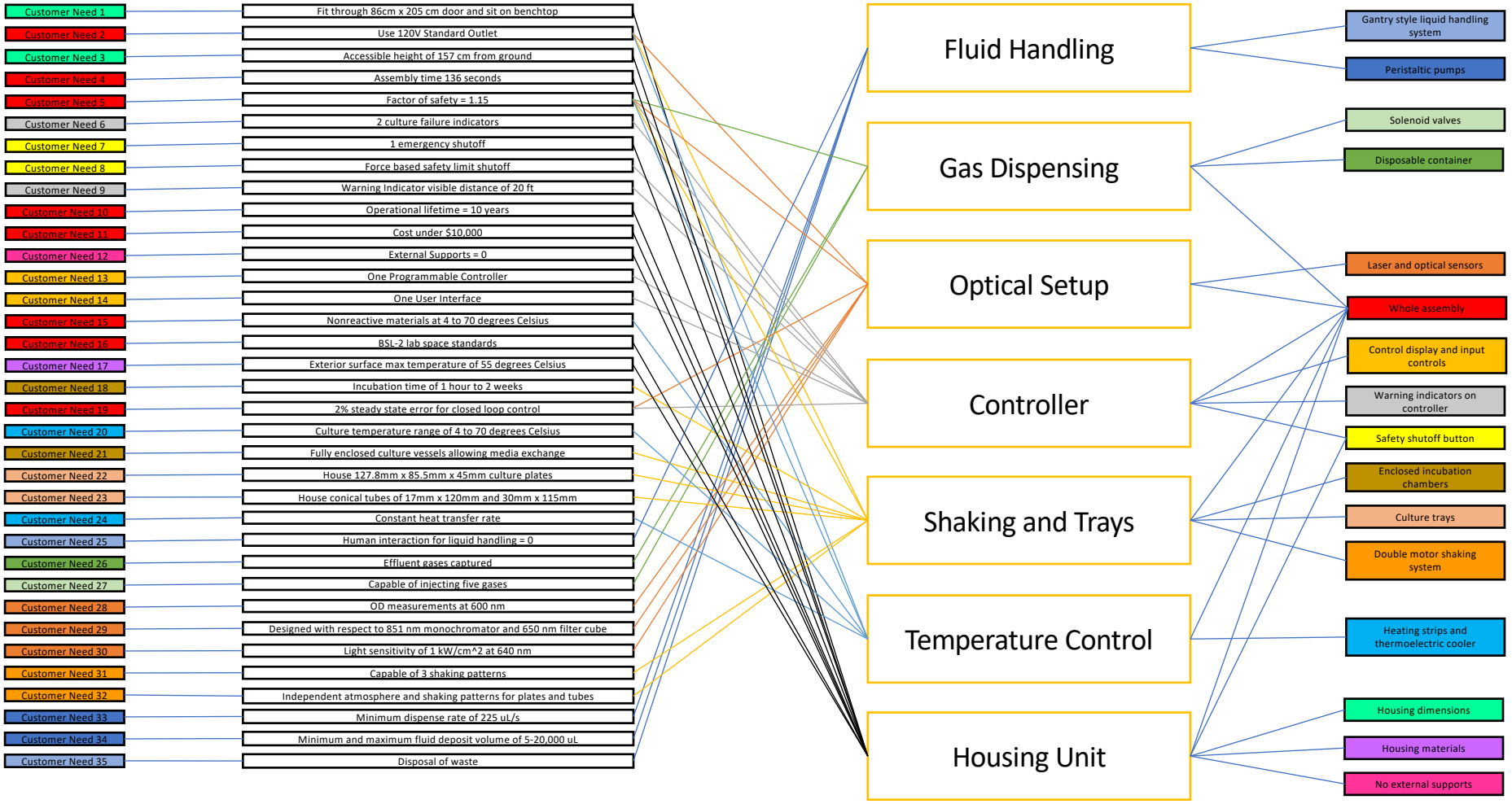
Customer Need 1
Customer Need 2
Customer Need 3
Customer Need 4
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Customer Need 34
Customer Need 35
Fit through 86cm x 205 cm door and sit on benchtop
Use 120V Standard Outlet
Accessible height of 157 cm from ground
Assembly time 136 seconds
Factor of safety = 1.15
2 culture failure indicators
1 emergency shutoff
Force based safety limit shutoff
Warning Indicator visible distance of 20 ft
Operational lifetime = 10 years
Cost under $10,000
External Supports = 0
One Programmable Controller
One User Interface
Nonreactive materials at 4 to 70 degrees Celsius
BSL-2 lab space standards
Exterior surface max temperature of 55 degrees Celsius
Incubation time of 1 hour to 2 weeks
2% steady state error for closed loop control
Culture temperature range of 4 to 70 degrees Celsius
Fully enclosed culture vessels allowing media exchange
House 127.8mm x 85.5mm x 45mm culture plates
House conical tubes of 17mm x 120mm and 30mm x 115mm
Constant heat transfer rate
Human interaction for liquid handling = 0
Effluent gases captured
Capable of injecting five gases
OD measurements at 600 nm
Designed with respect to 851 nm monochromator and 650 nm filter cube
Light sensitivity of 1 kW/cm^2 at 640 nm
Capable of 3 shaking patterns
Independent atmosphere and shaking patterns for plates and tubes
Minimum dispense rate of 225 uL/s
Minimum and maximum fluid deposit volume of 5-20,000 uL
Disposal of waste
Fluid Handling
Gas Dispensing
Optical Setup
Controller
Shaking and Trays
Temperature Control
Housing Unit
Gantry style liquid handling system
Peristaltic pumps
Solenoid valves
Disposable container
Laser and optical sensors
Whole assembly
Control display and input controls
Warning indicators on controller
Safety shutoff button
Enclosed incubation chambers
Culture trays
Double motor shaking system
Heating strips and thermoelectric cooler
Housing dimensions
Housing materials
No external supports