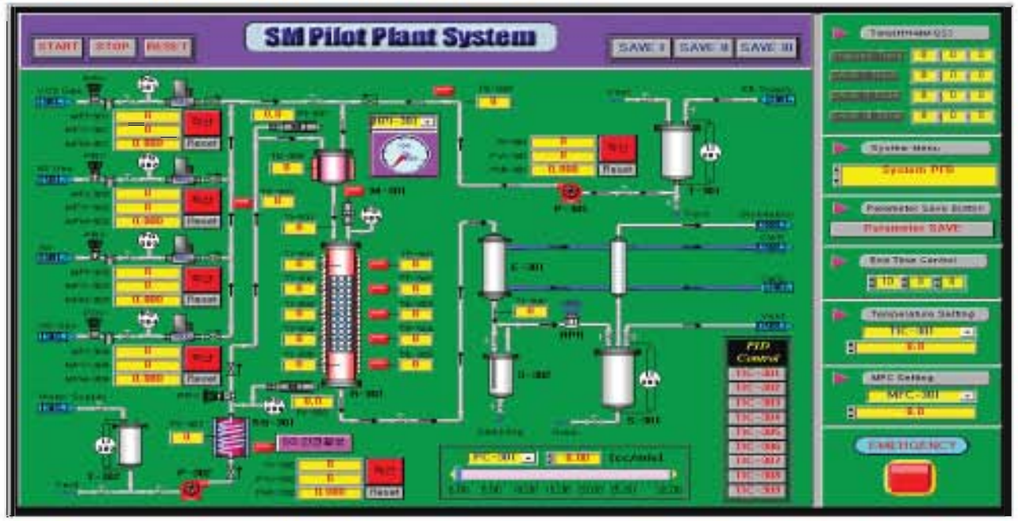
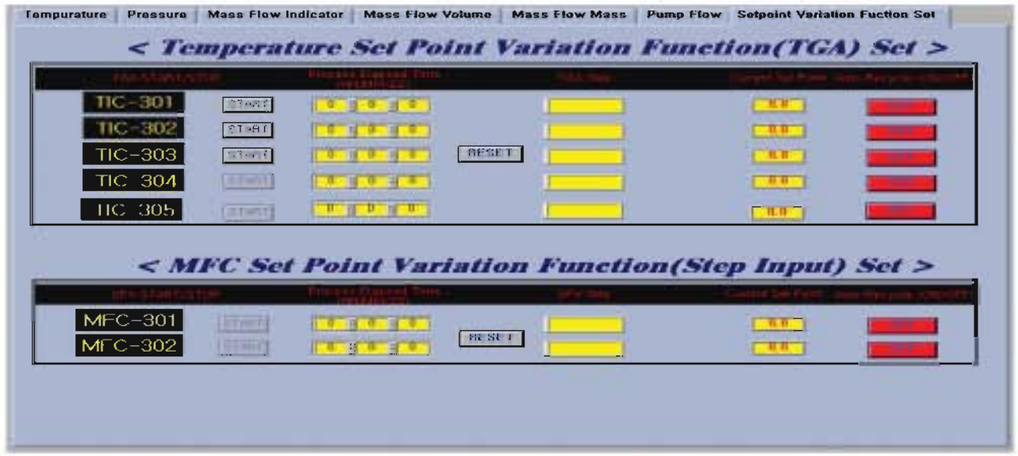
R-301 Series SCS Software System





301	A	B	C	D	E	F	G
Series	Capacity	Pressure	Temp.	Power	Catalysts	Control System	MFC
301	1. 8mL	1. 300psig	1. 300° C	1. 220/60/1	1. 5mL	1. PLC	1. MFC(1)
	2. 12mL	2. 500psig	2. 400° C	2. 220/60/3	2. 10mL	2. DCS	2. MFC(2)
	3. 20mL	3. 1000psig	3. 500° C	3. 220/50/1	3. Other	3. R.SCS Software	3. MFC(3)
	4. 100mL	4. 2000psig	4. 600° C	4. Other		4. Other	4. MFC(4)
	5. 300mL	5. 3000psig	5. 800° C				5. MFC(5)
	6. 500mL	6. 5000psig	6. 1000° C				6. Other
	7. Other	7. Other	7. Other				

REACTION ENGINEERING, INC.
15-4,Munwon-dong,Gwacheon,Kyonggi,Korea,427-090
Phone : (822)504-2942/3 Fax : (822)504-7922
E-mail : reaction@reactioneng.co.kr
Homepage : http://www.reactioneng.co.kr

Chemito Chemito Technologies Pvt. Ltd.
D-96, M.I.D.C., 'C' Road, Satpur Nashik 422 007, INDIA
Phone : +91-253-2350940/2351974 Fax : +91-253-2351908
E-mail : nrchandak@chemito.net
Homepage : http://www.chemito.net

OMEGA SCIENTIFIC PTE LTD
Comany Registration No.198305296Z
1,Kaki Bukit view,#05-15/16, Techview, Singapore 415941
Phone : +65-6744-6645 Fax : +65-6744-9958
E-mail : sales@omegascientific.com.sg
Homepage : http://www.omegascientific.com.sg

Printed in Korea
April. 20. 2006

R-301 Series

Catatest Reactor System (Fixed Bed Reactor System)

REACTION ENGINEERING, INC.

USE OF CATATEST

- Determinations of different variables for researching on Catalyst improvement, such as; Reaction Temperature, Pressure and Feed Flow, etc
- Test of Catalyst on Hydrogen reaction
- Catalyst Screen, Selectivity& Activity Test
- Test of Catalyst Life Span

GUIDELINE FOR PROCESS DESIGN

- Catalyst volume (5mL~2L) : 316SS & Hastelloy C276
- Reactor Design Pressure : 1,000psig~6,000psig
- Reactor Design Temperature : 800℃
- Operating Temperature : 650℃
- Operating Pressure : 1200psig
- Liquid Flow range : 20mL/min~100L/min
- Gas flow range : H_2 gas : 50mL/min~3L/min, O_2 gas : 50mL/min~3L/min, N_2 gas : 50mL/min~500mL/min, Feed &Spare gas : 50mL/min~500mL/min

MATERIAL, FITTING, VALVE & TUBING

- 316 Stainless steel & Hastelloy-C276
- Fitting and Valve will be used of BuTech, Hoke, Swagelok made, however, customers' request for using other makers are also acceptable.
- Valve for Catatest B/L should be used only of BuTech made.

COMPOSITIONS OF CATATEST

- Gas Feed module - For Supplying with fixed amount of feed and flow into the Rector for the High pressure gas cylinder.
- Liquid Feed module - Supplying with Liquid feed under fixed pressure and temperature into the system.
- Tubular Reactor module - To get the reactions of preheated feed from the Reactor's Catalyst of the preheater.
  - Applications: Hydrogenation, Oxidation, Hydrotreating, Catalyst testing
- Feed Tank module
- Receiver Tank module - Liquid Product receiving
- Separator module - Cooling of Effluent gas, and separation of Gas and Liquid.
- Electric Heaters - Helically Wound Ribbon Iron-Chrome-Aluminum - Rated to 2192°F(1200℃)

Gas Feed Module

Purpose of having this Module

- For supplying with fixed amount of Feed and Flow into The Reactor for the High pressure gas cylinder.

Condition

- Accurate Gas Flow control must be performed.
- Accurate Gas Pressure control must be performed.
- Pressure safety valve should be attached.
- Filtering should be available.
- An immediate action should be able to be taken for Unexpected emergency.
- H_2 & Air line shouldn't be used at the same time.

Gas material	Flow range	Max pressure
H_2	50ml/min ~ 3 liter/min	6000 Psig
O_2	50ml/min ~ 3 liter/min	"
N_2	50ml/min ~ 500ml/min	"
Feed & Spare	50ml/min ~ 500ml/min	"

Specification

- Gas flow range and Max pressure
- Numbers of Feed line: 4 (H_2, O_2, N_2, Feed & Spare) Lines

Compositions

- Pressure control valve
- Pressure safety valve
- Filter
- Block valve
- Mass flow control valve
- Solenoid valve
- Check valve
- Pressure indicator & Transmitter

R-301 Series Catatest Reactor System

Liquid Feed Module

Purpose of having this Module

- Supplying with Liquid feed under fixed Pressure and temperature into the System.

Condition

- Accurate Flow control of Liquid feed is a must.
- Accurate pressure control of Liquid feed is also a must.
- Pressure safety valve must be installed.
- Filtering should be available.
- An immediate action must be able to be taken for Unexpected emergency.
- Fixed temperature for Liquid feed should be maintained.
- Electronic tracing must be available for Keeping the Line temperature control.
- Liquid feed inside the Tank must not be Contacted with air.
- Tank will be used for Sampling bottle.

Specification

- Liquid feed rate : 5ml/min~1liter/min
- Viscosity: 40cp ▶Capacity : 2liter/min~10liter/min
- Design pressure : 6000 psig(Eldex, Milton Roy)
- Design temperature : 50℃
- Numbers of Tank : 2(including 1 Spare Tank)

Compositions

- Liquid feed tank : Includes Temperature Controller
- Agitator ▶Filter
- Feed line's temperature will be controlled by Electronic tracing *Pressure safety valve
- Check valve ▶Drain valve
- Block valve ▶Metering valve
- Weigher ▶Three-way Valve
- Pressure control valve
- Line filter ▶Pressure gauge (Indicator)

Receiver Tank Module

Purpose of having this Module

- Liquid product receiving

Condition

- Receiver weighing
- Direct sampling from Receiver
- Gas produced from the Receiver should be Connected through entire gas meter

Compositions

- Product receiver
- Weigher
- Drain valve
- Sampling valve

Preheater Module

- HT series Ultra High Temperature Semi-Cylindrical Helically Wound Ribbon Ceramic Heaters.
- Helically Wound Ribbon Iron-Chrome-Aluminum.
- Rated to 1200 ℃ (2192 °F)
- Low Mass Vaccum Formed Ceramic Fiber.
- Use Two Semi-Cylindrical Units to Form a Full Cylinder.

APPLICATIONS FOR HT MODELS

- Pipe Heating
- Process Air Heating
- Calibration Ovens
- Strain Annealing Ovens
- Tube Furnace
- "B" Type Thermocouple

Purpose

- For Mixing and Preheating of Reactant

Conditions

- Temperature in the Preheater / Furnace should be auto-controlled.
- Pressure safety valve must be installed.
- Electronic tracing should be available for temperature control in the outlet line of Preheater.
- No 'flow hunting' by Preheater is allowed in no case.

Specification

- Max temperature : 800° C
- Max pressure : 6000psig
- Materials : 316SS & Hastelloy-C276

Compositions

- Pressure safety valve
- Furnace (5-Zone)
- Pressure safety element
- Check valve
- Temperature element (For PID control)
- Electronic tracing should be available for temperature control in the Outlet line of Peheater.

Reactor Module

Purpose

- Cooling of Effluent gas, and separation of Gas and Liquid

Conditions

- Cooling water should be used for Condenser
- Condenser line to be installed
- By-pass valve to be installed for Separator' s liquid level control for an emergency case in the level control valve.
- No 'Flow hunting' by Condenser is allowed in no case.

Specification

- Max temperature : 250° C
- Max pressure : 2000Psig

Compositions

- Condenser
- High pressure separator
- Level control valve
- Condenser by-pass line(valve)
- Block valve
- Glove valve
- Level gauge

Feed Tank Module

- Capacity : 300mL~10L(Options : 20L~1,000L)
- Design Pressure : 0~2,000psig (Options : 6,000psig)
- Design Temperature : 0℃~250 ℃
- Materials : 316SS, 304SS, Hastelloy-C276

R-301 Series Catatest Reactor System

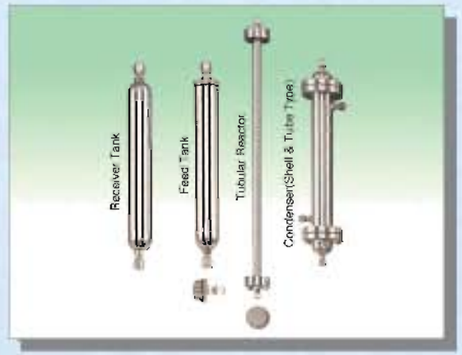
Reactor Module

Purpose

- To get the Reactions of preheated feed form the Reactor' s Catalyzer of the Preheater.

Conditions

- Max temperature of Furnace : 800℃
- By using 5 different Sensors on the Furnace, the Furnace shall be TIC' temperature controlled to show 5 different areas' temperatures constantly.
- If when any one area of the 5 parts shows exceeding temperature than standard, Power to the Furnace will be shut down immediately and, Solenoid valve of Feed line will be closed while Outlet solenoid valve and Nitrogen solenoid valve will be opening up.
- Pressure safety valve and Pressure safety element shall be installed.
- By the same way as above, temperature inside the Reactor will be controlled on all 4 different areas, and if when any one area shows exceeding temperature the same actions as above will be taken immediately.
- System pressure control : Under normal situation, pressure can be controlled either by pressure before preheated or Reactor' s outlet pressure. For an emergency, System can be controlled by Preheater inlet pressure because even though Reactor' s outlet solenoid valve was opened it doesn' t help any.



Specification

- Catalyst volume : 5ml ~ 2Liter
- Max Pressure : 1000psig ~ 6000psig
- Max temperature : 800 ℃
- Operating Pressure : 2000 psig
- Capacity of Reactor : 5ml ~ 2Liter
- Type of Reactor : Tubular fixed bed reactor for both up or down flow as required for process

Compositions

- Furnace (5-Zone)
- Reactor
- Solenoid valve
- Block valve
- TIC temperature controller

Tubular Reactor

Application : Hydrogenation, Oxidation, Hydro-treating, Catalyst testing

Ordering Information

Capacity	Design Pressure	Design Temperature	Materials	Outside Diameter	Outside Depth	Connections
8 ml	6000 Psig	800°C	316SS & Hast-C276	3/8"	200 mm	1/8"NPT(F)
2 ml	6000 Psig	800°C	316SS & Hast-C276	3/8"	300 mm	1/8"NPT(F)
16ml	6000 Psig	800°C	316SS & Hast-C276	1/2"	200 mm	1/8"NPT(F)
24 ml	6000 Psig	800°C	316SS & Hast-C276	1/2"	300 mm	1/8"NPT(F)
160 ml	6000 Psig	800°C	316SS & Hast-C276	1"	300 mm	1/4"NPT(F)
380 ml	6000 Psig	800°C	316SS & Hast-C276	1"	500 mm	1/4"NPT(F)
590 ml	6000 Psig	800°C	316SS & Hast-C276	2"	300 mm	1/4"NPT(F)
980 ml	6000 Psig	800°C	316SS & Hast-C276	2"	500 mm	1/4"NPT(F)

Accessories

High Pressure Metering Pump
- Max Pressure : 5880psig
- Accuracy : ±2%
- Flow rate : 0.01~9.9mL/min
- Size : 400 × 295 × 165(mm)
- Dual heads type

Mass Flow Control
- Flow Capacity :
  Min Flow : 0.02~1mL/min,
  Max Flow : 36~1800L/min
- Accuracy : ±0.2%
- Operating Temp. : -10~70℃
- Pressure Ratings up to 400 bar
- Output & Input Signal : 0~5V
- Power : +15~24Vdc

Liquid Mass Flow Control
- Flow Capacity : 1~30mg/h
- Accuracy : ±2%
- Operating Temp. : 5~50℃
- Maximum Pressure :
  400bar(Liquid Flow meter),
  100bar(Liquid Flow controller)
- Output & Input Signal : 0~5V/0~10Vdc/4~20mA
- Power : +15/+24Vdc

REI-100S Software System

This REI - 100S which include ethernet port, is simple in shape and be easily able to install in your system.
It can be communicated high performance speed by ethernet port.
That has built in 24 Digital Input and 16 Digital Output.
When you want to built simple system, we can provide the optimum solution for you.
This controllor be easily able to intergrate system of the various zone by internet.
It makes an proffer TCP/IP, UDP/IP with RS - 232, RS - 485 and Ethernet port. It supports Digitl GPIO 40CH

FEATURES

HARDWARE PROTOCOLS	TCP, UDP, ARP, ICMP, ETHERNET, MAC	
NETWORK INTERFACE	10M Base - T ETHERNET	
SERIAL PORT	RS - 232 1Port RS - 485 1Port	RS 232 / RS 485 1Port
FLASH	256K	
SRAM	128K	
CPU	22MHZ	
D/I	24CH	
D/O	16CH	
A/D	11CH [12bit, -10V ~ 10V] [4mA ~ 20mA]	
D/A	6CH [12bit, 0V ~ 10V]	
ADAPTOR	DC 9V ~ 24V 2A	
SIZE	182(W) X 130(L) X 40(D)mm	

R-301 Series Catatest Reactor System

R-301 Series Software Control System