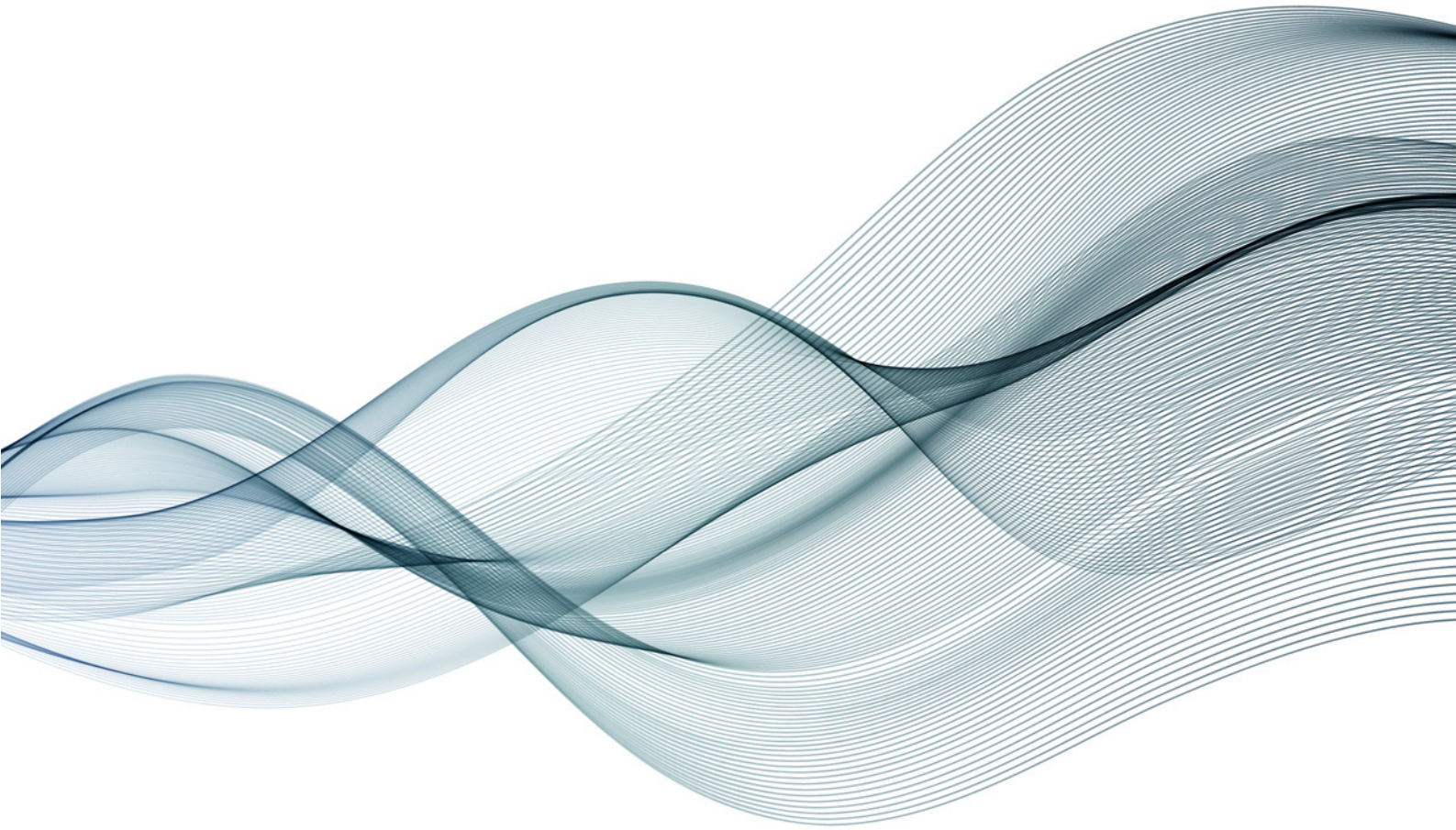

Operation and Maintenance Manual
Potable Water System Series PWS-01
& Remote Panel Option

Part Number: KI40008AA, KI40008AB & KI40008AAABS
Document Number: KI-OM-5672
Revision: 7

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Appendix A System Drawings

Appendix B Manufacturer Related Documents

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APPROVAL SHEET

Document Information		
Advitium No	**Title**	**Classification**
KI-OM-5672	Installation, Operation And Maintenance Manual for Potable Water System PWS-01	Commercial in confidence

Revision History					
Rev	**Date**	**BY**	**CHK**	**APP**	**Comments**
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1	29/06/2010	D. Henkel	N. Maske	R. Faustmann	ECN: CT00289, added item to spares list
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3	10/05/2011	N. Maske	R. Carli	N. Maske	ECN: CT00310
4	06/11/2013	D. Allan	V. Garzón	S. Coull	ECN: 15700 Schematic & drawings Appendix B updated
5	25/07/2016	J. Cusson	V. Garzón	P. Black	ECN 19052: Update for optional remote panel
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Responsibility	**Name**	**Position**
By	J. Cusson	Technical Author
Checked	E. Thomson	Graduate Mechanical Engineer
Approved	P. Black	Senior Mechanical Engineer

Review

This document is subject to review and revision in accordance with ISO 9001.

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WARNINGS AND CAUTIONS

Warnings, Cautions and Notes where used within this manual are placed prior to the text to which they are pertinent. Their uses are as follows;

INFORMS THE READER OF AN OPERATION OR STATE WITH POTENTIAL FOR PERSONNEL INJURY.

Informs the reader of an operation or state with potential for damage to equipment.

Note ***Informs the user of additional information for clarification or to assist with an operation.***

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1 Description

1.1 General

The JFD Potable Water System (PWS-01) has been specifically designed for use in professional diving systems. The system is designed to deliver hot and cold water at 7.5 ltr/min at pressures up to 68 bar. A mechanical thermostat limits the maximum output temperature to 70°C. The unit is simple to operate and requires a source of compressed air to drive the pumps, 380 or 440 Vac to operate the heaters, and a source of fresh water to deliver to the chamber. Once unit is set up, it can be left to operate without intervention and requires only minimal maintenance to keep it working at optimal performance.

Figure 1 PWS Front View with Connecting Piping

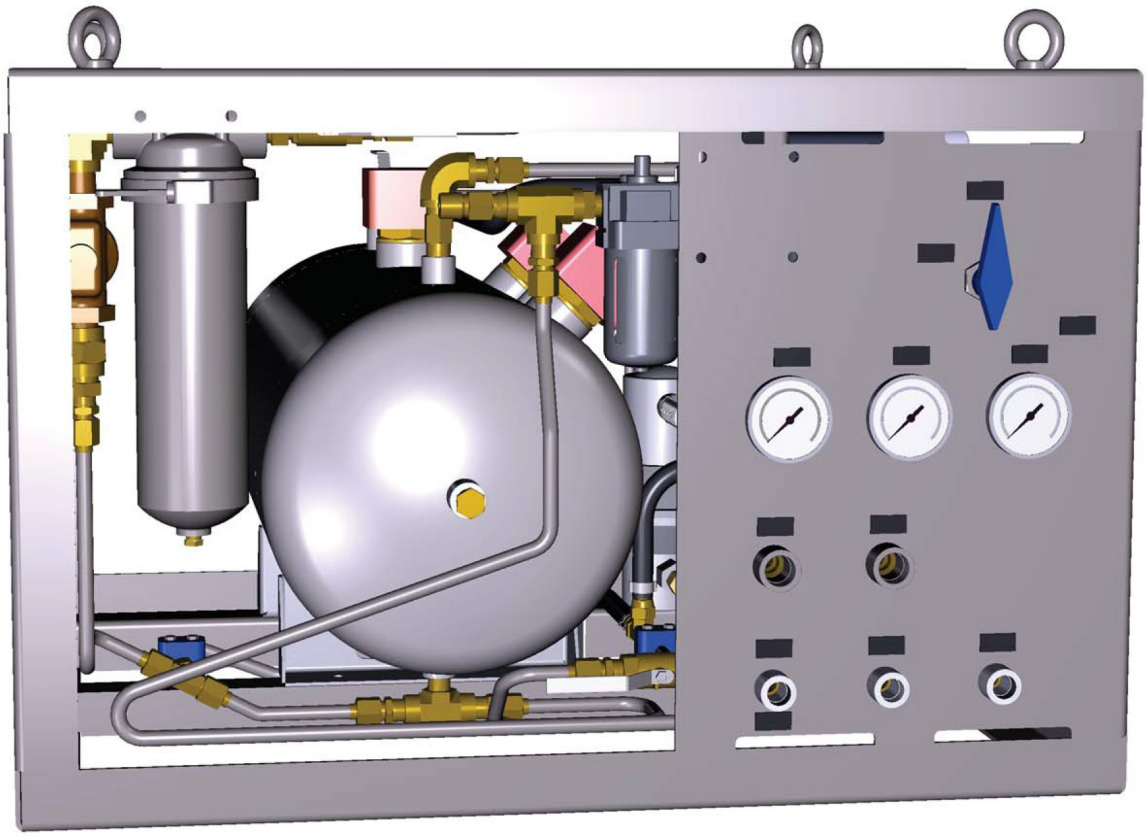
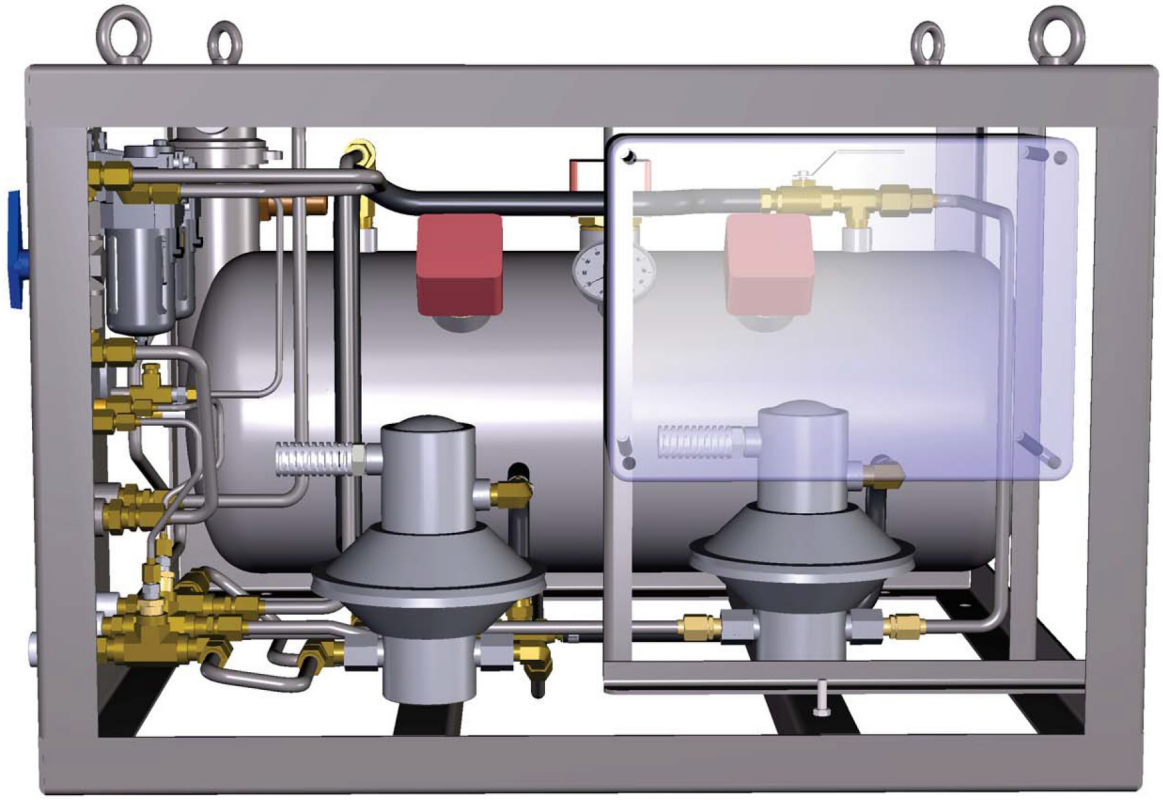


Figure 2 PWS-01 Side View



The PWS-01 comprises two air-driven 1:10 ratio pumps; one supplied with heated fresh water and the other fed directly from the fresh water supply. The main controls are the air regulator which is used to set maximum pump outlet pressure and the thermostat which is used to set the maximum hot water temperature.

1.2 Water System

The flow schematic for the system is shown in Appendix A, page A.4.

Fresh water is fed into the PWS-01 at the Fresh Water Inlet Port. It passes through a 5 micron carbon block filter (WF_1) which prevents particulate matter from entering the system and possibly damaging the pumps. The water passes through a pressure regulator (VPR_1) which is set to approximately 1 bar. The water path then splits with one branch feeding an electric heater tank (WHT_1) and the other feeding the cold water pump (AP_1).

The electric heater tank is fitted with a pressure relief valve (PRV_1) to protect the tank from over pressure, pressure relief piping is connected to the drain piping. The tank is equipped with an adjustable thermostatic switch which regulates the water temperature between 30 and 70ºC. The tank is equipped with a sacrificial zinc anode (ZA_1) to minimise any corrosion. The temperature of the heated water inside the heater is indicated by an analogue thermometer (TG_1). A drain with isolation valve (VB_03) is fitted on the base of the heater tank with drain piping leading to a front panel drain connection. A vent valve (VB_04) and hose (HA_03) is fitted to the hot water outlet connection to vent air from the tank when purging.

Both the hot and cold water pumps (AP_2 and AP_1) are pressure ratio pumps which deliver an output water pressure 10 times the input air pressure, thus, these pumps will deliver 65 bar water pressure from 6.5 bar input air pressure. The pumps will deliver a maximum flow rate of

7.5 ltr/min at 34 bar. The outlet pressure of each stream is indicated by the hot and cold water pressure gauges (PG_3 and PG_2). The hot and cold water passes from the system to the chamber through the hot and cold water outlet ports.

1.3 Air System

Air enters the system at the air inlet port at a minimum of 6.5 bar and a maximum of 10 bar. The air supply may be isolated using the front panel mounted quarter turn ball valve (VB_01). Air is fed to a filtered regulator / lubricator (AFRL_1) which filters the incoming air removing particulates and water, reduces the air pressure to 6.5 bar and adds a small amount of oil to lubricate the pump pistons. The outlet pressure of the regulator is indicated by pressure gauge (PG_1), an optional pressure switch may be fitted to the pressure gauge to give remote indication of pressure. The regulator output pressure may be adjusted thus varying the output water pressure. Following the regulator the air supply splits to supply the two on-board pneumatic pumps. A single relief valve set at 7 bar on the pump supply piping protects the two pumps from over-pressure should the regulator fail. Following use in the pumps the air is vented to atmosphere via two pneumatic silencers (NS_01 and NS_02).

1.4 Electrical System

Electricity is supplied to the PWS-01 to heat water via two heating elements, the heating elements are controlled by a thermostat which isolates the heaters when a set temperature is reached.

The Electrical Schematic for the PWS-01 is shown in Appendix A, page A.3.

Electrical services are located within an enclosure mounted on the left hand side of the skid, see Figure 2 . The electrical enclosure contains high voltage switching and protection for the heaters and a low voltage power supply unit for supplying low voltage to a control and indication circuit

The high voltage electrical circuit consists of the heater elements and associated switching and a parallel supply to a 24 Vdc power supply unit (PSU), the power supply unit is protected by two 1 A fuses (F1 and F2). The input power is 380 Vac, 50 Hertz, 3 Phase, 20 Amps maximum for KI40008AB units or 440 Vac, 60 Hertz, 3 Phase, 20 Amps maximum for KI40008AA and KI40008AAABS units. The power supply may be isolated at the main isolator (Q1). Two heating elements (HT_1 and HT_2) are fitted to a single heater tank, these heating elements are protected by two mini circuit breakers (MCB_2 for HT_1 and MCB_3 for HT_2). Following the mini circuit breakers both heater circuits are controlled by a contactor (C1) which remains closed while supplied with 24 Vdc from the control and indication circuit.

The low voltage control and indication circuit is supplied with 24 Vdc from the power supply unit, it is protected by two 5 Amp fuses (F3 and F4). The control functions of the circuit are connected in series such that any single control function will open the contactor (C1) isolating the heaters. The control functions are; an optional remote panel stop switch and a thermostat switch. The indication functions of the circuit are connected in parallel at points across the series control circuit. The indication functions are; A power on indicator light (L1) which will illuminate when power is available, an hours run indicator (H1) which will increment while power is available and an optional remote stop has not been pressed, A heater on indicator (L2) connected after the thermostat thus only lit while the heater is energised.

An optional remote panel is available, it is not required for standard operation but is an optional extra to the system. The remote panel provides.

- Emergency stop switch
- Power on indication

- Air pressure fault indication (below 5 bar)
- Heaters on indication

2 Performance

Hot Water flow rate	7.5 ltr/min @ 34 bar
Cold Water flow rate	7.5 ltr/min @ 34 bar
Water Pressure with 6.8 bar Air inlet	68 bar
Temperature Range	30 – 70°C
Heating Tank Capacity	Approximately 60 ltr
Heating Capacity	2 off 4.5 kW (total 9 kW)
Safety Pressure Relief setting	1.3 bar

3 Installation

3.1 Location

The PWS-01 should be located such that access to the front face and electrical enclosure on the right hand side is available as shown in Appendix A. Bolt holes are provided on the base of the skid for securing in location. Locations of pipework connections are shown in Appendix A. Once secured no stress is to be placed on services piping.

3.2 Specifications

To operate the PWS the following utilities are required;

Electrical

KI40008AB	380 V, 50 Hz, 20 Amp
KI40008AA, KI40008AAABS	440 V, 60 Hz, 20 Amp

Fresh Water

All variants	18 ltr/min at 2 bar minimum

Air

All variants	6 - 8.5 bar at 2.8 surface m^3/min

Connections

All inlet fittings for the PWS are 3/4” NPT female. All outlet fittings for the PWS are 1/2” NPT female. It is recommended that the fresh water circuit be plumbed with at least 1/2” pipe. The air circuit should be plumbed with 3/4” pipe or larger.

The output water pipes must be suitable for 100 bar sustained service.

Consideration should be given to fitting a removable spool piece at the water inlet connection to facilitate draining and purging of the system.

The electrical services should be wired with at least 4 mm^2 conductors.

3.3 Initial Set Up

Prior to initial operation the water circuits must be primed. This applies primarily to the hot water tank and is be achieved as follows;

1 Ensure that the following valves are closed;

- Air inlet valve
- Water inlet valve
- Heater tank vent valve
- Heater tank drain valve

2 Ensure the electrical isolator Q1 is in the off position.

3 Open the water supply to the skid.

4 Open the vent valve at the top / rear outlet of the heater tank.

5 Open the water inlet valve and allow water to flow through the system.

6 When water flows from the tank vent hose, close the vent valve.

3.4 Initial Operation

Utilities (water, air and power) must be turned on in the following sequence;

1 Turn the water inlet valve (VB-02) to the open position.

2 Turn the air inlet valve (VB-01) to the open position, and set air the air regulator for an outlet pressure of 6.8 bar as indicated on the air pressure gauge on the front of the unit.

3 Open valves in chamber to purge outlet fluid lines of air.

Note ***With chamber valves closed, hot and cold water outlet pressures should be at or near 68 bar.***

4 Check outlet water plumbing and repair any leaks.

5 After water and air circuits are operating satisfactorily. Verify the 380 or 440 Vac supply to the main switch in the electrical box. Turn main power switch to the "ON" position and verify that inlet current is 18 to 20 amperes (when heater is on, which should occur when the thermostat is set higher than the inlet water temperature). The water in the tank will reach 65ºC from 15.5ºC in about twenty minutes, this time is dependant on mixing occurring within the heater tank, it may take longer to homogenise dependant on flow.

The unit is now fully operational.

4 Operating Instructions

The PWS-01 is designed to be simple to operate; however, there are a few things to pay particular attention to, these are:

4.1 Normal Operation

Normal operation is initiated as follows;

1 Open the fresh water valve (VB-02) and prime the hot water tank with water, refer to “3.3 Initial Set Up”.

2 Open the air supply valve (VB-01).

3 Switch on the electric power.

4 Set the hot water tank thermostat to the desired hot water temperature.

The system is now ready for operation.

4.2 Shut Down

To shut down the system proceed as follows;

1 Turn the main power switch to “OFF” position.

2 Close the air supply valve (VB-01).

3 Close the water inlet valve (VB-02).

CAUTION

The water must be drained from the hot water tank and the water filter to prevent freezing in cold climates and to extend the life of the equipment during extended shut downs.

4.3 Draining of Water System

1 Isolate the water inlet piping.

2 Open a hot and cold water tap down stream of the PWS-01 unit.

3 Open the water inlet valve and heater tank drain valve.

4 Disconnect the water supply piping from the inlet connection.

5 Blow through the system by applying compressed air to the water inlet connection.

6 Open the air inlet valve for a few seconds at a time to cycle the pumps and allow water / air flow through the system.

7 When air flows at the open taps, close the taps and turn off the air supply.

8 Remove the compressed air from the water inlet and reconnect the water inlet piping.

9 Close the water inlet valve, leave the drain valve open.

The PWS-01 is now fully drained.

5 Periodic Maintenance

5.1 During Operations

5.1.1 Lubricator Oil Flow

The air system lubricator is located to the left of the front panel, oil flow may be observed via a sight glass on the top of the lubricator (AFRL-1).

1 While the pumps are operating check that two oil drops per minute are being added to the air flow.

2 If necessary adjust the flow, clockwise rotation of the sight glass reduces flow.

5.2 Weekly

5.2.1 Water Filter Check

1 Close the air and water inlet valves

2 Open then close a hot and cold water tap down stream of the PWS-01 unit to ensure the system is depressurised.

3 Open the water filter and remove the filter.

4 If necessary, clean the filter with a stream of fresh clean water.

5 If the filter cannot be made clean or is damaged, replace.

5.2.2 Lubricator Oil Level Check

1 Check the air system lubricator has sufficient oil.

2 If necessary fill the lubricator as follows;

3 Close the air inlet valve.

4 Remove the black oil reservoir fill plug located behind the sight glass.

5 Using a funnel, fill the reservoir with Omega® 609 oil or equivalent SAE 10 food grade oil.

6 Replace the oil reservoir fill plug and clean any oil spillage.

7 Open the air inlet valve.

5.2.3 Air Filter Check

1 Close the air inlet valve.

2 Locate the air filter behind the front panel.

3 Open the drain valve at the bottom of the air filter unit and dispose of any condensate produced.

4 Push down the locking tab and rotate the filter bowl 45° then remove the bowl.

5 Remove the filter.

6 Clean or replace the filter and reassemble.

5.3 Monthly

5.3.1 Zinc Anode Check

1 Close the air and water inlet valves.

2 Open then close the vent valve (VB-04) to ensure the system is depressurised.

3 Using a 7/8” spanner, remove the zinc anode from the heater tank.

4 Weigh the anode, if less than 80 g, replace the anode with a new one.

5 Open the water and air inlet valves.

5.3.2 Air Filter Drain

1 Close the air inlet valve.

2 Locate the air filter behind the front panel.

3 Open the drain valve at the bottom of the air filter unit and dispose of any condensate produced.

4 Close the drain valve and open the air inlet valve.

6 Troubleshooting

6.1 Water and Air System

Problem	Probable Cause	Solution
Low output pressure	Low air pressure.	Reset air regulator.
	Low air pressure at source.	Reset source pressure.
	Restriction in air line.	Clear restriction.
	Insufficient pressure or flow in water inlet lines.	Increase source pressure or pipe size then check pressure regulating valve.
	Faulty valves in pump.	Replace check valves as per procedure see link at Appendix B.
Water will not heat	Thermostat set too low.	Reset thermostat.
	Improper power to unit.	Correct source of power.
	Heater element burned out.	Replace heater element.
Relief valve leaks	Particle lodged in seat.	Disassemble, clean and reassemble.
	Inlet water pressure regulator set too high.	Reset regulator.
	Inlet water pressure regulator faulty.	Replace regulator.
Pump will not run	Air supply off.	Turn supply on.
	Air control valves not operating in pump.	Service as per procedure see link at Appendix B.
Low output flow or pressure drop after initial water flow	Restriction in air line.	Clear restriction.
	Insufficient volume of air available at required pressure.	Increase size of air supply line.

6.2 Electrical System

Problem	Probable Cause	Solution
Contactor buzzing	Dirt, debris or rust on pole pieces.	Disassemble contactor, clean and sand pole pieces, reassemble.
	Check frequency of electrical system.	Increase frequency if below 50 Hz.
	Faulty contactor.	Replace contactor.
	Low voltage to contactor coil.	Check voltage, increase input voltage, tighten all connections.
Contactor will not close	Open circuit in control circuit.	Check wiring, repair any broken wires.
	Faulty coil.	Replace coil. Check wiring to and from remote panel.
	Faulty contactor.	Replace contactor.
	Loose wiring.	Check wiring to and from the Remote Panel.
Heater will not heat	Thermostat set too low.	Reset thermostat.
	Control circuit has open circuit.	Check circuit and repair any open circuits (including fuse).
	Heater failure.	Replace heater element.
	Thermostatic switch failure.	Replace thermostat.

7 Spare Parts List

7.1 Air System

JFD recommend food grade SAE 10 oil for use in the air system oiler.

Part Number	Description
DO02359-C	Kit, Spare Cartridge, Press Reducing Valve
SM57386	Food Grade SAE 10 Oil

7.2 Water System

Part Number	Description
DO04769	Element Filter 5 µm Carbon Block
DO02369	Sacrificial Anode, Heater Tank
KI64916	Gasket, Heater Element
DD401149	Dowty Washer, Heater Element

7.3 Electrical System

Part Number	Description
DO02375	Element, 4.5 kW, 440 V, 1 1/4 BSP, 300 I.M.L
DO05664	Element, 4.5 kW, 380 V, 1 1/4 BSP, 300 I.M.L
DO03913	Fuse, 1 A
DO03914	Fuse, 5 A
DO06510	Contactor C1

7.4 Remote Panel, Optional

Part Number	Description
KI2087	Remote Panel

8 Part Identification

Figure 3 Front View

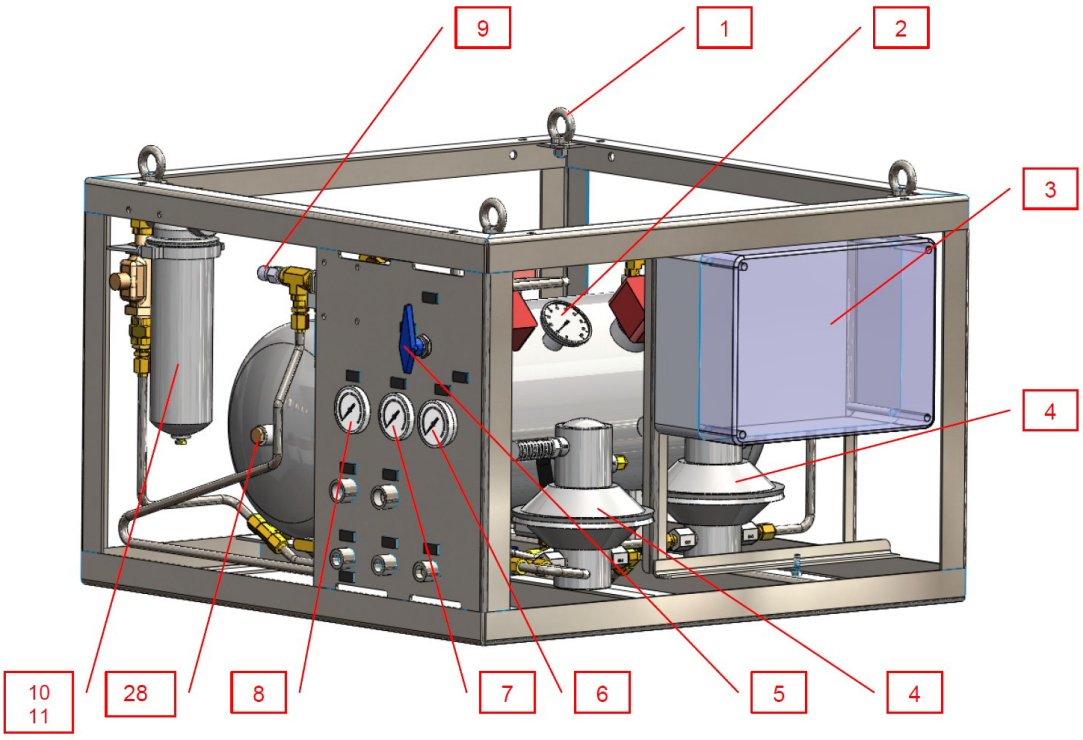


Figure 4 Rear View

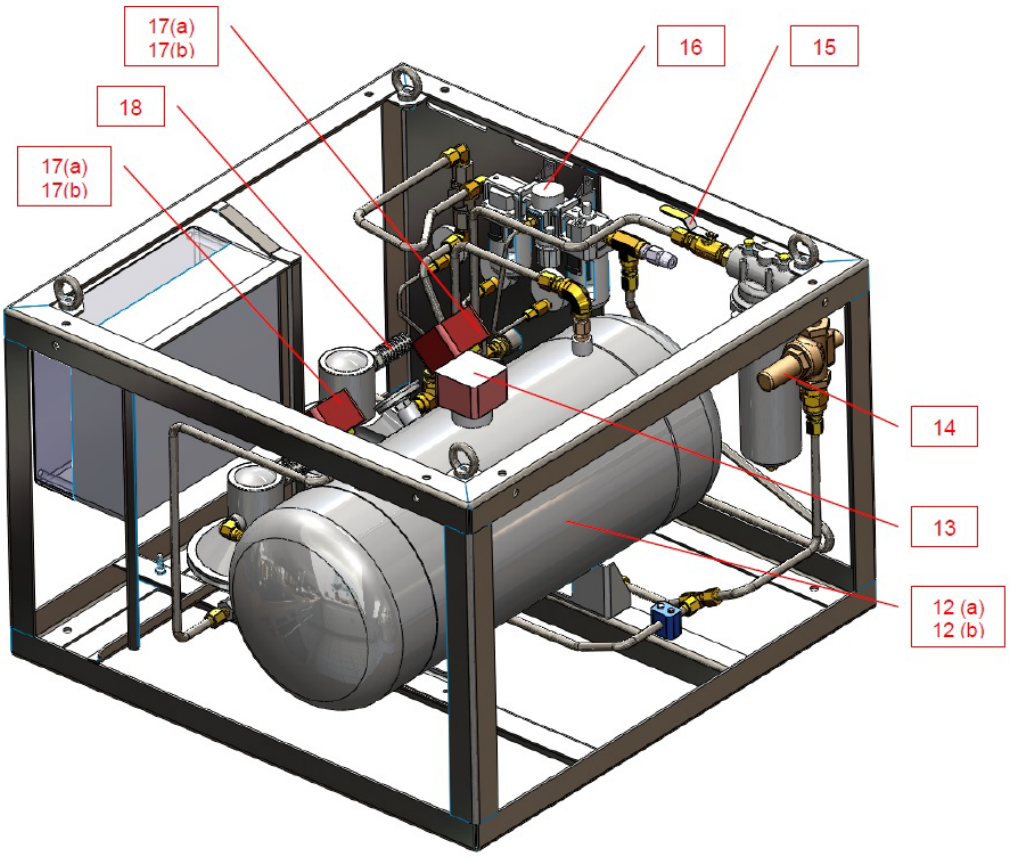


Figure 5 Electrical Panel Interior

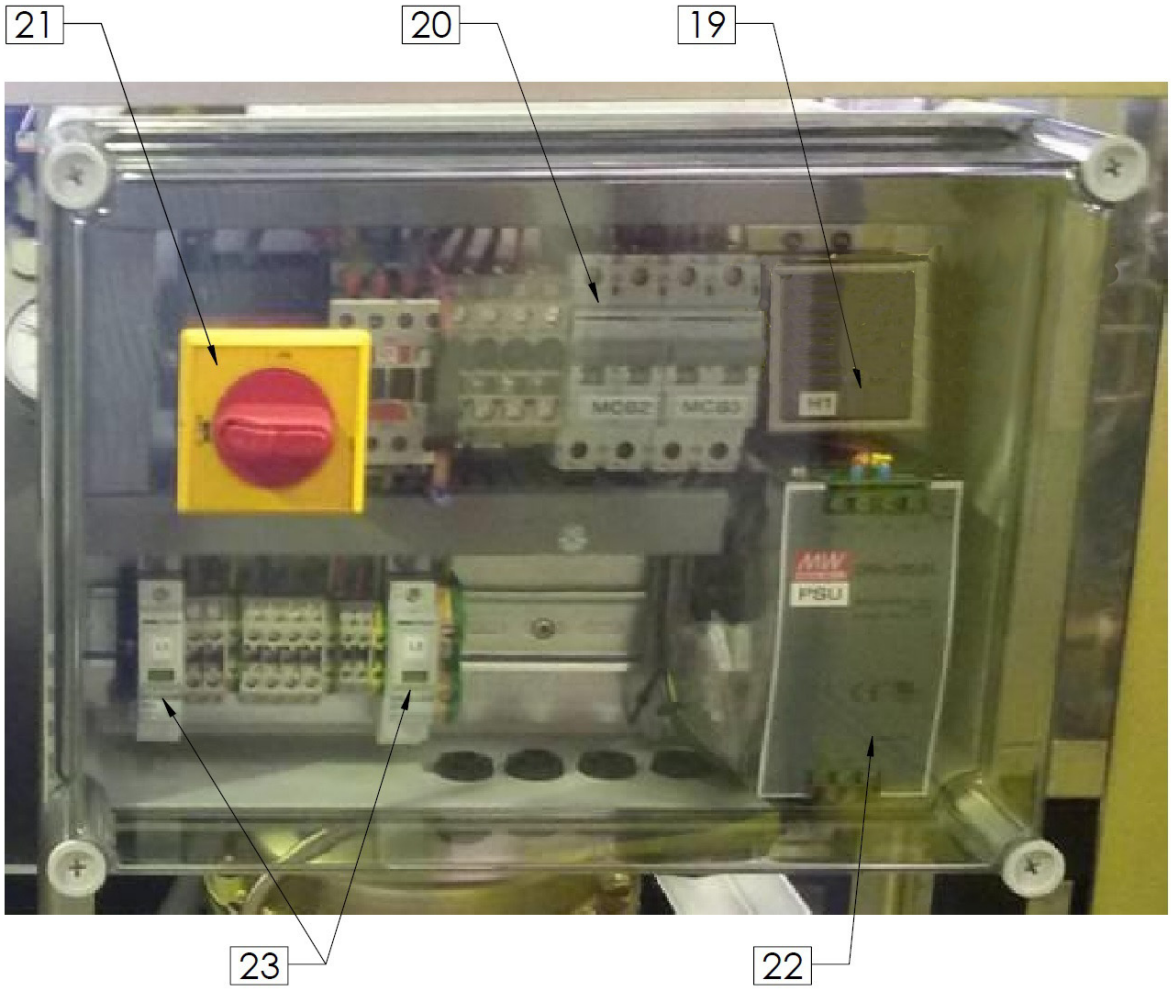
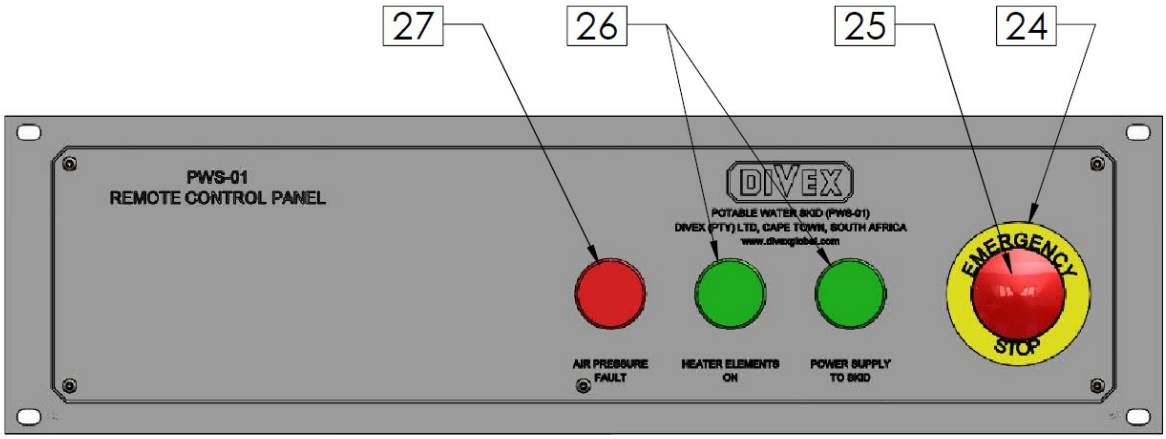


Figure 6 Remote Indicator Panel (if Applicable)



Item	Description	JFD Part No.
1	Lifting Eye	DO06007
2	Gauge Temperature, 100mm	DO05835
3	Enclosure, Polycarbonate, Rated to IP67	DO02344
4	Pump, Air Driven	KI11892
5	Valve Ball (Air Inlet)	VB37634
6	Pressure Gauge (Cold Water out)	DOPSBV63BB02QJ3C
7	Pressure Gauge (Hot Water out)	DOPSBV63BB02QJ3C
8	Pressure Gauge (Air Inlet)	DOPBBV63BB02QJ2A
9	Relief Valve 1/2 MNPT	DO02305
10	Filter Housing 3/4"NPT	DO04768
11	Filter Element 5 Micron	DO04769
12 a	Heater Water Tank 3.1 Cert (used on AA and AB versions)	DO02380
12 b	Heater Water Tank 3.2 Cert (used on AAABS version)	KI02380
13	Thermostat Mechanical	DO02374
14	Pressure Reducing Valve	DO02359
15	Valve Ball 1/2"NPT	VB36264
16	Assembly, Air Filter, Regulator, Lubricator	DO20303
17 a	Heating Element, 4.5KW, 440V, 1 1/4 BSPP (used on AA and AAABS versions)	DO02375
17 b	Heating Element, 4.5KW, 380V, 1 1/4 BSPP (used on AB version)	DO05664
18	Silencer	DO02373
19	Hour Meter, 24VDC	DO05670
20	Circuit Breaker, Double Pole, D Curve, 25 AMP	DO02496
21	Switch Handle, IP 65, Selector Type	DO02878
22	Power Supply, 24VDC, 5A, 340-550VAC	DO03904
23	Indicator Light Led Green, DIN Rail 12/48V DC	DO05671
24	Emergency Push Button Mushroom	DO03260
25	Stop Button Legend	DD360338-3
26	Light Pilot Green 24VAC/DC	DO04990
27	Light Pilot Reed 24VAC/DC	DO04992
28	Anode	DO02369

GA Potable Water System, PWS-1 (All Variants) A.2

PWS-01 Electrical Schematic (All Variants) A.3

Flow Schematic Potable Water System, PWS-01, PV'S 3.1 Cert . . . A.4
Sheet 1 of 2 . . . . . A.4
Sheet 2 of 2 . . . . . A.5

Panel assembly, Remote, PWS-01 . . . . . A.6

GA Potable Water System, PWS-1 (All Variants)

CONNECTIONS			
I.D.	**DESCRIPTION**	**CONNECTION**	
C1	POTABLE WATER IN	HALF COUPLING, 3/4"NPT(F), 3000LBS, ST/ST, 316	
C2	AIR IN	HALF COUPLING, 3/4"NPT(F), 3000LBS, ST/ST, 316	
C3	RELIEF VALVE / TANK DRAIN	HALF COUPLING, 1/2"NPT(F) 3000LBS, ST/ST, 316	
C4	HOT WATER OUT	HALF COUPLING, 1/2"NPT(F) 3000LBS, ST/ST, 316	
C5	COLD WATER OUT	HALF COUPLING, 1/2"NPT(F) 3000LBS, ST/ST, 316	

CONNECTION POINT COORDINATES			
I.D.	**X**	**Y**	**Z**
C1	610	200	938
C2	704	200	938
C3	610	100	938
C4	704	100	938
C5	798	100	938

FIXING POINT COORDINATES			
I.D.	**X**	**Y**	**Z**
B1	105	0	889
B2	809	0	889
B3	889	0	809
B4	889	0	105
B5	809	0	25
B6	105	0	25
B7	25	0	105
B8	25	0	809

INTERFACE DETAILS	
I.D	**DESCRIPTION**
1	REGULATED AIR PRESSURE
2	HOT WATER OUTPUT
3	COLD WATER OUTPUT
4	AIR ON / OFF
5	TANK TEMPERATURE

UNIT RATINGS

DELIVERY OUTPUT
HOT WATER OUTLET (MAX) - 7.5 L/min @ 68 bar, 30°C - 70°C

COLD WATER OUTLET (MAX) - 7.5 L/min @ 68 bar

SAFETY PRESSURE RELIEF SETTING (TANK) - 1.3 bar

SAFETY PRESSURE RELIEF SETTING (AIR) - 7 bar

SERVICES

HOT WATER TANK
STORAGE CAPACITY - 60 LITRES

PUMPS
OUTPUT - 7 L/min @ 68 bar (WITH 6.8 bar AIR INLET)
NOMINAL RATIO - 10:1

AIR SUPPLY
FLOW RATE - 6 - 8.5 bar @ 2.83 m3/min

WATER SUPPLY
FRESH WATER WITH MIN FLOW RATE 18 L/min @ 2 bar

DRAIN WATER OUT
1.3 bar (MAX) @ 70°C

FILTER ELEMENT
STAINLESS STEEL BODY, PARTICULATE FILTRATION TO 5µm

ELECTRICAL SUPPLY

440V, 3PH @ 60Hz OR 380V, 3PH @ 50Hz

LIFT POINTS

(LP) LOCAL - DEDICATED SKID LIFT POINTS. HOLE Ø14mm.

GENERAL / INFORMATION

UNIT WEIGHT (DRY)

140kg (309 lbs)

CONNECTION DIMENSIONS

±0.1m

LEGEND

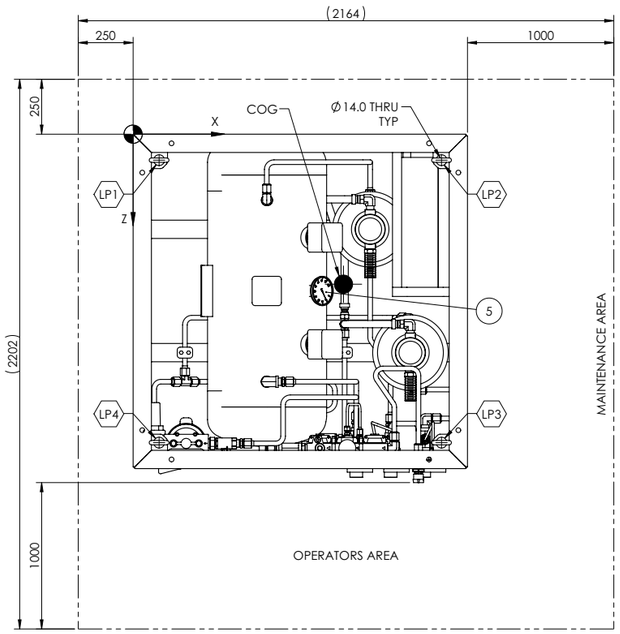
DATUM

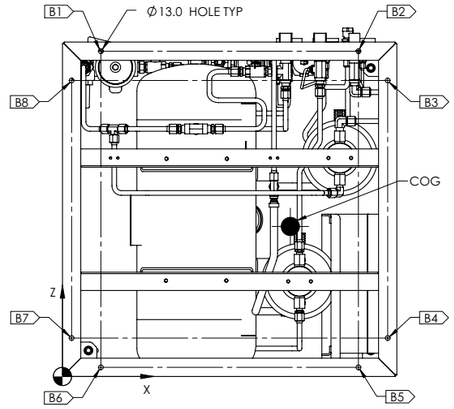
CENTRE OF GRAVITY (COG)

NOTES

ALL DIMENSIONS REFERENCE ONLY

CENTRE OF GRAVITY COORDINATES			
I.D.	**X**	**Y**	**Z**
COG	575	300	410





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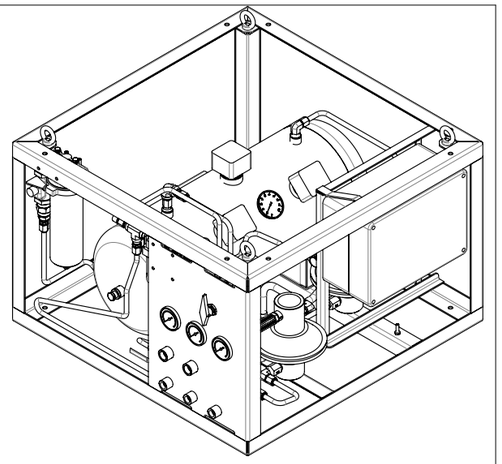
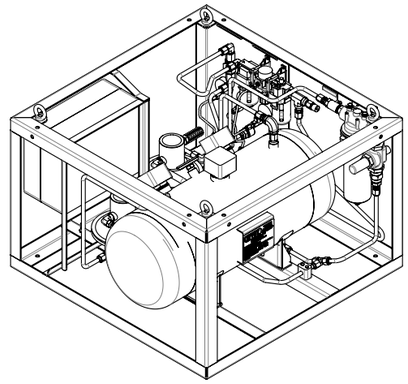
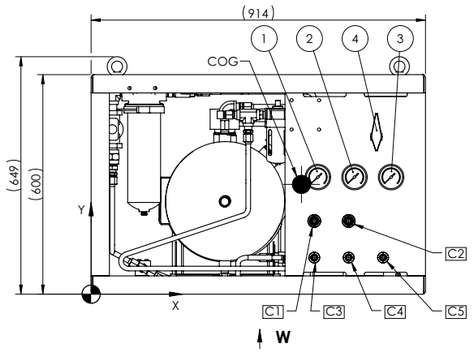
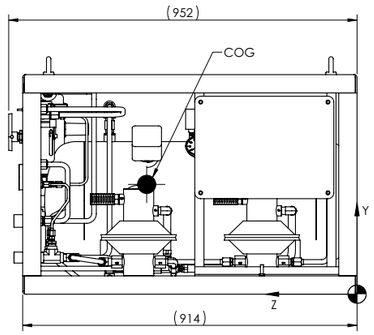


ISOMETRIC VIEW



ALTERNATIVE ISOMETRIC VIEW





NOTES
1. REMOTE PANEL AVAILABLE, SEE KI2087 FOR INTERFACE DETAILS

ALL DIMENSIONS SHOWN ARE IN MM (UOS)
ALL DIMENSIONS BEFORE PLATING (UOS)
REMOVE ALL SHARP EDGES AND BURRS

DIMENSIONAL TOLERANCES

MACHINING		FABRICATION	
NO DECIMAL PLACES	±1.0	SIZE >0 <100	±0.5
ONE DECIMAL PLACE	±0.2	SIZE >100 <500	±1.5
TWO DECIMAL PLACE	±0.05	SIZE >500	±3.0
ANGULAR TOLERANCE	±0.5°	ANGULAR TOLERANCE	±0.5°

MATERIAL: N/A

FINISH: N/A

THIRD ANGLE PROJECTION

REV	DESCRIPTION	ECN No	BY	DATE	AUTH.BY
R06					
R05					
R04					
R03					
R02					
R01					
R00	ISSUED FOR MANUFACTURE		RC	18/05/2016	PB

DO NOT SCALE DRAWING

TITLE: **POTABLE WATER SYSTEM, PWS-1 (ALL VARIANTS)**

DRAWING No. **GA1009017S1** REV **R00**

PART No. KI40008 (VARIANTS) PRODUCT / PROJECT No. KI

SIZE A2 SCALE 1:10 SHT 1 OF 1

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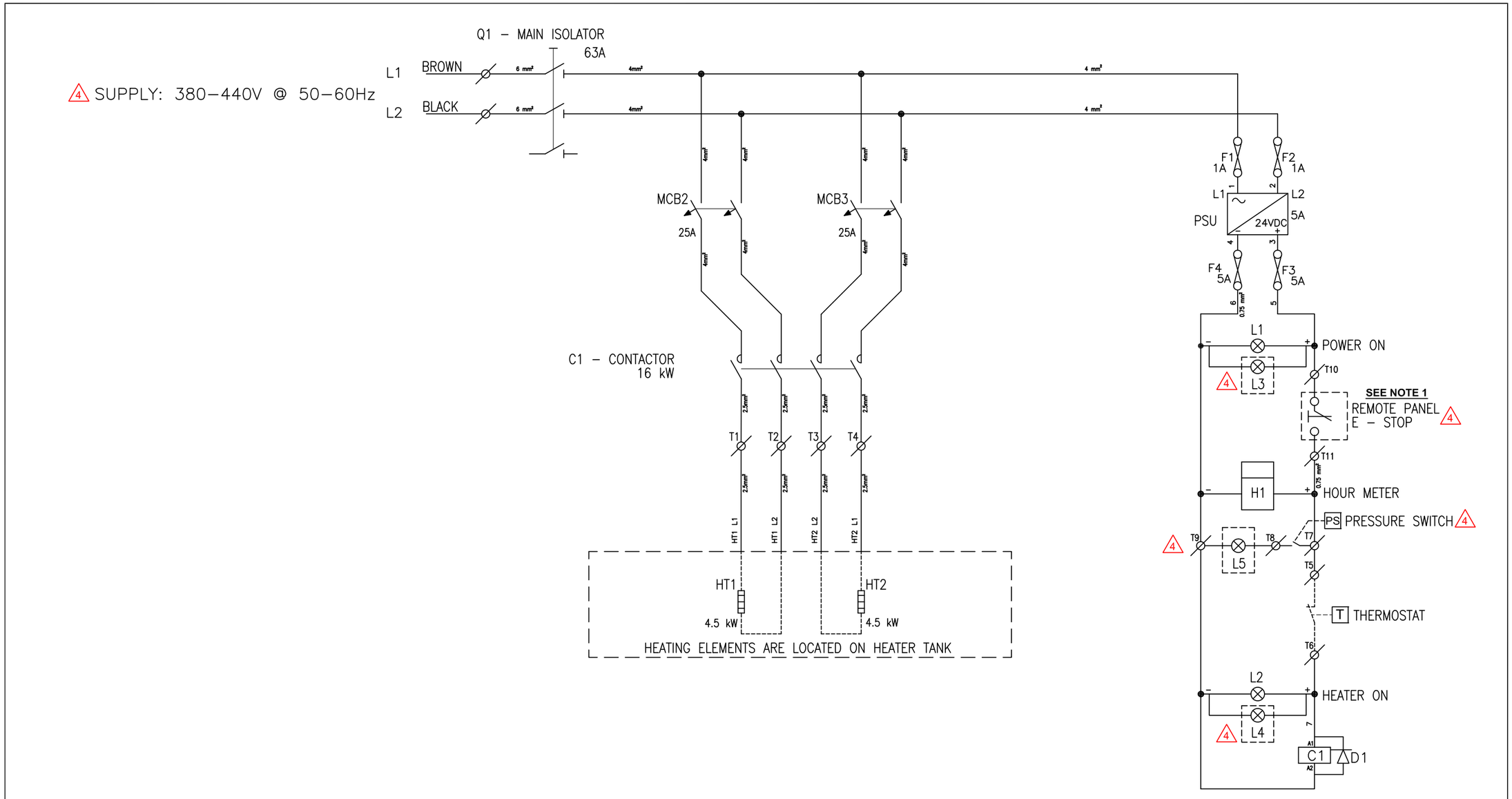
PWS-01 Electrical Schematic (All Variants)



NOTES

1. WHEN REMOTE PANEL IS NOT USED THE CONNECTION FROM T10 TO T11 SHOULD BE LINKED.
2. REMOTE PANEL CONNECTIONS SHOWN ON DRAWING KI2087S2. 4
3. ITEMS IN DASHED BOXES ARE REMOTE PANEL.

4 - DENOTES CHANGES MADE AT THIS REVISION.

ALL DIMENSIONS SHOWN ARE IN MM (UOS)
ALL DIMENSIONS BEFORE PLATING (UOS)
REMOVE ALL SHARP EDGES AND BURRS

DIMENSIONAL TOLERANCES

MACHINING		FABRICATION	
NO DECIMAL PLACES	±1.0	SIZE >0 <100	±0.5
ONE DECIMAL PLACE	±0.2	SIZE >100 <500	±1.5
TWO DECIMAL PLACE	±0.05	SIZE >500	±3.0
ANGULAR TOLERANCE	±0.5°	ANGULAR TOLERANCE	±0.5°

MATERIAL: N/A

FINISH: N/A

THIRD ANGLE PROJECTION

REV	DESCRIPTION	ECN No	BY	DATE	AUTH. BY
R04	REMOTE PANEL CONNECTIONS ADDED	18953	MJ	04/02/16	MH
R03	UPDATE TO WIRE GAUGE	17158	LW	07/11/14	SC
R02	VARIOUS	CT00310	RH	09/05/11	RF
R01	UPDATED AS PER ECN	CT00291	RC	28/07/10	RF
R00	ISSUED FOR MANUFACTURE		DH	04/11/08	NM

DO NOT SCALE DRAWING

TITLE: PWS-01 ELECTRICAL SCHEMATIC

DRAWING No.: DO56751S1 REV: R04

PART No.: KI40008AA/AAABS/AB PRODUCT / PROJECT No.: KI

SIZE: A3 SCALE: NTS SHT: 1 OF: 1

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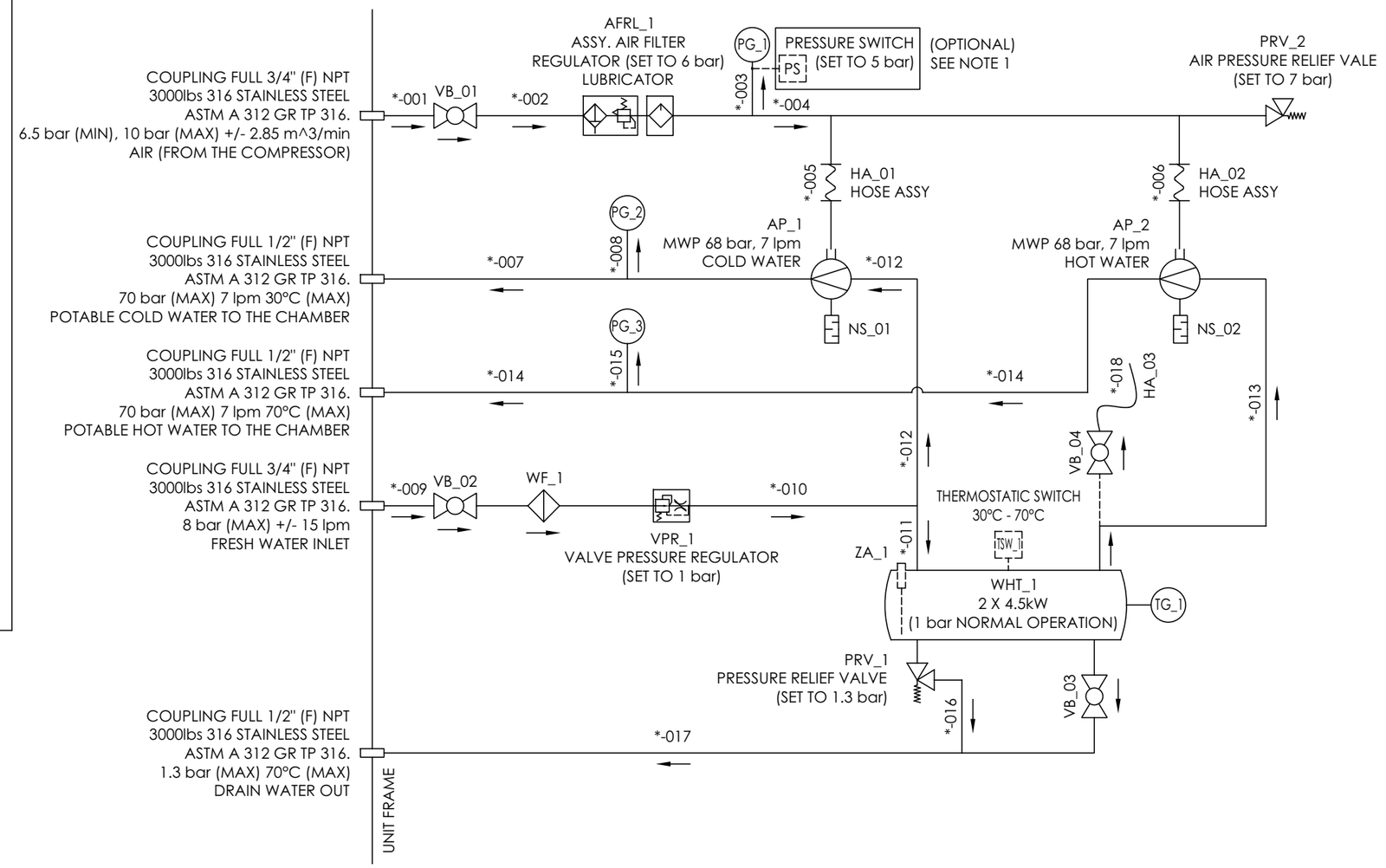
Flow Schematic Potable Water System, PWS-01, PV'S 3.1 Cert

Sheet 1 of 2

LEGEND

- BALL VALVE
- AIR FILTER ASSEMBLY
- PRESSURE RELIEF VALVE
- HOSE ASSEMBLY
- PUMP
- PNEUMATIC SILENCER
- FILTER
- VALVE PRESSURE REGULATOR
- TWS — THERMOSTATIC SWITCH
- WHT — WATER HOT TANK
- TG_X — TEMPERATURE GAUGE
- PG_X — PRESSURE GAUGE
- ANODE ZINC
- PS — PRESSURE SWITCH



NOTES:

1. OPTIONAL PRESSURE SWITCH FITTED WITH REMOTE PANEL.

DENOTES CHANGES MADE AT THIS REVISION

REV	DESCRIPTION	ECN	BY	DATE	AUTH.
R08	BOM UPDATED	21729	RC	27/11/17	AN
R07	BOM UPDATED	20264	JR	24/01/17	AN
R06	BOM UPDATED	19455	MJ	10/05/16	PB
R00	ISSUED FOR MANUFACTURE				

THIRD ANGLE PROJECTION | DO NOT SCALE DRAWING

TITLE: SCHEMATIC, POTABLE WATER SYSTEM, PWS-01, PV'S 3.1 CERT

DRAWING NO.	REV
DO3178S1	R08

PART NO.	PRODUCT / PROJECT No.
KI40008AA/AB	KI

SIZE	SCALE (UOS)	SHEET
A3	NTS	1 OF 2

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LINE TABLE

LINE NO.	SIZE	WALL THK / SCH	MATERIAL	MEDIA	WP (bar)	HYDRO TEST (bar)	PROCESS DESCRIPTION
*-001	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	COMPRESSED AIR	7	10.5	PIPING COMPRESSED AIR INPUT TO THE SHUT-OFF VALVE
*-002	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	COMPRESSED AIR	7	10.5	PIPING SHUT-OFF VALVE TO ASSY FILTER - PRESSURE REGULATOR - LUBRICATOR
*-003	1/4"	18 SWG	ASTM A790, SEAMLESS, G.316L	COMPRESSED AIR	6.8	10.5	PIPING ASSY FILTER - PRESSURE REGULATOR - LUBRICATOR TO PRESSURE GAUGE
*-004	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	COMPRESSED AIR	6.8	10.5	PIPING ASSY FILTER - PRESSURE REGULATOR - LUBRICATOR TO AIR PUMPS
*-005	1/2"	N/A	BS 5118:1980, SYNTHETIC RUBBER, HOSES FOR COMPRESSED AIR	COMPRESSED AIR	6.8	10.5	PIPING ASSY FILTER - PRESSURE REGULATOR - LUBRICATOR TO AIR PUMPS
*-006	1/2"	N/A	BS 5118:1980, SYNTHETIC RUBBER, HOSES FOR COMPRESSED AIR	COMPRESSED AIR	6.8	10.5	PIPING ASSY FILTER - PRESSURE REGULATOR - LUBRICATOR TO AIR PUMPS
*-007	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	68	105	PIPING PUMP TO OUTPUT COLD WATER
*-008	1/4"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	68	105	PIPING PUMP TO PRESSURE GAUGE OUTPUT COLD WATER
*-009	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	2	2	PIPING FRESH WATER INLET TO ASSY FILTER - REGULATOR
*-010	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	1.3	2	PIPING ASSY FILTER - REGULATOR TO WATER HEATING TANK INLET
*-011	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	1.3	2	PIPING ASSY FILTER - REGULATOR TO WATER HEATING TANK INLET
*-012	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	1.3	2	PIPING ASSY FILTER - REGULATOR TO AIR PUMP COLD WATER INLET
*-013	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	1.3	2	PIPING WATER HEATING TANK OUTLET TO AIR PUMP HOT WATER INLET
*-014	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	68	105	PIPING PUMP TO OUTPUT HOT WATER
*-015	1/4"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	68	105	PIPING PUMP TO PRESSURE GAUGE OUTPUT HOT WATER
*-016	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	1.3	2	PIPING RELIEF TANK VALVE TO DRAIN WATER OUT
*-017	1/2"	18 SWG	ASTM A790, SEAMLESS, G.316L	POTABLE WATER	1.3	2	PIPING DRAIN TANK VALVE TO DRAIN WATER OUT
*-018	1/2"	N/A	BS 5118:1980, SYNTHETIC RUBBER, HOSES FOR COMPRESSED AIR	DRAIN	N/A	N/A	TANK VENT LINE

COMPONENT TABLE △8

EQUIP. TAG	DESCRIPTION	REFERENCE JFD P/N	MANUFACTURER / SUPPLIER	MATERIAL	PRESSURE / TEMP. RATING
VB_01	VALVE, BALL, FEMALE, BRASS 2 LEVER 1/2	VB37634	PARKER HANNIFIN UK LTD	BRASS	103 bar (MAX) - 177 °C (MAX)
VB_02	VALVE, BALL, PARKER, 1/2"NPT, BRASS	VB36264	PARKER HANNIFIN UK LTD	BRASS	10.34 bar (MAX) - 176°C (MAX)
VB_03	VALVE, BALL, PARKER, 1/2"NPT, BRASS	VB36264	PARKER HANNIFIN UK LTD	BRASS	10.34 bar (MAX) - 176°C (MAX)
VB_04	VALVE, BALL, PARKER, 1/2"NPT, BRASS	VB36264	PARKER HANNIFIN UK LTD	BRASS	10.34 bar (MAX) - 176°C (MAX)
PRV-1	VALVE, RELIEF, 1/2" MNPT,3-50 PSI, BRASS	DO02304	SWAGELOK SCOTLAND	BRASS	0.2 bar (MIN) TO 3 bar (MAX)
PRV-2	VALVE, RELIEF, 50-150PSI, 1/2 MNPT	DO02305	SWAGELOK SCOTLAND	BRASS	3 bar (MIN) TO 10.3 bar (MAX)
PG-1	GAUGE, PRESSURE, BACK ENTRY, 0-10 BAR, 63MM DIA.	DOPBBV63BB02QJ2A	WIKA	316SS	10 bar
PG-2	GAUGE, PRESSURE,0-250 BAR, 1/4"(M)NPT CENTRE	DOPSBV63BB02QJ3C	WIKA	316SS	250 bar
PG-3	GAUGE, PRESSURE,0-250 BAR, 1/4"(M)NPT CENTRE	DOPSBV63BB02QJ3C	WIKA	316SS	250 bar
TG-1	GAUGE, TEMPERATURE ,100MM, -20 TO +120 DEG. C	DO05835	TBC	316SS	31 barg / -20°C TO +120°C
TSW_1	THERMOSTAT, MECHANICAL, RS11, 11" LONG	DO02374	HOTFLO LTD	N/A	+30°C TO +85 °C
ZA_1	ANODE, WHE-3, 1/2"NPT BRASS PLUG & ZINC ROD, 02369	DO02369	JFD	ZINC	N/A
AFRL_1	ASSY, AIR FILTER, REGULATOR, LUBRICATOR.	DO20303	PNEUAIRE	SEE SHEET DATA	10 bar (MAX) - 5°C TO +60°C
HA_1	HOSE, HYDRAULIC, 1/2", PARKER, 801-8-GRA-RL	HP621	HYDRASUN LIMITED	SYNTHETIC RUBBER	WP 17 bar
	HOSE END, SWIVEL,PUSHLOK,8-JICX1/2,BRASS,WP17BAR	FJ439	HYDRASUN LIMITED	BRASS	WP 17 bar
HA_2	HOSE, HYDRAULIC, 1/2", PARKER, 801-8-GRA-RL	HP621	HYDRASUN LIMITED	SYNTHETIC RUBBER	WP 17 bar
	HOSE END, SWIVEL,PUSHLOK,8-JICX1/2,BRASS,WP17BAR	FJ439	HYDRASUN LIMITED	BRASS	WP 17 bar
HA_3	HOSE, HYDRAULIC, 1/2", PARKER, 801-8-GRA-RL	HP621	HYDRASUN LIMITED	SYNTHETIC RUBBER	WP 17 bar
	1/2 HOSE BARB TO 1/2 NPTM	PP090	HYDRASUN LIMITED	BRASS	WP 17 bar
AP_1	PUMP, AIR DRIVEN, HYDRAULIC, SPRAGUE	KI11892	THE WEST GROUP LIMITED	316SS	100 bar (MAX) -10°C TO +135°C
AP_2	PUMP, AIR DRIVEN, HYDRAULIC, SPRAGUE	KI11892	THE WEST GROUP LIMITED	316SS	100 bar (MAX) -10°C TO +135°C
NS_1	SILENCER, 1/2" SMC 400-04, BLACK/WHITE	DO02373	RS COMPONENTS LTD	ACETAL	WP 10 bar +5°C TO +60°C
NS_2	SILENCER, 1/2" SMC 400-04, BLACK/WHITE	DO02373	RS COMPONENTS LTD	ACETAL	WP 10 bar +5°C TO +60°C
WF_1	FILTER, HOUSING, 3/4"NPT, ST/ST316, 10", 04768	DO04768	PALL EUROPE LTD	316SS	WP 17.9 bar (MAX)
VPR_1	VALVE, PRESSURE REDUCING,, DIVEX HOT WATER MACHINE	DO02359	CALEFFI	BRASS	0.5 bar TO 6 bar DOWNSTREAM
WHT_1	TANK, WATER HEATER, PWS, 3.1 CERT.	DO02380	JFD	316SS	7.5 bar (MAX)
PS.1	SWITCH, PRESSURE, 1/4" NPT(M), SPDT, 5 BAR SET	EM3860	GEMS	BRASS	7 bar

NOTES:

1. APPLICABLE WHEN REMOTE PANEL FITTED

△6 DENOTES CHANGES MADE AT THIS REVISION

REV	DESCRIPTION	ECN	BY	DATE	AUTH.
R08	BOM UPDATED	21729	RC	27/11/17	AN
R07	BOM UPDATED	20264	JR	24/01/17	AN
R06	BOM UPDATED	19455	MJ	10/05/16	PB
R00	ISSUED FOR MANUFACTURE				

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

TITLE: SCHEMATIC, POTABLE WATER SYSTEM, PWS-01, PV'S 3.1 CERT

DRAWING NO. DO3178S1 | REV R08

PART NO. KI40008AA/AB | PRODUCT / PROJECT No. KI

SIZE A3 | SCALE (UOS) NTS | SHEET 2 OF 2

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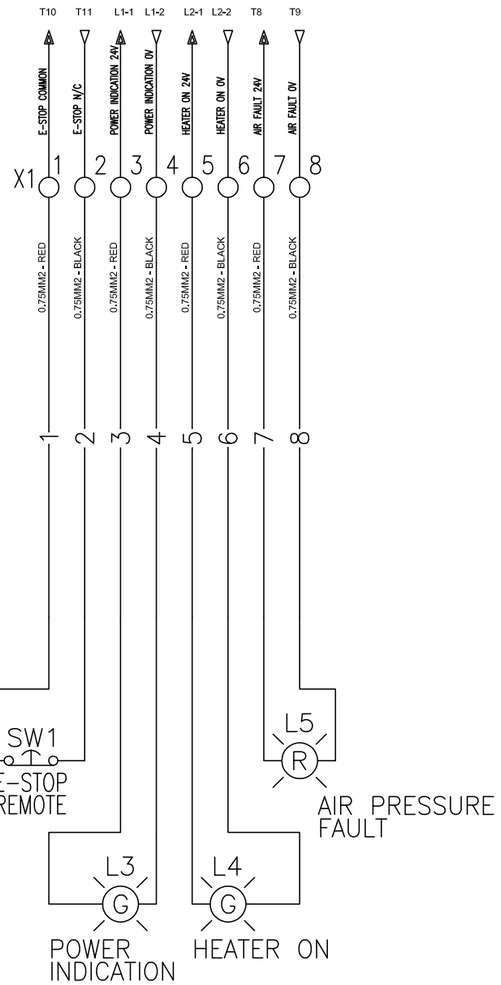
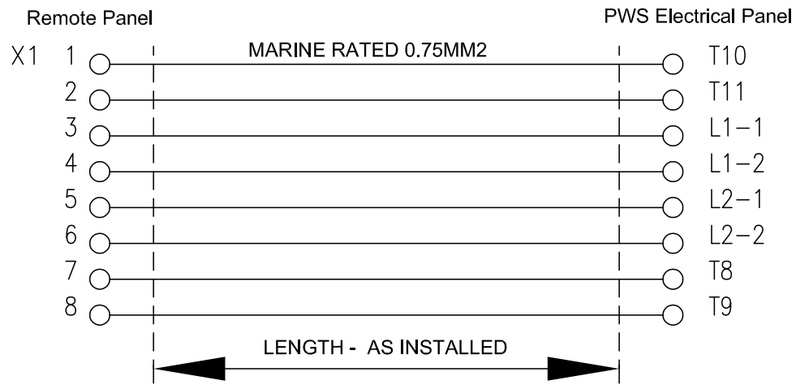
Panel assembly, Remote, PWS-01

PWS-01 ELECTRICAL PANEL TERMINALS



PWS-01 REMOTE PANEL INTERCONNECTS



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REV.	DESCRIPTION	ECN No.	BY	DATE	AUTH. BY
R00	ISSUED FOR CONSTRUCTION		LW	01/02/16	SC

DRAWING No.	PRODUCT / PROJECT No.	PART No.
KI2087S2	KI	KI2087

TITLE	SIZE	SCALE	TOTAL SHEETS	SHEET	REVISION
PANEL ASSY, REMOTE, PWS-01	A3	NTS	2	2	R00
DO NOT SCALE DRAWING					

APPENDIX B MANUFACTURER RELATED DOCUMENTS

The following details documents where manufacturers' operating, service and maintenance information for the major components of the PWS-01 may be sourced.

Pump, Air Drive, Hydraulic, Sprague (Manufacturer part number S-216-J-10)

http://www.cw-valvegroup.com/getattachment/787139e3-aa71-46b6-852c-2309b67db899/S-216-J-OP-Manual-10_14I

Assembly, Air Filter, Regulator, Lubricator (Hyflo part number AC40-F04 + bracket)

http://www.smcpneumatics.com/pdfs/ac_series.pdf

Pressure Reducing Valve (Caleffi part number 5360)

http://www.caleffi.com/sites/default/files/file/01026_05en.pdf

Omega® 609 Food Grade Oil

http://sovereign-omega.co.uk/Datasheets/Omega609-1.pdf

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