

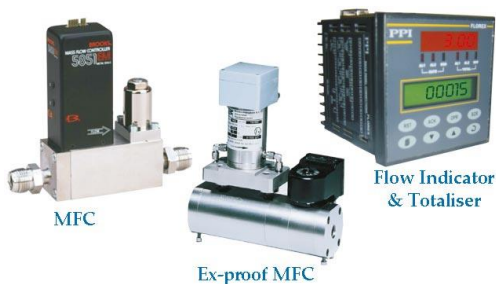
1. Gas Pressure Regulator

To manually charge different gases at desired pressure up to 140 bar/2000 psi or higher into the reactor from gas cylinder. The regulator is made from SS316 & comes with inlet-outlet pressure gauges & flexible SS braided Teflon PTFE high pressure hose pipe (4m long) with non-return valve.



2. Thermal Gas Mass Flow Meter (MFM)/ Controller (MFC)

MFM can be used to measure accurate mass flow rate of gas (in gm/hr or LPH) & totalized quantity of mass/volume (in gm/ltr) charged in the reactor at any point. Mass flow controller (MFC) is used to charge the set flow rate of gas into the reactor at high pressures up to 100bar. The same MFM/MFC comes with high pressure flexible hose, inlet filter with digital gas flow indicator.



3. Coriolis Gas-Liquid Mass Flow Meter/Controller (CFM/CFC)

These are used for higher & accurate gas or liquid flow rate indication or control in cases where thermal mass flow meters are not suitable. A common meter can be used for different gases & liquids for a particular range of flow.



4. Digital Pressure Indicator (DPI)

It consists of SS316 pressure sensor (transmitter) & digital pressure indicator/controller (mounted on common control panel) with pressure alarm.



5. Weighing Balance

To measure precise amount/ quantities of feed/ product consumed or produced during process.



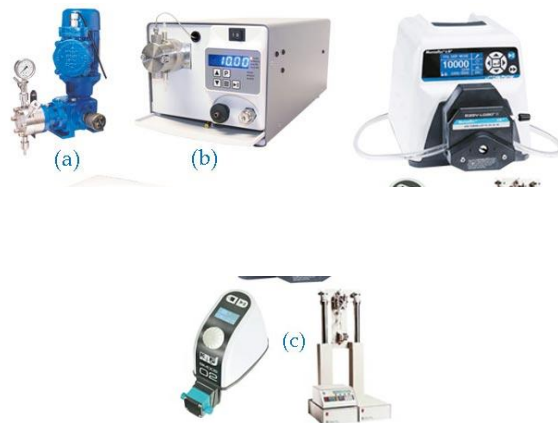
6. Liquid Metering Pump System (LMP)

This system is used to charge liquid at a desired rate from as low as 1ml/hr, is under pressurized condition.

High pressure more accurate HPLC type low flow metering pumps for high pressures up to 350 bar & flow range from 0.01 up to 100ml/min. Materials: SS316, option: Hastelloy C, Titanium.

Diaphragm metering pumps for pressures up to 100bar & minimum flow range of 60-600ml/hr to maximum 10-100 lit/hr. The flow rates are varied by varying the motor speed with variable frequency drive. Materials: SS316, options: Hastelloy C, Titanium, PTFE.

Low/High pressure syringe, pumps can be offered for pumping corrosive chemicals.



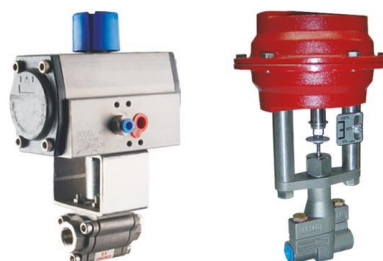
7. Heating Cooling Circulators

- Single Fluid closed loop system from -90°C to 250°C.
- Heating Cooling bath circulators from 70°C to 175°C.
- High temperature circulators from ambient to 350°C.
- Chillers up to -15°C.
- Suitable for reactor volume from 10 ml to 3000 ltr.



8. Flow Control valves (FOV/FOC)

These valves are used to control flow, pressure or level



9. Pressure Safety valve & Safety Rupture Disc

Saety rupture Discs can be provided for pressure ratings of 100 bar & pressure safety valves can be provided for any pressures from 1 to 350 bar with provision to vary release pressure within a certain range. These valves come with PTFE/ Viton/ Kalrez O rings



10. Back Pressure Regulator (BPR)

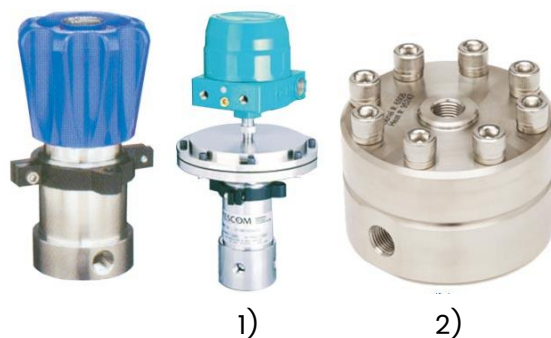
It is SS316 regulator mounted on the vent line of the reactor & is used for maintaining constant pressure inside the reactor up to 350bar. The pressure is maintained by releasing the excess pressure into the atmosphere.

Optional: 1) Electronically actuated digital pneumatic back pressure regulator, where the pressure is set digitally & can be released at preset rate of pressure release (6bar air supply is required).

2) Pneumatically actuated pilot operated back pressure regulator (air/N₂ gas supply for rated pressure is required to activate the same).

3) Electronic control unit & forward pressure regulator with 4mtr.

4) Materials: Hastelloy C, PTFE etc.



1)

2)

11. Purge Cabinet

Cabinet with nitrogen purging for explosion proof zones can be offered by mounting nonexplosion proof instruments & assembly inside the cabinet.



12. Wet Gas Meter

Wet Gas meter is an analog instrument to measure exhaust gas flow for gas mixer & is available in all flow rate ranges. It can give output for digital flow indication.



13. Control Panel

Control Panel consists of programmable PID temperature controller cum indicator with temperature alarm system (settable), safety alarm & heater trip system for malfunctioning of controller/sensor/ temperature rise beyond set limit. Digital pressure indicator/ controller, gas/liquid flow indicator, totalizer, heater, level, pH etc. Indicators are provided additionally on same common control panel depending on the optional accessories are selected.

Optional:

1. Touch screen panel with SCADA software for single or multiple autoclaves.

2. PLC based control panel with touch panel HMI or remote SCADA software & PC Control.

3. Complete Ex-proof-flame proof (FLP) group IIA/IIB or IIC, ATEX zone 1, class 1 div. 2 certified.

