



SEMIAN TECHNOLOGY
Semiconductor A New Technology Co.,Ltd

SEMIAN's ***GAS SCRUBBER***

FEATURES

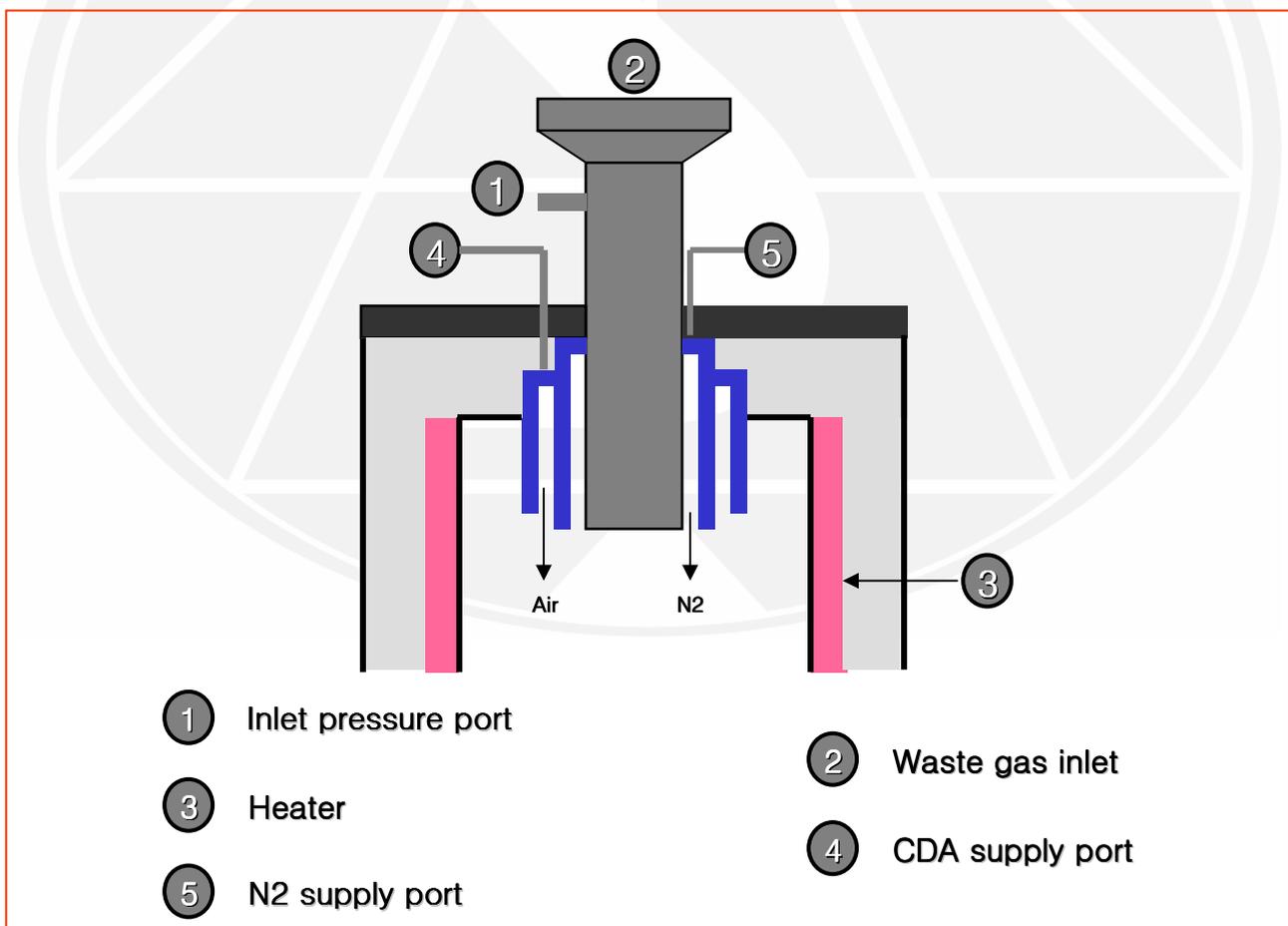
MODEL: SBW 200



1. Each of units function and explanation

1. Inlet head unit

- Intake of waste gas from wafer processing tool
- Independently inlet pipe line
 - Protection of incompatible gas mixture
- Prevention of solid powder deposition inside pipe line
- Preheat section(360~400 °C)
- Inlet pressure indication and control
- CDA supply port
 - Oxygen source





1-2. Incompatible gas mixture

- $\text{SiH}_4 + 3/8\text{NF}_3 \longrightarrow 4\text{SiH}_4 + 4\text{HF} + 4/3\text{N}_2$
 - Explosion volume : NF3 90% - 0.66%

- Halogen gas + H₂ (hydrogen)
 - Low temperature \longrightarrow Do not mixture

- Preheat section
 - Increase to uniformity temperature inside burn chamber

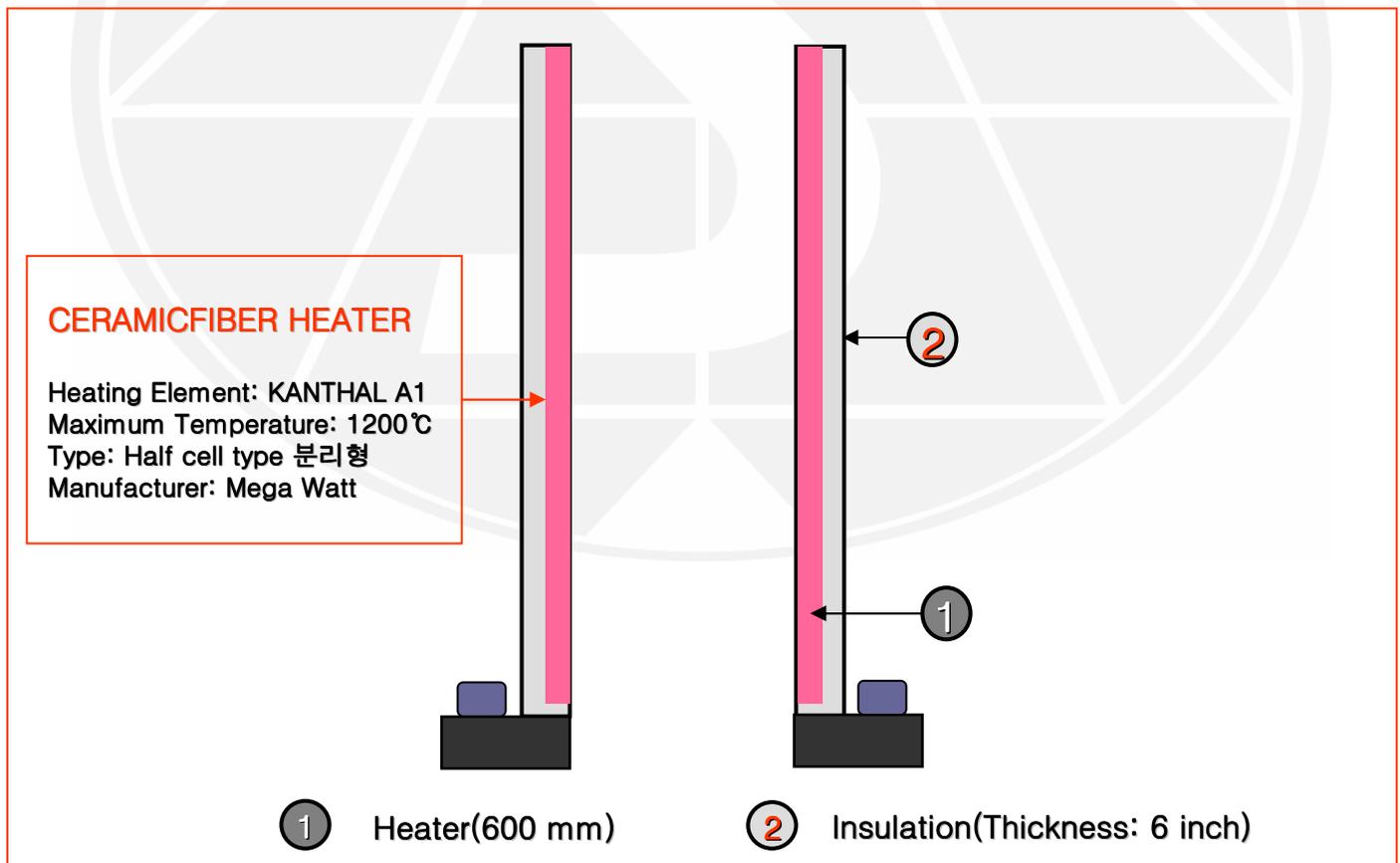
- Inlet pressure indication and control
 - Inlet pressure Increase \longrightarrow Reached alarm pressure \longrightarrow by-pass valve open
 - Inlet pressure check \longrightarrow Expect to PM and cleaning cycle

- If inside inlet pipe line deposited by solid powder.
 - Impact of process run
 - Short cycle PM time
 - Process run loss



2. Oxidation reactor unit

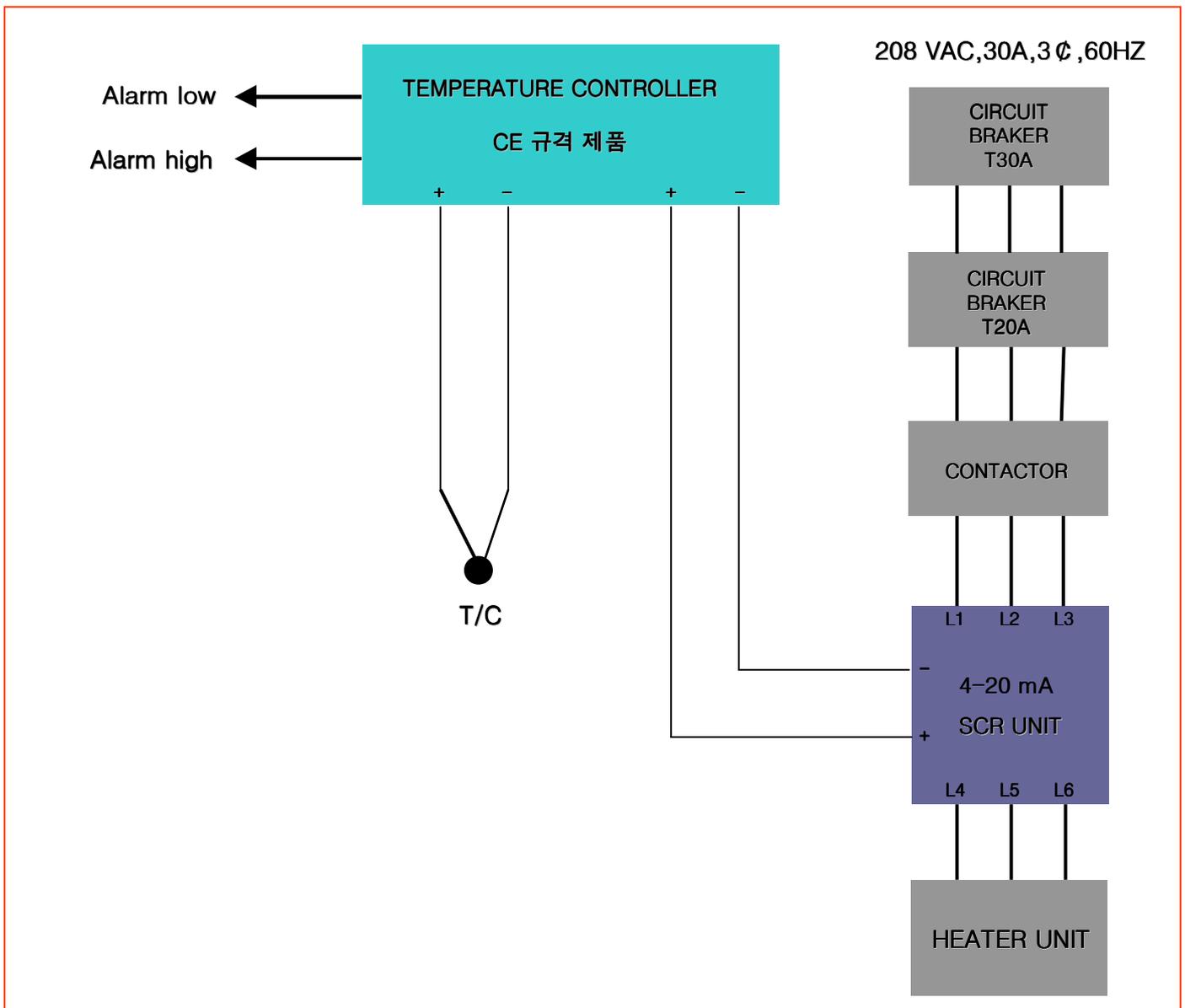
- Thermal decomposition and oxidation
 - $\text{SiH}_4 + 2\text{O}_2 \longrightarrow \text{SiO}_2 + 2\text{H}_2\text{O}$
- Waste gases changed to non-toxic solid powder and clean gas
- Running temperature 800 °C
 - Target waste gas : NH_3 (660 °C – 700 °C)
 SiH_4 (< 85 °C)
 NF_3 (>350 °C)
- Inside chamber material : STAINLESS STEEL 310S
- Waste gas passing time : Only burn chamber 2 – 3 Sec
- Waste gas treatment capacity
 - N_2 volume flow \longrightarrow Keep up continuously heat temperature and inlet pressure
- Thermocouple reading position : 360 mm





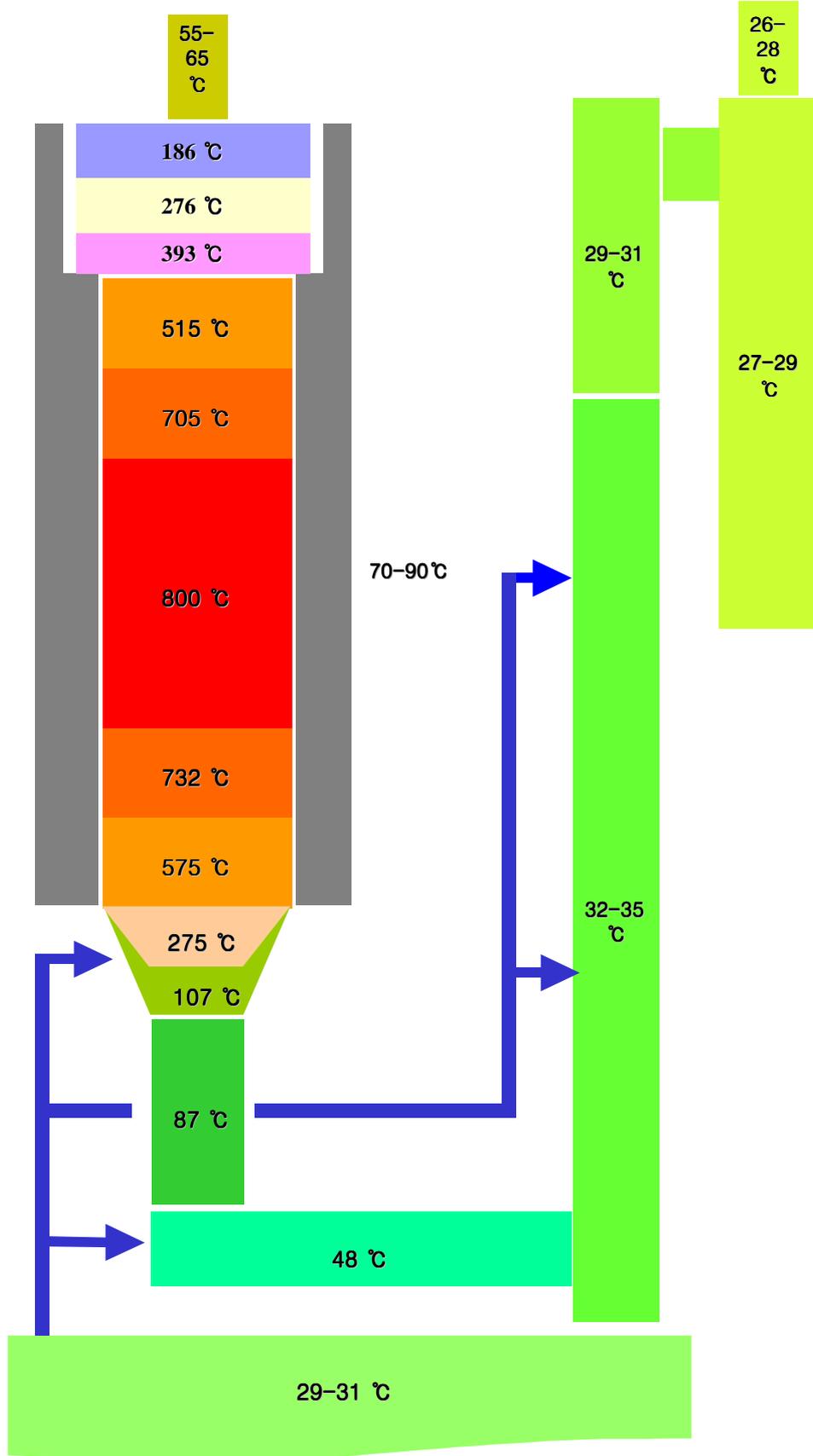
2-1. Heater control method

1. The electrical control system have long life time with heater element
 - Burst firing control : time base on/off cycle
 - Excellent process temperature control
2. Minimal EMI generation
3. Very fast response time
4. 3 years cost : low





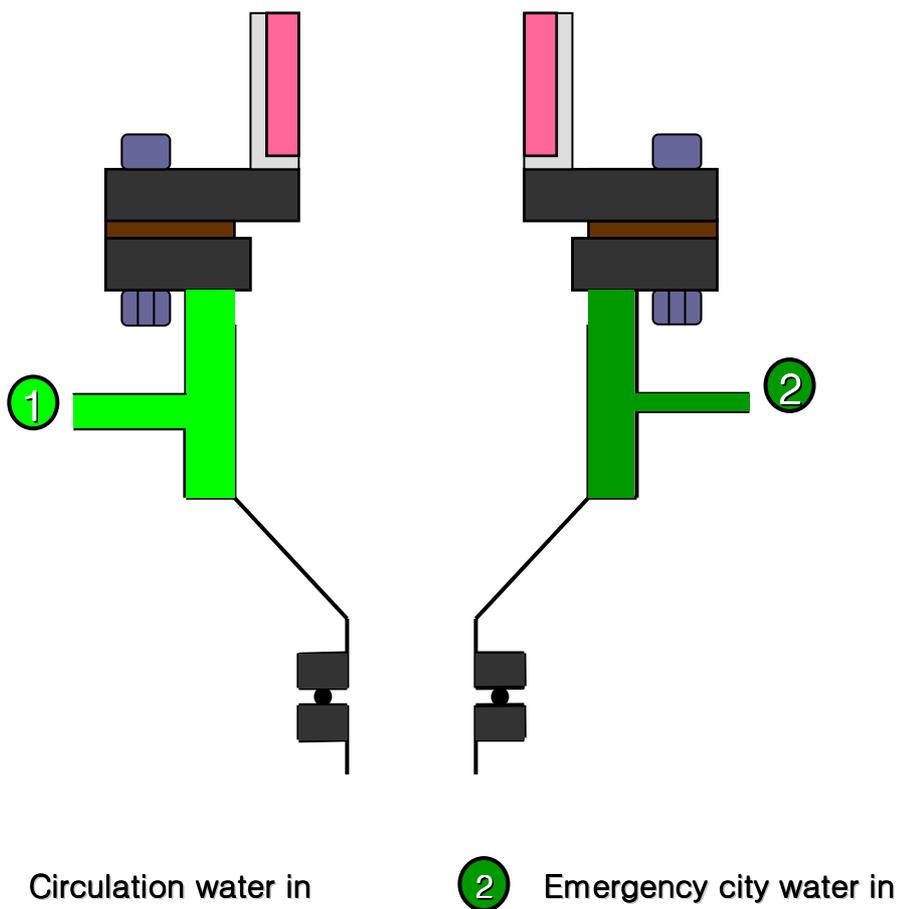
2-2. Processing temperature control zone





3. Swirl unit

- No deposition by solid powder inside this unit.
- Hot gas changed to cool gas because of rapidly temperature down (Water has very big heat capacity)
- Carrying solid powder and by-products
- Uniformity cooling zone

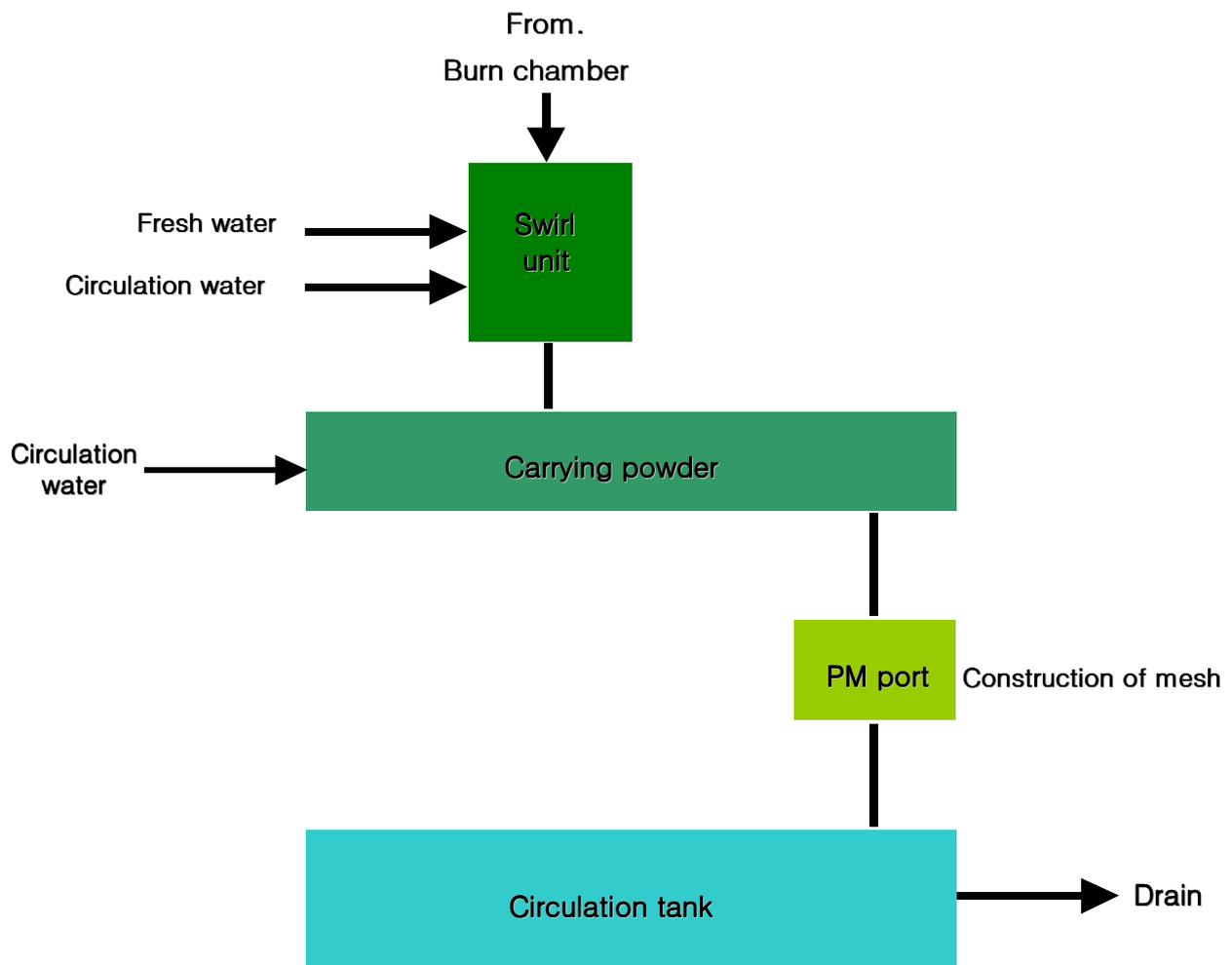


3-1. Cleaning system

* SBW 200 Gas scrubber has normally cleaning system during process time.

- Low cost
- Long cycle PM time
- Prevention deposit of solid powder inside wall

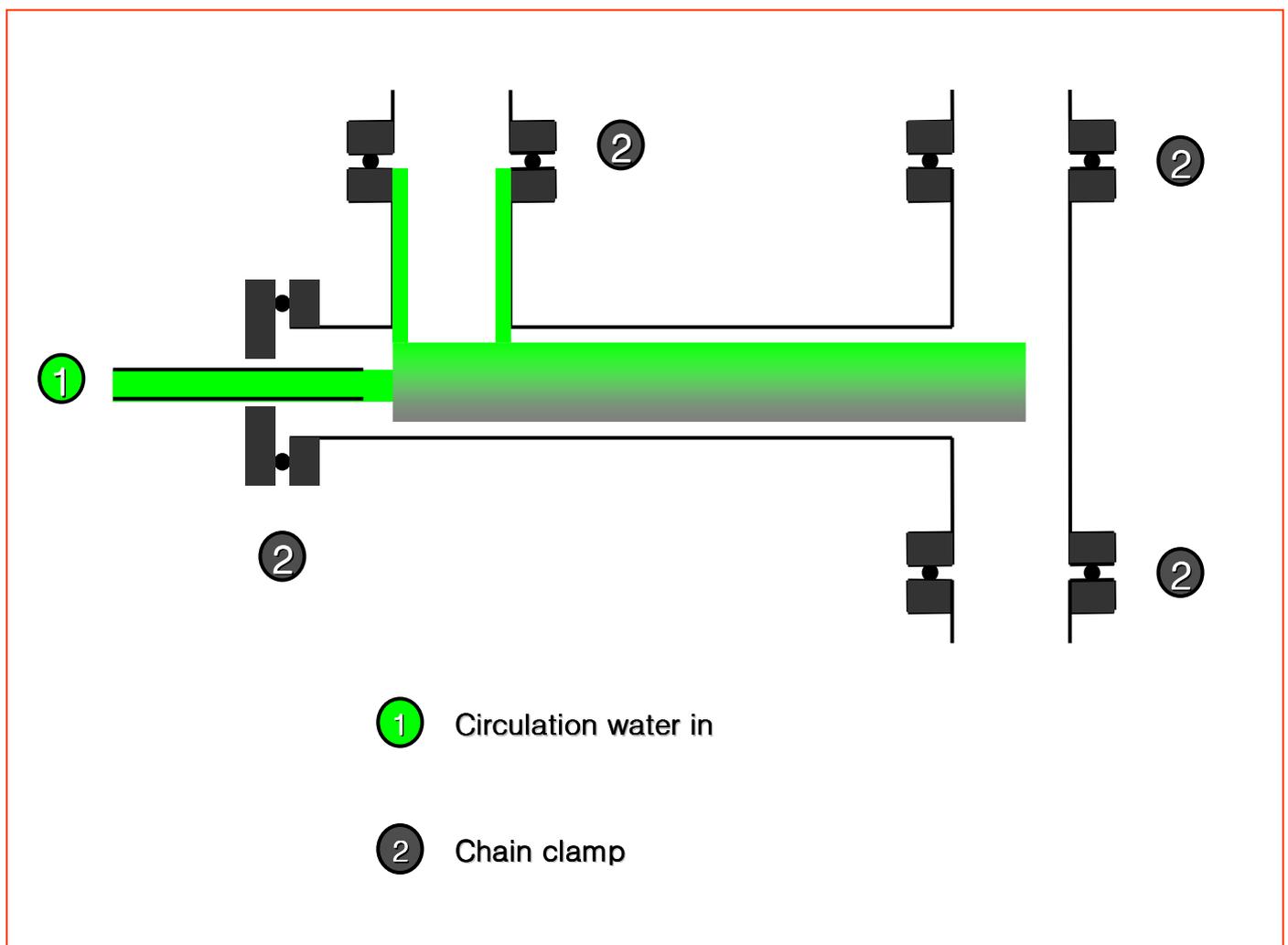
* Cleaning configure.





4. First wet scrubbing unit

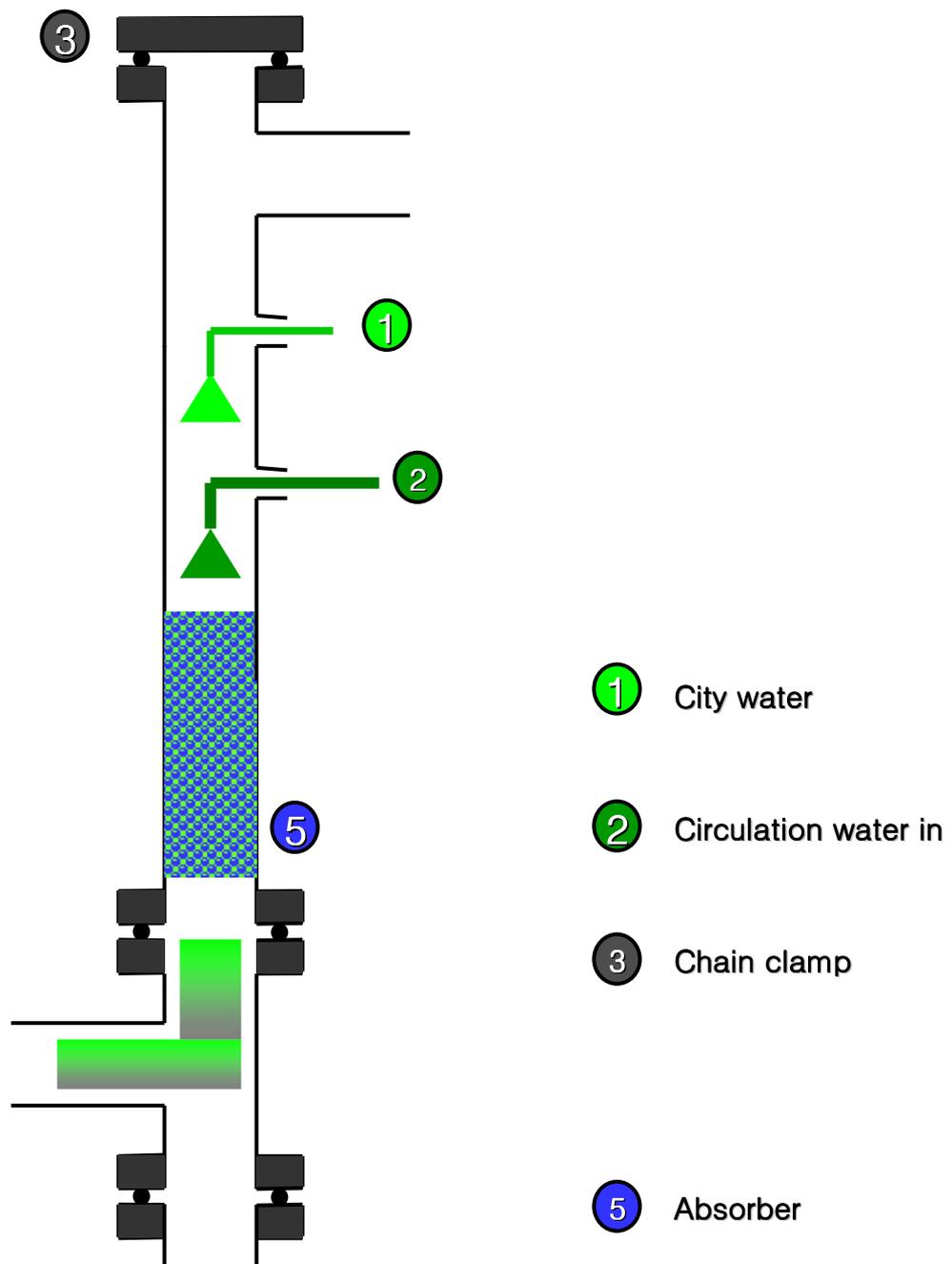
- Treatment of soluble gas
ex) $\text{Cl}_2, \text{F}_2 \longrightarrow \text{HF}, \text{HCl}$
- Forward injection nozzle
 - Prevention of powder formation
 - Carried by-products to circulation tank
- Perfectly cooling zone
- Supplied carrier NITROGEN





5. Second wet scrubbing unit

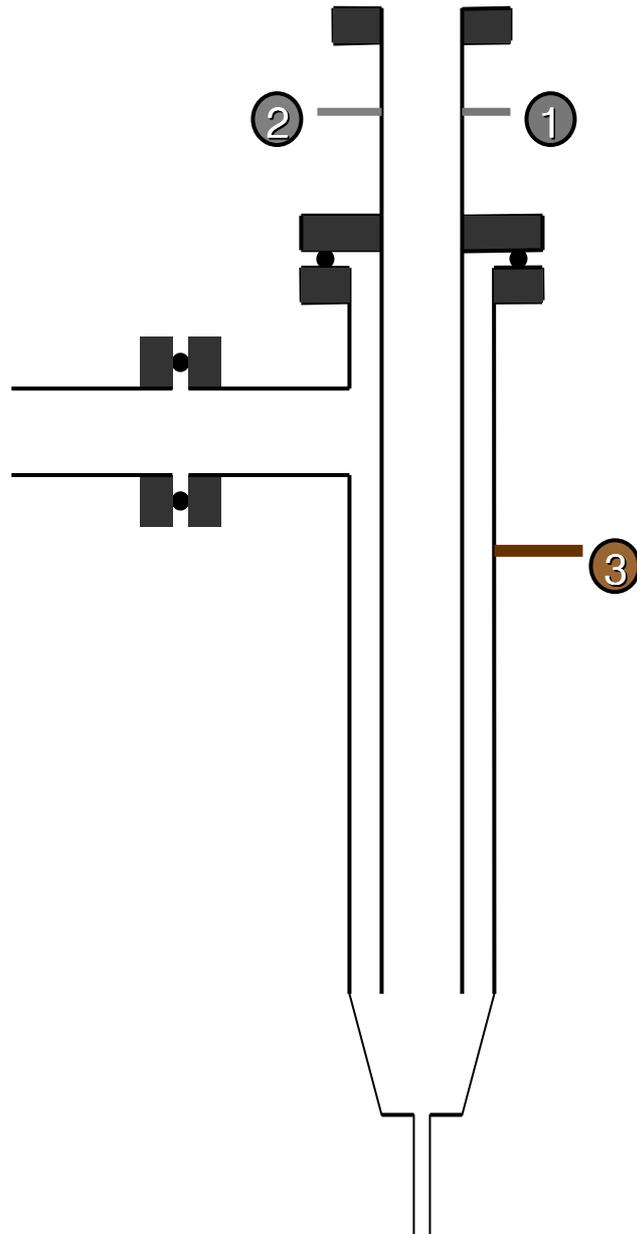
- Down stream spray nozzle
 - Soluble gases achieved more than 99% efficiency
 - Remove particle and small solid powder
- Patented absorber
 - Large area supplied during passing gases
 - Long passing time(long path)





6. Water trap unit

- Construction of centrifugal separator
- Trap water fall down into circulation tank.
- Prevent of moisture incoming to main duct
(Main duct come in moisture along clean gas)

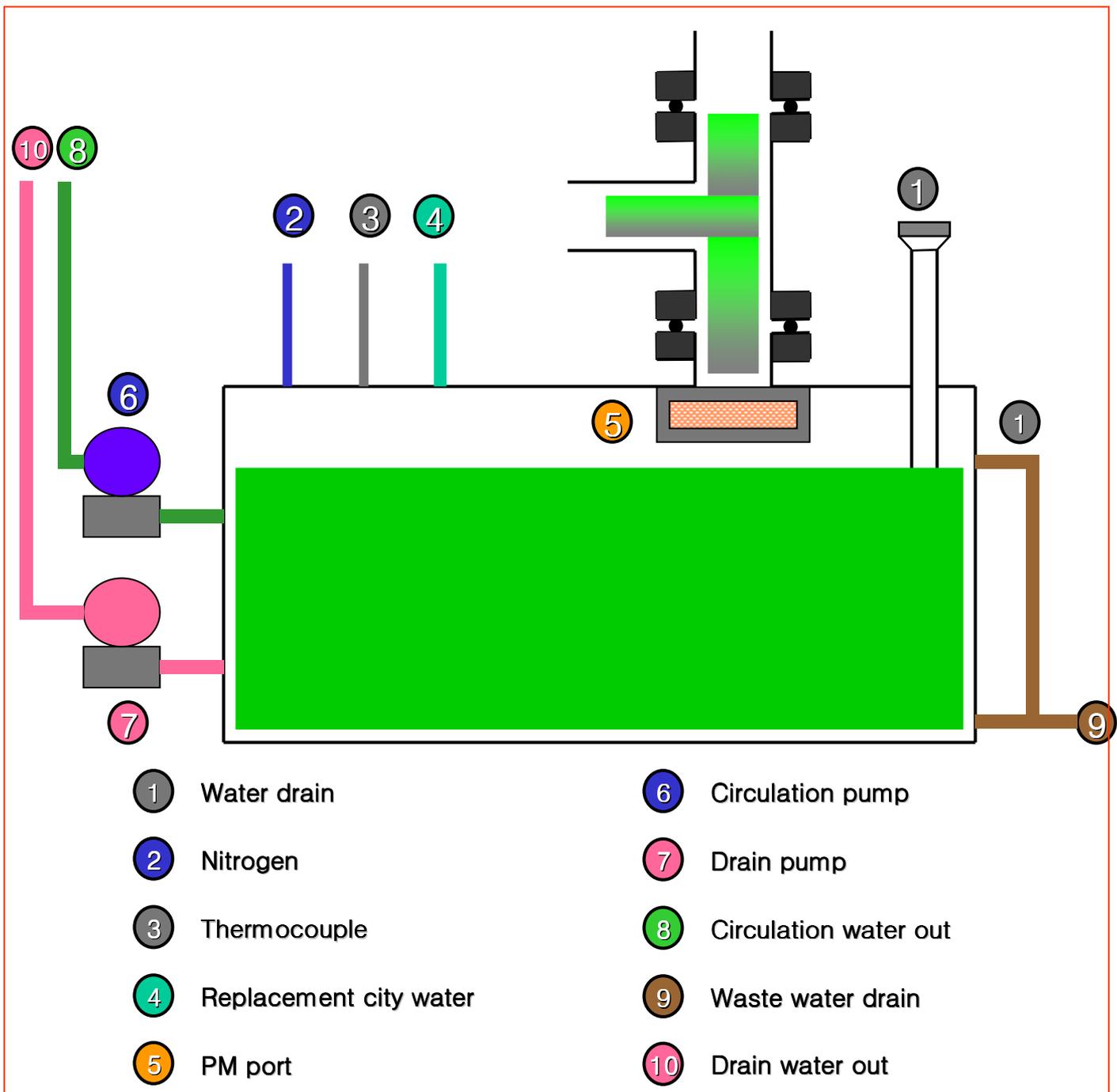


- ① Exhaust thermocouple
- ② Gas sampling port
- ③ Centrifugal separator N₂



7. Circulation tank unit

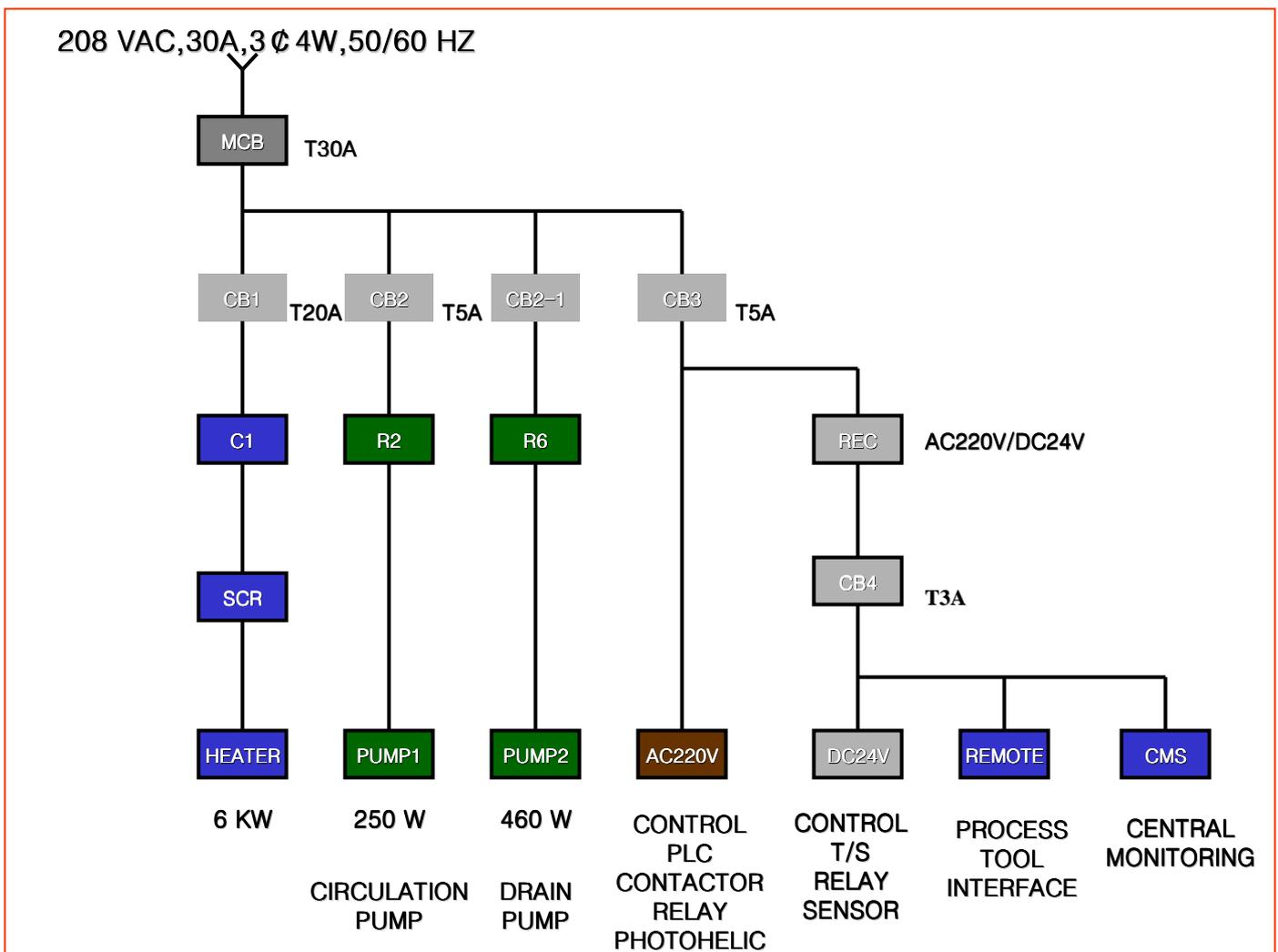
- Low consumption city water → low running cost
- Monolithic construction
- Water temperature control for the purpose of increase efficiency
- Easily PM port
 - System has low down time when occurred maintenance
- pH control(option)





8. Electrical control unit

- Installed touch screen
 - Easily operation and message displayed on screen
- Heater temperature control type
 - Burst firing power control
 - The heaters has long life time
- Safety
 - Alarm/warning interlock
 - Circuit protector
 - Water leak sensor
 - Cabinet temperature sensor





9. Option

- By-pass unit
 - prevention of process run loss

- pH control unit
 - For high efficiency treatment of soluble gases

- Central monitoring system