

N F P A

# ***Fluid Power***

## **VEHICLE**

# ***Challenge***



NFPA  
Education and  
Technology  
Foundation

**FINAL PRESENTATION & DESIGN REVIEW**  
**FAMU–FSU College of Engineering**  
**TEAM ADVISOR: Shayne McConomy**  
**4/24/2025**



**FAMU-FSU**  
**Engineering**

# Team FSU Introduction



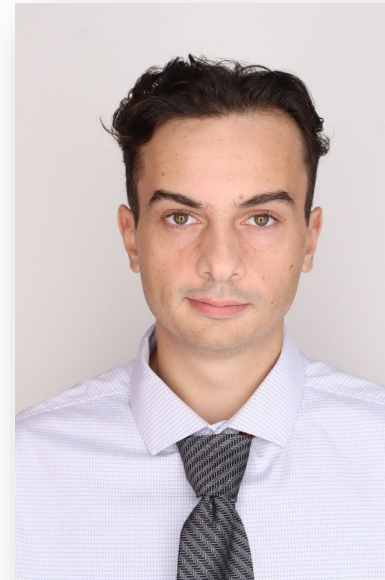
Adonay Almanza-  
Enriquez  
*Controls Engineer*



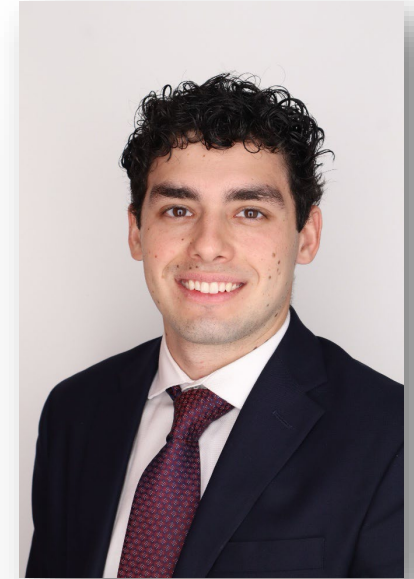
Trace Flowers  
*Modeling & Simulation  
Engineer*



Daniel Garmendia  
*Quality Engineer*



Ethan Mercado  
*Systems Engineer*



Gabriel Vazquez  
*Design Engineer*

# Sponsors and Advisors



Hakeem Rhodes  
*Dow Sponsor*



Marcus Rideaux  
*Dow Sponsor*



Dr. Mohd Yousuf Ali  
*FAMU-FSU College of  
Engineering Advisor*



Dr. Shayne McConomy  
*FAMU-FSU College of  
Engineering Advisor*

# Competition Mentors



Cory Fisher  
*Sun Hydraulics*



Dean Eberhardt  
*IFP Motion Solutions*





# Prototype





# Vehicle Construction





# Vehicle Construction: Reservoir





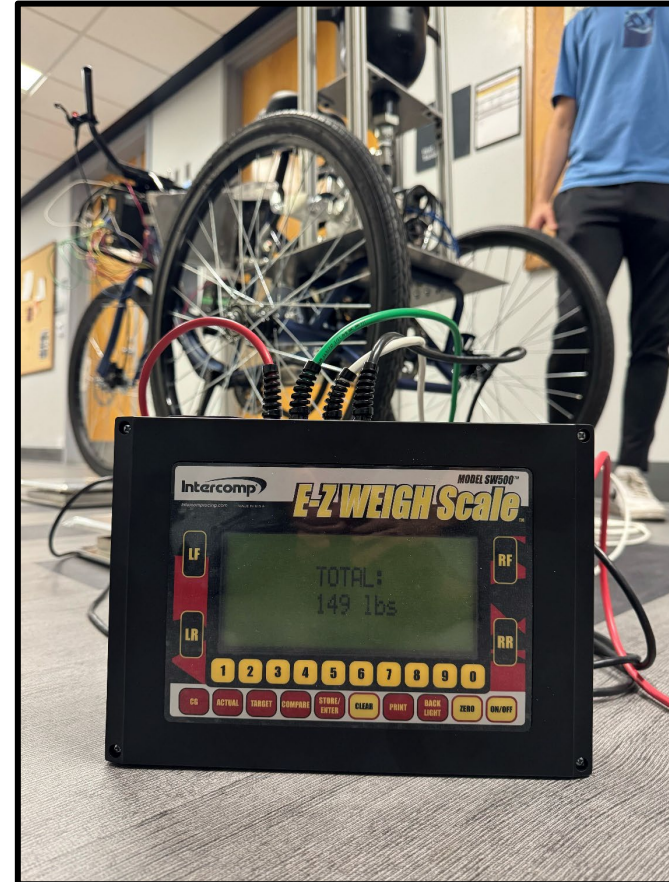
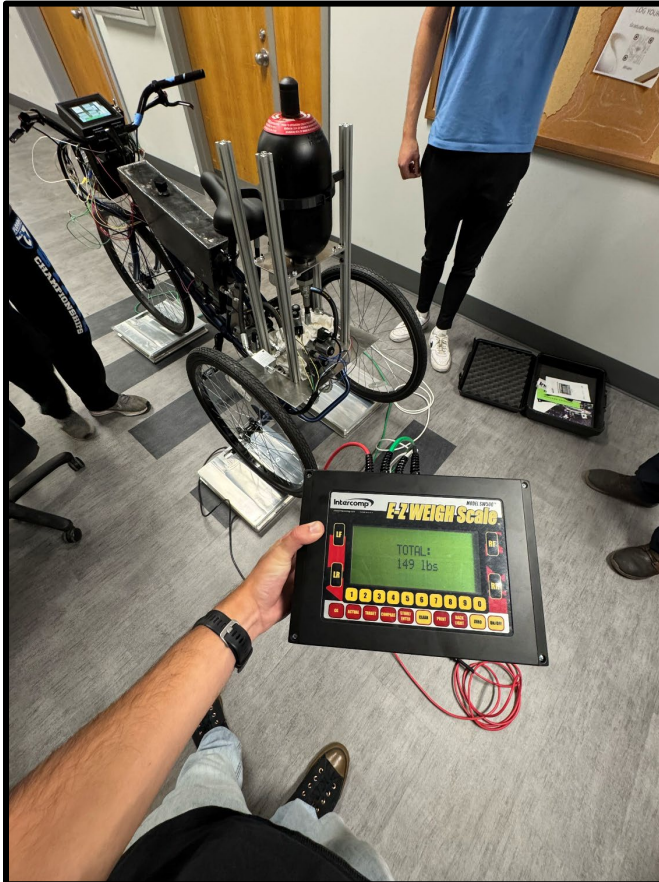
# Vehicle Construction: Reservoir



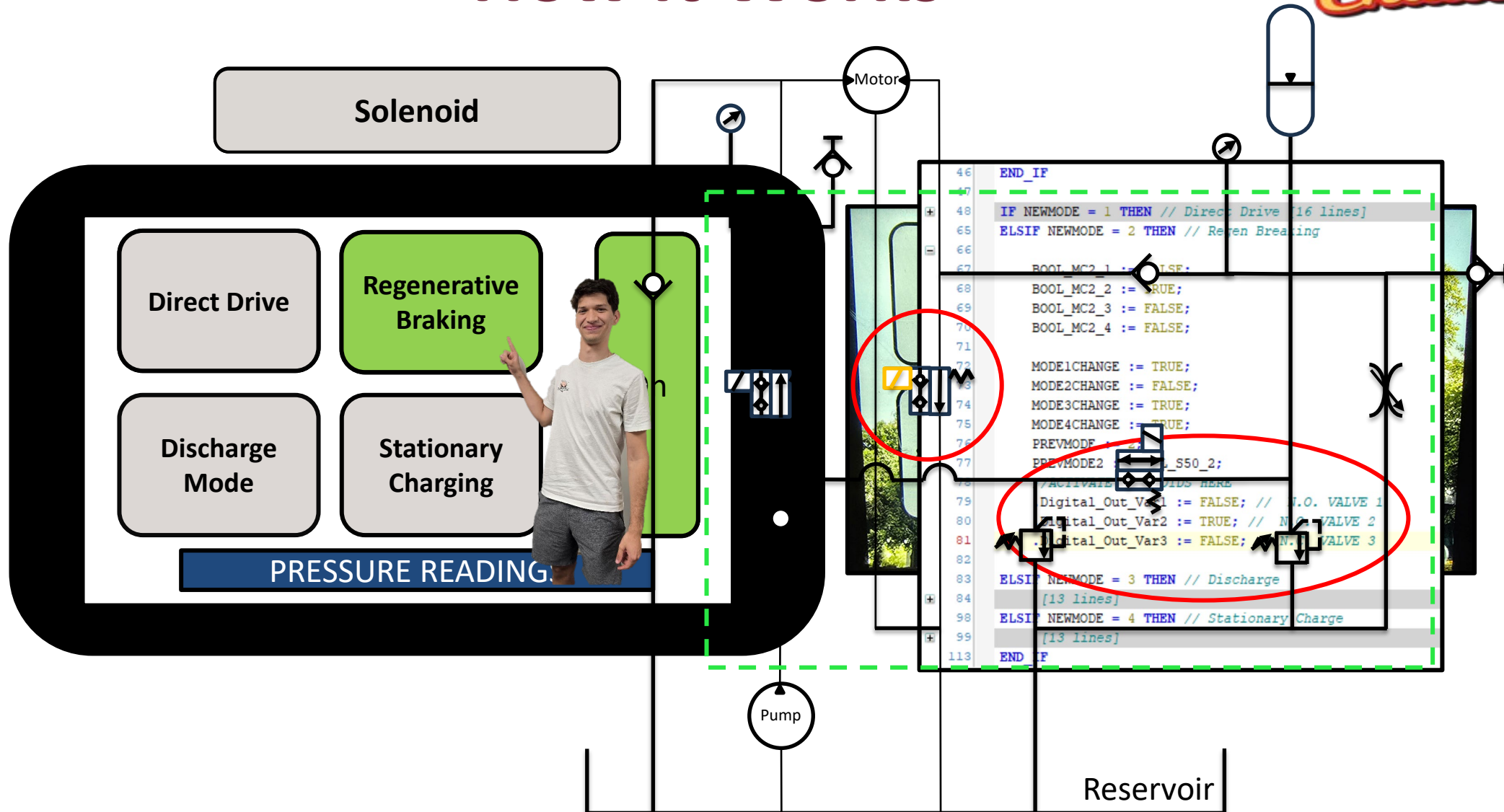


# Vehicle Weight

Weight < 150 [lbs]



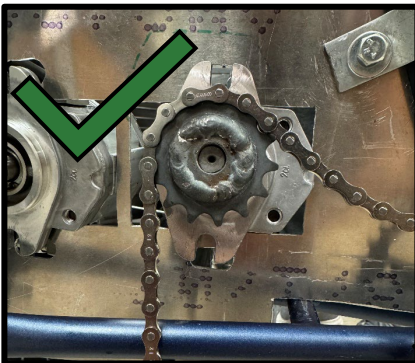
# How it Works



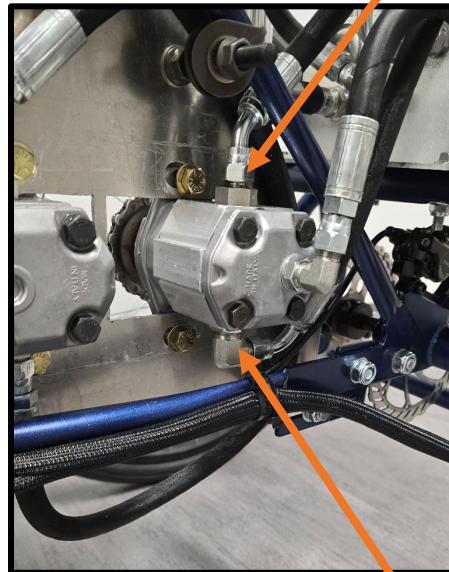


# Roadblocks/Testing

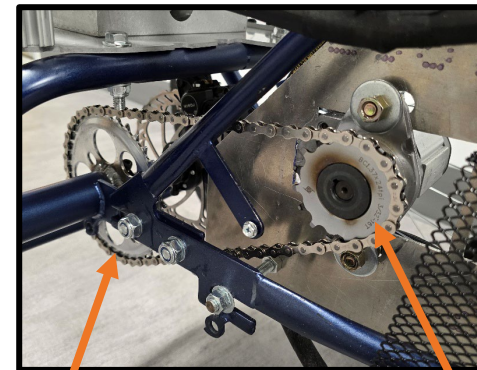
Chains and Sprockets



Bike Went Backwards



Not Enough Torque On Wheels



Unable to Pre-Charge



# Testing: Endurance Race

## Endurance Race

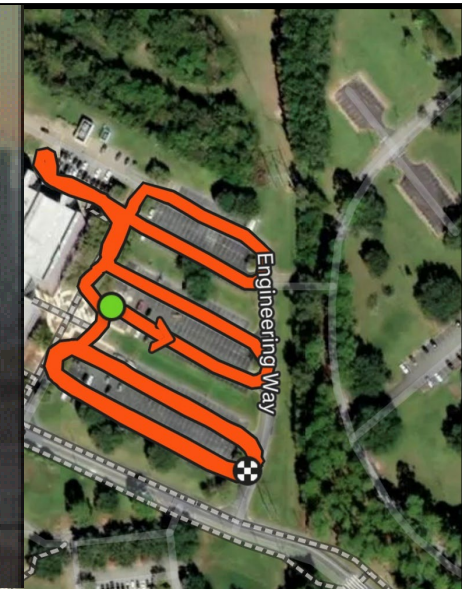
**Trial 1:**  
1.67 miles or 8817.6 feet  
Gabriel Vazquez

## Endurance Race

**Trial 2:**  
1.27 miles or 6705.6 feet  
Ethan Mercado

## Endurance Race

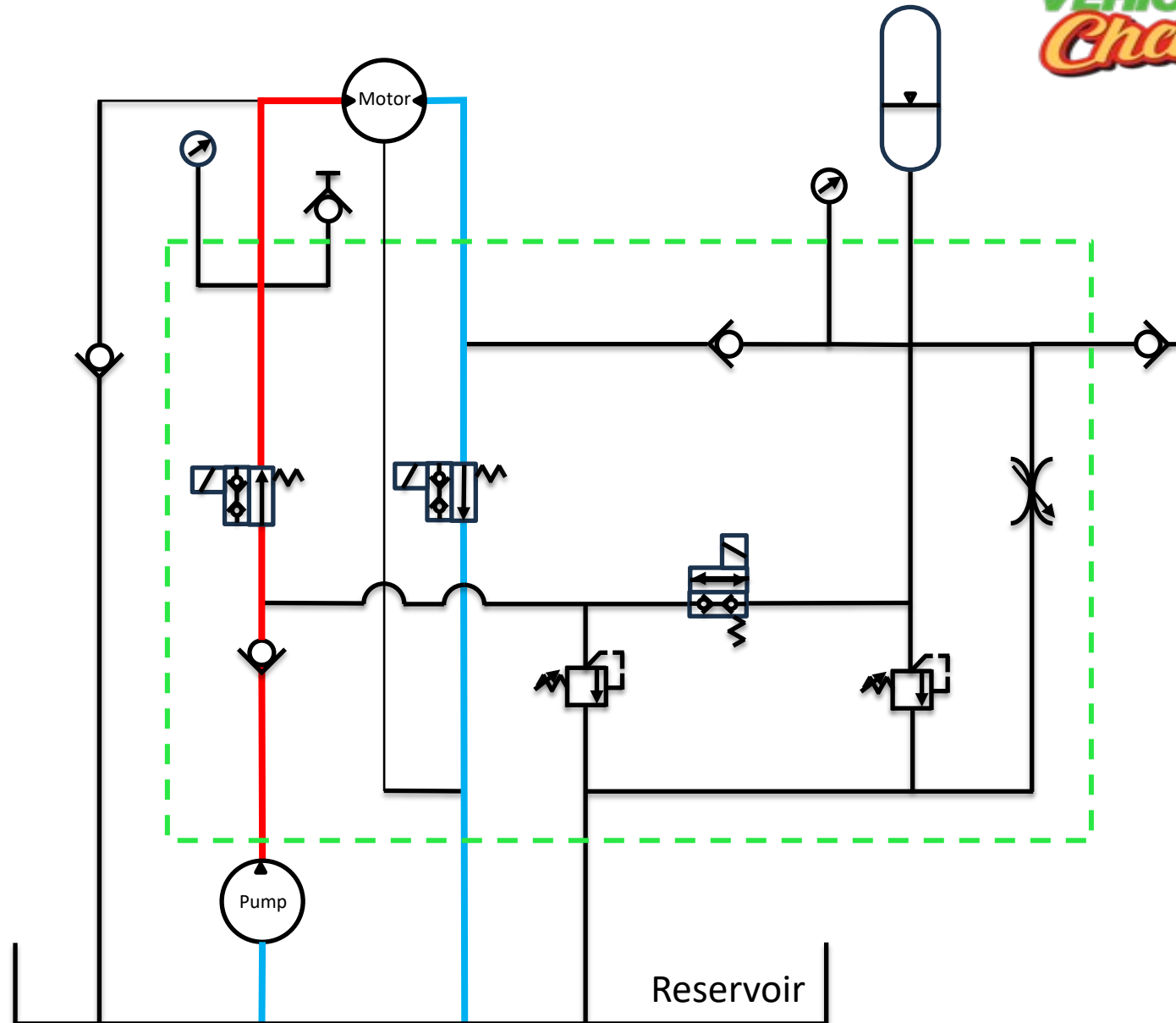
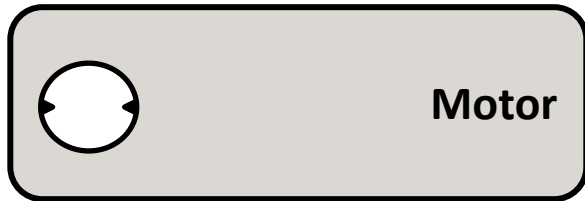
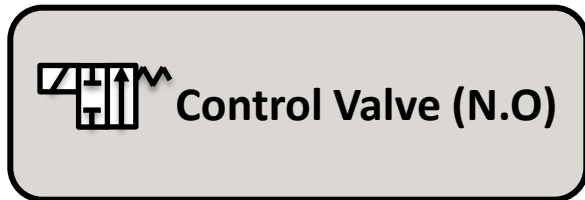
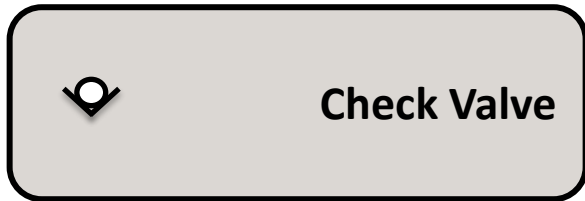
**Trial 3:**  
1.30 miles or 6864 feet  
Ethan Mercado

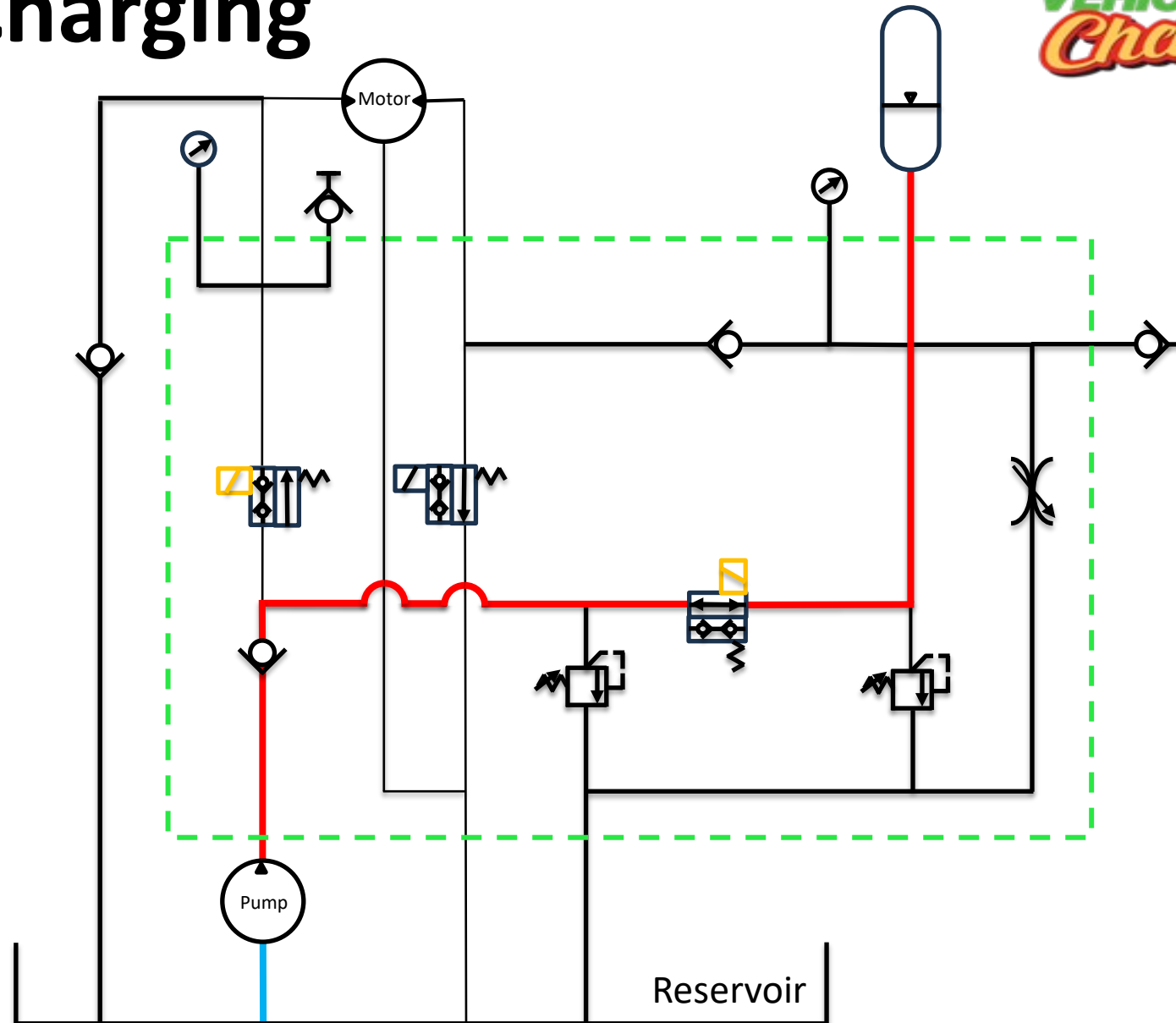


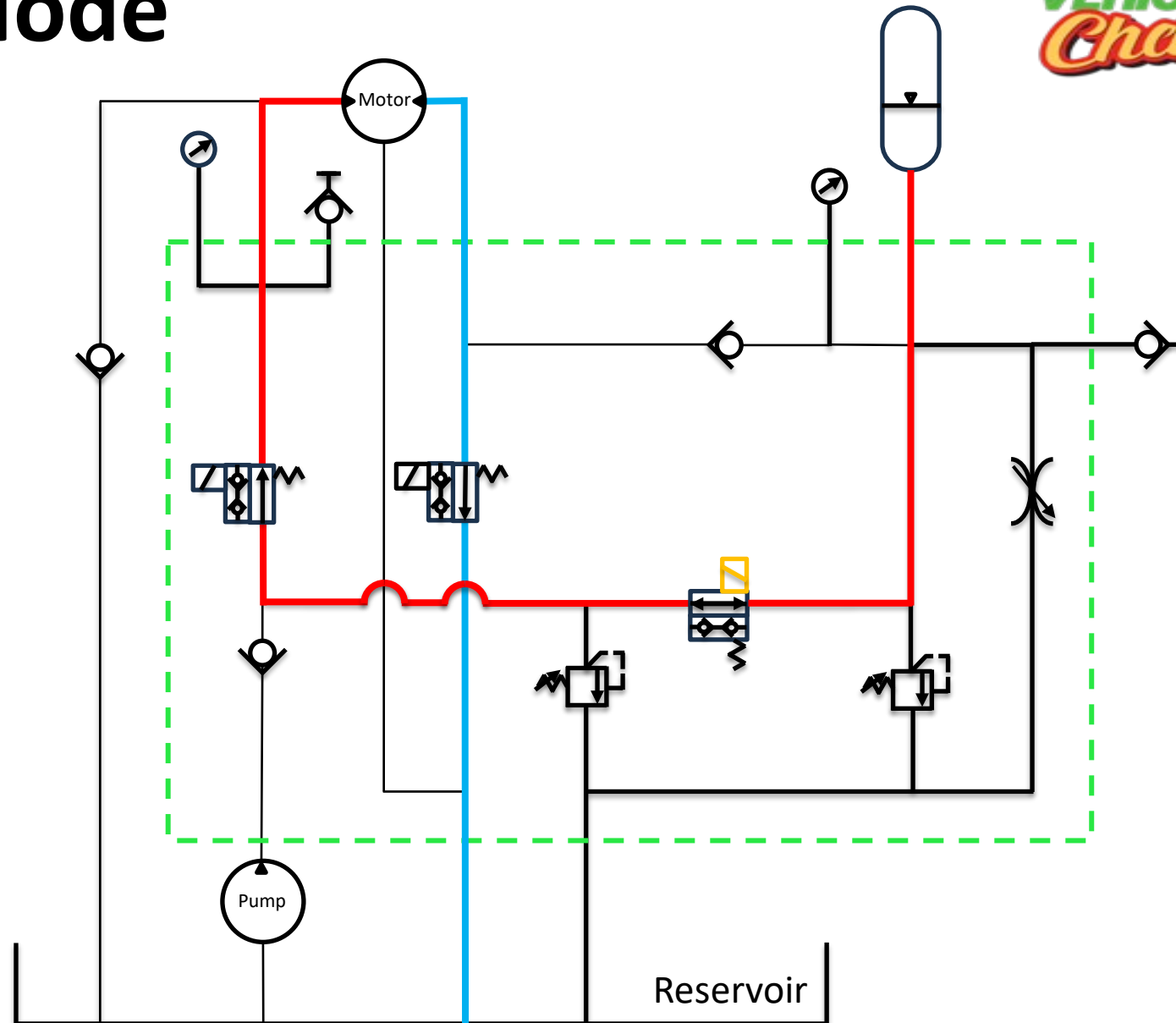


# Hydraulic Diagrams

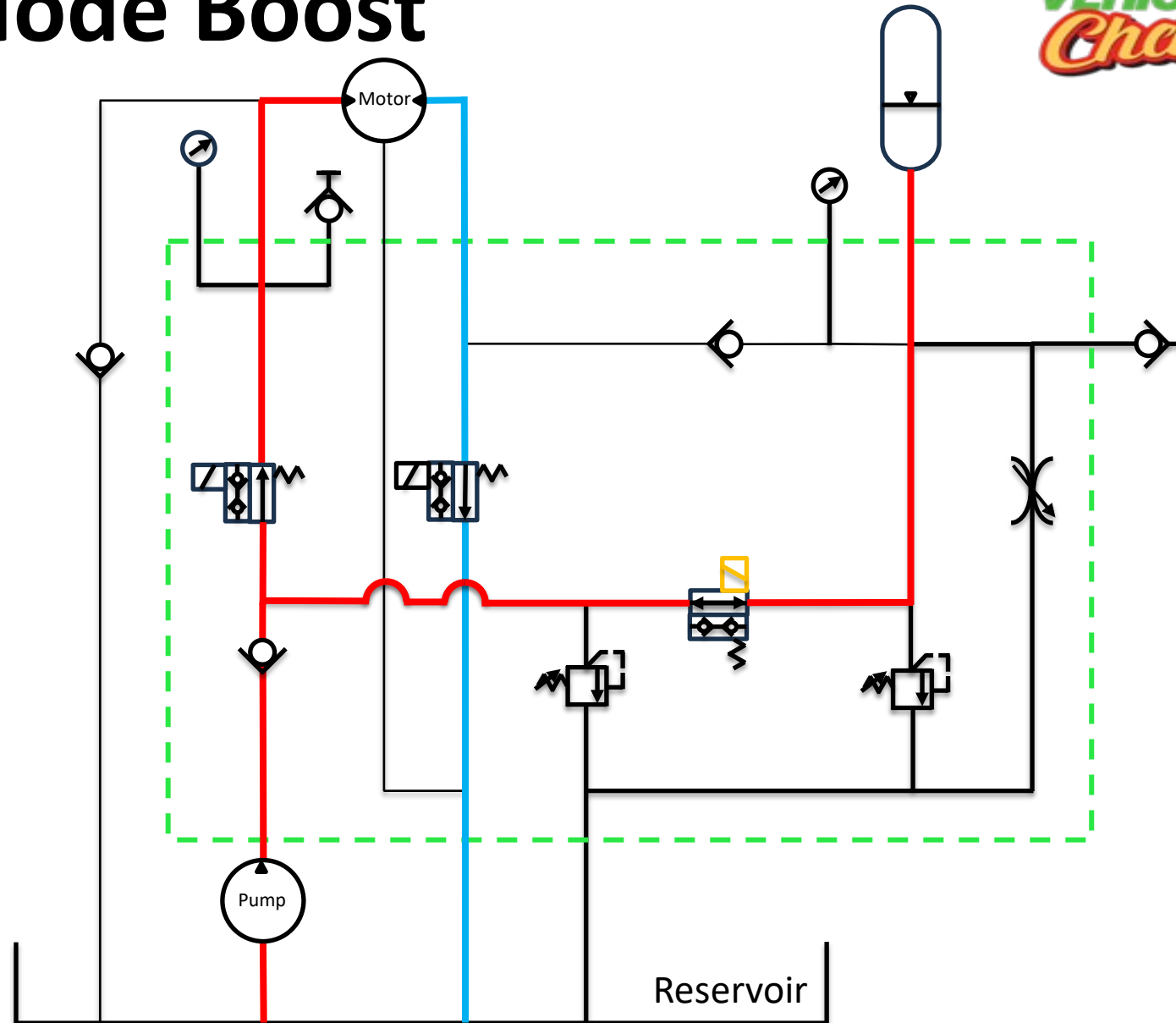
# Direct Drive

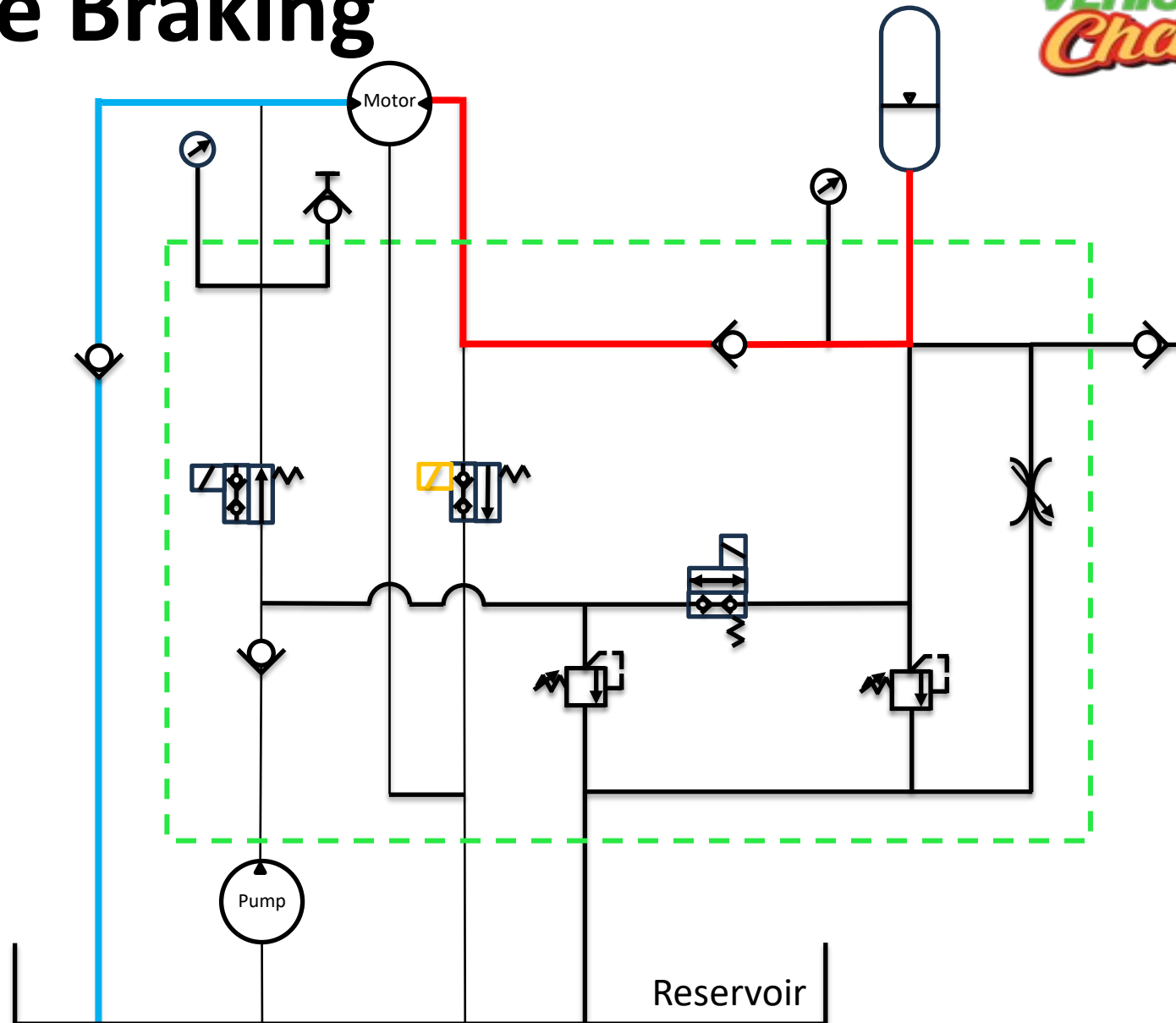




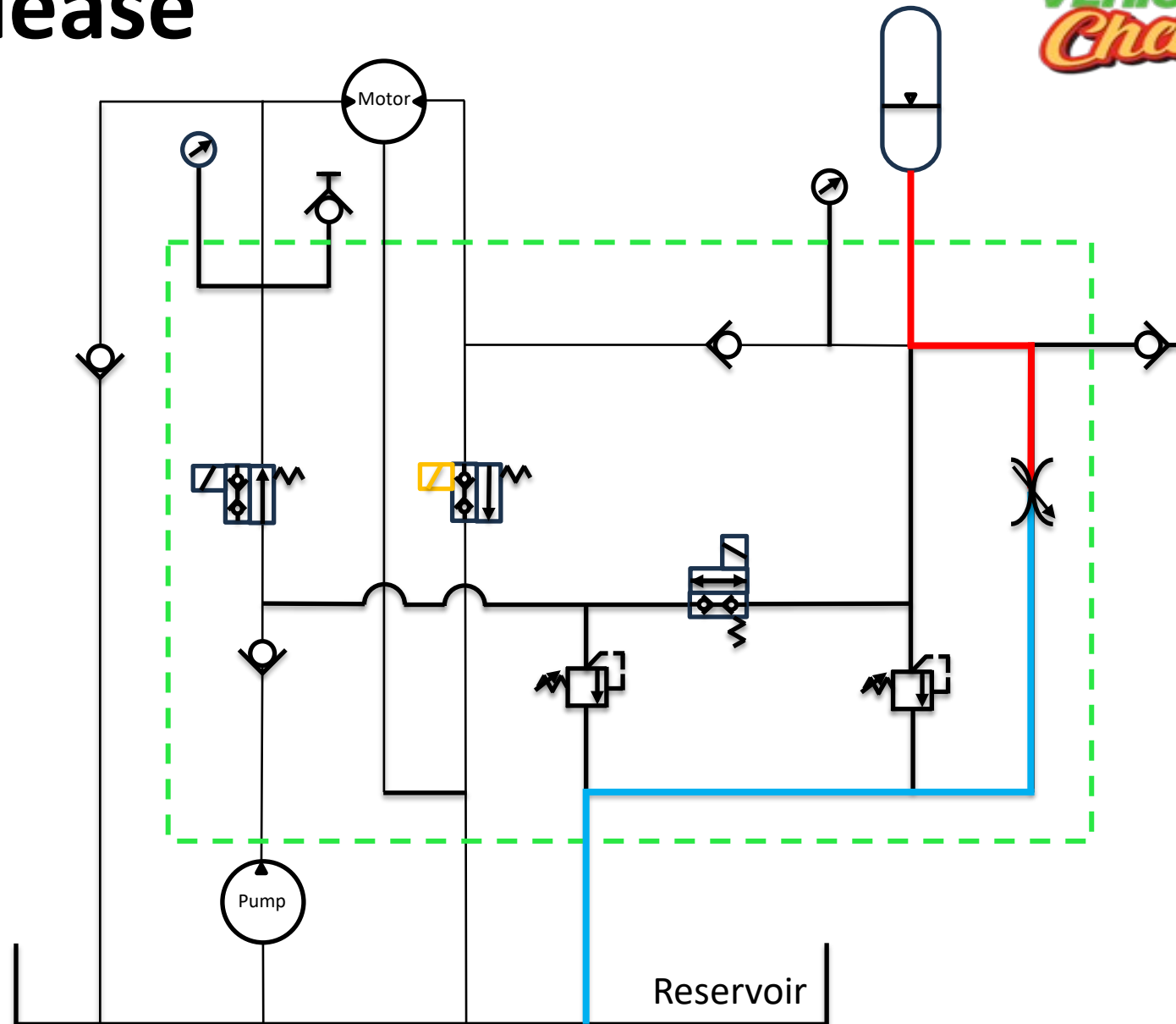
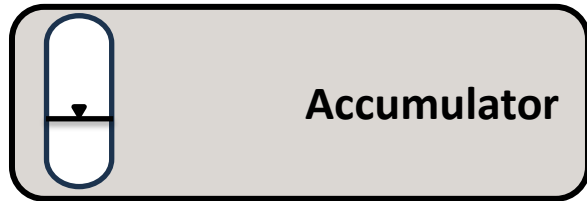






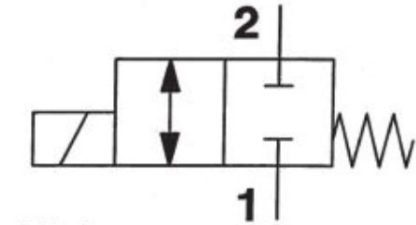
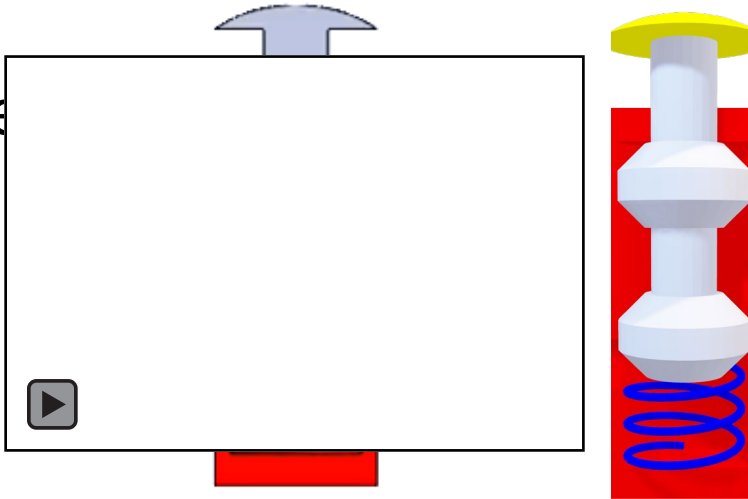


# Pressure Release

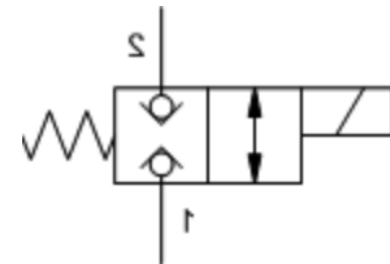
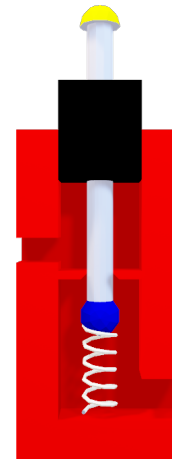
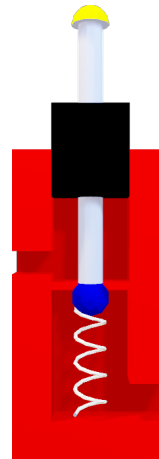
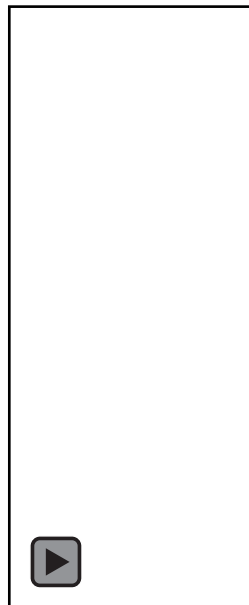


# Design Choices (Valves)

Spool Valve

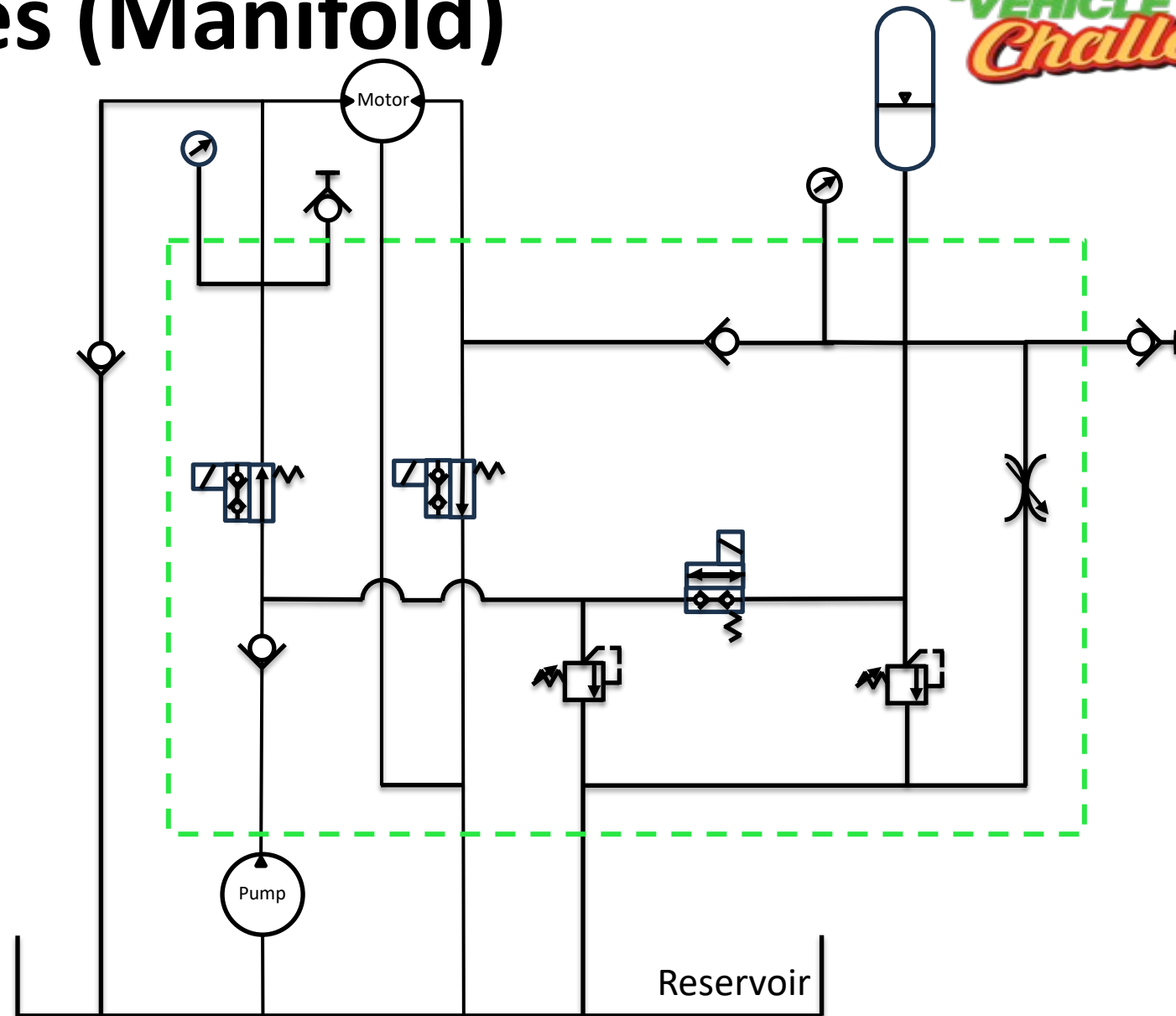
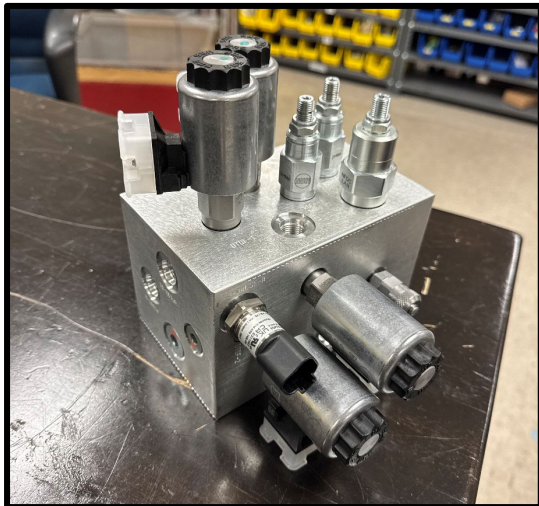
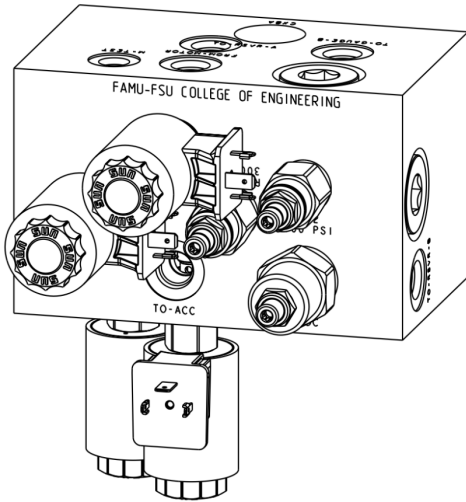


Poppet Valve





# Design Choices (Manifold)



# Design Choices (Shoes and Pedals)



# Design Choices (Oil Filter)





# Workmanship

## PLC Housing





# Lessons Learned



## Lessons Learned:

- Make mistakes early so you have enough time to fix them later



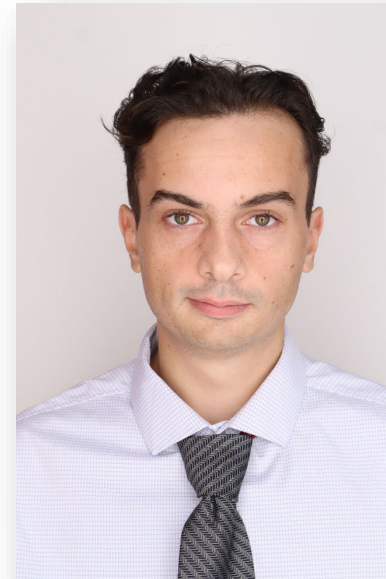
## Lessons Learned:

- Take advantage of group members' strengths and weaknesses



## Lessons Learned:

- Benchmark previous teams' designs
- Communication with the team and outside sources is key



## Lessons Learned:

- Utilize mentors, don't be scared to ask questions
- Order parts early



## Lessons Learned:

- Knowing when to improve and when to move on is key—time is limited, and “good enough” is sometimes the best call

# Questions

Adonay Almanza



Trace Flowers



Daniel Garmendia



Ethan Mercado



Gabriel Vazquez

