

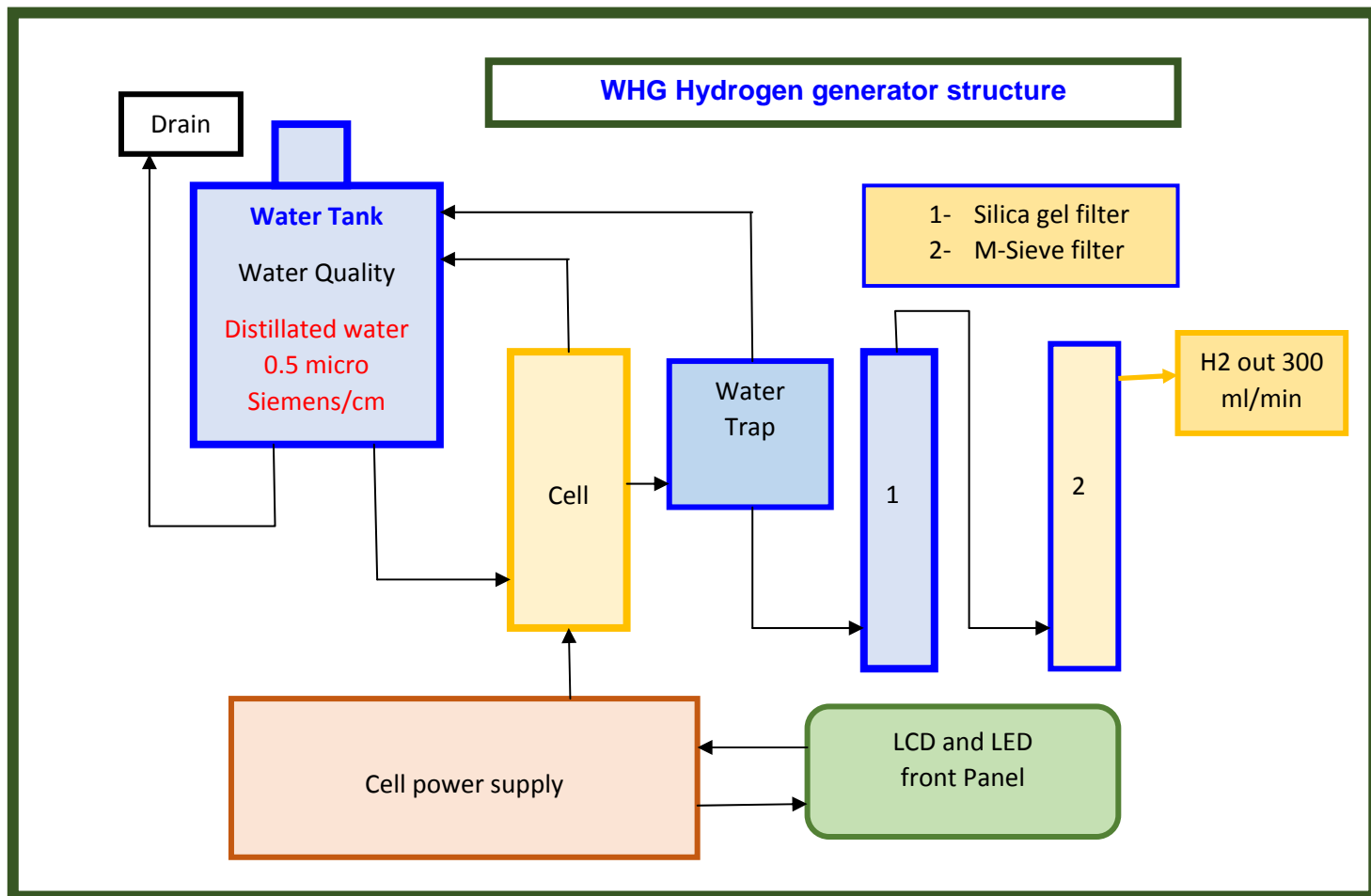
## Instruction manual WHG PEM Hydrogen Generator



# WHG Hydrogen generator instruction manual

## Technology:

This hydrogen generator use PEM membrane and electrolysis of pure water to produce pure hydrogen up to 99.9995%



## Attention!!!

- Don't add any lye to water such as KOH or NaOH
- Use only de ionized pure water less than 0.5 micro Siemens /cm or more than 2 Mega ohm/cm
- Change water and clean water tank every 1 month ( 30 days)

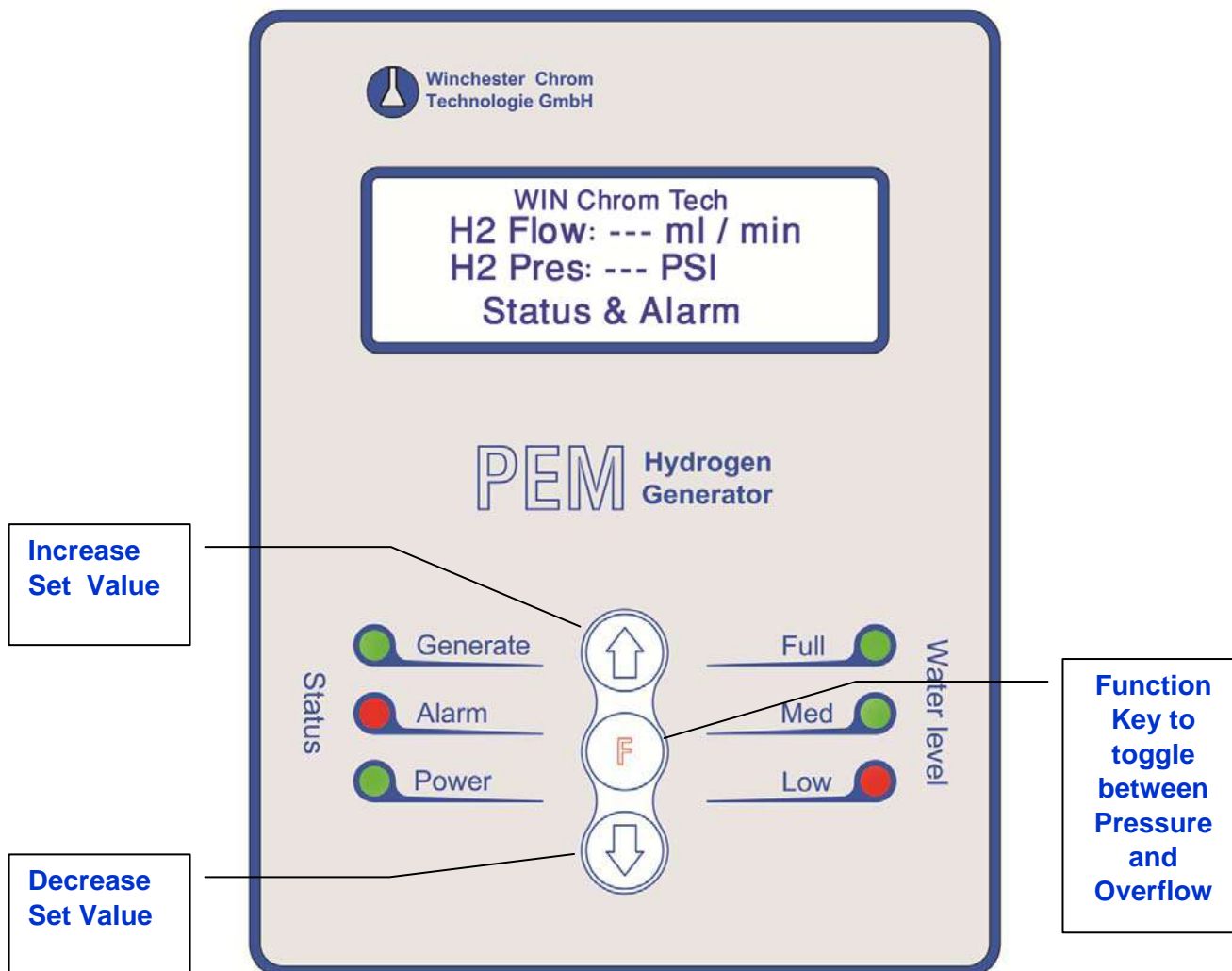


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## Key board and LCD



## LCD description

Line 1: **Name of manufacturing company**

Line 2: **H2 generation flow (ml/min)**

Line 3: **H2 output pressure (PSI)**

Line 4: **Status** of instrument and **Alarm message**

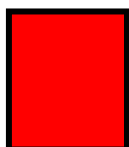


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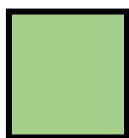
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**Generate Light:** shows the hydrogen generation and intensity of LED light depend on amount of generation



**Alarm Light:** if blink it shows one alarm and beep began to sound every 10 second and the **alarm message** appear at line 4 LCD (refer to Alarm section)



**Power Light:** shows that instrument power is on

## Status description

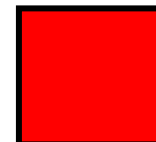
**Full Light:** Shows the water tank is full and if **LED Blink** it shows that **water tank is over** and it must to empty until it stop blinking and alarm is removed



**Med Light:** shows water level is medium and good



**Low Light:** Shows the water tank level is low and distilled water must be add to water tank. If LED Blink the water tank is empty and generation stop and Alarm appear in LCD



## Water Level



## Alarm message

### Line 4 LCD error list:

#### ❖ Water empty error

**Cause:** the water tank is empty

**Action:** H2 generation stop, **alarm Light** blinks and buzzer sound every 10 second

**Trouble shooting:** fill water tank with distillated water

#### ❖ Water over error

**Cause:** the water tank is over full

**Action:** H2 generation stop, **alarm Light** blinks and buzzer sound every 10 second

**Trouble shooting:** empty water tank until alarm disappear

#### ❖ Pressure over error

**Cause:** H2 pressure is more than 90 PSI

**Action:** H2 generation stop, **alarm Light** blinks and buzzer sound every 10 second

**Trouble shooting:** Turn instrument power off and call to company service section

### Attention!!!

**Change water and clean water tank every 1 month (30 days)**



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## Alarm message

### ❖ H2 leak error

**Cause:** There is leak or consumption of Hydrogen outside or inside of the instrument more than 300 ml/min for more than 12 minute

**Action:** H2 generation continue, alarm Light blinks and buzzer sound every 10 second

**Trouble shooting:** For checking internal leak turn instrument power off disconnect the output pipe and fix a blank nut and turn instrument power on and wait 15 minute and check for leak error again if no leak error then the leak is out of hydrogen generator and check the user instrument or connection of pipes

If steel the leak alarm exists check filter cap, it may be lose and if it was tight and no leak at filter cap then connect with maintenance section of company

**Use only de ionized pure water  
less than 0.5 micro Siemens /cm or  
more than 2 Mega ohm/cm**

**WHG-PEM maximum H2 generation is 300 ml/min  
and at continuous consumptions use 70% of maxi  
mum capacity 210 ml/min**



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## Filter

There are 3 filters at output of electrolyses cell

- 1- Water trap that automatically remove more water from produced hydrogen.
- 2- Silica gel filter with blue color that absorb more water vapor and it's color change to pink when it is saturated 60% (Pink color) must be regenerate in oven at 120 ° C for 60 ~ 120 minutes.
- 3- Molecular sieve 5 angstrom with dark yellow color that when saturated there is no color change and every 1 month it must be changed or regenerated in oven at 300° C for 120 ~ 240 minutes.



Fig – F1



Fig - F2



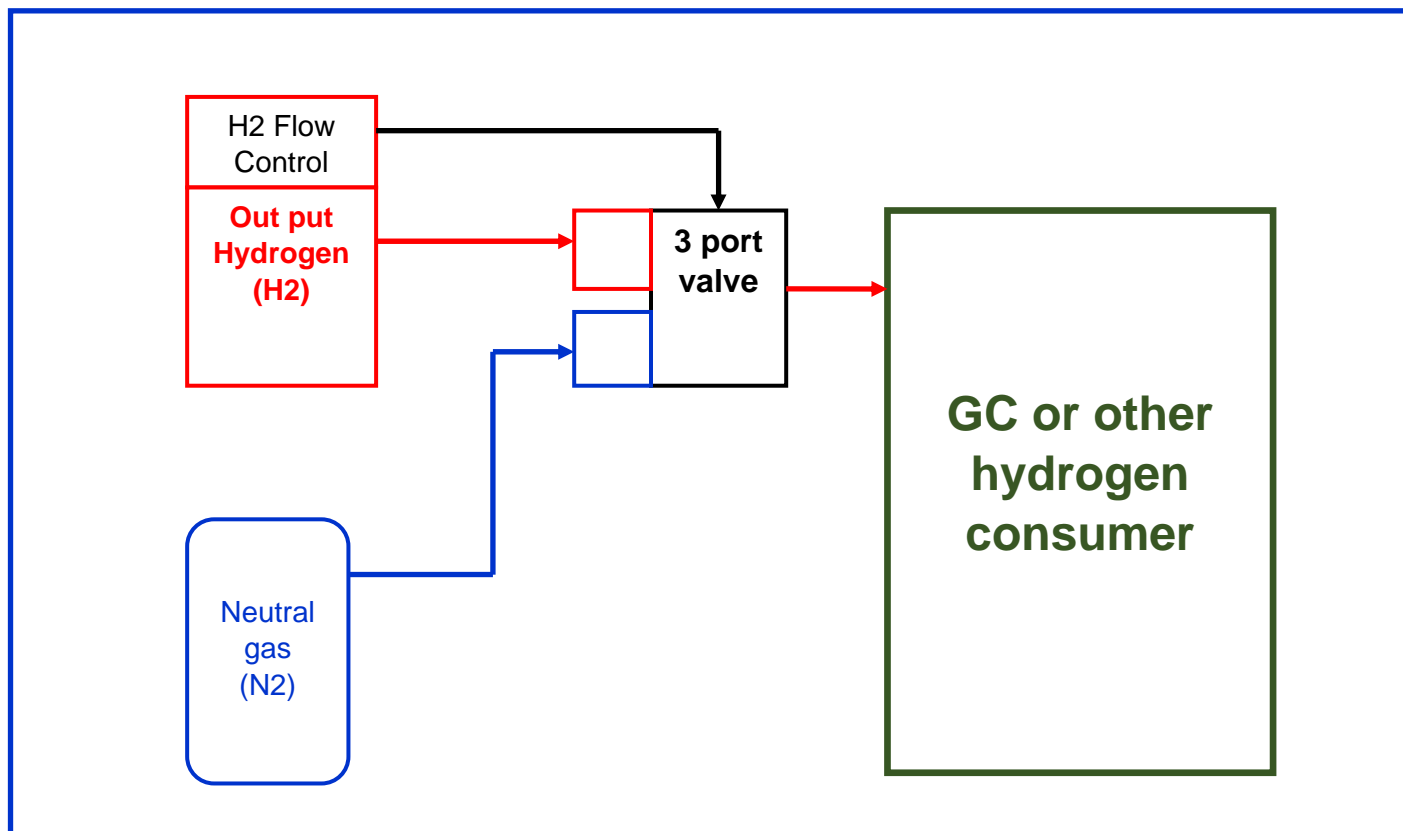
Fig – F3

### Filter content change or regeneration sequence

- Turn instrument off
- Reduce H<sub>2</sub> pressure to zero
- Open filter cap
- Take out the inside filter (Fig - F1 and F2)
- Open inside filter cap and change content or empty the content into clean glass vessel and regenerate in oven (Fig – F3)
- Reassemble filter again and use instrument



## Optional security H2 overflow consumption control



### How does it work:

There is an event output that is controlled by SET Flow, when real flow exceed the set flow more than 60 second then system realize an overflow (it may be of broken column in GC oven or any other leak in the stream of hydrogen) and then the system stop generating hydrogen and activates a 3 port valve and purge the oven or any other chamber with neutral gas such as nitrogen (N2) and issue flowing error in error line 4 of LCD and sounds the alarm buzzer.

**Over Flow Error**

Attention: This alarm will active 10 minute after power on

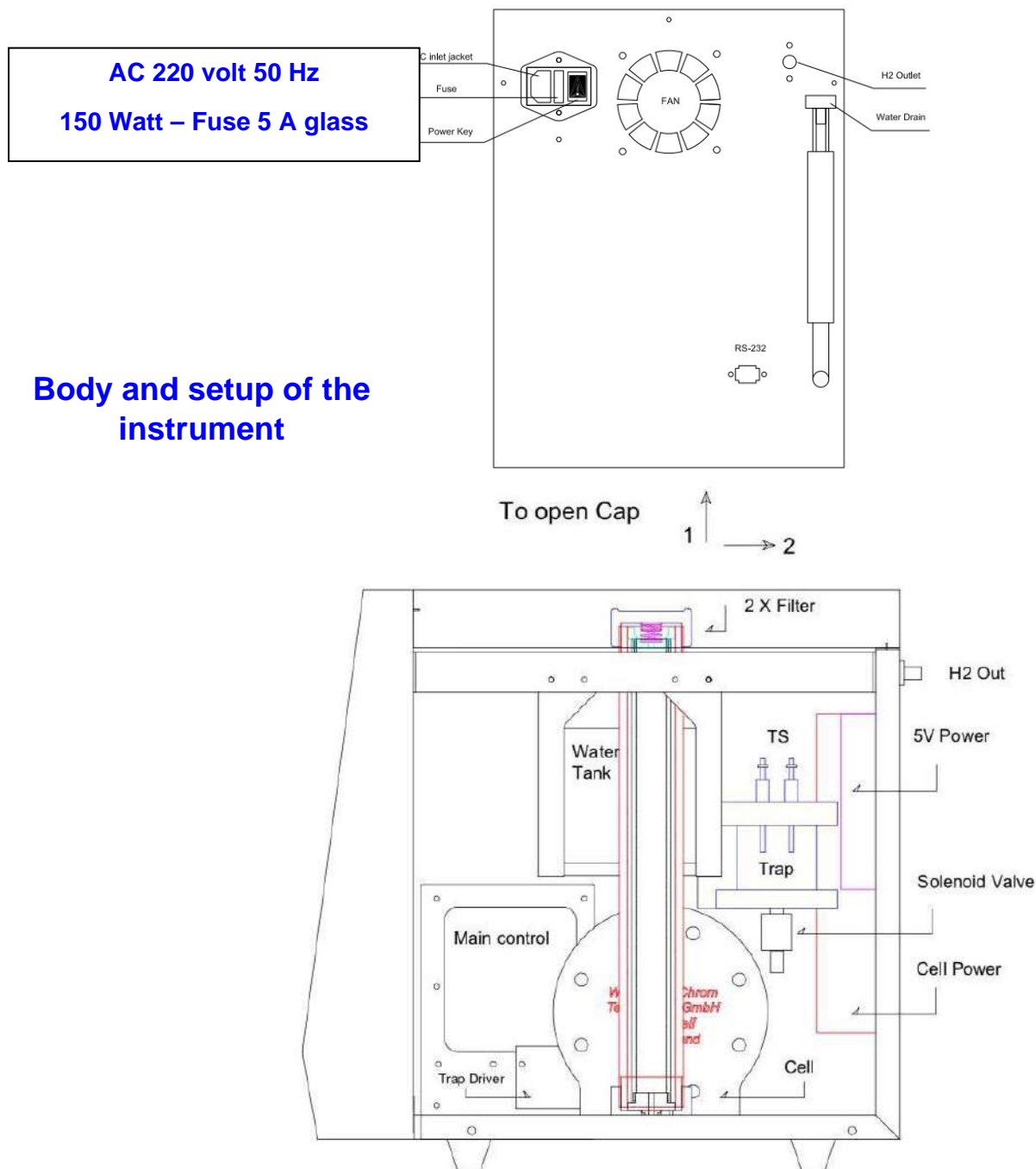


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**At following condition the guaranty service is not free of charge**

- users do not operate the generators according to the operational manual
- users disassemble parts by themselves
- users use more than generated capacity and use bad quality water



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