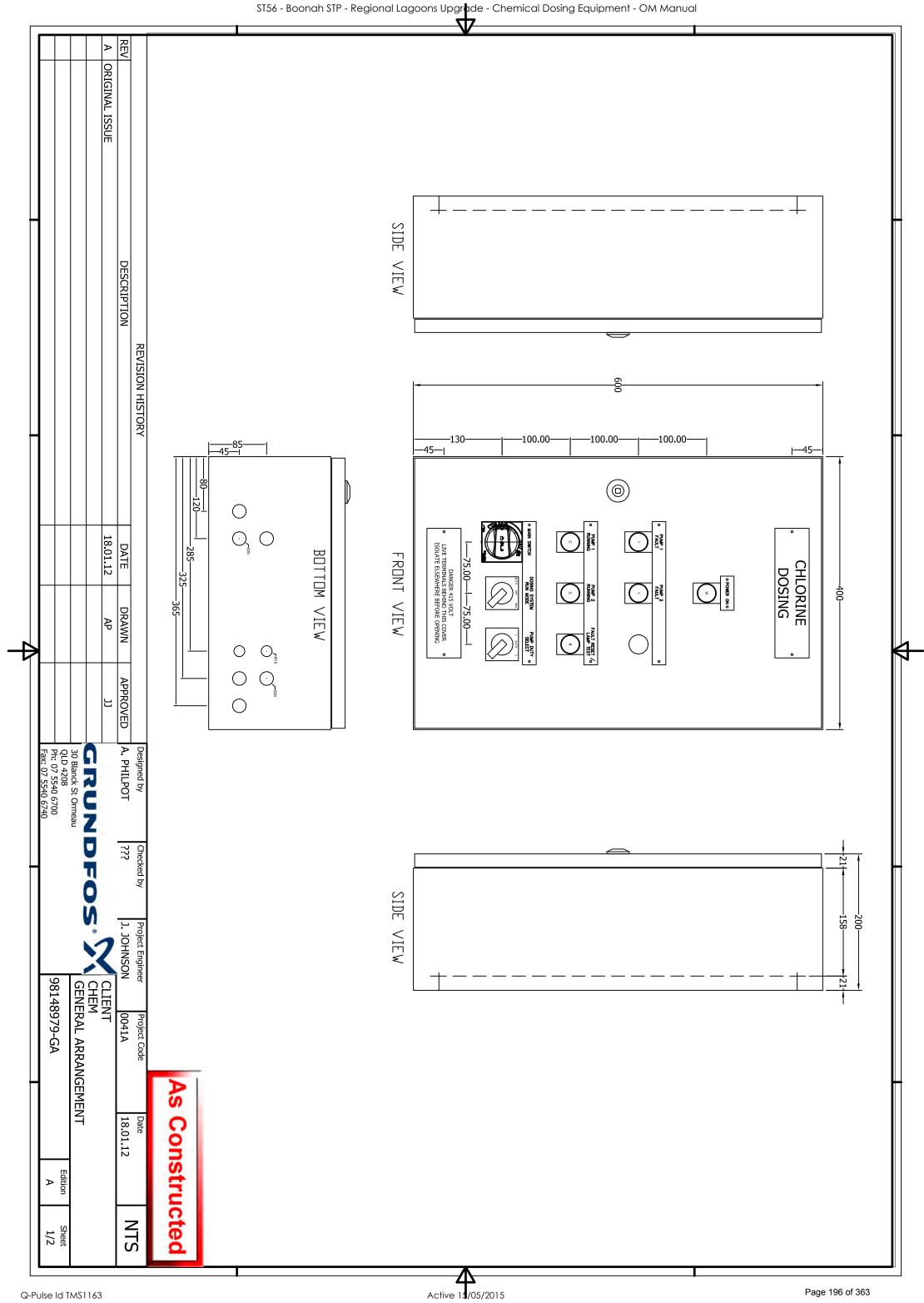


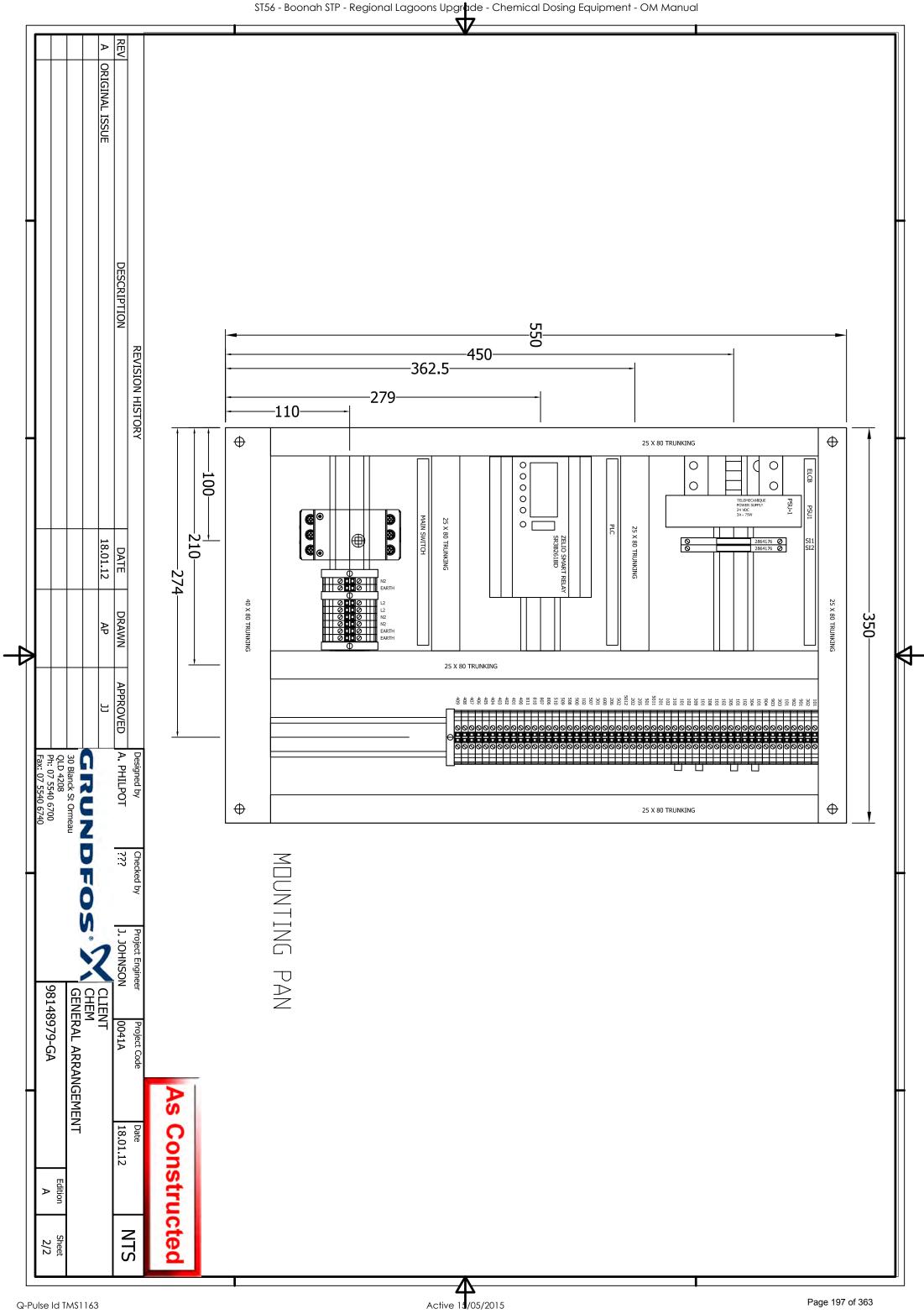


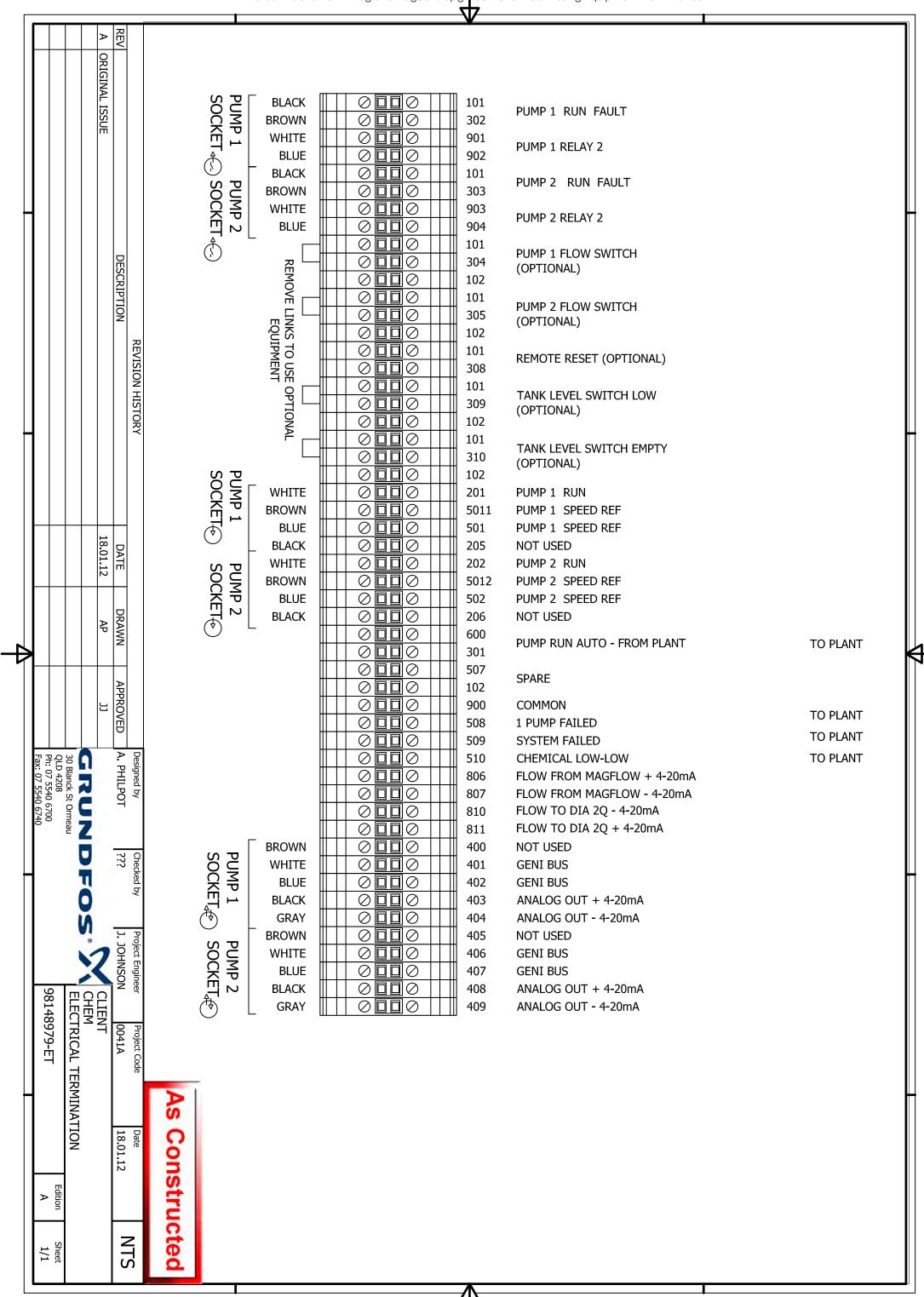


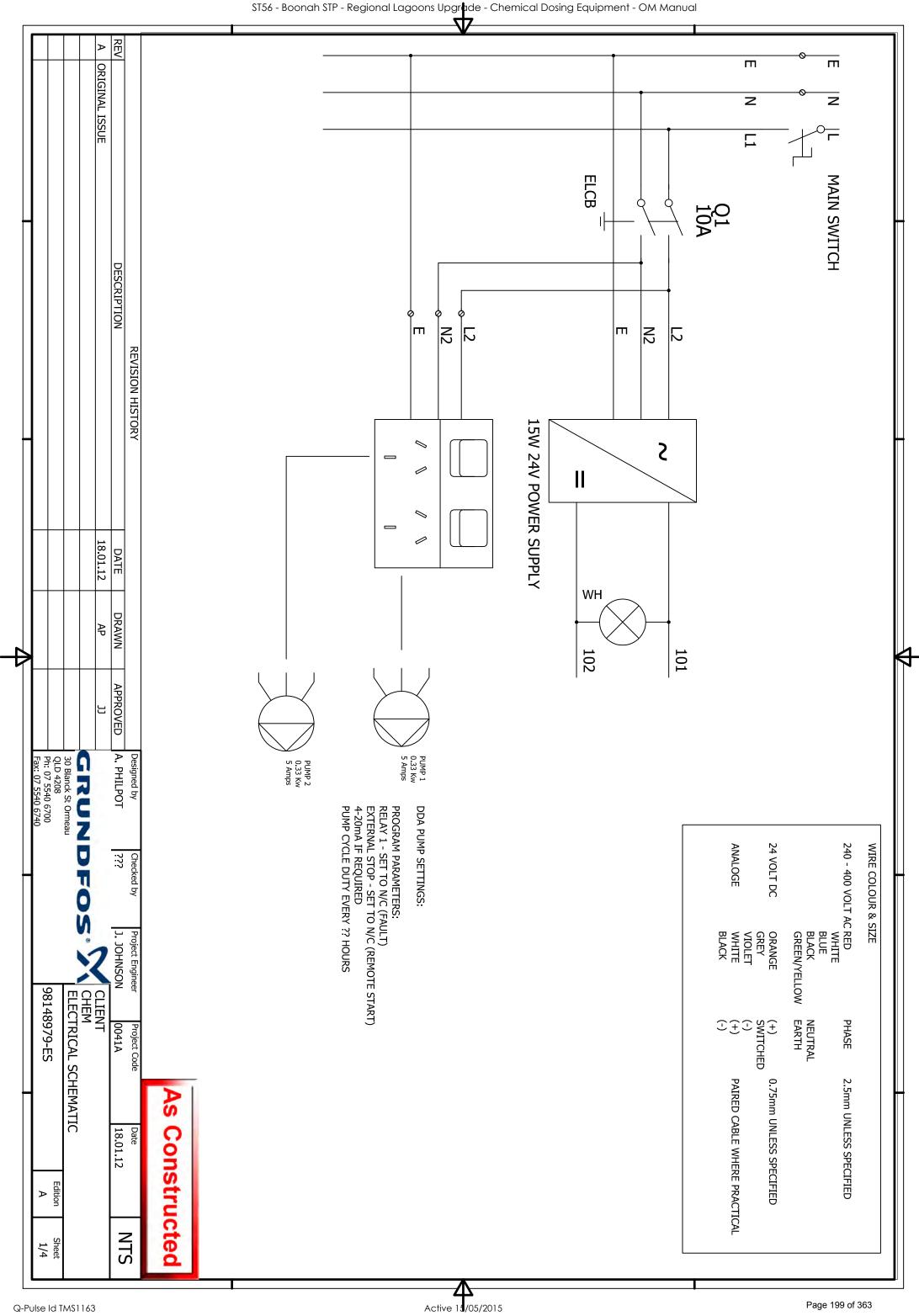


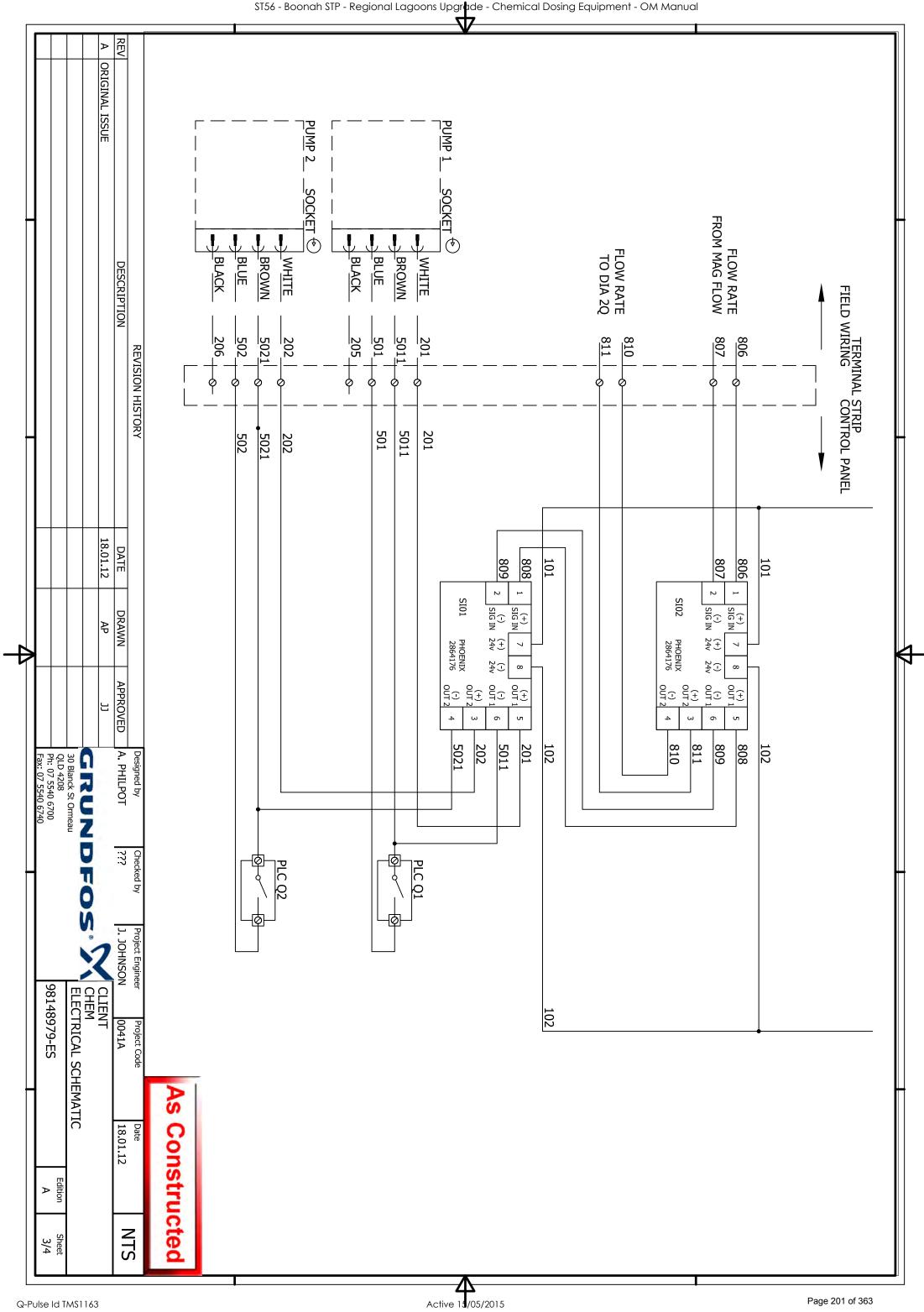


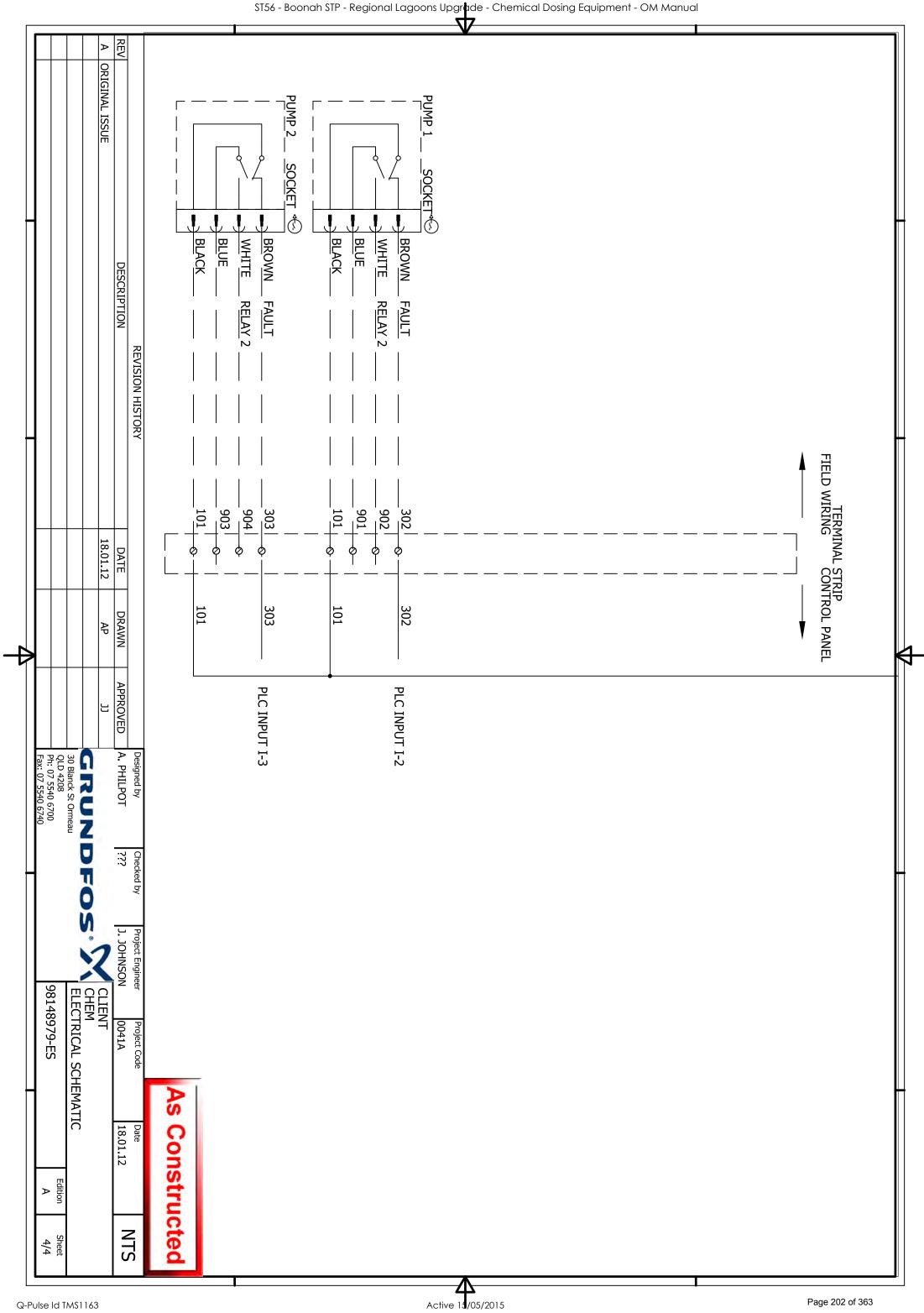


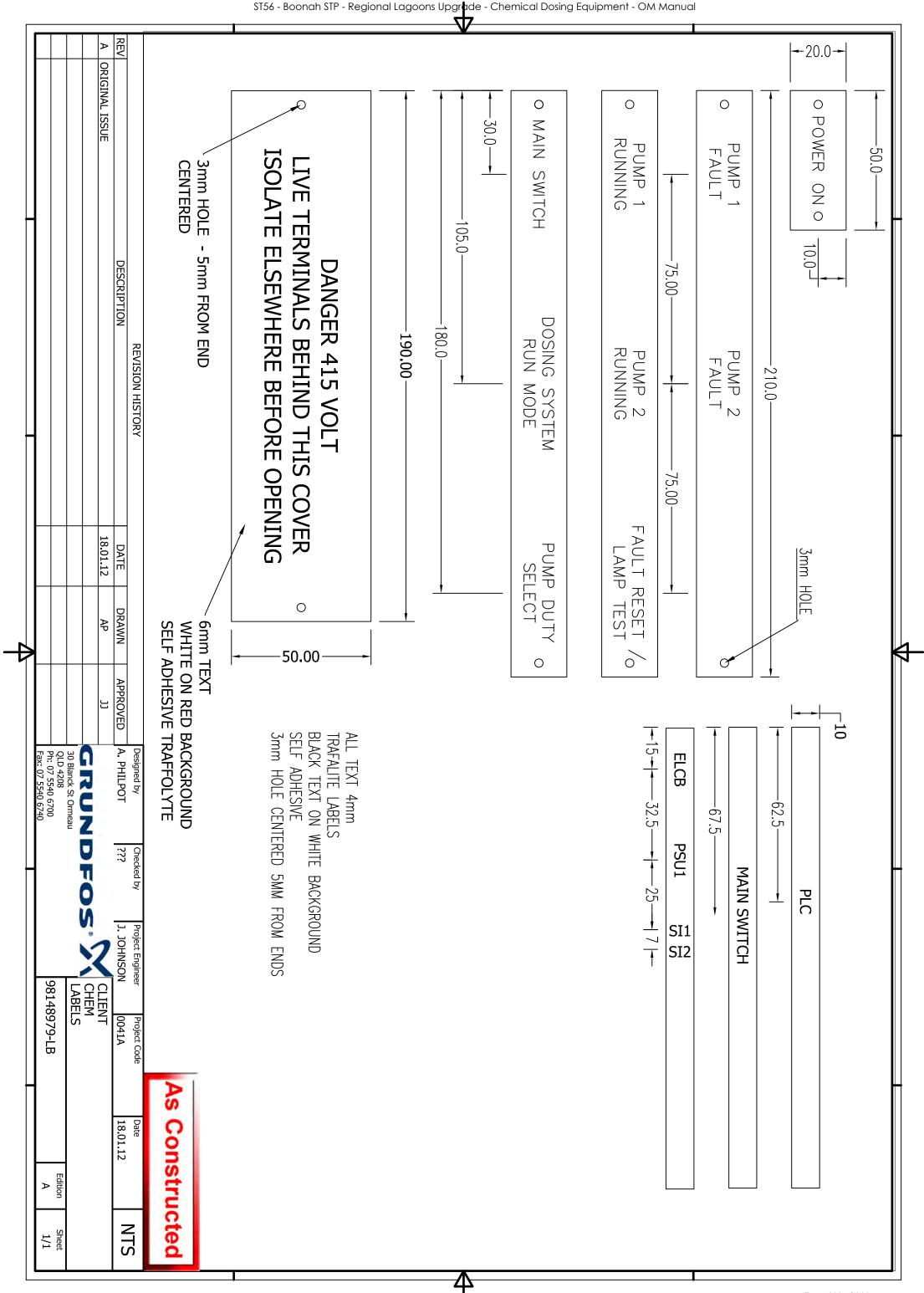


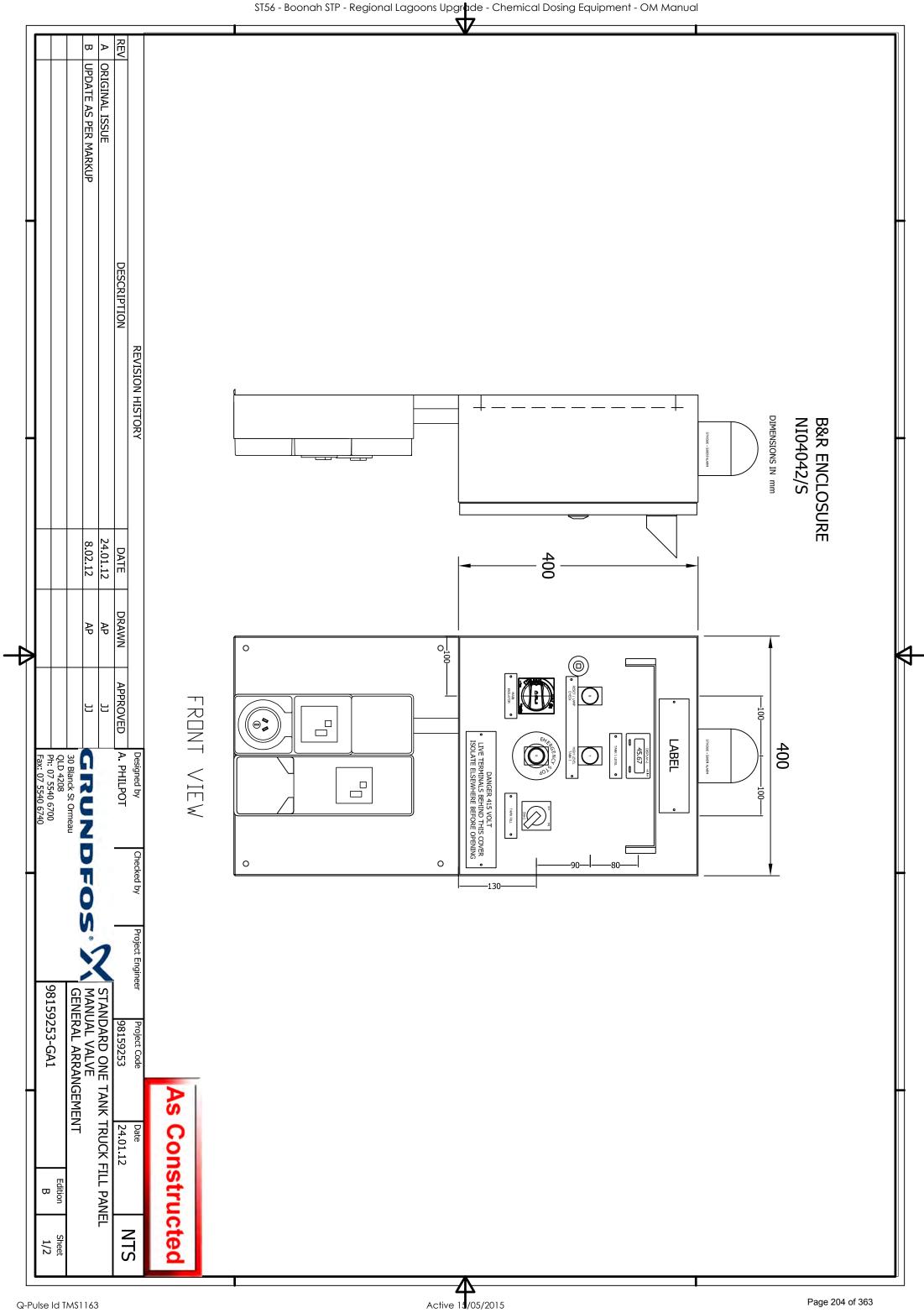




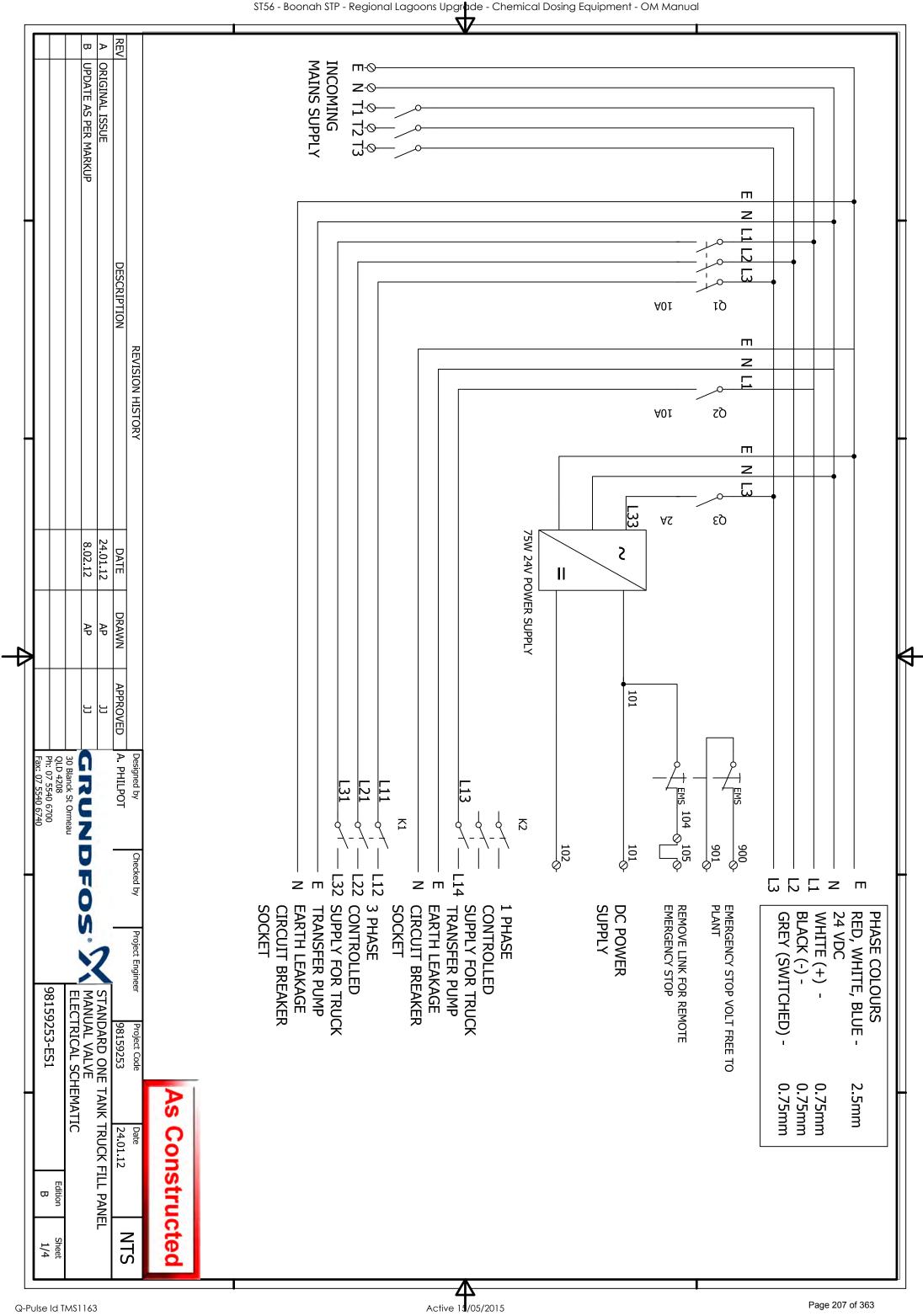


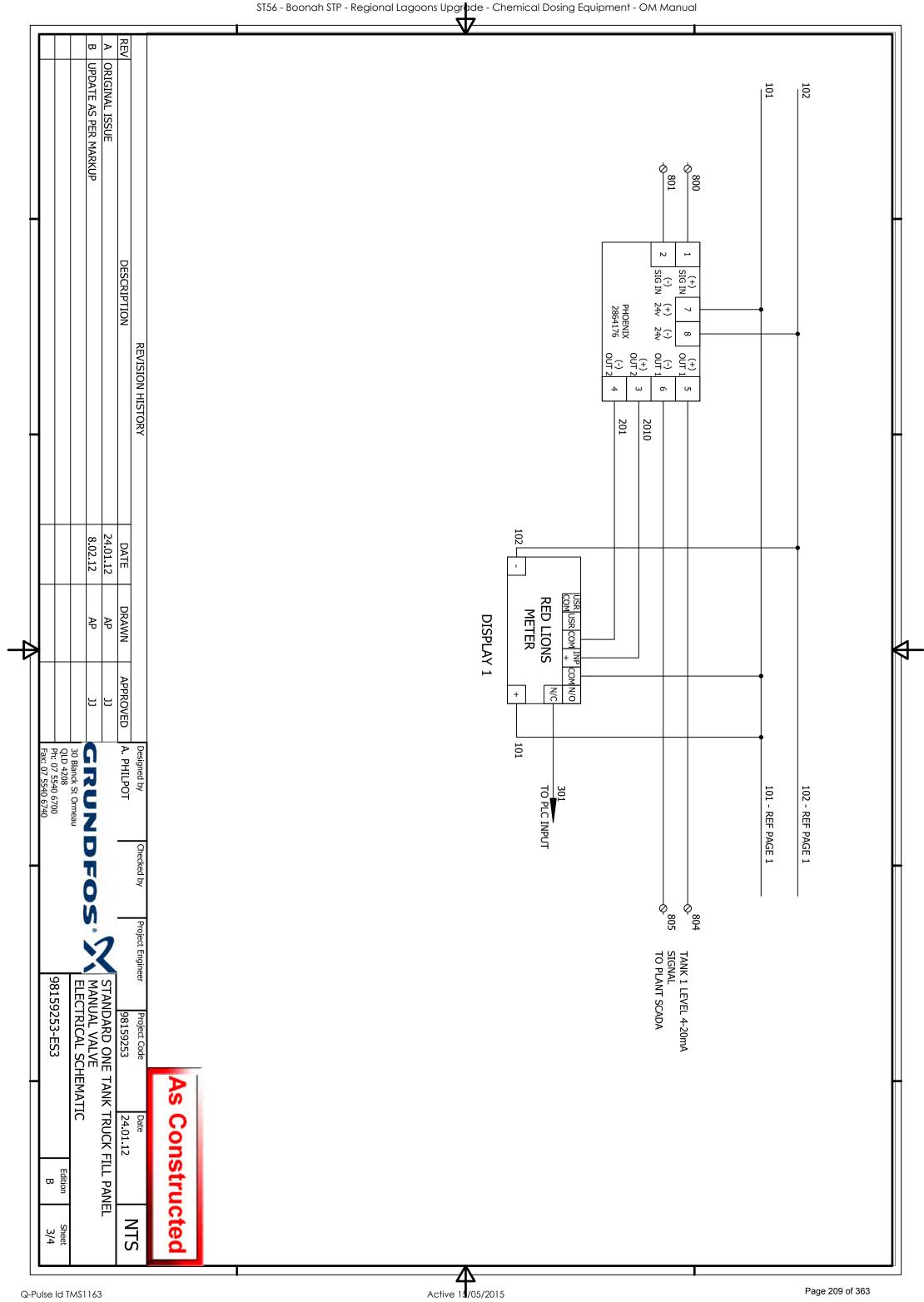


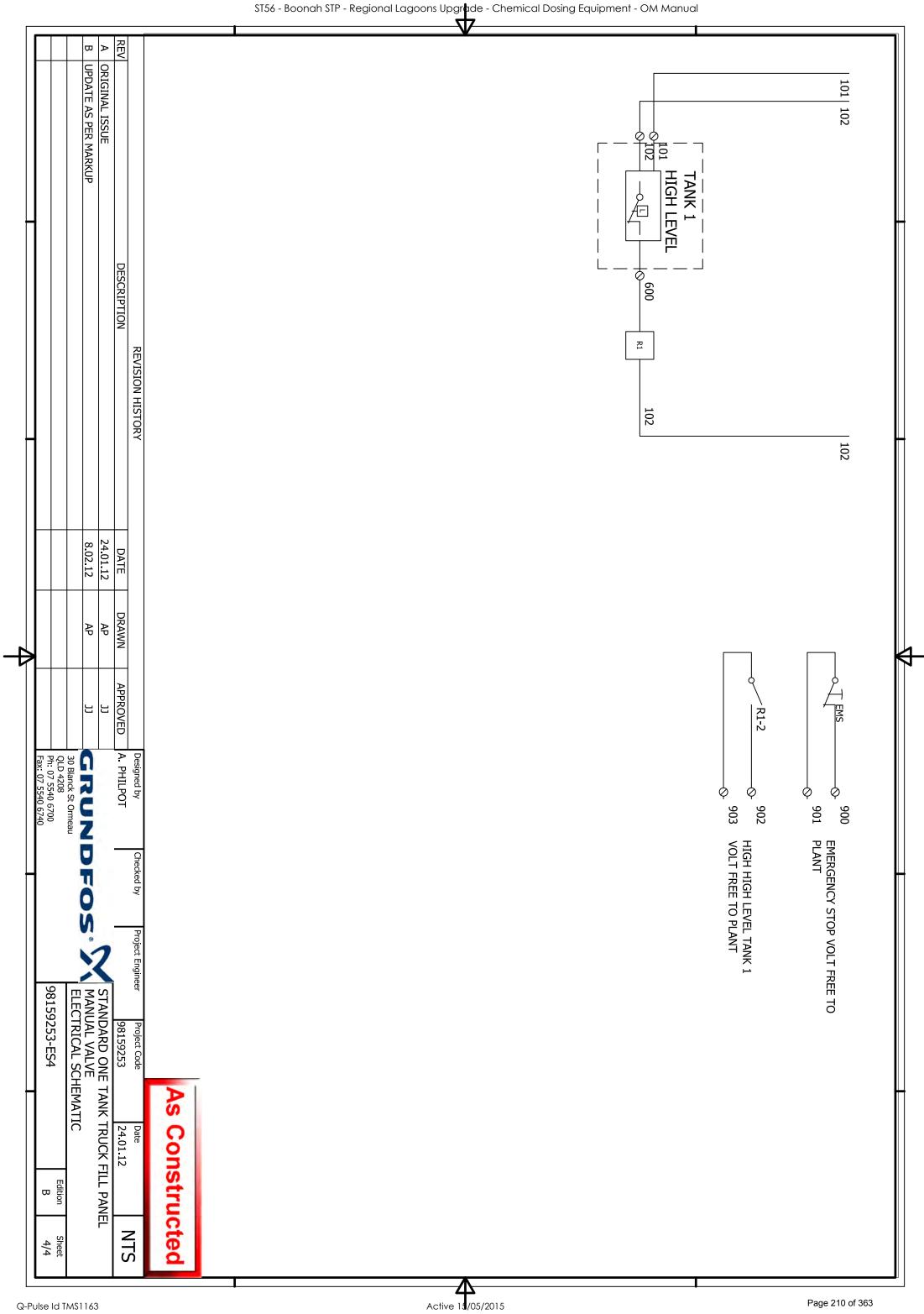


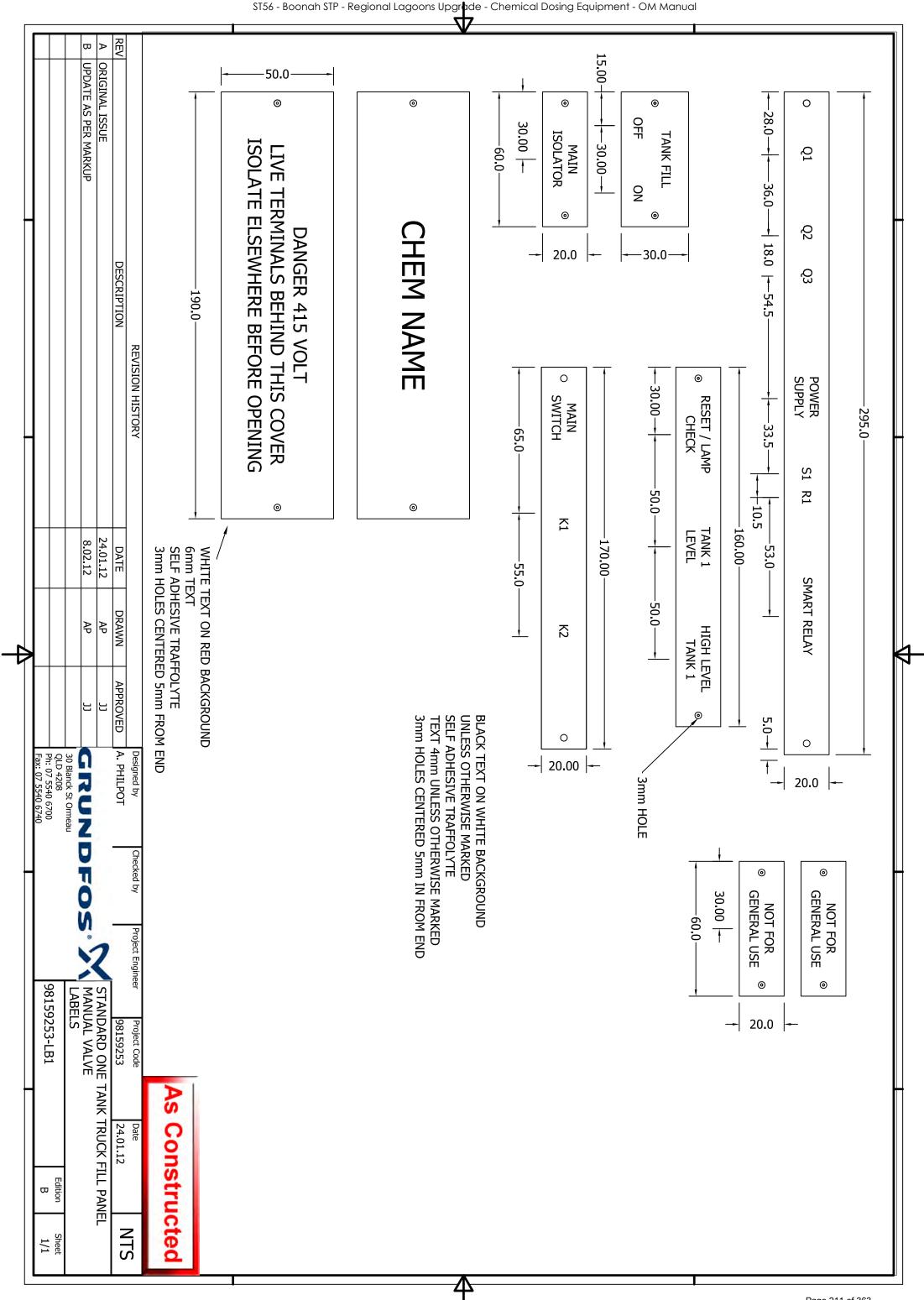


Sheet 1/1









Documents

Lutz Pump Data

Linked Documents







Pressure Switches

Linked Documents



Kelco Flow Switch

Linked Documents



pH Electrode

Linked Documents



Conex DIA 2Q Instrument Amplifier and Controller

Ther DIA 2Q controller is used to regulate the flow of CO2 gas to correct the pH of the Filtrate Water prior to the injection of Sodium Hypochlorite downstream.

Linked Documents



Sodium Hypochlorite Dosing Skid Manual

Grundfos Standard Manual for DSS Dosing Skid

Linked Documents



Sodium Hypochlorite Dosing Skid Trouble Shooting Flow Chart

Sodium Hypochlorite Dosing Skid Trouble Shooting Flow Chart

Linked Documents



CO2 Troubleshooting Flow Chart

CO2 Troubleshooting Flow Chart

Linked Documents



pH Preamplifier Signal Booster

The PHAMP-1 is a unity gain

preamplifier which convert the high

impedance mV signal of a pH or ORP

Regional Lagoons Manuals > ST56 Boonah STP > Chemical dosing equipment

electrode to a low impedance signal

Linked Documents



Burkert Valves & Controller

Linked Documents

DS2656-Ball-SS-Electric-3way-AU-EN (2).pdf

DS6027-2-way-Comp.-EU-EN.pdf

DS6027-2-way-Comp.-EU-EN.pdf

DS2875-Standard-EU-EN.pdf

Lutz®
The Fluid Managers

Safety

Economy

Diversity

Environment



Dear Reader

For many years Lutz has enjoyed the satisfaction of providing our worldwide customers with products which have given years of service in many diverse industries and markets.

As we cater responsibly for your many needs we would like to state clearly our mission, which is to consistently provide you with products which not only meet your specific requirements, but which are safe, reliable and cost-effective.

In this brochure you will find our range of accessories available. These articles will complete your pump to a perfect filling system.

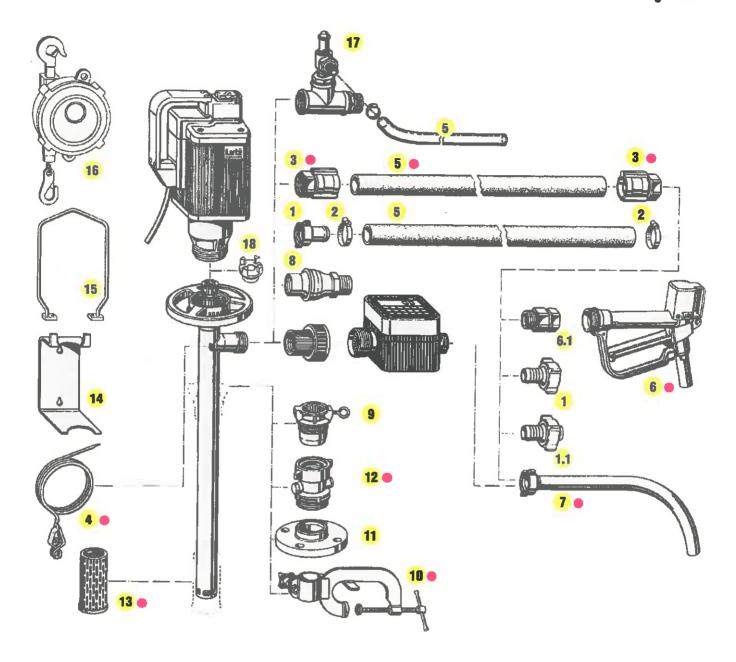
We would like to thank all of our existing customers for their loyalty and trust in us which has given us a position of leadership, and those of you who would benefit from our products in the future.

Jürgen Lutz



Accessories Lutz Drum and Container Pumps

At a glance



1		Hose connection
1.1		Hose connection, rotating
2		Hose clips
3	•	Hose connector (Ex)
4	•	Equipotential bonding cable
5	•	Hose
6	•	Nozzle

6.1	Rotating joint / Swivel joint
7	Discharge spout
8	Check valve
9	Drum adapter
10 0	Clamping device
11	Installation flange
12 •	EMIGA

13	Foot strainer
14	Wall bracket
15	Lifting device
16	Hoist
17	Bypass valve (B70)
18	Coupling part, motor side (B70)

Sultable for transferring combustible and easy inflammable liquids (e. g. ethanol, petrol) or in explosive hazardous area.

Hose connections

roductdetail	Specification			Order-No.
	1 Hose connection		9	
	Hose connector with wing nut for connecting the hoses to the pump tube or nozzle.			ozzle.
	Connection thread:	G 1 1/4		
	Material:	Nominal diameter:		
are con-	PP	DN 13 (1/2")		0204-409
	PP	DN 19 (3/4")		0204-410
	PP	DN 25 (1")		0204-411
	PP	DN 32 (1 1/4*)		0204-412
		DN 19 (3/4")		0204-419
	PP grey	N 19 (3/4)		0207 713
	PVDF	DN 19 (3/4")		0204-421
	PVDF	DN 25 (1")		0204-422
	PVDF	DN 32 (1 1/4")		0204-423
				0204-403
	Alu	DN 19 (3/4")		0204-403 0204-404
	Alu	DN 25 (1")		
	Alu	DN 32 (1 1/4°)		0204-405
	Stainless steel	DN 19 (3/4")		0204-400
	Stainless steel	DN 25 (1")		0204-401
	Stainless steel	DN 32 (1 1/4")		0204-402
		·		2024 427
	HC	DN 25 (1")		0204-407
	Hose connection for			0001 100
	Alu	DN 32 (1 1/4")		0204-420
	Stainless steel	DN 25 (1")		0204-416
	Stainless steel	DN 32 (1 1/4")		0204-417
	Stainless steel	DN 38 (1 1/2")		0204-418
	Hose connection for	Lutz R2 Vario		
			0202 044 . 02	43-398 + 0314-231
	PP Stainless staal	DN 19 (3/4")	••••	02-539 + 0313-009
	Stainless steel	DN 19 (3/4")	U3U2-U30 + U1	UZ-303 + 03 13-005
ri.	1.1 Hose connection rot			
	Hose connector with wi Connection: Inner threa		the hoses to the PP and PVDF	nozzie.
	Material:	Nominal diameter:		
	PP	DN 19 (3/4")	Seal FPM/Viton®	0204-424
	PP	DN 25 (1")	Seal FPM/Viton®	0204-434
	PP	DN 32 (1 1/4")	Seal FPM/Viton®	0204-367
	PP	DN 19 (3/4")	Seal FEP/Viton®	0204-430
	PP	DN 25 (1")	Seal FEP/Viton®	0204-431
	PP	DN 19 (3/4")	Seal EPDM	0204-432
	PP	DN 25 (1")	Seai EPDM	0204-433
				DO04 405
	PVDF	DN 19 (3/4")	Seal FPM/Viton®	0204-435
	PVDF	DN 25 (1")	Seal FPM/Viton®	0204-425
	PVDF	DN 32 (1 1/4°)	Seal FPM/Viton®	0204-368
		DD	G 1 1/4"	0204-353*
	0			
	Connecting sleeve	PP PVDF	G 1 1/4"	0204-354*

Suitable for transferring combustible and easy inflammable liquids (e. g. einenol, periol), or in explosive horsefocts sing.
 Vitor* and Kears* are registered independs of DuPont Dev Electromers.

Hose clips, Ex-hose connections, Equipotential bonding cable

Specification

Order-No.

Productdetail

2 Hose clips

Stainless steel hose clips to fix hoses of various nominal bore at the hose connection.

Nominal diameter:

DN 19 (3/4") DN 25 (1")

0301-400 0301-401

Hose clips for B70

DN 32 - 38 (1 1/4" - 1 1/2") DN 50 (2")

0302-402 0302-403

Hose clips for Lutz B2 Vario DN 19 (3/4")

0301-257

Hose connector (ex) for hazardous liquids

The use of conductive hoses is obligatory in explosion hazard areas. The ohmic resistance between the armatures must be less than 10° ohm. The hose connection must ensure a highly conductive transition between hose and pump tube.



Brass

For hose DN 19 (3/4")	inner thread G 1 (EN 12 115)
For hose DN 19 (3/4")	inner thread G 1 1/4 (EN 12 115)
For hose DN 25 (1°)	inner thread G 1 (EN 12 115)
For hose DN 25 (1")	outer thread G 1 (EN 12 115)
For hose DN 25 (1")	inner thread G 1 1/4 (EN 12 115)
For hose DN 32 (1 1/4")	outer thread G 1 1/4 (EN 12 115)
For hose DN 32 (1 1/4")	inner thread G 1 1/4 (EN 12 115)

0302-073 0302-106

0302-011 0302-010 0302-012 0302-093

0302-107

Stainless steel (1.4571)

For hose DN 19 (3/4")	inner thread G 1 (EN 12 115)	0302-108
For hose DN 19 (3/4")	inner thread G 1 1/4 (EN 12 115)	0302-109
For hose DN 25 (1")	inner thread G 1 (EN 12 115)	0302-014
For hose DN 25 (1")	outer thread G 1 (EN 12 115)	0302-013
For hose DN 25 (1")	inner thread G 1 1/4 (EN 12 115)	0302-015
For hose DN 32 (1 1/4")	outer thread G 1 1/4 (EN 12 115)	0302-094
For hose DN 32 (1 1/4")	inner thread G 1 1/4 (EN 12 115)	0302-11 0

Hose connector (Ex) for B70

Brass

For hose DN 32 (1 1/4")	inner thread G 1 1/2 (EN 12 115)	0302-090 🌑
For hose DN 38 (1 1/2")	inner thread G 1 1/2 (EN 12 115)	0302-091
For hose DN 50 (2")	inner thread G 2 (EN 12 115)	5000-100 🔴

Stainless steel (1.4571)

For hose DN 32 (1 1/4")	inner thread G 1 1/2 (EN 12 115)	0302-096
For hose DN 38 (1 1/2")	inner thread G 1 1/2 (EN 12 115)	0302-092
For hose DN 50 (2")	inner thread G 2 (EN 12 115)	5000-101

4 Equipotential bonding cable

Serves to create electrically conductive connection between explosion proof pump and container as earthing and equipontential bonding function.

2 m long with fastening clip

0204-994

 Suitable for transferring combustible and easy inflammable liquids (e.g. ethanol, penel) or in explosive hazardous easy. Wittin® and Kairez® are registered Trademarks of DuPort Dow Esistement

Hoses

o ductdetail 📗	Specification		Order-No.
	5 PVC-hose		
		O haas for aggressive, pap flammable liquids	
	Fadric reinforced PV	C hose for aggressive, non-flammable liquids.	
	Operating processres	max. 6 bar	
	Operating pressure: Temperature of medi		
	reminerature or mear	uni. O up to +oo C	
	Nominal diameter:	Weight:	
	DN 19 (3/4")	0.35 kg/m	0374-423
	DN 25 (1")	0.4 kg/m	0374-424
	DN 32 (1 1/4")	0.5 kg/m	0374-425
	DN 38 (1 1/2")	0.6 kg/m	0374-431
	composition. If corn remain with type Ω Mineral oil hose Colour coding: "yell Hose for mineral oil Inner rubber NBR (a Type Ω smaller 10s Operating pressure: Temperature of med	onductivity is assured through the assigned matestly installed, resistance during the entire life of smaller 10° ohm and with type M smaller 10° ohm. low". products of all kinds up to 50 % aromatics and intistatic) and outer rubber chloroprene (CR). ohm (to EN 12115) max. 10 bar ium: -35 up to +60 °C Weight:	the hoses will m (to EN 12115). m ethanol content.
	DN 19 (3/4")	0.6 kg/m	0374-411 🛑
	DN 25 (1")	0.8 kg/m	0374-412
	DN 32 (1 1/4")	1.0 kg/m	0374-413
	DN 38 (1 1/2")	1.2 kg/m	0374-414
	5 Solvent hose		
	Inner rubber of spe	ue". wide range of commercial solvents. cial coating (not conductive) and outer rubber of ohm (to EN 12115)	chloroprene (CR).
	Operating pressure		
	Temperature of med	dium: -35 up to +60 °C	
	Nominal diameter:	Weight:	
	DN 19 (3/4")	0.6 kg/m	0374-416
	DN 25 (1")	0.8 kg/m	0374-417
	DN 32 (1 1/4")	1.2 kg/m	0374-418
	DN 38 (1 1/2")	1.5 kg/m	0374-450

Suitable for transferring combustible and easy inflammable liquids (e. g. ethanol, petrol) or in explosive hazardous area. Viton® and Kalnez® are registered Trademarks of DuPont Dow Elastomers.

Hoses

Specification

Order-No.

Productdetail

1

5 Universal-chemical hose

Colour coding: "blue/white/blue".

Suitable for 95% of all customary industrial chemicals such as almost all acids and alkalis, mineral oil products and solvents of all kinds. Internal finish: Smooth special lining of ultra high molecular polyethylene (U-PE) and white intermediate safety layer. External finish: Electrically conductive EPDM. Intermediate layers: Textile mesh in tinplated copper fibres and tin-plated steel wire filament. If correctly installed, resistance during the entire life of the hose will remain under 10^6 ohm. Type Ω smaller 10^6 Ohm (to EN 12115).

Operating pressure: max. 10 bar
Temperature of medium: -30 up to +100 °C

Nominal diameter: Weight:
DN 19 (3/4") 0.8 kg/m
DN 25 (1") 0.9 kg/m
DN 32 (1 1/4") 1.2 kg/m
DN 38 (1 1/2") 1.5 kg/m

0374-420 • 0374-419 • 0374-421 •

0374-453

5 Special chemical hose

Colour coding: "blue/white/red".

Suitable for all chemical and mineral oil products as well as solvents. Ideal also for food and consumable products. Internal finish: White fluorpolymere, smooth, glossy finish non-leaching, non-dyeing, non-hardening (in conformity with FDA demands). External finish: Chloroprene (CR) (electrically conductive).

Type M smaller 1020hm (to EN 12115).

Operating pressure: max. 16 bar
Temperature of medium: -30 up to +100 °C

Nominal diameter: Weight:
DN 19 (3/4") 0.65 kg/m
DN 25 (1") 0.9 kg/m
DN 32 (1 1/4") 1.1 kg/m
DN 38 (1 1/2") 1.3 kg/m
DN 50 (2") 2.1 kg/m

0374-428 • 0374-429 • 0374-430 • 0374-455 •

0374-456

5 Hose for foodstuffs

Colour coding: "white". Suitable for all foodstuffs and luxury food, milk, oils, fats, molasses and syrup. Internal finish: NBR white, not electrically conductive, outside: chloroprene (CR), black (electrically conductive).

Operating pressure: max. 10 bar
Temperature of medium: -25 up to +90 °C

Nominal diameter: Weight: DN 25 (1") 0.8 kg/m DN 32 (1 1/4") 1.0 kg/m

0374-459 **•** 0374-460 **•**

5 Lutz B2 Vario set-accessories

Comprises of:

Lutz nozzle, 1.5 mtr. PVC-hose 3/4", hose connection, hose clips, wall bracket

For Pumps Lutz B2 Vario PP-SL ø 32

0201-550



Saltische Schriebertring combustible and easy inflammable liquids (e. g. inflamm, paint) or in expressive frazioners lives.

Vitoria and Karresa are registered. Trademarks of DuPont Dow Electroners.

Nozzles

Productdetail

Specification

Order-No.



6 PP nozzle

For filling and transferring neutral and aggressive liquids.

With hoop guard and two outlet spouts ø 23 mm (cylindrical) and ø 12 mm (conical).

Polypropylene (PP) housing and valve tappet.

Operating pressure:

max, 3 bar at 20 °C

Viscosity:

max, 760 mPas

Flow rate:

max. 50 I/min. (water)

Temperature of medium: max. 50 °C

Weight.

approx. 0.25 kg

Connection:

outer thread G 1 1/4

Seal:

FPM (Viton®)

0204-380

EPDM

0204-385

FEP/Viton®

0204-387



6 PVDF nozzle

For filling and transferring neutral and aggressive liquids.

With hoop guard and two outlet spouts \(\varrho\$ 23 mm (cylindrical) and \(\varrho\$ 12 mm (conical).

Polyvinvlidenflucride (PVDF) housing and valve tappet. FPM (Viton®) seals.

Additional costs for seals Kalrez® or FEP/Viton® or EPDM.

Operating pressure:

max, 3 bar at 20 °C

Viscosity:

max. 760 mPas

Flow rate:

max. 50 i/min. (water)

Temperature of medium: max. 80 °C

Weight:

approx. 0.3 kg

outer thread G 1 1/4 Connection:

0204-390

The following seal material are available:

Seal:

add price seal Kalrez®

add price seal EPDM

add price seal FEP/Viton®

on request on request

on request

6 Stainless steel nozzle

Ideally suitable for filling and transferring liquids - also for combustible and easy inflammable liquids - in food and pharmaceutical industry.

Stainless steel (1.4571) housing and valve tappet.

With hoop guard and rotating joint. Additional costs for seals EPDM.

NEW: Nozzle in physiologically safe version (PU) available.

Operating pressure:

max, 3 bar

Viscosity:

max. 760 mPas max. 50 I/min. (water)

Flow rate: Temperature of medium: max. 80 °C

Weight:

approx. 1 kg

Connection:

outer thread G 1 1/4

Seal:

FPM (Viton®)

FEP/Viton®

0204-370 0204-377

The following seal material are available:

add price seal EPDM (PU)

on request

Suitable for transferring combustible and easy inflammable figules (e. g. ethanol, petrol) or in explosive hazardous area.

Viton® and Kalrez® are registered Trademarks of DuPont Dow Elastomers.

Nozzles

Specification

Order-No.

Productdetail

6 Brass nozzle

Brass housing and valve tappet, nickel-plated, PTFE seals.

With hoop guard and rotating joint. For filling and transferring solvents and

neutral liquids.

Operating pressure: Viscosity:

max. 4 bar max, 760 mPas

Flow rate:

max. 80 I/min. (water)

Temperature of medium: max. 80 °C Weight:

approx. 0.6 kg

Connection:

outer thread G 1 1/4

0372-502

6 Aluminium nozzle

For filling and transferring fuel and diesel oil. Aluminium housing and valve tappet, NBR seals. With hoop guard and rotating joint.

Operating pressure:

max. 4 bar

Viscosity:

max. 760 mPas

Flow rate: Temperature of medium: max. 60 °C

max. 60 I/min. (water)

Weight:

approx. 0.5 kg

Connection:

inner thread G 1

Seal:

NBR

0372-250

Connection thread: G1

Material:

Nominal diameter:

Brass **Brass**

DN 19 (3/4") OT

DN 25 (1") OT

0204-428 0204-429

Automatic aluminium nozzle

Automatic switch-off with ball-tilt safety release. Housing in aluminium, internal components in brass/Delrin. Swivel hose connection is possible.

Operating pressure:

max. 0.5 up to 4 bar

Viscosity:

max. 7 mPas

Flow rate:

max. 80 I/min. (water)

Weight:

Temperature of medium: max. 60 °C

Connection:

approx. 1.1 kg outer thread G 1

Seal:

PTFE

0372-245

Rotating joint

Rotating connection between hose connector and nozzle

in brass or stainless steel with FEP/Viton® seals.

on request 🛑



6 Lutz nozzie for Lutz B2 Vario

For filling and transferring neutral and aggressive liquids. The liquid stream can be regulated by a turnlock fastener. Outlet spout ø 12 mm (conical). Polypropylene (PP) housing, FPM (Viton®) seals.

Operating pressure:

max. 1 bar at 20 °C

Viscosity:

max, 300 mPas

Flow rate:

max. 40 I/min. (water)

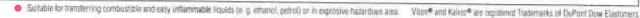
Temperature of medium: max. 50 °C Weight:

approx. 0.1 kg

Connection:

hose liner DN 19 (3/4")

0201-215



Discharge spouts, Check valves, Drum adapters, Clamping devices

Spec	ification			Order-No.
7 Disch	arge spout			
Servir	ng to transfer an	d fill liquids directly in	to other vessels. They are available	
in PP,	alu and stainles	s steel and are threade	ed onto the pump outlet connection.	
	ial:			
-				0204-200
				0204-373
SS		DN 25 (1")	G 1 1/4	0204-225
Disc	narge spout fo			0004.074
Alu		, ,		0204-374 0204-226 •
SS		DN 25 (1")	G 1 1/2	UZU4-ZZO •
				stops.
			•	0372-017
			·	0372-050
				0204-516
Stalli	1699 21961			0201010
PVC		Inner thread G 1	1/4/Outer thread G 1 1/4	0204-517
1 40		Seal EPDM (pref	erred for horizontal fitting)	
O Danie	n adoptor in E	OD.		
	•		ameters	
For f	i auapier iui cui ivina the numn	in the drum opening. F	entitions. Prevents the drum nump falling over	
			Totolito illo arain panip ianing area	0208-007
	' -			
	-		th enlarged pump foot.	
For i	ixina the pump	in the drum opening. F	Prevents the drum pump falling over	
				0204-215
Dru	m adapter in s	steel, galvanized fo	r mixing pumpt tube (MP)	
For	fixing the pump	in the drum opening. I	Prevents the drum pump falling over	•
in th	e empty drum.	Thread G 2. For mixing	pump tube PP	0208-013
	-			
Sepa	arable drum ada	pter for pump tubes w	th enlarged pump foot.	
For	For fixing the pump in the drum opening. Prevents the eccentric screw pump			0204-169
	•		anu IVI 04 x 4.	UZU4-103
	•			
For	fixing the pump	Lutz B2 Vario in the d	rum or container opening.	
		for pump type:		0004 000
				0204-328
				0208-009 0208-010
-				0208-010
				0208-028
, C 04	£ 111111	11 000		
10 Clamping device				
				0205-040
	pump tubes PP B70	, EVDE, A!U, 55 8110 FI		0205-052
	7 Disch Servir in PP, Mater PP Alu SS Discl Alu SS Chec The co Mater Stain PVC 9 Drur Drun For f in the Dru Sepa For f in th Dru For f in th Cla To f Suit	in PP, alu and stainles Material: PP Alu SS Discharge spout for Alu SS Check valve The check valve prevent Material: Stainless steel Stainless steel Stainless steel Stainless steel PVC Drum adapter in F Drum adapter for core for fixing the pump in the empty drum. The empty drum adapter St. Separable drum adapter St. Separable drum adapter for fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum. The empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling over in the empty drum adapter PP For fixing the pump falling ov	Serving to transfer and fill liquids directly in in PP, alu and stainless steel and are threade Material: Nominal diameter PP DN 19 (3/4") Alu DN 25 (1") SS DN 25 (1") Discharge spout for B70 Alu DN 25 (1") SS DN 25 (1") SS DN 25 (1") 8 Check valve The check valve prevents flow back from the Material: Nominal diamete Stainless steel Inner thread G 1 Stainless steel Inner thread G 1 Stainless steel Inner thread G 1 Seal PTFE (prefer PVC Inner thread G 1 Seal EPDM (prefer Inner thread G 2. Drum adapter in PP Drum adapter in ST 37 Separable drum adapter for pump tubes with For fixing the pump in the drum opening. Fin the empty drum. Thread G 2 and M 64 x Drum adapter in steel, galvanized for For fixing the pump in the drum opening. Fin the empty drum. Thread G 2. For mixing the pump in the drum opening. Fin the empty drum. Thread G 2. For mixing Drum adapter St 37 for B70 (Ø 52) Separable drum adapter for pump tubes with For fixing the pump in the drum opening. Fin the empty drum. Thread G 2. For mixing Drum adapter St 37 for B70 (Ø 52) Separable drum adapter for pump tubes with For fixing the pump in the drum opening. Fin the empty drum. Thread G 2. For mixing Drum adapter PP for Lutz B2 Vario For fixing the pump in the drum opening. Fin the empty drum. Thread G 2. For mixing Drum adapter PP for Lutz B2 Vario For fixing the pump Lutz B2 Vario For fixing the pump Lutz B2 Vario in the defense of pump tube: Ø 32 mm PP-DL 32 Ø 32 mm PP-DL 32	Serving to transfer and fill liquids directly into other vessels. They are available in PP, alu and stainless steel and are threaded onto the pump outlet connection. Material: Nominal diameter: Wing nut: PP DN 19 (3/4") G1 1/4 Alu DN 25 (1") G1 1/4 SS DN 25 (1") G1 1/4 SS DN 25 (1") G1 1/4 Discharge spout for B70 Alu DN 25 (1") G1 1/2 SS DN 25 (1") G1 1/2 SS DN 25 (1") G1 1/2 8 Check valve The check valve prevents flow back from the hose to the pump when the motors Material: Nominal diameter: Stainless steel Inner thread G1 1/4 Stainless steel Inner thread G1 1/4 Stainless steel Inner thread G1 1/4/Outer thread G1 1/4 Seal PTFE (preferred for horizontal fitting) PVC Inner thread G1 1/4/Outer thread G1 1/4 Seal FPDM (preferred for horizontal fitting) 9 Drum adapter in PP Drum adapter in PP Drum adapter for continuous pump tube diameters. For fixing the pump in the drum opening. Prevents the drum pump falling over in the empty drum. Thread G 2. Drum adapter in ST 37 Separable drum adapter for pump tubes with enlarged pump foot. For fixing the pump in the drum opening. Prevents the drum pump falling over in the empty drum. Thread G 2 and M 64 x 4. Drum adapter in steel, galvanized for mixing pumpt tube (MP) For fixing the pump in the drum opening. Prevents the drum pump falling over in the empty drum. Thread G 2. Drum adapter in steel, galvanized for mixing pumpt tube (MP) For fixing the pump in the drum opening. Prevents the drum pump falling over in the empty drum. Thread G 2. Drum adapter PF for Lutz B2 Vario For fixing the pump Lutz B2 Vario For gump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump tube: for pump type: g 32 mm PP-DL 32 BCS 70 x 6 BCS 70 x 6 BCS 70 x 6

Emission proof drum adapters

Specification 11 Installation flange

For fixing the drum and container pump according to DIN 2573 DN 50 PN 6 to a companion flange. The flange is welded onto the pump tube.

 Material:
 For pump tube:

 PP
 Ø 41 mm

 PVDF
 Ø 41 mm

 Alu
 Ø 41 mm

 SS
 Ø 41 mm

 HC
 Ø 42 mm



Productdetail

Installation flance

According to DIN 2576 DN 80 PN 10 For fixing the pump B70V to a companion flange. The flange is welded onto the pump tube.

In stainless steel (1.4571)

0170-310

0204-250

0204-252

0204-253

on request

Order-No.

0110-191

0122-001

0132-120

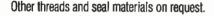
0151-622

0169-613



To prevent emission of dangerous gases when using a drum pump, so protecting the operator, the environment and the drive motor from hazardous, aggressive gases and vapours. Two venting valves ensure pressure compensation between inside of the drum and surrounding atmosphere.

Connection for gas displacement pipe: G 3/8; Screw-in thread: G 2 outer thread Seals: Viton® or EPDM.



Material: Pump tube diameter:
PP 41 mm
Brass 41 mm
Stainless steel 41 mm
PVDF 41 mm



Following special threads are available without additional costs

PP S 71 x 6 OT, S 70 X 6 OT, S 69 x 5.5 OT, S 57 x 4 OT

Stainless steel S 57 x 4 OT, S 60 x 5 IT, M 64 x 4 OT

Air valve for emptying of containers 0204-364



Emission proof drum adapter for B70

Material: Pump tube diameter:

 Stainless steel
 52 mm
 9204-254

Emission proof drum adapter for Lutz B2 Vario

Connection for gas displacement pipe: G 3/8, screw-in thread: G 2 outer thread, seals: Viton®

Material:

Pump type:

PP-SL 32

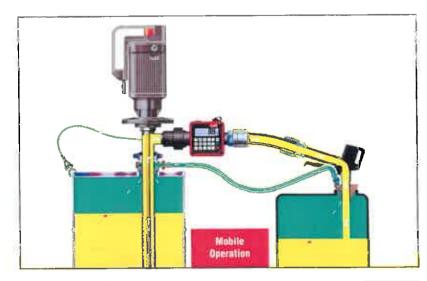
0204-251

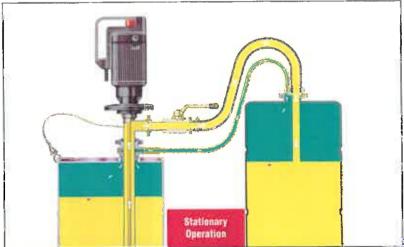
Container cap

DN 150 0373-060 DN 250 0373-061

Suitable for transferring condustrible and easy inflammable Goulds (e. g. ethanol, petrol) or in explosive hazardous area.
 Vitor® and Kalles® are registered Trademarks of DuPort Dow Elastonians.

EMIGA: Emission proof drum adapter with gas displacement system





Concern about air pollution has never been so widespread as it is today. Acting on its sense of environmental responsibility, Lutz has further developed its emission proof drum adapter as a complete gas displacement system. Harmful gases and vapours created when transporting hazardous media remain practically in a closed system while themselves ensuring the necessary pressure compensation.

- Prevents emissions of harmful gases and vapours when filling and emptying.
- Protects the operator as well as the environment from noxious, toxic and/or severely oxidising emissions.
- All advantages of the reliable Lutz-EMIGAsystem will be maintained.
- For flexible operation with nozzle or stationary operation by fixed union.
- A check valve integrated into the gas displacement pipe, prevents the gas from back-flow at standstill of the pump.

Productdetail

Specification

Order-No.



Gas sealing kit with union for stationary operation

Reliable connection by fixed union on the container. Stop valve and fast-action coupling ensure as fast and safe changing of drum.

Gas sealing klt with union

Comprising of: Stop valve, connection fittings, sealing plug, drip-free fast-actioncoupling closing on two sides, hose connection with wing nut

Shown in addition here: Emission drum adapter stainless steel

0204-253

Gas sealing hose: PVC-hose DN 9

0373-153

0204-202

Gas sealing kit with nozzle for flexible operation

The sealing plug adapts on different drum and container openings (D = 40-75 mm). Combined with a nozzle a safe transferring even into smali vessels ist possible.

A valve integrated into the gas displacement pipe, prevents the gas from back-flow at standstillof the pump or changing the drum.

Suitable for transferring combustible and easy inflammable liquids (e. g. ethanol, petrol) or in explosive hazardous area.
 Viton® and Kalrez® are registered Trademarks of DuPont Dow Elastomers.

EMIGA: For safe handling of hazardous liquids

Specification

Order-No.

Productdetail

Application with pump tube SS 41 and nozzle SS

Variable system for use with a nozzle in such areas as fuels and solvents, etc.

Gas sealing kit for nozzle

Comprises of: Conical sealing plug, check valve for gas displacement pipe, screw-in nipple with wing nut and connection piece, hose clips	0204-201
Shown in addition here: Emission proof drum adapter stainless steel Other emission proof drum adapter see page 109	02 04-253
Nozzle stainless steel, G 1 1/4	02 04-370
Gas sealing hose: PVC hose DN 9	0373-153
Alternatively for flammable liquids: Solvent hose DN 9	0374-415
Emission proof hose	0204-272



Application with pump tube SS 41 and automatic nozzle Alu

In conjunction with an automatic nozzle, the flow rate is cut off automatically when the maximum level is reached.

(serving to return with sealless pump tubes arising gases back into the container)

Gas sealing kit for nozzle

comprises or: Conical sealing plug, check valve for gas displacement pipe, screw-in nipple with wing nut and connection piece, hose clips	0204-201
Shown in addition here: Emission proof drum adapter stainless steel Other emission proof adapter see page 109	0204-253
Automatic nozzle in aluminium DN 25, seal PTFE	0372-245
Discharge pipe cpl. for automatic nozzle Alu (necessary when using a valve pad)	0204-274
Gas sealing hose: PVC hose DN 9	0373-153
Alternatively for flammable liquids: Solvent hose DN 9	0374-415
Emission proof hose	0204-272



Application with pump tube PP 41 and nozzle PP

Prevents emissions when handling severely oxidising or furning acids and alkalis.

(serving to return with sealless pump tubes arising gases back into the container)

Gas sealing kit for nozzle

Q-Pulse Id TMS1163

Cas southing kit to Hozzig	
Comprises of: Conical sealing plug, check valve for gas displacement pipe, pipe fitting	0204-5 10
Shown in addition here: Emission proof drum adapter PP	0204-250
Nozzle PP/FPM (Viton®) G 1 1/4	0204-380
Nozzle outlet spout PP	0204-297
Gas sealing hose: PVC hose DN 9	0373-153
Add price: Emission proof hose with connection flange PVDF*	0204-511



(serving to return with sealless pump tubes arising gases back into the container)

Vitor# and Katrez# are registered Tradertaries of DuPoof Dow Elastomers

Suitable for fransferring combustible and many inframmable liquids (e. q. ethanol, petrol) or in explosive hazardous area. "In continuation with a new pump tube.

Foot strainer, Wall bracket, Lifting device

roductdetail	Specification	Order-No.
	Foot strainer For mounting on the pump foot. Keeps impurities away from the rotating part Material: For pump tube: PP PP 41 mm PVDF Alu/PVDF Ø 41 SS SS Ø 41 mm	0343-177 0343-187 0204-617 0204-802
	SS B70 PP Lutz B2 Vario ø 32 mm	0204-539
	14 Wall bracket For storage of drum pumps. This facility helps protect pumps from damage, and maintains their value.	
	For pump tubes with hand wheel For B70V For B70V-SR For Lutz B2 Vario	0204-308 0204-309 0204-307 0102-079
	To simplify the process of lifting the pump in and out of drums and containe When using an explosion proof driving motor for B70 pumpt the Ex-protection plug is mounted onto the lifting device.	ve
	For motors MA II and ME II For motors B4/GT For pump tube HD-E For B70V with three phase and pneumatic motor For B70V with three phase gear motor For B70V-SR with universal motor	0211-047 0214-196 0155-154 0172-619 0175-621 0174-607
\uparrow	16 Holst (for easy lifting and moving of the pump) For drum pump, with infinitely adjustable load balancer. For easy lifting and moving of the pump.	
A.P.	Load bearing capacity: 10-14 kg Tackle: 2 m	0371-012
	For B70 and HD-E, with infinitely adjustable load balancer Load bearing capacity: 18-22 kg	0371-013
	Tackle: 2 m Load bearing capacity: 22-25 kg	0371-014
h	Tackle: 2 m Load bearing capacity: 25-30 kg Tackle: 2 m	0371-015
1	Bypass valve When using a closing valve (nozzle, stop valve etc.) the application of a bypis recommended. (Opening pressure: brass 2.5 bar, stainless steel 5 bar).	pass valve
	Connection thread: G 1 1/2 Material: For pump tube: Brass B70V Stainless steel 1.4571) B70V Brass HD-E	0172-640 0170-274 0155-600
famil.	18 Coupling part, motor side When sourcing your own motor please order the correct coupling to suit the relative shaft diameter.	3-1-20
8	Shaft diameter: ø 14 ø 19 ø 24 ø 28 (only in combination with intermediate flang	0302-028 0302-027 0302-026 ge) 0302-029
	ø 28 (only in combination with intermediate flange for ø 28	0172-850

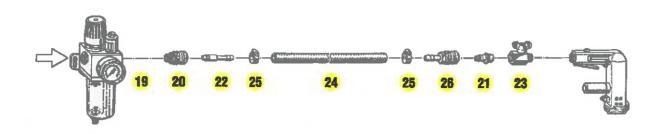
14

For compressed air supply of motors MD-1, MD-2 and MD-3

Specification

Order-No.

Productdetail



19 Maintenance unit

For cleaning and oiling the supply air.

With manometer for setting operating pressure.

Operating pressure:

max, 10 bar

0204-152



20 Coupling (female part)

Self-disconnecting in brass. For screwing in the maintenance unit.

G 3/8 outer thread

0372-154



21 Nipple (male part)

In brass

G 3/8 outer thread

0372-045



22 Air hese coupling connector

For connection to a coupling.

For compressed air hose DN 9

0372-155



23 Stop valve

Chromium-plated brass for regulating the compressed air as well as the speed of the compressed air motors.

G 3/8 outer thread/inner thread

0372-043



24 Compressed air hose

PVC-hose with intermediate woven layer, DN 9, for air supply to compressed air motors.

Operating pressure:

max, 14 bar at 20 °C

0373-153



25 Hose clips

(Chromated steel: 1.4016)

For compressed air hose DN 9

0301-156



26 Coupling (female part)

Self-disconnecting in brass, with hose connector DN 9

For compressed air hose DN 9

0372-166



Sultable for transferring combustible and easy inflammable liquids (e. g. ethanol, petrol) or in explosive hazardous area.

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Professional Fluid Management

Founded in 1954 Lutz-Pumpen has distinguished itself by producing quality products, and has built up a sound reputation for safety in the pumping field led by its expertise in the drum and container market. Successively, other products have been added in order to cater to the needs of our customers. We are indebted to all our loyal customers who have often been the source of our many innovations, as we sought to provide them with the solutions they required.

In this brochure, we would like to take this opportunity to give you an everview of our product range. Naturally, we welcome any enquiries you may have, so please do not hesitate to contact us or one of our offices or distributors for further help or assistance.

Lutz is represented world wide in over sixty countries. Our distributors are trained by us and are ready to assist you, to find out more please see our web site www.lutz-pumpen.de



Lutz representation world wide:

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Vietnam

Lutz Pumpen GmbH

P.O. Box 14 62 · D-97864 Wertheim Tel.: (+49 93 42) 8 79-0 · Fax: (+49 93 42) 87 94 04

e-mail: info@lutz-pumpen.de

www.lutz-pumpen.de

Orger-No C699-254 Bo 0 000/00 08



In keeping with our philosophy of making life safe and simple, we have a complete range of accessories available for you.

From the humble wall bracket to protect your pump, connectors to fit your hose size, to bonding and grounding wires to protect your employees, nothing has been overlooked.

To reduce the risk of spillage, we have nozzles available in five different materials, polypropylene, PVDF, stainless steel, brass and aluminium.

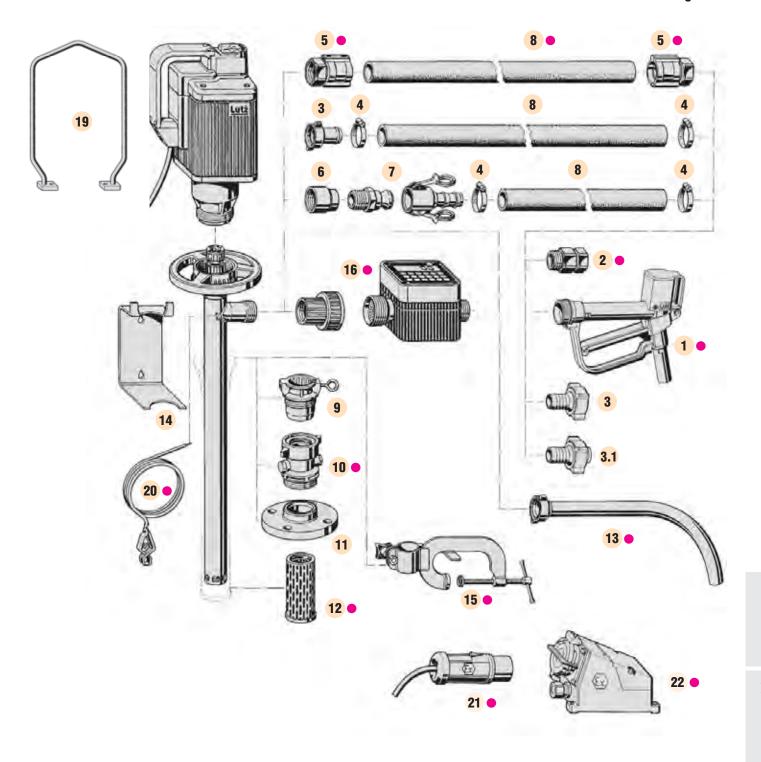
To avoid fumes or emissions from drums or containers, we have specialised drum adapters, and when it comes to accurate measurement or process control, we have a full range of flow meters to cater to your needs. The latter not only cover thin and thick fluids, but also flammable and explosive liquids.







At a glance



1	Mozzlo
ш.	Nozzle

•	١ ـــ	_		
-,	-	- 1111	rnına	knuckle
_	•	Tul	HIIIIU	NIIUUNIU

- **3** Hose connection
- **3.1** Hose connection, turnable
- 4 Hose clips

Q-Pulse Id TMS1163

- **5** Hose connectors
- 6 Reducing sleeves

- **7** Quick-action hose couplings
- 8 Hose
- **9** Drum adapter
- 10 Emission proof drum adapter
- 11 Installation flange
- **12** Foot strainer
- **13** Discharge spout

- 14 Wall bracket
- 15 Clamping device
- 16 Flow meter
- 19 Lifting device
- 20 Equipotential bonding cable
- **21** Explosion proof plug
- **22** Explosion proof socket

For the delivery of easy flammable Jiquids (e. g. ethanol, petrol) or in hazardous locations

Page 231 of 363

3

4

Lutz Drumoand - Container Pumps | Dosing Equipment - OM Manual

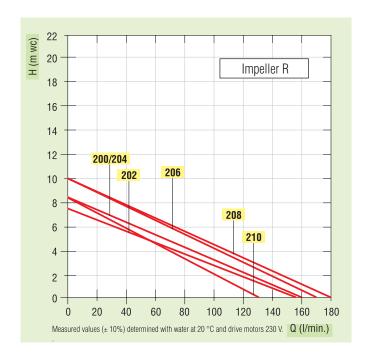
Pump tube PVDF (polyvinylidene fluoride)

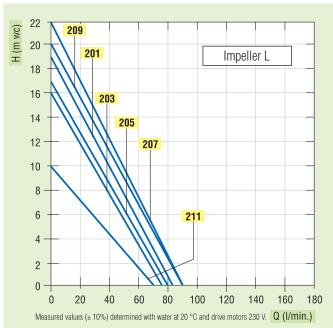


Materials (coming into contact with the pumped medium)

	PVDF-MS	PVDF-SL	
Housing:	PVDF	PVDF	
Impeller:	ETFE	ETFE	
Seals:	Viton®	none	
Mechanical seal:	Carbon/SiC, Viton®, HC-4 (2.4610)	none	
Bearing:	ETFE/PTFE	ETFE/PTFE	
Drive shaft:	HC-4 (2.4610)	HC-4 (2.4610)	

Viton[®] is a registered trademark of DuPont Dow Elastomers.





Please remember that the delivery rate is reduced as the **viscosity** increases. The **density** of the pumped liquid similarly affects the delivery rate, though to a lasser extent

Q-Pulse Id TM\$1163 Active 15/05/2015 Page 232 of 363



ADJUSTABLE PRESSURE SWITCH F4 SERIES

Execution with P2 electric connection

Ø 24 40 24 hexagon

Execution with P3 electric connection



Execution with M2 electric connection



24 hexagon ~ 49

69

24 hexagon



"F4" adjustable pressure switches allow a micro-switch commutation once a preset pressure value is reached. Working on the central screw in the P2 execution or intercepting the regulator dowel put inside the instrument using a 2mm hexagonal screw, rotating the operating point in hourly sense to increase and vice-versa to decrease. Mechanical stops protect both the spring and the micro-switch from over pressurization.

Technical features:

Body: 24 mm hexagonal in zinc-plated carbon steel

Assembly: in every position

Working temperature: from - 25°C to + 85°C

Switching frequency: 90 cycles/min

Switching accuracy: ± 4% of the pressure settled to 20°C **Operating point:** adjustable through an internal screw

Fixed hysteresis value:

membrane execution ~ 10% of the settled value
 piston execution ~ 15% of the settled value

Weight: 0,05 Kg

Mechanical life: 106 cycles at 70 bar (1000 psi) at 20°C

Electric Features:

- Maximum load: 0.5 Ampère at 250 Volt AC (see dedicated page)

- Exchange contacts NO and NC

- Electric connection according to DIN 43650 for M2 and M3

 Electric protection according to DIN 40050: IP65 for M2/M3 execution IP54 for P2 and P3 execution

Warranty: see dedicated page Spare parts: see dedicated page

Also available:

- F4X with fluid connection port made in AISI 316 stainless steel

- F4L body in brass

- Seals in Viton, EPDM, PTFE

- WF4: vacuum switch with adjustable field from -0.15 to -0.85 bar

C€ II 3 G/D EEx e T6

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	F4			ŧ_,	t	t_	<u>.</u> /	ţ	ŧ,	ن ے /	• <u>•</u> •													
	Switching pressure range	Execution	P Max	Body material	Hydraulic Connection	Type of Seal	Type of microswitch	Preset Value	Condition	Type of Electric Connection	Protection Cup													
<u> </u>	Bar		Bar					Ваг																
R	0,2>2,5	Membrane	25	X AISI316L	0 %" BSP					P2 Connection with screw														
s	1>12	Membrane	25	L BRASS	1/4" BSP	VITON	G	Indicate	D means	P3	P1 Rubber cup protection only on													
т	5>50	Piston	200	B NICKEL PLATED	2 %*BSPT 3	T PTFE	Golden Contact	the value if you want the pressure	down pressure setting	Connection with Fast-on	request necessary to protect the													
V	10>100	Piston	300	if omitted	if		if	if	if omitted	if omitted	if omitted	if omitted	if omitted	if omitted	if omitted	if omitted	if 4 omitted 1/4"NPT	M10x1	E	if omitted seemed seeme	switch already preset	U	M2 16x16	instrument from dirt and moisture
Z	20>200	Piston	300	means body in zinc plated	5 1/4*NPT	5	5	5	5	5	if om 5 mea	if omitted means	if omitted pressure 5 means setting	Contact		connector M3	(only for P2 and P3 execution)							
Y	50>400	Piston	600	carbon steel	6 %"BSPT					30x30 connector														

We reserve us the right to make modifications to the construction without prior notice.

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ST56 - Boo Rump gitube PVDF - (polyvinylidene fluoride)

for highly corrosive chemicals and neutral liquids

Pump tube				PVD	F-MS	PVD	F-SL	Productdetail		
Type of im	peller					R	L	R	L	
Zone 0 (app	roved acc. to IE(C and VbF)				no	no	no	no	
Immersion	tube diamet	er:		up to mm		41	41	41	41	
Temperatur	re of medium	1:		up to °C		100	100	100	100	
Material:				Pump tube		PVDF	PVDF	PVDF	PVDF	
				Impeller		ETFE	ETFE	ETFE	ETFE	
Hose conn	ection:			Nominal diame	eter mm	19-32	19-32	19-32	19-32	
				Outer thread		G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	
Length: 7				Order No.		0123-400	0123-404	0122-200	0122-204	
Length: 10				Order No.			0123-405			
Length: 12	00 mm***			Order No.		0123-402	0123-406	0122-202	0122-206	1
Choice	of motors	S		Operating	data					
	MI 4	MI 4-E		Characteristic of		200	201	200	201	
	-	with speed		,	up to I/min.	160	85	160	85	a
Output:	500 W	controller 500 W		Delivery head* Viscosity**	up to m wc up to mPas	8.5 150	19 500	8.5 150	19 500	
Voltage:	230 V	230 V		Density****	up to IIIPas up to kg/dm³	1.1	1.4	1.1	1.4	
-	0030-000			Weight (kg)	motor + pump tube	4.5	4.5	4.5	4.5	
				01 1 1 1		222	000	000	222	
Outout	MA II 3	400 W		Characteristic		202 155	203 75	202	203 75	
Output: Voltage:	460 W 230 V	460 W 230 V		Delivery rate* Delivery head*	up to I/min.	7.5	16	155 7.5	75 16	U.AE
LVR:	no	yes		Viscosity**	up to m we	150	500	150	500	
		,		Density****	up to kg/dm³	1.2	1.6	1.2	1.6	
Order No.	0060-000	0060-008		Weight (kg)	motor + pump tube	6.3	6.3	6.3	6.3	
	MA II 5	MA II 5	MAII5S	Characteristic of	curve no.	204	205	204	205	
Output:	575 W	575 W	575 W	Delivery rate*	up to I/min.	160	80	160	80	
Voltage:	230 V	230 V	230 V	Delivery head*	up to m wc	8.5	17	8.5	17	
LVR:	no	yes	no	Viscosity**	up to mPas	350	800	350	800	
Order No.	0060-001	0060-009	acid-proof 0060-091	Density**** Weight (kg)	up to kg/dm³ motor + pump tube	1.3 7.1	1.8 7.1	1.3 7.1	1.8 7.1	
	MA II 7			Characteristic of	curvo no	206	207	206	207	
Output:	795 W	795 W		Delivery rate*	up to I/min.	170	90	170	90	
Voltage:	230 V	230 V		Delivery head*		10	22	10	22	Low-voltage release (LVR): Prevents the pump from starting
LVR:	no	yes		Viscosity**	up to mPas	350	800	350	800	up again without warning after a
				Density****	up to kg/dm³	1.4	1.9	1.4	1.9	power failure. It's recommended when pumping hazardous liquids.
Order No.	0060-002	0060-010		Weight (kg)	motor + pump tube	8.3	8.3	8.3	8.3	
	MD-1	MD-2		Characteristic of	curve no.	208	209	208	209	
Output:	400 W	400 W		Delivery rate*	up to I/min.	180	90	180	90	
Operating	6 hor	6 hor		,	up to m wc	10	20	10	20	
Pressure:	o nar	6 bar		Viscosity** Density****	up to mPas up to kg/dm ³	600 1.3	850 1.8	600 1.3	850 1.8	11
Order No.	0004-087	0004-088		Weight (kg)	motor + pump tube	3.2	3.2	3.2	3.2	(4)
	B4/GT			Characteristic of	curve no.	210	211	210	211	
Output:	750 W	750 W		Delivery rate*	up to I/min.	130	70	130	70	
Voltage:	230/400 V	230/400 V		Delivery head*		8.5	10	8.5	10	
Protection				Viscosity**	up to mPas	400	400	400	400	
switch: Order No.	NO 040	yes		Density****	up to kg/dm³	2.0 11.7	2.2 11.7	2.0 11.7	2.2 11.7	
	пппд-птч	0004-067		Weight (kg)	motor + pump tube	11.7	11.7	11.7	11.7	48

Q-Pulse Id TM\$1163 Determined with water at 20 °C

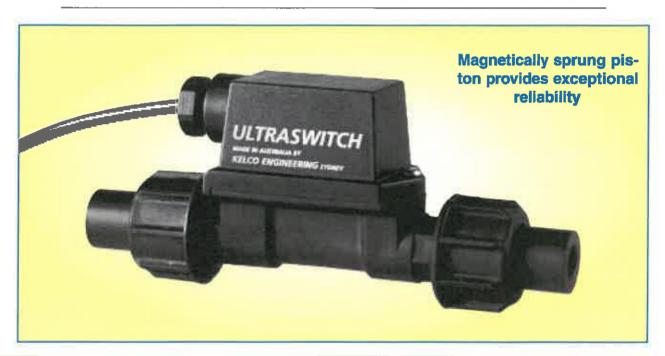
*** Special lengths ** Determined with oil 200-2500 mm on request

**** Determined with 3 in hose 3/4" and open nozzle 3/4". Higher densities possible for shorter operating periods.

Special voltages and frequencies on request.

ULTRASWITCH P20 SERIES

CORROSION RESISTANT IN LINE FLOW SWITCHES



FEATURES

- SUITS TUBES & PIPES 6 TO 20 MM ('4" TO '4") DIA.
- NO METAL PARTS IN CONTACT WITH LIQUIDS
- ALL POSITION MOUNTING
- CHOICE OF 3 SWITCHING FLOW RATES
- DETECTS VERY LOW FLOWS
- ROBUST RELIABLE SWITCH
- EASY TO INSTALL
- HIGH FLOW THROUGH
- 18 BAR (260 PSI) PRESSURE RATING
- VERY LOW HEAD LOSS
- MANY OPTIONS AVAILABLE

APPLICATIONS

- Liquid or gas flow detection
- Constant pressure pump control
- Loss of prime pump protection
- Water treatment contol
- Industrial process control
- Irrigation control
- Chemical dosing systems
- Chilled water control
- Vapour flow detection



HORIZONTAL MOUNTING

VERTICAL MOUNTING





GENERAL INFORMATION

DESCRIPTION

The P20 In line Flow Switch is a simple and reliable flow switch that can detect the flow of liquids or gases in tubes and small diameter pipes. The P20 can detect either continuous or pulsed flows. Typical applications include monitoring flow in water treatment and irrigation systems, domestic constant pressure system control, gland cooling systems and a myriad of uses in industrial process control. The P20 flow switch gives a simple on or off response to liquid flow. There are no metal parts in contact with liquids within the switch, so the P20 is ideal for use in

aggressive liquids such as seawater, groundwater, acids and many chemical solutions. The standard switch is supplied complete with pipe spigots and unions, for direct fitting into PVC or ABS pipe work. In addition 6 electrical modules are available that give a wide choice of control options. These include electrical modules with single and multiple reed switches, relays with various coil voltages, and solid-state switches. Each P20 flow switch is supplied complete with 3 pistons, to provide the user with a wide choice of flow switching points.

OPERATING PRINCIPLE

The body of the P20 flow switch houses a fluted piston. Any flow, either pulsed or continuous, causes the piston to be pushed back within the switch body to a point where the liquid can pass over the piston and out of the switch. The piston contains a magnet that actuates a reed switch and this provides the switching output. When flow stops, the piston is pushed back to the off position by a second magnet built into the switch body. No

metal parts are in contact with the process liquid, and the magnetically sprung piston provides an exceptionally reliable corrosion proof mechanism. The sensitivity of the flow switch and its switching point are determined by the viscosity of the fluid and by the clearance between the piston and the switch body. The P20 flow switch can be mounted in any orientation in pipe-work, including upside down, with no adverse effects.

CONSTRUCTION

The standard P20 flow switch is made from glass reinforced polypropylene and ABS, with neoprene o-ring seals. The piston return mechanism and the electrical switching action within the switch are achieved using high power magnets operating through the solid body of the switch. The electri-

cal housing is hose-proof & weatherproof, and is supplied with a built in 20mm cable gland, for conduit or flexible cable entry. The electrical circuit boards used in the switch are interchangeable, and all of the parts of the P20 flow switch are available as spare parts.

OPTIONS

In addition to a choice of 6 standard circuit boards to suit the P20 flow switch; the user also has the following options.

Each P20 flow switch is supplied complete with 3 pistons. By simply changing pistons the user has the choice of 3 switching points, 140 millilitres per minute, 570 millilitres per minute or 1.70 Litres per minute. In addition, for OEM applications, switches can be ordered pre-set to any required switching

point from one Litre per hour to 4 Litres per minute. Contact your supplier for details.

The standard P20 flow switch is supplied complete with inlet and outlet pipe connections with 20mm (3/4 BSP) male threads and unions. Pipe spigots in 15 nominal size are also included. In addition, the P20 flow switch can also be ordered with optional 25mm (1" BSP) unions and 20mm (3/4") nominal size spigots, in PVC or ABS.

MADE IN AUSTRALIA BY

KELCO ENGINEERING

Manufacturing division of CYNCARD PTY LTD A.B.N. 20 002 834 844 Head Office and Factory: 2/9 Powells Road BROOKVALE 2100 AUSTRALIA Postal Address: PO Box 496 BROOKVALE NSW 2100

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Please note the P20 flow switch is the subject of PCT International patent applications.

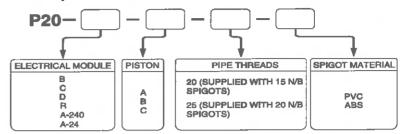
P20 SERIES IN LINE FLOW SWITCH TECHNICAL DATA

The P20 In Line Flow Switch is a versatile and adaptable flow switch that lends itself to a myriad of applications ranging from low flow detection in chemical metering systems through to domestic constant pressure pump control. The following technical data is principally intended to assist system designers and process engineers with details of the most common parameters of the product.

NOMENCLATURE

EXAMPLE: P20-B-A-20-PVC

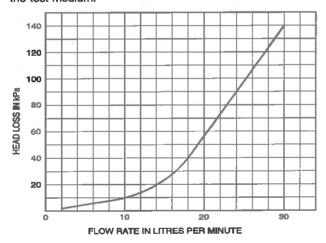
P20 FLOW SWITCH WITH SINGLE REED SWITCH CIRCUIT BOARD, NORMALLY OFF, SWITCHES ON AT 0.14 LITRES PER MINUTE ON A RISING FLOW, 20mm (3/4BSP) UNIONS AT BOTH ENDS AND 15 N/B PVC SPIGOTS PROVIDED.



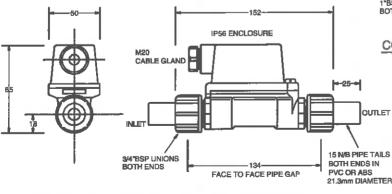
CONSTRUCTION MATERIALS

The P20 In Line Flow Switch has no metal parts in contact with the process fluid. The only materials in contact with fluid passing through the switch are glass-reinforced polypropylene, and neoprene (O-rings). The working action of the switch is achieved using high power permanent magnets operating through the solid glass reinforced polypropylene body of the switch. The electrical housing is made from ABS, and the pipe spigots supplied with the switch are available in either PVC or ABS

The graph below sets out the dynamic head loss across the P20 flow switch. The graph data refers to water at 15°C as the test medium.



DIMENSIONS

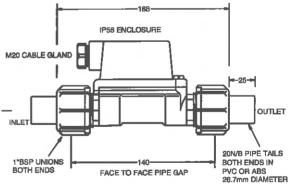


CONFIGURED FOR 15mm NOMINAL BORE PIPE

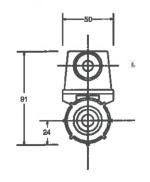
OPERATING ENVIRONMENT

Maximum Operating Pressure (Static or Dynamic) at Ambient Temperature	1800 Kpa (260 P.S.I.)
Minimum Burst Pressure at Ambient Temperature	9700 Kpa (1400 P.S.I.)
Maximum Liquid Temperature (Standard P20 Switch)	80.C
Minimum Liquid Temperature (Standard P20 Switch)	-30°C
Maximum Recommended Continuous Flow Rate (Water)	25 Litres per Minute Dynamic head loss across the switch <100kPa)
Liquid Ph range	1 to14
Ingress Protection Rating (Weatherproof Rating)	IP56 (Hose proof & weather proof)

Important Note Maximum operating pressure must be de-rated, in proportion to temperature increase, and in consideration of any chemical solutions being processed.



CONFIGURED FOR 20mm NOMINAL BORE PIPE



Page 237 of 363

FLOW SENSITIVITY & HYSTERESIS

Sensitivity to fluid flow is a direct function of liquid viscosity and piston clearance. There are 3 pistons available to suit the P20 flow switch. Each piston has a distinct switching point. The pistons are designated and marked A, B and C. The P20 Flow switch is supplied as standard with the "A " piston fitted. The optional "B" or "C" pistons are also supplied with each switch.

The following table sets out the performance parameters of the 3 pistons. The data is based on testing using water at 15°C as the test medium, and is accurate to +/-10%. Changes in liquid viscosity will affect the switching point. Increases in viscosity will proportionally decrease the flow rate required to actuate the switch, and will proportionally increase the response time. Decreasing viscosity will proportionally increase the flow rate required to actuate the switch, and will proportionally decrease the response time.

Piston Markings and Designation	Switching Point on a Slowly Rising Flow in Litres per Minute	Switching Point on a Slowly Reducing Flow in Litres per Minute	Electrical Response Time in Seconds After Cessation of Flow
Α	0.140	0.065	0.4
В .	0.570	0.370	0.3
С	1.700	1.330	0.2

Please Note The type "A "piston is supplied as standard fitted to each switch, unless otherwise specified. The B & C pistons are included packed in with each switch.

ELECTRICAL DATA

The P20 In Line Flow Switch is available in a variety of electrical configurations, to suit specific applications.

The model numbers and details of these options are outlined in the table below.

Switch Model	Module Type	Contact Configuration	Switched Power Maximum	Switched Voltage Maximum	Switched Current Resistive AC (rms) Maximum	Inductive Loads (Power Factor 0.4)	Typical Application
P20-B	Dry Reed Switch	S.P.S.T. N.O	40W	240V AC 200V DC	1A	Not Suitable	PLC and General Control Circuits
P20-C	Dry Reed Switch	S.P.D.T.	40W	240V AC 200V DC	1A	Not Suitable	PLC and General Control Circuits
P20-D	Dry Reed Switch	3 Pole Switch 3 by N.O	40W	240V AC 200V DC	1A	Not Suitable	Telemetry and local Control Circuits
P20-R	Solid State Relay (Triac)	S.P.S.T. N.O	750W	2 to 240V AC	4A Continuous (Spike to 16A)	4A at 240V AC	AC Control circuits and AC Motor Control to 1 HP
P20-A-240	Standard Relay 240V AC Coil	S.P.D.T.	2500VA at 250VAC 300VA at 30VDC	0 to 240 V AC	10A	7.5A at 240V AC 5A at 30V DC	General AC or DC Control
P20-A-24	Standard Relay 24V AC Coil	S.P.D.T.	2500VA at 250VAC 300VA at 30VDC	0 to 240V AC	10A	7.5A at 240V AC 5A at 30V DC	General AC or DC Control

Note The P20 In Line Flow Switch uses reed switches as the primary switching element. Reed switches are one of the most reliable mechanical switching devices ever devised. They offer an operating life in excess of 100 million cycles, however, care needs to be taken to ensure they are not electrically overloaded or if applied in questionable applications, suitable protection should be added to the control circuit.

COMPONENT PARTS

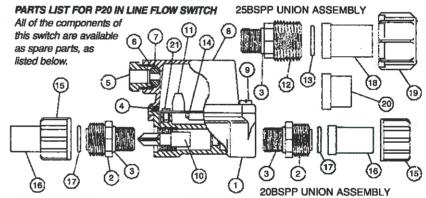
The P20 In Line Flow Switch is a fully serviceable device. All of the component parts of the switch are available as spare parts, and many of the parts are interchangeable, these include the circuit boards, the pistons and the inlet and outlet adaptors and unions.

The interchangeability of components allows custom configuration of the switch. For example it is entirely practical to configure the P20 flow switch with a 25mm inlet thread and a 20mm outlet thread, or to configure the switch with the reverse of this arrangement. This flexibility can be achieved using the standard component parts of the switch.

ADDITIONAL OPTIONS

The P20 flow switch can be supplied with 20 BSP (3/4" BSP) or 25 BSP (1" BSP) unions and 15mm or 20mm sockets or spigots in PVC or ABS. In addition, sets of tube flare fittings are available to suit the switch. These allow the switch to be installed in flexible poly tubing systems in 6 by 5mm, 8 by 4mm or 12 by 9mm sizes.

Switches are also available in materials of construction other than those outlined here. Contact your supplier with your specific requirements.



TEM	DESCRIPTION	QTY	MATERIAL
1	SWITCH BODY	1	GLASS REINFORCED POLYPROPYLENE
2	M20 by 3/4BSPP ADAPTOR	2	GLASS REINFORCED POLYPROPYLENE
3	No 018 O-RING	2	NEOPRENE
4	MAIN LID GASKET	1	SANOPRENE
5	CABLE GLAND NUT	1	HIGH IMPACT ABS
6	CABLE GLAND THRUST RING	1	HIGH IMPACT ABS
7	CABLE GROMMET	1	SANOPRENE
В	LID	1	HIGH IMPACT ABS
θ	LID FIXING SCREW	1	M5 BY 16 STAINLESS STEEL TYPE 304
10	PISTON,MODEL A, B or C	1	GLASS REINFORCED POLYPROPYLENE
11	TERMINAL BLOCK	1	ACETAL RESIN
12	M20 by 1° BSPP ADAPTOR	2	GLASS REINFORCED POLYPROPYLENE
13	No 117 O-RING SEAL	2	NEOPRENE
14	CIRCUIT BOARD ASSEMBLY	1	COMPLETE ELECTRICAL MODULE
15	20 from BSPP UNION NUT	2	GLASS REINFORCED POLYPROPYLENE
16	15 mm (1/2") PIPE SPIGOT	2	PVC OR ABS
17	No 115 O-RING SEAL	2	NEOPRENE
18	20mm (3/4") PIPE SPIGOT	2	PVC OR ABS
19	25mm BSPP UNION NUT	2	GLASS REINFORCED POLYPROPYLENE
20	15mm (1/2") PIPE SOCKET	2	PVC OF ABS
21	CIRCUIT BOARD SCREW	2	M4 BY 6 STAINLESS TYPE 304

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INSTALLATION AND OPERATING SHEET FOR P20 IN LINE FLOW SWITCH

PLEASE READ THIS INSTALLATION SHEET CAREFULLY AND FULLY BEFORE INSTALLING THIS FLOW SWITCH

INTRODUCTION

The P20 flow switch is an in line piston flow switch that is supplied preset to switch on or off at a specific flow rate. The body of the switch contains a piston that obstructs the line of flow. To pass through the switch, the process fluid must push the piston back and flow over the piston and out through the outlet fitting. When fluid pushes the piston back, a magnet inside the piston actuates a reed switch in the electrical enclosure; this provides a set of closed, (or open) electrical contacts, which can be used in control circuits to indicate flow. The body of the P20 contains a fixed magnet that opposes the magnet in the piston. The repulsive force generated between the piston and body magnets constantly pushes the piston back to the off position, against the incoming flow. This unique magnet system negates the need for metal springs and provides the switch with exceptional reliability.

OPERATING ENVIRONMENT

The P20 flow switch has no metal parts in contact with the process fluid. Inert thermoplastics are all that come in contact with the liquid passing through the switch. This means the P20 can be used in aggressive chemical solutions, seawater, and bore water and in many fluids that would attack metal parts. The P20 flow switch contains a close fitting piston, and should only be used in applications where the process fluid is reasonably clean and free of entrained or suspended material. Fluids containing large particulate matter, ferrous materials or fibrous matter should not be used in this switch. If the degree of contamination of the process fluid can't be guaranteed, then suitable line filtration should be fitted to the system upstream of the P20 flow switch.

The standard P20 flow switch is constructed from glass reinforced polypropylene, with neoprene o-rings, and an ABS electrical housing. The P20 flow switch is weatherproof to IP56, that is it is hose-proof and suitable for all outdoor exposed applications. The switch should be protected from freezing, or from exposure to fluid temperatures in excess of 80°C. The P20 flow switch should not be used in applications where the line pressure exceeds 18 bars, in the interest of safety, the switch has a burst pressure rating of >97 bars. Care should be taken not to expose the P20 switch to excess pressures such as may be generated by water hammer.

The environmental limitations of the standard P20 flow switch are set out in the following table.

Maximum Operating Pressure (Static or Dynamic) at Ambient Temperature	1800 Kpa (260 P.S.I.)
Minimum Burst Pressure at Ambient Temperature	9700 Kpa (1400 P.S.I.)
Maximum Liquid Temperature (Standard P20 Switch)	80°C
Minimum Liquid Temperature (Standard P20 Switch)	-30°C
Maximum Recommended Continuous Flow Rate (Water)	25 Litres per Minute
Liquid Ph range	1 to14

Important Note: Maximum operating pressure must be de-rated, in proportion to temperature increase, and in consideration of any chemical solutions being processed.

INSTALLATION

The P20 flow switch can be mounted in any orientation in the pipe-work, including upside down. There is a direction of flow arrow on the switch body. This directionality must be adhered to, as the switch will not operate against a reversed flow. Pipe-work can be used to support the switch, or the switch can be connected directly into valve manifolds or pump ports.

PIPE TERMINATION & SPIGOTS

There are a number of optional piping terminations available that may have been supplied with the P20 flow switch. These include tapered or parallel BSP male fittings, in ³/₄" or 1" sizes. The parallel thread fittings are supplied with suitable union nuts, O-rings and pipe sockets or spigots. The taper thread adaptors are not supplied with unions, as they are intended to be screwed directly into pipe-work. Where parallel thread fittings and unions are supplied, a set of tube flare fittings to suit standard flexible tubing may also be included. The tube flare fittings accept flexible poly tubing in sizes 12 by 9, 8 by 4 and 6 by 5mm.

FLOW SENSITIVITY & SWITCHING POINT

The P20 flow switch is supplied configured to switch at one of three possible flow rates. It is possible to alter the switching point of the flow switch, on site, simply by substituting one of the 2 alternate pistons. The piston fitted to a specific P20 flow switch can be identified by a letter, either A, B or C that is engraved on the conical nose of each piston. The "A" piston is supplied as standard fitted to the switch, and detects the lowest flow rate, 0.14 L/m, it is therefore the most sensitive. The "B" piston switches at 0.57 L/m, and the "C" piston is the least sensitive, and requires a flow of 1.70 L/m to actuate. Pistons are easily cleaned or replaced simply by unscrewing the inlet adaptor and removing the specific piston, a piston kit is included with each switch that contains the optional "B" and "C" pistons.

ELECTRICAL

The electrical enclosure on the P20 switch is accessible by removing one screw on the lid. The lid has an integral 20mm cable gland designed to accept flexible cable up to 10mm diameter. If the gland nut is removed the exposed female thread will then accept a 20mm conduit bush. Various electrical options are available for the P20 flow switch. Details of the specific circuit board module, including its model number are located inside the lid of the electrical housing of each switch. All the available electrical modules use a reed switch as the primary switching element. The contacts of the reed switch open and close in response to the position of the switch piston magnet. The reed switch may be the primary switch, or

it may be used to drive a triac or a relay, that is included on the circuit board in the switch. Where the reed switch is used as the main switch, care should be taken to ensure it is not overloaded. Reed switches are very reliable devices but may be damaged easily if overloaded. Use interposing relays and avoid inductive loads, fit suitable protection such as diodes or rate effect suppression circuits. Avoid capacitive coupling effects associated with long cable runs, use shielded cable in such situations, and fit diode protection to the reed switches in DC applications.

The table below sets out details of the various electrical modules, their model numbers and their electrical specifications.

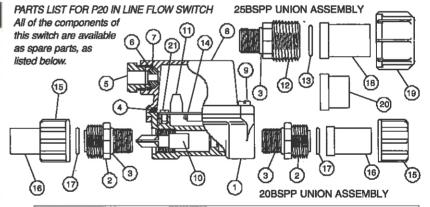
Switch Model	Module Type	Contact Configuration	Switched Power Maximum	Switched Voltage Maximum	Switched Current Resistive AC (rms) Maximum	Inductive Loads (Power Factor 0.4)	Typical Application
P20-B	Dry Reed Switch	S.P.S.T. N.O	40W	240V AC 200V DC	1A	Not Suitable	PLC and General Control Circuits
P20-C	Dry Reed Switch	S.P.D.T.	40W	240V AC 200V DC	1A	Not Suitable	PLC and General Control Circuits
P20-D	Dry Reed Switch	3 Pole Switch 3 by N.O	40W	240V AC 200V DC	1A	Not Suitable	Telemetry and local Control Circuits
P20-R	Solid State Relay (Triac)	S.P.S.T. N.O	750W	2 to 240V AC	4A Continuous (Spike to 16A)	4A at 240V AC	AC Control circuits and AC Motor Control to 1 HP
P20-A-240	Standard Relay 240V AC Coil	S.P.D.T.	2500VA at 250VAC 300VA at 30VDC	0 to 240 V AC	10A	7.5A at 240V AC 5A at 30V DC	General AC or DC Control
P20-A-24	Standard Relay 24V AC Coil	S.P.D.T.	2500VA at 250VAC 300VA at 30VDC	0 to 240V AC	10A	7.5A at 240V AC 5A at 30V DC	General AC or DC Control

TESTING

The P20 switch can be tested for electrical function in the following way. With the switch isolated, place a continuity tester across terminals S1 and S2 or C and NO. (Do not use a lamp tester for this, due to the high inrush current.) Use a pencil or similar object to depress the piston. Each time the piston is depressed a closed circuit should appear across S1 and S2 or C and NO. The piston is accessed by pushing the pencil straight down the centre of the switch, through the inlet fitting. This test can be done dry, and without the switch in the pipe-work. Each time the piston is released it should return to the off position, due to the internal magnetic repulsion, and the switch should respond with an open circuit across its terminals.

MAINTENANCE

This flow switch is a very low maintenance device. If The P20 flow switch is correctly installed and if the process fluid is compatible with the materials of construction of this switch, then a very long service life can be expected. Factors that may contribute to early failure of this device include excess temperature, excess pressure or electrical loads in excess of the electrical modules ratings.



TEM	DESCRIPTION	QTY	(KATERIAL
1	SWITCH BODY		GLASS REINFORCED POLYPROPYLENE
2	M20 by 3/4BSPP ADAPTOR	2	GLASS REINFORCED POLYPROPYLENE
3	No C18 O-RING	2	NEÓPRENE
4	MAIN LID GASKET	1	SANOPRENE
5	CABLE GLAND NUT	1	HIGH IMPACT ABS
6	CABLE GLAND THRUST RING	7	HIGH IMPACT ABS
7	CABLE GPOMMET	1	SANOPRENE
ß	LID	1	HIGH IMPACT ABS
θ	LID FIXING SCREW	1	M5 BY 16 STAINLESS STEEL TYPE 304
10	PISTON, MODEL A, B or C	1	GLASS REINFORCED POLYPROPYLENE
11	TERMINAL BLOCK	1	ACETAL RESIN
12	M20 by 1' BSPP ADAPTOR	2	GLASS REINFORCED POLYPROPYLENE
13	No 117 C-RING SEAL	2	NEOPRENE
14	CIRCUIT BOARD ASSEMBLY	1	COMPLETE ELECTRICAL MODULE
15	20 mm BSPP UNION NUT	2	GLASS REINFORCED POLYPROPYLENE
16	15 mm (1/2") P.PE SPIGOT	2	PVC OR ABS
17	No 115 O-RING SEAL	2	NEOPRENE
18	20mm (3/4") PIPE SP:GOT	2	PVC OR ABS
19	25mm BSPP UNION NUT	2	GLASS REINFORCED POLYPROPYLENE
20	15mm (1/2") PIPE SOCKET	2	PVC OR ABS
21	CIRCUIT BOARD SCREW	2	M4 BY 6 STAINLESS TYPE 304

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PLEASE NOTE: The "P20" Series In Line Float Switch is the subject of patent and trademark applications both in Australia and internationally.

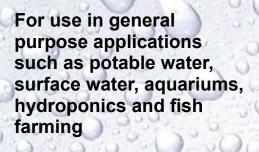
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Model OPF 10 pH Electrode



General purpose pH electrode with optional integral temperature sensor and ½" MNPT process connection

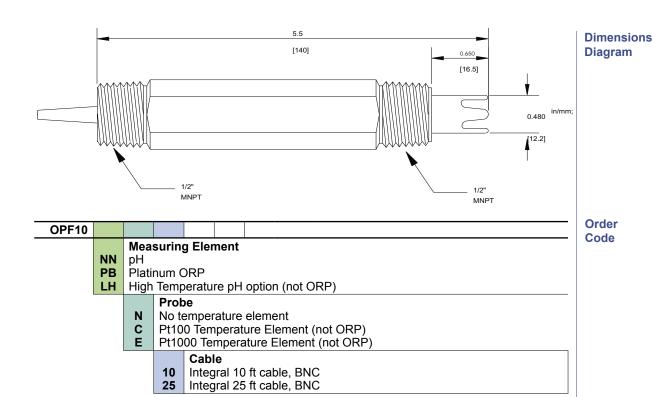
- Patented Teflon® junction and gelled electrolyte deliver high performance and low maintenance
- Single chamber reference system for clean water conditions
- ORP option available
- Standard and high temperature versions available
- Compact design for insertion or flow through installation



Q-Pulse Id TMS1163

OPF 10	Specifications
Measurement range	pH 0 - 14
Pressure range	0 to 6.9 bar (100 psig)
Temperature range	 - 5 to 80°C (23 to 176°F Standard Version) 25 to 110°C (77 to 230°F High Temperature Version)
Temperature sensor	Pt 100, Pt 1000 RTD
Minimum conductivity	10 μS/cm
Electrolyte	KCI/AgCI gel
Response time (@ 25°C / 77°F)	95% of reading in 10 seconds
Materials of construction	Ryton® body with Viton® O-rings
Minimum conductivity Electrolyte Response time (@ 25°C / 77°F)	Pt 100, Pt 1000 RTD 10 µS/cm KCl/AgCl gel 95% of reading in 10 seconds

Active 15/05/2015 Page 241 of 363



Calibration Solutions	
OPY 21	NIST Traceable pH Calibration Solution, pH 4.00, 1000ml
OPY 23	NIST Traceable pH Calibration Solution, pH 7.00, 1000ml
OPY 30	NIST Traceable ORP Calibration Solution, Value: +220mV @ pH 7.00, 1000ml
OPY 31	NIST Traceable ORP Calibration Solution, Value: +468 @ pH 7.00, 1000ml

Accessories



Wedgewood Analytical, Inc. 4123 East La Palma Avenue, Suite 200 Anaheim, CA 92807

Toll Free: 1-800-835-5474
Direct: 1-714-577-5600
Fax: 1-714-577-5688
www.WedgewoodAnalytical.com

Conex[®] DIA-2Q

Instrument amplifier and controller

Installation and operating instructions



Declaration of conformity

EC Declaration of Conformity

We, Grundfos, declare under our sole responsibility that the product Conex® DIA-2Q, to which this declaration relates, is in conformity with these Council directives on the approximation of the laws of the EC member states:

- Low Voltage Directive (2006/95/EC)*. Standard used: EN 61010-1: 2001 (second edition).

- EMC Directive (2004/108/EC). Standards used:

EN 61326-1: 2006,

EN 61000-3-2: 2006 + A1: 2009 + A2: 2009,

EN 61000-3-3: 2008.

* Only for products with operating voltage > 50 VAC or > 75 VDC.

Pfinztal, 1 June 2011

Ulrich Stemick **Technical Director** Grundfos Water Treatment GmbH Reetzstr. 85, D-76327 Pfinztal, Germany

Person authorised to compile technical file and empowered to sign the EC declaration of conformity.

English (GB) Installation and operating instructions

CON.	TENTS	
		Page
1.	Symbols used in this document	3
2.	A few words in advance	4
3.	Installation data	4
4.	Installation sketch	5
5.	Instrument settings	6
6.	General information	8
6.1	Warranty	8
7.	Applications	8
8.	Safety	8
8.1	Obligations of the owner/operations	
0.0	manager	8
8.2	Avoidance of danger	8
9. 9.1	Identification	9 9
9.1	Nameplate Type key, Conex® DIA-2Q controllers	10
9.3	Type key, Conex® DIA-2Q	10
	preassembled systems	10
10.	Technical data	12
10.1	Design/enclosure class	12
10.2	General data	12
10.3 10.4	Electronic data and functions Measuring ranges	12 14
10.4	Dimensions	14
11.	Installation	15
11.1	Transport and storage	15
11.2	Unpacking	15
11.3	Installation requirements	15
11.4	Installation in control panel	15
11.5	Installation of wall-mounted enclosure	16
12.	Commissioning/electrical connections	17
12.1	Terminals	18
12.2	Power supply connection	20
12.3	Relay outputs	20
12.4	Current output	21
12.5	Connections of controller stop, sample-water sensor and temperature	
	sensor	21
12.6	Connection of measuring cells	22
13.	Operation	25
13.1	Control and display elements	25
13.2	Display elements during initial	0.5
13.3	commissioning Software overview	25 27
13.4	Main menu	28
13.5	Setup	29
13.6	Selection, configuration and	
40.7	parameterisation of the controller	35
13.7 13.8	"Alarm" menu Checking the settings in the "service"	41
10.0	menu	43

13.9	Calibration	45
13.10	Manual operation	50
14.	Fault finding	53
15.	Maintenance	53
16.	Disposal	53

Warning

These complete installation and operating instructions are also available on www.Grundfosalldos.com.

Prior to installation, read these



Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

1. Symbols used in this document



Warning

If these safety instructions are not observed, it may result in personal injury.



If these safety instructions are not observed, it may result in malfunction or damage to the equipment.



Notes or instructions that make the job easier and ensure safe operation.

2. A few words in advance

The **Conex**® **DIA-2Q** is a multipurpose device designed to carry out high-precision measurements and controls of the following:

- a value from parameter group 1:
 - chlorine, chlorine dioxide, ozone, hydrogen peroxide or peracetic acid
- · a value from parameter group 2:
 - pH value, redox potential or fluoride.

The integrated controller, the high-resolution graphics display and the multilingual plain-text user interface make complicated measuring and control tasks in water chemistry much easier.

Just a few button inputs lead you to your goal. The potentiostat helps save even more time, being automatically matched to the various input variables.

The safety standard of the dosing process is raised by the automatic open-circuit monitoring of the current outputs.

Properties of the **Conex**[®] **DIA-2Q** measuring amplifier and controller include the following:

- all control functions including PID and continuous-action controls
- · proportional control
- · setpoint control
- combined setpoint control with external disturbance variable feedforward
- · manual or automatic temperature compensation
- logbook function: chronological recording of calibration values with date and time
- user coding function as a means of protection against access by unauthorised persons and for system administration
- error message function for indication of non-functioning sensors.

3. Installation data

Please fill in the data below after commissioning. It will help you and your Grundfos service partner make subsequent adjustments to the installation.

in Owner:

Grundfos customer number:

Order number:

Product number:

Product serial number:

Put into service on:

Location of product:

Used for:

. Installation sketch			

5. Instrument settings

Parameter 1			
Setup		Controller	Alarm
Parameter	Controller	Proportional Xp	Alarm On:_ Off:_
Chlorine:_ Chlorine dioxide:_ Ozone:_ Peroxide:_ Peracetic acid:_	Proport. contrl. Current input Proport. variable Off:_ 0 - 20 mA:_ 4 - 20 mA:_ Others:	Reset time TN (PI/PID control) sec.	Alarm value 1 Switching point
Temp. meas. Yes:_ No:_	Interpulse ctrl.:_ Pulse freq. ctrl:_ Cont. controller:_	Deriv. action Tv (PID control)	Alarm value 1 Switching direction Upward violation:_ Downward viol.:_
Temp. comp. Yes:_ No:_	Setpoint contrl. Combined contrl. Off:_ Limit:_ Interpulse ctrl.:_ Pulse freq. ctrl:_ Cont. controller:_	Int.pulse period (interpulse ctrl.)	Alarm value 2 Switching point
pH compensation Yes:_ No:_	Limit contact Downward viol.:_ Upward violation:_	Min. ON time (interpulse ctrl.)	Alarm value 2 Switching direction Upward violation: Downward viol.:
Measuring ranges	Ctrl. direction Downward control:_ Upward control:_	Max. frequency (pulse freq. ctrl.)	Hysteresis
Current output 1	Type of control P:_ PI:_ PID:_	Setpoint (limit contact)	Alarm delay
Measuring cell	Current input Disturbance variable Off:_ 0 - 20 mA:_ 4 - 20 mA:_ Others:	Constant load	Dos. time monit. On:_ Off:_
Measuring cell type		Max. dosing flow	Dos. time monit. Max. dosing time
Cleaning motor Monitoring on:_ Monitoring off:_		% Limit (limit contact)	min
Water sensor On:_ Off:_		Hysteresis (limit monitor)	

	Paran	neter 2	
Se	etup	Controller	Alarm
Parameter	Controller	Proportional Xp	Alarm On:_ Off:_
pH:_ Redox:_ Fluoride:_	Proport. contrl. Current input Proport. variable Off:_ 0 - 20 mA:_ 4 - 20 mA:_ Others:	Reset time TN (PI/PID control) sec.	Alarm value 1 Switching point
Temp. meas. Yes:_ No:_	Interpulse ctrl.:_ Pulse freq. ctrl:_ Cont. controller:_	Deriv. action TV (PID control)	Alarm value 1 Switching direction Upward violation: Downward viol.:
Temp. comp. Yes:_ No:_	Setpoint contrl. Combined contrl. Off:_ Limit:_ Interpulse ctrl:_ Pulse freq. ctrl:_ Cont. controller:_	Int.pulse period (interpulse ctrl)	Alarm value 2 Switching point
pH compensation Yes:_ No:_	Limit contact Downward viol.:_ Upward violation:_	Min. ON time (interpulse ctrl)	Alarm value 2 Switching direction Upward violation:_ Downward viol.:_
Measuring ranges	Ctrl. direction Downward control:_ Upward control:_	Max. frequency (pulse freq. ctrl)	Hysteresis
Current output 1	Type of control P:_ PI:_ PID:_	Setpoint (limit contact)	Alarm delay
	Current input Disturbance variable Off:_ 0 - 20 mA:_ 4 - 20 mA:_ Others:_	Constant load	Dos. time monit. On:_ Off:_
		Max. dosing flow	Dos. time monit. Max. dosing time
		Limit (limit contact)	mii
		Hysteresis (limit contact)	

6. General information

These installation and operating instructions contain all information important for users of the Conex® DIA-2Q:

- technical data
- instructions on commissioning, use and maintenance
- safety information.

Should you require further information or should you encounter problems that are not handled in sufficient depth in this manual, please contact Grundfos Water Treatment. We shall be pleased to support you with our comprehensive know-how in the fields of measuring and control technology as well as water

We always welcome suggestions on how to optimise our installation and operating instructions to satisfy our customers.

6.1 Warranty

A guarantee claim in accordance with our general terms of sale and delivery is only valid if the following requirements are fulfilled:

- The product is used in accordance with the information within this manual.
- The product is not dismantled or handled incorrectly.

7. Applications

The Conex® DIA-2Q instrument amplifier and controller is suitable for measuring chlorine (Cl₂), chlorine dioxide (CIO₂), ozone (O₃), hydrogen peroxide (H2O2), peracetic acid, fluoride, pH or redox potential and for controlling these variables using appropriate actuators within the applications described in this manual.

Warning

Other applications are not approved and not permitted. Grundfos cannot be held liable for any damage resulting from incorrect use.

8. Safety

8.1 Obligations of the owner/operations manager

The owner/operations manager must ensure that persons working with the Conex® DIA-2Q instrument amplifier and controller fulfil these requirements:

- They are acquainted with the regulations concerning working safety and accident prevention.
- They have been trained in use of the device.
- They have read and understood the warning information and handling symbols.

The owner/operations manager is also responsible for ensuring that this manual is kept in the immediate vicinity of the device and is always available for the operating personnel.

8.2 Avoidance of danger

Warning



Installation and connection of the device and the associated supplementary components must only be carried out by authorised personnel! The local safety regulations must be observed!

Warning



Switch off the power supply before connecting the power supply cable and relav contacts!

Do not dismantle the device! Maintenance and repair must only be carried out by authorised personnel!

selected so that the housing is not



subjected to mechanical loading. Check that all settings are correct before starting up the device!

The mounting location must be

9. Identification

9.1 Nameplate

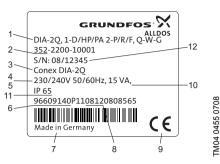
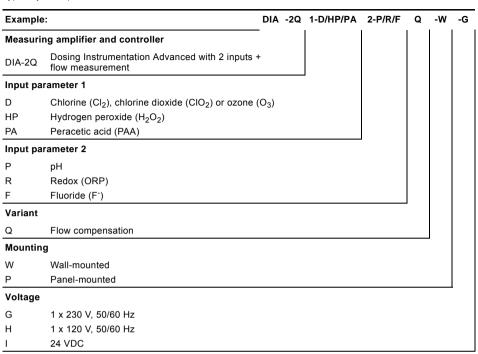


Fig. 1 Nameplate, Conex® DIA-2Q

Pos.	Description
1	Type designation
2	Model
3	Product name
4	Voltage [V]
5	Frequency [Hz]
6	Product number
7	Country of origin
8	Year and week of production
9	Marks of approval, CE mark, etc.
10	Power consumption [VA]
11	Enclosure class
12	Serial number

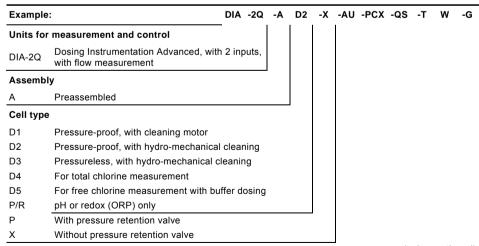
9.2 Type key, Conex® DIA-2Q controllers

Type key example: DIA-2Q, 1-D/HP/PA 2-P/R/F, Q-W-G



9.3 Type key, Conex® DIA-2Q preassembled systems

Type key example: DIA-2Q-A, D2-X-AU-PCX-QS-T, W-G



(to be continued)

Examp	ole: DIA	-2Q	-A	D2	-X	-AU	-PCX	-QS	-T	W	-G
Disinfe	ection electrodes										
AU	Gold										
PT	Platinum										
X	No disinfection measuring										
Other e	electrodes						•				
PCB	pH, ceramic diaphragm, incl. buffer solution	1									
PTB	pH, PTFE diaphragm, incl. buffer solution										
PKB	pH, KCI filling, incl. buffer solution										
PGB	pH, gel filling incl. buffer solution										
PCX	pH, ceramic diaphragm, excl. buffer solution	n									
PTX	pH, PTFE diaphragm, excl. buffer solution										
PKX	pH, KCL filling, excl. buffer solution										
PGX	pH, gel filling, excl. buffer solution										
RCB	Redox (ORP), ceramic diaphragm, incl. but	fer sol	ution								
RTB	Redox (ORP), PTFE diaphragm, incl. buffer solution										
RCX	Redox (ORP), ceramic diaphragm, excl. buffer solution										
RTX	Redox (ORP), PTFE diaphragm, excl. buffe	er solut	ion								
F	Fluoride										
PA	Peracetic acid										
HP	Hydrogen peroxide										
Χ	No electrode										
Flow s	ensor										
QS	Flow sensor integrated										
Χ	No flow sensor										
Tempe	rature sensor										
Т	With Pt100										
Χ	No temperature sensor										
Mounti	ing of controller										
W	Wall-mounted										
Р	Panel-mounted										
Voltag	e										
G	1 x 230 V, 50/60 Hz										
Н	1 x 120 V, 50/60 Hz										
I	24 VDC										

10. Technical data

10.1 Design/enclosure class

Wall-mounted enclosure (distance from sensors up to three metres)	IP65
Control panel enclosure including separate potentiostat	IP54 (front)/ IP65 (sensor interface) (distance from sensor interface up to 100 metres, distance from sensor interface to sensors up to three metres)

10.2 General data

Input power	Approximately 15 VA		
Permissible ambient temperature	0 °C to +50 °C		
Permissible storage temperature	-20 °C to +65 °C		
Maximum relative humidity	90 % (non-condensing)		
Weight	1.5 kg		
Weight Enclosure	1.5 kg Plastic (control panel enclosure: noryl, wall-mounted enclosure: ABS)		

10.3 Electronic data and functions

10.3.1 Electronics

Display	Display High-resolution graphics LCD with background light Potential-free relay outputs 1 alarm relay, 2 controller relays (250 V/6 A, maximum 550 VA) Controller stop; proportional value, disturbance variable 0/4 to 20 mA; water sensor 4 analog outputs 0/4 to 20 mA, freely adjustable, maximum load 500 Ω Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values			
Potential-free relay outputs 1 alarm relay, 2 controller relays (250 V/6 A, maximum 550 VA) Signal inputs Controller stop; proportional value, disturbance variable 0/4 to 20 mA; water sensor 4 analog outputs 0/4 to 20 mA, freely adjustable, maximum load 500 Ω Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values Freely adjustable or fluoride For temperature or continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide, parameters from group 1 (chlorine, chlorine dioxide, parameters from group 1 (chlorine, chlorine dioxide,	Potential-free relay outputs 1 alarm relay, 2 controller relays (250 V/6 A, maximum 550 VA)	Electronics	16-bit microprocessor	
relays (250 V/6 A, maximum 550 VA) Signal inputs Controller stop; proportional value, disturbance variable 0/4 to 20 mA; water sensor 4 analog outputs 0/4 to 20 mA, freely adjustable, maximum load 500 Ω Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values For temperature or continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide,	relays (250 V/6 A, maximum 550 VA) Signal inputs Controller stop; proportional value, disturbance variable 0/4 to 20 mA; water sensor 4 analog outputs 0/4 to 20 mA, freely adjustable, maximum load 500 Ω Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values Freely adjustable outputs for measured values Freely adjustable analog outputs for measured values Freely adjustable outputs for measured for the parameter group 2 (pH, redox or fluoride) For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide, ozone, peroxide, peracetic acid)	Display		
Signal inputs value, disturbance variable 0/4 to 20 mA; water sensor 4 analog outputs 0/4 to 20 mA, freely adjustable, maximum load 500 Ω • Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid • Parameter group 2: pH, redox or fluoride • For temperature or continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide, ozone, peroxide, peracetic acid • Parameter group 2: pH, redox or fluoride • For temperature or continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide,	Signal inputs value, disturbance variable 0/4 to 20 mA; water sensor 4 analog outputs 0/4 to 20 mA, freely adjustable, maximum load 500 Ω • Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid • Parameter group 2: pH, redox or fluoride • For temperature or continuous control (0/4 to 20 mA) of the parameters from group 2 (pH, redox or fluoride) • For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide, ozone, peroxide, peracetic acid)		relays (250 V/6 A,	
Signal outputs 20 mA, freely adjustable, maximum load 500 Ω Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values Freely adjustable analog outputs for measured values For temperature or continuous control (0/4 to 20 mA) of the parameters from group 2 (pH, redox or fluoride) For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide,	Signal outputs 20 mA, freely adjustable, maximum load 500 Ω Parameter group 1: chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values Fro temperature or continuous control (0/4 to 20 mA) of the parameters from group 2 (pH, redox or fluoride) For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide, ozone, peroxide, peracetic acid)	Signal inputs	value, disturbance variable	
chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values For temperature or continuous control (0/4 to 20 mA) of the parameters from group 2 (pH, redox or fluoride) For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide,	chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride Freely adjustable analog outputs for measured values Freely adjustable analog outputs for measured values For temperature or continuous control (0/4 to 20 mA) of the parameters from group 2 (pH, redox or fluoride) For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide, ozone, peroxide, peracetic acid)	Signal outputs	20 mA, freely adjustable,	
	acid)	analog outputs for	chlorine, chlorine dioxide, ozone, peroxide, peracetic acid Parameter group 2: pH, redox or fluoride For temperature or continuous control (0/4 to 20 mA) of the parameters from group 2 (pH, redox or fluoride) For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide,	

10.3.2 Functions of the instrument amplifier

Display mode	Measured-value display: measured value with its unit, temperature display: in °C or °F
Temperature compensation	Manual or automatic with Pt100 (-5 °C to +120 °C)
Calibration	Manual calibration, or with automatic recognition of buffer solution

10.3.3 Proportional controller functions

10.3.3 Proportional	controller functions
Proportional value input	0-20 mA/4-20 mA or other value (freely adjustable between 0 mA and 20 mA)
Controller output	Proportional or inversely proportional
Controller output	Interpulse output, pulse frequency output, continuous controller output
Interpulse period	1 to 100 seconds (only with interpulse controller)
Minimum ON time T _{min}	0.1 to 10.0 seconds (only with interpulse controller)
Maximum frequency	1-180 pulses per minute (only with pulse frequency controller)
Basic load	0 to 100 % of dosing rate
Maximum dosing rate	0 to 100 % of dosing rate (value for maximum dosing rate < basic load is possible!)
Dosing factor D.F.	0.1 to 10 (weighting of proportional value)
Controller stop	Adjustable to NC or NO

10.3.4 Setpoint controller functions

10.3.4 Setponit con	troller fullctions
Controller output	Limit monitor, interpulse controller (P, PI, PID), pulse frequency controller (P, PI, PID), continuous controller (P, PI, PID)
Limit	0 to 100 % of measuring range, adjustable in the unit of the measured value (only with limit monitor)
Hysteresis	0 to 50 % of full-scale value, adjustable in the unit of the measured value (only with limit monitor)
Setpoint input	0 to 100 % of measuring range, adjustable in the unit of the measured value
Proportional band X _p	0.1 to 3000.0 %
Reset time T _n	1 to 3000 seconds, resolution 1 second (only with PI, PID controllers)
Derivative action time T _v	0 to 1000 seconds, resolution 1 second (only with PID controller)
Interpulse period	1 to 100 seconds (only with interpulse controller)
Minimum ON time T _{min}	0.1 to 10.0 seconds (only with interpulse controller)
Maximum frequency	1 to 180 pulses per minute (only with pulse frequency controller)
Basic load	0 to 50 % of dosing rate
Maximum dosing rate	Value (basic load + 1) to 100 % of dosing rate
Control direction	Adjustable to upward or downward control
Controller stop	Adjustable to NC or NO

10.3.5 Combined controller functions

Minimum ON time T _{min}	0.1 to 10.0 seconds (only with interpulse controller)
Maximum frequency	1 to 180 pulses per minute (only with pulse frequency controller)
Basic load	0 to 50 %
Maximum dosing rate	Value (basic load + 1) to 100 % of dosing rate
Control direction	Adjustable to upward or downward control
Controller stop	Adjustable to NC or NO
Disturbance variable input	0 to 20 mA/4 to 20 mA or other (freely adjustable between 0 and 20 mA)
Dosing factor D.F.	0.1 to 10.0 (weighting of disturbance variable)
-	•

CI ₂	CIO ₂	03	H ₂ O ₂	Peracetic acid	рН	Redox (ORP)	Fluoride
mg/l	mg/l	mg/l	mg/l	mg/l	рН	mV	mg/l
0.00 - 0.50	0.00 - 0.50	0.00 - 0.50	0 - 100	0 -100	0.00 - 14.00	- 1500 to + 1500	0.00 - 2.00
0.00 - 1.00	0.00 - 1.00	0.00 - 1.00	0 - 500	0 - 500	2.00 - 12.00	0 - 1000	0.00 - 5.00
0.00 - 2.00	0.00 - 2.00	0.00 - 2.00	0 - 1000	0 - 1000	5.00 - 9.00		
0.00 - 5.00	0.00 - 5.00	0.00 - 5.00	0 - 2000	0 - 2000			
0.00 - 10.00	0.00 - 10.0						
0.00 - 20.00							

ST56 - Boonah STP - Regional Lagoons Upgrade - Chemical Dosing Equipment - OM Manual

Note The measuring ranges are also freely adjustable (within the above-mentioned range limits).

10.5 Dimensions

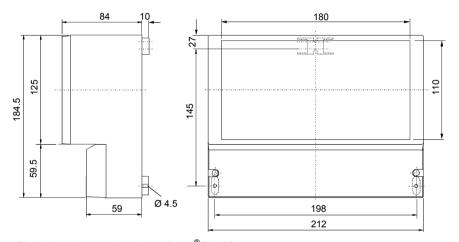


Fig. 2 Wall-mounted enclosure Conex® DIA-2Q

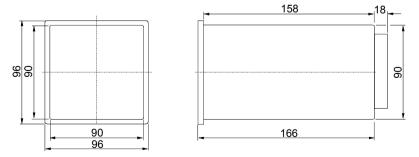


Fig. 3 Control panel enclosure Conex® DIA-2Q

11. Installation

11.1 Transport and storage

- Transport the device carefully, do not drop!
- · Store at dry and cool location.

11.2 Unpacking

- Check the device for damage.
 Install as soon as possible after unpacking.
- · Do not install or connect damaged devices!



Retain the packing material or dispose of it according to local regulations.

11.3 Installation requirements

- Dry room
- Room temperature: 0 °C to 50 °C
- · Vibration-free location.

Caution

If you do not observe the installation requirements, the device may be damaged!

The measurements may not be correct!

11.4 Installation in control panel

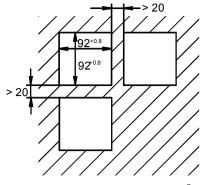


Fig. 4 Control panel enclosure Conex® DIA-2Q

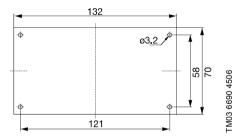


Fig. 5 Sensor interface

- 1. Make an opening of 92 + 0.8 mm x 92 + 0.8 mm in the control panel.
- 2. Slip on the supplied gasket.
- Insert the Conex[®] DIA-2Q into the opening from the front.

Caution

Do not damage the gasket! The gasket must be fitted exactly!

- 1. Hook the clamps into the tightening cones on the sides at the top and bottom.
- Secure the device from the rear using a screwdriver.
- Install a separate sensor interface near the sensors (maximum distance of three metres).

11.5 Installation of wall-mounted enclosure

Warning

 \bigwedge

Switch off the power supply before installing!

Enclosure class IP65 is only guaranteed if the terminal cover is correctly sealed, if the front panel of the terminal enclosure is closed and the appropriate cable glands or dummy caps fitted.

Caution

Do not damage the terminal cover gasket! The terminal cover gasket must fit exactly!

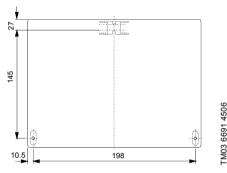


Fig. 6 Wall-mounted enclosure Conex® DIA-2Q

- Drill three holes (Ø8 mm) as shown in the diagram, and insert the supplied dowels.
- Screw the screw (A) into the top centre dowel until it projects by approximately 1 cm. See fig. 7.
- 3. Loosen the fastening screws of the front panel, and remove the front panel.
- 4. Hang the instrument onto the screw (A).
- 5. Tighten the instrument with the two screws (B).
- 6. Mount the front panel of the enclosure.

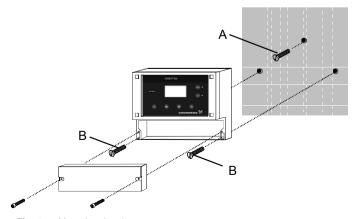


Fig. 7 Mounting drawing

A03 6692 A506

12. Commissioning/electrical connections

Warning



Switch off the power supply before installing!

Enclosure class IP65 is only guaranteed with the front panel of the terminals enclosure closed and with appropriate cable glands or dummy caps.

Warning



Switch off the power supply before connecting the power supply cable and the relay contacts! For safety reasons, the protective conductor must be connected correctly!

Observe the local safety regulations! Protect the cable connections and plugs against corrosion and humidity.

Before connecting the power supply cable, check that the supply voltage specified on the nameplate corresponds to the local conditions! An incorrect supply voltage may destroy the device!

Caution

To guarantee electromagnetic compatibility (EMC), the input and current output cables must be screened.

Connect the screening to the screen ground on one side.

Refer to the wiring diagram! Route the input, current output and power supply cables in separate cable channels.

Enclosure class IP65 is only guaranteed if the terminal cover is correctly sealed! Do not damage the gasket on the terminal cover!

Caution

The gasket on the terminal cover must be positioned precisely!

Do not damage the gasket!

Note

Unused terminals must remain open.

- 1. Remove the terminal cover on the front of the device.
- 2. Use the appropriate cable feedthroughs and tighten the screws carefully.
- 3. Connect the cables used to the terminals according to the Conex® DIA-2Q terminal assignment.
- 4. Close the terminal cover again with correctly positioned gasket.

12.1 Terminals

12.1.1 Wall-mounted enclosure Conex® DIA-2Q

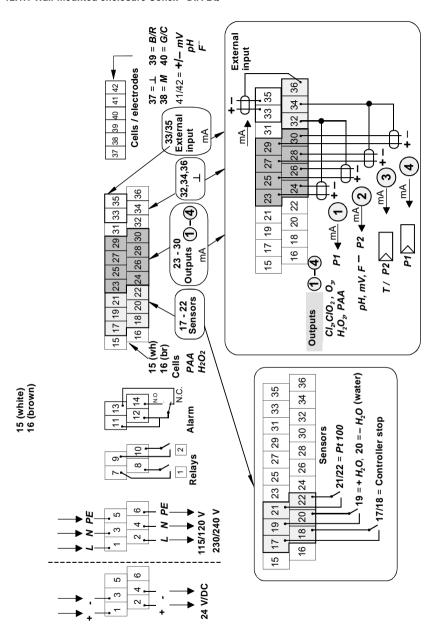


Fig. 8 Terminals of wall-mounted enclosure

TM03 6693 4506

12.1.2 Control panel enclosure Conex® DIA-2Q

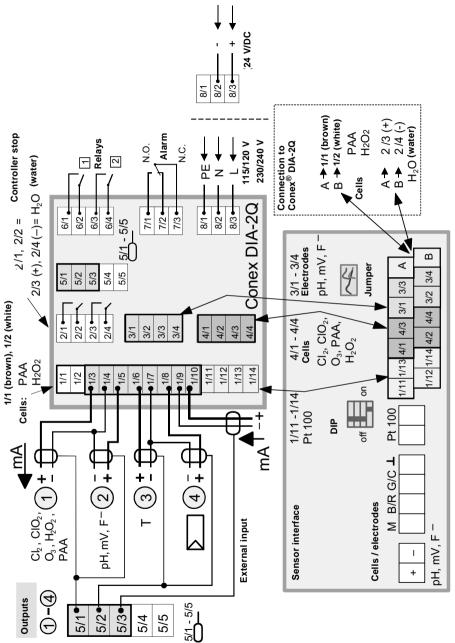


Fig. 9 Terminals of control panel enclosure

Legend of terminals Pos. Description Relays Relay 1 + 2 Alarm relay - N.O.: normally open Alarm - N.C.: normally closed Pt100 Temperature sensor H_2O Water sensor Controller stop Stop (NO or NC selectable) Outputs Current outputs [mA] Cl2 (chlorine), ClO2 (chlorine dioxide), O₃ (ozone), H₂O₂ 1 (hydrogen peroxide) or PAA (peracetic acid) 2 pH, mV (redox), F- (fluoride) T/P2: temperature/continuous 3 controller parameter 2 P1: output of continuous controller 4 parameter 1 External inputs [mA] Inputs Measuring cells, electrodes and Electrodes single-rod measuring chains М Measuring electrode B/R Reference electrode G/C Counter electrode Earth mV Redox electrode F-Fluoride electrode

Control panel enclosure Conex® DIA-2Q

- Conex[®] DIA-2Q: for installation in the control panel.
- Sensor interface: for installation near the sensors.

Use the following cable to connect the sensor interface to the **Conex**[®] **DIA-2Q**: shielded cable, 4 x 0.5 mm².

12.2 Power supply connection

- Control panel enclosure: Plug the plug strip into the corresponding terminal strip at the rear side of the device. Ensure correct orientation.
- Connect the protective earth conductor (PE) to terminal 5 (wall-mounted enclosure) or terminal 8/1 (control panel enclosure).
- Connect the neutral conductor (N) (or the conductor with 24 V version) to terminal 3 (wall-mounted enclosure) or terminal 8/2 (control panel enclosure).
- Connect phase (L1) (or the + conductor with 24 V version) to terminal 1 (wall-mounted enclosure) or 8/3 (control panel enclosure).

Switch the device on and off by switching the power supply on and off accordingly. The device itself is not equipped with a separate on/off switch.

12.3 Relay outputs

Note

The connection of the relay outputs depends on the application and the final control elements used. Therefore the connections described below should only be considered as quidelines.

With inductive loads (also relays and contactors), interference suppression is necessary. If this is not possible, protect the relay contacts using a suppressor circuit as described below.

· With AC voltage:

Current up to	Capacitor C	Resistor R
60 mA	10 nF, 275 V	390 Ω, 2 W
70 mA	47 nF, 275 V	22 Ω, 2 W
150 mA	100 nF, 275 V	47 Ω, 2 W
1.0 A	220 nF, 275 V	47 Ω, 2 W

 With DC voltage: Connect the free-wheeling diode in parallel to relay or contactor.

Caution

Provide the relay outputs with a corresponding backup fuse!

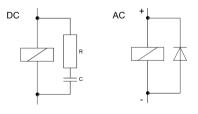


Fig. 10 Suppressor circuit, DC/AC

screen

TM03 7209 4506

ST56 - Boonah STP - Regional Lagoons Upgrade - Chemical Dosing Equipment - OM Manual

12.4 Current output



Make sure that the polarity of the current output is correct!

Maximum load: 500 Ω.

The current output can be set to one of the two standard ranges "0-20 mA" or "4-20 mA", or it can be freely adjusted.

Connect the screen to earth (PE) at one end.

Output 1: chlorine, chlorine dioxide, ozone, hydrogen peroxide or peracetic acid (parameter 1)

This current output shows the displayed measured value as an analog current signal.

Use of current signal for measured values:

- · as input signal for another indicator
- · as input signal for an external controller.
- Connect the + conductor to terminal 23 (wall-mounted enclosure) or terminal 1/3 (control panel enclosure).
- Connect the conductor to terminal 24 (wall-mounted enclosure) or terminal 1/4 (control panel enclosure).

Output 2: pH, redox or fluoride (parameter 2)

This current output shows the displayed measured value as an analog current signal.

Use of current signal for measured values:

- as input signal for another indicator
- · as input signal for an external controller.
- Connect the + conductor to terminal 25 (wall-mounted enclosure) or terminal 1/5 (control panel enclosure).
- Connect the conductor to terminal 26 (wall-mounted enclosure) or terminal 1/4 (control panel enclosure).

Output 3: continuous controller parameter 2 (or temperature)

Shows the calculated actuating variable signal of the controller as an analog current signal.

Use of actuating variable signal:

 as input signal for a final control element with current input

or temperature output:

Shows the temperature measured by the optional temperature sensor as an analog current signal.

Use of temperature current signal:

- · as input signal for another indicator.
- Connect the + conductor to terminal 27 (wall-mounted enclosure) or terminal 1/6 (control panel enclosure).
- Connect the conductor to terminal 28 (wall-mounted enclosure) to terminal 1/7 (control panel enclosure).

Output 4: continuous control parameter 1

This current output shows the calculated actuating variable signal as an analog current signal.

Use of actuating variable signal:

- as input signal for a continuous final control element.
- Connect the + conductor to terminal 29 (wall-mounted enclosure) or terminal 1/8 (control panel enclosure).
- Connect the conductor to terminal 30 (wall-mounted enclosure) or terminal 1/7 (control panel enclosure).

12.5 Connections of controller stop, sample-water sensor and temperature sensor

Connecting the controller stop

- Connect the + conductor to terminal 17 (wall-mounted enclosure) or terminal 2/1 (control panel enclosure).
- Connect the conductor to terminal 18 (wall-mounted enclosure) or terminal 2/2 (control panel enclosure).

Connecting the sample-water sensor

Cable colours and marking: See connections of measuring-cell types AQC-D1/AQC-D2/AQC-D3.

- Connect the + conductor to terminal 19 (wall-mounted enclosure) or terminal 2/3 (control panel enclosure).
- Connect the conductor to terminal 20 (wall-mounted enclosure) or terminal 2/4 (control panel enclosure).



When using measuring cell AQC-D2, the water sensor must always be connected and activated!

Connecting the Pt100 temperature sensor

- Connect the + conductor to terminal 21 (wall-mounted enclosure) or terminal 1/11 (control panel enclosure).
- Connect the conductor to terminal 22 (wall-mounted enclosure) or terminal 1/12 (control panel enclosure).

TM03 6696 4506

12.6 Connection of measuring cells

Jumper setting

- All measuring values except for peroxide: All cell types: position 1 (standard).
- Measuring value peroxide: Cell type HP (peroxide): position 1 (standard).
- Measuring value peroxide: Cell types AQC-D1/AQC-D3: position 2 (move the wire strap of the jumper (blue) to the higher position).

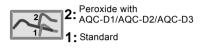


Fig. 11 Jumper setting

12.6.1 Connection of wall-mounted enclosure Conex® DIA-2Q

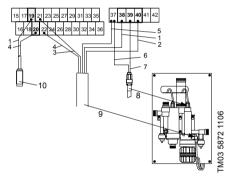


Fig. 12 Connection to measuring cells AQC-D1/AQC-D2/AQC-D3

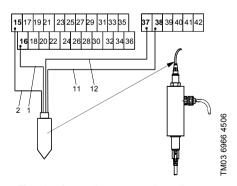
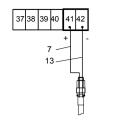


Fig. 13 Connection to measuring cells PA (peracetic acid)/HP (peroxide)



TM03 6967 4506

Fig. 14 Connection to single-rod measuring chains for pH, redox and fluoride

12.6.2 Connection of control panel enclosure Conex[®] DIA-2Q

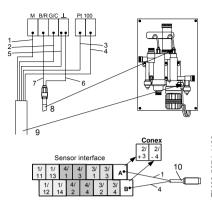


Fig. 15 Connection to measuring cells AQC-D1/AQC-D2/AQC-D3

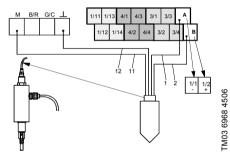


Fig. 16 Connection to measuring cells PA (peracetic acid)/HP (peroxide)

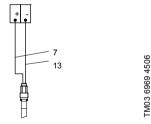


Fig. 17 Connection to single-rod measuring chains for pH, redox and fluoride

Pos.	Description			
1	Brown			
2	White			
3	Black			
4	Blue			
5	Screen			
6	Outer conductor (screen)			
7	Inner conductor			
8	Reference electrode			
	Measuring electrode			
9	Counter electrode			
	Pt100 temperature sensor			
10	Water sensor			
11	Yellow			
12	Green			
13	Outer conductor			

Peculiarities for the connection at the control panel enclosure of Conex® DIA-2Q

- First connect the measuring cells, the single-rod measuring chains and the water sensor (if present) to the separate sensor interface.
- Secondly, connect the sensor interface to the Conex[®] DIA-2Q control panel enclosure.

Connecting the sensor interface to the Conex® DIA-2Q (see back side of device)

- Measuring cells AQC-D1/AQC-D2/AQC-D3, PA (peracetic acid)/HP (peroxide) Connect terminals 4/1 to 4/14 of the sensor interface to the corresponding terminals of the Conex® DIA-2Q.
- Measuring cells HP (peroxide)/ PA (peracetic acid)
 In addition, connect terminal A to terminal 1/1 and terminal B to terminal 1/2 of the Conex® DIA-2Q.
- Single-rod measuring chains (pH, redox, fluoride)
 Connect terminals 3/1 to 3/4 of the sensor interface to the corresponding terminals of the Conex® DIA-2Q.
- Sample-water deficiency sensor
 Connect terminal A to terminal 2/3 and terminal B to terminal 2/4 of the Conex[®] DIA-2Q.

When using measuring cell AQC-D2, the water sensor must always be connected and activated!

DIP switch

Note

 If necessary, set the DIP switch for the desired measured value to "On" (move the switch to the right, top switch 1 is not used).

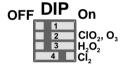


Fig. 18 DIP switch

TM03 6970 4506

13. Operation

13.1 Control and display elements

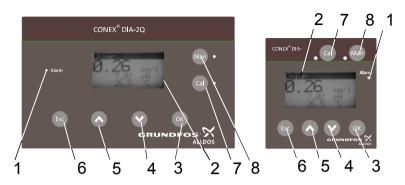


Fig. 19 Wall-mounted enclosure and control panel enclosure

Pos.	Description
------	-------------

Control elements

Red alarm LED

- Flashes in case of faults or incorrect entries
- 2 Display

Operating buttons

[OK] button

- Enters the selected menu.
 - · Confirms the selected line or value.

[Down] button

- Moves one line downward (the selected line is displayed inversely).
 - · Decreases values.

[Up] button

- Moves one line upward (the selected line is displayed inversely).
 - · Increases values.

[Esc] button

6

7

- Returns to the previous menu.
 - The data which were entered last are not changed.

Function buttons with yellow LED

[Cal] button

- Switches between calibration mode and measuring mode.
 - In calibration mode, the corresponding LED illuminates.

[Man] button

- Switches between automatic and manual modes.
 - In manual mode, the corresponding LED illuminates.

13.2 Display elements during initial commissioning

When connected to the power supply on the device's initial commissioning and following the start-up indication, the display shows the "Sprache/language" menu.



 The word "language" in the header is displayed in all available languages successively at intervals of approximately one second.

Start the **Conex**[®] **DIA-2Q** by selecting the desired operating language:

- Select the desired language using the [Up] and [Down] buttons.
 - The selected language is displayed inversely (white letters on black background).
- 2. Press [OK] to confirm.

The selected language is stored and will remain the operating language when the device is rebooted. If necessary, the operating language can be changed in the "language" submenu in the "setup" menu.

See section 13.5 Setup.

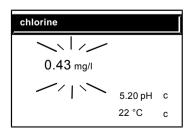
Note

The translations for the words "setup" and "language" into the currently available languages are:

uic.				
Deutsch				
Hauptmenü	Grundeinstellung	Sprache		
English				
main menu	setup	language		
Français				
Menu principal	Paramétrage	Langue		
Nederlands				
hoofdmenu	basisinstelling	taal		
Español				
Menu principal	Ajuste básico	Idioma		
Italiano				
Menu principale	programm. fond.	lingua		
Português				
Menu principal	Posição inicial	Língua		
Русский				
главное меню	станд. настройка	язык		
Polski				
manu główne	ustawienia	język		

chlorine	
0.43 mg/l	

- After selecting and confirming the operating language by pressing [OK] during initial commissioning, the display shows "chlorine" as the value to be measured.
 - On subsequent start-ups, the display will show the measured value selected the previous time.



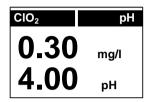
 On upward or downward violation of the selected measuring range, the display will show the upper or lower limit and flash. See sections 10.4 Measuring ranges and 13.5.4 Setting the measuring ranges for chlorine, chlorine dioxide, ozone, peroxide, peracetic acid, pH, redox and fluoride.

13.2.1 Display modes

Switching between display modes 1 and 2:

1. Use the [Up] and [Down] buttons to switch between the two display modes:

Display mode 1 with two parameters

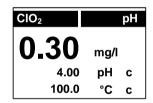


M03 6971 4506

The large display shows the measured values for the two parameters (for example CIO₂ and pH). The inverted font in the header displays the two parameters left-justified and right-justified.

The measured value for the left-justified parameter 1 is displayed in the first line, and the measured value for the right-justified parameter 2 is displayed in the second line underneath the header. The measured value for a possibly active temperature measurement is not output in this display mode.

Display mode 2 with two parameters



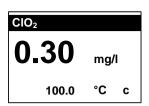
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The large display shows the measured values for parameter 1, and the small display shows the measured values for parameter 2 and the possibly active temperature measurement. "c" is displayed if the compensation functions are active.

M03 6704 4506

M03 6973 4506

Display with one parameter



The large display shows the measured values, and the selected parameter is displayed in the header. The measured value for a possibly active temperature measurement is output in the second line. "c" is displayed if the compensation functions are active.

Alarm signals

A parameter-based alarm refers to the flashing parameter in the header. Parameter-independent alarms are displayed in the bottom line, but the display does not flash for this alarm.

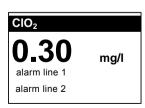
If several alarms are present, they can be scrolled using the [Up] and [Down] buttons. They are displayed in chronological order. The selected alarm signal is displayed with inverted font. Subsequently, the display is switched to the last display mode set.

Display mode with active alarms and two parameters

рН
4.00

The parameters are displayed left-justified and right-justified in the header, and the measured values of the parameters are displayed directly underneath. The measured value for a possibly active temperature measurement and the display "c", if the compensation functions are active, are suppressed.

Display mode with active alarms and one parameter



The large display shows the measured values, and the selected parameter is displayed in the header. The measured value for a possibly active temperature measurement and the display "c", if the compensation functions are active, are suppressed.

13.3 Software overview

Provided that the code numbers for access right have been set, some menus (and submenus) as well as the functions Cal and Man are protected against unauthorised access. The protected menus are marked with "C" (calibration rights) or "F" (full rights).

Main menus

Note

- Controller 1/2, see section Controller 1/2.
- Alarm 1/2, see section Alarm 1/2.
- Service, see section Service.
- Setup, see section Setup.

Function buttons

- Cal. see section Calibration function.
- · Man, see section Manual operation.

Controller 1/2

"F" (full rights)

Setting the parameters

- Relay 1/2
 - setpoint
 - controller parameters.
- · Continuous controller
 - setpoint
 - controller parameters.

Alarm 1/2

"F" (full rights)

- Alarm settings
 - alarm 1/2 values (switching points)
 - effective direction
 - hysteresis
 - alarm delay.
- · Dosing time monitoring
 - maximum dosing time (at constant dosing flow level of 100 %).

Service

TM03 6974 4506

- Calibration logbook 1/2
 - the last 10 calibrations.
- Calling up the controller 1/2 settings
- Test of functioning of current outputs
- Test of functioning of relays
- Test of functioning of display.

M03 6975 4506

Note

Setup

"F" (full rights)

- Selecting language
- · Parameter 1/2: selecting measured values
- Selecting measuring cell
- · Selecting measuring range
- Configuration of controller 1/2
- Switching on/off water sensor
- Time setting
- Code function
- Display contrast
- · Calling up factory settings
- Current output: assignment of current outputs to measuring ranges
- Calling up program version.

Calibration function

"C" (calibration rights)

- · Calibration of selected parameters
 - chlorine, chlorine dioxide, ozone, peroxide, peracetic acid, pH, fluoride.

Manual operation

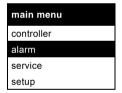
"C" (calibration rights)

Running the configured controllers manually.

13.4 Main menu

 Switch to "main menu" by pressing [OK] or, if necessary, by pressing [Esc] several times.

Options in "main menu"



"controller"

In this submenu, a controller can be parameterised. This option will only be displayed if a type of controller has been selected in the "setup" menu.

· "alarm"

In this submenu, the measured value is compared with the permitted value, and an alarm is triggered, if necessary.

"service"

Diagnosis submenu. The measured values and the last 10 alterations of calibration data can be viewed. In this mode, values cannot be altered. If measuring cell AQC-D2 is selected, the data of the water sensor can be viewed.

"setup"

In this submenu, the settings for language, parameters, measuring ranges, controllers, etc. can be adjusted.

Selecting the functions "calibration" and "manual operation"

See the buttons [Cal] and [Man] to the right of the display.

- Calibration: Press [Cal] to switch to the calibration menu (the yellow LED illuminates).
- Manual operation: Press [Man] to switch to manual operation (the yellow LED illuminates).

Switching to manual operation is only possible if a controller type has been selected in the "setup" menu. The functions "Cal" and "Man" can only be accessed by persons with calibration rights or full rights.

All standard settings of the device can be defined in the "setup" menu. During initial commissioning, basic functions are configured which after that should only be altered rarely or even not at all.

The "setup" menu can only be accessed by persons having full rights.

See section 13.5.8 Code function.

Enter the code number.

13.5.1 Selection of measured values for chlorine, chlorine dioxide, ozone, peroxide, peracetic acid, pH, redox and fluoride

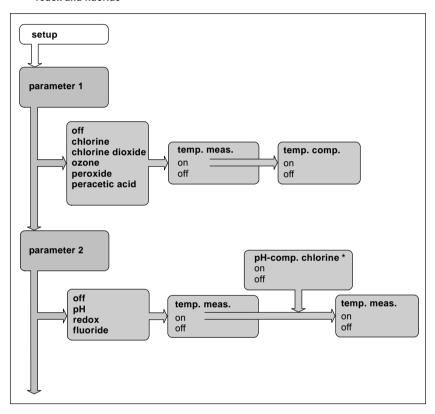


Fig. 20 Selection of measured value in menus "parameter 1" and "parameter 2"

- * pH-comp. chlorine is only available if chlorine and pH have been selected as parameters.
- Select the line "parameter 1"/"parameter 2" using the [Up] and [Down] buttons, and press [OK] to switch to the corresponding menu.
- Use the [Up] and [Down] buttons to select the measured variable (parameter). Press [OK] to confirm.
- Use the [Up] and [Down] buttons to select further settings. Press [OK] to confirm.

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13.5.2 pH and temperature compensation

pH compensation with chlorine measurement

The dissociation of hypochlorous acid (HOCI) into the hypochlorit-anion (OCI⁻) leads to a loss of slope (loss of sensitivity) of the sensor for chlorine measuring.

Using a mathematical compensation function, this loss of sensitivity can be eliminated.

Temperature compensation

Using a compensation function, the influence of temperature on the measurement can be eliminated mathematically.

Control field for pH value, pH compensation, temperature and temperature compensation in the display of measured value

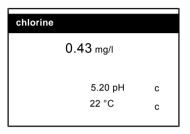


Fig. 21 Chlorine measurement with pH and temperature compensation

 Press [Esc] once or twice to change to the display with the measured value.

See sections 13.2 Display elements during initial commissioning and 13.6.3 Controller control fields on the display.

In addition to the current measured value, the current pH value and the temperature of the sample water are indicated as well.

With activated pH compensation or temperature compensation, the letter "c" for "compensation" is displayed at the end of the line.

With deactivated temperature measurement, the water temperature for compensation should be entered manually after calibration.

See section 13.9.2 Calibrating the pH value.

13.5.3 Selection of measuring cell

The "measuring cell" submenu is shown only if the measured values chlorine, chlorine dioxide, ozone, peroxide or peracetic acid were selected during the parameterisation.

Names of the measuring cells contained in the software

- AQC-D1
- AQC-D2
- AQC-D3

M03 6703 4506

HP (peroxide).

The measuring cell that corresponds to the selected measured value can be selected:

- AQC-D1/AQC-D2/AQC-D3 with chlorine, chlorine dioxide or ozone
- · AQC-D1/AQC-D3, HP with peroxide.

The measuring cell PA (peracetic acid) is selected automatically if "peracetic acid" is selected as the measured value.

Monitoring the cleaning motor (measuring cells AQC-D1)

Having selected measuring cell type AQC-D1, press [OK] to get to the "cleaning motor" submenu.

 Switch the monitoring of the cleaning motor on/off.

Measuring cell AQC-D2/-D3 selected

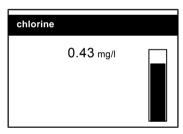


Fig. 22 Chlorine measurement with AQC-D2/-D3

A black bar on the display indicates the actual data of the water sensor.

See installation and operating instructions for the potentiostatic measuring cell AQC-D2/-D3.

LM03 6708 4506

13.5.4 Setting the measuring ranges for chlorine, chlorine dioxide, ozone, peroxide, peracetic acid, pH, redox and fluoride

In the "measuring ranges" menu, the corresponding measuring ranges are assigned to the measured values which have been selected in the "parameters" menu.

- In the "measuring ranges" menu, the following options are available:
 - standard measuring ranges
 - "others."

See section 10.4 Measuring ranges.

 The measuring ranges for temperature can be defined in °C (Celsius) or in °F (Fahrenheit).



The "temperature" submenu is only shown if the temperature measurement has been switched on in the "parameter" menu, or if parameter pH or fluoride has been selected.

13.5.5 Controller parameters 1/2

See section 13.6 Selection, configuration and parameterisation of the controller in order to adjust the controllers.

13.5.6 Water sensor

In the "wat. def. sensor" menu, the water sensor can be switched on/off.

In the event of sample-water deficiency, the following will occur:

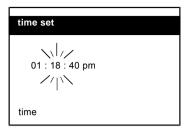
- The malfunction-indicating relay is activated, and the alarm message "fault water sensor" is triggered.
- With devices with control functions, the actuators are switched to passive or closed.



The water sensor must be switched on for the measuring cell AQC-D2!

13.5.7 Setting the current time (date/time/summer time)

 Switch from the "setup" menu to the "date/time" menu.



TM03 6709 4506

Fig. 23 Time setting

- 2. Set the device to the current time in the "time set" menu in the format hh mm ss
 - Press [OK] to switch to the next number field.
 The number field which is currently activated flashes
 - Alter the settings by pressing the [Up] and [Down] buttons.
 - Pressing the buttons continuously makes the adjustment dynamically faster.
- Set the device to the current date in the "date" menu in the format mm.dd.yyyy with English as operating language or the format dd.mm.yyyy for all other languages similarly to the adjustment of time. The corresponding day of the week (Mo...Su) is displayed automatically.
- If necessary, enter the beginning and end date of the summer time, the kind of time shift and the number of hours of the time shift

Note

13.5.8 Code function

The code function is designed to protect the device from unauthorised access.

Entering the four-digit code number and changing it

 Select the line "code function" in the "setup" menu using the [Up] and [Down] buttons, and press [OK] to switch to the corresponding menu.

There are two types of access rights:

Calibration rights: The owner of calibration rights has access to the calibration menu and to manual operation.

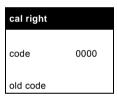
The owner of calibration rights may do the following:

- alter calibration data
- operate control relays manually.

Full rights: The owner of full rights has full access to all settings including calibration data.

The owner of full rights may do the following:

- alter calibration data
- alter setup
- parameterise the controller
- · alter alarm settings
- · run the device manually.



- 2. Select the desired type of access rights, and press [OK] to get to the corresponding menu.
- If an old code exists, confirm the old code number first (on first use, confirm code 0000).
- 4. Select "change".
- Enter the old code in the submenu (see comment line at the bottom of the display) using the [Up] and [Down] buttons, and press [OK] to confirm and switch to the query "new code" (see the comment line at the bottom of the display).
- Enter a new four-digit code number using the [Up] and [Down] buttons. Press [OK] to confirm.
- Repeat to confirm: Set a new four-digit code number using the [Up] and [Down] buttons, and press [OK] to confirm.
- Access rights can be cancelled by deleting the corresponding code number in the "delete" submenu.
- Entering a valid four-digit code number gives the operator access to the corresponding functions for a limited time of 60 minutes.
- If no code was entered previously, the desired menu can be accessed without restrictions.
 The code number 0000 will not be displayed/the operator will not be asked to enter it.

If a wrong code is entered, access to the corresponding menus is denied. An error message is triggered (duration: five seconds), and the device will return to "main menu".

Reset function

- Entering the code number "1998" deletes all previously entered code numbers.
- All prior access codes are deleted and reset to "0000"

13.5.9 Adjusting display contrast

In the "display" menu, the contrast of the display can be adjusted.

 Switch from the "setup" menu to the "display" menu using the [Up] and [Down] buttons, and press [OK] to confirm.

Note

If the contrast setting is too high, it may not be possible to read the display. Hold down the [Down] button until the contrast setting is low enough to be read again.

13.5.10 Saving/accessing user settings

In the "factory setting" submenu, the current device setting can be saved so that it can be reactivated later, or a saved setting can be activated.

- Setup
 - Save setup: Saves all current device settings from the menus (not just the "setup" settings).
 - Activate setup: Resets the device to the last saved setup.

In this menu, save your device settings once you have set all the values in the "setup", "controller" and "alarm" menus. You can then activate them again at any time (even after a factory reset)!

Note

33

13.5.11 Factory setting reset

In the "factory setting" submenu,

the Conex® DIA-2Q can also be reset to the factory setting using code 6742.

Caution

Only use this function in an emergency. All device settings are lost and must be re-entered!

Do not disconnect the device from the power supply during the reset!

Resetting the Conex® DIA-2Q to the factory setting

- Reset
 - Code 0000 is displayed.
 - Set code 6742 using the [Up] and [Down] buttons, and press [OK] to confirm.

The device is now returned to the original factory setting.

Before subsequent start-up:



Check all parameters and set the device again according to your application!

General factory settings

- Language**: The Conex® DIA-2Q is waiting for language input. The languages "Deutsch/English Français...." are indicated alternately.
- · Summer time: off.
- Code numbers: 0000 calibration rights, 0000 full rights.
- Current outputs 1-4: 0-20 mA.
- · Dosing monitoring: off.
- Parameter 1: chlorine.
- Parameter 2: off.
- ** For the first calibration, the default value = last setting.

Default values for parameter group 1

	CI ₂	CIO ₂ /O ₃	PAA	H_2O_2
Measuring range [mg/l]	0.00 - 2.00	0.00 - 1.00	0 - 100	0 - 100
Measuring cell	AQC-D1	AQC-D1	PA (peracetic acid)	AQC-D1
Temperature measurement	off	off	off	off
Water sensor	off	off	off	off

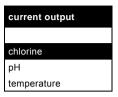
Default values for parameter group 2

	pН	Redox	Fluoride
Measuring range	0.00 - 14.00	0 - 1000	0.00 - 2.00
Temperature measurement	off	off	off
Water sensor	off	off	off

13.5.12 Current outputs

In the "current output" menu, the operator can assign the selected values to the current outputs and then assign the current outputs to the selected measuring ranges.

In the "current output" menu, the selected parameters are listed in the following order:

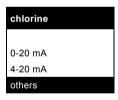


- Output 1, parameter group 1: chlorine, chlorine dioxide, ozone, hydrogen, peroxide and peracetic acid
- Output 2, parameter group 2: pH, redox, fluoride
- Output 3: temperature or continuous controller for parameters from group 2
- Output 4: continuous controller for parameters from group 1.

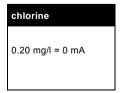
Assignment of the current outputs to the measuring range (example: chlorine measurement)

There are two standard ranges, "0-20 mA" and "4-20 mA" which can be assigned to the current outputs. They are assigned to the measuring range linearly.

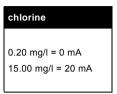
The start-of-scale and full-scale values can be freely defined within 0 to 20 mA in an optional setting for the current outputs 1 and 2 as well as for current output 3 with temperature measurements.



- In the corresponding submenu (for example chlorine), select the line "others" using the [Up] and [Down] buttons. Press [OK] to confirm.
- In the subsequent display "0.00 mg/l", enter the start-of-scale value of the range using the [Up] button. Press [OK] to confirm.
 - In the same line, "= 0 mA" is displayed.

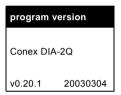


- Enter the associated start-of-scale current value using the [Up] button. Press [OK] to confirm.
 - An additional line is displayed with the scan for the full-scale value of the range "20.00 mg/l".
- Enter the full-scale value of the range using the [Down] button. Press [OK] to confirm.
 - In the same line, "= 20 mA" is displayed.



 Enter the associated full-scale current value using the [Down] button. Press [OK] to confirm and return to the "current output" menu.

13.5.13 Program version



In case problems make it necessary to contact our service department, the "program version" menu enables the operator to easily identify the software components of the actual device.

- Version, for example v0.20.1.
- · Last update: yyyymmdd.

It takes two steps to set up the controller:

- First: selection and configuration of the controller type in the "setup" menu, "controller" submenu.
- Second: parameterisation of the selected controller type in "main menu", "controller" submenu.

13.6.1 Selection and configuration of the controller

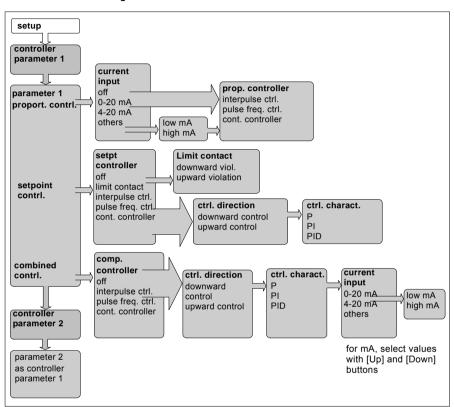


Fig. 24 Selection and configuration of the controller

 In the "setup" menu, select the line "controller parameter 1" or "controller parameter 2" using the [Up] and [Down] buttons, and select the menu with the same name using [OK]. TM03 6740 4506

Selection and configuration of the proportional controller

- Mark the "proport. contrl" line using the [Up] and [Down] buttons, and select using [OK].
- Select the current input of the ratio value using the [Up] and [Down] buttons as one of the following:
 - off
 - 0-20 mA
 - 4-20 mA
 - others

and confirm using [OK].

If "others" is selected:

- Adjust the current range freely between 0 and 20 mA by doing the following:
 - setting the start-of-scale value in the "Low mA =" line using the [Up] and [Down] buttons
 - setting the full-scale value in the "High mA =" line using the [Up] and [Down] buttons.
- Use the [Up] and [Down] buttons to select one of the following:
 - interpulse controller (two-position controller)
 - pulse frequency controller (two-position controller)
 - continuous controller

and confirm using [OK].

Selection and configuration of the setpoint controller

- Mark the "setpoint contrl" line using the [Up] and [Down] buttons, and select using [OK].
- Select the controller using the [Up] and [Down] buttons as one of the following:
 - off
 - limit contact
 - interpulse controller (two-position controller)
 - pulse frequency controller (two-position controller)
 - continuous controller

and confirm using [OK].

If "limit contact" is selected:

- Use the [Up] and [Down] buttons to select the switching direction as one of the following:
 - downward violation
 - upward violation

and confirm using [OK].

If "interpulse ctrl.", "pulse freq. ctrl" or "cont. controller" is selected, the following applies:

- 4. Use the [Up] and [Down] buttons to select the control direction as one of the following:
 - downward control (switches with upward violation of setpoint)
 - upward control (switches with downward violation of setpoint)

and confirm using [OK].

- Use the [Up] and [Down] buttons to select the control response as one of the following:
 - P (proportional controller),
 - PI (proportional-plus-integral controller)
 - PID (proportional-plus-integral-plus-derivative controller)

and confirm using [OK].

Selection and configuration of the combined controller

- Mark the line "combined controller" using the [Up] and [Down] buttons, and select using [OK].
- 2. Use the [Up] and [Down] buttons to select the controller output as one of the following:
 - off
 - interpulse controller (two-position controller)
 - pulse frequency controller (two-position controller)
 - continuous controller

and confirm using [OK].

- Use the [Up] and [Down] buttons to select the control direction as one of the following:
 - downward control (switches with upward violation of setpoint)
 - upward control (switches with downward violation of setpoint).

and confirm using [OK].

- 4. Use the [Up] and [Down] buttons to select the control response as one of the following:
 - P (proportional controller)
 - PI (proportional-plus-integral controller)
 - PID (proportional-plus-integral-plus-derivative controller) and confirm using [OK].
- Use the [Up] and [Down] buttons to select the current input (disturbance variable) as one of the following:
 - 0-20 mA
 - 4-20 mA
 - other

and confirm using [OK].

If "others" is selected:

- Adjust the current range freely between 0 and 20 mA by doing the following:
 - setting the start-of-scale value in the line"Low mA =" using the [Up] and [Down] buttons
 - setting the full-scale value in the line
 "High mA =" using the [Up] and [Down]
 buttons

 Select a controller in the "setup" menu and configure it.

See section 13.5.5 Controller parameters 1/2.

Select the line "controller" in "main menu" using the [Up] and [Down] buttons, and press [OK] to switch to the "controller" menu.

See section 13.4 Main menu.

Note The "controller" option in "main menu" is only available if a controller has been selected in the "setup" menu!

The options available in the "controller" submenu (main menu) correspond to the configuration made in the "setup" menu.

 Use the [Up] and [Down] buttons to change internal setpoints within the selected measuring range.

See section 10.4 Measuring ranges.

 Select the displayed controller parameters using the [Up] and [Down] buttons, press [OK] to switch to the desired submenu, and use the [Up] and [Down] buttons to adjust the setpoints as needed within the permitted ranges.

See section 10.3 Electronic data and functions.

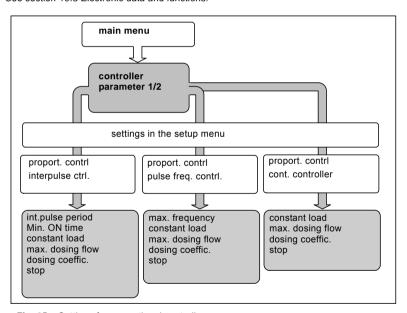


Fig. 25 Settings for proportional controllers

J03 6741 4506

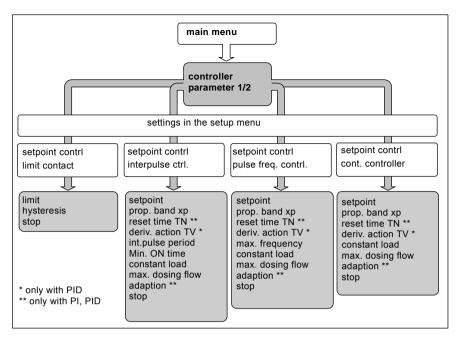


Fig. 26 Settings for setpoint controllers

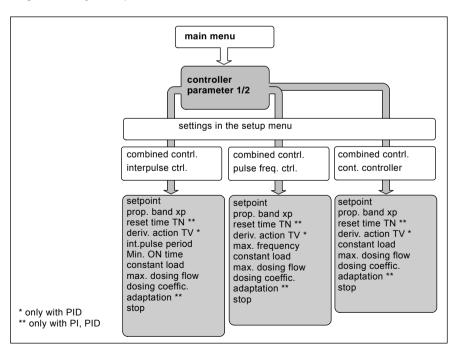


Fig. 27 Settings for combined controllers

TM03 6976 4506

13.6.3 Controller control fields on the display

 Press [Esc] once or twice to switch to the display "measured value".

See sections 10.2 General data and 13.2.1 Display modes.

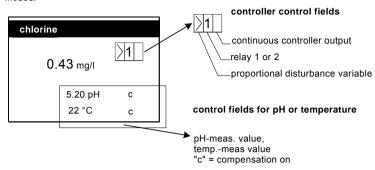


Fig. 28 Chlorine measurement with pH and temperature compensation

 The display with the measured value always refers to the measuring range 0-20 mA.
 Depending on the current input (proportional or disturbance variable), it is displayed unfilled or partially to completely filled (inverted font in latter case).

Unfilled (at 0 mA):



Partially filled (at 0 < x < 20 mA):



Completely filled (at 20 mA):



 The control fields for relays 1 and 2 appear as follows for configured limit monitors/two-position controllers:

Unfilled field for relay off:



Filled field (displayed inversely) for relay on:



 The control field for the continuous controller is empty, partially filled or completely filled depending on the set dosing rate - and when configured accordingly - and the filling of the bar always refers to 100 % of dosing rate.

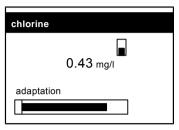
Example:
0 %:
50 %:
100 %:

13.6.4 Adaptation

An adaptation can be started to simplify the setting of the controller parameters.

The adaptation is only available for PI and PID controllers.

 Start adaptation in the "controller" menu (main menu) under "adaptation" by pressing "start".



TM03 6715 4506

Fig. 29 Chlorine measurement with adaptation of continuous controller

- Return to the display "measured value" automatically. A black bar on the display indicates the adaptation process. The LED next to [Man]/[AUTO] flashes during the whole adaptation. A progress bar shows the advancement of the adaptation.
- The configured controllers can only be adapted separately.
- On upward control, the measuring value has to be more than 20 % below the setpoint
- On downward control, the measuring value has to be more than 20 % above the setpoint.

In case of a fault, the message "Start conditions false" is shown directly after the start.

- 3. The message "adaptation successful" is shown after ending the adaptation.
- Press [OK] or [Esc] to quit. The determined controller settings are automatically adapted by the parameterisation of the controller. They are displayed in the adaptation menu under "adapt. result".
- If the adaptation was not successful, the message "adaption abortive" is shown. Press [OK] or [Esc] to quit.

The adaptation may be aborted in the following cases:

- If an error message was shown during the adaptation.
- · If the controller is set to manual operation.
- If the standstill time was more than one hour.
- If the total measuring time was more than two hours.

Note

With selected temperature/pH/redox measurement, the temperature value, pH/redox value and their compensations will not be displayed during the adaptation.

13.7 "Alarm" menu

With the help of the alarm function, the measured value can be monitored and compared with the permitted range.

If the measured value exceeds the limits of the measuring range, an alarm is triggered.

- The alarm relay is deactivated after the selected alarm delay time.
- When the cause of the alarm has been removed, the relay is deactivated immediately (without delay).

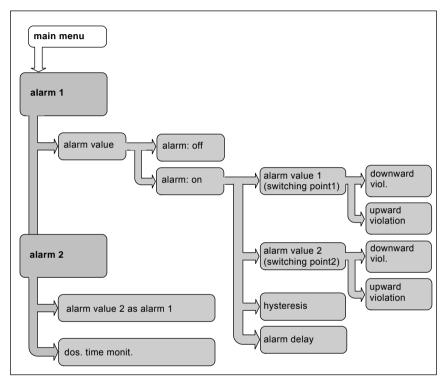
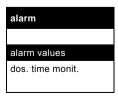


Fig. 30 "Alarm" menu in "main menu"

- Select the line "alarm" in "main menu" using the [Up] and [Down] buttons.
- 2. Press [OK] to switch to the "alarm" menu.

Two functions are available there:



- alarm values: If the measured value exceeds the permitted range, the alarm relay is activated and an alarm message is triggered. The red alarm LED starts flashing.
- dos. time monit.: If the dosing flow constantly remains at 100 % during a selected maximum dosing time, the alarm relay is activated and an alarm message is triggered. The red alarm LED starts flashing.

FM03 6737 4506

13.7.1 Setting the alarm values

- Select the line "alarm values" using the [Up] and [Down] buttons. Press [OK] to switch to the "alarm on/alarm off" submenu.
- Confirm the line "alarm on" using [OK], and select the "alarm values" selection menu.

13.7.2 Setting the upper and lower switching point (limits)

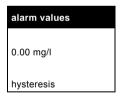
Select the line "alarm value 1" or "alarm value 2".
 Press [OK] to confirm and switch to the desired menu.

alarm value 1
0.00 mg/l
switching point1

Set switching points between 0 and the upper limit of the measuring range defined earlier using the [Up] and [Down] buttons (in the unit of the measured value, the resolution depends on the selected measuring value and measuring range).

See section 10.4 Measuring ranges.

- 3. Press [OK] to switch to the "eff. direction" menu. Options: alarm message in the event of upward/downward violation of the selected switching point.
- Select the desired line using the [Up] and [Down] buttons.
- 5. Press [OK] to return to the "alarm values" menu automatically.
- Select the line "hysteresis" in the "alarm values" menu, and press [OK] to switch to the corresponding submenu.

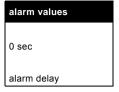


Set the hysteresis to a value between 0 and half of the measuring range using the [Up] and [Down] buttons.

The hysteresis ensures that the relays switch less frequently in the event of upward or downward violation of the limits.

8. Press [OK] to return to the "alarm values" menu.

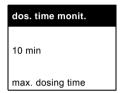
 Select the line "alarm delay" in the "alarm values" menu, and press [OK] in the corresponding submenu



10. Set the alarm delay to a value between 0 and 300 seconds using the [Up] and [Down] buttons.

13.7.3 Dosing time monitoring

This function can be used to monitor the dosing process. If the dosing flow remains at a constant level of 100 % during a selected period, an alarm message is triggered.



 Select the line "dos. time monit." in the "alarm" menu, and press [OK] to switch to the corresponding submenu.

In the "dos. time monit." menu, the monitoring function can be switched on or off.

- If "off" has been selected, the device returns to the "alarm" menu.
- If "on" has been selected, the "dos. time monit." submenu is displayed.
- Set the maximum dosing time to a value between 0 and 600 minutes using the [Up] and [Down] buttons.

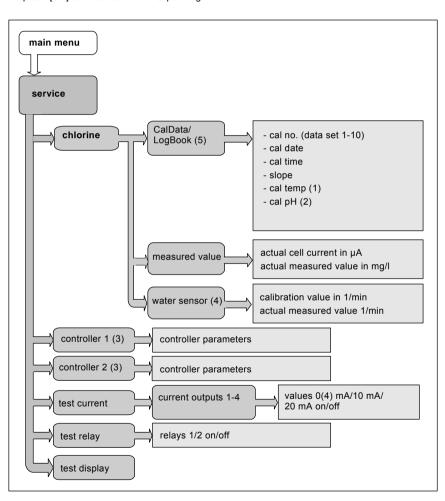
menu

In the "service" menu, the operator can check all important settings and test the functions of the device in the event of problems that make service necessary.



In the "service" menu, calibration data and controller settings cannot be altered. Therefore the menu can be accessed without an access code.

Select the line "service" in "main menu", and press [OK] to switch to the corresponding menu.



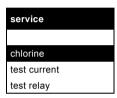
Example: chlorine measurement

TM03 6738 4506

Notes to figures in fig. 31:

- "cal temp." will only be displayed if temperature measurement or temperature compensation has been switched on in the "setup" menu.
- "cal pH" will only be displayed if pH
 (2) measurement or pH compensation has been switched on in the "setup" menu.
- "controller" will only be displayed if a controller has been selected and configured in the "setup" menu and in the "main menu".
- "water sensor" will only be displayed if

 (4) measuring cell AQC-D2 has been selected in the "setup" menu.
- (5) "CalData/LogBook" will only be displayed if a calibration has already been made.



In the "service" menu, the following items are listed:

- "parameter": displaying data of the previous 10 calibrations
- "controller": checking controller settings
- "test current": testing the functioning of the current outputs
- · "test relay": testing the functioning of the relays
- "test display": testing the functioning of the display.

"parameter": logbook registration of calibration data

The calibration data of all activated measuring values are registered in chronological order by a logbook function (exception: redox measurement!).

Example: With pH measurement, the logbook lists the following data:

- · calibration number with date/time
- slope (sensitivity of the electrode)
- · asymmetric potential of the electrode
- · temperature of the buffer solution used.

Under "measured value", the following data are displayed:

- · current measured value
- · current cell voltage or cell current.

Under water sensor, the following data are displayed:

- speed of the water sensor during the last calibration
- · actual speed of the water sensor.

"controller" (checking controller settings)

- Select the [Up] or [Down] button depending on the controller, and select the corresponding menu using [OK].
 - In the first line, the configured type of controller is displayed, and in the subsequent lines the current controller settings are listed. (Select the value y_{out} using [OK]).

"test current" (testing the functioning of the current outputs)

 Select the current output to be tested using the [Up] and [Down] buttons, and press [OK] to switch to the corresponding menu.

Depending on the configuration of the current outputs, the current outputs can be switched on with the following current values, and the current value can be output to the system:

- test currents of 0, 10, 20 mA with selected standard range 0-20 mA
- test currents of 4, 12, 20 mA with selected standard range 4-20 mA or with freely adjusted current outputs.
- 2. Select the current values using the [Up] and [Down] buttons.
 - When a line is selected, the state of the current output with the corresponding value is automatically set to on.
 - As soon as another line is selected, the previous current value is automatically switched off, and the new current value is set to on.

"test relay" (testing the functioning of the relays)

 Select the relay to be tested using the [Up] and [Down] buttons, and press [OK] to switch it on or off

If either of the lines "relay 1", "relay 2" or "alarm" has been selected, the relay that was the last one activated before entering the test menu is switched off. Considering the current alarm values and controller values, the relay is switched on again when the test menu is left.

"test display" (testing the functioning of the display)

- If the display turns completely dark: The display functions OK.
- If the display stays partly bright: The display is faulty.
- · Press [OK] to leave the test menu.

13.9 Calibration

- 1. Press [Cal] to switch to the calibration menu.
 - The LED next to [Cal] illuminates.
- Depending on the set access rights, it may be necessary to enter the four-digit code number using the [Up] and [Down] buttons. Confirm using [OK].
- 3. Select a parameter for the calibration.

In order to avoid an overdosing, the controllers are switched off, and the final control elements are closed.

13.9.1 Peculiarities for the calibration of chlorine with pH compensation

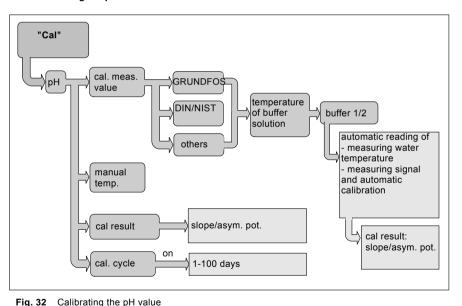
pH calibration is of prime importance, since during the calibration of the chlorine value, the device uses the already calibrated measured pH value as a reference value.

Therefore the pH value must be calibrated first!

Only then calibrate the chlorine value!

13.9.2 Calibrating the pH value

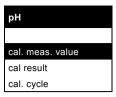
Caution



rig. 32 Calibrating the pri value

JUS 6718 4506

The pH calibration is carried out as a two-point calibration.



- Press [Cal] to switch to the calibration function. Select the line "pH", and press [OK] to switch to the "pH" calibration menu.
- Select "cal. meas. value", and press [OK] to switch to the corresponding menu.

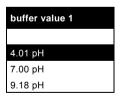
Selecting buffer types and buffer values, reading in buffer values and calibrating

Three optional buffer types are available:

- GRUNDFOS: buffer values pH 4.01, 7.00, 9.18.
- DIN/NIST: buffer values pH 4.01, 6.86, 9.18.
- "others": Lower and upper buffer values can be freely adjusted (difference at least 1 pH) within the configured pH value measuring range ("setup" menu).

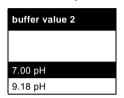


- Select a buffer type using the [Up] and [Down] buttons.
- Press [OK] to jump to the "temperature" menu automatically.
- 3. Enter the temperature of the buffer solution used.
- Press [OK] to jump to the "buffer value 1" menu automatically.



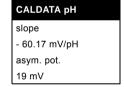
- Select one of the three optional buffer values offered for the buffer solutions GRUNDFOS or DIN/NIST.
- 6. Fill buffer 1 from the storage bottle into a clean calibration cup.
- 7. Dip the electrode into the buffer solution.

- 8. Press [OK] to start the automatic reading function (reading in of measured signal) and the calibration.
 - The display shows the message "please wait" during the calibration.
 - The automatic reading function during pH calibration has the effect that the correct electrode signal for the buffer value is read only when the measuring signal remains stable during a defined interval.
- Dispose of the first buffer solution (i.e. do not return it to the storage bottle!), and rinse the electrode with water.
- 10. Press [OK] to jump to the "buffer value 2" menu automatically.



It is only possible to choose between the two remaining buffer values.

- Fill buffer solution 2 from the respective storage bottle into a clean calibration cup.
- 2. Dip the electrode into the second buffer solution.
- 3. Press [OK] to start the automatic reading function and the calibration.
- After that, dispose of the buffer solution and rinse the electrode with water.



Immediately after the calibration, its result is displayed automatically:

- sensor slope in mV/pH
- asymmetry potential of the electrode in mV.

ST56 - Boonah STP - Regional Lagoons Upgrade - Chemical Dosing Equipment - OM Manual

Error messages during the reading in of the voltage signal of the pH electrode

The calibration may be aborted in the following cases:

- If the electrode is faulty or a wrong buffer has been used.
 - The message "fault of electrode/buffer" is displayed.
- If the electrode does not reach a stable measuring signal in 120 seconds.
 - The message "calibration time exceeded" is displayed.
- If the result of the plausibility testing of the pH calibration data is upward/downward violation of the slope range of - 50 to - 62 mV/pH.
 - The message "slope error" is displayed.
- Downward/upward violation of the precision/exactness range from - 60 to + 60 mV.
 - The message "error asym, pot," is indicated.

The calibration process will be aborted in all four cases.

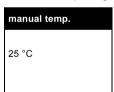
Press [OK] to return to the "calibration" menu automatically.

If the process is aborted, the old calibration date will not be overwritten!

Manual temperature compensation

With deactivated temperature measurement, the water temperature for compensation should be entered manually after calibration. The default value is 25 $^{\circ}$ C.

- Determine the water temperature with a thermometer.
- Press [Cal] to switch to the calibration function. Select the line "pH", and press [OK] to switch to the "pH" calibration menu.
- 3. Select "manual temp.", and press [OK] to switch to the corresponding menu.



- 4. Enter the water temperature.
 - The water temperature is shown in °C (Celsius) or in °F (Fahrenheit), as selected in the "setup" menu "measuring ranges".
- Press [OK] to return to the "calibration" menu automatically.

Cal. cvcle

Following selection of "cal. cycle" in the "measured value" menu, a countdown function is started which triggers the alarm signal "calibrate sensor" following expiry of a defined time interval of 1-100 days.

Cal result

 The result of the current (last) calibration can be displayed at any time using the "cal result" menu item.

13.9.3 Calibration of the parameters chlorine, chlorine dioxide, peroxide, ozone and peracetic acid

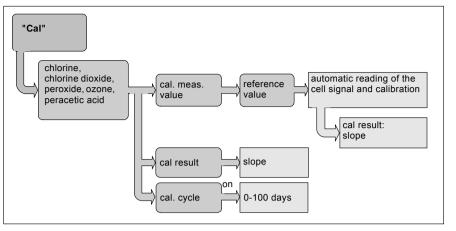
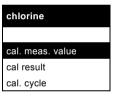


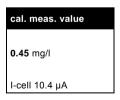
Fig. 33 Calibration of the parameters chlorine, chlorine dioxide, peroxide, ozone and peracetic acid

Having switched to the calibration function by pressing [Cal], the display is in the mode "measured value" and indicates the current measured value.

 Press [OK] to switch to the calibration menu (the first line reads "chlorine", for instance").



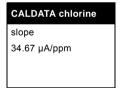
- Select the line "cal. meas. value", and press [OK] to switch to the corresponding menu.
- In the bottom line, the entry field (value in mg/l) for the reference value (determined photometrically or analytically) and the present cell current or electrode current (in µA) are displayed.



 Enter a reference value (for example determined photometrically with the Grundfos DIT photometer).

TM03 6719 4506

- 4. Press [OK] to start calibration.
 - An automatic reading function reads in the sensor data, and the calibration is carried out.
 - The slope (sensitivity) of the sensor is calculated.
- Immediately after calibration, the result of the calibration is indicated automatically (first line: "cal. meas. value"):
 - The slope of the sensor in $\mu A/ppm$ is displayed.



ST56 - Boonah STP - Regional Lagoons Upgrade - Chemical Dosing Equipment - OM Manual

13.9.4 Calibration of fluoride measurement

In principle, the calibration of a fluoride single-rod measuring chain can be compared with the calibration routine of a pH electrode.

See section 13.9.3 Calibration of the parameters chlorine, chlorine dioxide, peroxide, ozone and peracetic acid.

Two standard solutions are used to generate defined electrode signals, depending on temperature.

- Press [Cal] to switch to the calibration function, and press [OK] to switch to the "fluoride" calibration menu.
 - In the "fluoride" menu, the line "cal photometer" is indicated in addition to the lines "cal. meas. value", "cal result" and "cal. cvcle".

fluoride cal. meas. value cal photometer cal result cal. cycle

Entering temperature of standard solution and calibrating

- Select the line "cal. meas. value" in the "fluoride" menu
 - After that, the device automatically switches to the "temperature" menu.
- 2. Enter the temperature of the standard solution using the [Up] and [Down] buttons.

Two standard solutions are used to generate defined electrode signals, depending on temperature.

The numerical values of the two standard solutions for the calibration function are defined as:

- standard solution 1 (Cal 1):
 0.5 ppm fluoride (colour code: green)
- standard solution 2 (Cal 2):
 2.0 ppm fluoride (colour code: blue).

standard solutions are used),
both values can be adjusted
dynamically within the selected
measuring range.

following reasons:

The temperature of the standard solutions must be entered even in the case of configured temperature measurement/compensation for the

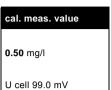
If necessary (for example if different

Note

- The fluoride electrode is removed from the process when it is calibrated.
- The temperature of the standard solutions may differ from the process temperature.

Standard solution 1

- Fill the first standard solution into a clean calibration cup, and dip the cleaned electrode into this solution.
- 2. Press [OK] to switch to the "cal 1" menu.
 - The entry field for concentration 1 is indicated.
 - The corresponding sensor voltage is indicated.



- Change the concentration using the [Up] and [Down] buttons.
- 4. Press [OK] to start the automatic reading of the applied sensor voltage.
- Press [OK] after the calibration is finished. The device switches to the "cal 2" menu automatically.

Standard solution 2

- Fill the second standard solution into a clean calibration cup, and dip the cleaned electrode into this solution.
- 2. Press [OK] to switch to the "cal 2" menu.
 - The entry field for concentration 2 is indicated.
 - The corresponding sensor voltage is indicated.
- Change the concentration using the [Up] and [Down] buttons.
- 4. Press [OK] to start the automatic reading of the applied sensor voltage.
- 5. Press [OK] when the calibration is completed. The result of the calibration is displayed:
 - sensor slope in mV/dec.

Error messages during the reading in of the voltage signal of the fluoride electrode

The calibration may be aborted in the following cases:

- If the electrode does not come to a stable measuring signal in 120 seconds.
 - The message "calibration time exceeded" is indicated.
- If the result of the plausibility testing of the fluoride calibration data is upward/downward violation of the slope range of
 - 50 to 62 mV/dec.
 - The message "slope error" is displayed.

The calibration process is aborted in both cases.

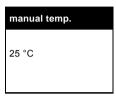
 Press [OK] to return to the calibration menu automatically.

If the process is aborted, the old calibration date will not be overwritten!

Manual temperature compensation

With deactivated temperature measurement, the water temperature for compensation should be entered manually after calibration. The default value is 25 °C.

- Determine the water temperature with a thermometer
- Press [Cal] to switch to the calibration function. Select the line "fluoride", and press [OK] to switch to the "fluoride" calibration menu.
- 3. Select "manual temp.", and press [OK] to switch to the corresponding menu.

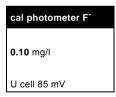


- 4. Enter the water temperature.
 - The water temperature is shown in °C (Celsius) or in °F (Fahrenheit), as selected in the "setup" menu "measuring ranges".
- 5. Press [OK] to return to the "calibration" menu automatically.

Photometrically determined reference value

The signal generated by the fluoride single-rod measuring chain is strongly influenced by the composition of the sample water.

- Thus a shift (a so-called offset shift) of the electrode characteristic occurs whereas the electrode slope remains constant.
- This offset shift can be compensated with the help of a photometric measurement.



- 1. Enter the photometrically determined measured value in the "cal photom. F-" menu.
- The automatic reading function reads the sensor data, and the calibration is carried out.
- 3. The device switches to the "calibration" menu automatically.

13.9.5 Redox measurement

- Calibration is not necessary in connection with redox measurement.
- If redox is selected, the [Cal] button is out of function.
- To check a single-rod measuring chain for redox, use a special redox buffer (for example Grundfos redox buffer 220 mV, product number: 96609166/549-051).

13.10 Manual operation

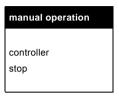
The manual operation mode is used to switch off the automatic control and run the control relays manually.

Manual operation is only possible after a controller has been configured.

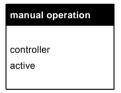
Manual operation can only be accessed with calibration rights or full rights.

Note

1. Press [Man].



- Depending on the set access rights, it may be necessary to enter the four-digit code number using the [Up] and [Down] buttons.
 - The LED next to [Man] illuminates.
- 3. The display reads "controller stop": All configured controllers are switched off.
 - With configured two-position and continuous controllers, the actuating variable is set to 0.
 - With configured-limit contacts, the corresponding relay is switched off.



- 4. Press [Man] to return to automatic operation.
 - The LED next to the button goes out.
 - The message "controller active" is shown on the display for five seconds.
 - After that, the device automatically returns to the menu from which the manual operation was started



Every time the manual-operation mode is entered, every single controller type must be activated again.

FM03 6721 4506

13.10.1 Manual operation with configured two-position and continuous controllers

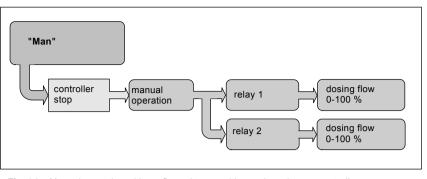
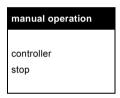
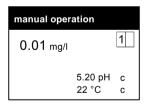


Fig. 34 Manual operation with configured two-position and continuous controllers

With configured two-position controllers, the relay outputs 1 and 2 as well as the output "cont. controller" can be separately run manually. By selecting the desired relay output, the dosing flow of the pump/pumps can be changed.



- Having switched to manual operation, the message "controller stop" is displayed for five seconds.
 - All controllers are switched off.
 - The final control elements are closed (set to 0).

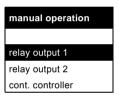


- After that, the device automatically switches to the mode "display measured value" (first line: "manual operation").
 - The controller control display is shown on the right side of the display window. Either control field 1 is present for relay 1, or there is a field for the continuous controller.

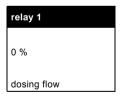
See section 13.6.3 Controller control fields on the display.

 Since switching to manual operation will cause all controllers to be switched off, none of the control fields are filled (there are no areas displayed inversely).

- 3. Press [OK] to switch to the subsequent menu. Three options are available:
- · relay output 1
- · relay output 2
- · continuous controller.



- Select relay output 1 using the [Up] and [Down] buttons. Press [OK] to switch to the corresponding menu.
- Set the desired dosing rate of the pump using the [Up] and [Down] buttons.



FM03 6739 4506

- For relay output 2 and the output continuous controller, proceed similarly to relay output 1.
- Press [OK] to start the controller at the selected dosing flow.
 - The display shows the controller control display which depends on the selected dosing flows.

See section 13.6.3 Controller control fields on the display.

13.10.2 Manual operation with configured limit contact and continuous controller

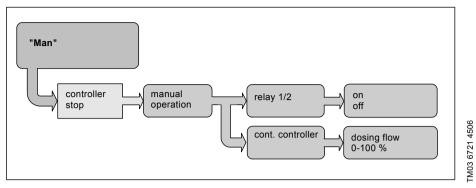


Fig. 35 Manual operation with configured limit contact and continuous controller

Manual operation with configured limit contacts is largely similar to manual operation with two-position controllers and continuous controllers.

The difference: When the desired relay output is selected, the relay can be switched on or off.

Press [OK] to start the controller.

 The display shows the controller control display in its dependence of the switching state of the relay or in dependence of the selected dosing flow with continuous control.

See section 13.6.3 Controller control fields on the display.

14. Fault finding

Note

Faults during the measurement, see installation and operating instructions of the electrode or measuring cell.

_				
Fault			iuse	Remedy
1.	No display following start-up.		No power supply.	Connect the power supply.
2.	With pH measurement: Display permanently indicates pH approximately 7. - With measurement of oxidisers: Display permanently indicates zero.	a)	Short-circuit in cable between measuring cell and instrument amplifier, moisture in connectors.	Check the connection cable and eliminate short-circuit and moisture.
	 With redox measurement: Display permanently indicates approximately 0 mV. 			
3.	Display permanently at full-scale value.	a)	Open circuit in cable between measuring cell and instrument amplifier.	Check the connection cable and reestablish connection.
4.	Display with measured value unsteady.	a)	Interferences on cable from electrode/measuring cell.	Check that the display is properly connected.
		b)	pH and redox measurement: air in sample-water flow.	Check the sample-water supply system (pipes, etc.) and make changes, if necessary.
		c)	pH and redox measurement: sample-water flow interrupted.	Check the sample-water supply system (pipes, etc.) and make changes, if necessary.
		d)	Cable between electrode/measuring cell and instrument amplifier broken.	Check the connection cable and reestablish connection.
		e)	Sensor/electrode faulty.	Replace the sensor/electrode.
5.	With measurement of oxidisers: insufficient sensitivity of measuring cell.	a)	Measuring cell contaminated or passivated by deposits.	Disassemble the measuring cell, and clean the electrode surface.
6.	With pH and redox measurement:	a)	Electrode aged.	Replace the electrode.
	Display with measured value reacts extremely slowly.		Electrode dirty.	Clean the electrode.
7.	With pH and redox measurement:		Wrong buffer solution used.	Use the correct buffer solution.
error message during calibration		b)	Electrode aged.	Replace the electrode.
		c)	Electrode dirty.	Clean the electrode.
8.	Device cannot be set.	a)	Incorrect code set (device protected against adjustment).	See section 13.5.8 Code function.
9.	Faulty control.	a)	Device is incorrectly parameterised.	Check the settings and match them to the local conditions.
				If necessary, reset the device to the factory settings.

15. Maintenance

The device is maintenance-free.

Repairs can only be carried out in the factory by authorised personnel.

16. Disposal

This product or parts of it must be disposed of in an environmentally sound way. Use appropriate waste collection services. If this is not possible, contact the nearest Grundfos company or service workshop.

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Innovation is the essence

GRUNDFOS Instructions

DSS

Installation and Operation Manual



Q-Pulse Id TMS1163

NOTES

REVISION PAGE

PROJECT NAME: BOONAH REGIONAL LAGOON UPGRADE

CUSTOMER: THOMAS & COFFEY

LOCATION: GORKOW ROAD,

BOONAH QLD, 4310

CLIENTS REF: 6232240/003

GRUNDFOS PART CODE: 98386271

EQUIPMENT: BOONAH CHLORINE DOSING SKID

DATE: 13TH MAY 2013

Revision	Date	Revised Pages	Approval Signature
Α	13/5/13		IG

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Contents

SECTION 1: DESCRIPTION	1
1.1 Introduction	
1.2 DESCRIPTION OF EQUIPMENT	
1.2.1 Equipment Overview	
1.2.2 Equipment Description	
1.2.3 Equipment Key	
1.2.4 Equipment ID	4
SECTION 2: PRINCIPLE OF OPERATION	5
2.1 System Working Description	5
2.1 EQUIPMENT LAYOUT	
2.2 EQUIPMENT DESCRIPTION	7
2.2.1 Equipment Listing	
SECTION 3: OPERATING INSTRUCTIONS	9
3.1 Operational Procedures	9
3.1.1 Prior to Start-up	g
3.1.2 Pump Priming	
Dosing Pump Priming Procedure:	
3.1.3 Normal Pump Operation	10
3.1.4 Pump Calibration Procedure	
3.2 Post Start Checks	
3.3 CONTINUOUS OPERATION.	12
3.4 Flushing the Dosing System / Pump Prior to Maintenance	13
3.4.1 Flushing Pump No. 1 - PMP-01	
3.4.2 Flushing Pump No. 2 – PMP-02	
3.5 Flushing Strainers	
3.5.1 Flushing strainer STN-01	
3.5.2 Flushing strainer STN-02	
3.5 SAFETY ASPECTS	15
SECTION 4: INSTALLATION & COMMISSIONING	
4.1 STANDARDS AND PROCEDURES - MECHANICAL EQUIPMENT	
4.2 Standards and Procedures for Wiring the Equipment	
4.3 STANDARDS AND PROCEDURES FOR LUBRICATING THE EQUIPMENT	
4.4 Installation and Commissioning Instructions	
4.4.1 Installation Instructions	
4.4.2 Commissioning Instructions	
SECTION 5: ROUTINE MAINTENANCE	19
5.1 CLEANING THE EQUIPMENT	19
5.2 Lubrication	
5.2.1 Equipment Lubrication	
E 2 POLITING MAINTENANCE COURDING	20

SECTION 6: REPAIR AND MAINTAINENCE	21
6.1 CORRECTIVE MAINTENANCE	21
6.1.1 Replacement of non-consumable parts	21
6.2 ISOLATING AND REMOVING DOSING PUMP	21
6.3 Servicing the Suction Line Strainers	
6.3.1. To Service Strainer STN-01	
6.3.2. To Service Strainer STN-02	
6.4 Installation of a removed Dosing Pump and Priming	22
SECTION 7: TROUBLESHOOTING	23
7.1 MANUFACTURER'S MANUAL TROUBLESHOOTING REFERENCE TABLE	23
7.2 FAULT FINDING CHART	
SECTION 8: DRAWINGS, TEST SHEETS & ITP'S	25
8.1 DIMENSIONS DSS CHAIR	26
8.2 DIMENSIONS DSS CABINET	27
8.3 COMPONENTS	
8.4 GENERAL DATA	
8.5 PUMP TECHNICAL DATA	
8.7 PUMP LIQUIDS GUIDE	32
SECTION 9: STORAGE AND PRESERVATION	33
9.1 STORAGE PRIOR TO INSTALLATION	33
9.2 STORAGE AFTER CHEMICAL COMMISSIONING	33
SECTION 10: ADDITIONAL INFORMATION	34

SECTION 1: DESCRIPTION

1.1 Introduction

This operation and maintenance manual presents information required for installation, operation, and maintenance of the **DSS Dosing Standard Skid** system.

The Grundfos **DSS Dosing Standard Skid** is a low maintenance liquid feed dosing system, designed to provide continuous supply of chemical from the dosing skid to the dosing points.

This document is intended as a guide to assist Operators in understanding and operating the **Dosing Standard Skid**. This document contains information regarding the Chemical Dosing System only within the scope of supply of Grundfos.

1.1.1 Training Program

The main training tool for the **DSS** is this Operation and Instruction Manual. The manual essentially contains all necessary information to familiarise the operators with individual equipment and the overall system operation. Individual equipment manuals should also be included to assist the operators.

Emphasis should be placed on the following:

- ♦ Plant and Equipment Operating Hazards.
- ♦ Operating Parameters/Limits.
- ♦ Equipment Limits.
- ♦ Operating Requirements.
- ♦ Maintenance Requirements.
- ♦ Location of Emergency Stops.
- Familiarity with Plant Facilities Management Program.
- ♦ Plant Controls.
- Equipment operation, calibration, maintenance, cleaning etc.

1.2 Description of Equipment

1.2.1 Equipment Overview

Each DSS Dosing System consists of one only chemical dosing skid.

The Dosing Pumps operate in a duty/standby arrangement. They draw chemical from the Storage tank and pump it to the chemical injection point. Chemical piping and electrical connection to and from the DSS are not included as part of the skid system.

Digital diaphragm dosing pumps with stepper/EC motors, allow adjustment of the chemical solution flow rate.

One online calibration tube is provided for pump calibration.

Chemical storage tanks and injection point connections are NOT included.

1.2.2 Equipment Description

1) Chemical Dosing Skid

This system comprises the following major items of equipment.

- 2 x Grundfos digital diaphragm pumps
- 2 x Grundfos sets of input and output cables.
- ♦ 2 x Grundfos pressure relief valves.
- ◆ 1 x Grundfos pressure sustaining valve.
- ◆ 1 x Grundfos graduated calibration cylinder.
- ♦ 1 x Stubee 63mm 10bar diaphragm separated pressure indicator.
- 2 x Georg Fischer chemical inline strainers.
- 18 x Georg Fischer isolation valves
- ♦ 2 x Clipsal IP 66 240V electrical GPO's
- ♦ 1 x Grundfos electrical junction box and emergency stop switch.

1.2.3 Equipment Key

Example	DSS	2	2	1	1	L2	P2	Х	1	Х	2	Х	DDA7.5-16FCM
Type Ran	ge												Pump Model
DSS	-B-												- will product
		_											Extras
Style												Х	None
1	Duty pum	р										1	Chemical flow meter
2	Duty/star	ndby										2	2 x Chemical Flow meter
3	Duty/Dut	y										3	Dilution/carrier water
												4	2 x Dilution/carrier water
Frame												5	FM + carrier water
1	Chair SS											6	2 x FM + carrier water
2	Chair PC											7	2 x FM + 2 x carrier water
3	Cabinet S												
4	Cabinet P	C		J									x, cables & GPO
											1	-	oump
Material										}	2	2 x p	oumps
1	uPVC/Vito									<u> </u>			
2	uPVC/EPD												damper
3	cPVC/Vito	n								X)ampe	
_	CC /\/i+an									1		Dampe	
5	SS/Viton				J					2	2 X L	Dampe	215
										Pres	sure		
Valve Ty										Gau	ge		
1	Ball								V	No			
1	valve								X	Gau			
2	Diaphragi	m valv	⁄e						1	bar			(16 bar for DDA 7.5-16)
						_'			_	2 x			(
									2	10ba	ar		(16 bar for DDA 7.5-16)
Suction r		- i	:41- C	دارين ا	حالم مد				Ch.	de vez l	41		
L1 L2	Single stra			=				Х		: k valv heck v		r pun	ip .
LZ	Double st	ramer	WILII	Lai. Cy	maer		J					ck	
Pressure	manifold							1 2	_	le exti extra			S
P1													
P2	Duty/Standby - 2x Relief, 1 x Loading va												
Р3	Duty/Dut	_											
	Duty - RV,	PV +	Δυτο Γ)egas									
P6	valve			-543									
P7	Duty/star					gas val	ve						
DO.	Duty/Duty	y - RV,	, PV + A	Auto D)egas								
P8	valve												

3

1.2.4 Equipment ID

Chem. group	Frame	Pumps	Configuration	Material -size	Valve Type	Description	Code
1	Chair PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386271
1	Chair PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386272
1	Chair PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386273
1	Chair PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386274
1	Chair PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Ball	DSS 2 2 1 1 L2 P2 X 1 X 2 X DDI150-4AF	98386275
1	Cabinet PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386276
1	Cabinet PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386277
1	Cabinet PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386278
1	Cabinet PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386279
1	Cabinet PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Ball	DSS 2 4 1 1 L2 P2 X 1 X 2 X DDI150-4AF	98386280
2	Chair SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98347262
2	Chair SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386281
2	Chair SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386282
2	Chair SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386283
2	Chair SS	DDI 150-4 AF	Duty/Standby	uPVC/E –DN20	Ball	DSS 2 1 2 1 L2 P2 X 1 X 2 X DDI150-4AF	98386284
2	Cabinet SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98347856
2	Cabinet SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDA12-10FCM	98386285
2	Cabinet SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDA30-4FCM	98386286
2	Cabinet SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDI 60-10AF	98386287
2	Cabinet SS	DDI 150-4 AF	Duty/Standby	uPVC/E –DN20	Ball	DSS 2 3 2 1 L2 P2 X 1 X 2 X DDI150-4AF	98386288
3	Chair SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386289
3	Chair SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386290
3	Chair SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386291
3	Chair SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386292
3	Chair SS	DDI 150-4 AF	Duty/Standby	uPVC/E -DN20	Dia.	DSS 2 1 2 2 L2 P2 X 1 X 2 X DDI150-4AF	98386293
3	Cabinet SS	DDA 7.5-16 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386294
3	Cabinet SS	DDA 12-10 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386295
3	Cabinet SS	DDA 30-4 FCM	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386296
3	Cabinet SS	DDI 60-10 AF	Duty/Standby	uPVC/E -DN15	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386297
3	Cabinet SS	DDI 150-4 AF	Duty/Standby	uPVC/E –DN20	Dia.	DSS 2 3 2 2 L2 P2 X 1 X 2 X DDI150-4AF	98386298
4	Chair PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386299
4	Chair PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386300
4	Chair PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386301
4	Chair PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386302
4	Chair PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Dia.	DSS 2 2 1 2 L2 P2 X 1 X 2 X DDI150-4AF	98386303
4	Cabinet PC	DDA 7.5-16 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDA7.5- 16FCM	98386304
4	Cabinet PC	DDA 12-10 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDA12-10FCM	98386305
4	Cabinet PC	DDA 30-4 FCM	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDA30-4FCM	98386306
4	Cabinet PC	DDI 60-10 AF	Duty/Standby	uPVC/V -DN15	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDI 60-10AF	98386307
4	Cabinet PC	DDI 150-4 AF	Duty/Standby	uPVC/V -DN20	Dia.	DSS 2 4 1 2 L2 P2 X 1 X 2 X DDI150-4AF	98386308

Chemical Groups	
1	Sodium Hypochlorite. All acids to 96% solution. General chemicals.
2	Ammonia, Alum, Antiscalant, SMBS
3	Sodium Hydroxide, Soda ash, Copper sulphate
4	Calcium Hypochlorite, Sodium Hypochlorite, Ferric & Ferrous solutions.

SECTION 2: PRINCIPLE OF OPERATION

2.1 System Working Description

The DSS Chemical Dosing System is designed to meter accurate quantities of chemical to a dosing point in the plant. It is configured in a duty/standby arrangement. Two positive displacement variable frequency metering pumps are supplied, one duty and one standby to ensure continuity of supply.

Both pumps are capable of running in parallel, if necessary.

Pump flow can be regulated within this specified range with a repeatable accuracy of ± 1 per cent of the set rate. The dosing flow rate in is displayed on the pump screen (adjustable 0-800, 0-1000 or 0-3000 turndown range depending on pump selected) to facilitate pre-setting and is capable of adjustment while the pump is either running or stationary. DDA-FCM and DDI-AF dosing pumps monitor and measure the dosing flow during operation.

The rate of injection is automatically controlled by the "flow" and "no flow" signals from the plant PLC via the SCADA.

The metering pumps have indication of set rate in L/hr.

Pumps have been provided with suction strainers of uPVC with a maximum opening of 1 mm in duty/standby configuration so that one strainer can be cleaned while the other is working.

Each pump has been fitted with a pressure relief valve with a return line to the suction side. Appropriate isolation valves have been included. Whenever the pressure relief valve operates, there is obvious audible indication.

A back pressure valve has been installed on the discharge line from the dosing system to maintain dosing accuracy at various depths in the chemical storage tank. This also prevents chemical siphoning when the dosing point is lower than the chemical tank and it maintains the accuracy of the dose rate when system pressures are below 2 bar. The back pressure setting is able to be set externally without dismantling the valve, but should never be adjusted above 4 bar.

A PVC calibration tube has been included adjacent to the metering pumps as a reference to check the pump output flows.

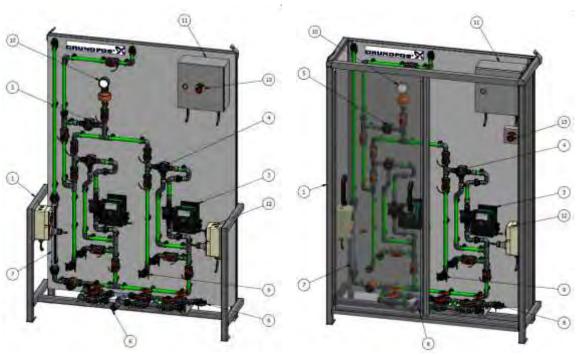
The calibration tube has a diameter of 50 mm and is graduated in one (1) litre and decilitre marks. The top of the calibration tube must be extended at least 500 mm above the overflow pipe of the chemical storage tank.

The DSS system is plumbed to facilitate manual selection of duty and standby pumps. Valves are located to allow drain and flushing of the suction manifold, pumps and discharge manifold so that a dosing pump or filter can be drained and cleaned before being removed for service.

Camlock connections are included on all flush and drain points to allow containment of drained chemicals and flushing water.

A pressure gauge with diaphragm gauge protector provides visual indication of the system operating pressure.

2.1 Equipment Layout



Chair frame Enclosed frame

Pos.	Key Specification
1	Free-standing open Chair frame or Cabinet enclosure with bolt down feet & lifting lugs.
2	Doors. Clear uPVC. Lift-in Type. (For Cabinet frame only)
3	Grundfos Digital Diaphragm dosing pump/s – DDA - FCM, DDI - AF series
4	Pressure Relief Valve/s, hard plumbed into the discharge manifold
5	Pressure loading valve
6	Suction manifold with suction strainer/s and selection/isolating valves
7	Calibration cylinder. (Always with Diaphragm valve for slow release.)
8	Flush valves with camlock connection.
9	Drain valves with camlock connection.
10	Pressure gauge & chemical barrier block
11	Signal junction box. SS (Plus input signal cable, Alarm output cable, 4-20mA output cable)
12	General Power Outlet IP56 AU/NZ 1-phase
13	Emergency Shutdown button

2.2 Equipment Description

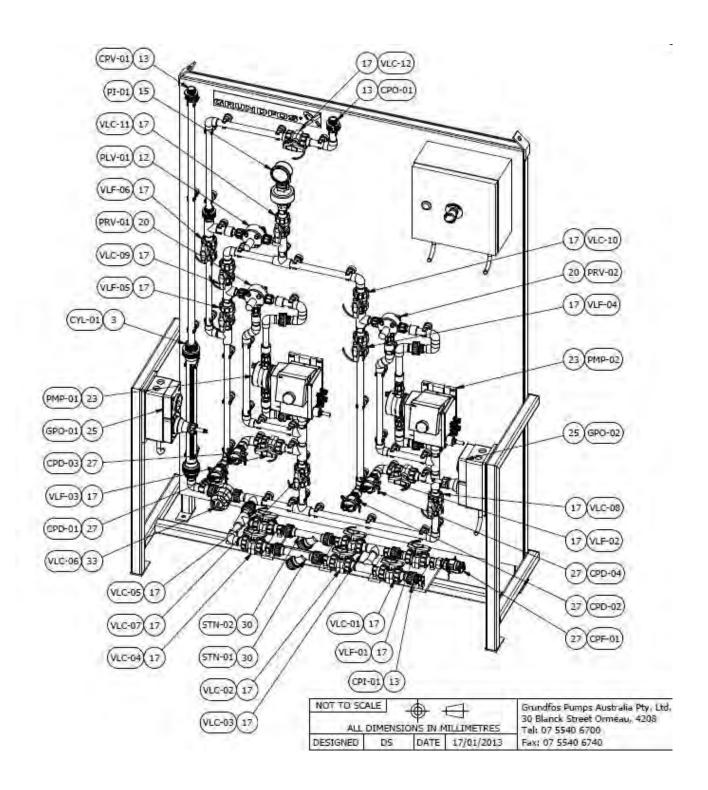
The following are the main equipment installed in the DSS Dosing System:

2.2.1 Equipment Listing

1. DSS Dosing Skid.

Dosing Skid equipment details are summarised below:

Equipment	Tag No.	Qty	Model/Size	Supplier
Dosing Pump	PMP-01 PMP-02	2	DDA/DDI / (as per model)	Grundfos
Calibration Cylinder	CYL-01	1	1L 501-01000-1A PVC; 95714471	Grundfos
Pressure Loading Valve	PLV-01	1	DN8 PVC/V or EPDM	Grundfos
Pressure Relief Valve	PRV-01 PRV-02	2	DN8 PVC/V or EPDM	Grundfos
Strainer	STN-01 STN-02	2	1/2" Type 305 Spigot Clear uPVC/V or EPDM	Georg Fischer
Control Valve	VLC-	12	1/2" Type 546 Ball or 514 Diaphragm Grey uPVC/V or EPDM	Georg Fischer
Flush Valve	VLF-	6	1/2" Type 546 Ball or 514 Diaphragm Grey uPVC/V or EPDM	Georg Fischer
Chemical Inlet	CPI-01	1	½" Barrel Union uPVC/V or E	Georg Fischer
Chemical Outlet	CPO-01	1	½" Barrel Union uPVC/V or E	Georg Fischer
Chemical Flush	CPF-01	1	½" Camlock PP	
Chemical Drain	CPD-	4	½" Camlock PP	
Vent Point	CPV-01	1	½" Barrel Union uPVC/V or E	Georg Fischer
Power Point	GPO-01 GPO-02	2	240V, 1-phase power outlet	Clipsal
Pressure Gauge	PI-01	1	63mm + PVC/PTFE Protector	A&H
riessule dauge	PI-01	1	1/4" BSPM 63mm 10 or 16bar	A&H



SECTION 3: OPERATING INSTRUCTIONS

3.1 Operational Procedures

Danger: Moving Parts

Potential Slip Hazard Chemical Contact

3.1.1 Prior to Start-up

Prior to Start-up, the following items need to be checked:

- a) Ensure adequate supply of chemical is available to the dosing system.
- b) Isolation Valves are configured correctly as set out in tables below. (Refer to the P&IDs)
- c) Ensure adequate flush water (if applicable) is available to the dosing system
- d) Ensure adequate chemical available.
- e) Check tightness of all union connections.
- f) Ensure that no alarms are activated.
- g) Ensure that Pumps are primed and calibrated. refer to 3.1.2 and 3.1.4

3.1.2 Pump Priming

Dosing Pump Priming Procedure:

1. Prime pump No.1 - PMP-01:

- 1. Open and close valves as per section 3.1.3
- 2. Select Manual mode on Pump 1.
- 3. Uncap CPD-03 then open Chemical tank valve to flood Suction of Pump and bleed air from the system through VLF-03. Then close VLF-03. Replace cap on CPD-03
- 4. Slightly Open drain/flush valve VLF-05 and uncap CPD-01.
- 5. Start pump No. 1.
- 6. Let pump run in continuous operation.
- 7. Leave the pump running until a continuous stream of fluid flows from the drain/flush valve VLF-05 on the pressure side.
- 8. Close drain/flush valve VLF-05 opened during step #5
- 9. Keep pump running to fill the discharge line to the doing point and turn off pump.
- 10. The pump is now ready to operate.

2. Prime pump No.2 - PMP-02:

- 1. Open and close valves as per section 3.1.3
- 2. Select manual mode on Pump 2.
- 3. Uncap CPD-04 then open Chemical tank valve to flood Suction of Pump and bleed air from the system through VLF-02. Then close VLF-02. Recap CPD-04
- 4. Slightly Open drain/flush valve VLF-04 and uncap CPD-02
- 5. Start pump No. 2.
- 6. Let pump run in continuous operation.
- 7. Leave the pump running until a continuous stream of fluid flows from the drain/flush valve CLF-04 on the pressure side.
- 8. Close drain/flush valve VLF-04 opened during step #5
- 9. Keep pump running to fill the discharge line to the doing point and turn off pump.
- 10. The pump is now ready to operate.

3.1.3 Normal Pump Operation

1. To run pump No.1 – PMP-01

Valve Numbers	Configuration
VFL-01; VLF-02; VLF-03; VLF-04; VLF-05; VLF-06; VLC-03; VLC-05; VLC-06	Closed
VLC-01; VLC-02; VLC-04; VLC-07; VLC-09; VLC-11; VLC-12	Open

- 1. Ensure that adequate chemical is within Tank.
- 2. Ensure that no alarms are activated.
- 3. Ensure that pumps are primed and calibrated.
- 4. Ensure that all piping and connections are connected

2. To run pump No.2 - PMP-02

Valve Numbers.	Configuration
VFL-01; VLF-02; VLF-03; VLF-04; VLF-05; VLF-06; VLC-03; VLC-05; VLC-06	Closed
VLC-01; VLC-02; VLC-04; VLC-08; VLC-10; VLC-11; VLC-12	Open

- 1. Ensure that adequate chemical is within Tank.
- 2. Ensure that no alarms are activated.
- 3. Ensure that pumps are primed and calibrated.
- 4. Ensure that all piping and connections are connected

Note

To operate the pumps in automatic duty / standby change over system valves VLC-07, VLC-08, VLC-09 and VLC-10 must remain open.

3.1.4 Pump Calibration Procedure

It is recommended that the pumps are calibrated on a monthly basis.

Note: On-the-fly calibration is not recommended by Grundfos

1. Dosing Pump No.1 - PMP-01:

- 1. Ensure manual mode is enabled on the dosing pump. Ensure the pump is primed and the system up to normal working pressure.
- 2. Open and close valves as per section 3.1.1-1
- 3. Open VLC-01 Isolation Valve
- 4. Open Calibration Cylinder isolation valve VLC-06 and fill Calibration tube to the top Zero mark.
- 5. Close Valve VLC-01
- 6. Open Calibration cylinder isolation Valve VLC-06
- 7. Enter Calibration mode on pump No1.
- 8. Run pump and note drawdown from Calibration Cylinder over 60 seconds
- 9. Stop pump
- 10. Record results and cross reference with pump calibration figure. Adjust pump calibration setting and repeat steps 2-10 to ensure accuracy.
- 11. Start pump
- 12. Allow calibration Cylinder to empty.
- 13. Stop pump.
- 14. Close Calibration Cylinder isolation valve VLC-06
- 15. Open valve VLC-01.
- 16. Return system to normal operation.

2. Dosing Pump No. 2 - PMP-02:

- 1. Ensure manual mode is enabled on the dosing pump as for PMP-01.
- 2. Open and close valves as per section 3.1.1-2
- 3. Open VLC-01 Isolation Valve
- 4. Open Calibration Cylinder isolation valve VLC-06 and fill Calibration tube to top Zero mark.
- 5. Close isolation valve VLC-06
- 6. Enter calibration mode on pump No. 2
- 7. Run pump and note drawdown from Calibration Cylinder over 60 seconds
- 8. Stop pump
- 9. Record results and cross reference with pump calibration figure.
- 10. Adjust calibration setting and repeat steps 2-10 to ensure accuracy
- 11. Start pump
- 12. Allow calibration Cylinder to empty.
- 13. Stop pump.
- 14. Close Calibration Cylinder isolation valve VLC-06
- 15. Open valve VLC-01.
- 16. Return system to normal operation.

3.2 Post Start Checks

- 1. Check for leaks and fix if necessary. Wash away any chemical residue.
- 2. Ensure pump is running normally and dosing chemical at the set rate.
- 3. Visually and audibly check the dosing skid for abnormal sound and vibration.

3.3 Continuous Operation

The Chemical Dosing system is designed for continuous operation. For continuous operation the following procedures should be followed:

- 1. Refer to start-up procedures
- 2. Ensure all of the valves specified remain open refer to 3.1.3.

3.4 Flushing the Dosing System / Pump Prior to Maintenance

• Flushing of the system is required whenever equipment is out of service for more than one week.

3.4.1 Flushing Pump No. 1 - PMP-01

- 1. Close Valves VLC-01; VLC-09
- 2. Connect drain hose to CPD-01 then open Valve VLF-05 to relieve discharge pressure.
- 3. Connect flushing supply line CPF-01 and open valve VLF-01.
- 4. Run the Pump No.1 and flush the pump through for 30 seconds.
- 5. Stop the pump.
- 6. Close valve VLF-01
- 7. Close valve VLF05
- 8. Remove Pump refer 6.2

3.4.2 Flushing Pump No. 2 - PMP-02

- 1. Close Valves VLC-01; VLC-07; VLC-10
- 2. Connect drain hose to CPD-02 then open Valve VLF-04 to relieve discharge pressure.
- 3. Connect flushing supply line CPF-01 and open valve VLF-01.
- 4. Run the Pump No.2 and flush the pump through for 30 seconds.
- 5. Stop the pump.
- 6. Close valve VLF-01
- 7. Close valve VLF-04
- 8. Remove Pump refer 6.2

3.5 Flushing Strainers

3.5.1 Flushing strainer STN-01

- 1. Close valves VLC-01, VLC-03, VLC-05, VLC-09, VLC-10
- 2. Open valves VLF-01, VLF-03
- 3. Uncap CPF-01 and attach drain hose
- 4. Uncap CFD-03 and attach flush hose
- 5. Flush until strainer is clear
- 6. Remove hoses and recap CPF-01 and CPD-03
- 7. Close valves VLF-01 and VLF-03
- 8. Restore system to normal operation refer 3.1.3

3.5.2 Flushing strainer STN-02

- 1. Close valves VLC-01, VLC-02, VLC-04, VLC-09, VLC-10
- 2. Open valves VLF-01, VLF-03
- 3. Uncap CPF-01 and attach drain hose
- 4. Uncap CFD-03 and attach flush hose
- 5. Flush until strainer is clear
- 6. Remove hoses and recap CPF-01 and CPD-03
- 7. Close valves VLF-01 and VLF-03
- 8. Restore system to normal operation refer 3.1.3

3.5 Safety Aspects

- "Always" wear protective clothing when operating or undertaking any maintenance on the chemical systems. i.e. clothing, eye protection, gloves.
- "Always" ensure you isolate the power to the equipment you are about to work on, to avoid the risk of the equipment starting up without warning.
- "Always" ensure you isolate the suction and discharge of each pump before attempting to do any service work or repairs.
- "Always" relieve the back pressure in the discharge line between the isolation valve and the pump, prior to attempting to work on the pump, or remove any fittings, unions, or connections.
 - Chemical dosing skids require established safety guidelines for plant operation and maintenance.
 - Note: These procedures do not address all of the safety concerns associated with operating this system and do not replace a properly designed and implemented facility safety program. It is the responsibility of the user to establish appropriate safety and health practices and ensure that they are implemented.
 - Operators should be familiar with chemicals being utilised (Refer to Material Data Sheets supplied by Chemical Manufacturers/Suppliers) and all hazards associated with the equipment provided (Refer to the Manufacturers' Literature).
 - Equipment warranty can be voided due to inappropriate operation eg:
 - 1. running the pump with the suction/isolation valve closed
 - 2. not performing routine maintenance refer to individual manuals
 - 3. Knot keeping strainers clear failing to do so will destroy diaphragm valves
 - 4. Over tightening PVC fittings hand tighten only.

The following safety pre-cautions should be followed during plant operation:

- DO NOT operate any rotating equipment without the protective guards in place.
- DO NOT attempt to dismantle any pipe work and fittings, prior to relieving the system pressure within all of the lines.
- Warning: All electrical work must be carried out by a qualified electrician.

Established facility safety procedures should be followed during maintenance:

Local isolators and motors should be properly locked and/or tagged out according to plant safety procedures. A facility policy should be in place and followed to prevent unauthorised maintenance on the skids, including pipe work dismantling and testing.

- 1. Maintenance may require use of multiple tools, disassembly of equipment, and/or removal of guards normally in place when equipment is operating.
- 2. Eye protection should be worn at all times when operating, or adjusting any equipment on the dosing skids, whilst systems are operational, or stationary, due to pressure and possible corrosive nature of fluids contained within the pipe work and fittings.
- These measures should be outlined in facility manuals, and addressed in personnel training.
- It is the responsibility of the end-user to establish safe work-practices for Plant operation.

16

SECTION 4: INSTALLATION & COMMISSIONING

4.1 Standards and Procedures - Mechanical Equipment

AS2032: Installation for PVC Pipe Systems

AS1554.6: Welding Stainless Steel for structural purposes

AS1345: Identification of the contents of pipes, conduits and ducts

AS3780: The Storage and Handling of Corrosive Substances

AS1692: Steel Tanks for flammable and combustible liquids

AS1940: The Storage and handling of flammable and combustible liquids

AS1657: Fixed Platforms, walkways, stairways and ladders – Design, construction and installation

4.2 Standards and Procedures for Wiring the Equipment

AS3000: Electrical Installations (wiring rules)

AS3008: Electrical Installations – Selection of Cables

4.3 Standards and Procedures for Lubricating the Equipment

Please refer to Manufacturer's O&M Manuals.

4.4 Installation and Commissioning Instructions

4.4.1 Installation Instructions

- 1. Ensure the site civil works have been completed and all services are available.
- 2. Identify any hazards or safety issues before installation proceeds by completing site relative workplace risk assessment and job safety analysis sheets.
- 3. Mark out site to ensure correct location, orientation and levels as per site requirements and design.
- 4. Ensure all plant components have arrived to site ready for the installation.
- 5. Use a crane to lower the dosing station into the final position.
- 6. Mark and drill the DSS mount pattern to the footings.
- 7. Carefully unpack all crates and lift the dosing skid panels into the correct position ensuring the inlet and outlet of the dosing skid are correct to the desired layout.
- 8. Fix the dosing skid into position using chemical anchors, making sure it is level and plumb before final lockdown.
- 9. Mark out the route for the suction line from the storage tank to the inlet of the dosing skid then cut, glue and fix the pipework into final position.
- 10. Cut, glue and fit the calibration tube vent assembly and chemical lines to the storage tank.
- 11. Mark out and fit pipework from service water line to the flush water circuit inlet. Define the drain and flush collection system.
- 12. Connect the outlet of the dosing skid to the dosing point carrier lines
- 13. Connect services and complete all wiring to the dosing system and conduct all testing before commissioning.

4.4.2 Commissioning Instructions

- 1. Ensure services are available.
- 2. Visually inspect all plumbing and Electrical Equipment.
- 3. Physically examine all valves, unions etc.
- 4. Proceed as per Commissioning Test Sheet.
- Note: Operators should be aware of updated Site Dosing Specifications and adjust test procedures / values accordingly.

SECTION 5: ROUTINE MAINTENANCE

5.1 Cleaning the Equipment

- 1. The pipe work and hardware on the skid should be cleaned only with mild detergent and damp cloth. No solvents or abrasive cleaners should be used.
- 2. Line strainers these will require frequent cleaning during the first 3-4 months of operation due to contaminants in the tank and pipe work. Frequency during this period should be weekly. After this time, as required approximately monthly.

5.2 Lubrication

5.2.1 Equipment Lubrication

Equipment	Recommended Lubricant	Required Volume
DDA/DDI Series dosing pumps.	No lubrication is required for these pumps	

5.3 Routine Maintenance Schedules

Equipment	Operation	Day	Wk	Mth	2 year
Calibration cylinder	Clean calibration cylinder			Х	
Pumps	Calibrate Pump (See Pump O&M Manual)		Х		
	Replace pump kit				Х
Service Water line	Check for leaks, faulty valves etc.		х		
Strainers	Check for debris / clean out			Х	
Unions	Inspect for leaks		Х		
All equipment	Physically check for vibration and security of mounting			Х	
Visual inspection for leaks		Х			
Check valve configurations			Х		

SECTION 6: REPAIR AND MAINTAINENCE

6.1 Corrective Maintenance

Prior to any equipment maintenance:

- Ensure that equipment is isolated from the system refer 6.2
- All Electrical work is carried out by a qualified electrician.
- Refer to the Manufacturer's Literature for corrective maintenance procedures for individual equipment refer section 8.

For corrective maintenance on the Alum Dosing System:

- 1. Isolate the Chemical Storage Tank
- 2. Electrically isolate the pump.
- 3. Flush and drain the system as per section 3.4
- 4. Individual pieces of equipment can now be repaired or replaced, as required.
- 5. Hand tighten PVC fittings only do not over-tighten

6.1.1 Replacement of non-consumable parts

♦ Please refer to manufacturer's manuals.

6.2 Isolating and Removing Dosing Pump

- 1. To remove the dosing pump, firstly ensure power supply is disconnected from the pump, including all signal cables.
- 2. Close the pump suction isolation valve, followed by the pump discharge isolation valve.
- 3. Once both valves are closed, slowly open the bleed valve between the pump and the isolation valve and drain to a suitable container. This is to relieve any residual pressure between the pump and the back pressure valve.
- 4. Flush refer 3.4
- 5. Disconnect the unions and flanges on the dosing pump/s to disconnect the pump from the pipe work. Once this has been done, the pump can be removed from service to carry out any required maintenance.

6.3 Servicing the Suction Line Strainers

• The two strainers – STN-01 and STN-02 - operate in Duty/Standby arrangement to ensure continuity of supply of chemical to the dosing pumps

6.3.1. To Service Strainer STN-01

- 1. Close Valves VLC-02 and VLC-04
- 2. Remove and clean STN-01 strainer screen
- 3. Return screen to strainer
- 4. Open Valves VLC-02 and VLC-04

6.3.2. To Service Strainer STN-02

- 1. Close Valves VLC-03 and VLC-05
- 2. Remove and clean STN-02 strainer screen
- 3. Return screen to strainer
- 4. Open Valves VLC-03 and VLC-05

Note: Appropriate personal safety equipment must be used when handling chemicals.

6.4 Installation of a removed Dosing Pump and Priming

- 1. Installation is a reversal of the process in section 6.2.
- 2. Reconnect the power supply.
- 3. To re-prime the pump when the tank level is above the skid, open the suction and discharge isolation valves, then slowly open bleed / drain valves until fluid discharges from the outlet, then close the valve. The pump is now primed ready for use. Refer 3.1.1.
- 4. Start the pump in manual mode to ensure functionality and bleed again if necessary, however, this should not be required.
- 5. To re-prime when the tank level is lower than pump height run the pump manually until air is discharged from the outlet.
- 6. Stop the pump close valve pump is ready for use. Refer 3.1.1.

SECTION 7: TROUBLESHOOTING

7.1 Manufacturer's Manual Troubleshooting Reference Table

• Refer to the below table to reference the section and page number for the listed equipment located in Section 8: Supplier Operations Manuals.

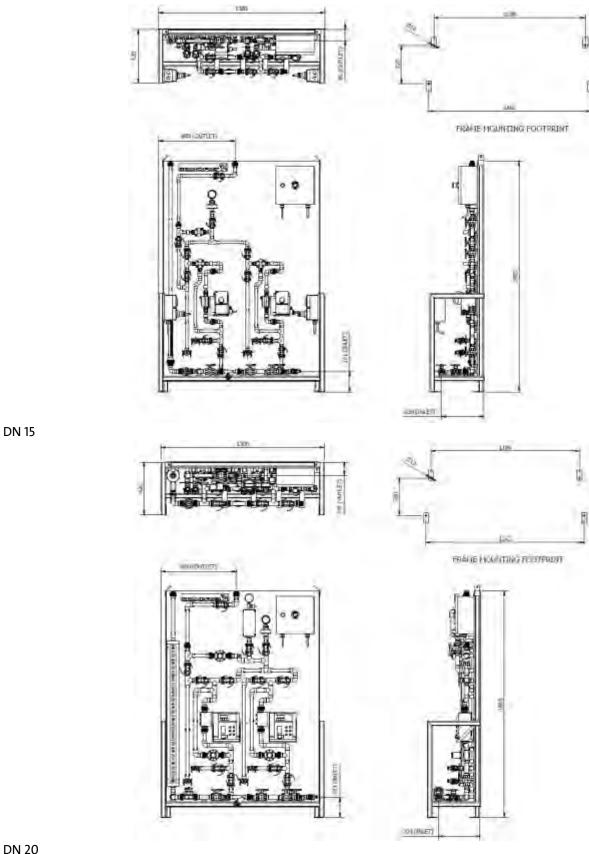
<u>Equipment</u>	<u>Manufacturer</u>	<u>Document</u>	Section	<u>Page</u>
Grundfos DDA digital dosing pump	Grundfos Pumps	Operation & Installation Manual	11	46
Grundfos DDI 209 digital dosing pump	Grundfos Pumps	Operation & Installation Manual	11	67
Grundfos DDI 222 digital dosing pump	Grundfos Pumps	Operation & Installation Manual	11	48
Grundfos 525 PLV	Grundfos Pumps	Operation Manual	7	16
Grundfos 525 PRV	Grundfos Pumps	Operation Manual	7	18

7.2 Fault finding chart

Fault	Cause	Remedy
Pump does not start or	a) No power supply	Re-establish power supply, release emergency
stops without visible		stop, check circuit breaker
cause	\5	
Incorrect or no flow from	a) Pump not running	Press start button on pump
the dosing pump		Check control signal is available
		Check signal cable
		Check pump is in correct operating mode
	b) Pump Running	Check correct flow path valve selection
		Check pump prime
		Check strainers are clean
		Check for air lock
		Check Suction / discharge valves for blockages
		Check tank level
	c) Low system pressure	Check and clean Pressure Loading Valve
		Check Pressure relief valve is not bypassing
		Check strainers are clean
		Check for air lock
		Flush suction manifold
		Check dosing valves are fully open
		Check drain / flush valves are closed
	d) High system pressure	Check and clean Pressure Loading Valve
		Check discharge valves are open
		Check injection point quill
		Check for blockages
No indication on pressure	a) Pump not running	Restart pump
indicator	b) Isolation valve closed	Open isolation valve
	c) Faulty gauge	Replace gauge
		· · · ·

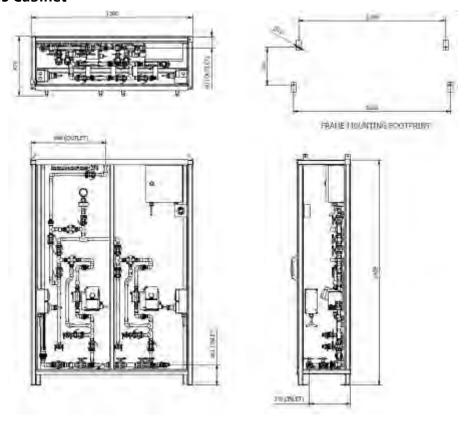
For Test sheets and ITP's pleases see appendices.

8.1 Dimensions DSS Chair

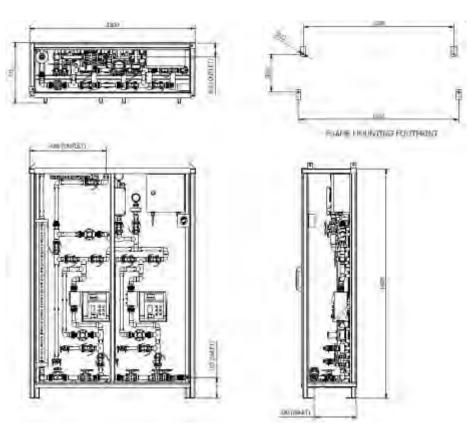


DN 20 Weight: 92 – 95kg

8.2 Dimensions DSS Cabinet



DN 15



DN 20 Weight: 97 – 100Kg

8.3 Components

Supplier list	Product manufacturer	15mm	20mm
Skid frame	Grundfos	Х	Х
Suction manifold, suction strainer, selection/isolating valves, fittings & pipe. Material: Pipe Sched. 80, uPVC UV resist Grey.	George Fischer	X	х
Calibration cylinder	Grundfos	Х	х
Digital Diaphragm dosing pumps	Grundfos	Х	х
Pressure manifold, drain/flush valves, fittings and pipe. Material: Pipe Sched. 80 uPVC, UV resistant Grey.	George Fischer	X	х
Pressure Relief Valve	Grundfos	Х	Х
Pressure loading valve	Grundfos	Х	х
Pulsation Damper	Hidracar/Grundfos	Х	Х
Junction box	Grundfos	Х	х
GPO & E-stop	Schneider	Х	х
Signal cables & terminal junction box	Grundfos	Х	х
Documentation: 3d CAD as built P&ID drawing. Operation manual. Performance test certificates	Grundfos	х	х

8.4 General Data

Performance range

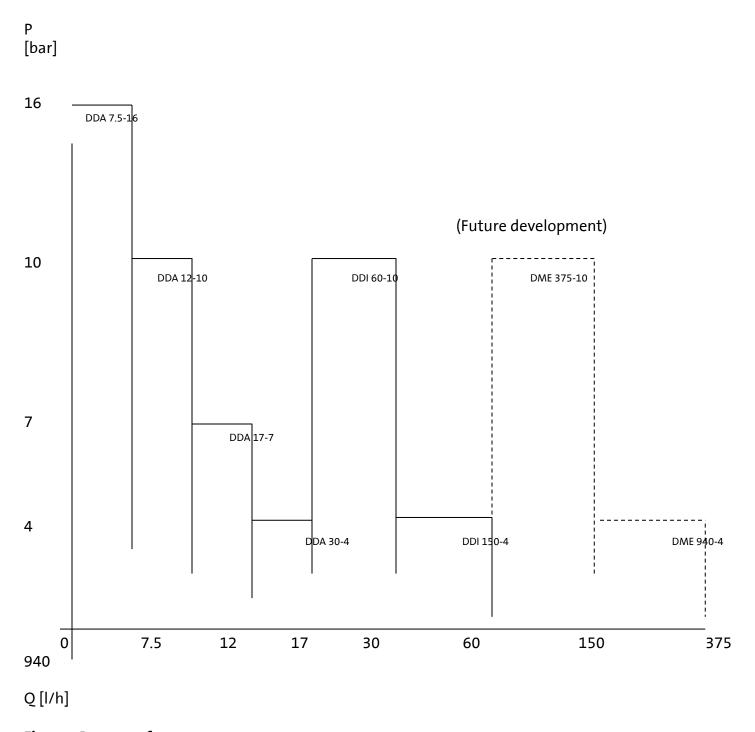


Fig. 1 Pump performance range

8.5 Pump Technical Data

DDA

Data			7.5-16	12-10	17-7	30-4	
	Turndown ratio (setting range)	[1:X]	3000	1000	1000	1000	
		[l/h]	7.5	12.0	17.0	30.0	
	Max. dosing capacity	[gph]	2.0	3.1	4.5	8.0	
		[l/h]	3.75	6.00	8.50	15.00	
	Max. dosing capacity with SlowMode 50 %		1.00	1.55	2.25	4.00	
		[gph] [l/h]	1.88	3.00	4.25	7.50	
	Max. dosing capacity with SlowMode 25 %	[gph]	0.50	0.78	1.13	2.00	
		[l/h]	0.0025	0.0120	0.0170	0.0300	
	Min. dosing capacity	[gph]	0.0007	0.0031	0.0045	0.0080	
		[bar]	16	10	7	4	
	Max. operating pressure	230	150	100	60		
	Max. stroke frequency 1)	[psi] [strokes/min]	190	155	205	180	
	Stroke volume	[ml]	0.74	1.45	1.55	3.10	
Mechanical data		[%]			1		
	Max. suction lift during operation ²⁾	[m]			В		
		[m]	2	3	3	2	
	Max. suction lift when priming with wet valves 2)				d FCM: 2)		
	Min. pressure difference between suction and discharge side Max. inlet pressure, suction side	[bar] [bar]		•	2 PONI: 2)		
			2500	2500	2000	1500	
	Max. viscosity in SlowMode 25 % with spring-loaded valves 3)	[mPas] (= cP)					
	Max. viscosity in SlowMode 50 % with spring-loaded valves 3)	[mPas] (= cP)	1800	1300	1300	600	
	Max. viscosity without SlowMode with spring-loaded valves 3)	[mPas] (= cP)	600	500	500	200	
	Max. viscosity without spring-loaded valves 3)	[mPas] (= cP)	50	300	300	150	
	Min. internal hose/pipe diameter suction/discharge side 4), 2)	[mm]	4	6	6	9	
	Min. internal hose/pipe diameter suction/discharge side (high viscosity) 4)	[mm]	9				
	Min./Max. liquid temperature	[°C]	-10/45				
	Min./Max. ambient temperature	[°C]	0/45				
	Voltage	[V]	100-240 V, 50/60 Hz				
	Length of mains cable	[m]	1.5				
	Max. inrush current for 2 ms at 100 V	[A]	8				
Electrical data	Max. inrush current for 2 ms at 230 V	[A]	25				
	Max. power consumption P ₁	[W]		24	, ⁵⁾		
	Enclosure class			IP 65, N	lema 4X		
	Electrical safety class				II		
	Max. load low-level / empty tank / pulse / external stop input				5 mA		
	Min. pulse length	[ms]			5		
Signal input	Max. pulse frequency	[Hz]			00		
	Impedance at analog 0/4-20 mA input	[Ω]	15				
	Max. resistance in level/pulse circuit	[Ω]			000		
	Max. ohmic load on relay output	[A]	0.5				
Signal output	Max. voltage on relay/analog output	[V]	30 VDC/30 VAC				
	Impedance at 0/4-20 mA analog output	[Ω]			00		
100-1-140-1	Weight (PVC, PP, PVDF)	[kg]	2.4		.4	2.6	
Weight/size	Weight (stainless steel)	[kg]	3.2		.2	4.0	
	Diaphragm diameter	[mm]	44		0	74	
Sound pressure	Max. sound pressure level	[dB(A)]		- 6	10		
Approvals		CE	E, CB, CS	A-US, NS	F61, GOS	T, C-Tick	

¹⁾ The maximum stroke frequency varies depending on calibration

²⁾ Data is based on measurements with water

³⁾ Maximum suction lift: 1 m, dosing capacity reduced (approx. 30 %)

⁴⁾ Length of suction line: 1.5 m, length of discharge line: 10 m (at max. viscosity)

⁵⁾ With E-box

8.6 Pump Technical Data

DDI

Normal operation				Slow Mode step 1			Slow Mode step 2			V			
Q [l/h]	P _{max} [bar]	Q [USg/h]	P _{max} [psl]	Q [l/h]	P _{max} [bar]	Q [USg/h]	P _{max} [psl]	Q [l/h]	p _{max} [bar]	Q [USg/h]	p _{max} [psl]	[ml] (p = 3 bar)	DDI model
60	10	15.87	145	40	10	10.58	145	24.7	10	6.53	145	6.63	222-60D
150	4	39.68	58	100	4	26.46	58	62	4	16.40	58	13.9	222-150D

Input of the dosing capacity	Digital – by regulation of the dosing stroke speed adjustment range: from 0.125% to 100% of the maximum dosing capacity								
	Material of connection	DDI model 222-60D	(DN 8)	DDI model 222-150D (DN 2					
Connections	PVC	PVC hose 6/12 (pres PE hose 9/12 (suctio or PVC tube 10/12 or PE hose/2" (USA)	n side) *)	PVC hose 13/20 PVC tube 20/25 PVC hose 19/27 PVC tube 3/4" NPT (USA					
	PP	PE hose 9/12 *) PP tube 12/16		PPtube	20/25				
	PVDF	PTFE hose 9/12 PVDF tube 12/16		PVDFt	ube 20/25				
	Stainless steel	Stainless steel tube 1/4" NPT (USA)	R 1/4"	Stainless steel tube R 3/4 3/4" NPT (USA)					
Accuracy	Dosing flow < ± 1.5%, line	earity < ± 1.5 %							
Noise level	65 ± 5 dB (A), tested acco	rding to DIN 45635-01-	KL3						
Max. suction height	6 m Water Column for	liquids with viscosity s	imilar to water						
Max. viscosity (HV version) at operating temperature	DDI model 222-60D 222-150D	Normal operation 200 mPa s 500 mPa s	Slow Mode 1 1000 mPa s 800 mPa s		Slow Mode 2 2600 mPa s 2000 mPa s				
Max. admission pressure	2 bar on the suction side		122						
Min. backpressure	1 bar (pressure difference	e with the suction side)							
Max, temperature	max. ambient and ope storage temperature -		0°C						
Max. relative air humidity	up to 92 %, no condensat	tion							
Motor, motor voltage	AC 110 - 240 V ±10%, 50/	60 Hz, power consump	otion 50 W (includ	ing all sen	sors)				
Material of enclosure	Pump and electronics, PP Option: flame-proof encl		einforced						
Protection	IP 65								
Weight		VC, PP, PVDF: 5 kg / st VC, PP, PVDF: 7.5 kg / st		g					

^(*) max. backpressure 9 bars

8.7 Pump Liquids Guide

The resistance table below is intended as a general guide for material resistance (at room temperature), and does not replace testing of the chemicals and pump materials under specific working conditions.

The data shown are based on information from various sources available, but many factors (purity, temperature, abrasive particles, etc.) may affect the chemical resistance of a given material.

Note: Some of the liquids in this table may be toxic, corrosive or hazardous.

Note: Please be careful when handling these liquids.

Pumpe	Material										
				Dosin	g head		Gasket			Ball	Acc.
Description	Chemical formula	Concentration %	4	PVDF	SS 1.4401	PVC	FKM	EPDM	PTFE	Ceramic	PE
		25	•	•	•	•	-	•	•	•	•
Acetic acid	CH3COOH	60	•	•	•	•	-	•	•	•	•
		85	•	•	0	_	-	-	•	•	_
Aluminium chloride	AICI ₃	40	•	•	_	•	•	•	•	•	•
Aluminium sulphate	Al ₂ (SO ₄) ₃	60	•	•	•	•	•	•	•	•	•
Ammonia, aqueous	NH ₄ OH	28	•	•	•	•	_	•	•	•	•
Calcium hydroxide ★ ⁷	Ca(OH) ₂		•	•	•	•	•	•	•	•	•
Calcium hypochlorite	Ca(OCI) ₂	20	0	•	-	•	•	•	•	•	•
		10	•	•	•	•	•	•	•	•	•
Chromic acid	H ₂ CrO ₄	30	-	•	-	•	•	0	•	•	•
		50	-	•	-	•	•	-	•	•	•
Copper sulphate	CuSO ₄	30	•	•	•	•	•	•	•	•	•
Ferric chloride★ ³	FeCl ₃	100	•	•	-	•	•	•	•	•	•
Ferric sulphate★ ³	Fe ₂ (SO ₄) ₃	100	•	•	0	•	•	•	•	•	•
Ferrous chloride	FeCl ₂	100	•	•	_	•	•	•	•	•	•
Ferrous sulphate	FeSO ₄	50	•	•	•	•	•	•	•	•	•
Fluosilicic acid	H ₂ SiF ₆	40	•	•	0	•	-	0	•	•	•
		< 25	•	•	-	•	•	•	•	•	•
Hydrochloric acid	HCI	25-37	•	•	-	•	•	0	•	•	•
Hydrogen peroxide	H ₂ O ₂	30	•	•	•	•	•	•	•	•	•
		30	•	•	•	•	•	•	•	•	•
Nitric acid	HNO ₃	40	0	•	•	•	•	-	•	•	•
		70	-	•	•	-	•	-	•	•	0
Peracetic acid	CH3COOOH	5-15	0	•	0	0	_	0	•	•	0
Potassium hydroxide	KOH	50	•	-	•	•	-	•	•	•	•
Potassium permanganate	KMnO ₄	10	•	•	•	•	0	•	•	•	•
Sodium chlorate	NaClO ₃	30	•	•	•	•	•	•	•	•	•
Sodium chloride	NaCl	30	•	•	-	•	•	•	•	•	•
Sodium chlorite	NaClO ₂	20	•	•	-	0	•	•	•	•	•
Sodium hydroxide	NaOH	30 50	•	•	•	•	0	•	•	•	•
Sodium hypochlorite	NaOCI	12-15	_	•	_	•	•	•	•	•	•
Sodium sulphide	Na ₂ S	30	•	•	•	•	•	•	•	•	•
Sodium sulphite	Na ₂ SO ₃	20	•	•	•	•	•	•	•	•	•
Sodium thiosulfate	Na ₂ S ₂ O ₃	10	•	•	•	•	•	•	•	•	•
Sulphurous acid	H ₂ SO ₃	6	•	•	•	•	•	•	•	•	•
		< 80	•	•		•	•	0	•	•	•
Sulphuric acid★ ⁴	H ₂ SO ₄	80-96	0	•	_	•	•		•	•	 -
		98		•	•		0	_	•	•	 -

Resistant

^{★&}lt;sup>3</sup> Risk of crystallisation.

O Limited resistance

^{* 4} Reacts violently with water and generates much heat. (Pump should be absolutely dry before dosing sulphuric acid.)

⁻ Not resistant

^{★&}lt;sup>7</sup> Once the pump is stopped, calcium hydroxide will sediment rapidly.

SECTION 9: STORAGE AND PRESERVATION

9.1 Storage Prior to Installation

- ♦ Equipment is transported in wooden crates.
- ◆ Fork lift or crane will be required to move crates due to weight and size constraints.
- ♦ Open wooden crate carefully and check for transit damage immediately report to Grundfos if any.
- ◆ Re-pack dosing skid in wooden crate and store in enclosed building out of direct exposure from the environment
- ◆ Store in such a place to prevent damage from moving plant.
- ◆ Remove equipment from wooden crates when ready to install.

9.2 Storage after Chemical Commissioning

- ◆ Drain all chemicals from all pipe work and flush refer to section 3.4.
- ♦ Drain all water from system then isolate suction and discharge valves.
- ♦ Isolate power from system and lock out as per site specifications and procedures.
- ◆ Ensure all inlets and outlets are isolated to reduce the chance of external contaminations or ingress.

SECTION 10: ADDITIONAL INFORMATION

WebCAPS



WebCAPS is a Web-based Computer Aided Product Selection program available on www.grundfos.com. WebCAPS contains detailed information on more than 185 000 Grundfos products in more than 20 languages.

In WebCAPS, all information is divided into 6 sections:

- Catalogue
- Literature
- Service
- Sizing
- Replacement
- · CAD drawings.



Catalogue

With a starting point in areas of applications and pump types, this section contains

- technical data
- curves (QH, Eta, P1, P2, etc) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- · quotation texts, etc.



Literature (M)

In this section you can access all the lastest documents of a given pump, such as

- · data booklets
- Installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- · product brochures, etc.



Service (3)

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and cancelled Grundfos pumps. Furthermore, this section contains service videos showing you

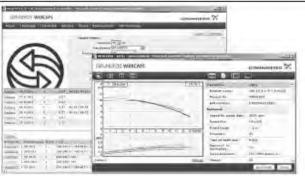
how to replace service parts.



Sizing (

With a starting point in different application areas and installation examples, this section gives easy step-by-step instructions in how to

- select the most suitable and efficient pump for your installation
- carry out advanced calculations based on energy consumption, payback periods, load profiles, lifecycle costs,
- · analyse your selected pump via the built-in lifecycle cost tool
- determine the flow velocity in wastewater applications, etc.



Replacement (5)



In this section you find a guide to select and compare replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump. The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. After having specified the installed pump, the guide suggests a number of Grundfos pumps which can improve both comfort and efficiency.



CAD drawings (15)



In this section it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

The following formats are available in WebCAPS:

2-dimensional drawings

- .dxf. wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings

- dwg, wireframe drawings (without surfaces)
- stp, solid drawings (with surfaces)
- eprt, E-drawings.

WinCAPS



Fig. 58 WinCAPS CD-ROM

WinCAPS is a Windows-based Computer Aided Product Selection program containing detailed informtion on more than 185,000 Grundfos products in more than 22 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no Internet connection is available.

WinCAPS is available on CD-ROM and updated once a year.

GRUNDFOS Pumps Pty Ltd

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www.grundfos.com

PHAMP-1 pH Preamplifier





PHAMP-1 pH Preamplifier

General Description

The PHAMP-1 is a unity gain preamplifier which convert the high impedance mV signal of a pH or ORP electrode to a low impedance signal which can travel 1,000 feet over ordinary wire and connectors not only to pH meters and controllers (such as the INFCPH) which are designed with high impedance input circuitry, but also to Process Meters and controllers such as the IDP and INFP which can not otherwise register the high impedance signal.

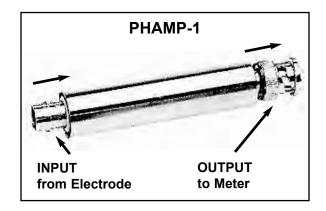
In many applications the PHAMP-1 Preamp will also extend the useful life of expensive pH electrodes, lowering the output impedance of an aging electrode allowing it to continue providing a measurable signal.

The PHAMP-1 is powered by lithium batteries with an estimated life of 5 years when used with high input impedance instruments.

The electrodes are entirely encapsulated in an epoxy filled stainless steel enclosure. The input and output connections are industry standard BNC. The output can be split from coaxial to separated leads with a BNC to the Banana plug adapter (part number 3073/N).

Operating Instructions

1. Plug it in.



Specifications

Output Offset: 1 mV typical; 2 mV max.

which corresponds to .033 pH

Input Impedance: 10¹³ Ohms **Output Impedance:** 20 K Ohms

Output Voltage: -2000 mV to +2000 mV

Operating Temperature:

0 to 60°C

Dimensions: 95.25 cr

95.25 cm L x 17.8 cm D

 $(3.75" \times 0.7")$

Weight: 5.7 g (2 oz.)

PHAMP-1

pH/ORP Preamplifier

Operator's Manual



2875





2/2-Way Solenoid Control Valve

- Excellent range (1:200)
- Very good response
- Compact valve design
- Orifice sizes 2 ... 8 mm
- Port connection 3/8" and 1/2"

Type 2875 can be combined with..





Type 8605



Type 2508

Control Electronics. Cable plug version

Digital control electronics Cable plug DIN-rail version

Universal controller

The direct-acting solenoid control valve Type 2875 is used as the regulating unit in control loops. Due to an elastomeric seat seal the valve closes tight (integrated shut-off function), up to the DN specific nominal pressure, see ordering chart on page 3. The plunger of the valve is assembled frictionless, which leads to an extraordinary adjustment characteristic. This valve is particularly suitable for demanding control tasks (high control range, dry gases, etc.).

Circuit function A



direct acting 2-way solenoid control valve, normally closed

Valve control takes place through a PWM signal 1). The duty cycle of the PWM signal determines the coil current and hence the position of the plunger. Optionally the valve can also be driven with DC voltage.

Please note the sizing comments for such a control valve on page 2.

- 1) PWM pulse width modulation
- ²⁾ Pressure data [bar]: Measured as overpressure to the atmospheric pressure, orifice further depends on nominal pressure
- 3) Maximum value, value depends on operating pressure
- 4) Characteristic data of control behaviour depends on process conditions
- 5) by flow measurement

Technical Data - Valve	
Body material	Brass, stainless steel
Seal material	FKM, EPDM on request
Medium	Neutral gases, liquids on request
Pressure range	0 25 bar ²⁾
Medium temperature	-10 +90 °C
Ambient temperature	max. +55 °C
Power supply	24 V DC
PWM frequency	900 Hz
Power consumption	16 W
Max. coil current 3)	750 mA
Duty cycle	100% continuously rated
Port connection	G 3/8, G 1/2, NPT 3/8, NPT 1/2
Electrical connection	Tag connector (DIN EN 175301-803 Form A)
Installation	As required, preferably with actuator in upright position
Typical control data 4)	
at PWM-Control	
Hysteresis	< 5%
Repeatability	< 0.5% FS ⁵⁾
Sensitivity	< 0.25% FS ⁵⁾
Span	1:200
Response time (10 -90%)	25 ms
Protection class - valve	IP65

The valve control can take place through the control electronics of Type 8605, which converts an analogue input signal into a PWM signal.

Further functional features of the Type 8605 electronic control unit:

- Temperature compensation for coil heating by internal current regulation
- · Simple adaptation of zero and span settings
- Ramp function to dampen fast set point changes

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p. 1/5

burkert

Characteristics of a solenoid control valve

$\frac{K_V}{K_{Vs}}$ 1,0 0,9 0,8 0,7 0,6 0,5 0,4 0.3 0,2 0,1 10 [V] 20 [mA] 5 12 0 10 20 [mA]

Advice for valve sizing

In continuous flow applications, the choice of an appropriate valve size is much more important than with on/off valves. The optimum size should be selected such that the resulting flow in the system is not unnecessarily reduced by the valve. However, a sufficient part of the pressure drop should be taken across the valve even when it is fully opened.

Recommended value: Δp_{valve} > 25 % of total pressure drop within the system

Otherwise, the ideal, linear valve curve characteristic is changed.

If the differential pressure (difference between inlet and outlet pressure) exceeds half the value of the nominal pressure, the characteristics may change.

For that reason take advantage of Bürkert competent engineering services during the planning phase!

[(273+t)K]

Determination of the k value

Pressure drop	k _v value for liquids [m³/h]	k _v value for gases [m³/h]
Subcritical $p_2 > \frac{p_1}{2}$	$= Q \sqrt{\frac{\rho}{1000 \Delta p}}$	$=\frac{\mathbf{Q}_{N}}{514}\sqrt{\frac{T_{1}\rho_{N}}{p_{2}\Delta p}}$
Supercritical $p_2 < \frac{p_1}{2}$	$= Q \sqrt{\frac{\rho}{1000 \Delta p}}$	$=\frac{Q_{\scriptscriptstyle N}}{257p_{\scriptscriptstyle 1}}\sqrt{T_{\scriptscriptstyle 1}\rho_{\scriptscriptstyle N}}$

Medium temperature

- 6) measured for water , $\Delta p = 1$ bar, over the value
- 7) At reference conditions 1.013 bar and 0°C (273K)
- 8) Absolute pressure

2875



Ordering chart

All valves with FKM seal

Circuit	Orifice [mm]	Port connection	k,s value water [m³/h] ⁹⁾	Q _{nn} value [I/min] ¹⁰⁾	Nominal pressure ¹¹⁾ [bar]	Max. differential pressure [bar]	ltem no. Brass	Item no. Stainless steel
A 2/2-way	2	G 3/8	0.12	129	25	12.5	236 897	236 899
Normal closed (NC)		NPT 3/8	0.12	129	25	12.5	236 898	236 900
	3	G 3/8	0.25	270	10	5	236 901	263 903
A		NPT 3/8	0.25	270	10	5	236 902	236 904
	4	G 3/8	0.45	485	8	4	236 905	236 910
, P		NPT 3/8	0.45	485	8	4	236 908	236 912
		G 1/2	0.45	485	8	4	236 906	236 911
		NPT 1/2	0.45	485	8	4	236 909	236 913
	6	G 1/2	0.80	862	4	2	236 915	236 919
		NPT 1/2	0.80	862	4	2	236 917	236 921
	8	G 1/2	1.10	1186	2	1	236 922	236 924
		NPT 1/2	1.10	1186	2	1	236 923	236 925

 $^{^{9)}}$ k_{vs} value: Flow rate value for water, measured at +20 $^{\circ}$ C and 1 bar pressure differential over a fully opened valve.

Note: Please note that the valves are delivered without control electronics and cable plug (see accessory ordering information).

Ordering chart - variants for higher differential pressure

All valves with FKM seal

Circuit func- tion	Orifice [mm]	Port connection	k,s-value water [m³/h]	Q _n value [l/min]	Nominal pressure [bar]	ltem no. Brass	Item no. Stainless steel
	2.0	G 3/8	0.12	129	25	239 040	239 085
A	3.0	G 3/8	0.25	270	10	239 086	239 087
4 T + T	4.0	G 3/8	0.45	485	8	239 088	239 089
	6.0	G 1/2	0.80	862	4	239 090	239 091
	8.0	G 1/2	1.10	1186	2	239 092	239 093

Note: The following technical data changes compared with the data on page 1:

- PWM frequency 500 Hz, span 1:100.
- Other connection variations (sub-base, NPT) on request<

Further versions on request





Oxygen version Parts oil-, fat- and silicon free





p. 3/5

 $^{^{}v_s}$ value: Flow rate for air with inlet pressure of 6 bar, 1 bar pressure differential and +20 °C.

The Pressure data [bar]: Overpressure with respect to atmospheric pressure, with a differential pressure (difference between inlet and outlet pressure) above half of the nominal pressure there are discontinuities in the valve's characteristics possible.

2875



Ordering chart for accessories

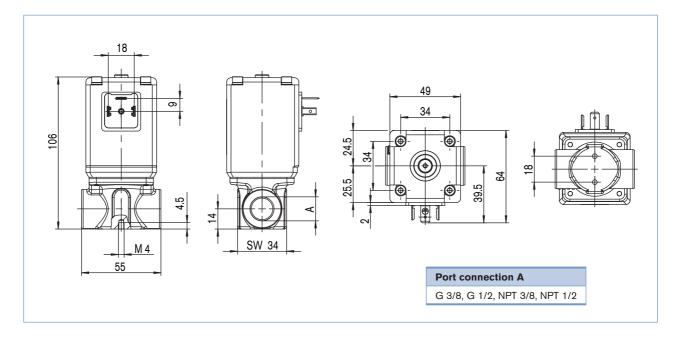
Cable plug 2508 acc. to DIN EN 175301-803 Form A

The delivery of a cable plug includes the flat seal and fixing screw

Circuitry	Voltage / frequency	Item no.
None	0 - 250 V AC/DC	008 376
None, with 3 m cable	0 - 250 V AC/DC	783 573

Control elecronics, Type 8605 - please see datasheet

Dimensions [mm]



DTS 1000173855 EN Version: A Status: RL (released | freigegeben | validé) printed: 05.10.2012

2875



Design data for solenoid control valves

Please fill out this form and send to your local Bürkert Sales Centre* with your inquiry or order

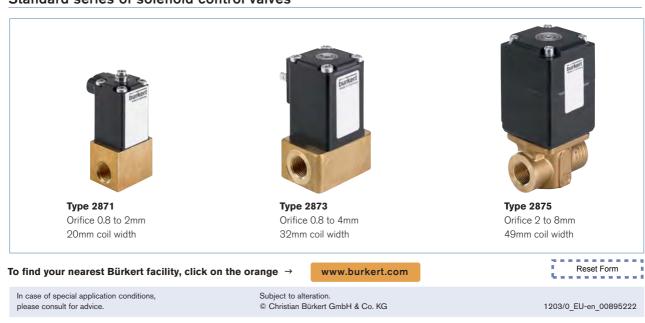
You c	an		out
you c the fi	elds	s di	recu file
the fi in th befo	e Pl	orin	ting
befo	the	for	m.

Company	Contact person	Jul
Customer No	Department	
Address	Tel./Fax	
Postcode/Town	E-mail	

■ = Mandatory fields			Quantity		Requested delivery date
Process data					
Medium					
State of medium		liquid		gaseous	
Medium temperature			°C		
Maximum flow rate	O _{nom =}		Unit:		
Minimum flow rate	Q _{min} =		Unit:		
Inlet pressure at nominal operation	p ₁ =		barg		
Outlet pressure at nominal operation	p ₂ =		barg		
Max. inlet pressure (nominal pressure)	p _{1max} =		barg		
Ambient temperature			°C		
Additional specifications					
		1			
Body material		Brass		Stainless steel	
Seal material		FKM		other	

Note: Please state all pressure values as overpressures with respect to atmospheric pressure [barg].

Standard series of solenoid control valves



p. 5/5

FLUID CONTROL SYSTEMS



2/2-way Compact Solenoid Valve, G 1/4 - G 1/2

- Direct-acting, normally closed
- Brass and stainless steel body
- Electrical connection cable plug Form A
- High pressure version up to 100 bar
- High temperature version up to +180 °C

Type 6027 Compact can be combined with...





Type 1078

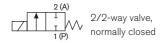
Type 2511 ASI cable plug

Type 2508 Cable plug

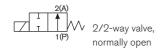
Timer unit

Type 6027 is a direct-acting solenoid valve used for shut-off, dosing, filling, and ventilation. The push-over solenoid system is of modular design and the coil can be rotated 360°.

Circuit function A



Circuit Function B



Technical data	
Port connection	G 1/4, G 3/8, G 1/2 (NPT and RC on request)
Orifice	DN 2.0 - 12.0
Body material	Brass or stainless steel 1.4404 (316L)
Coil material	Ероху
Coil insulation class	
	Epoxy class H
Seal material	FKM, PTFE/FKM and PTFE/PEEK for high temperature versions (EPDM on request)
Medium	Vacuum, neutral gases and liquids (e.g. compressed air, town gas, natural gas, water, hydraulic oil, petrol) and slightly aggressive medium (stainless steel version)
High temperature version	Hot fluids and steam (only with stainless steel body)
Medium temperature Seal material FKM, PTFE/FKM Seal material PTFE/PEEK	-10 to +140°C -40 to +180 °C
Ambient temperature	-10 to +55°C
Viscosity	max. 21 mm²/s
Voltages	24 V DC, 24 V/50 Hz, 230 V/50 Hz
Voltage tolerance	±10%
Duty cycle / single valve	100 % continuous operation
Electrical connection	According to DIN EN 175301-803 Form A for cable plug Type 2508 (see Ordering chart for accessories)
Protection class	IP65 with Cable Plug
Installation	As required, preferably with actuator in upright position



Technical data (cont.)

Power consumption								
Orifice	Power consumption Inrush AC Hold AC DC							
[mm]	Inrush AC			DC				
	[VA]	(hot coi [VA]	i) [W]	(hot/cold coil) [W]				
2.0-12.0	105	37	16	16 / 21				

Respons	Response times									
Orifice	Response	e times AC	Response times DC							
[mm]	Opening [ms]	Closing [ms]	Opening [ms]	Closing [ms]						
2.0-12.0	10-20	20-30	20-80	20-30						

Response times [ms]:

Measured at valve outlet at 6 bar and +20°C.

Opening: pressure build-up 0 to 90% Closing: Pressure relief 100 to 10%

Ordering chart for valves with brass or stainless steel body, standard temperature version

Valves with AC19 coil (42 mm), seal material FKM, without cable plug

	Ę				Pressure range [bar] 2)			Item no.		
_	÷.			o ⊃	for liquid a	ad magazina		1		
# ₽	9		e	를고드		lium	2	20	20	
Circuit	Port		Orifice [mm]	Kv value water [m3/h] ¹⁾	20	AC	024/DC	024/50	230/50	
ਹ ⊋				_		ă	8	8	×	
A 2/2-way valve	Seal material F	KM, mediun	n temper	temperature -10 to +140°C						
NC	Brass body									
2 (A)	Threaded port	G 1/4	3.0	0.28	0-30	0-25	178 295	178 296	178 297	
★ 1	40		4.0	0.54	0-12	0-16	178 299	178 300	178 301	
	42 mm		5.0	0.73	0-6	0-10	178 303	178 304	178 305	
1 (P)			6.0	0.95	0-3	0-6	178 307	178 308	178 309	
		G 3/8	3.0	0.28	0-30	0-25	178 311	178 312	178 313	
			4.0	0.54	0-12	0-16	178 315	178 316	178 317	
			5.0	0.73	0-6	0-10	178 319	178 320	178 321	
			6.0	0.95	0-3	0-6	178 323	178 324	178 325	
	_		8.0	1.6	0-1	0-3	178 327	178 328	178 329	
		G 1/2	6.0	0.95	0-3	0-6	178 331	178 332	178 333	
			8.0	1.6	0-1	0-3	178 335	178 336	178 337	
			10.0	1.8	0-0.4	0-2.0	178 339	178 340	178 341	
	Stainless steel	· · · · · · · · · · · · · · · · · · ·	•							
	Threaded port	G 1/4	3.0	0.28	0-30	0-25	178 239	178 240	178 241	
	42		4.0	0.54	0-12	0-16	178 243	178 244	178 245	
	mm		5.0	0.73	0-6	0-10	178 247	178 248	178 249	
			6.0	0.95	0-3	0-6	178 251	178 252	178 253	
		G 3/8	3.0	0.28	0-30	0-25	178 255	178 256	178 257	
			4.0	0.54	0-12	0-16	178 259	178 260	178 261	
	C		5.0	0.73	0-6	0-10	178 263	178 264	178 265	
			6.0	0.95	0-3	0-6	178 267	178 268	178 269	
	-	0.44	8.0	1.6	0-1	0-3	178 271	178 272	178 273	
		G 1/2	6.0	0.95	0-3	0-6	178 275	178 276	178 277	
			8.0	1.6	0-1	0-3	178 279	178 280	178 281	
			10.0	1.8	0-0.4	0-2.0	178 283	178 284	178 285	
B 2/2-way valve	Brass body		12.0	2.0	0-0.2	0-1.2	178 287	178 288	178 289	
NO	42	G1/4	3	0.28	0	-16	211 914	228 487	228 488	
NO	mm mm	G1/4								
2(A)			4	0.54		-10	208 623	228 489	228 490	
	-	0.1/0	6	0.95)-6	211 915	000.500	000.504	
1(P)		G1/2	8	1.6		-3	211 916	228 503	228 504	
	Chainle		10	1.8	0)-2	210 436	219 530	210 438	
	Stainless steel	04/4	0	0.00		10	000 040	000.044	000.045	
		G1/4	3	0.28		-16	230 243	230 244	230 245	
	-	04:-	4	0.54		-10	230 246	230 247	230 248	
	_	G3/8	6	0.95)-6	230 255	230 256	230 257	
		G1/2	8	1.6)-3	230 261	230 262	230 263	
			10	1.8	0)-2	225 248	230 264	230 265	

 $^{^{\}mbox{\tiny 1)}}$ Measured at +20 °C, 1 bar $^{\mbox{\tiny 2)}}$ pressure at valve inlet and free outlet

Please note that the cable plug has to be ordered separately, see accessories on page 5 and separate datasheet for Type 2508.





Port connection

NPT, RC





p. 2/5

■ on request

²⁾ Measured as overpressure to the atmospheric pressure



Ordering chart for valves with brass body, standard temperature and high pressure version

All valves with AC19 coil (42 mm), seal material PTFE/FKM, without Cable Plug

_	_		=					range [bar] gaseous r		Item no. p	er voltage/ [V/Hz]	frequency
Circuit function	Port connection		Orifice [mm]	Kv value water [m3/h] ¹¹	for liquid and gaseous medium	Liquids	Gaseous	024/DC	024/50	230/50		
A 2/2-way valve	Seal material	PTFE/F	(M, medi	um temper	ature -10 to	+140°C						
NC	Brass body											
2 (A)	Threaded port	G 1/4	2.0	0.14	0-80	0-75	0-80	184 667		184 668		
	42		4.0	0.54	0-20	0-30	0-50	184 670		184 671		
1 (P)	mm		6.0	0.95	0-5	0-	12	184 674		184 675		
		G 3/8	6.0	0.95	0-5	0-	12	184 677		184 678		
			8.0	1.6	0-1	0	-5	184 680		184 681		
		G 1/2	8.0	1.6	0-1	0	-5	184 683		184 684		
			10.0	1.8	0-0.4	0-2	0-3	184 686		184 687		

¹⁾ Measured at +20 °C, 1 bar2) pressure at valve inlet and free outlet

on request

Please note that the cable plug has to be ordered separately, see accessories on page 5 and separate datasheet for Type 2508.

Ordering chart valves with stainless steel body, also for high temperatures and high pressure

All valves with AC19 coil (42 mm), seal material PTFE/PEEK, without Cable Plug

_	_		=					ange [bar] [:] Jaseous me	²⁾ for liquid edium	Item no. per voltage/frequency [V/Hz]		
tio	tio		_	water	DC	Α	C					
Circuit function	Port connection		Orifice [mm]	Kv value wa [m3/h] ¹⁾	for liquid and gaseous medium	Liquids	Gaseous medium	024/DC	024/50	230/50		
A 2/2-way valve	Seal material	PTFE/PE	EK, also	for high t	emperature	s up to +1	B0°C					
NC	Stainless stee	l body										
2 (A)	Threaded port	G 1/4	2.0	0.14	0-100	0-75	0-100	184 689		184 690		
▲ 1	42 mm		4.0	0.54	0-20	0-30	0-50	184 692	•	184 693		
1 (P)		G 3/8	6.0	0.95	0-5	0-	-12	184 695		184 696		
			8.0	1.6	0-1	C)-5	184 698		184 699		
		G 1/2	10.0	1.8	0-0.4	0-2	0-3	184 701	•	184 702		
	200		12.0	2.0	0-0.2	0-1.2	0-2	184 704	•	184 705		

¹⁾ Measured at +20 °C, 1 bar 2) pressure at valve inlet and free outlet

■ on request

Please note that the cable plug has to be ordered separately, see accessories on page 5 and separate datasheet for Type 2508.

Further versions on request

Materials

Seal material EPDM, PTFE

Port connection NPT, RC

Voltage
Non-standard voltages

Approvals ATEX

Pressure

Higher pressures for gaseous medium

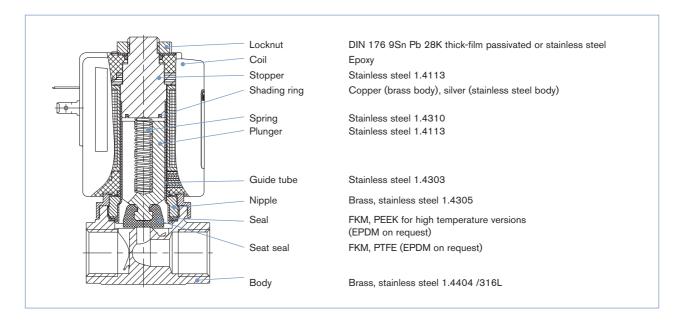
Additional Oxygen versions

²⁾ Measured as overpressure to the atmospheric pressure

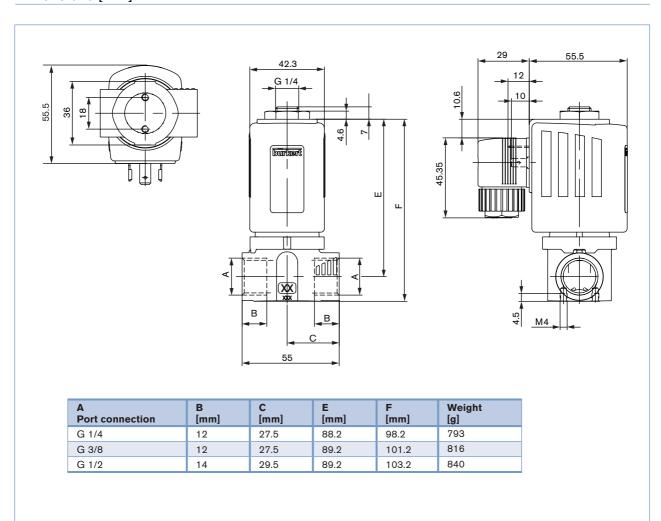
²⁾ Overpressure with respect to atmospheric pressure



Materials



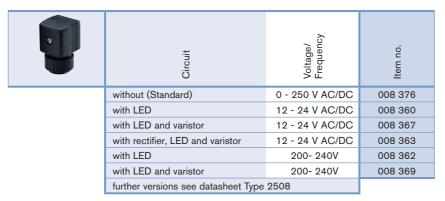
Dimensions [mm]

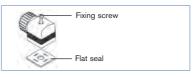




Ordering chart accessories

Cable plug Type 2508 according to DIN EN 175301-803 Form A





Included in delivery is a connector with flat seal and fixing screw. For other cable plug versions according to DIN EN 175301-803 (previously DIN 43650) Form A, see separate datasheet for Type 2508. When you click on the orange box "More info." below, you will come to our website for the resp. product where you can download the datasheet.

To find your nearest Bürkert facility, click on the orange box \Rightarrow

www.burkert.com

In case of special application conditions, please consult for advice.

Subject to alterations

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p. 5/5

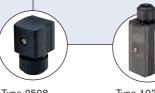
burkertFLUID CONTROL SYSTEMS



2/2-way Compact Solenoid Valve, G 1/4 - G 1/2

- Direct-acting, normally closed
- Brass and stainless steel body
- Electrical connection cable plug Form A
- High pressure version up to 100 bar
- High temperature version up to +180 °C

Type 6027 Compact can be combined with...



Type 2508 Cable plug

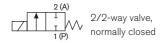
Type 1078
Timer unit



Type 2511 ASI cable plug

Type 6027 is a direct-acting solenoid valve used for shut-off, dosing, filling, and ventilation. The push-over solenoid system is of modular design and the coil can be rotated 360°.

Circuit function A



Circuit Function B



Technical data	
Port connection	G 1/4, G 3/8, G 1/2 (NPT and RC on request)
Orifice	DN 2.0 - 12.0
Body material	Brass or stainless steel 1.4404 (316L)
Coil material	Ероху
Coil insulation class	Epoxy class H
Seal material	FKM, PTFE/FKM and PTFE/PEEK for high temperature versions (EPDM on request)
Medium High temperature version	Vacuum, neutral gases and liquids (e.g. compressed air, town gas, natural gas, water, hydraulic oil, petrol) and slightly aggressive medium (stainless steel version) Hot fluids and steam (only with stainless steel body)
Medium temperature	The haide and elean (emy with elamose elect body)
Seal material FKM, PTFE/FKM Seal material PTFE/PEEK	-10 to +140°C -40 to +180 °C
Ambient temperature	-10 to +55°C
Viscosity	max. 21 mm ² /s
Voltages	24 V DC, 24 V/50 Hz, 230 V/50 Hz
Voltage tolerance	±10%
Duty cycle / single valve	100 % continuous operation
Electrical connection	According to DIN EN 175301-803 Form A for cable plug Type 2508 (see Ordering chart for accessories)
Protection class	IP65 with Cable Plug
Installation	As required, preferably with actuator in upright position

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Technical data (cont.)

Power consumption								
Orifice Power consumption								
[mm]	Inrush AC	Hold AC		DC				
		(hot coi		(hot/cold coil)				
	[VA]	[VA]	[W]	[W]				
2.0-12.0	105	37	16	16 / 21				

Respons	Response times										
Orifice Response times AC Response times DC											
[mm]	Opening [ms]	Closing [ms]	Opening Closing [ms]								
2.0-12.0	10-20	20-30	20-80	20-30							

Response times [ms]:

Measured at valve outlet at 6 bar and +20°C.

Opening: pressure build-up 0 to 90% Closing: Pressure relief 100 to 10%

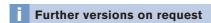
Ordering chart for valves with brass or stainless steel body, standard temperature version

Valves with AC19 coil (42 mm), seal material FKM, without cable plug

	_				Pressure ra	nge [bar] 2)		Item no.				
_	ţ			Φ -		nd gaseous						
# A	ည်		9	를 누도	med		20	20	20			
Circuit	Port connection		Orifice [mm]	Kv value water [m3/h] ¹⁾			024/DC	024/50	230/50			
:i					20	AC	07	07	73			
A 2/2-way valve	Seal material F	KM, mediun	ı temper	temperature -10 to +140°C								
NC	Brass body											
2 (A)	Threaded port	G 1/4	3.0	0.28	0-30	0-25	178 295	178 296	178 297			
<u> </u>	40		4.0	0.54	0-12	0-16	178 299	178 300	178 301			
	42 mm		5.0	0.73	0-6	0-10	178 303	178 304	178 305			
1 (P)	_		6.0	0.95	0-3	0-6	178 307	178 308	178 309			
		G 3/8	3.0	0.28	0-30	0-25	178 311	178 312	178 313			
			4.0	0.54	0-12	0-16	178 315	178 316	178 317			
			5.0	0.73	0-6	0-10	178 319	178 320	178 321			
			6.0	0.95	0-3	0-6	178 323	178 324	178 325			
	_		8.0	1.6	0-1	0-3	178 327	178 328	178 329			
		G 1/2	6.0	0.95	0-3	0-6	178 331	178 332	178 333			
			8.0	1.6	0-1	0-3	178 335	178 336	178 337			
			10.0	1.8	0-0.4	0-2.0	178 339	178 340	178 341			
	Stainless steel	1.4404 (316L	.)									
	Threaded port	G 1/4	3.0	0.28	0-30	0-25	178 239	178 240	178 241			
	40		4.0	0.54	0-12	0-16	178 243	178 244	178 245			
	42 mm		5.0	0.73	0-6	0-10	178 247	178 248	178 249			
	_		6.0	0.95	0-3	0-6	178 251	178 252	178 253			
		G 3/8	3.0	0.28	0-30	0-25	178 255	178 256	178 257			
			4.0	0.54	0-12	0-16	178 259	178 260	178 261			
			5.0	0.73	0-6	0-10	178 263	178 264	178 265			
			6.0	0.95	0-3	0-6	178 267	178 268	178 269			
	_		8.0	1.6	0-1	0-3	178 271	178 272	178 273			
		G 1/2	6.0	0.95	0-3	0-6	178 275	178 276	178 277			
			8.0	1.6	0-1	0-3	178 279	178 280	178 281			
			10.0	1.8	0-0.4	0-2.0	178 283	178 284	178 285			
			12.0	2.0	0-0.2	0-1.2	178 287	178 288	178 289			
B 2/2-way valve	Brass body	0.111										
NO	42 mm	G1/4	3	0.28		·16	211 914	228 487	228 488			
2(A)			4	0.54		·10	208 623	228 489	228 490			
	_		6	0.95		-6	211 915					
1(D)		G1/2	8	1.6	0	-3	211 916	228 503	228 504			
1(1)	600		10	1.8	0	-2	210 436	219 530	210 438			
	Stainless steel											
		G1/4	3	0.28	0-	·16	230 243	230 244	230 245			
			4	0.54	0-	10	230 246	230 247	230 248			
		G3/8	6	0.95	0	-6	230 255	230 256	230 257			
	_	G1/2	8	1.6	0	-3	230 261	230 262	230 263			
			10	1.8		-2	225 248	230 264	230 265			

¹⁾ Measured at +20 °C, 1 bar2) pressure at valve inlet and free outlet

Please note that the cable plug has to be ordered separately, see accessories on page 5 and separate datasheet for Type 2508.





NPT, RC





p. 2/5

■ on request

²⁾ Measured as overpressure to the atmospheric pressure



Ordering chart for valves with brass body, standard temperature and high pressure version

All valves with AC19 coil (42 mm), seal material PTFE/FKM, without Cable Plug

_	_	E				range [bar] gaseous n		Item no. per voltage/frequency [V/Hz]		
Circuit function	Port connection		Orifice [mm] Kv value water		for liquid and gaseous C	Liquids	Gaseous medium	024/DC	024/50	230/50
A 2/2-way valve	Seal material	PTFE/FK	(M, medi	um temper	ature -10 to	+140°C				
NC	Brass body									
2 (A)	Threaded port	G 1/4	2.0	0.14	0-80	0-75	0-80	184 667		184 668
	42		4.0	0.54	0-20	0-30	0-50	184 670		184 671
1 (P)	mm		6.0	0.95	0-5	0-	12	184 674		184 675
			6.0	0.95	0-5	0-	12	184 677		184 678
		G 1/2		1.6	0-1	0	0-5			184 681
				1.6	0-1	0	-5	184 683		184 684
			10.0	1.8	0-0.4	0-2	0-3	184 686		184 687

¹⁾ Measured at +20 °C, 1 bar2) pressure at valve inlet and free outlet

on request

Please note that the cable plug has to be ordered separately, see accessories on page 5 and separate datasheet for Type 2508.

Ordering chart valves with stainless steel body, also for high temperatures and high pressure

All valves with AC19 coil (42 mm), seal material PTFE/PEEK, without Cable Plug

_	ç					ange [bar] [:] Jaseous me	²⁾ for liquid edium	Item no. per voltage/frequency [V/Hz]		
tio	tio	ctio		water	DC	Α	C			
Circuit function	Port connection		Orifice [mm]	Kv value wa [m3/h] ¹⁾	for liquid and gaseous medium	Liquids	Gaseous medium	024/DC	024/50	230/50
A 2/2-way valve	Seal material	PTFE/PE	EK, also	for high t	emperature	s up to +1	B0°C			
NC	Stainless stee	l body								
2 (A)	Threaded port	G 1/4	2.0	0.14	0-100	0-75	0-100	184 689		184 690
▲ 1	42 mm		4.0	0.54	0-20	0-30	0-50	184 692	•	184 693
1 (P)		G 3/8	6.0	0.95	0-5	0-	-12	184 695		184 696
			8.0	1.6	0-1	0-5		184 698		184 699
		G 1/2	10.0	1.8	0-0.4	0-2	0-3	184 701	•	184 702
	200		12.0	2.0	0-0.2	0-1.2	0-2	184 704	•	184 705

¹⁾ Measured at +20 °C, 1 bar 2) pressure at valve inlet and free outlet

■ on request

Please note that the cable plug has to be ordered separately, see accessories on page 5 and separate datasheet for Type 2508.

Further versions on request

Materials

Seal material EPDM, PTFE

Port connection NPT, RC

VoltageNon-standard voltages

Approvals
ATEX

Pressure
Higher pressures for gaseous medium

Additional Oxygen versions

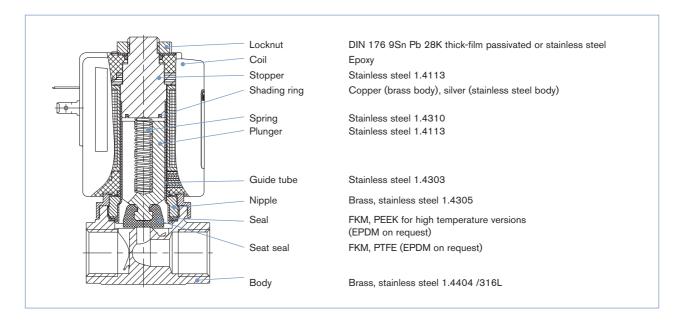
p. 3/5

²⁾ Measured as overpressure to the atmospheric pressure

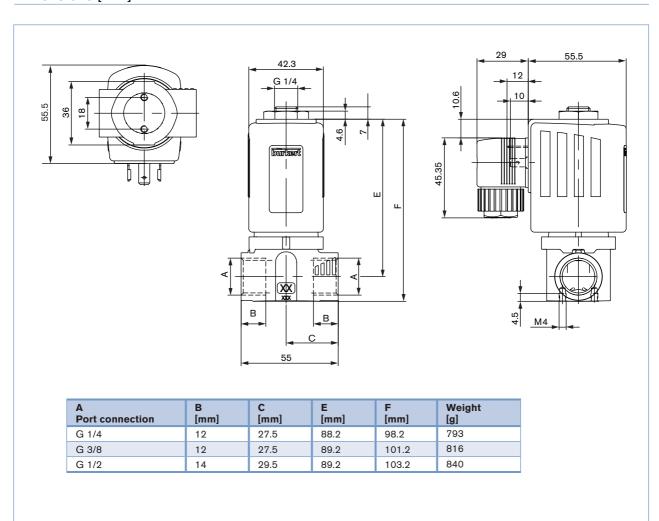
²⁾ Overpressure with respect to atmospheric pressure



Materials



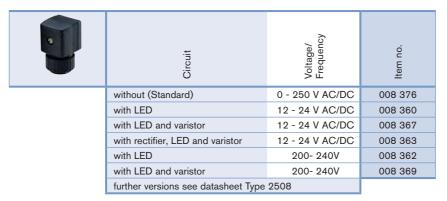
Dimensions [mm]

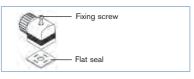




Ordering chart accessories

Cable plug Type 2508 according to DIN EN 175301-803 Form A





Included in delivery is a connector with flat seal and fixing screw. For other cable plug versions according to DIN EN 175301-803 (previously DIN 43650) Form A, see separate datasheet for Type 2508. When you click on the orange box "More info." below, you will come to our website for the resp. product where you can download the datasheet.

To find your nearest Bürkert facility, click on the orange box \Rightarrow

www.burkert.com

In case of special application conditions, please consult for advice.

Subject to alterations

1112/10_EU-en_00895015

p. 5/5





3/2-way ball valve with electric quarter turn actuator, ball valve in stainless steel

- Suitable for aggressive media
- High flow rate value
- Actuator with adjustable limit switches
- Visual position indicator
- Multiport versions on request

Type 2656 can be combined with...







Type 2655

Pneumatically actuated ball valve

Type 8326 Pressure transmitter

The electric ball valve Type 2656 consists of an electrical quarter turn actuator and a 2/2way or 3/2-way ball valve made of stainless steel. This datasheet refers to the 3/2 way version with threaded ports. Weld, flanged and other port types are also available.

The quarter turn actuator is compactly built for various power options. One unit suits all quarter turn style valves. Alternatively the heavy duty Type 3005 electric actuator, for high torque and industrial applications, may be used. Contact Bürkert for more information.

Technical data Body material	Stainless steel 1.4408
bouy material	Stalliess steel 1.4400
Seal material	PTFE
Medium	Gaseous and liquid media, which do not attack the housing and sealing materials
Medium temperature	-10 to +180°C (see valve pressure chart)
Ambient temperature	-10 to +55°C
Port connection	Threaded ports BSP Weld and flanged ported versions available
Operating pressure	0-70 bar
Connection between actuator and ball valve	Flange acc. to ISO 5211
Operating voltage	24 V AC/DC, 100-240 V AC / 50-60 Hz (Other voltages on request)
Voltage tolerance	DC: +/-20%; AC: +/-10%
Duty rating	At max. torque: 50% of the time
Electrical connection	2 cable glands ISO M20 (cable plug EN175301-803 on request)
Protection class	IP65
Rotation angle	90° (+/-5°)
Limit switches	4 adjustable - (2 for motor and 2 additional for feedback) max. 230 V / 5A
Elec. actuator material Cover Body Axis/Screws gearbox Installation	ABS PA Stainless steel Steel, PC Don't mount the actuator upside down

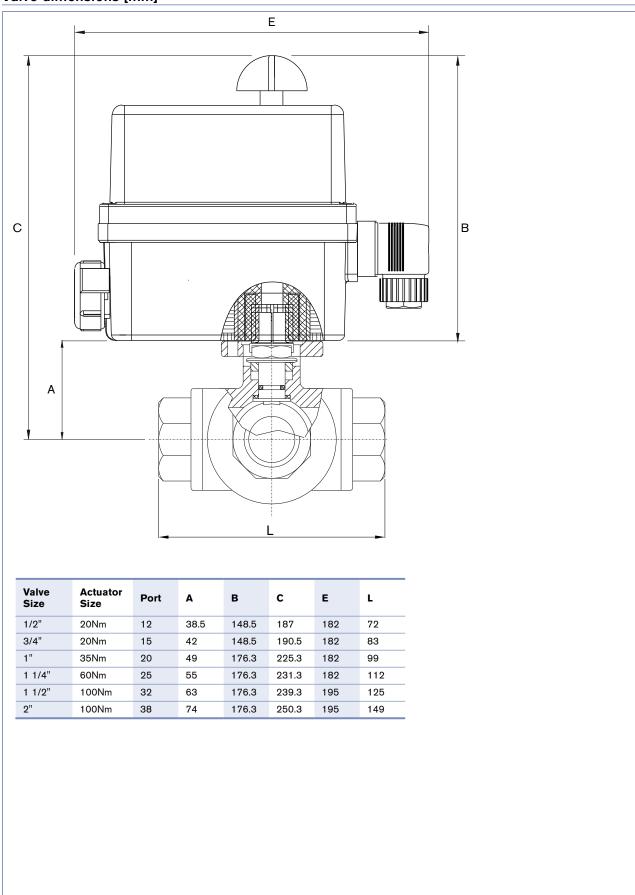
Applications

Universal application Water treatment Food & beverage General manfacturing

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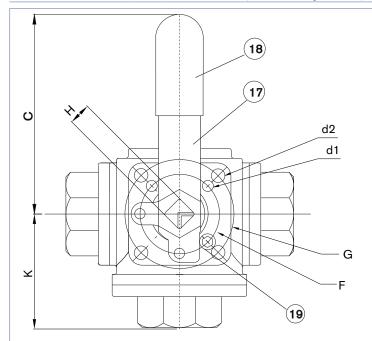


Valve dimensions [mm]

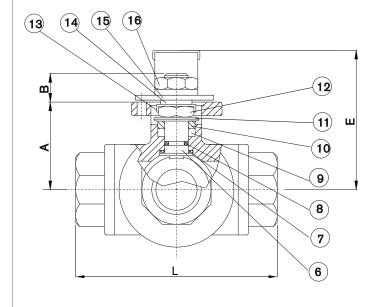


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Valve dimensions [mm], continued (valve body detail)



Item	Part Name	Materials
1	End Cap	CF8M
2	Gasket	PTFE
3	Body	CF8M
4	Ball	SS 316
5	Seat	PTFE
6	Stem	SS 316
7	Thrust Washer	RPTFE
8	O-Ring	VITON
9	Stem Packing	PTFE
10	Gland	SS 304
11	Disk Wahser	SS 301
12	Stem Nut	SS 304
13	Nut Stop	SS 304
14	Space Washer	SS 304
15	Stopper Plate	SS 304
16	Handle Nut	SS 304
17	Handle	SS 304
18	Sleeve	PLASTIC
19	Stop Pin	SS 304



Po

L-port



Bürkert's 3/2-way ball valve is available for 180° operation. The design facilitates a variety of flow patterns from one model; for this option customer request or themselves change a 180° stop plate.

180 °stop plate

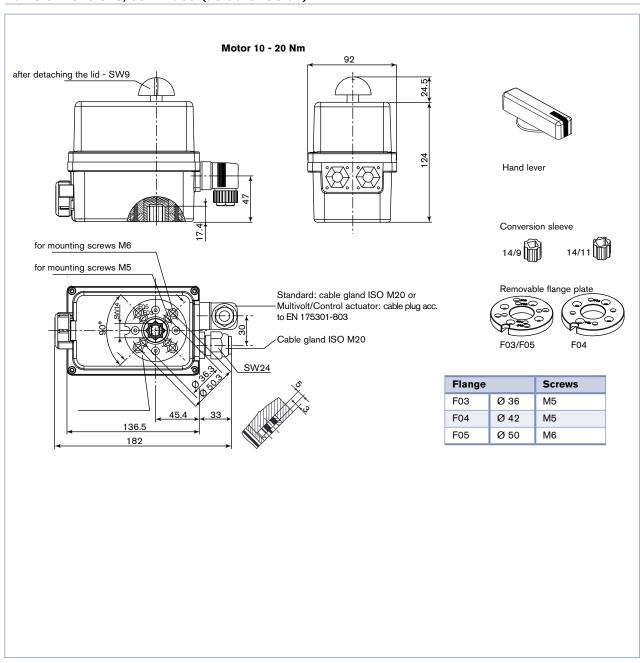
T-port



Valve dimensions [mm], continued (valve body detail)

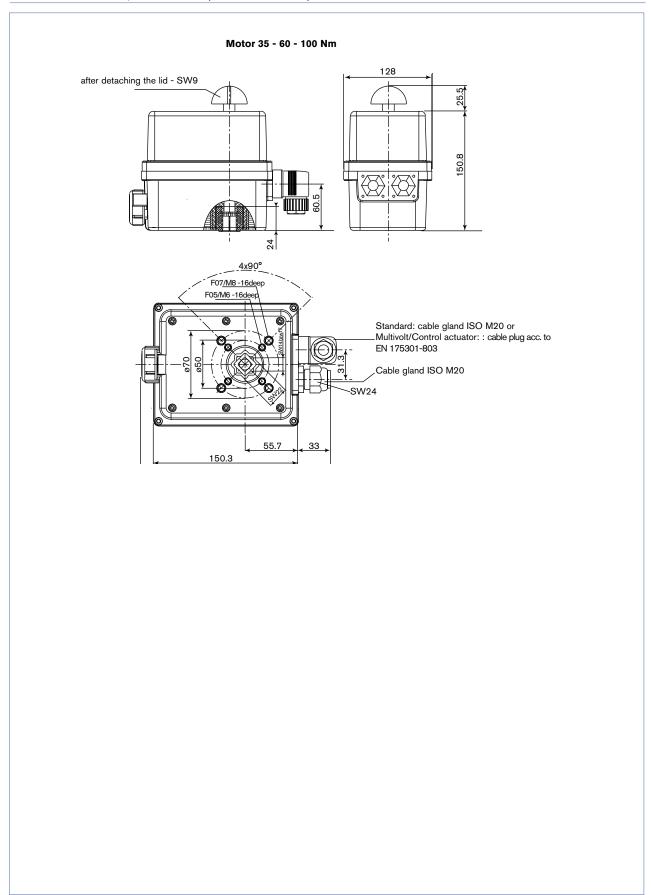
Full Port	Std. Port	A	В	С	d1	d2	E	F	G	н	K	L	Port	Full Wt [Kg]	Std Wt [Kg]
1/4"	-	37.5	11	130	6	6	62	36	42	9	36	72	11	0.66	0.66
3/8"	1/2"	38.5	11	130	6	6	62	36	42	9	36	72	12	0.66	0.66
1/2"	3/4"	42	11	130	6	6	64	36	42	9	41.5	83	15	0.86	0.66
3/4"	1"	49	14	165	6	7.1	82	42	50	11	49.5	99	20	1.48	0.86
1"	1 1/4"	55	14	165	6	7.1	89	42	50	11	56	112	25	2.22	1.52
1 1/4"	1 1/2"	63	18	205	7.1	9.2	98	50	70	14	62.5	125	32	3.22	2.18
1 1/2"	2"	74	18	205	7.1	9.2	108	50	70	14	74.5	149	38	5.36	3.38
2"	-	93	22	325	9.2	11.4	140	70	102	17	87	174	50	9.7	5.26

Valve dimensions, continued (actuator detail)





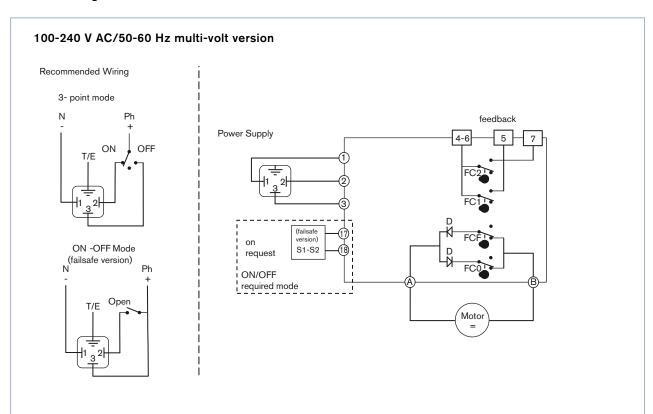
Valve dimensions, continued (actuator detail)



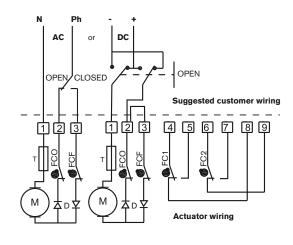


Electrical connection

Switch drawings



24 V AC/DC standard version



Symbol	Description			
FCO	Open limit switch			
FCF	Close limit switch			
FC1	Auxilary 1 limit switch			
FC2	Auxilary 1 limit switch			
М	Motor			
Т	Thermal fuse			

Symbol	Description
D	Diode
С	Capacitor
Р	Potentiometer
Н	Heating resistor
J7	Heating resistor connection
J8	Potentiometer connector



Ordering chart

3/2-way stainless steel ball valve with on/off Type 3003 actuator & L port configuration

Valve function	Orifice Diameter [mm]	Port connection Ø	Pressure [bar]	Power	Body material	Seal material	ID No. [on/ off control]
3/2 Way	12	1/2"	70 bar	24V DC	SS-316	PTFE	AU33046
L Port	12	1/2"	70 bar	240V AC	SS-316	PTFE	AU33047
	15	3/4"	70 bar	24V DC	SS-316	PTFE	AU33051
	15	3/4"	70 bar	240V AC	SS-316	PTFE	AU33052
	20	1"	70 bar	24V DC	SS-316	PTFE	AU33055
	20	1"	70 bar	240V AC	SS-316	PTFE	AU33057
	25	11/4"	70 bar	24V DC	SS-316	PTFE	AU33060
	25	11/4"	70 bar	240V AC	SS-316	PTFE	AU33062
	32	11/2"	70 bar	24V DC	SS-316	PTFE	AU33065
	32	11/2"	70 bar	240V AC	SS-316	PTFE	AU33067
	40	2"	70 bar	240V AC	SS-316	PTFE	AU33070
	40	2"	70 bar	24V DC	SS-316	PTFE	AU33071

3/2-way stainless steel ball valve with on/off Type 3003 actuator & T port configuration

Valve function	Orifice Diameter [mm]	Port connection Ø	Pressure [bar]	Power supply	Body material	Seal material	ID No. [on/ off control]
3/2 Way	12	1/2"	70 bar	24V DC	SS-316	PTFE	AU33075
T Port	12	1/2"	70 bar	240V AC	SS-316	PTFE	AU33076
	15	3/4"	70 bar	24V DC	SS-316	PTFE	AU33079
	15	3/4"	70 bar	240V AC	SS-316	PTFE	AU33080
	20	1"	70 bar	24V DC	SS-316	PTFE	AU33083
	20	1"	70 bar	240V AC	SS-316	PTFE	AU33085
	25	1 1/4"	70 bar	24V DC	SS-316	PTFE	AU33088
	25	1 1/4"	70 bar	240V AC	SS-316	PTFE	AU33090
	32	11/2"	70 bar	24V DC	SS-316	PTFE	AU33093
	32	11/2"	70 bar	240V AC	SS-316	PTFE	AU33095
	40	2"	70 bar	240V AC	SS-316	PTFE	AU33098
	40	2"	70 bar	24V DC	SS-316	PTFE	AU33099

Further versions on request



Port Connection



Approvals



Temperature

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2656, 3-Way

Alternative Electric Actuator, Types 3005 & 3004: Heavy Duty & High Torque



Bürkert's Type 3005 electrical actuator is for heavy duty industrial applications where a higher torque rating or a more rugged IP67 housing is required. The Type 3004 delivers the same heavy duty function, with ATEX and IECEx approvals. The Types 3005 and 3004 come in models with torques 25Nm, 45Nm, 75Nm, 100Nm, 150Nm, 300Nm (plus 600Nm & 1,000 Nm on request).

Similarly to the Type 3003 electrical actuators featured in this datasheet, these heavy duty models offer on/off and modulating control functions, prominent visual position indication and manual override standard. Note that models 25Nm – 75Nm have a gear disengage manual override, while larger torque models come with a hand wheel manual override.

Contact Bürkert on 1300 888 868 (Aust) or 0800 BURKERT (NZ) for more information on Type 3005 and 3004 heavy duty electrical actuators for quarter turn valves.

In case of special application conditions, please consult for advice.

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