Winpact

gibthai
A 3N HOLDING COMPANY

FERMENTER DESIGN

MR. Nuttawut Kongklom

Product Manager

FERMENTER DESIGN

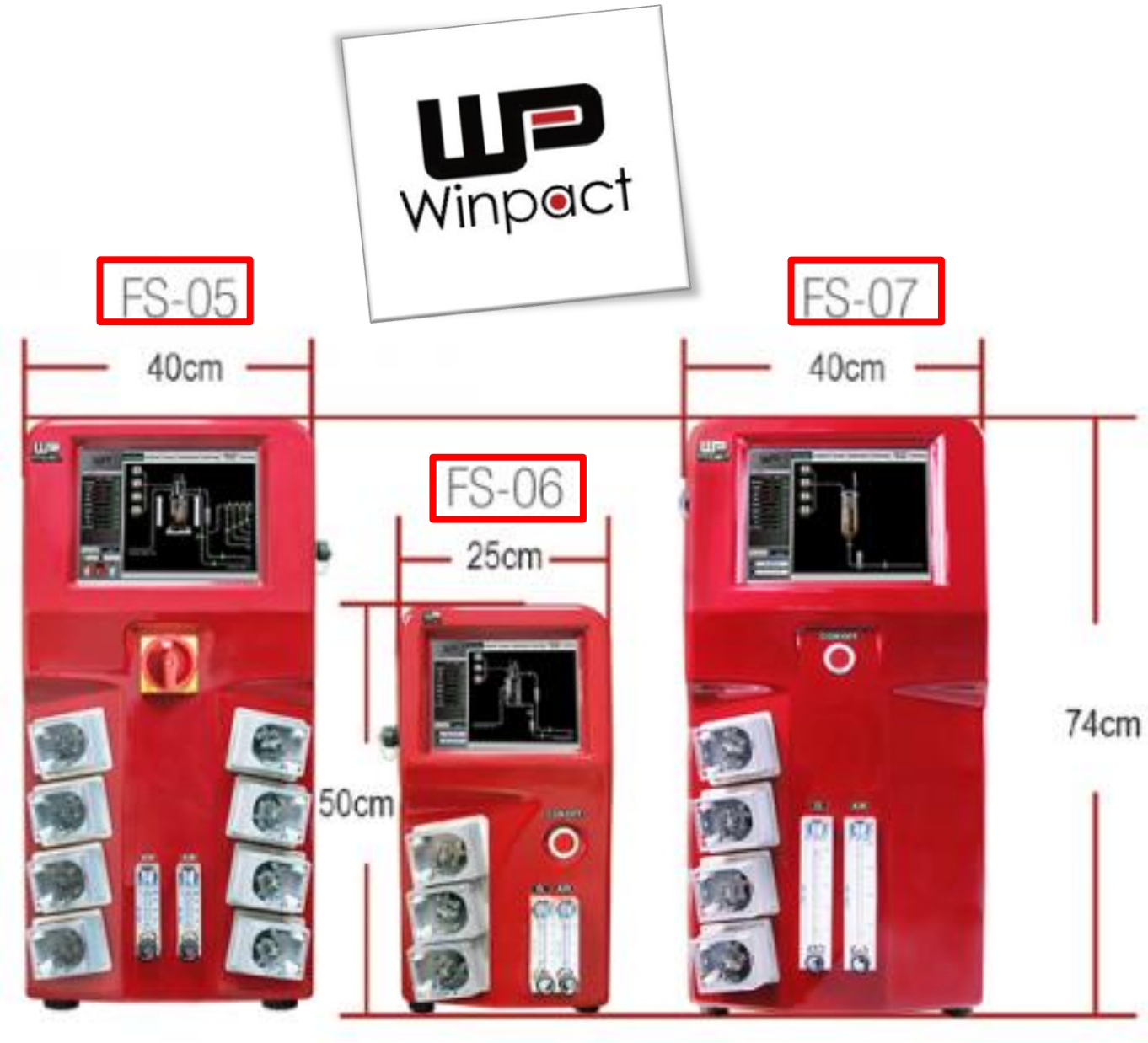
Bench Top

Pilot Scale

Winpact

Production Scale

WINPACT FERMENTER



WINPACT FERMENTER

VESSLE SIZE
0.5-20L

DOUBLE JACKET

SINGLE WALL

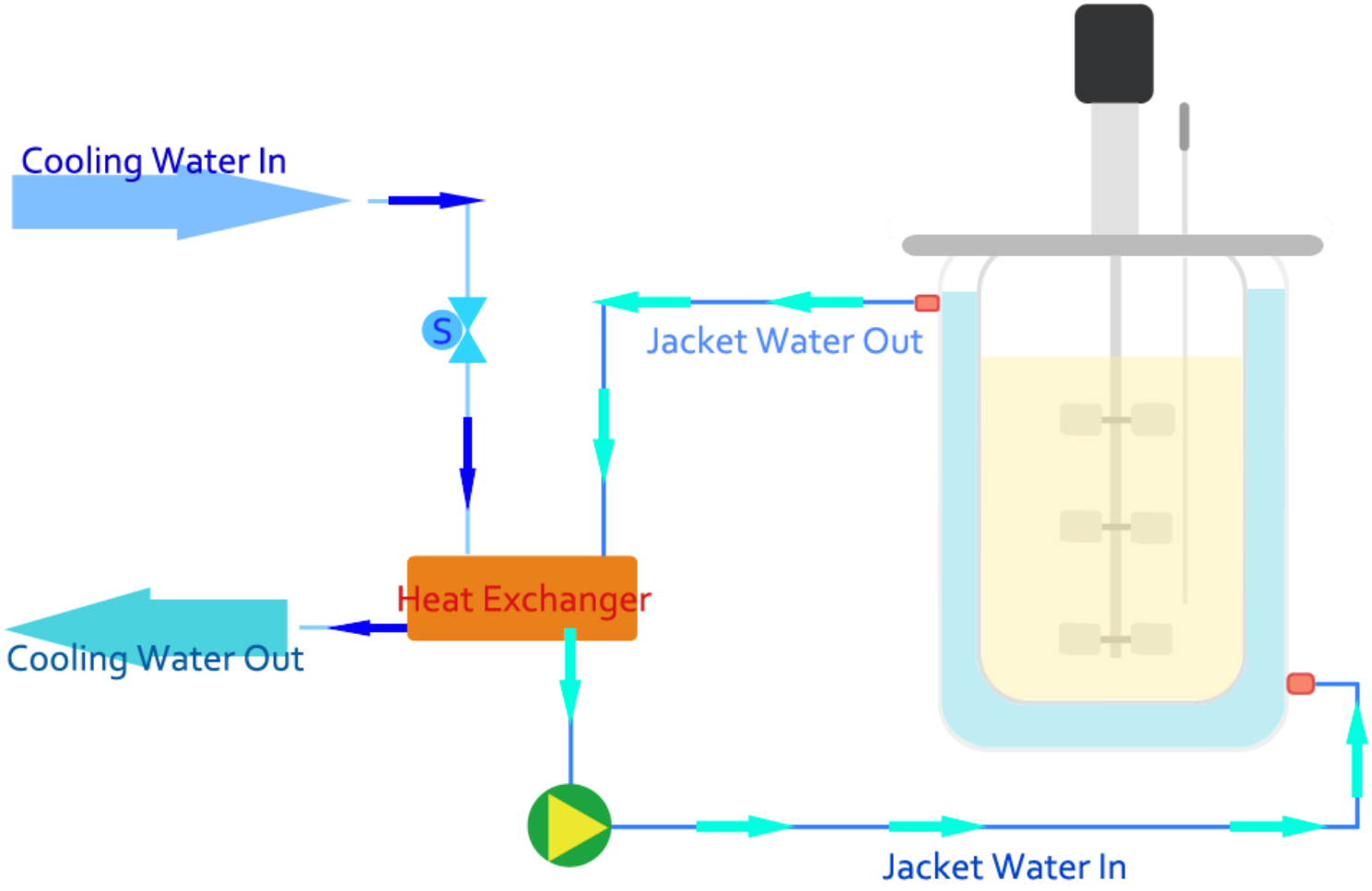
AIR LEFT

SINGLE WALL WITH BLANKET

SINGLE WALL PLAIN BOTTOM

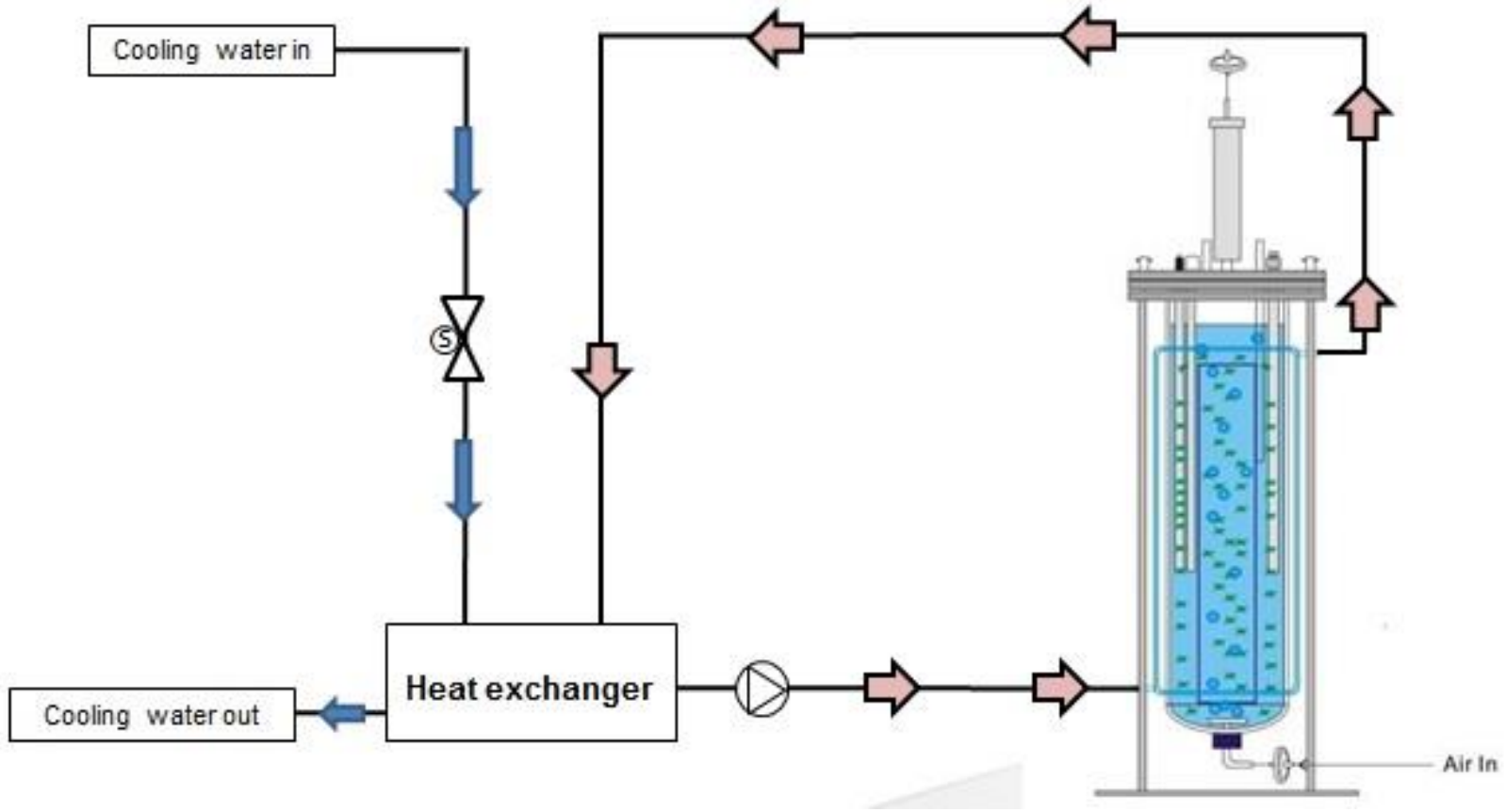
WINPACT FERMENTER

(Heating System)



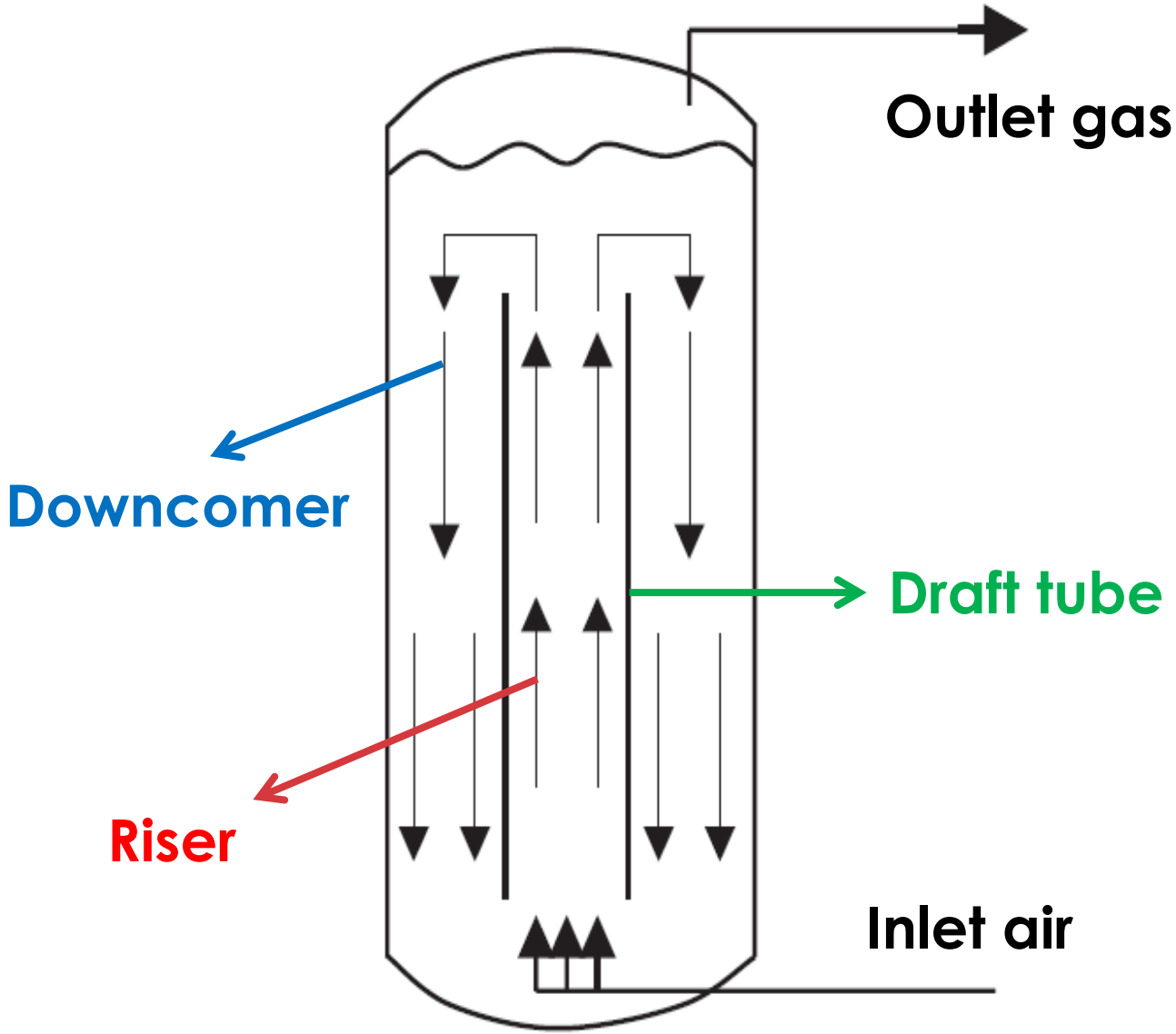
WINPACT FERMENTER

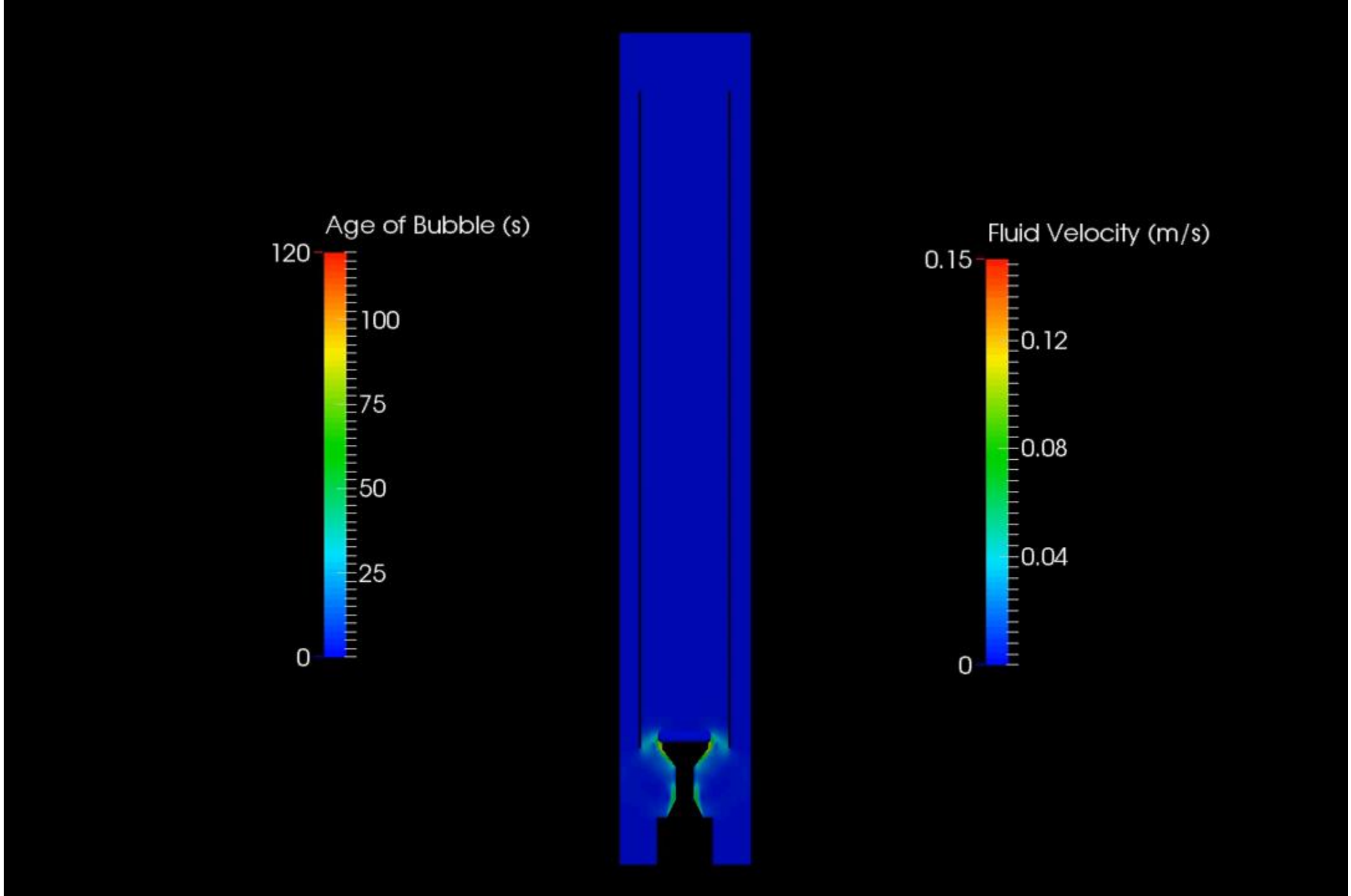
(Heating System)



WINPACT FERMENTER

(For Plant Cell)

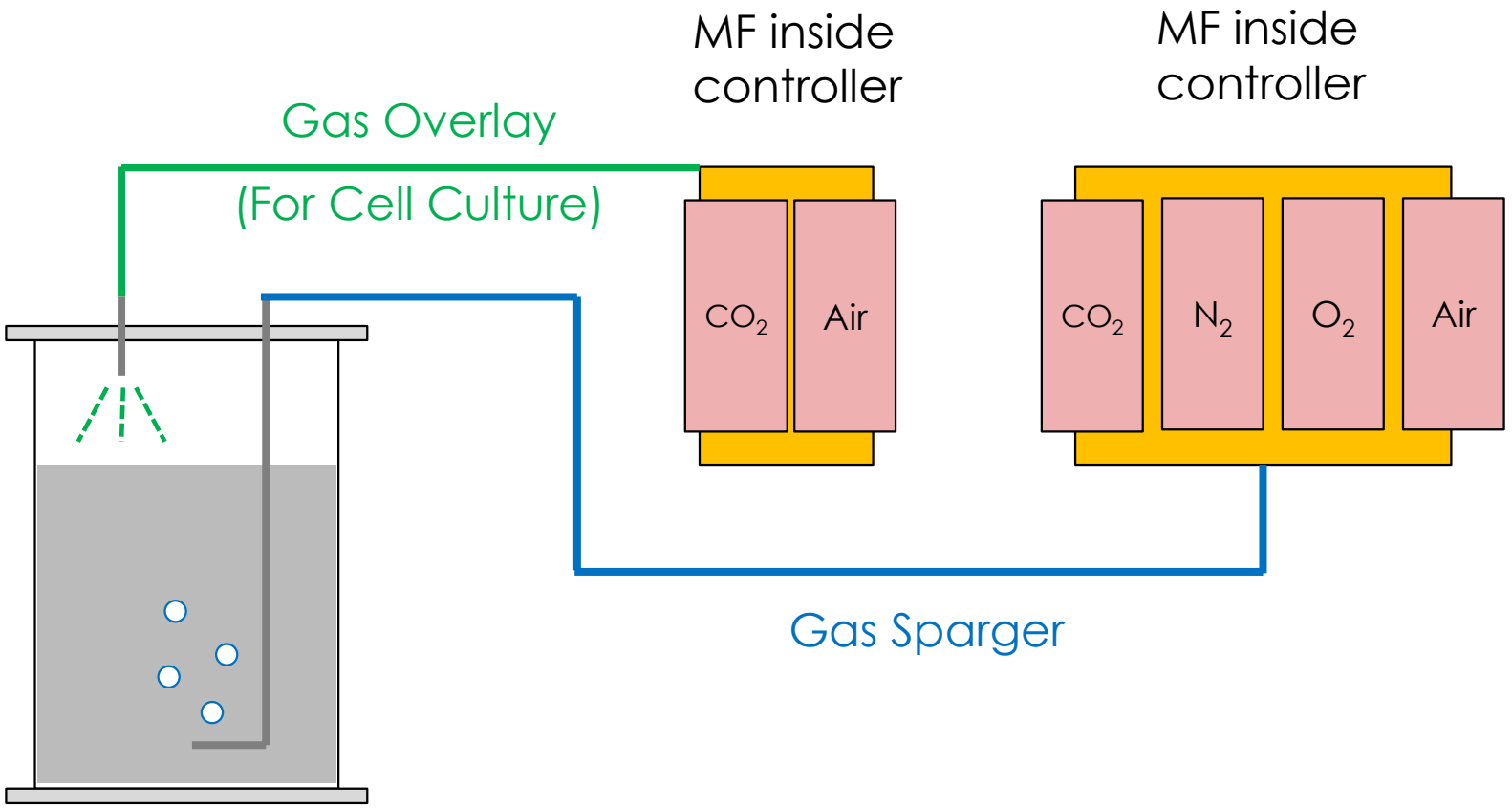



Age of Bubble (s)
120
100
75
50
25
0
Fluid Velocity (m/s)
0.15
0.12
0.08
0.04
0

WINPACT FERMENTER

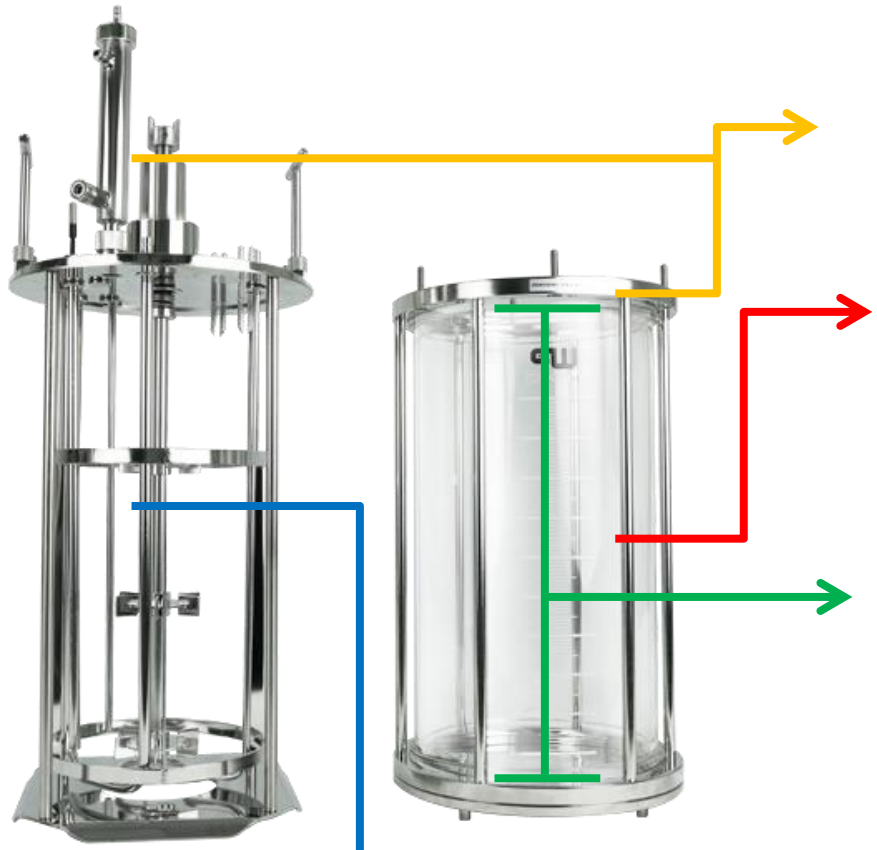
(For Cell Culture)

- Optional Devices to enhance fermentation control experience
  - All-in-1 Mass Flow Controller
    - Diagram



WINPACT FERMENTER

(Tank Design)



Medium-free: Sanitary SUS 304

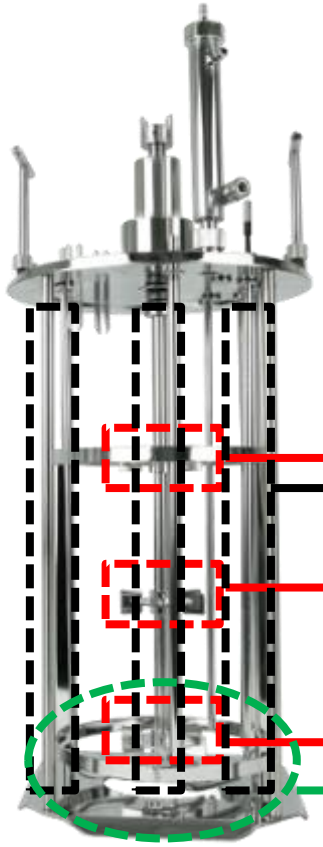
Premium German-made Borosilicate Glass

2:1 or 3:1 (air lifting) H/D Ratio ideal for mixing & homogeneity

In contact to medium: Sanitary SUS 316L

WINPACT FERMENTER

(Tank Design)



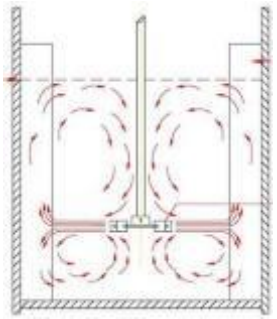
Impeller: Mixing & Breaking up bubbles

Rushton (Disk)

Pitched Blade (Segment)

?

(Customizable)



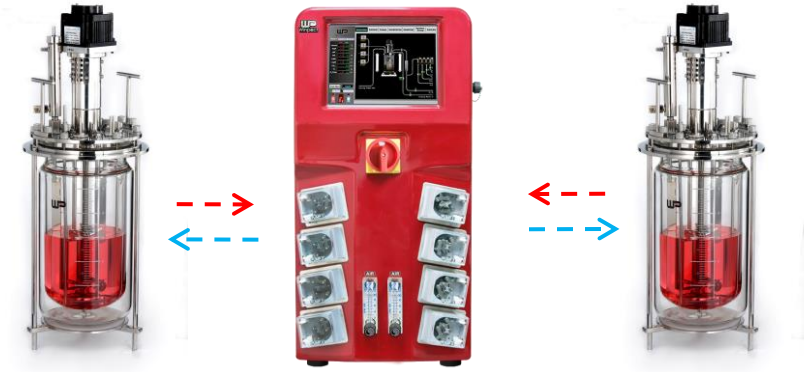
Baffle: Convert flow of fluid radial motion into axial

Sparger: Breaking up & distribute bubbles from the bottom

WINPACT FERMENTER SYSTEM (FS-05)

FS-05

VESSEL



VESSEL

CONTROLLER

CHILLER (COOLING BATH)

AIR PUMP

TEMPERATURE

pH

DO

ANTI FOAM

WINPACT FERMENTER SYSTEM (FS-06/07)

FS-07

FS-06

VESSEL

CONTROLLER

CHILLER (COOLING BATH)

AIR PUMP

TEMPERATURE

pH

DO

ANTI FOAM

FS-07 FS-05

WINPACT FERMENTER

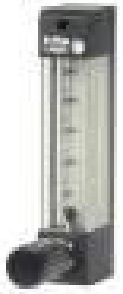
(Optional)

GAS MIXING

CO_2 & O_2 ANALYZER

CH_4 ANALYZER

MASS FLOW



O_2 ENRICHMENT

PHOTOSYNTHESIS LIGHTING

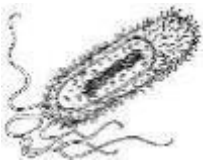
EXTERNAL PUMP

ORP

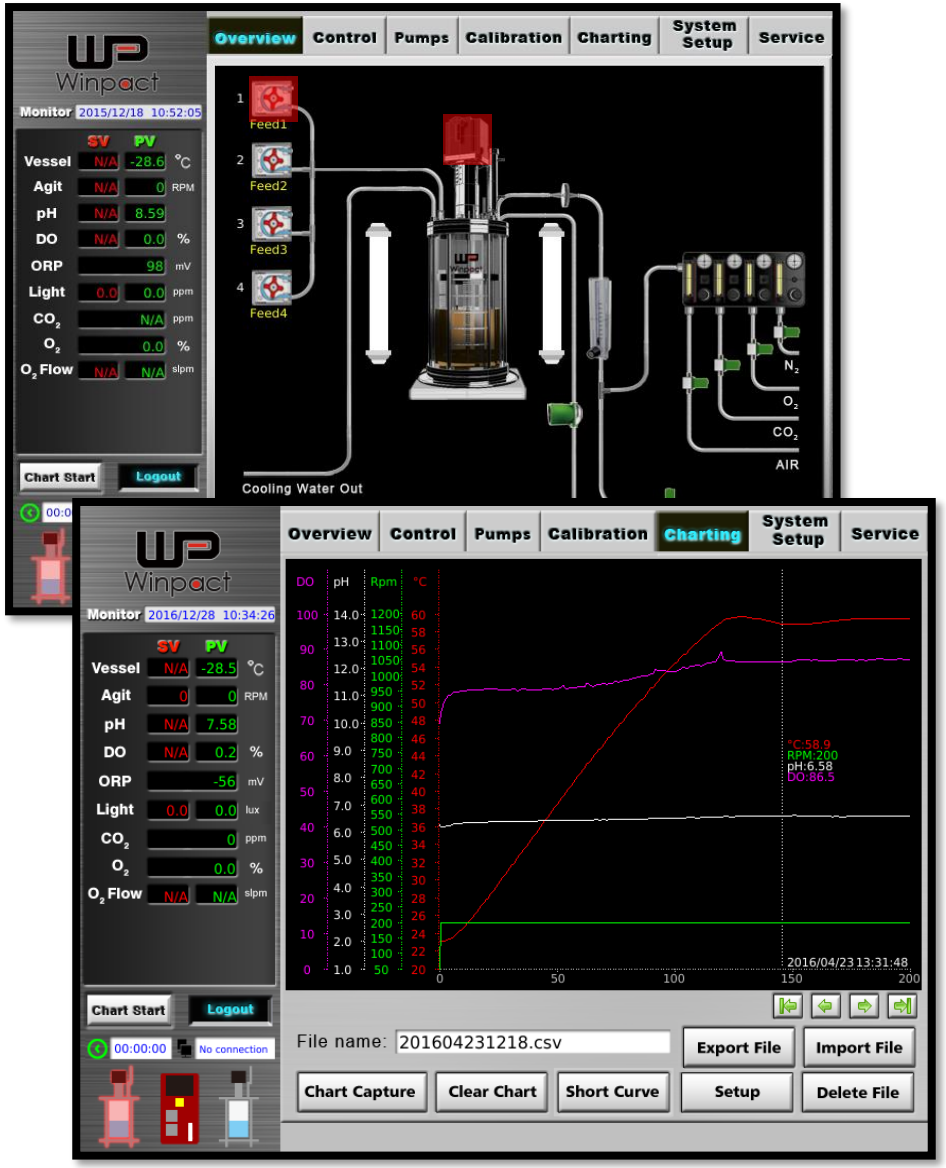
CELL DENSITY MONITOR

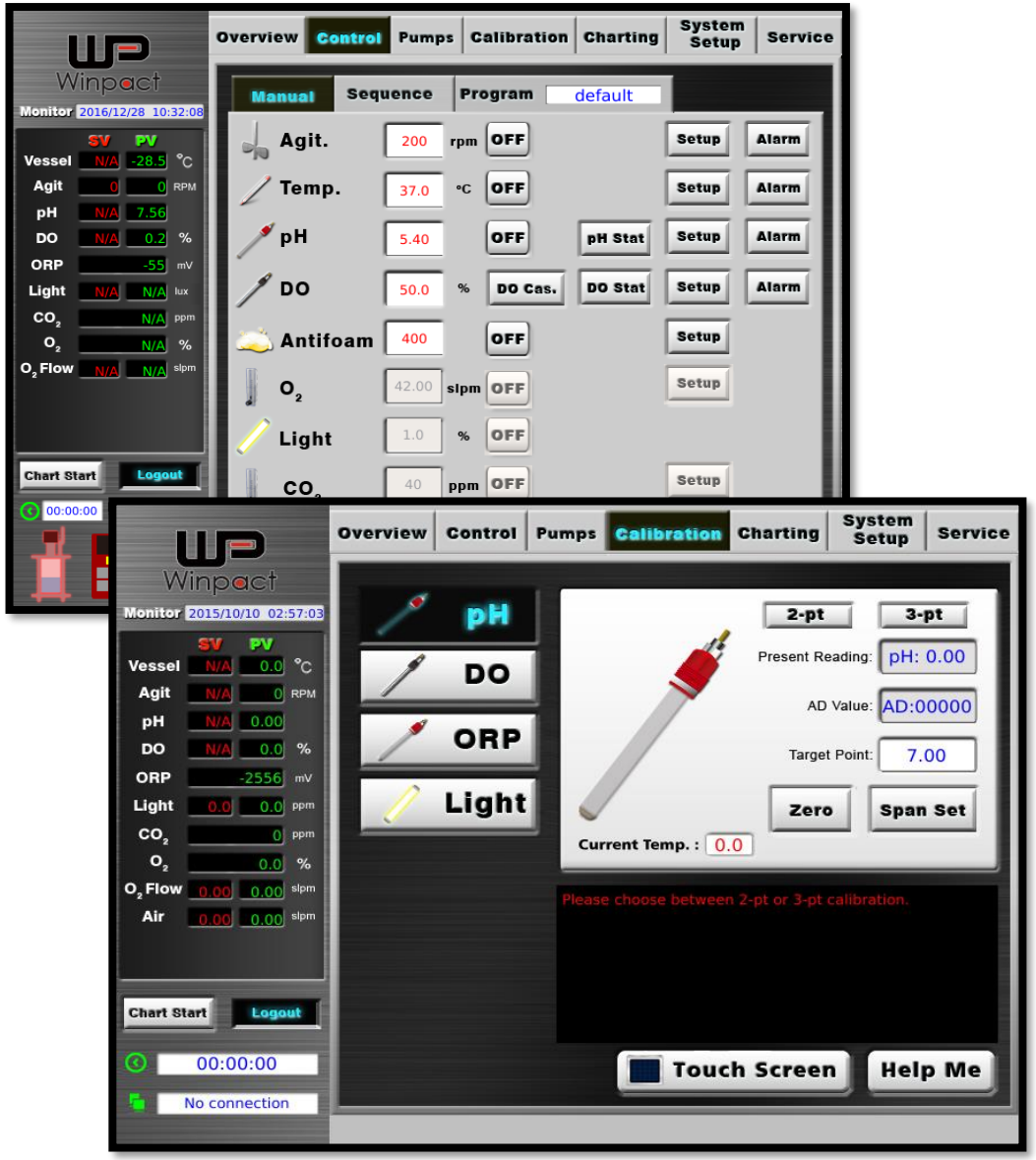
Winpact Fermentor: *more than just a fermentor*

Warning: It's also a Bioreactor

Recommended Configuration	 	 	 
Glass Vessels	 Double Jacket (FS-V-A)	 Air Lift vessel (FS-V-C)	 Double Jacket Single Vessel (FS-V-A, B,D)
Gas Requirement	 Air CO_2 O_2 N_2	 Air CO_2 O_2 N_2	 Air O_2 N_2
Impellers	 Pitched Blade (Segment)		 Rushton (Disk)

CONTROL INTERFACE (OVERVIEW)



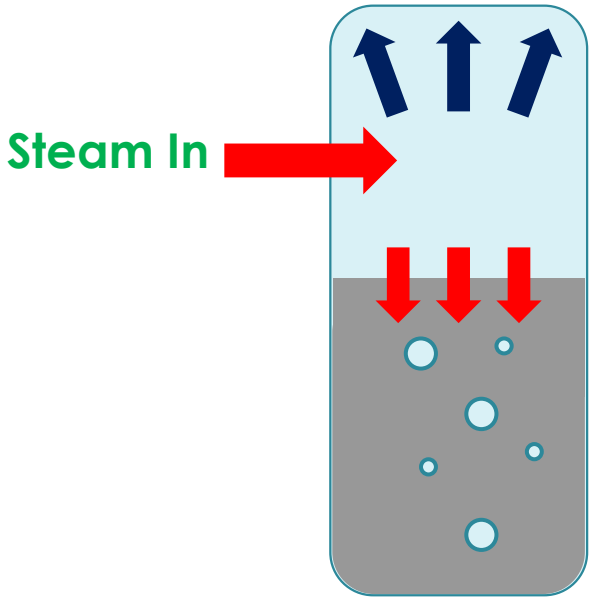


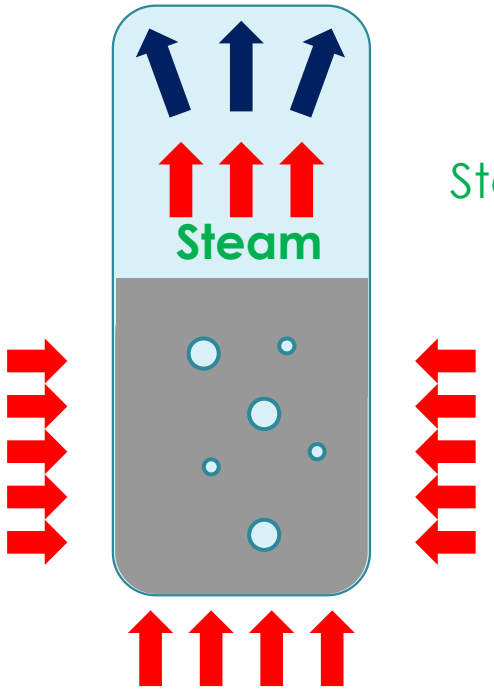
WINPACT
SIP System

Pilot scale-10L/30L/50L
Production scale-100L~10T
SIP：Sterilization in Place

Introduction

- Main difference between bench-top system and SIP system
  → **Sterilization**
  Bench-top: Put the vessel into the autoclave
- **SIP: Sterilization in Place (By machine itself!!)**
  To achieve atomization → Pneumatically controlled valves

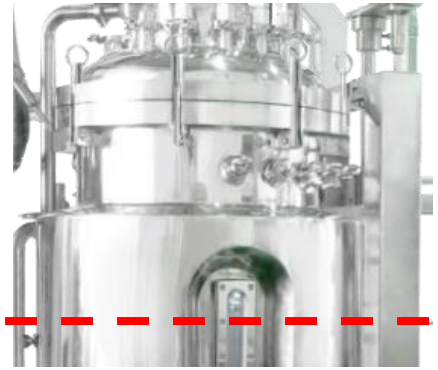




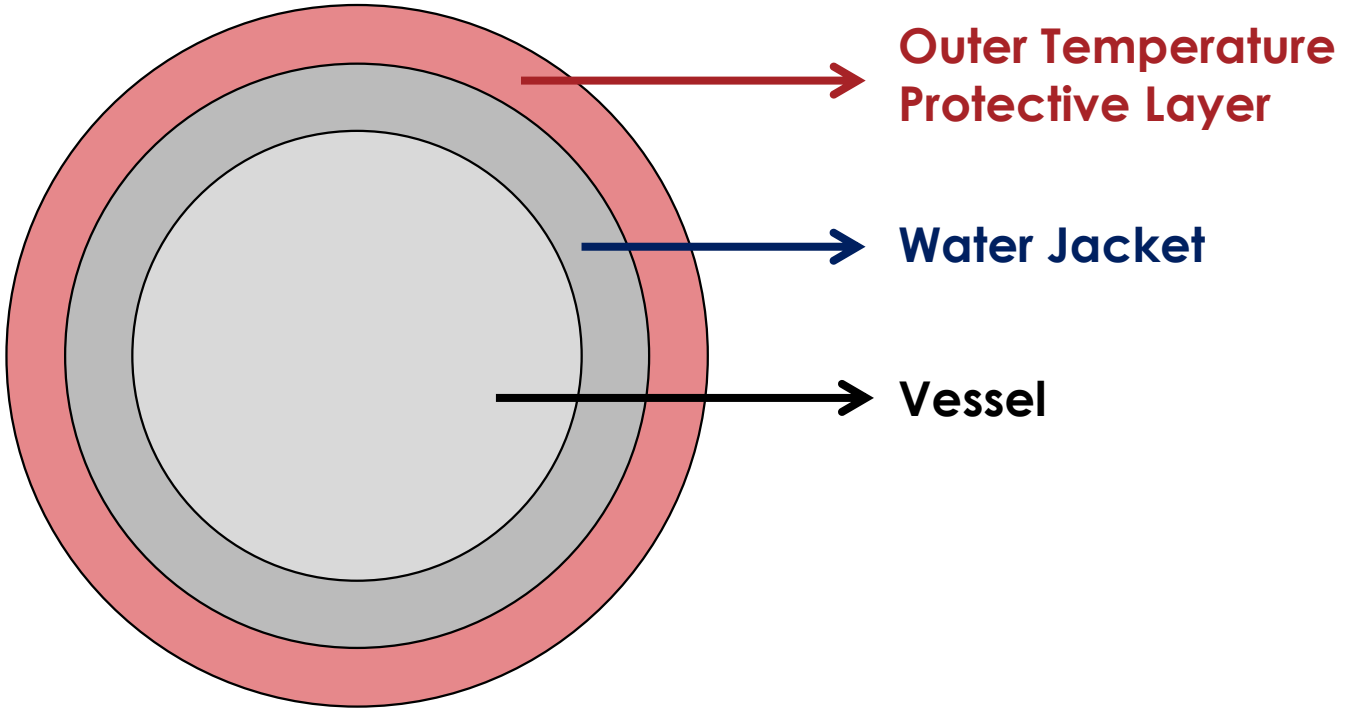
Steam: Pressure + Heat
→ Sterilization

Component Description

Sectional view



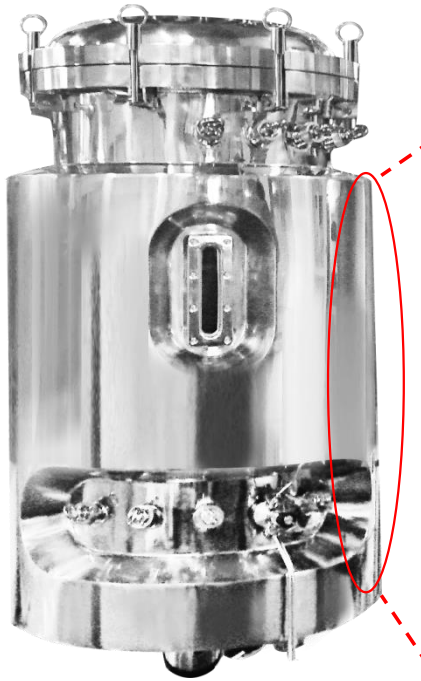
Sectional View

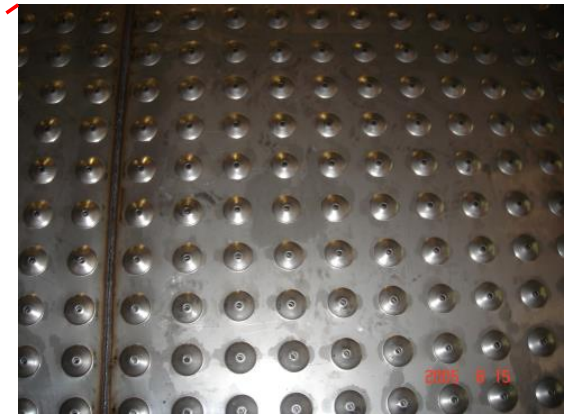


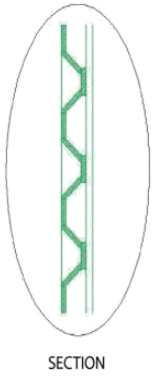
Component Description

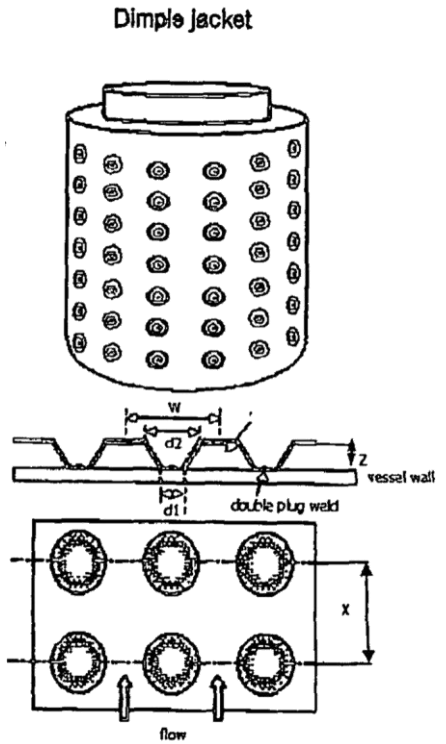
Dimple jacket

- Better heat transfer characteristics due to turbulence generated by the dimples









Utility Requirements

Air compressor

Air Dryer

Chillier

Steam Generator

Component Description

Inoculation/feeding port

- Four inoculation/feeding ports available on the headplate

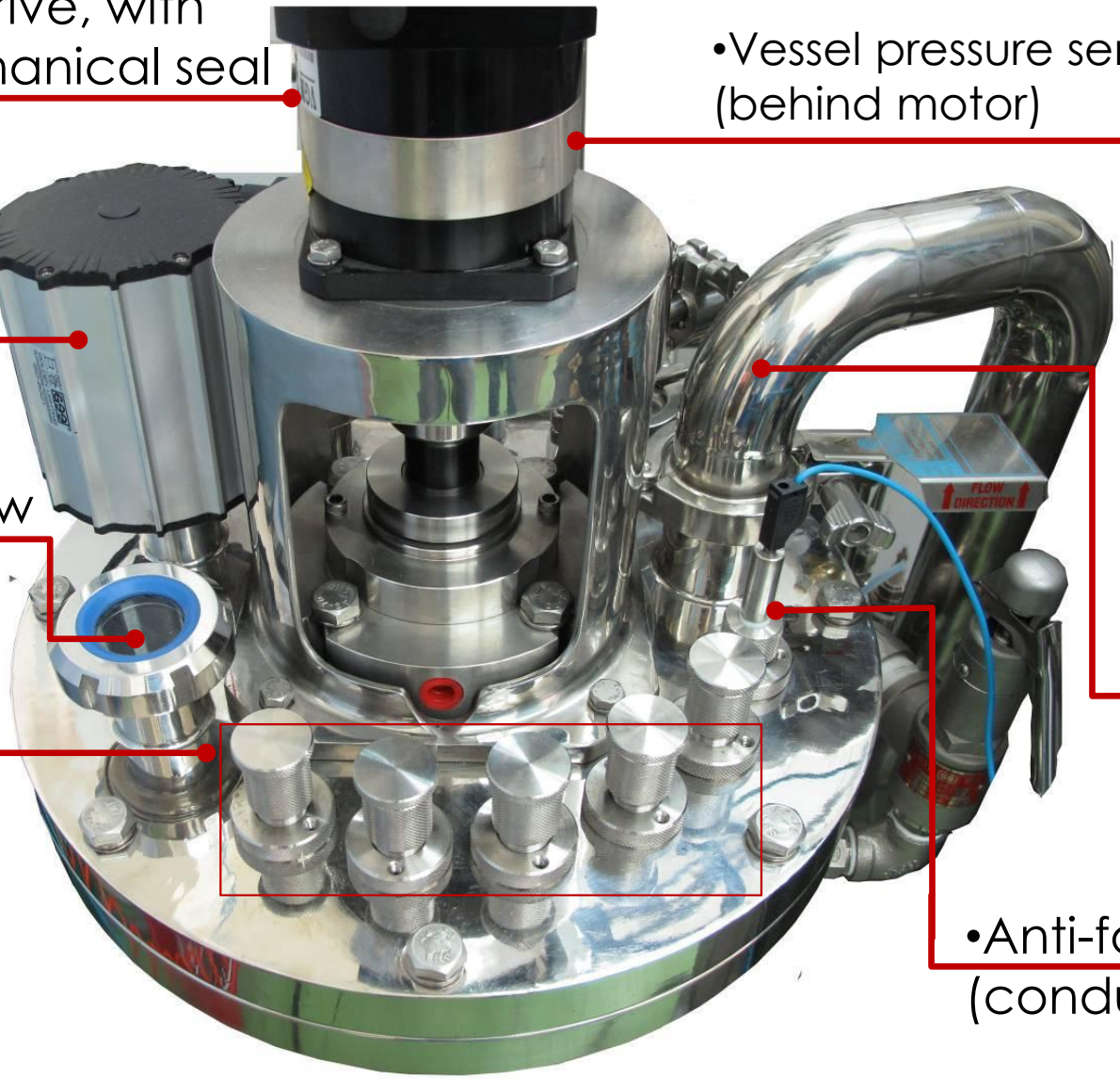
SIP system: Specification

•Agitation motor drive, with double layer mechanical seal

•Vessel pressure sensor (behind motor)

•Observation light

•Observation window

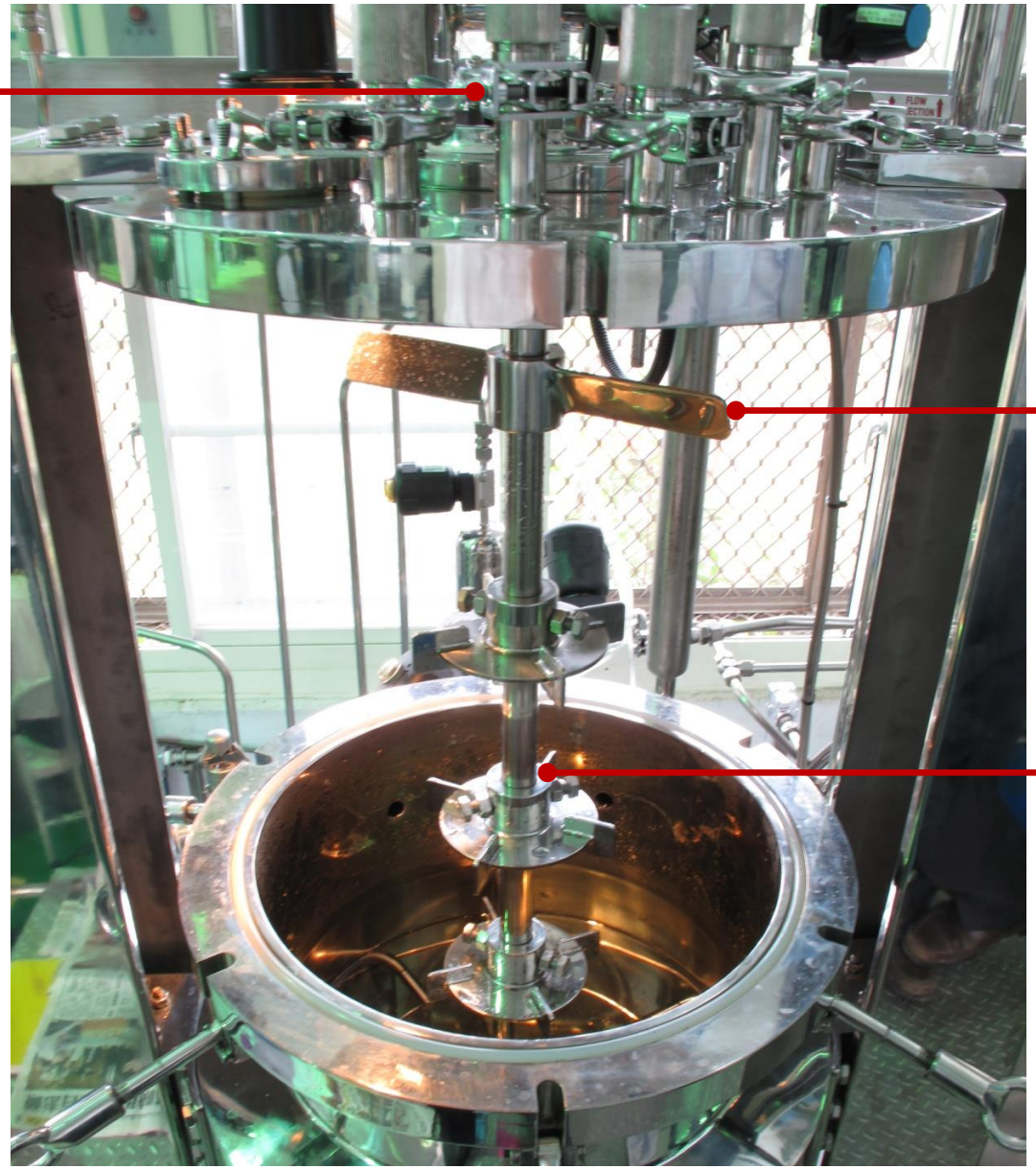


•Rupture disc/safety release valve

•Feeding ports for addition of acid, base, anti-foam, or inoculation

•Anti-foam probe (conductivity type)

Mechanical Seal:
•Double layered
•Liquid lubrication and cooling
•Automatically refilled



Mechanical foam breaker

Rushton impellers:
•SUS316L (≤20 μ-in)
•Rushton impeller (4 or 6-blades)
•Height adjustable

Component Description

Bottom harvest valve

- Steam sterilization before harvesting

Harvesting

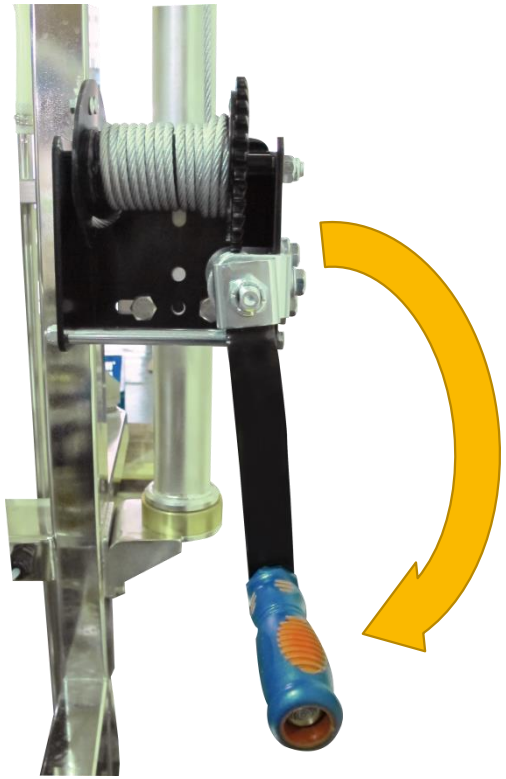
SIP-50L

Application: BHK21 cell

Component Description

Headplate lifter

- Wheel and axle for lifting the headplate with minimum labor



Production Scale Fermentors (From 100L to 10ton)

Designed for large scale production

Sterilized by external steam (faster & efficient)

SIP-500L

SIP-1000L

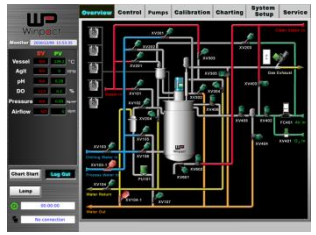
Headplate capsule design (200L up)

ASME BPE Pneumatic valve

ASME BPE Standard bottom valve
(The same level)

SUS
316L/304
Piping

Watson-Marlow Peristaltic
Pumps (The same level)



SUS 316L
Vessel

Rushton

Pitched Blade (Customization)

?

Device for downstream

High speed tubular system

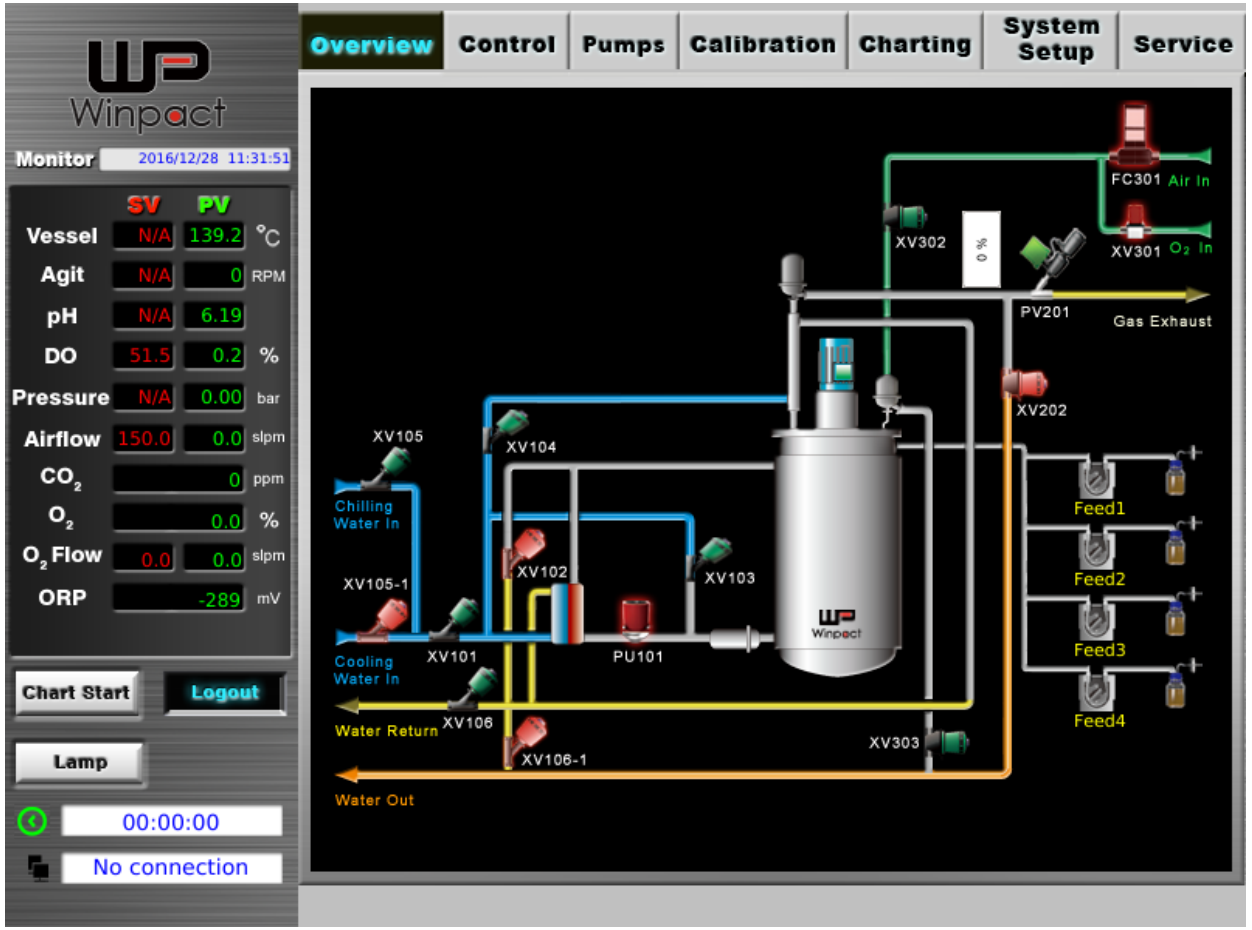
Filter system equipment

Customized equipment

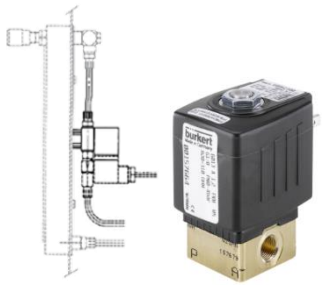
Control Interface

User-friendly, graphical control interface

- Real-time display of vessel set point parameters and conditions
- Monitor the process immediately



Optional Devices

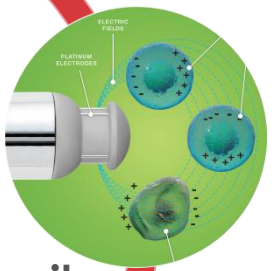


Oxygen Enrichment Module

External Pump

ORP Probe

Lighting Module

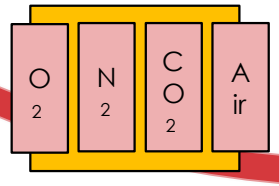


Cell Density Probe

Mass Flow Controller

Winpact

Gas Mixing Station



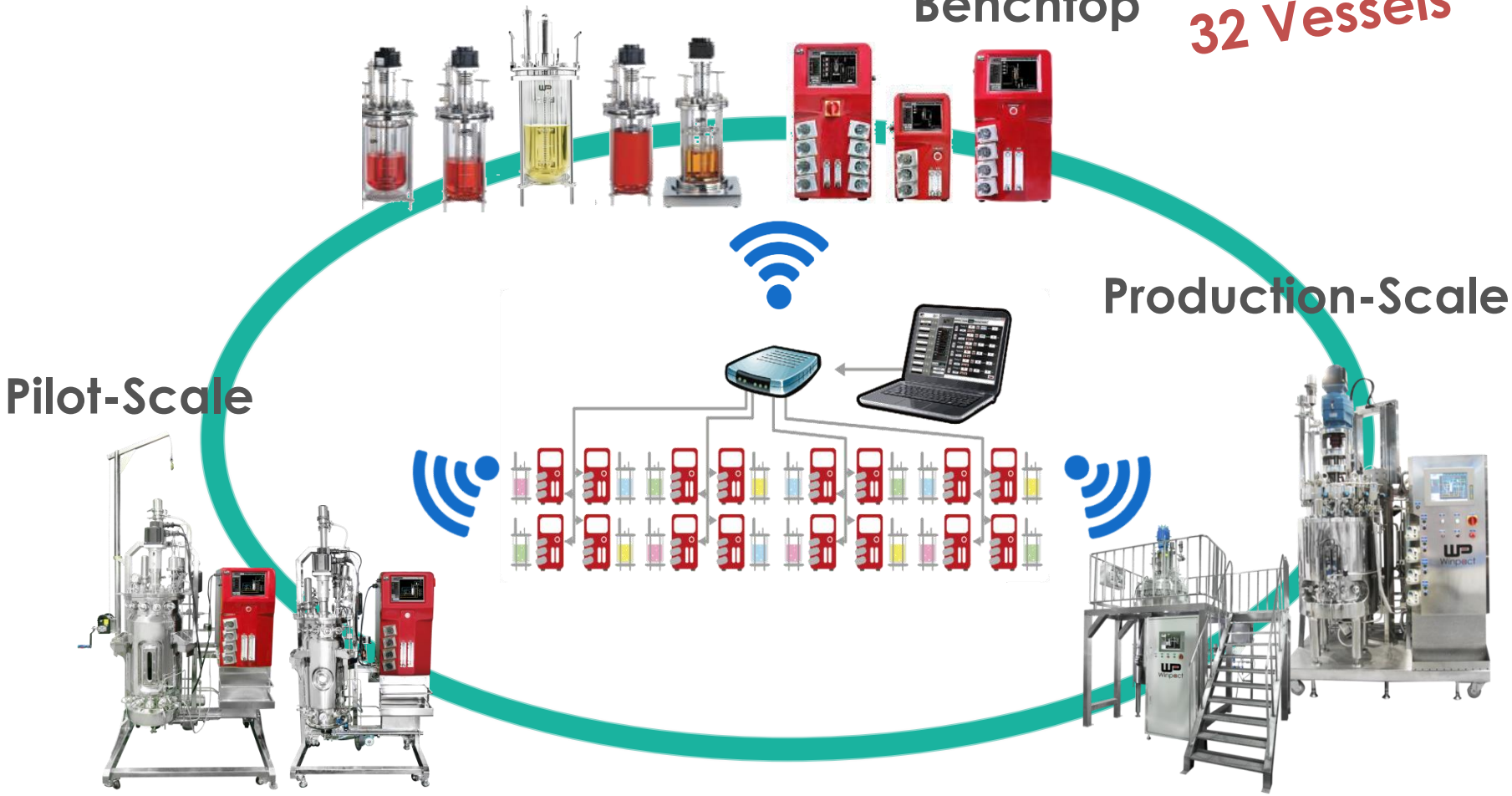
All-in-one Mass Flow Controller

O_2/CO_2 Off Gas Analyzer

Methane Off Gas Analyzer

Remote Control

➢Smart communication technology



THANK YOU FOR YOUR ATTENTION

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