

- Temp Sensors:
- 1 Collector
 - 2 T1 bottom
 - 3 Toilet
 - 4 Tinet
 - 5 T2 bottom
 - 7
- Flanges with valves are used
- Controls if warm or hot water is used
- Hot water circulation pump externally controlled by X10

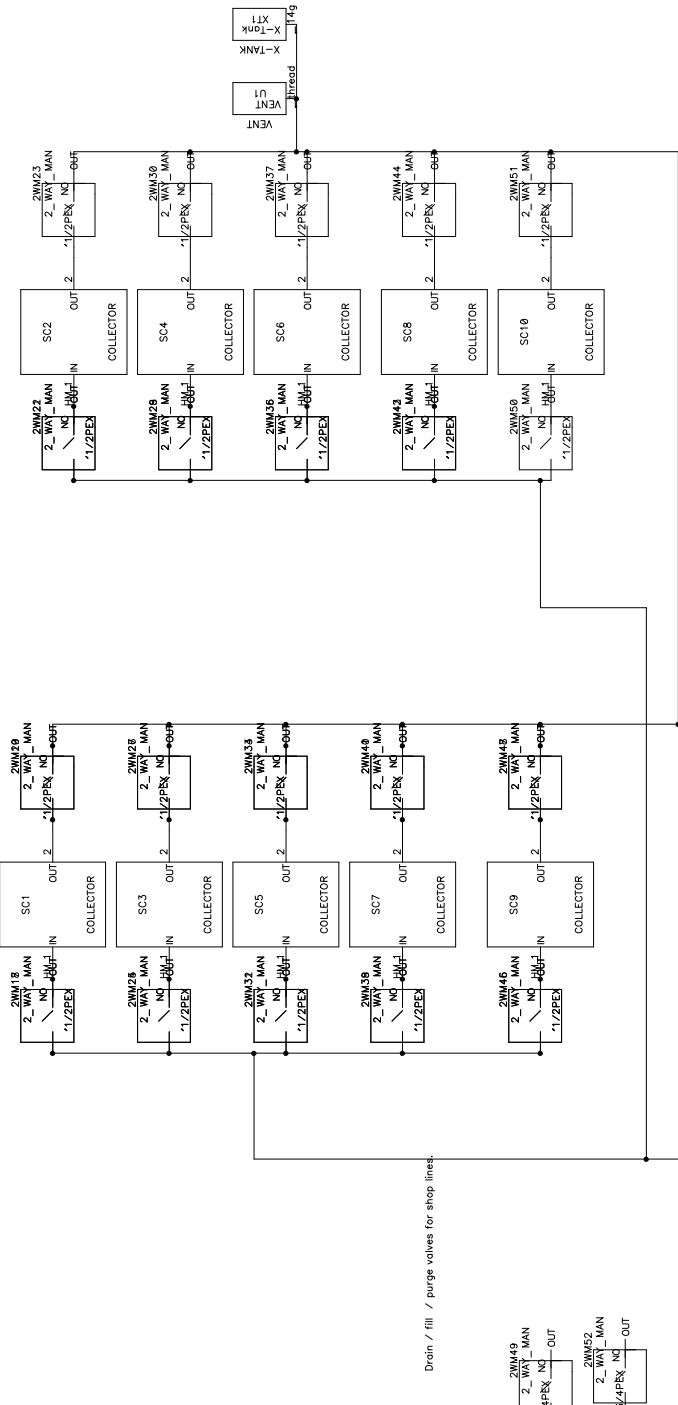
- Outputs
- Store, Output, Desc
- 1 Hot water dump 2w1 -> SS relay -> 24vac
 - 2 2 Stage 1 Solar Enable / Solar Bypass -> 12v SPDT relay
 - 3 3 Solar Parallel Output Enable (Runs Solar only with Furnace) -> SS relay -> 24vac
 - 4 House Tank Glycol Bypass -> SS relay -> 24vac
 - 5 P2 main pump -> SS relay -> 120vac
 - 6 Shop Pump backup -> SS relay -> 120vac
 - 7
 - 8
 - 9 PWM Water Pump P3 12v PWM

- Inputs
- 1 P3 flow
 - 2 AC input
 - 3 frq: collector flow sensor

Title			
Solar System and Controls			
Size	Number	{Drawing Number}	Rev
C			{Revision}
Date	1-29-19	Drawn by	{Drawn By}
Filename	20180130_solar_plumbing_and_electrical	Sheet	1 of 4

Brass T's for PEX to collectors

FIT7	1/2x1/2x1/2 PEX	FIT9	3/4x3/4x1/2 PEX
FIT10	1/2x1/2x1/2 PEX	FIT12	3/4x3/4x1/2 PEX
FIT13	3/4x3/4x1/2 PEX	FIT14	1/2x1/2x1/2 PEX
FIT15	1/2x1/2x1/2 PEX	FIT16	1/2x1/2x1/2 PEX
FIT17	1/2x1/2x1/2 PEX	FIT18	1/2x1/2x1/2 PEX
FIT19	3/4x3/4x1/2 PEX	FIT20	1/2x1/2x1/2 PEX
FIT21	1/2x1/2x1/2 PEX	FIT22	1/2x1/2x1/2 PEX
FIT23	3/4x3/4x1/2 PEX	FIT24	1/2x1/2x1/2 PEX
FIT25	3/4x3/4x1/2 PEX	FIT26	1/2x1/2x1/2 PEX
FIT27	3/4x3/4x1/2 PEX	FIT28	1/2x1/2x1/2 PEX
FIT29	1/2x1/2x1/2 PEX	FIT30	1/2x1/2x1/2 PEX
FIT31	3/4x3/4x1/2 PEX	FIT32	1/2x1/2x1/2 PEX



Bottom fittings for collectors

FIT33	PEXCpl1/2	FIT34	PEXCpl1/2	FIT35	PEXCpl1/2	FIT36	PEXCpl1/2
FIT37	PEXCpl1/2	FIT38	PEXCpl1/2	FIT39	PEXCpl1/2	FIT40	PEXCpl1/2
FIT41	PEXCpl1/2	FIT42	PEXCpl1/2	FIT43	PEXCpl1/2	FIT44	PEXCpl1/2
FIT45	PEXCpl1/2	FIT46	PEXCpl1/2	FIT47	PEXCpl1/2	FIT48	PEXCpl1/2
FIT49	PEXCpl1/2	FIT50	PEXCpl1/2	FIT51	PEXCpl1/2	FIT52	PEXCpl1/2
FIT53	PEXCpl1/2	FIT54	PEXCpl1/2	FIT55	PEXCpl1/2	FIT56	PEXCpl1/2
FIT57	PEXCpl1/2	FIT58	PEXCpl1/2	FIT59	PEXCpl1/2	FIT60	PEXCpl1/2
FIT61	PEXCpl1/2	FIT62	PEXCpl1/2	FIT63	PEXCpl1/2	FIT64	PEXCpl1/2
FIT65	PEXCpl1/2	FIT66	PEXCpl1/2	FIT67	PEXCpl1/2	FIT68	PEXCpl1/2
FIT69	PEXCpl1/2	FIT70	PEXCpl1/2	FIT71	PEXCpl1/2	FIT72	PEXCpl1/2
FIT73	PEXCpl1/2	FIT74	PEXCpl1/2	FIT75	PEXCpl1/2	FIT76	PEXCpl1/2
FIT77	PEXCpl1/2	FIT78	PEXCpl1/2	FIT79	PEXCpl1/2	FIT80	PEXCpl1/2

Top fittings for collectors

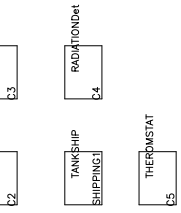
The collectors will use PEX to connect them to the system.
 A 1/2" PEX will be used for the collector.
 Each collector will have shut off valves for in and out. It is not advised to close both unless relief is provided!!

Expansion tanks in basement will have a 30 PSI air compressor connected to them.
 This will fill tanks to push water into lines.
 Second expansion tank array in shop to store nitrogen / ?? to fill lines when empty.

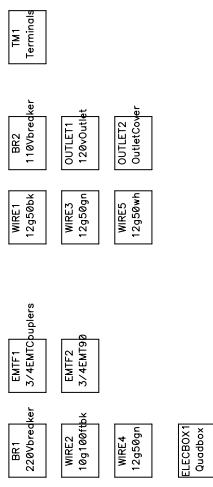
Drain / fill / purge valves for shop lines.

Solar System and Controls

Size	Number	Rev
C	{Drawing Number}	{Revision}
Date	1-29-19	Drawn by {Drawn By}
Filename	20180130_solar_plumbing_and_electrical	Sheet 2 of 4



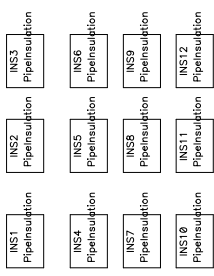
Electrical



24 VAC transformers for zone valves.

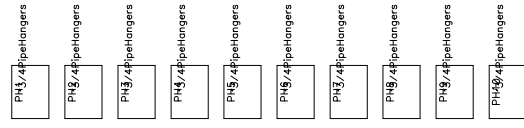
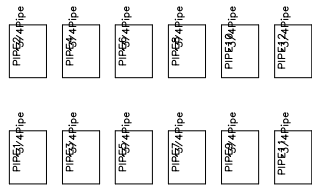


Pipe Insulation

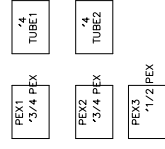


Copper Pipe. Each is 10 feet

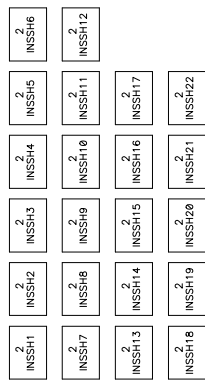
Shop panel piping



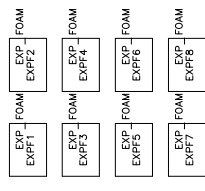
PEX tube and corrugated tubing



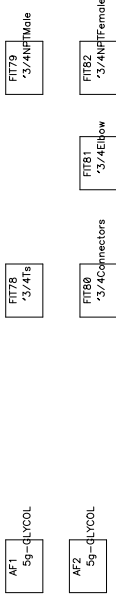
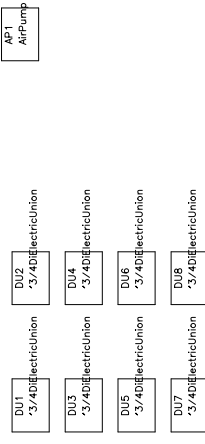
Insulation for PEX tubing



Expanding foam for assembling insulation



HX1,HX2: x 4 ea

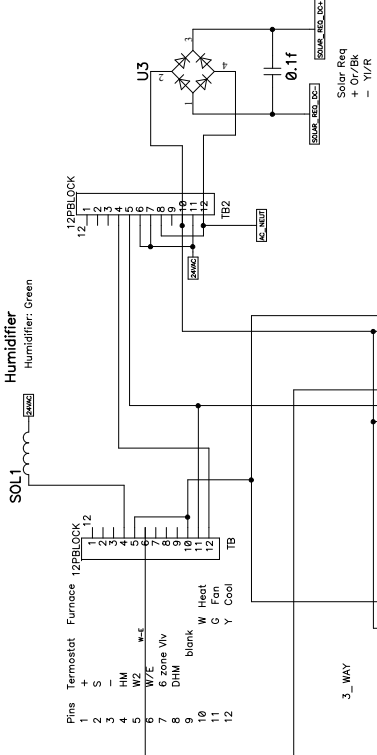


Title		Solar System and Controls	
Size	Number	Rev	Rev
C	{Drawing Number}		{Revision}
Date	1-2010	Drawn by	{Drawn By}
Filename	20100130_solar_plumbing_and_electrical	Sheet	3 of 4

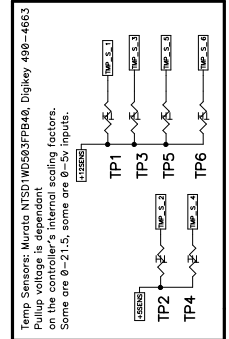
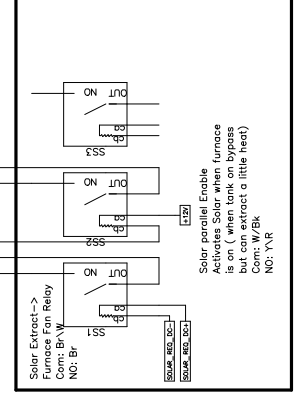
Thermostat: White-Rogers 1F95-1291
 7 day 4/2 stage heat pump multi fuel
 touchscreen
 Humidifier
 Humidity

Pins Termostat Furnace Other
 1 OVB
 2 L
 3 YZ
 4 Y
 5 G
 6 Rc
 7 Rh
 8 C
 9 C
 10
 11 24 AC R/Rc/Rh
 12 Common C

Furnace required to command full blower when W terminal has power. Furnace will not activate if heat is commanded but the HX is not up to temp yet.



Stage 1: If OFF, commands solar heat extract.
 Stage 2: If relay ON commands solar heat extract.
 Relay UIC: B/L, G/Y
 Common: Bk
 NO: Y/R
 NC: Y/R

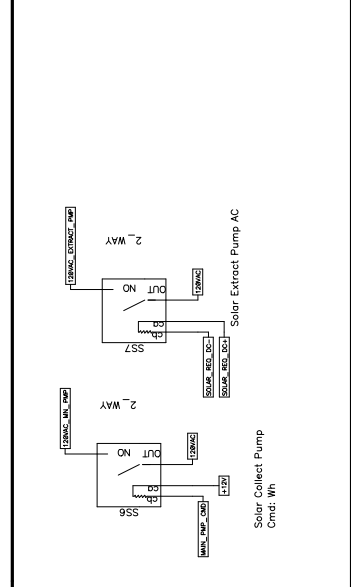
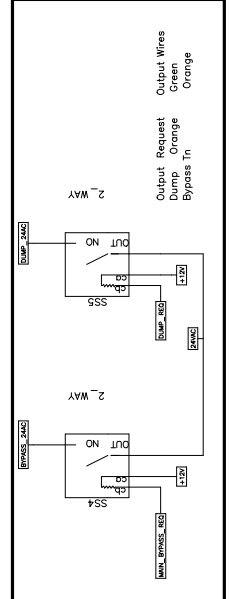
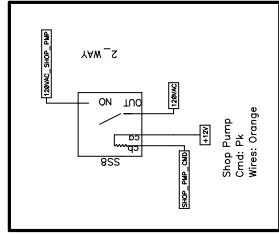


Temp Sensors:

Number	Location	Wire	Colors	To Controller
1	Y/R			
2	Hot Water Tk	Orange	Wh/Bk	
3	Hot In	Green	Or/Bk	
4	Hot Cold Out	Brown	Pk/Wh	
5	Hot Tank	Orange	Pk/Bk	
6	Outside Air	?	W/R	

Resistors are necessary to properly bias the thermistors.

R7 5.6k
 R9 3.3k
 R8 3.3k
 R5 3.3k
 R4 5.6k



Title		Solar System and Controls	
Size	C	Number	{Drawing Number}
Date	1-2919	Drawn by	{Drawn By}
Filename	20180130_solar_plumbing_and_electrical	Sheet	4 of 4