SALCHLOR

SAL300/2

USER MANUAL

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1. PRODUCT FEATURES, SPECIFICATIONS

MODEL	SAL300/2 (#JOB20170630)	
TYPE	Salt Chlorination Plant	
COMPOSITION OF SYSTEM	A Self-Contained Stand-alone unit Housing the power supply, Cells, Acid Cleaning system & Plumbing integrating everything together.	
SYSTEM PRODUCTION AND CONSUMPTION		SALT LEVEL (5,000 PPM)
	Chlorine Production	300 grams/hour
	Power Consumption	2,190W
	Above data approximation based on typical water conditions, 28°C temperature & specified salt levels. Actual values may vary due to local climatic & operating conditions.	
RECOMMENDED WATER CONDITIONING	These systems utilize the TDS in the water to perform the sanitizing process but do not consume any of the dissolved particles. Concentrations can vary between 4,000 ppm to 6000 ppm. **Note: Low ppm/TDS may reduce output capacity**. Optimum conditions for user & operation require the following pool characteristic…. Alkalinity 90 -120 ppm pH 7.2 – 7.6 Chlorine Stabilizer (isocyanuric Acid) 50 – 80 ppm	
TYPICAL WATER TREATMENT CAPACITY	~810,000 litres. This is based on standard chlorine requirements, water & climatic conditions. It also assumes 24-operation, 30°C water Temperature & ~1,200 people/day.	
POWER SUPPLY SPECIFICATIONS	Supply specification	Primary Voltage: 200 – 240 Vac Current: 12.5A Max Secondary Output Voltage: ~24 Vdc Current: 60A Wattage: 1440 Max Complete Power supply designed as a single-phase installation.
	Dimensions:	Complete Unit (including Power Supply, Cell, Acid Cleaning Unit & Frame): 1750 x 1165 x 800 (mm)
	Display & Controls:	• Displays: Current & Voltage Output • Switches: Mains Power On; Cell On; Controller Override; & Acid Pump (illuminated when active) • Lamp Indicators: Cell Operation, External Controller shutdown, Over-temp shutdown & No-flow.

CELL SPECIFICATIONS	Cell Material	Mono-Polar EC300 Electrode
	Plumbing	Cells integrated into a single stand-alone unit which includes: • Flanges for easy installation into filtration system, • Valves for isolating unit from filtration system, • Valves connecting unit to acid wash unit. Generally, cell units are connected in a bypass configuration inline with a 1.5-2 HP pump All pipes, fitting, valves are all industrial grade PVC or CPVC & have been tested to 500KPa. Cells are made from Acrylic for easy inspection.
	Cell Cleaning	Semi-Automatic acid wash System.
	Min Water Flow	Minimum flow rate- 10 litres/second.
P R O T E C T I O N SYSTEMS	Primary Protection: • Current/Voltage Regulation; • Circuit Breakers: • Water flow cut-off detection system. Secondary Protection: • Constant Voltage Control; • Current Limiting; • Gas build-up avoidance via careful placement of unit along water return lines.	
MAINTENANCE	Periodic cell cleaning should between 2 - 5 weeks, subject to local conditions & how the pool has been maintained. Cell material replacement is estimated to be required every 5 years. Refurbishment of cells can be done at a reduced cost.	

2. INSTALLATION

2.1 GENERAL LAYOUT OF SYSTEM INSTALLATION

This type of system is normally setup in a bypass configuration using a bypass pump to re-direct water from the filtration return line through the cells. While this system has a flow sensor to ensure that water is flowing during operation, the responsibility for making sure that the main filtration system is operating is on the operator.

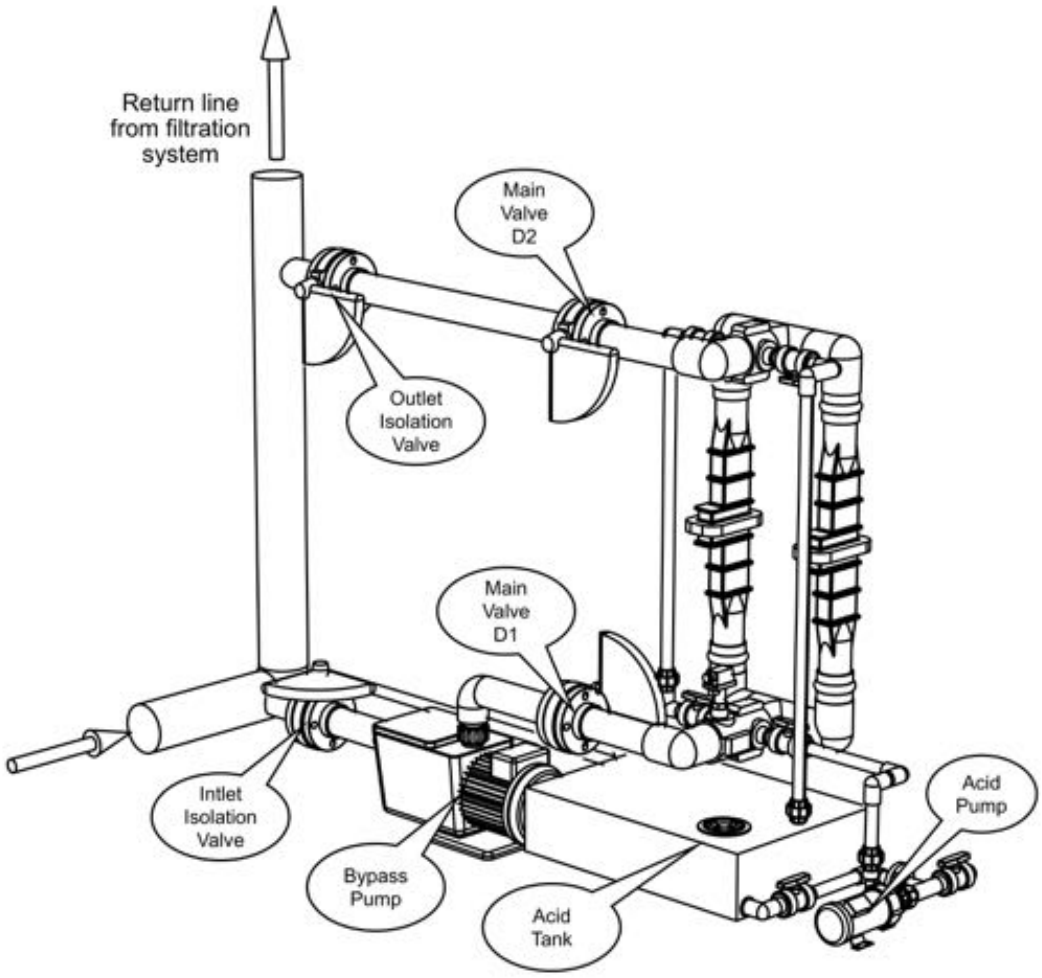


Figure 3.1 – Schematic for a bypass installation

2.2 SYSTEM COMPONENT DESCRIPTIONS

Power Supply (A)

Commercial Cells ($B_{1,2}$): Individual commercial cells mounted in a stand-alone frame or on wall-mounted frame.

Acid Cleaning Unit (C): Acid tank containing an acid solution (hydrochloric acid) diluted 1:5.

Main Flow Valves (D_1, D_2): Main flow valves, normally open during normal operation, are closed to isolate the cells from the main filtration system during acid cleaning cycles. D_1 is on the inlet.

Acid Cleaning Valves (E_1, E_2, E_3, E_4 & E_5): Normally Closed, these valves need to be open during an acid cleaning cycle. **E_4 is used to drain the cells directly to the tank & E_5 is used to drain the acid tank.**

Air Vent Valve (F): This valve is either used to remove air from the system or to allow air to enter the plumbing of the cells either when water is being drained prior to an acid cleaning cycle or prior to the removal of a cell(s) during maintenance.

Drain Valve (G): Used to draining the system during a cleaning cycle or prior to the removal of a cell(s) for maintenance.

Flow Sensor (H): Used to ensure flow of water during cell operation. Always ensure the sensor is pointing in the correct direction.

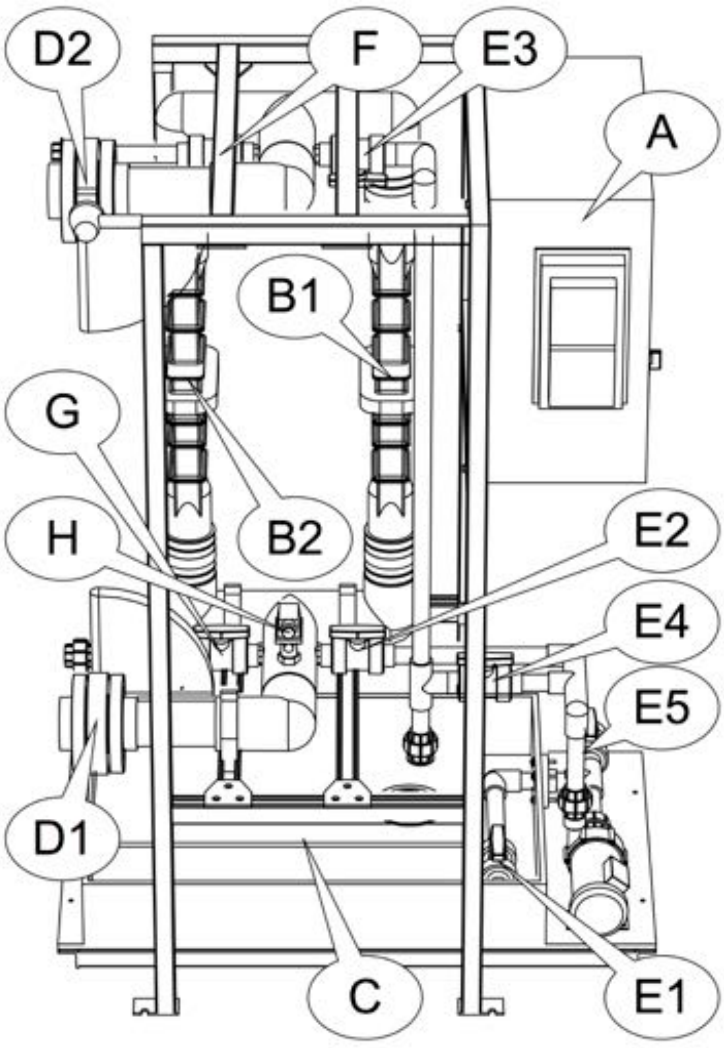


Figure 2.2 – Complete Installation

2.3 CONTROL PANEL LAYOUT, DESCRIPTION & FUNCTION

Figure 2.3 – Control Panel Layout

Mains Switch (A_1): (See Figure 2.3) Switches all power entering the power supply.

Current & Voltage Output Displays (J_1, J_2): These displays are set to show the performance of each of the cell units. These displays are connected to cell 1 & all cell are setup to give the same output. See Section 3.4 for discussion on required readings.

POWER switch (L): Switch is used to power up all the cells. Unless a fault lamp (N, O) or controller shutdown lamp (P_2) indicates otherwise, the displays (J_1, J_2) will indicate output levels. The switch will also illuminate when active.

Acid Switch (M): Used to activate the acid pump during a cleaning cycle. When active, the switch will illuminate. Note that this switch will only work when the POWER switch (L) is off.

Over-Temp Fault Lamp (N): During operation, if the power supply overheats, it will shutdown until the cooling system brings the temperature down, there upon it will start up again. It is up to the installer & operator to ensure that temperatures in the plant room are at a reasonable level.

No-Flow Lamp (O): If at start up, or during operation, the flow sensor ceases to measure any flow, the system will shut down & lamp will illuminate. This ensures that no build up of gas can occur.

External Control Override (P_1): If during maintenance, the external controller needs to be overridden, this switch can be used. When active, the switch will illuminate. Also note switch will also illuminate when the external controller has the system turned on.

Controlled Shutdown (P_2): If during operation, the external controller switches the system down, this lamp will illuminate.

2.4 OUTPUT CURRENT & VOLTAGE (J_1 & J_2)

Chlorine production is governed by the amount of current that is able to flow through the cells & is dependent on water temperature & salinity / TDS. The system is designed to run at its maximum capacity & will regulate itself so that is will never go beyond this level. It needs to be noted though that the system may not achieve this maximum level if conditions do not allow for it … LOW temperature or salinity / TDS.

2.5 EXTERNAL CONTROLLER OPERATION

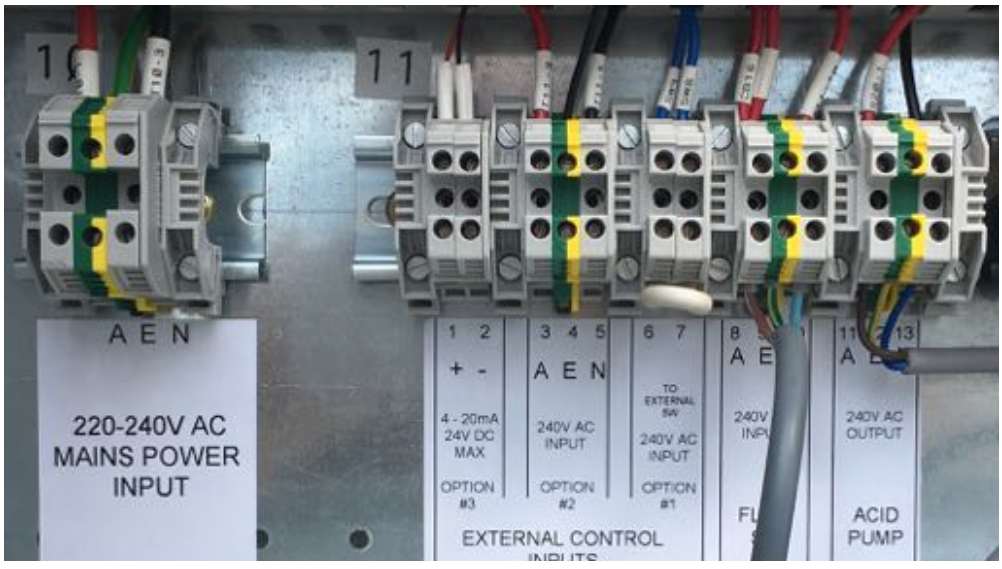


Figure 2.4 External Control Connections

This commercial system can be setup to be externally regulated through 3 possible options.

Option #1 (Terminals 6 & 7 of Terminal block 11)

If the external controller has a relay which can switch 240V AC, it can switch the system ON and OFF. NOTE: Make sure to keep these connection isolated from the circuit of the controller beyond the relay. Also note that, by default, a jumper wire closes this connection to set the system permanently in the ON setting.

Option #2 (Terminals 3,4 & 5 of Terminal block 11)

If the external controller can supply 240V AC to switch the system ON/OFF, this option can be used. The connection go to a internal relay which closes the connections of option #1 & keeps this connection isolated from the rest of the system. NOTE: DO NOT use this in conjunction with option #1.

Option #3 (Terminals 1 & 2 of Terminal block 11)

If the external controller can output 4-20mA for full variable control, this is the best option. Terminals 1 & 2 are + & -, respectively. **Note that this needs to be connected correctly, otherwise the controller will assume NO OUTPUT REQUIRED!!!** This input is continuously monitored & if there isn't a 4-20mA connection, the system will assume that 100% output is required.

To accommodate external controllers, the system also has an override switch & controlled shutdown lamp. During maintenance, the user may need to override the controller. Placing the override switch in the ON position turns the system ON & takes the output level to 100% if option #3 has been used. This switch will also illuminate when override is active.

A controlled shutdown lamp has also been provided to indicate when an external controller has shut down the system.

Alternative Option ….

An alternative method to options #1 & #2 is directly controlling the bypass pump thereby controlling the flow through the system & therefore when the system comes ON via the flow switch.

NOTE!!! CAUTION!!! when using any of the above options, the operator should be mindful that damage CAN occur when cycling the chlorination system ON/OFF at high frequencies. Such operation can be detrimental to the control circuit of the system. Further in particular with option#3, such a setup can ALSO be detrimental to the cell & plumbing of the system. Such frequent starting & stopping the bypass pump WILL dynamically load the cell(s) which ultimately could lead to cell failure.

3. OPERATION

Note: Valves have been labelled & colour coded to help during maintenance.

3.1 NORMAL OPERATION

Prior to starting the system for normal operation the following needs to be checked….

1. Make sure the main filtration system is operating.
2. All acid cleaning valves (E_1, E_2, E_3) are closed;
3. If resuming normal operation after an acid cleaning cycle where the air-vent valve (F) and/or drain (G) have been used, ensure all are closed;
4. Once the 3 previous points are checked & cleared, open both main flow valves (D_1, D_2), if not already.
5. Once points 2, 3, & 4 are satisfied, only then should the bypass pump be activated. This is external to the system described here & therefore not covered by this user manual.
6. Check all fault lamps, as they will stop the system from commencing normal operation. A no flow fault indicates either one of valves (D_1, D_2) is closed; the bypass pump, which feed the system, is not running; or, there is some other obstruction to flow.

Once all the above points have been checked & cleared, the system is ready to be started. Therefore Place power switch (L) into the ON position.

3.2 CELL CLEANING OPERATION

Note that a diluted solution of acid (Hydrochloric Acid diluted 1:10) should always be used for the cleaning of the cells.

After an estimated 1 – 4 weeks of operation, the cell may need to be cleaned of buildup. The following procedure should be followed when performing this operation. This operation can be performed at any time, irrespective of the operation of the main filtration system.

The following procedure should be performed when starting the acid cleaning process.

1. Shutdown the system from normal operation, via switch (L);
2. Shutdown the bypass pump. This is external to the system described here & therefore not covered by this user manual;
3. Fill Tank with acid to the specified dilution;
4. Isolate the cells from the rest of the filtration system by closing main valves (D_1, D_2);
5. Drain the remaining water from the cell by opening vent valve (F) & drain valve (G). Once completely drained, ensure that all these valves are closed;
6. Open the acid cleaning valves (E_1, E_2, E_3);
7. Start the acid pump by placing the Acid switch (M) into the ON position. The acid pump should stay on for the duration of the cleaning cycle;

8. WAIT …The duration of this cycle depends on how much coating has developed. Therefore, the process should always be monitored. NOTE: In situations where the buildup is very bad, one may need to turn off the acid pump & allow the cells to stay submerged in the acid until the buildup has softened & the acid pump can be turned back on to remove the coating.
   Once the coating has been adequately removed, the procedure can be continued with the following…

9. Stop the acid pump by placing the Acid switch (M) into the OFF position;
10. Close the acid cleaning valves (E_1, E_2, E_3);
11. Re-open main valves (D_1, D_2);
12. Re-start the bypass pump. This is external to the system described here & therefore not covered by this user manual. Run the pump until the acid has cleared the cells (approximately 5min). NOTE YOU ARE NOW FLUSHING THE ACID MIXTURE TO THE POOL;

13. Fill Tank now with fresh water and repeat steps 4 to 11 excluding step 8. DO THIS 2 TO 3 TIME TO DILUTE AND FLUSH OUT REMAINING ACID FROM THE TANK;
14. At this point the bypass pump should be running and the system is now ready for normal operation. See section 3.1;

3.3 CUSTOMER RESPONSIBILITIES

Before you call for service please read the Operating Instructions carefully and check through the following points regarding your responsibilities as the customer.

A service fee WILL be charged should service be required as a result of any of the following condition(s):

1. Power is **INCORRECTLY** connected to the system;
2. Identified faults are **EXTERNAL** to the system;
3. System has been INCORRECTLY installed and/or operated;
4. INCORRECTLY set up external controllers;
5. POOR water chemistry;
6. IN-ADEQUATE water flow through system OR main filtration system;
7. The system has been tampered with by UN-AUTHORISED PERSONNEL.

NOTE!!! **ANY damage requiring replacement parts and/or repair due to the above condition(s) will be the customer's responsibility.**

3.4 GENERAL MAINTENANCE

It is expected that the customer or operator will inspect & maintain the system during its operating life. There is a number of points which should be considered when doing so. They are as follows …

1. Always maintain good water chemistry;
2. Regularly monitor the cell(s) for calcium buildup & when required, perform the cell cleaning operation (see the previous **section** 3.2). NOTE: Good water chemistry, if setup correctly, can reduce the frequency that the cell(s) require cleaning.
3. The operator should always carry out a general inspection of the complete system to eliminate potential problems in the future. Some of the specific points of interest on the system are as follows …
    - Is there any leaks from the plumbing (e.g. valves) of the system? Is this due to something requiring a service? or requiring a barrel union to be tighten? If so, tighten them;
    - Have the boot clamps loosened? If so, tighten them;
    - Are the terminals on the cell(s) warm? or have they loosened? If so, tighten them as loose connections can undermine the life of a cell;
    - Do the terminals have corrosion? Corrosion can undermine the life of a cell. Use a "Battery Terminal Protective spray" to stop the corrosion. NEVER EVER use products like WD40 or INOX as we will quickly loosen the terminal(s), BURNING THEM OUT & damage the cell(s) ….
    - Is the cell Housing(s) warm to the touch? This could suggest blockage which is reducing the flow rate.

NOTE!!! Failure to do any of these things may result in VOIDING THE WARRANTY!!!!

4. Cell Replacement … During the life of the system circumstances may require cell maintenance, refurbishment or replacement. The cells are plumbed into the system with 3" boots allowing for quick replacement. In the unforeseen event a cell needs to be replaced & a replacement isn't immediately available, the cell can be swapped with a 800mm 3"pipe to allow continued use of the system, be it at a reduced capacity. An operator should be able to perform this. Note: The system should be shut down & isolated before removing the cell.

4. WARRANTY

This product has been produced & thoroughly tested to the highest standard & therefore carries the following warranty.

Both power Pack & cell(s) have 24-month full warranty, from date of purchase, entitling the purchaser to have the product repaired, and/or replaced, if shown to have failed due to workmanship or material(s).

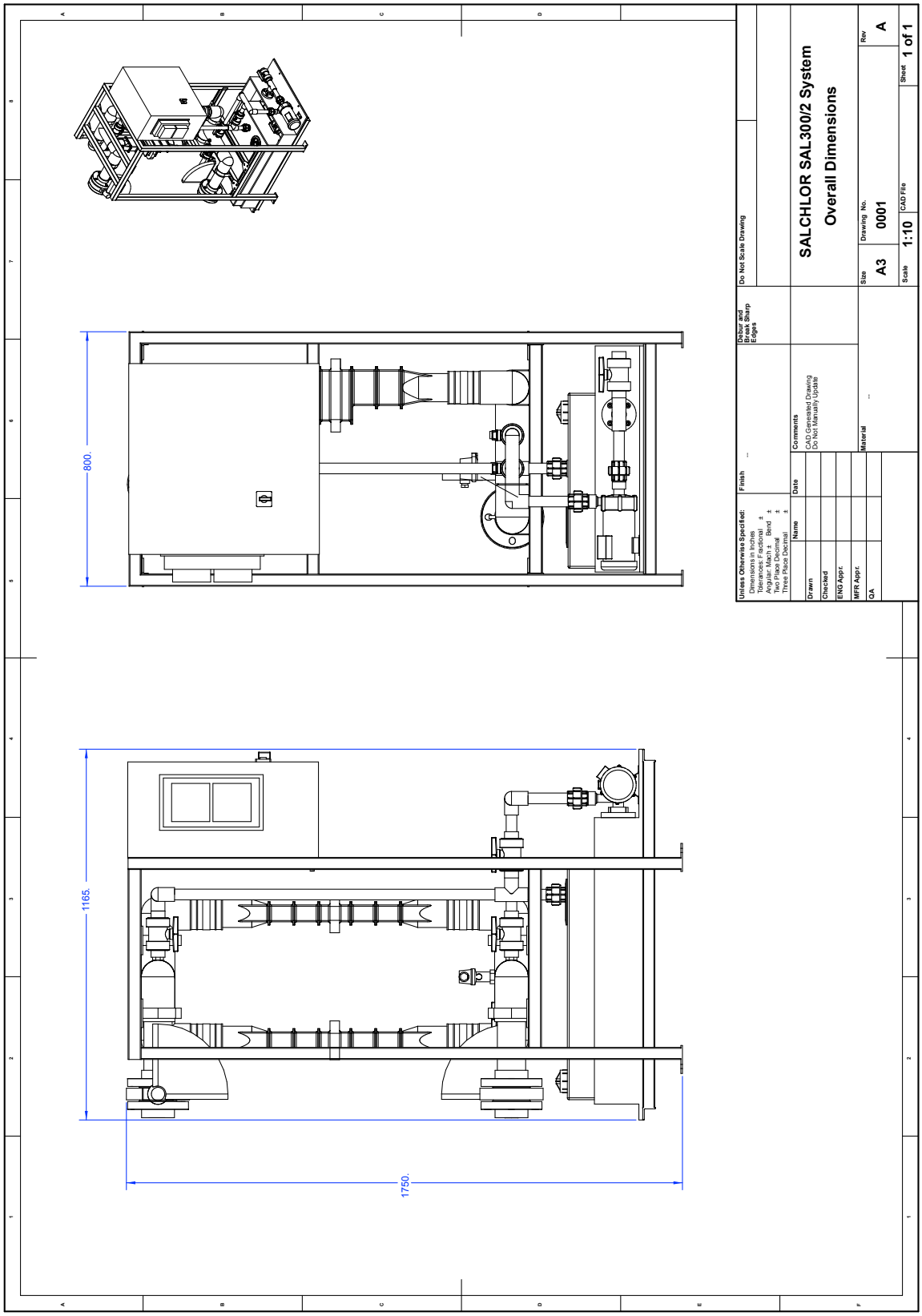
THIS WARRANTY IS IMMEDIATELY VOIDED UNDER THE FOLLOWING CIRCUMSTANCE…

i) The installation was performed incorrectly by an un-authorised personnel;
ii) The Power Pack, and/or cell(s), were serviced by un-authorised personnel;
iii) Correct Salt or TDS levels were NOT maintained at all times;
iv) Power Pack was NOT operated correctly,NOT protected adequately, and/or WITHOUT adequate ventilation;
v) Cell(s) NOT correctly maintained, or operated with NOT enough flow rate.

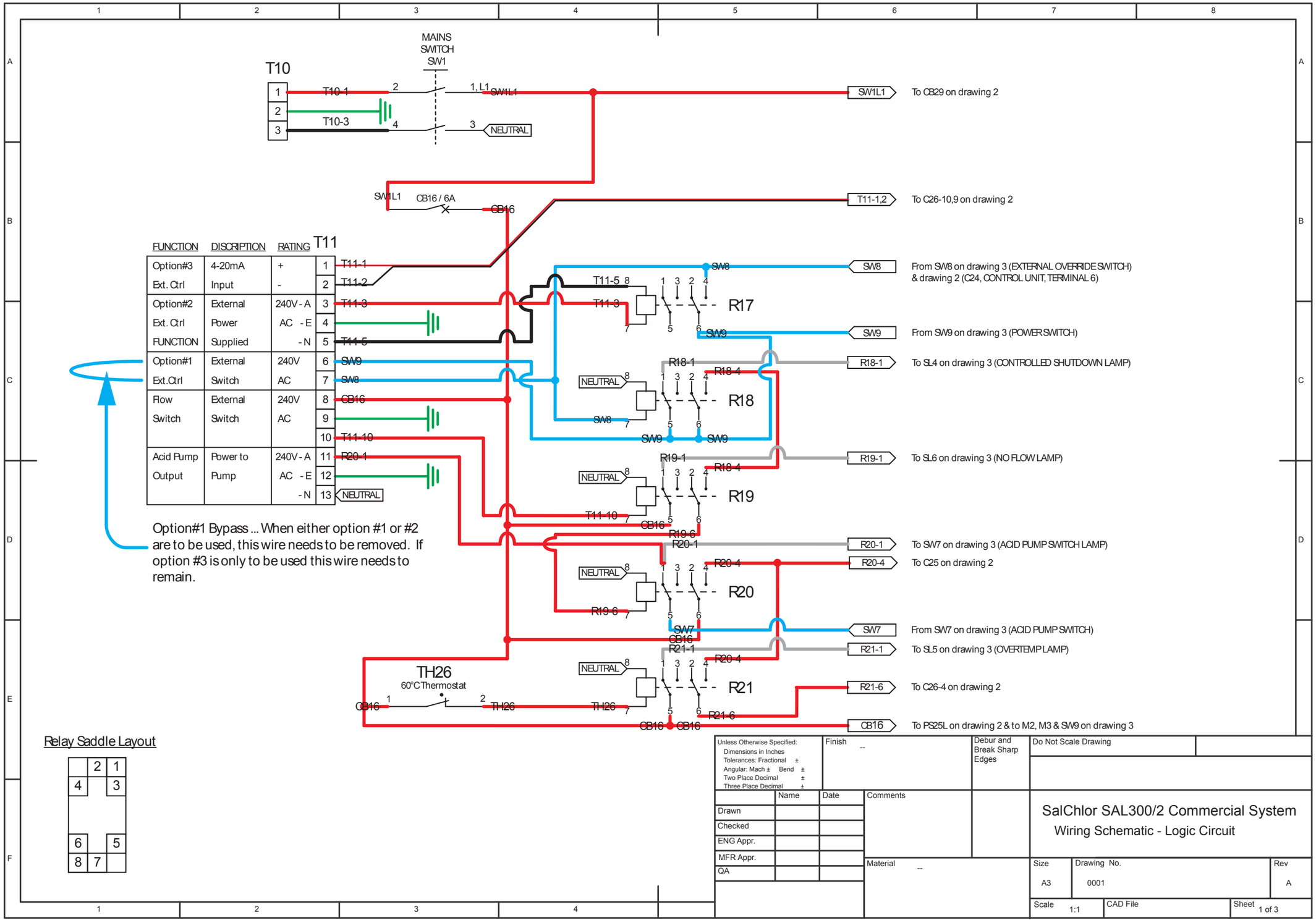
This warranty is ONLY applicable to material & workmanship ONLY. It is non-transferable & DOES NOT cover freight cost!! UNDER NO CIRCUMSTANCE will we EVER take responsibility for loss, damage to property and/or injury to person(s) due to a failure of this equipment and/or the installation. This warranty shall NOT extend to any cost(s) otherwise incurred.

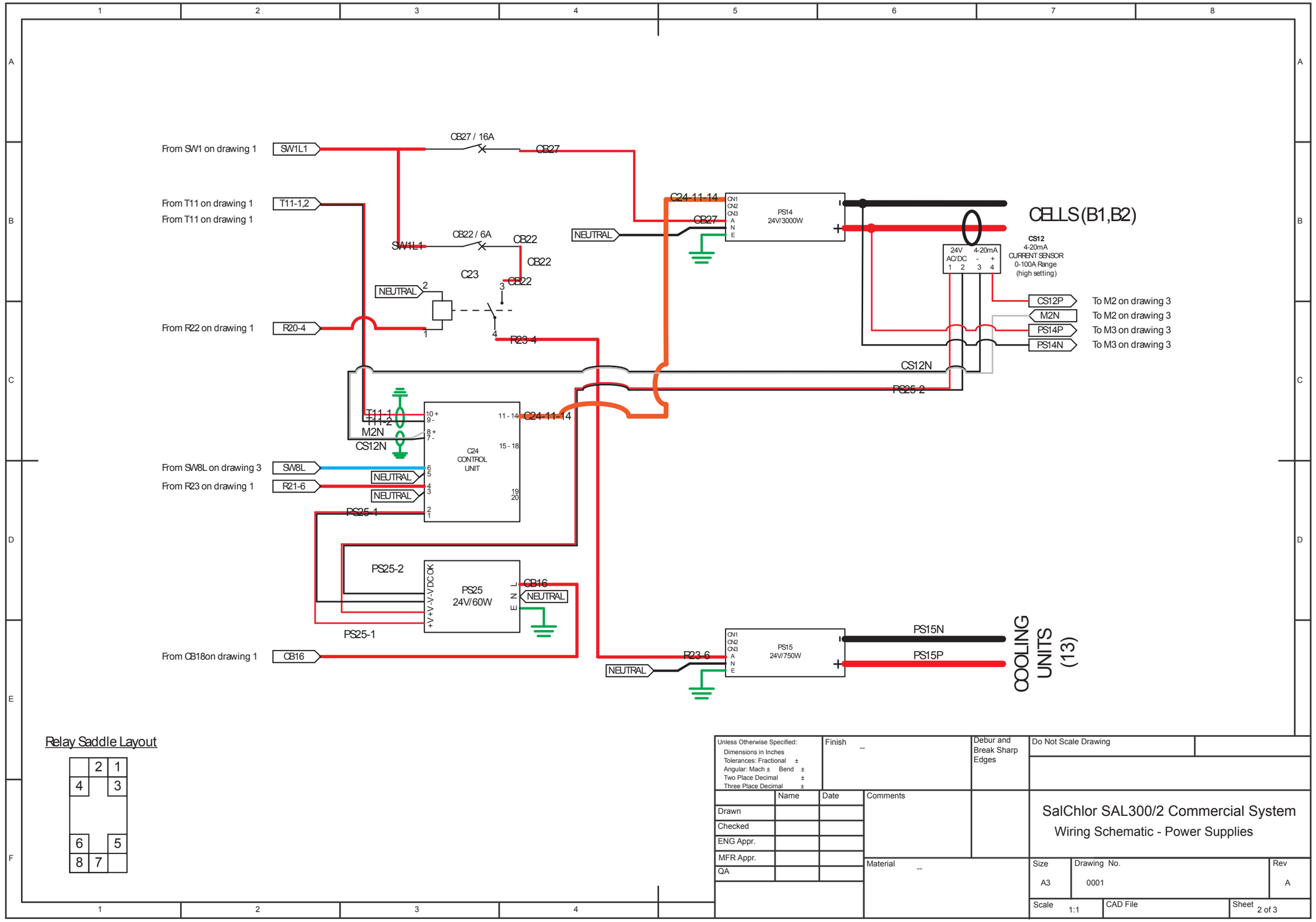
5. APPENDIX

5.1 SYSTEM OVERALL DIMENSIONS



5.2 SYSTEM CIRCUIT DIAGRAM





Relay Saddle Layout

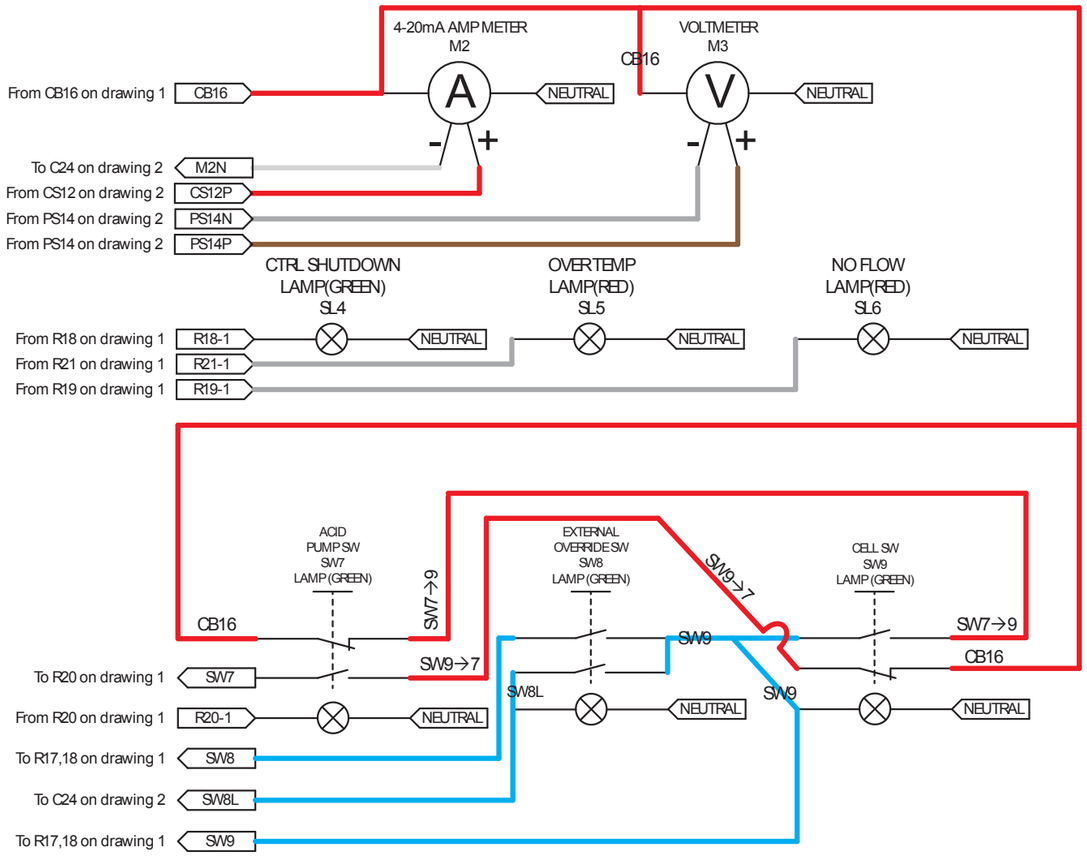
	2	1
4		3
6		5
8	7	

Unless Otherwise Specified: Dimensions in Inches; Tolerances: Fractional ±; Angular: Mach ± Bend ±; Two Place Decimal ±; Three Place Decimal ±	Finish --	Debur and Break Sharp Edges	Do Not Scale Drawing
	Name	Date	Comments
Drawn			
Checked			
ENG Appr.			
MFR Appr.			
QA			
Material --			

SalChlor SAL300/2 Commercial System

Wiring Schematic - Power Supplies

Size	Drawing No.	Rev
A3	0001	A
Scale 1:1	CAD File	Sheet 2 of 3



Unless Otherwise Specified: Dimensions in Inches Tolerances: Fractional ± Angular: Mach ± Bend ± Two Place Decimal ± Three Place Decimal ±	Finish --	Debur and Break Sharp Edges	Do Not Scale Drawing		
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Drawn					
Checked					
ENG Appr.					
MFR Appr.			Material --	Size A3 / Drawing No. 0001 / Rev A	
QA				Scale 1:1 / CAD File / Sheet 3 of 3	

5.3 POWER SUPPLY PARTS LIST

Part No	Description	Wiring Code
1	Mains Switch	SW1
2	Current Display (4-20mA)	M2
3	Voltage Display	M3
4	Control Shutdown Lamp (Green)	SL4
5	OverTemp Lamp (Red)	SL5
6	No Flow Lamp (Red)	SL6
7	Acid Pump Switch	SW7
8	Override Switch	SW8
9	Cell Power On Switch	SW9
10	Mains Terminal Connection	T10
11	Input/Output Terminal Connections	T11
12	4-20mA Current Transformer Sensor	CS12
13	Cooling System	13
14	Main Cells Power Supply 24V/3000W	PS14
15	Cooling Power Supply 24V/750W	PS15
16	6A Circuit Breaker (‘D’curve)	CB16
17 - 21	Relays	R17 - R21
22	6A Circuit Breaker (‘D’curve)	CB22
23	Contactor	R23
24	Controller	C24
25	Small Power Supply 24V/60W	PS25
26	Thermostat 0^{o}C-60^{o}C	TH26
27	16A Circuit Breaker (‘D’curve)	CB27