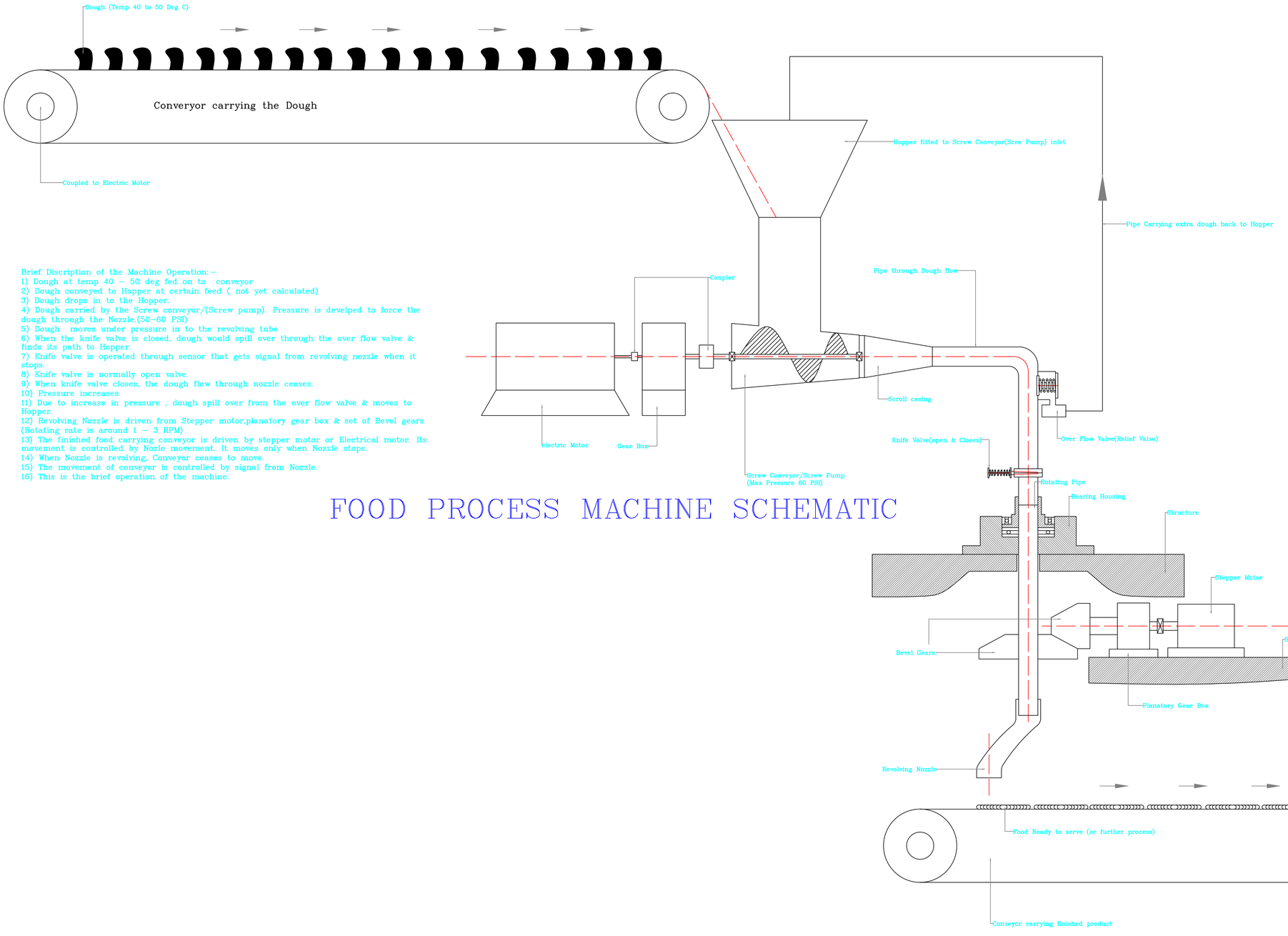
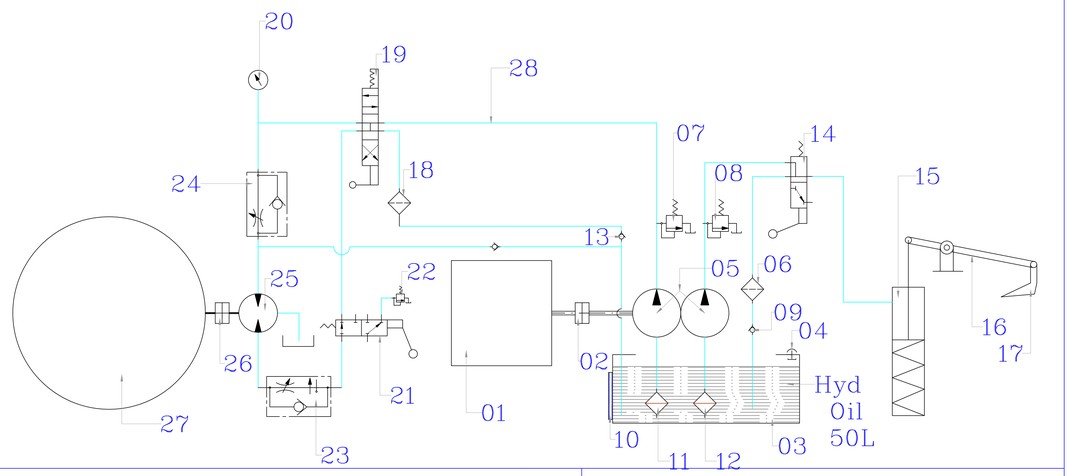
FOOD PROCESS MACHINE SCHEMATIC



Brief Discription of the Machine Operation: –
1) Dough at temp 40 – 50 deg fed on to conveyor
2) Dough conveyed to Hopper at certain feed (not yet calculated)
3) Dough drops in to the Hopper.
4) Dough carried by the Screw conveyor/(Screw pump). Pressure is develped to force the dough through the Nozzle.(50–60 PSI)
5) Dough moves under pressure in to the revolving tube
6) When the knife valve is closed, dough would spill over through the over flow valve & finds its path to Hopper.
7) Knife valve is operated through sensor that gets signal from revolving nozzle when it stops.
8) Knife valve is normally open valve.
9) When knife valve closes, the dough flow through nozzle ceases.
10) Pressure increases.
11) Due to increase in pressure , dough spill over from the over flow valve & moves to Hopper.
12) Revolving Nozzle is driven from Stepper motor,planatory gear box & set of Bevel gears (Rotating rate is around 1 – 3 RPM)
13) The finished food carrying conveyor is driven by stepper motor or Electrical motor. Its movement is controlled by Nozle movement. It moves only when Nozzle stops.
14) When Nozzle is revolving, Conveyor ceases to move.
15) The movement of conveyor is controlled by signal from Nozzle.
16) This is the brief operation of the machine.

Hydraulic Motorized Plo



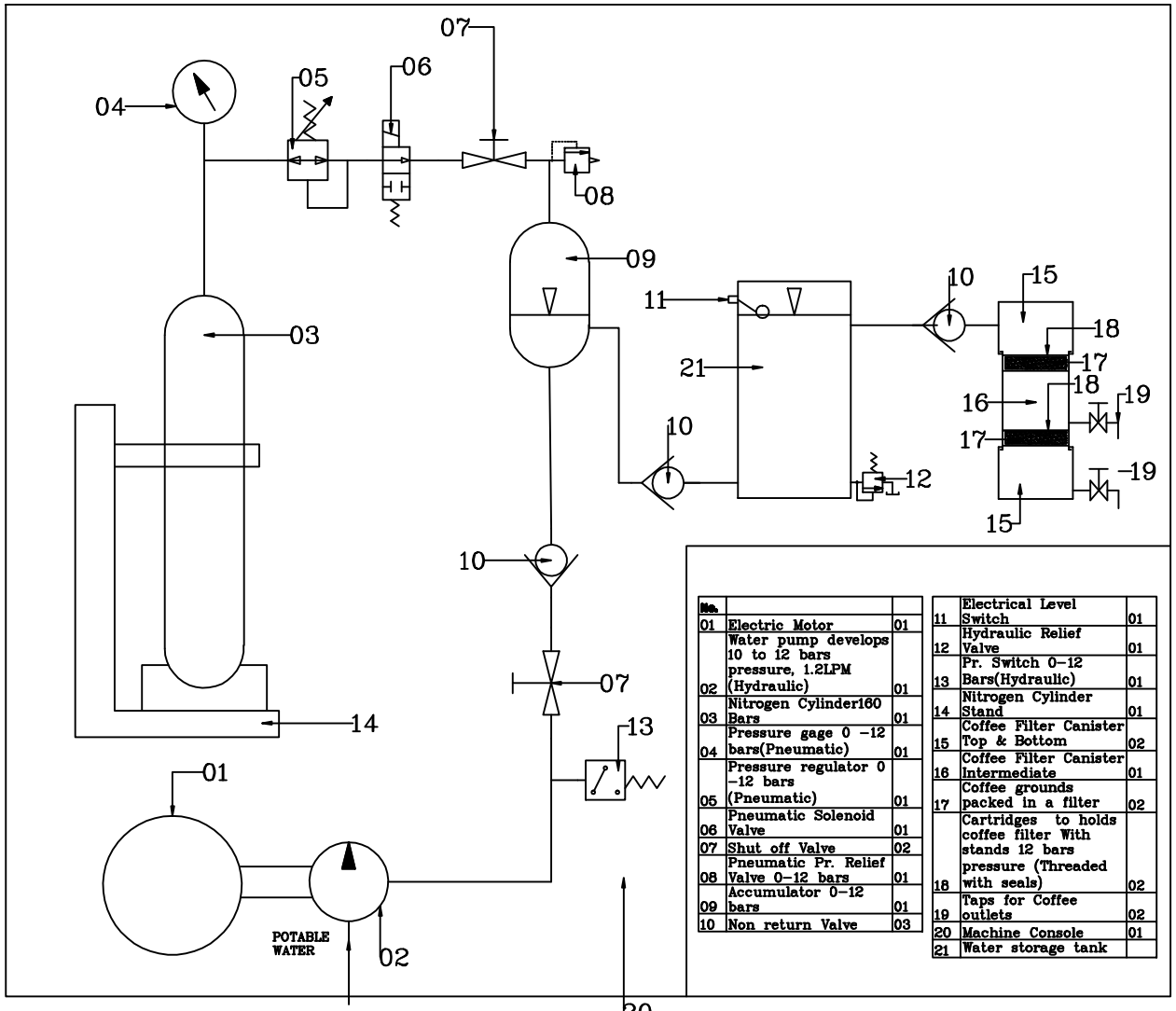
BRIEF DESCRIPTION OF TILLER :
I. CHASSIS IS FABRICATED OUT OF STEEL.
II. ALL HYDRAULIC SYSTEM & ENGINE ARE MOUNTED ON CHASSIS.
III. CHASSIS IS SUSPENDED ON WHEELS , UN-SPRUNG.
NO SHOCK ABSORBER IS PROVIDED. SINCE SPEED IS VERY SLOW.
IV. THE DRIVE IS IMPARTED TO A SINGLE RUBBER TIRE WHEEL VIA HYDRAULIC MOTOR.
V. SPEED IS VARIABLE WITH IN 5 KM/HR.,
VI. TWO SMALL RUBBER DRIVEN WHEEL ARE BUILT IN TO SUPPORT THE CHASSIS
THE TILLER IS STEERED WHILE WALKING BY A PERSON . PROVISION IS MADE TO STAND ON THE CHASSIS?
VII. STEERING IS TO THE DRIVE WHEEL BY PIVOT TABLE.
VIII. SEPARATE LEVER MECHANISM, (16) IS PROVIDED TO HOOK PLOUGHING & OTHER AGRICULTURAL EQUIPMENT.
IX. WHILE PLOUGHING, IN CASE YOU ENCOUNTER ANY PROBLEM, PLOUGH CAN BE LIFTED BY OPERATING A DC VALVE HAND LEVER (14).
X. WHEN NOT IN USE THE IMPLEMENT CAN BE UN-HOOKED FROM THE LEVER MECHANISM.
XI. MAIN CONTROLS: –
i STEERING MANUALLY BY HAND.
ii TILLER SPEED CONTROL BY HAND LEVER .
iii TILLER REVERSE WHEN REQUIRED BY A HAND LEVER.
iv TILLER BRAKE MANUALLY.
v TILLER PARKING BRAKE MANUALLY.

11. MAJORITY ITEMS ARE PURCHASE ITEMS.

THE TILLER IS ALSO SUITABLE TO DO OTHER AGRICULTURAL OPERATION SUCH AS ROTARY TILLING, LEVELING, CULTIVATING, WEEDING ETC: – USING CONCERNED IMPLEMENTS.
THESE IMPLEMENTS COULD BE HOOKED TO THE LEVER MECHANISM.

23. Flow Control valve pr.compensated & temperature compensated. This valve is valve available in market. Reference would be provided.
This valve varies the oil flow in the hydraulic motor. When flow is reduced speed of hydraulic motor is reduced. when flow increased, speed is increased. However maximum speed is only limited to 5 KM/hr.
24. Throttle valve preset.: This valve is used to reverse direction. At times you may need to reverse the tiller plough. Valve can be purchased from market.
25. Hydraulic motor: This motor drives the wheel of tiller. The detail specification is given in excel chart.
Oil is fed from pump at pressureto hydraulic motor & it rotates at an RPM set by flow control valve 23.
This can be purchased from White Drive products .com Address & email is give in the Excel Chart.
Catalog is also enclosed.. Model : White RS (200/201) Series. Flow 205 CC/rev. Other specification & detail model code would be furnished later on. while detail design.
26. Drive coupling to drive wheel . To be designed & manufactured in-house.
27. Rubber Tire wheel, Wheel Flange, Rim Etc: –
To be purchased from market. Wheel OD is to be around 300 mm – 400 mm. Nearest available standard in market. Width around 100 mm. Reference would be given
28. Pipe & Hoses & fittings: –These items are purchased from market. Detail bill of material would be given in the later stage.
29. Chassis. Steel fabrication in-house. Detail drawing would be made. Entire engine & hydraulic system is mounted . ChaSSIS is on drive & two small driven wheels. Not shown in the schematic.
30. Rubber mounts for Engine.Required to absorb engine vibration. Not shown in the drawing.would be given in BOM.
31. Pivot table, Drawing would be made. for manual Steering . Not shown in the drawing.
32. Rubber Rear Wheel around 150 mm Dia , width 50 mm Not shown in the drawing.
33. Parking brake manual operation: Would be designed. Not shown in the schematic

01. Petrol Engine: Make Loncin G200FQ OR HondaGX200UT1X4
Web Site:- http://www.flowfitonline.com/petrol-and-diesel-engines/loncin-petrol-engines
http://www.honda-engines-eu.com/
Brief specification : Max Power at max rpm 3600 = 5.5 HP
More Details refer the catalog of the manufacturers enclosed & Excel calculations chart enclosed.
02. Drive coupling To couple the Engine with Hydraulic Pump. Use any reputed. contact reference would be furnished.
03. Hydraulic Oil Tank : To be manufactured In-House
04. Breather cum oil filler : purchased from a reputed manufacturers.
05. Hydraulic Pump :Can be purchased from Flowfit
Web Site : : http://www.flowfitonline.com/
The pump & Engine assembly isd purchased from this source.
Web site : http://www.flowfitonline.com/hydraulic-power-units/petrol-engine-driven
Pump Specification:
Flow :Front pump (Near to engine) = 6.3 CC/rev
Rear pump = 2.1 CC/rev. Max RPM = 3600.
Catalogs enclosed for detail specifications
In our Case Engine governing RPM set at =2600.
This means the engine run at a constant RPM of 2600.
Thus pump delivers constant flow in LPM
For more details please refer the Excel calculations .
Alternately you can use any make pump, matching the flow in CC/Rev (Approximately). Then you have to buy engine from Honda/Loncin & pump any gear pump manufacturers. Assembly them.
06. Hydraulic oil Filter: Can be purchased from any reputed source. contact would be furnished.
Capacity of filter is around 20 LPM 10 microns.
07 Relief valve : This valve is to set maximum pressure. Serves as safety valve. for the pump. Pressure is set at around 85 Kg/cm2. There are many valve manufacturers from whom you can buy. Contact reference would be furnished.
Specs 30 LPM Pr. Range 0-100 Kg/cm2
08. Relief valve : This valve is to set maximum pressure. Serves as safety valve. for the pump pump. Pressure is set at around 40 Kg/cm2. There are many valve manufacturers from whom you can buy. contact reference would be furnished.
Specs 15 LPM Pr.Range 0-100 Kg/cm2
09. Check Valve : This valve allows oil to flow in one direction. Does not allow in the opposite direction. Can be purchased from any source. Contact reference would be furnished.
10. Oil site glass. You can see the oil level in the tank. Buy from markes.
11. Suction Strainer : Can be purchased from any source.
Specs: 60 LPM Mesh 119 Microns
12. Suction Strainer : Can be purchased from any source.
Specs: 30 LPM Mesh 119 Microns
13. 09. Check Valve : This valve allows oil to flow in one direction. does not allow in the opposite direction. Can be purchased .
14. Hand lever operated 3 position 2 way DC Valve spring center. Can be purchased from market.
This valve allows the oil to flow under pressure to plough cylinder, 15 to lift it. when not required it is released by hand.
15. Spring operated cylinder, It is actuate the plough, to lift it when not in use. Cylinder may be purchased or manufactured in-house.
16. Lever mechanism : to be manufactured & assembled in-house.
17. Plough
18. Hydraulic oil Filter: Can be purchased from any reputed source. contact would be furnished.
19. 3 Position – 4 way handlever operated Detent DC valve. Can be purchased from hydraulic element manufacturers. Reference would be furnished. The function of this valve is to reverse the hydraulic motor for reversing. Also by operating the lever the motor can rotate in forward direction & drive the Tiller wheel.
20. Pr. Gage : measures the Hydraulic pressure.
21. Two position-3 way Spring center DC valve. Cn be purchased from market. The function is to apply brake in running. forst the DC valve 19 is to be brought to neutral position. Then this valve lever is pulled/pushed to apply brake.
22. Brake valve. This is a relief valve set at say 40 Kg/cm2 pressure. While the hyd motor is brought neutral position, the motor has inertia. It tries to move , then oil flow through this valve and the motor/wheel comes to stop quickly.



No.		
01	Electric Motor	01
02	Water pump develops 10 to 12 bars pressure, 1.2LPM (Hydraulic)	01
03	Nitrogen Cylinder160 Bars	01
04	Pressure gage 0 –12 bars(Pneumatic)	01
05	Pressure regulator 0 –12 bars (Pneumatic)	01
06	Pneumatic Solenoid Valve	01
07	Shut off Valve	02
08	Pneumatic Pr. Relief Valve 0–12 bars	01
09	Accumulator 0–12 bars	01
10	Non return Valve	03
11	Electrical Level Switch	01
12	Hydraulic Relief Valve	01
13	Pr. Switch 0–12 Bars(Hydraulic)	01
14	Nitrogen Cylinder Stand	01
15	Coffee Filter Canister Top & Bottom	02
16	Coffee Filter Canister Intermediate	01
17	Coffee grounds packed in a filter	02
18	Cartridges to holds coffee filter With stands 12 bars pressure (Threaded with seals)	02
19	Taps for Coffee outlets	02
20	Machine Console	01
21	Water storage tank	

Brief Function & Construction: The machine comprises of an electric motor to pump potable water in to the accumulator through a water pump that develops a pressures of maximum 12 bars.
The accumulator maintains pressure by a high pressure N2 Cylinder. N2 cylinder is connected via regulator to maintain the pressure in the accumulator with in 12 bars.
The pressure switch,13 in pump line signals the electric motor driving the pump to start when pressure drops in the accumulator.
At the same time when the float switch, 11 signals when water level drops below the pre set level. Then the pr.switch signal is over ride & water is pumped in to the accumulator.
In order to isolate the N2 cylinder pressure, the float switch signal is sensed by solenoid (06) & it cuts off gas supply.
However the pumping of water may rise the pressure in the accumulator but it is relieved by relief valve, 08.
The storage tank 21 is connected to the accumulator & thus pressure is the same as accumulator pressure.
This pressure is also transmitted to the coffee canisters 15 & 18
The top & bottom canister are identical & interchangeable.
The top & both canister are screwed to the intermediate canister.
In between the top & intermediate and bottom & intermediate canister is housed cartridges, that dispenses water at high pressure/velocity.
In the space between cartridges is housed coffee ground packed in the filter.
There are two taps, 19. One filter is after the first filter & second after both filters. Thus the solution coming out from the second filter is stringer than first.
All the controls are electrical.

NOTE:–
01. All machined surfaces to be square with in ±0.05.
02. All bore with respect to faces to be at right angle with in ±0.05
03. All taped holes to be concentric with in ±0.05
04. All mating surfaces to be right angle with in ±0.5, unless otherwise.
05. Drilled holes to have "two triangle" finish
06. Unrestricted chamfer = 0.5 mm
07. Finished weight =

REV.NO	DATE	REASON
–	–	–

WELDING INSTRUCTIONS:
WELD FILLET SIZE: FOR PLATE THK. 12, h = 6 MM
PLATE THK. 16, h = 8 MM
PLATE THK. >16 TO 25 h = 10 MM
PLATE THK. >25 h = 14 MM
WELDING TO BE CONTINUOUS; WELD ALL AROUND.
WELDING METHODOLOGY SHOULD ENSURE DISTORTION–FREE WELDING

Unlimited machining & Fabrication tolerances:–

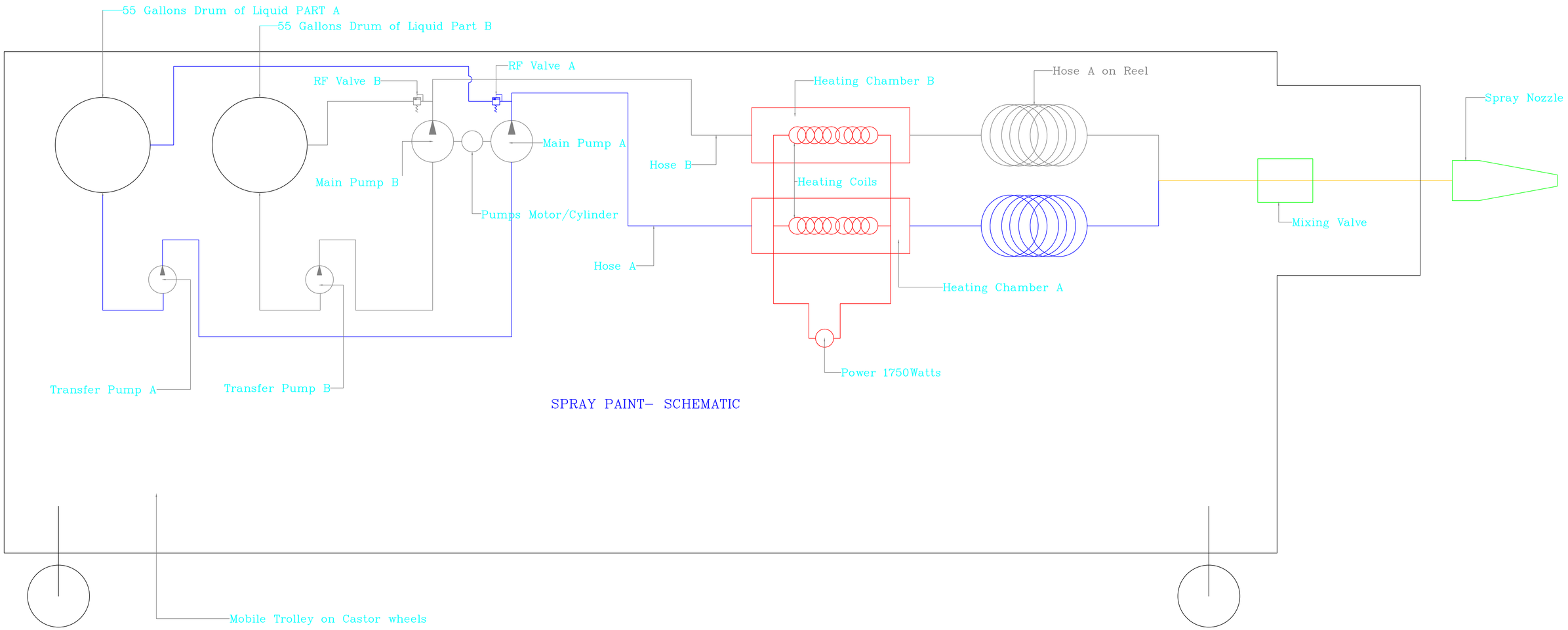
Dimension	0–10	11–50	51–100	101–500
Casting/Fab	±0.5	±0.5	±1.5	±2.0
Machining	±0.1	±0.2	±0.3	±0.5

DESIGN: C.S.R	
DRAWN: CSR	
Sub Assly	--
Main Assly	--
Agency	oDesk
Client	Rodrigo

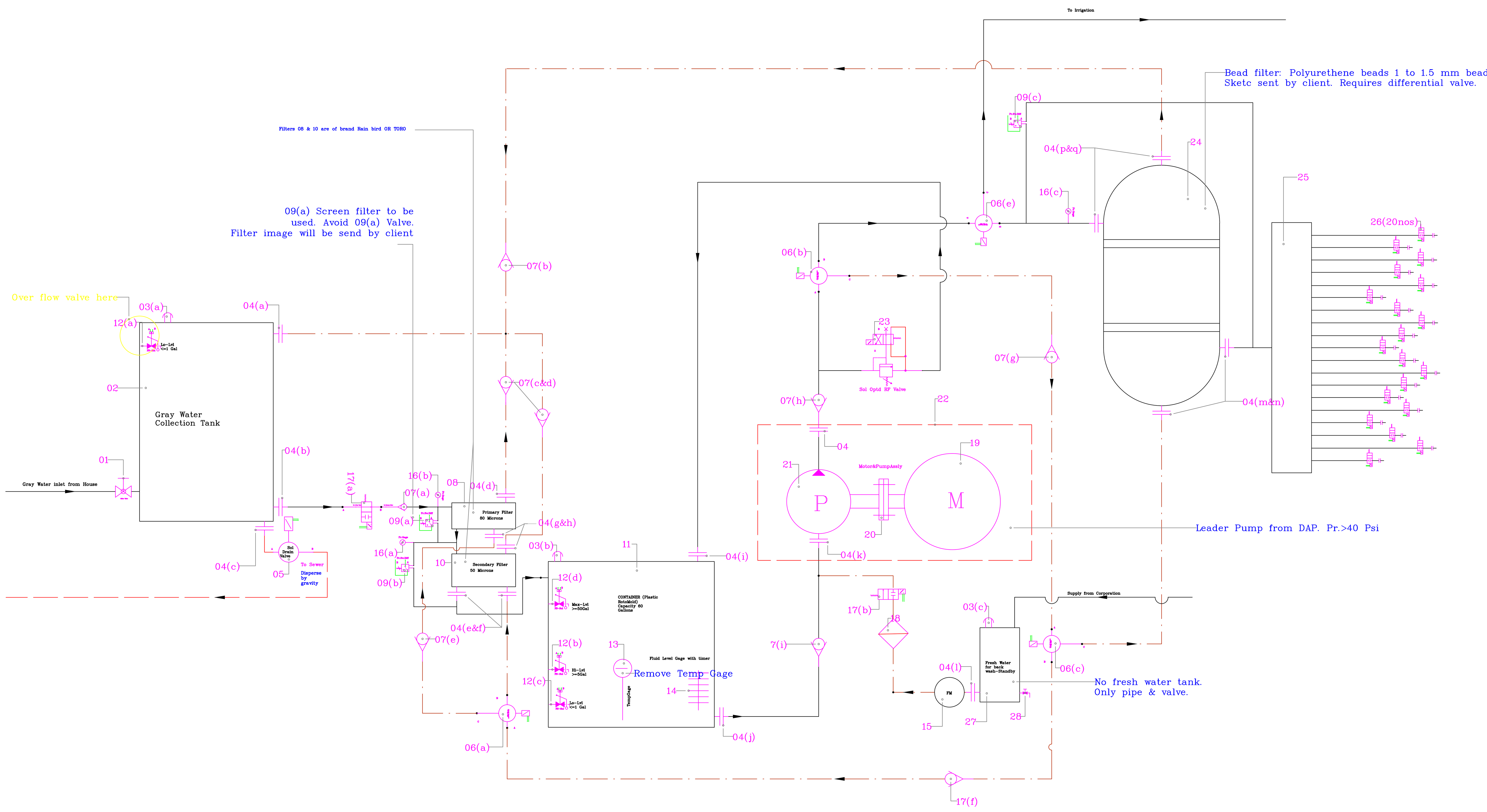
PROJECTION | SCALE : -- | MATERIAL: --

Schematic – Coffee making M/C

DATE:– 16–11–12 | DRG.NO:– CFE–01
PAGE:– 01 of 01 | PART NO. ––



SPRAY PAINT– SCHEMATIC



Major Parts List & brief functions of each parts:–

01:– Globe valve Qty=01 Water enters the gray storage tank. The valve can be shut off manually/electrically
02:– Gray water Tank Qty=01, This storage tank is necessary to store the water entering from washing machine, showers & hand wash at different time and from different locations. This tank is not in the specification, but necessary to be installed.
03(a) to 3(c) :– These are breathers & mounted on the tanks & functions as a air vent. It avoids the air locks. Qty=03
04 (a) to (q) These are connectors between two parts. These are threaded connections or flanged connection with proper sealing. Qty=18 to 20
05:– Solenoid Drain Valve: This valve is fitted to the drain line of the gray water storage tank. Whenever you want to drain the gray water from storage tank it can be done by operating the solenoid remotely. Qty=01
06 (a) to (e) : Qty=05. These are 3 – way solenoid operated valves controlled remotely. These valve are used in the main line & back wash lines to connect the required lines as per the signal received either indication filter clogging, level of water in the Container tank etc:–
07 (a) to (i) Qty=09: These valves are non return valves & allow the water to flow in forward direction only. These are fitted in places where there is a possibility of reverse flow, but we do not want it to happen.
08:– Primary filter of 80 microns. This is the primary filter in the line to filter the gray water before it enters the system. The capacity is around 40 GPI , i.e. four time the maximum flow is considered. This is purchase item.
09(a) & (c):–Qty=03 These are differential pressure indicators. The pressure difference between inlet at filters & outlet of filters is measured. If the pressure is more than the desired, it indicates that the filter is clogged & filter required to back washed. Thus signals sent to remote control to run back wash system.
10:– Secondary filter of 50 microns. Water enters from primary filter for further filtration. This is a purchase item.
11:– This is the container tank where filtered water from 80 M & 50 M are stored here. The tank is fabricated PVC tank, manufactured by rotomold.
12(a) to 12(d):–Qty=04. These are an electrical float switches. These give indications of Hi level of water, low level of water & Max level of water in the container and gray water storage tank . When the level reaches 5 Gal then water is fed to bead filter & then to surrounding land scope / irrigation. when level reaches Max, supply will be from storage is stopped.
13:– Temperature gage measures the temperature of the water in the container.
14:– Fluid level gage installed in the container tank to measure the fluid level, besides it also times out how many hours the fluid is at the constant level. This is an electronic gage & signal is proportional fluid level in the tank. In case the level is constant for 24 hours it sends signal to main control to perform the function as enumerated in the specification.
15: flow meter:– This is a purchase item. It measures the amount of water used to back wash from external source. This is once again electronic meter & measured the total flow fed to the system from the system in Gallons. This is as required in the specification.
16. Pressure gage: Qty=03. This indicates the pressure of the water before entering the filter.
17(a) & 17(b).Qty=02 Two way solenoid valves. These valve is placed in between lines. It is normally closed or open depending on the requirement.
18: Suction strainer. This avoids any durt in fresh water that replenished from the fresh water tank.
19: Electrimotor. This drives the pump. The HP would be calculated, adequate enough to drive the pump at the maximum flow.
20: Mechanical coupling: this connects the electric motor & pump .
21: Water pump: it pumps the clean water to land scape & turf. It capacity would be adequate enough .
22: Motor Base plate: To mount the pump & Motor.
23:– Solenoid operated pressure relief valve. This is a safety valve for the pump. In the event of pressure exceeds, It diverts the water back to container tank & thus maintains constant pressure in the system.
24: Bead Filter. Water will pass through this filter before sent to landscape/ turf. This is a bought items.
25:– Distributor This block distributes water to various zones.
26:– Two way solenoid valve. This valve is normally There would be one valve for each zone. These valves are operated remotely to supply water to any required zone
27: Fresh water tank where fresh water is stored as stand by for back washing.
29: Drain valve to empty the fresh water tank when required.
NOTE: Besides there are many valve blocks ,pipes & fittings. The detail list would be available in the final stage as bill of material.

Initial conditions of input signal:–
A+B = connected = ON =1
A+C = connected = ON =1
A–B = Not connected = OFF = 0
When A+B=1, A–C = 0
When A+C =1, A–B =0
Initial :–
Valve 05 = 0
Valve 17(a) =0
Valve 17(b) = 0
Valve 09(a), 09(b) & 09(c) = 0
Valve 09(b) =0
Valve 12(a), 12(b),12(c) & 12(d) =0
Valve 06(a), 06(b) & 06(c) A+B =1 A–C =0
Motor Push button = 1 (ON)
Valve 26 All =0

OUTPUT → / INPUT ↓	MOTOR	05	17(a)	17(b)	23	06(b)	06(c)	06(a)	Alarm	Timer	06(e)	Description
Push button Depressed (Motor)	ON	0	0	0	0	A+B=1	A+B=1	A+B=1	0	0	A+B=1	Motor Starts & pump is ON As per schematic shown.
12(a) = 1	ON	1	0	0	0	A+B=1	A+B=1	A+B=1	0	0	A+B=1	Gray Water Tank full. Water to Sewer.
For Maintenance 17(a) PB depressed	OFF	0	1	0	1	A+B=1	A+B=1	A+B=1	0	0	A+B=1	System shut of for maintenance
09(a) = 1 .AND. 12(b)=1	ON	0	1	0	0	A–B=0 A+C=1	A+B=1	A–B=0 A+C=1	0	0	A+B=1	Primary filter clogged. Water available in container (11). Back wash primary filter
09(a) = 1 .AND. 12(b)=0	ON	0	1	1	0	A–B=0 A+C=1	A+B=1	A–B=0 A+C=1	0	0	A+B=1	Primary filter clogged. Water not available in container (11). Back wash primary filter fro fresh water from 27
09(b) = 1 .AND. 12(b)=1	ON	0	1	0	0	A–B=0 A+C=1	A+B=1	A+B=1	0	0	A+B=1	Secondary filter clogged. Water available in container (11). Back wash Secondary filter
09(b) = 1 .AND.12(b)=0	ON	0	1	1	0	A–B=0 A+C=1	A+B=1	A+B=1	0	0	A+B=1	Secondary filter clogged. Water not available not in container (11). Back wash secondary filter from fresh water from 27
09(c) = 1 .AND.12(b)=1	ON	0	1	0	0	A–B=0 A+C=1	A–B=0 A+C=1	A–B=0 OR A+C=1	0	0	A+B=1	Bead filter clogged. Water available in container (11). Back wash Bead filter
09(c) = 1 .AND. 12(b)=0	ON	0	1	1	0	A–B=0 A+C=1	A–B=0 A+C=1	A–B=0 OR A+C=1	0	0	A+B=1	Bead filter clogged. Water not available not in container (11). Back wash Bead filter from fresh water from 27
12(c)=0	OFF	0	0	0	0	A+B=1	A+B=1	A+B=1	1	0	A+B=1	No water in the container(11) to feed. system stopped to avoid damage to pump & alarm ON
12(d)=1	ON	0	1	0	0	A+B=1	A+B=1	A+B=1	0	0	A+B=1	Container 11, full. supply from storage tank cut off.
14=1 Change in Level < 0.1mm/0 mm in 10 minutes	ON	0	1	0	0	A+B=1	A+B=1	A+B=1	0	1	A+B=1	Container 11, full. supply from storage tank cut off.
If Time >24 Hours, Deemed level constant.	ON	0	1	0	0	A+B=1	A+B=1	A+B=1	0	1	A+C=1	Water level in container is constant. Water sent to irrigation.
26=1	ON	0	0	0	0	A+B=1	A+B=1	A+B=1	0	0	A+B=1	Water is dispersed to any or all zones.

Signals:–

1)
i) Input Signal Storage tank full –12(a) – Float valve
ii) Out put signal– solenoid drain valve 05, of storage tank energized?to open the valve to Sewer.
Inference: controls the flow of gray water in to the storage tank.
2)
i) Input signal: Valve 17(a) – Normally open.
ii) Output signal: At the time of maintenance or emergency Valve is closed.
Solenoid valve is energized to to but off water supply to upstream. A push button is provided to energies the solenoid.
3)
i) Input signal: Pr.Switch. Differential 09(a). When 80 micron filter is clogged, differential pressure raised. Switch makes contact. This signal sent to remote controller.
ii) Out put signal:
ii(a) If water level in the container (11), > 5 Gal [12(b) is NC] , 3–Way valve 06(b) & 06(a) energized, divert water to Back wash primary tank.
11(b) If water level in the container (11) < 5 Gal [12 (b) is NO] AND 17(b) energized, 3–Way valves 06(a) & 06(b), divert water to back wash primary tank
opening fresh water tank to back wash.
4) Input signal: Pr.Switch. Differential 09(b). When 50 micron filter is clogged, differential pressure raised, switch makes contact. This signal sent to remote controller.
ii) Out put signal
ii(a) If water level in the container (11), > 5 Gal [12(b) is NC] , 3–Way valve 06(b) energised water to back wash secondary filter.
ii(b) If water level in the container (11), < 5 Gal [12(b) is NC] AND 17(b) energized to open water from fresh water tank , 3–Way valve 06(b) energized to divert water to back wash secondary filter.

5) Input signal: Pr.Switch. Differential 09(c). When bead filter(24) is clogged, differential pressure raised, switch makes contact. This signal sent to remote controller.
ii) Out put signal
ii(a) If water level in the container (11), > 5 Gal [12(b) is NC] , 3–Way valve 06(b) AND 3–way valve 06(c) energized. to back wash bead filter..
ii(b) If water level in the container (11), < 5 Gal [12(b) is NC] AND 17(b) energized to open water from fresh water tank , 3–Way valve 06(b) AND 3–way valve 06(c) energized to divert water to back wash bead filter.

6) Input Signal If Water level in container 11 <1 Gal, Float switch 12(c) is NO.
ii) Out put signal Motor Stops This is required from the point of safety of Motor & Gives an audio alarm.
7) Input Signal : If water in container 11 is full , Float switch 12(d) is NC,
Out put : 17(a) energized to avoid over flow in the container tank (11).

8) Input signal Level indicator . Change in level < 0.1 Gal , Timer ON If time > 24 hours,

Out put : Water to irrigation. Valve 06(e) actuates

WATER CYCLE –Design Concept

BOLS: