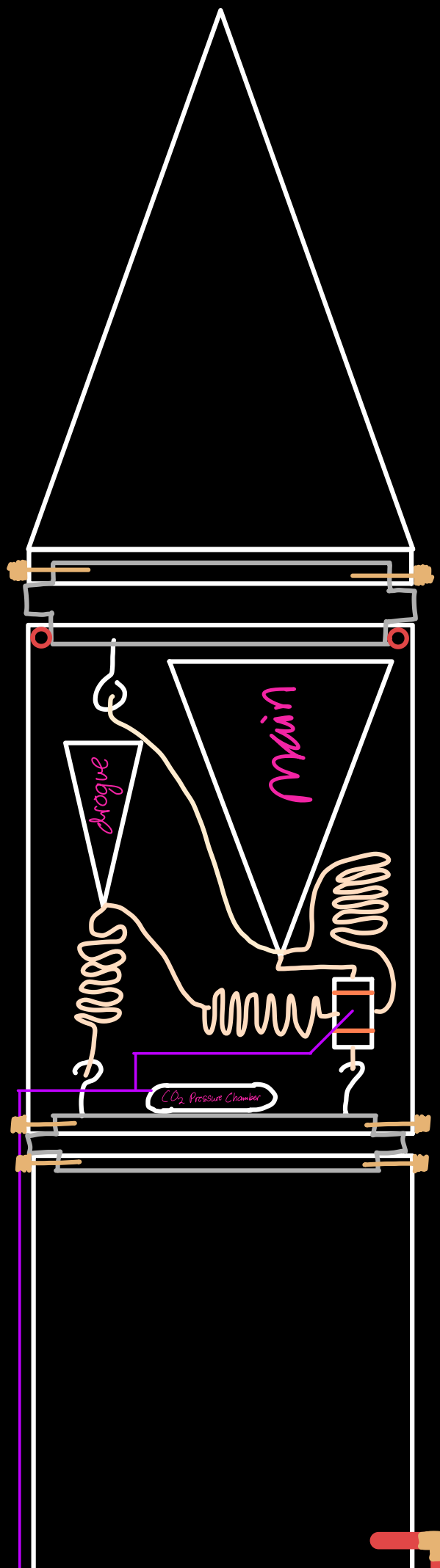
Arjan Reyes

Cpss 25-26 pump fed liquid rocket - Kamasi

Sketch #1 25/05/29



legend:

Fuel - Ethanol

Oxidizer - NO_2

← need some sort of vent, so pump doesn't make a vacuum

tanks

← copper compression fitting
- halfcat uses some kinda other fitting

idrk how bulk heads work for the self made tanks :\

TOM

Battery

Wait, don't want 90°s actually...

don't know if motor should be vert or horz :\. For now will just go with vertical for rall stabe...

Solenoid Ball Valve

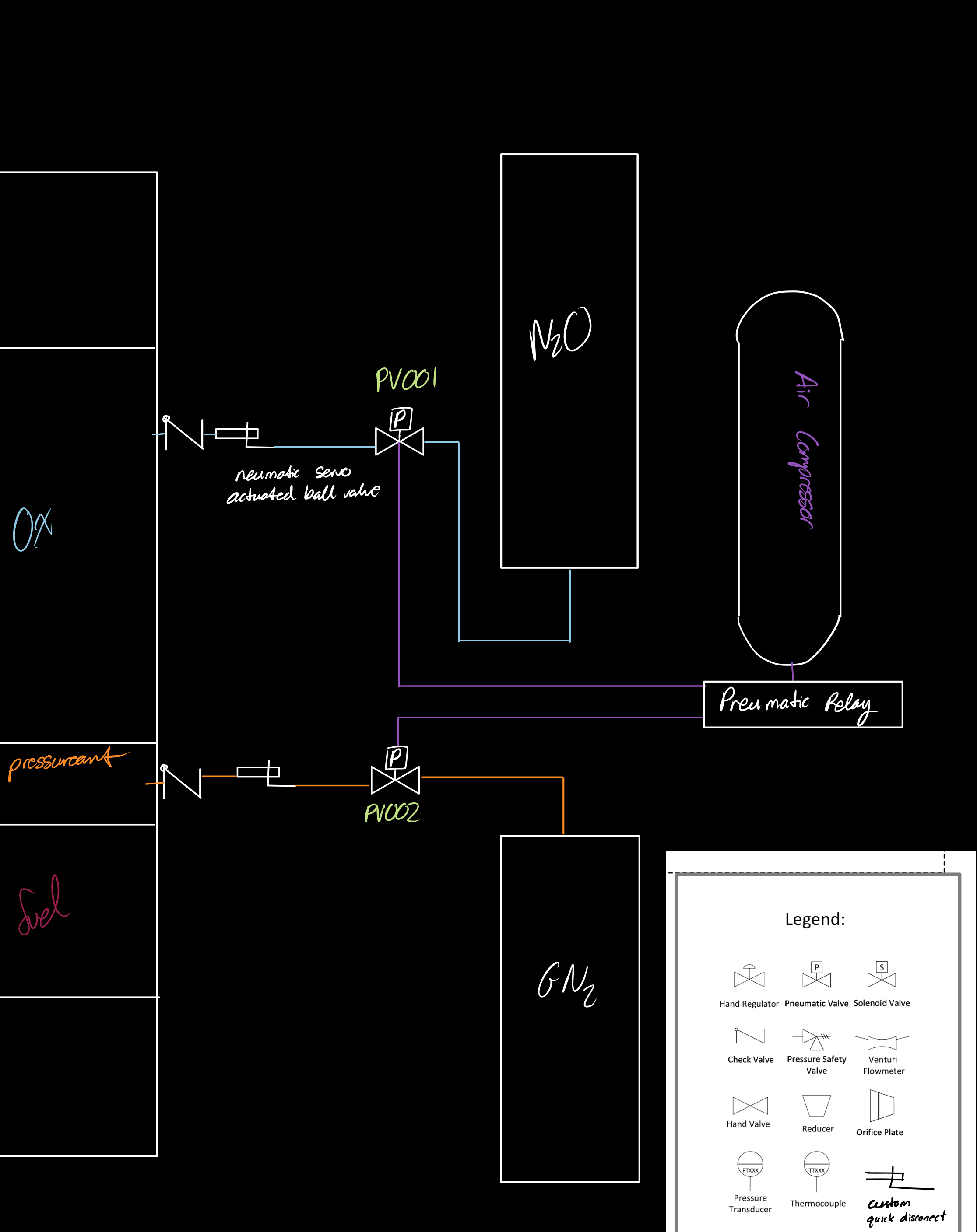
Solenoid Ball Valve

motor controller

Solid Igniter

injector

4 fins!
- geometry not final


N2O
Air Compressor
PV001
P
neumatic servo
actuated ball valve
Ox
Pneumatic Relay
pressurant
P
PV002
Fuel
GN2
Legend:
Hand Regulator
Pneumatic Valve
Solenoid Valve
Check Valve
Pressure Safety Valve
Venturi Flowmeter
Hand Valve
Reducer
Orifice Plate
PTXXX
Pressure Transducer
TTXXX
Thermocouple
custom quick disconect
Oxidizer Line
Fuel Line
Pressurant Line
Pneumatic Line

Flow coeff.

$$C_V = Q\sqrt{\frac{SG}{\Delta P}}$$

want to find a C_V such that for given $\dot{m}$ it works.

- Find C_V minimum for flow, value must be higher

$$Q = \frac{\dot{m}}{\rho}$$

$\Delta P = 1$ psi across valve

$SG_{N2O} = 1.226$

$SG_{water} = 1.0$

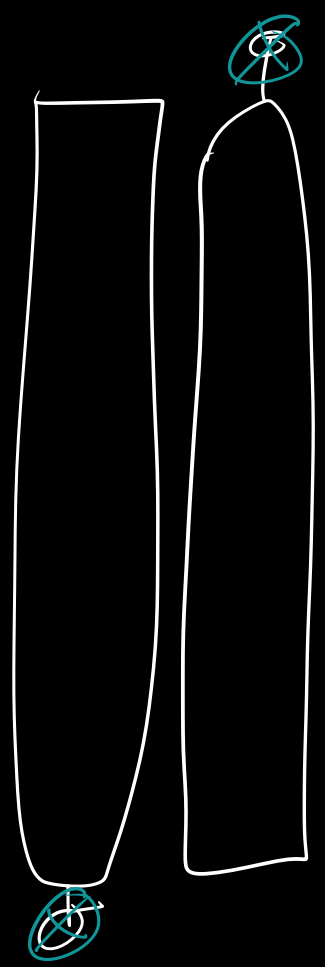
$$C_{V_{min}} = \frac{\dot{m}}{\rho}\sqrt{\frac{1.226}{}} \qquad \frac{gallons}{min}$$

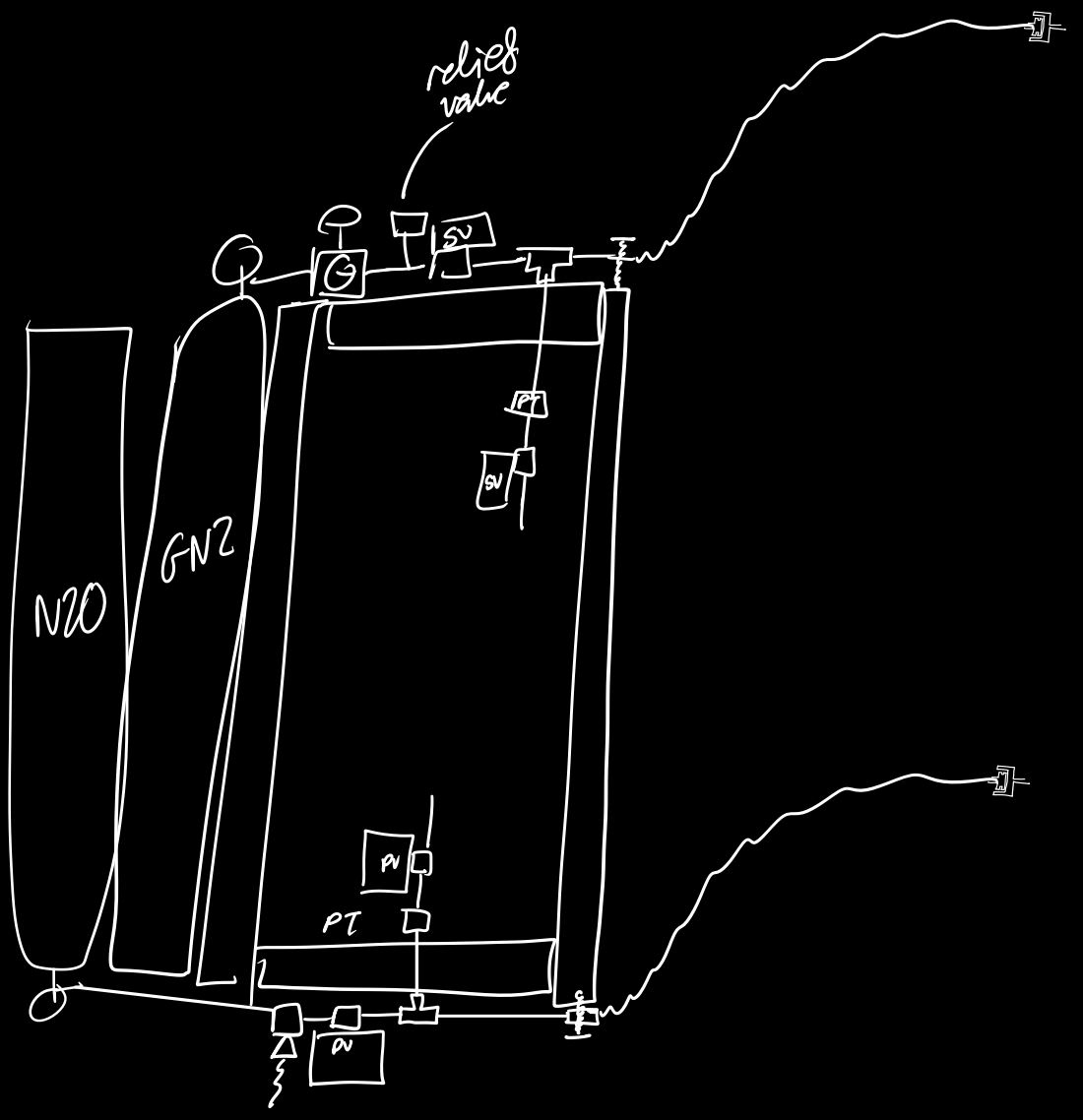
$$C_{V_{min}} = \frac{0.6}{1230}\left[\frac{m^3}{s}\right]\sqrt{\frac{1.226}{1}}$$

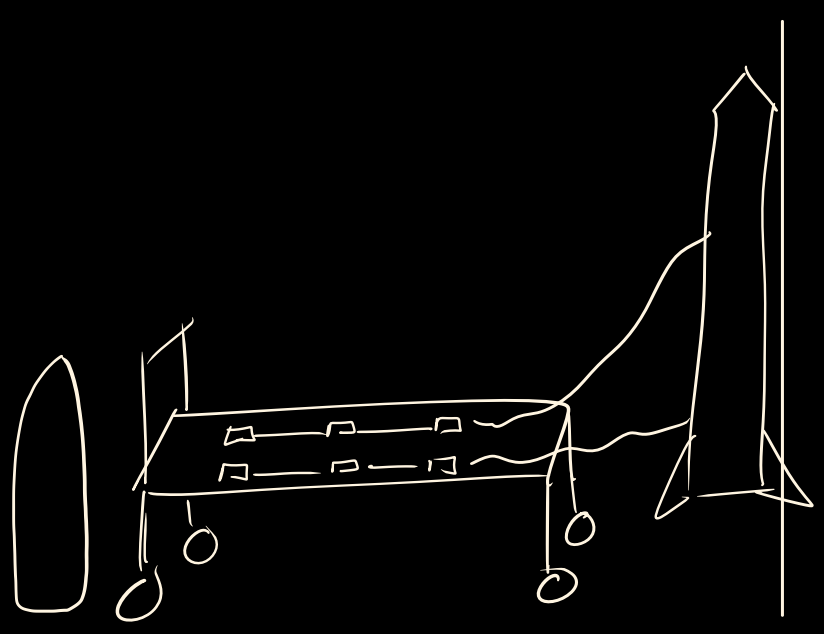
$$= .000540\left[\frac{m^3}{s}\right] \cdot 15850.32 \ \frac{GPM}{m^3/s}$$

$$= \underline{8.559 \ GPM \ minimum}$$

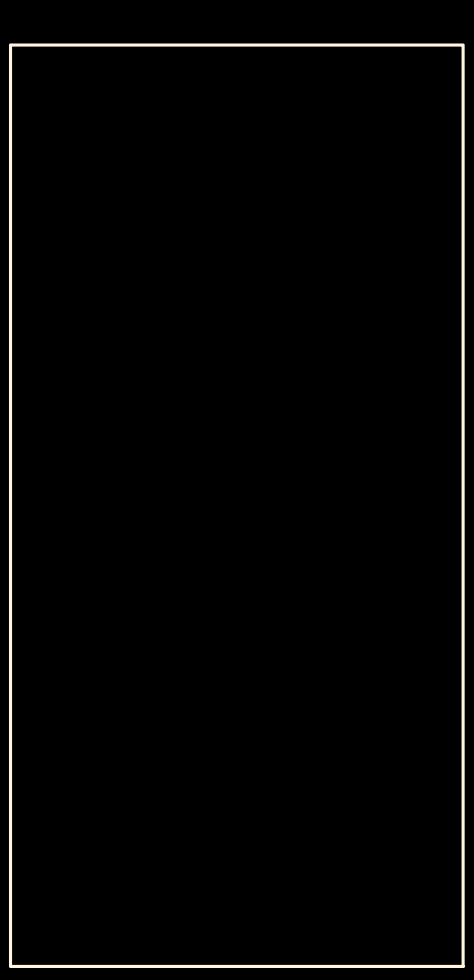
Tk, for filling want largest flow rate possible

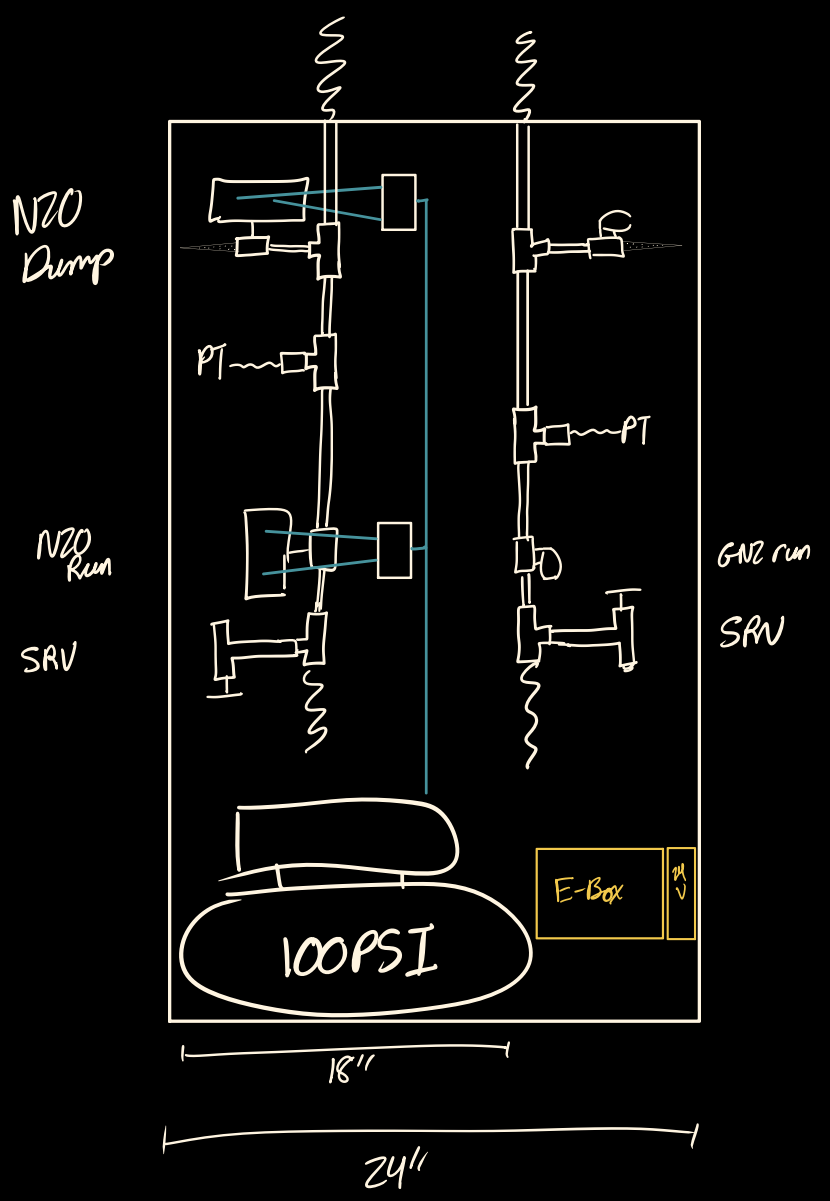



relief valve
SV
PT
SV
N2O
GN2
PT
PV
PT
PV

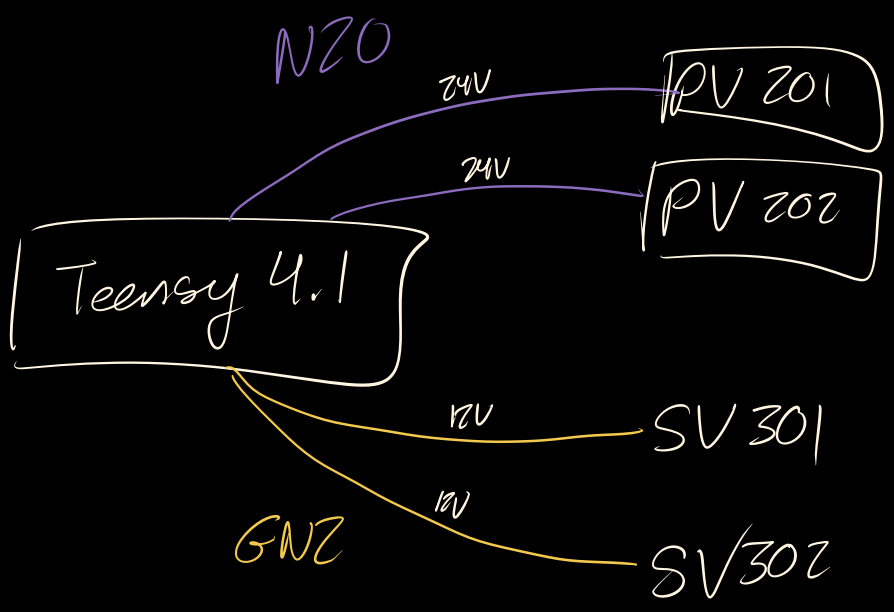


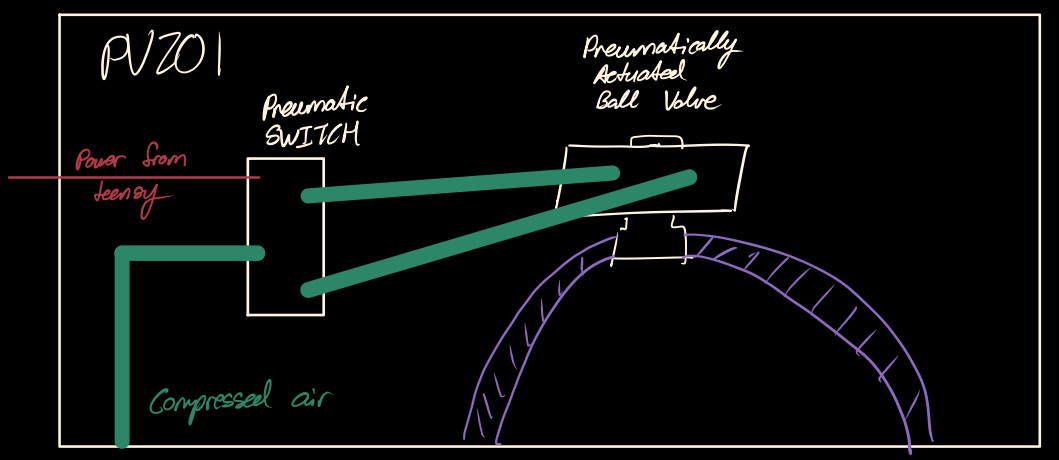

minimum dist



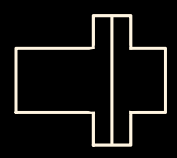

N2O Dump
PT
N2O Run
SRV
PT
GN2 run
SRV
E-Box
100PSI
18"
24"

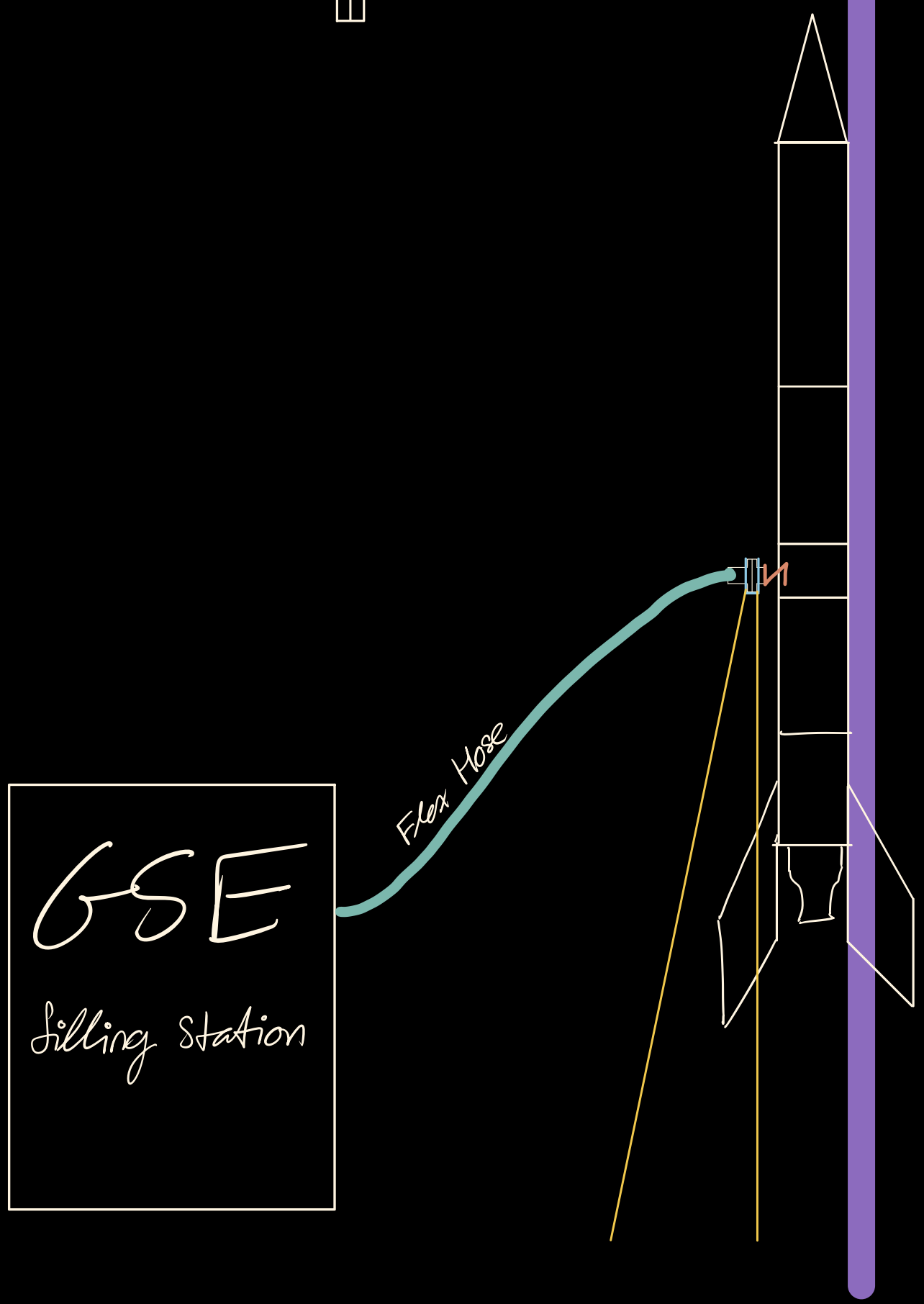
Electronics:

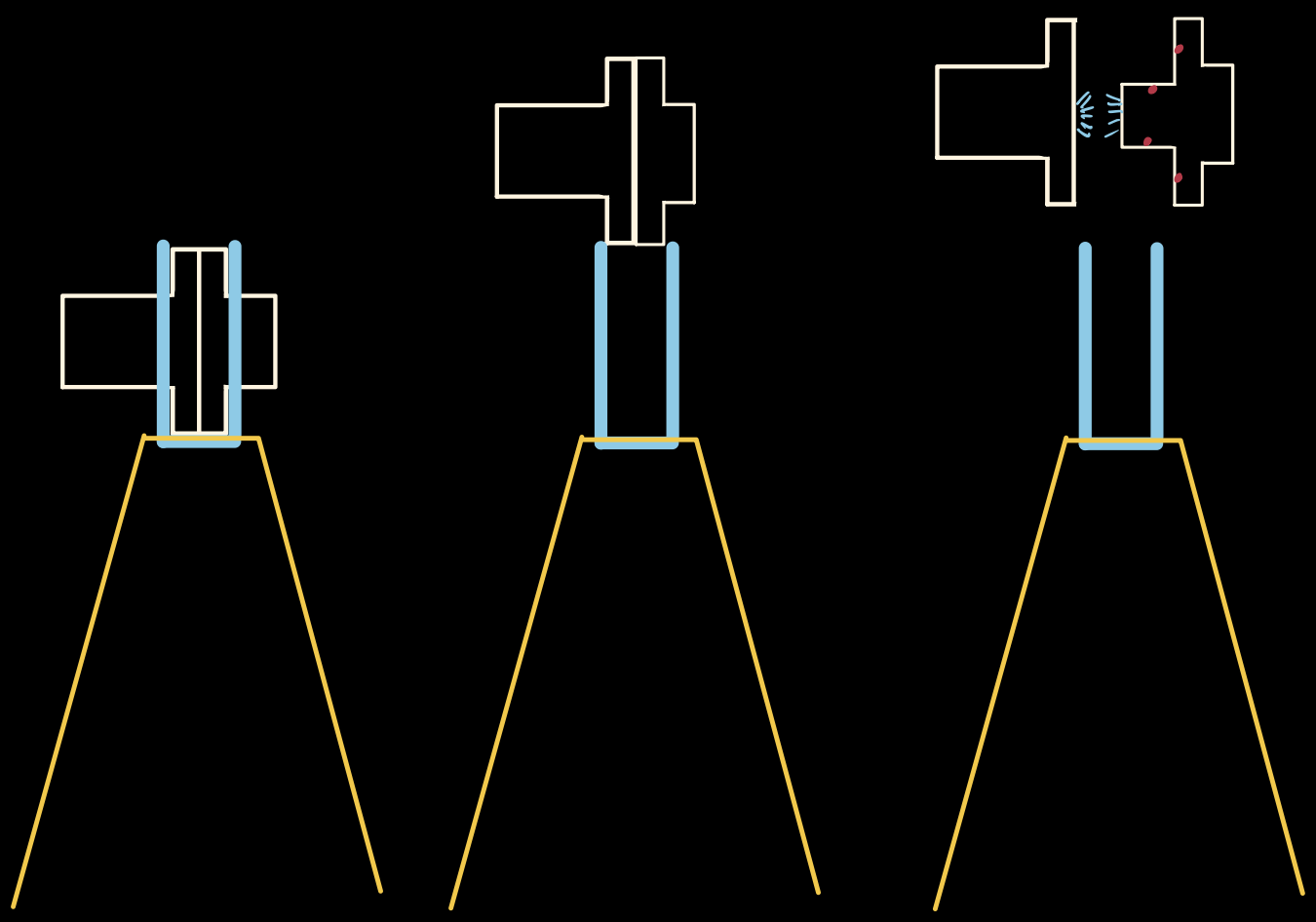




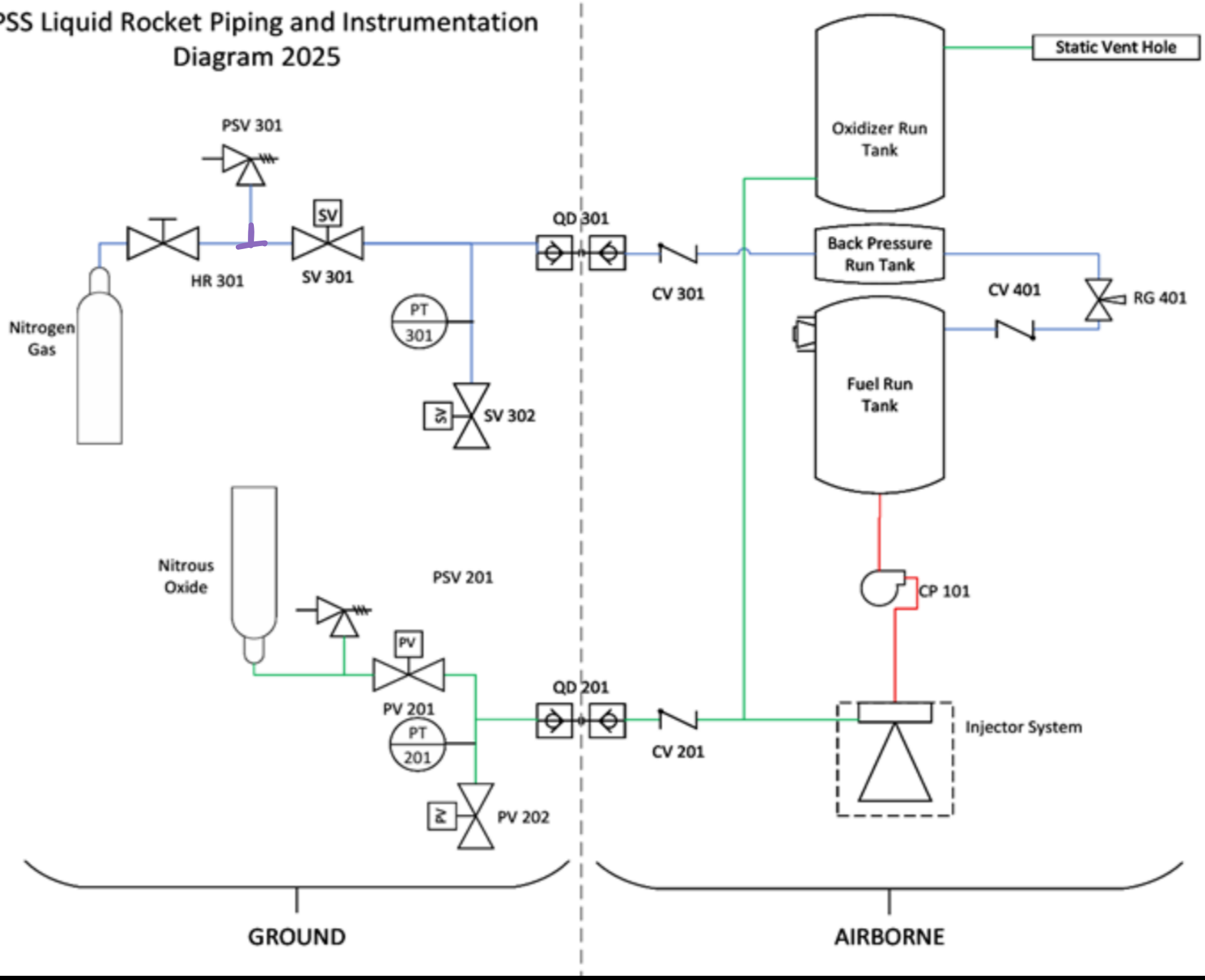
Quick Disconnect:



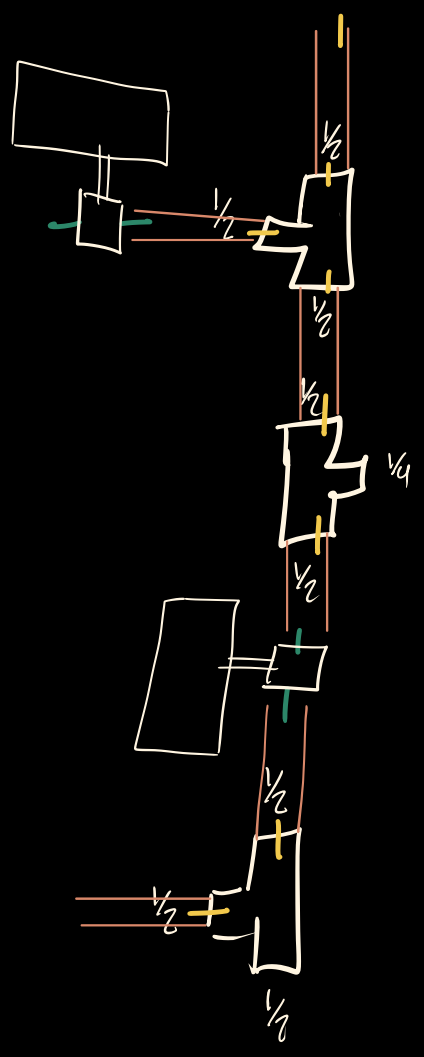




CPSS Liquid Rocket Piping and Instrumentation Diagram 2025



- ½ Flare ↔ ½" NPT
- ½ Flare ↔ ¼" NPT



3× ½" NPT Tees

1× Female ¼ to Male ½ NPT

8× Flare to ½" NPT male

4× ½" Flare to ¼" NPT

3× ½" NPT Tees

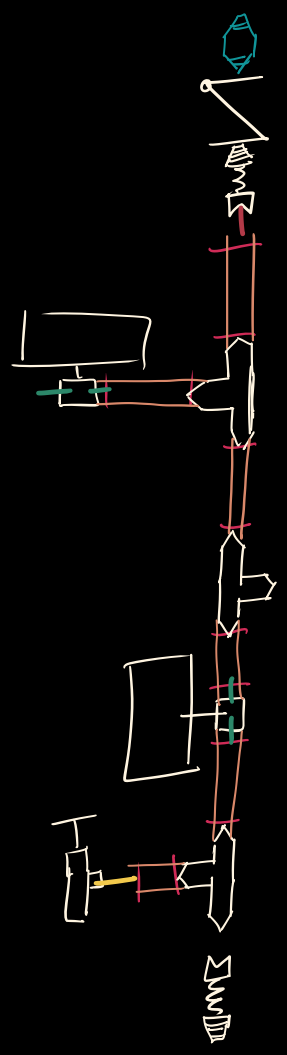
1× Female ¼ to Male ½ NPT

12× Flare to ½" NPT male

6× M-M ½" NPT ↔ ½" NPT

4× F-F ½" NPT 4' flex hoses

- ½ Flare ↔ ½" NPT
- ½ Flare ↔ ¼" NPT
- ½" flare M–M



2x F ½" flare to ½" NPT flex hose
1x red
4 green
1 x yellow
1x ½" NPT ↔ ½" NPT
M M
2x MMM Tees
1x MM NPT Tee
1x F ½ NPT – F ¼" NPT

2x F ½" Flare ↔ M ½ NPT flex hose
5x yellow
1 red
1x ½" NPT ↔ ½" NPT
M M
2x MMM Tees
1x MM NPT Tee
1x F ½ NPT – F ¼" NPT

4x Flex hose
2x red
4 green
6 yellow
2 ½" NPT M–M
4x MMM Flare Tees
2x MM Flare M NPT tee
2x F ½ NPT ↔ F ¼" NPT

Round 2:

½ F → ⅛th F NPT

Flare Flare Fem NPT