



**SEMIA** TECHNOLOGY  
Semiconductor A New Technology Co.,Ltd

# ***SEMIA's*** ***GAS SCRUBBER***

## ***FEATURES***

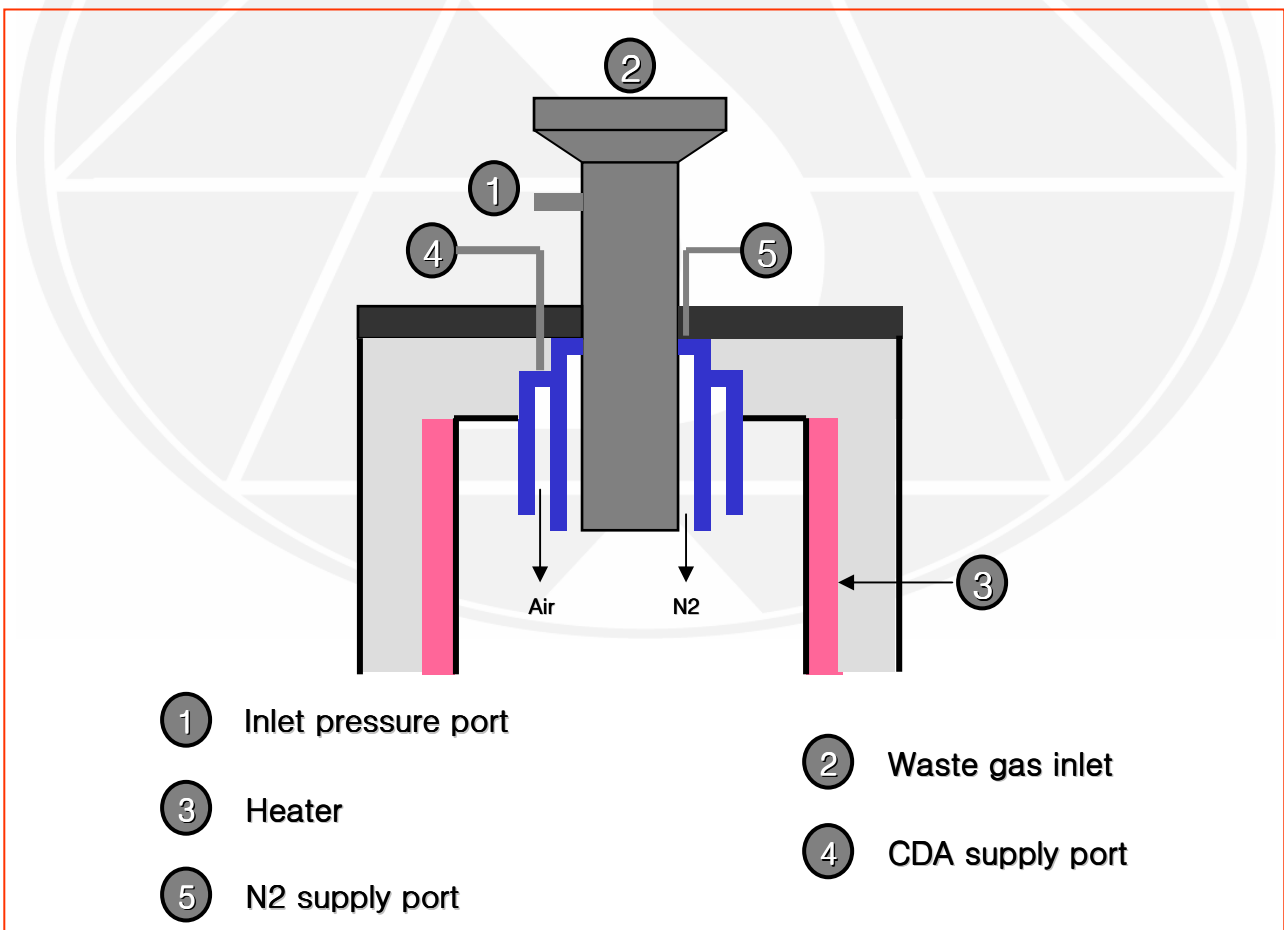
### ***MODEL: SBW 200***



# 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





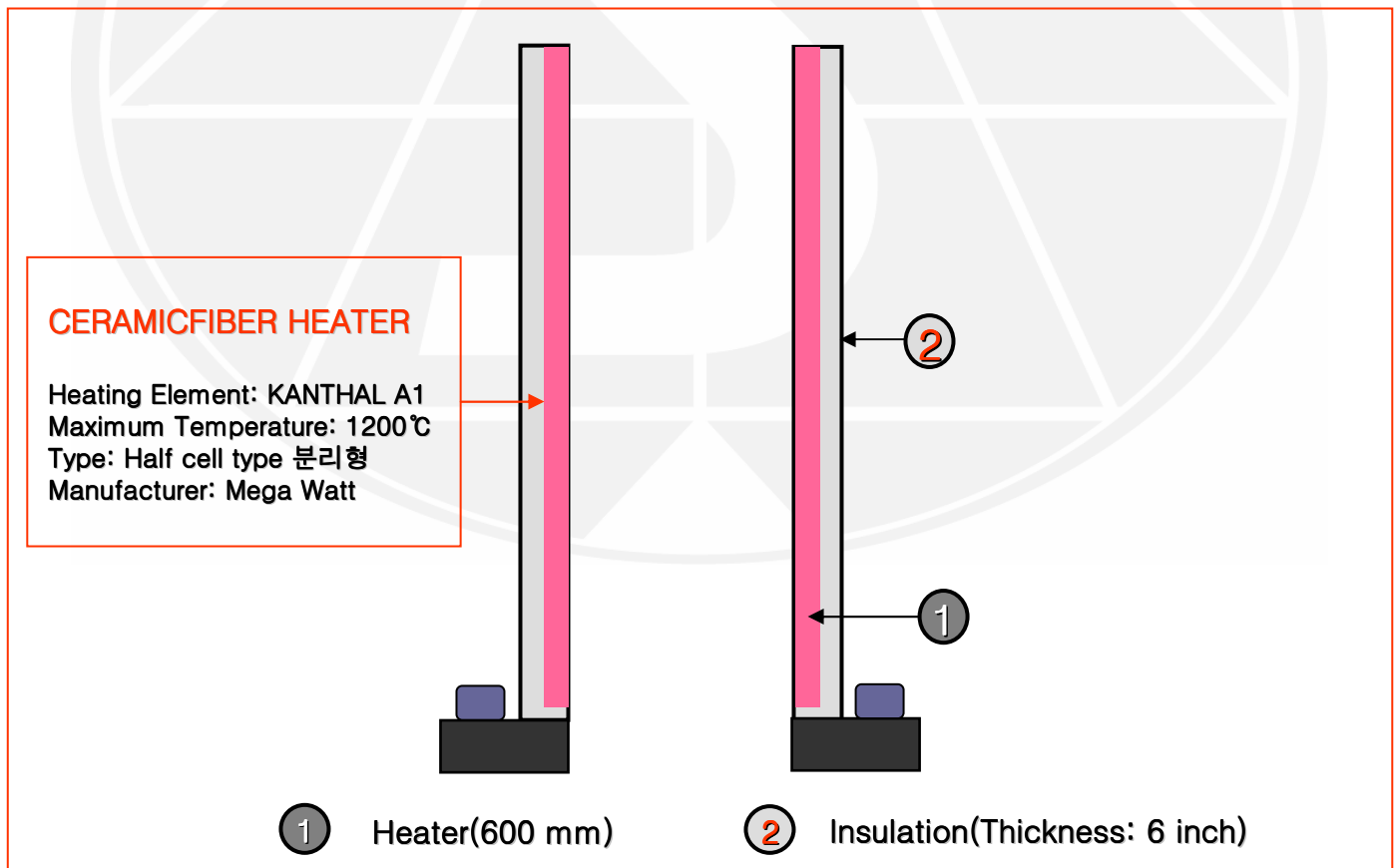
## 1-2. Incompatible gas mixture

- $\text{SiH}_4 + 3/8\text{NF}_3 \longrightarrow 4\text{SiH}_4 + 4\text{HF} + 4/3\text{N}_2$ 
  - Explosion volume : NF3 90% - 0.66%
  
- Halogen gas + H<sub>2</sub> (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

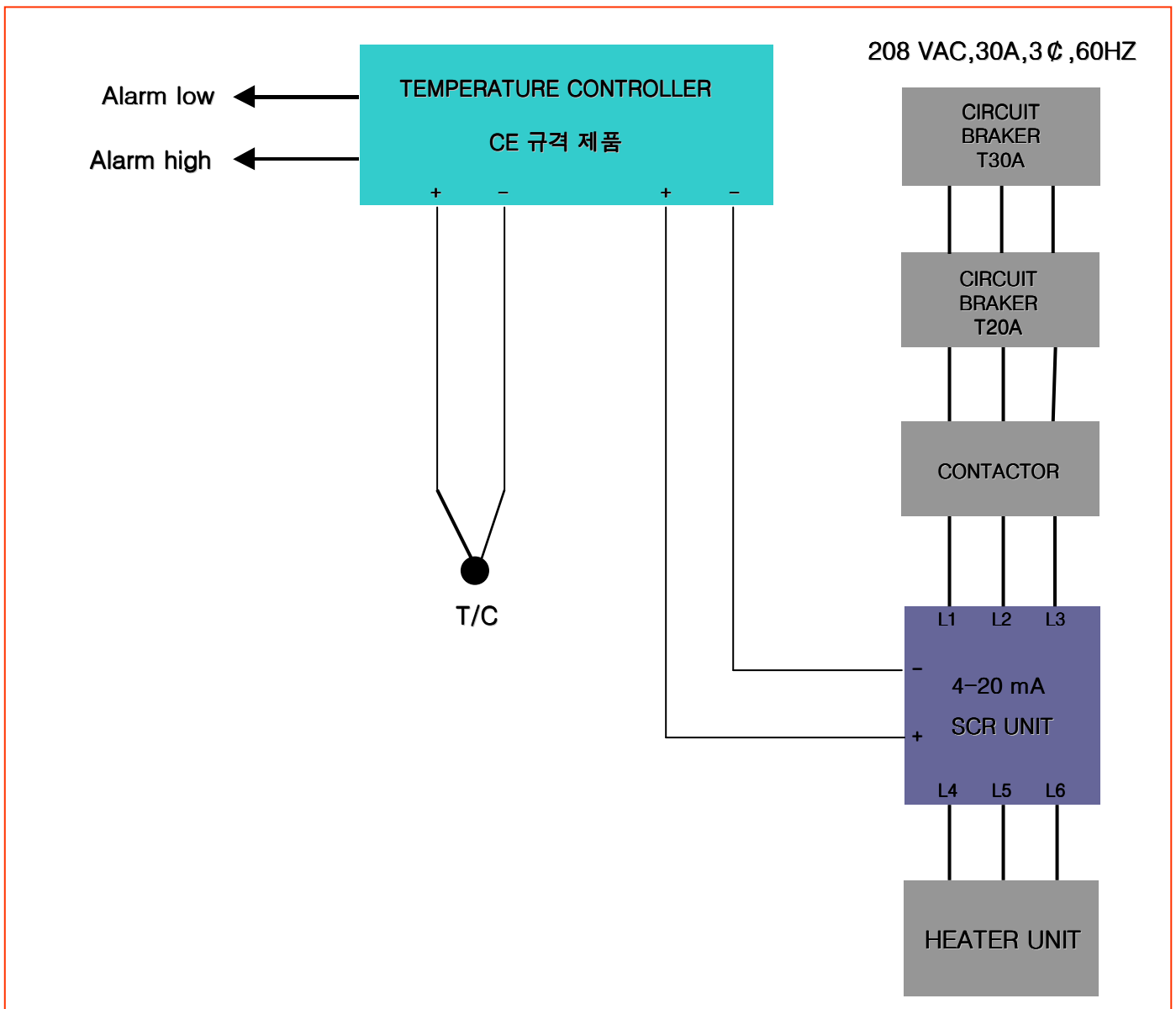
- Thermal decomposition and oxidation
  - $\text{SiH}_4 + 2\text{O}_2 \longrightarrow \text{SiO}_2 + 2\text{H}_2\text{O}$
- Waste gases changed to non-toxic solid powder and clean gas
- Running temperature 800 °C
  - Target waste gas :  $\text{NH}_3$  ( 660 °C – 700 °C )  
 $\text{SiH}_4$  ( < 85 °C )  
 $\text{NF}_3$  ( >350 °C )
- Inside chamber material : STAINLESS STEEL 310S
- Waste gas passing time : Only burn chamber 2 – 3 Sec
- Waste gas treatment capacity
  - $\text{N}_2$  volume flow  $\longrightarrow$  Keep up continuously heat temperature and inlet pressure
- Thermocouple reading position : 360 mm





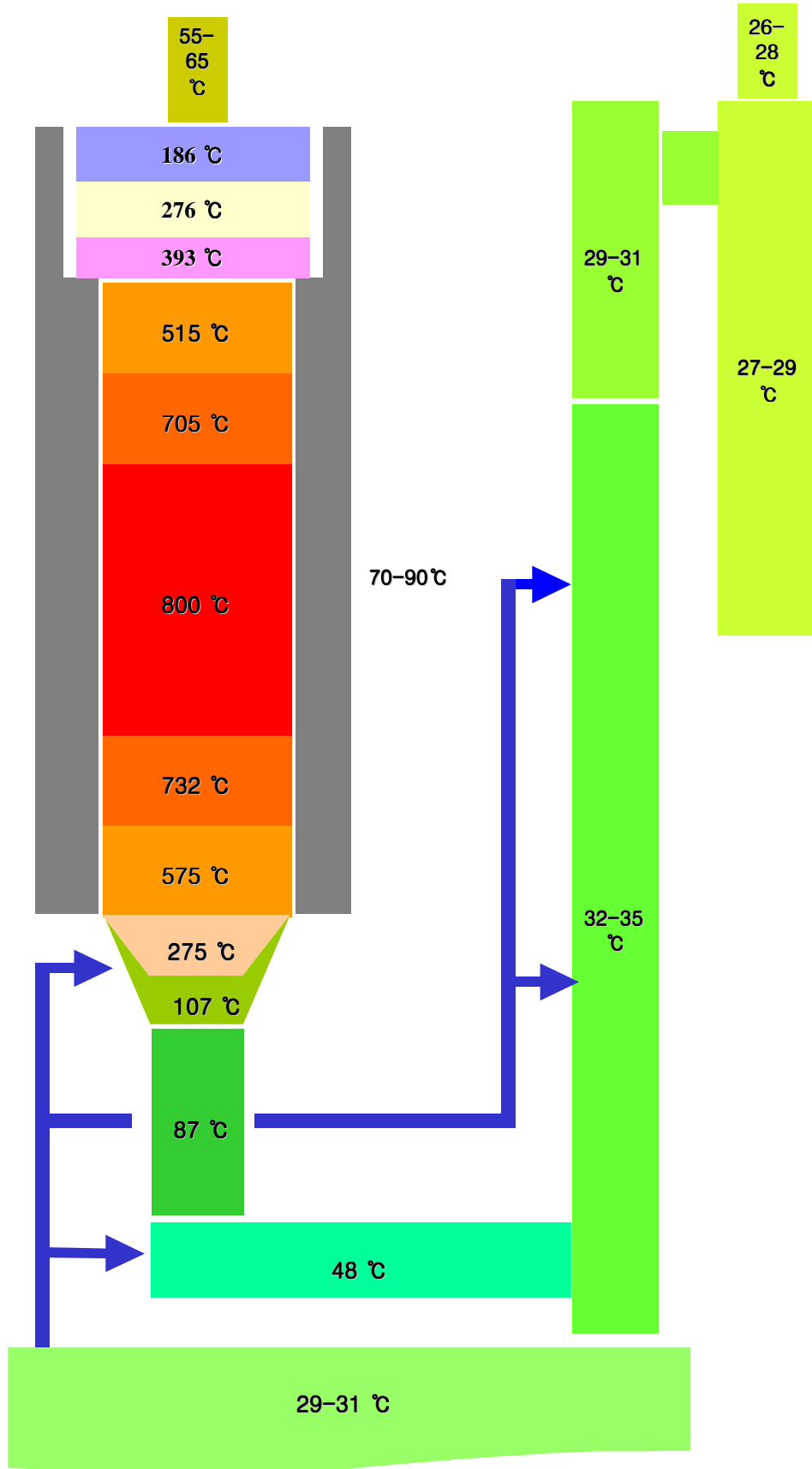
## 2-1. Heater control method

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





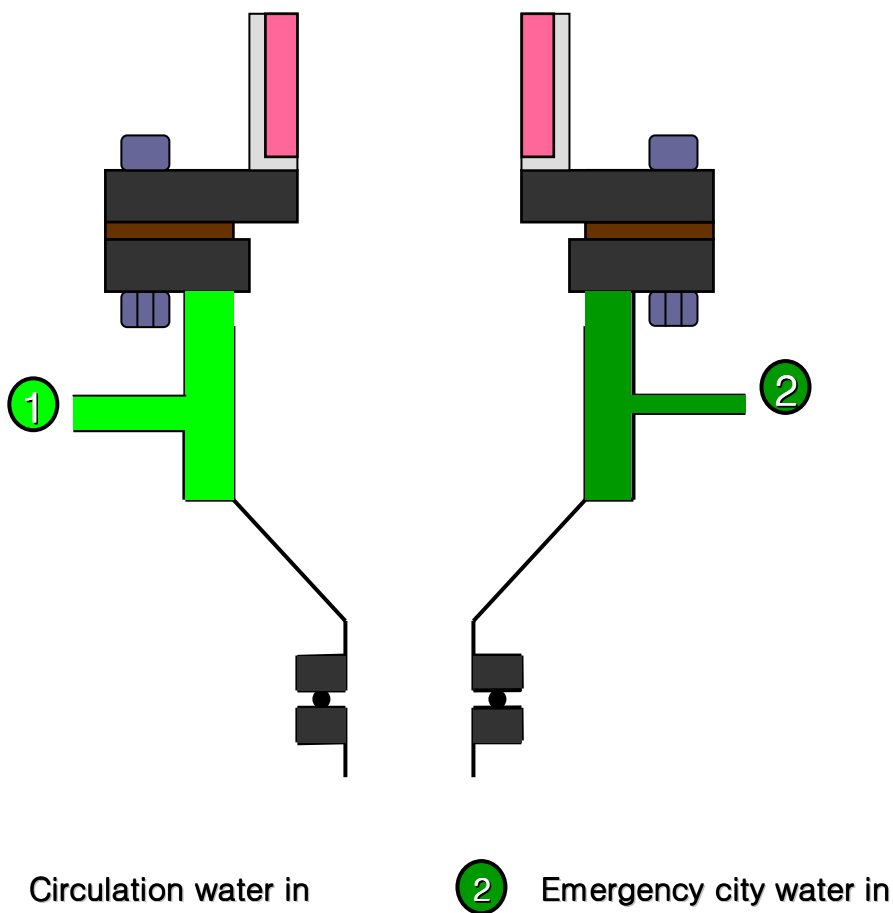
## 2-2. Processing temperature control zone





### 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

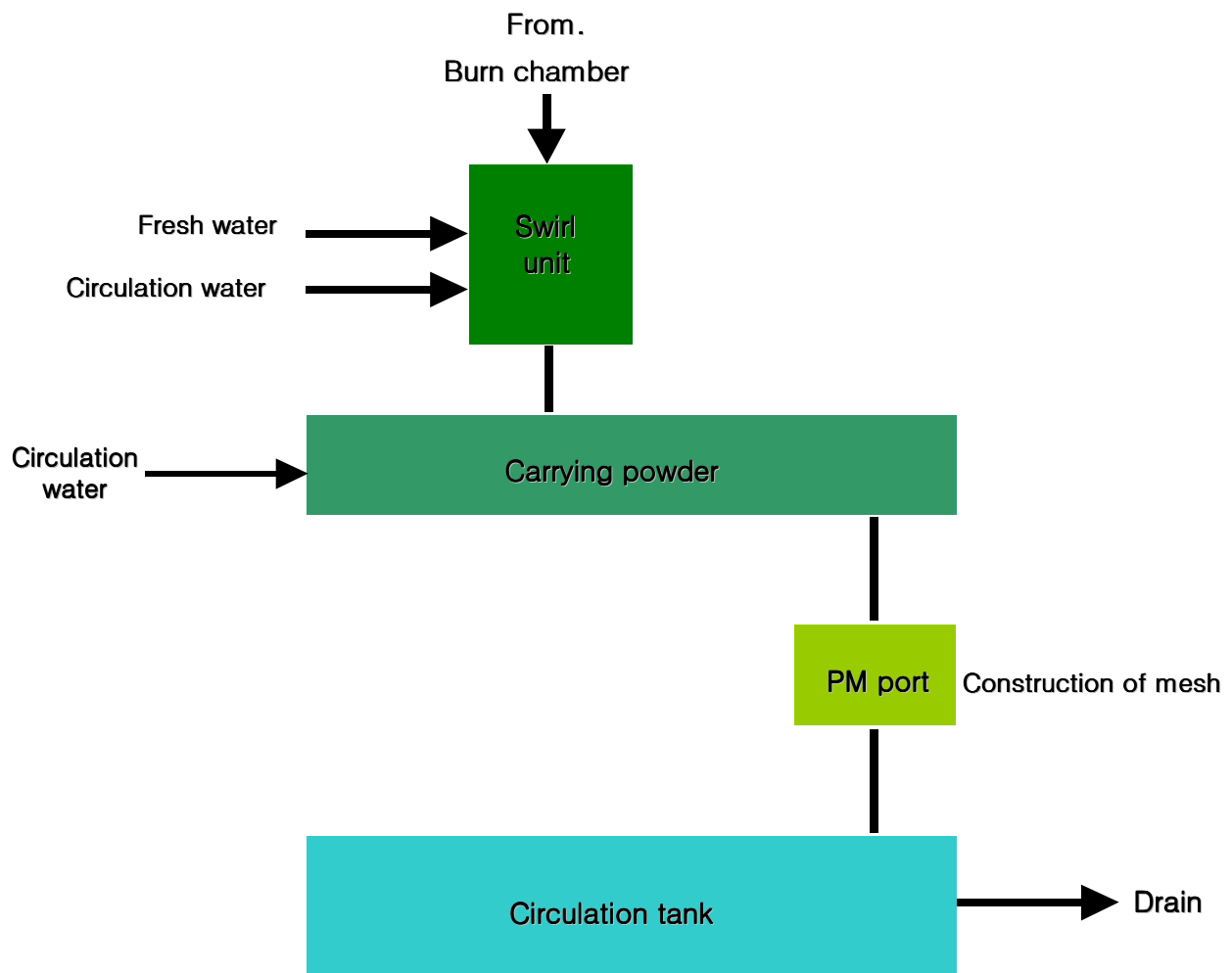


## 3-1. Cleaning system

\* 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.

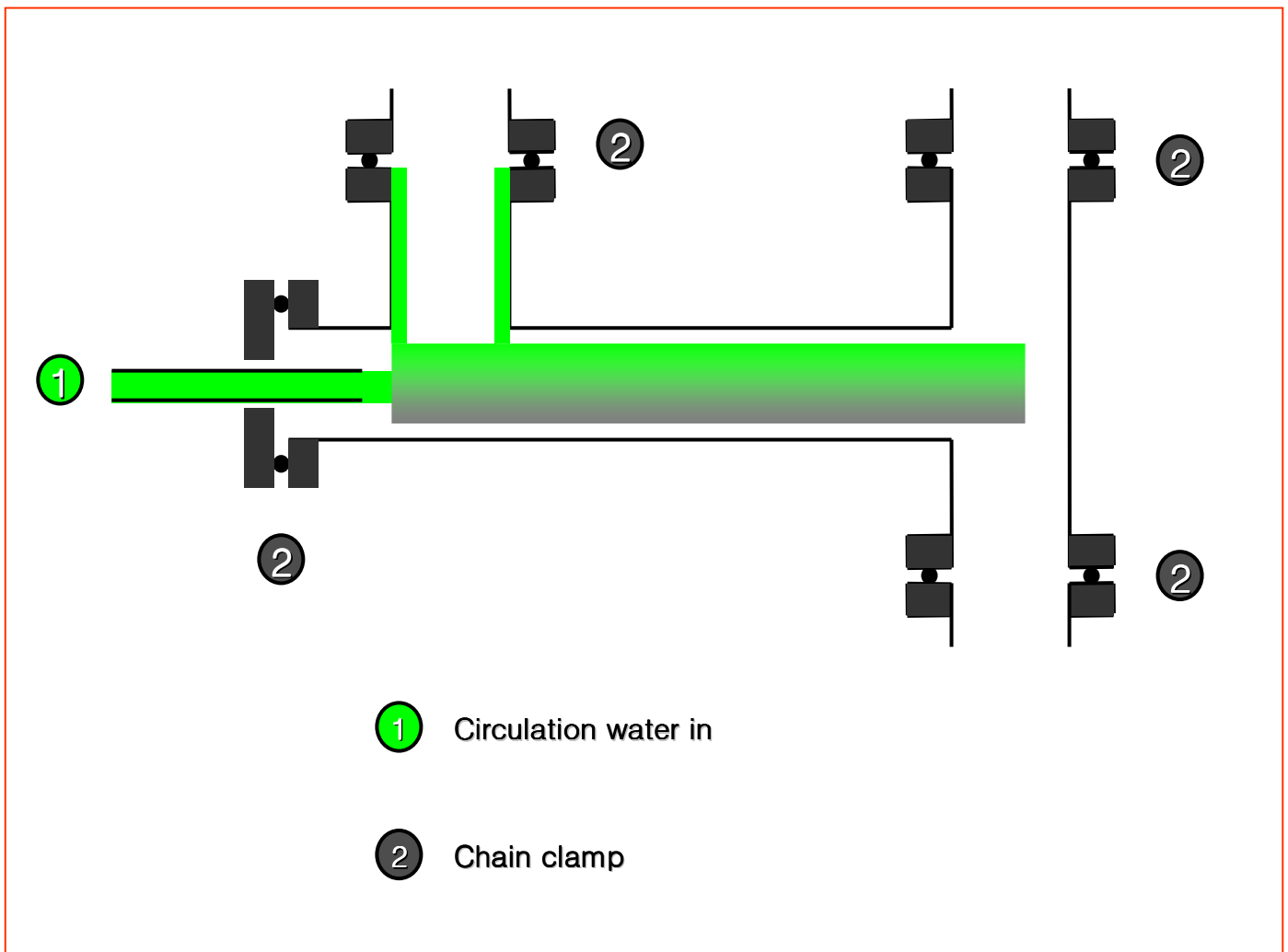






## 4. First wet scrubbing unit

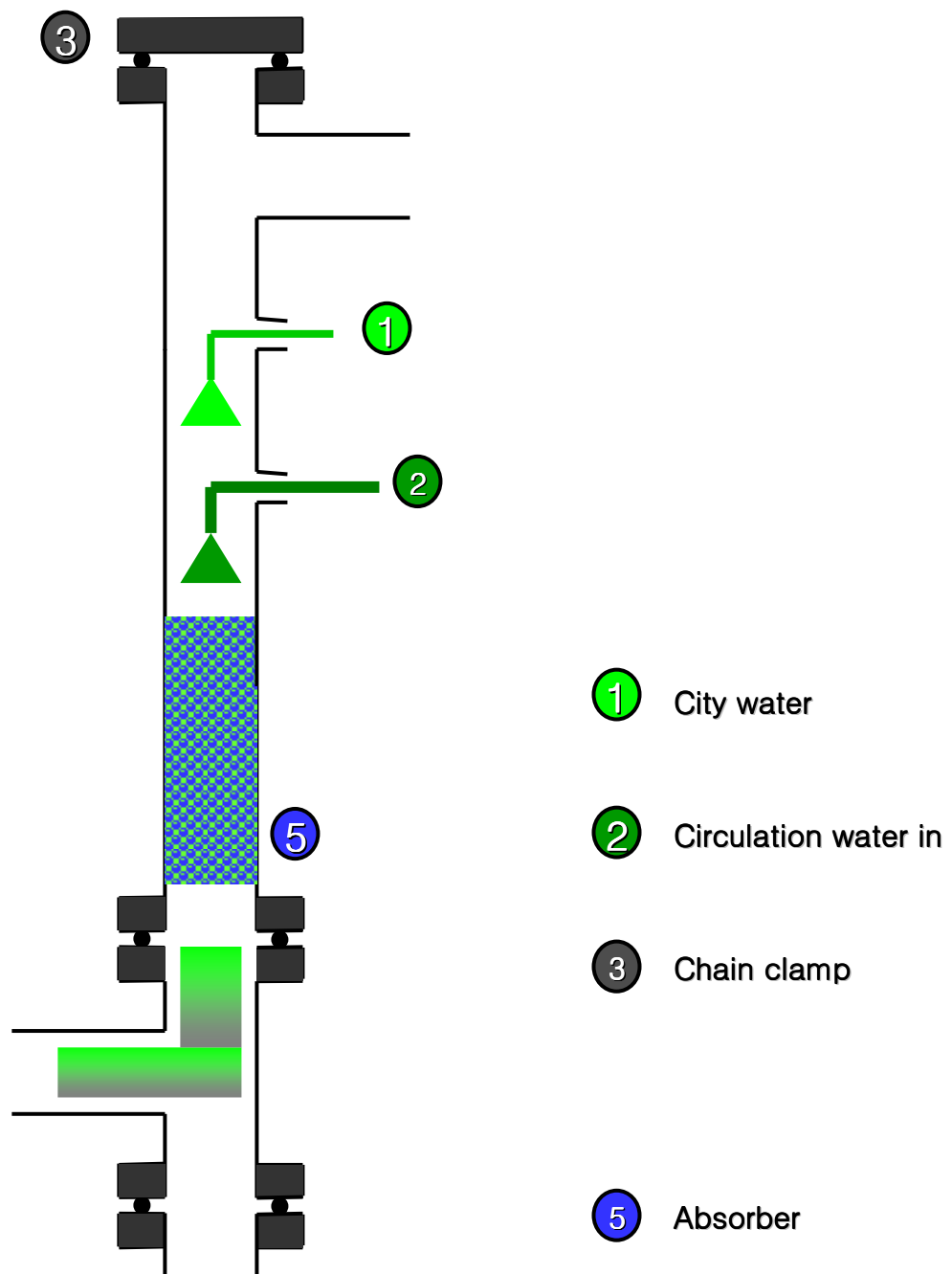
- Treatment of soluble gas  
ex)  $\text{Cl}_2, \text{F}_2 \longrightarrow \text{HF}, \text{HCl}$
- Forward injection nozzle
  - Prevention of powder formation
  - Carried by-products to circulation tank
- Perfectly cooling zone
- Supplied carrier NITROGEN





## 5. Second wet scrubbing unit

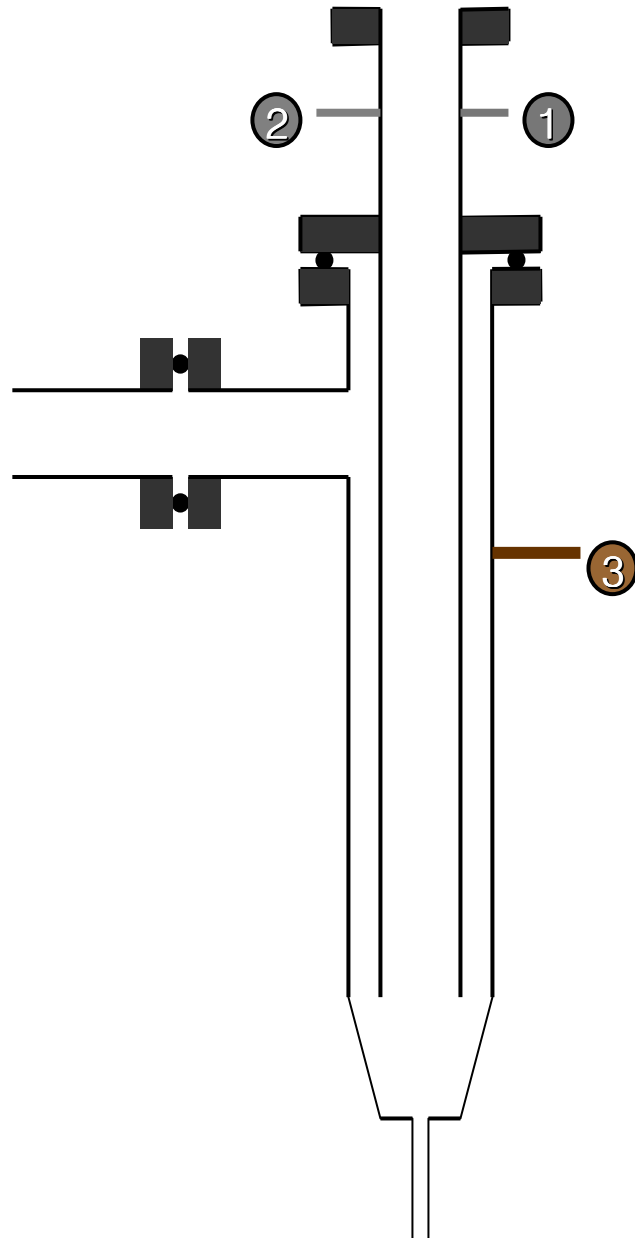
- Down stream spray nozzle
  - Soluble gases achieved more than 99% efficiency
  - Remove particle and small solid powder
- Patented absorber
  - Large area supplied during passing gases
  - Long passing time( long path )





## 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)

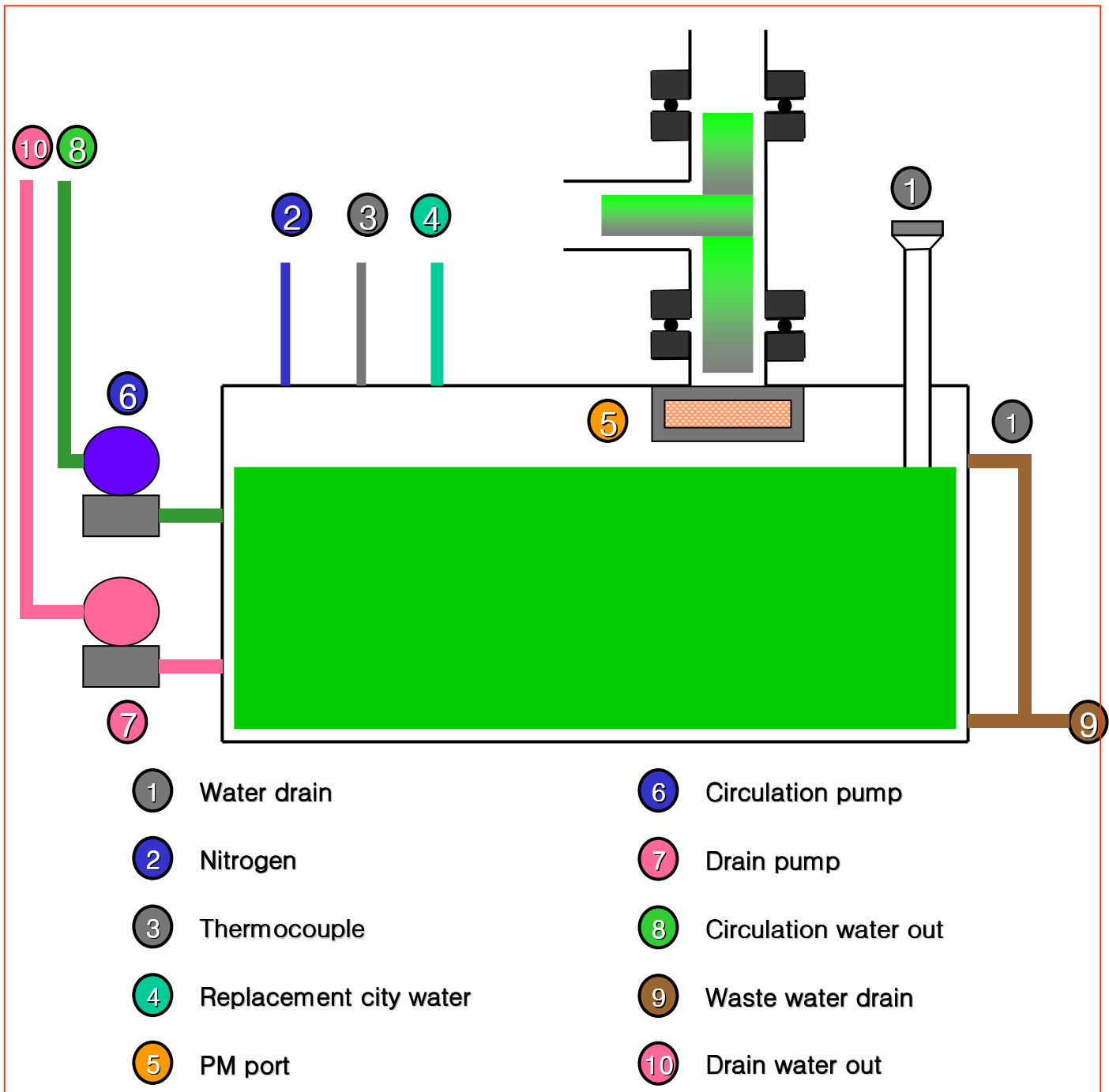


- ① Exhaust thermocouple
- ② Gas sampling port
- ③ Centrifugal separator N<sub>2</sub>



## 7. Circulation tank unit

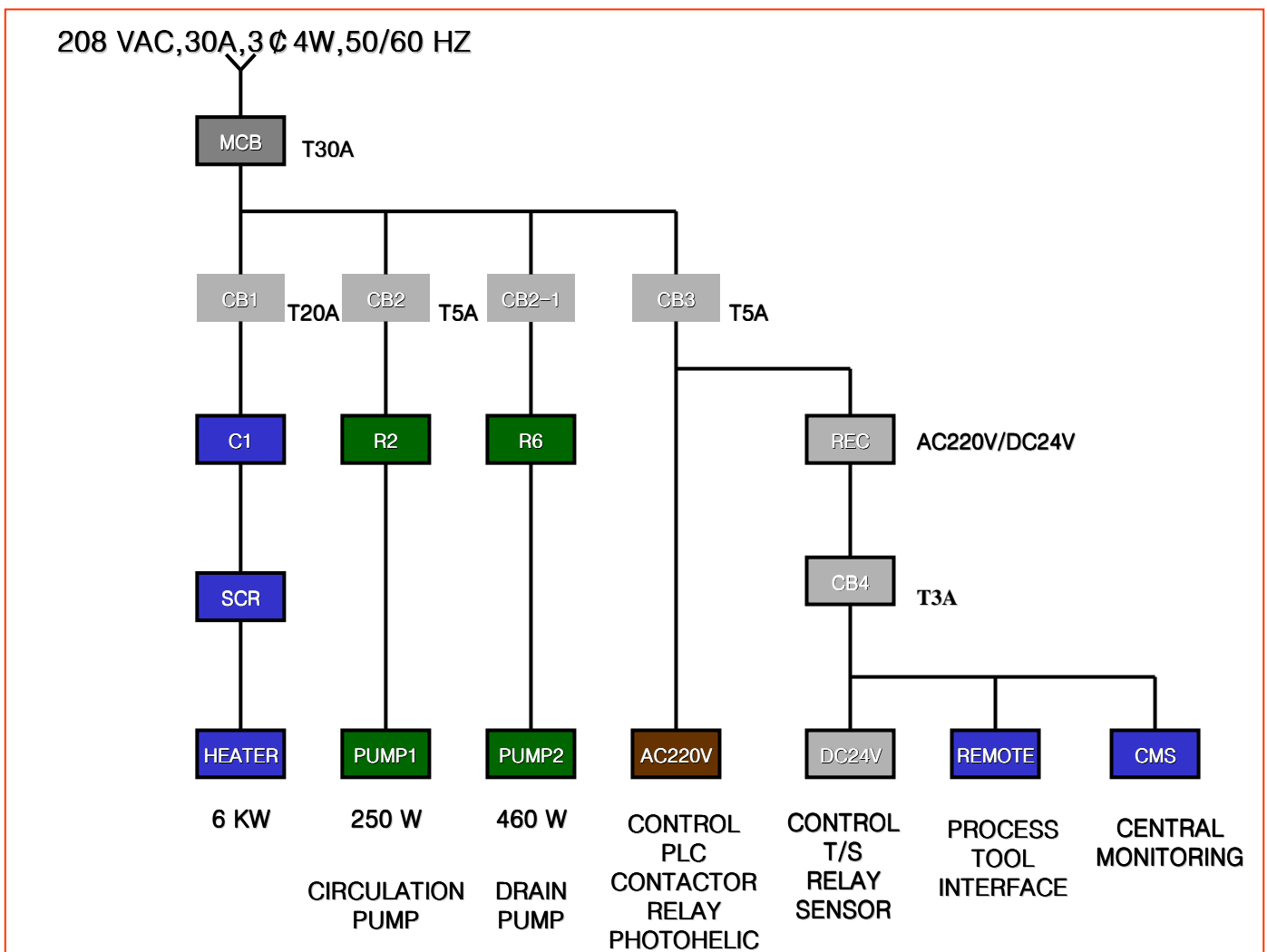
- Low consumption city water → low running cost
- Monolithic construction
- Water temperature control for the purpose of increase efficiency
- Easily PM port
  - System has low down time when occurred maintenance
- pH control( option )





## 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