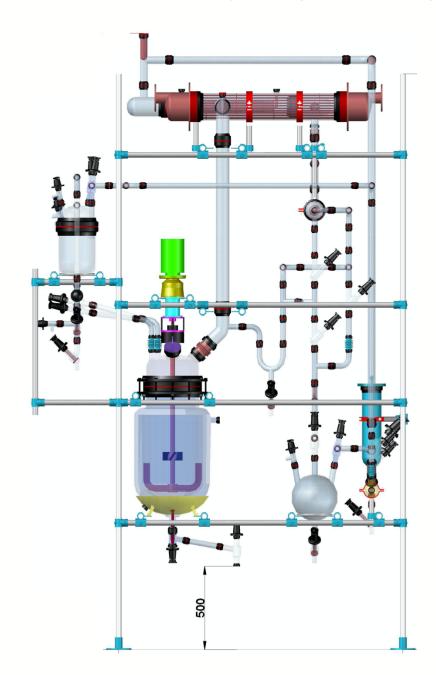


A Representation of Engineering and Technology



**KILO LAB REACTOR SYSTEMS** 

### INTRODUCTION

**JAGDAMBA ENTERPRISE** multipurpose kilo lab systems are highly engineered and has a very sophisticated user friendly design.

These kilo lab systems are mainly used in Pharma and chemical companies where there is a use of highly corrosive chemicals.

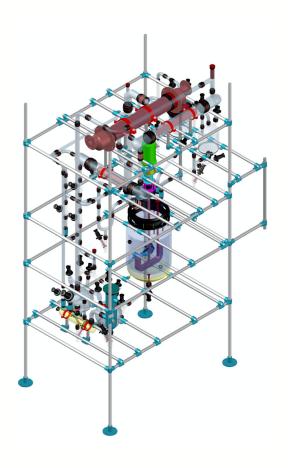
Our kilo lab systems are as per GMP standards and comes with / without automation as per CFR21 Part 11 compliance. Certifications for the same shall be provided with the supply of the assembly

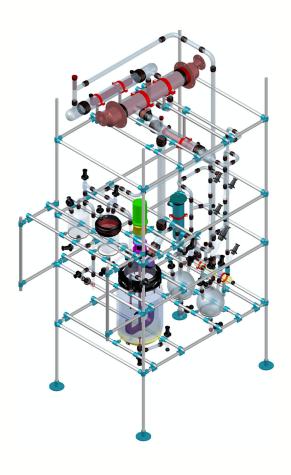
MULTIPURPOSE KILO LAB GENERAL SPECIFICATIONS												
SR NO	DESCRIPTION	JE-KL-10	JE-KL-20	JE-KL-50	JE-KL-100	JE-KL-200	REMARKS					
A)	GLASS MAIN PARTS											
1	Glass Cylindrical Reactor	10L	20L	50L	100L	200L	Option available for Jacketed and Triple Wall available only upto 100L reactor					
2	SS-PTFE Lined Agitator with PBT Impeller	1	1	1	1	1	Option available for Anchor, CBT impeller in single as well as dual stage. Proper L/D ratio shall be maintained					
3	Ex-proof Motor, Gearbox and Mechanical Seal	0.25 HP	0.25 HP	0.5 HP	1 HP	1 HP	Option available for ATEX Certified					
4	Glass Feed Vessel - Cylindrical & Graduated	2L	5L	10L	20L	20L	Option available for twin vessel					
5	Glass Receiver Twin Vessels - Spherical & Graduated	5L	5L	10L	20L	20L	Option available for single vessel					
6	Glass Vapour Line	DN40	DN50	DN80	DN100	DN150	Option available for packed column - Raschig rings / structured packing					
7	Glass Primary Condenser	DN80-C	DN80-C	DN100-S	DN150-S	DN150-S	S - Shell & Tube Type					
8	Glass Secondary Condenser	DN80-C	DN80-C	DN80-C	DN80-C	DN80-C	C - Coil Type					
9	Glass Phase Separator	1L	2L	2L	2L	2L	Provision of refluxing / collecting either heavy or light phase as per the demand of the process					
10	Glass Vacuum Manifold	DN50	DN50	DN80	DN80	DN80	5 Nozzles, drain and vent					
11	Glass Ice Trap	DN80	DN80	DN100	DN100	DN100						
12	Glass Internal Process Pipelines	DN15 / DN25	DN25	DN40 / DN25	DN40 / DN25	DN40 / DN25						
13	Glass Main Vacuum Line	DN25	DN25	DN40	DN40	DN40						
14	Glass Vacuum Balance Line to Receivers / Feed Vessels	DN15	DN15	DN25	DN25	DN25						
15	Hardware - Plastic flanges, Inserts , SS Nuts, bolts, washers and springs	SET	SET	SET	SET	SET	Plastic flanges used as per DIN standard					
16	Structure - Main Frame - SS304	DN25	DN25	DN30	DN30	DN30	Option available for Vessel lifting and lowering with limit switches.					
В)			SA	FETY FEATU	RES							
17	Pressure Safety Valve	DN40	DN40	DN50	DN50	DN50						
18	Rupture Disc	DN50	DN50	DN50	DN50	DN50	Suitable to withstand vacuum and burst under set pressure					
C)			AUTOMATIO	N AND INSTR	UMENTATION	l						
19	Temperature Sensors	4	4	4	4	4	Reactor temp, Vapour temp, Vent temp and Product temp					
20	Pressure Transmitter	1	1	1	1	1	Option available for dial gauge instead of transmitter					
21	Agitator RPM controller (VFD)	1	1	1	1	1						
22	Operation Panel : Simple panel for process parameters indications and Agitator control	1	1	1	1	1	Option available for :  1) Ex d enclosure (Ex II 2GD Ex DB)  2) PLC with ATEX / NON-ATEX approved HMI					
23	SCADA Automation Solution (Optional)	Available	Available	Available	Available	Available	CFR21 PART 11 compliant SCADA automation solutions					
24	Heating & Cooling System	TCU-535W	TCU-555W	TCU-575W	TCU-5A10W	TCU-5A25W	Temp range: -45 DegC to +250 DegC. Options available for different temp ranges as well					
25	Documentation (Optional)	SET	SET	SET	SET	SET	DQ,IQ,OQ, 3D GA drawings of the assembly and relevant certifications of the instruments					
26	Approximate Foot Print - L X W X H (In mm)	1500 X 800 X 2400	1650 X 900 X 2450	1700 X 900 X 3600	1800 X 1000 X 3800	2000 X 1100 X 4000	Can be fit in a small footprint, final GA drawings can be approved before manufacturing					

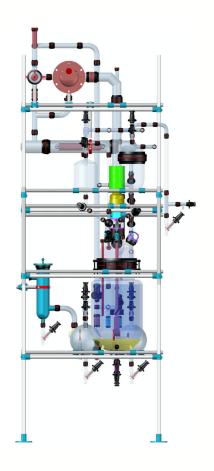
SS-PTFE Lined Agitator with PBT	GLASS OVERHEAD ASSEMBLY ON GLASS LINED REACTORS													
1 Cites Lined Reactor with glass top cover 2 SS-PTFE Lined Agiltetor with PBT 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SR NO	DESCRIPTION	JE-KL-63	JE-KL-100	JE-KL-160	JE-KL-250	REMARKS							
SS-PTFE Lined Agitator with PBT Inspeller	A)	GLASS AND GLR MAIN PARTS												
2 SS-PTE Linds Agistor with PBT impeller 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	• •	63L	100L	160L	250L	Option for jacketed, insulated and SSGL available							
Glass Feed Vessel - Cylindrical & Conducted   10L   10L   20L	2	•	1	1	1	1	Option available for Anchor, CBT impeller in single as well as dual stage. Proper L/D ratio shall be maintained; SS-PTFE lined thermowell with tantalum tip							
Glass Receiver Twin Vessels - Spherical	3	• •	0.5 HP	1 HP	1 HP	1 HP	Option available for ATEX Certified							
6 Glass Primary Condenser DN80 DN100 DN100 DN100 DN150 Cption available for panded column Reaching rings / structured packing of the process	4	-	10L	10L	20L	20L	Option available for twin vessel							
Glass Primary Condenser	5	•	10L	20L	50L	50L	Option available for single vessel							
8 Glass Secondary Condenser DN80-C DN80-C DN100-C DN100-C C-Col Type  9 Glass Phase Separator 2L 2L 2L 5L Provision of refluxing / collecting either heavy or light phase as per the dema the process 10 Glass Vacuum Manifold DN80 DN80 DN80 DN100 SN2des, drain and vent 11 Glass Ice Trap DN100 DN100 DN100 DN100 DN100 12 Glass Internal Process Pipelines 13 Glass Main Vacuum Line DN40 DN40 DN40 DN40 DN40  14 Glass Vacuum Balance Line to Receivers / Feed Vessels 15 Bradware - Plastic flanges, Inserts, SS Nuts, bolts, washers and springs 16 Structure - Main Frame - SS304 DN30 DN30 DN30 DN30 DN30 DN30 DN30 DN30	6	Glass Vapour Line	DN80	DN100	DN100	DN150	1							
Glass Phase Separator  2L  2L  2L  2L  2L  3L  Provision of refluxing / collecting eithe heavy or light phase as per the dema the process  10 Glass Vacuum Manifold  DN80  DN80  DN80  DN80  DN80  DN100  DN40  DN4	7	Glass Primary Condenser	DN100-S	DN150-S	DN225-S	DN225-S	S - Shell & Tube Type							
9   Glass Phase Separator	8	Glass Secondary Condenser	DN80-C	DN80-C	DN100-C	DN100-C	C - Coil Type							
11 Glass Ice Trap DN100	9	Glass Phase Separator	2L	2L	2L	5L	Provision of refluxing / collecting either heavy or light phase as per the demand of the process							
12 Glass Internal Process Pipelines DN40 / DN25 DN40 DN40 DN40 DN40 DN40 DN40 DN40 DN40	10	Glass Vacuum Manifold	DN80	DN80	DN80	DN100	5 Nozzles, drain and vent							
Glass Main Vacuum Line  DN40  DN55  DN25  DN30  DN50	11	Glass Ice Trap	DN100	DN100	DN100	DN100								
Glass Vacuum Balance Line to Receivers / Feed Vessels   DN25   DN25   DN25   DN25   DN25	12	Glass Internal Process Pipelines	DN40 / DN25	DN40 / DN25	DN40 / DN25	DN40 / DN25								
14 Receivers / Feed Vessels 15 Hardware - Plastic flanges, Inserts , SS Nuts, bolts, washers and springs 16 Structure - Main Frame - SS304 DN30 DN30 DN30 DN30 DN30 DN30 Option available for SS flanges as we option available to Withstand vacuum and but under set pressure  17 Pressure Safety Valve DN50 DN50 DN50 DN50 DN50 Suitable to withstand vacuum and but under set pressure  18 Rupture Disc DN50 DN50 DN50 DN50 Suitable to withstand vacuum and but under set pressure  29 Pressure Transmitter 1 1 1 1 1 Pressure Standard Standa	13	Glass Main Vacuum Line	DN40	DN40	DN40	DN40								
Nuts, bolts, washers and springs   SE1   SE1   SE1   SE1   Option available for SS flanges as we	14		DN25	DN25	DN25	DN25								
Structure - Main Frame - SS304   DN30   DN	15		SET	SET	SET	SET	Plastic flanges used as per DIN standard; Option available for SS flanges as well							
17 Pressure Safety Valve DN50 DN50 DN50 DN50 DN50 Suitable to withstand vacuum and bur under set pressure  C) AUTOMATION AND INSTRUMENTATION  19 Temperature Sensors 4 4 4 4 4 Reactor temp, Vapour temp, Vent tem and Product temp  20 Pressure Transmitter 1 1 1 1 1 1 Option available for dial gauge instead transmitter  21 Agitator RPM controller (VFD) 1 1 1 1 1 1 Option available for Ex I   Ex d enclosure (Ex II 2GD Ex DB)  22 Pressure Transmitter 1 1 1 1 1 Coption available for :  1	16	Structure - Main Frame - SS304	DN30	DN30	DN30	DN30	Option available for Vessel lifting and lowering with limit switches.							
AUTOMATION AND INSTRUMENTATION  Temperature Sensors 4 4 4 4 4 Reactor temp, Vapour temp, Vent tem and Product temp  Pressure Transmitter 1 1 1 1 1 1 Option available for dial gauge instead transmitter  Agitator RPM controller (VFD) 1 1 1 1 1 1 Option available for ill 2D Ex DB) 2) PLC with ATEX / NON-ATEX appror HMI  Coperation Panel: Simple panel for process parameters indications and Agitator control  Agitator control  Available Available Available Available Available CFR21 PART 11 compliant SCADA automation Solution (Optional)  Available Available TCU-5A15W TCU-5A15W TCU-5A25W Options available for different temp rates well  DQ,IQ,OQ, 3D GA drawings of the assembly and relevant certifications of instruments  Approximate Foot Print - L X W X H (In 1800 X 1000 X 1850 X 1000 X 1850 X 1000 X 2000 X 1050 X drawings can be approved before	В)			SAFETY F	EATURES									
AUTOMATION AND INSTRUMENTATION  19 Temperature Sensors 4 4 4 4 4 Reactor temp, Vapour temp, Vent tem and Product temp  20 Pressure Transmitter 1 1 1 1 1 1 Option available for dial gauge instead transmitter  21 Agitator RPM controller (VFD) 1 1 1 1 1 1 Option available for Example panel for process parameters indications and Agitator control  22 SCADA Automation Solution (Optional) Available Available Available Available Available Available Available Available TCFR21 PART 11 compliant SCADA automation solutions  23 SCADA Automation Solution (Optional) SET	17	Pressure Safety Valve	DN50	DN50	DN50	DN50								
Temperature Sensors 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	18	Rupture Disc	DN50	DN50	DN50	DN50	Suitable to withstand vacuum and burst under set pressure							
Pressure Transmitter  1 1 1 1 1 1 Option available for dial gauge instead transmitter  21 Agitator RPM controller (VFD) 1 1 1 1 1 Option available for dial gauge instead transmitter  22 Operation Panel: Simple panel for process parameters indications and Agitator control  23 SCADA Automation Solution (Optional) Available Available Available Available Available Available CFR21 PART 11 compliant SCADA automation solutions  24 Heating & Cooling System TCU-575W TCU-5A10W TCU-5A15W TCU-5A25W Options available for different temp rates well  25 Documentation (Optional) SET	C)		AUTO	MATION AND	INSTRUMENT	ATION								
21 Agitator RPM controller (VFD) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	19	Temperature Sensors	4	4	4	4	Reactor temp, Vapour temp, Vent temp and Product temp							
Option available for : 1) Ex d enclosure (Ex II 2GD Ex DB) 2) PLC with ATEX / NON-ATEX appro HMI  CFR21 PART 11 compliant SCADA automation Solution (Optional)  Available  Available  Available  Available  TCU-575W  TCU-5A10W  TCU-5A15W  TCU-5A25W  Documentation (Optional)  SET  SET  SET  SET  SET  SET  SET  Can be fit in a small footprint, final GA adrawings can be approved before	20	Pressure Transmitter	1	1	1	1	Option available for dial gauge instead of transmitter							
22   Operation Panel: Simple panel for process parameters indications and Agitator control	21	Agitator RPM controller (VFD)	1	1	1	1								
23 SCADA Automation Solution (Optional)  Available Avail	22	process parameters indications and	1	1	1	1	Ex d enclosure (Ex II 2GD Ex DB)     PLC with ATEX / NON-ATEX approved							
24 Heating & Cooling System  TCU-575W  TCU-5A10W  TCU-5A15W  TCU-5A25W  Options available for different temp rates as well  DQ,IQ,OQ, 3D GA drawings of the assembly and relevant certifications of instruments  Approximate Foot Print - L X W X H (In 1800 X 1000 X 1850 X 1000 X 1850 X 1000 X 2000 X 1050 X drawings can be approved before	23	SCADA Automation Solution (Optional)	Available	Available	Available	Available	· ·							
25 Documentation (Optional)  SET  SET  SET  SET  SET  SET  assembly and relevant certifications of instruments  Approximate Foot Print - L X W X H (In In I	24	Heating & Cooling System	TCU-575W	TCU-5A10W	TCU-5A15W	TCU-5A25W	Temp range: -45 DegC to +250 DegC. Options available for different temp ranges as well							
26 Approximate Foot Print - L X W X H (in   1800 X 1000 X   1850 X 1000 X   1850 X 1000 X   2000 X 1050 X   drawings can be approved before	25	Documentation (Optional)	SET	SET	SET	SET	assembly and relevant certifications of the							
min) 3800 4000 4000 manufacturing	26	Approximate Foot Print - L X W X H (In mm)	1800 X 1000 X 3800	1850 X 1000 X 3800	1850 X 1000 X 4000	2000 X 1050 X 4000								

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# TYPICAL MULTIPURPOSE KILO LAB SYSTEM DIFFERENT VIEWS



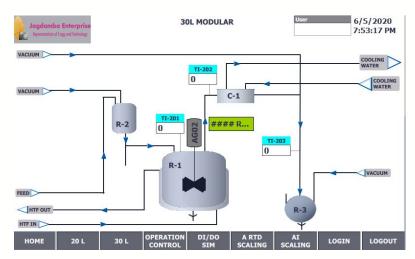






• The above drawings are only for your reference from our past projects. We reserve the right to modify our design and specifications as and when required

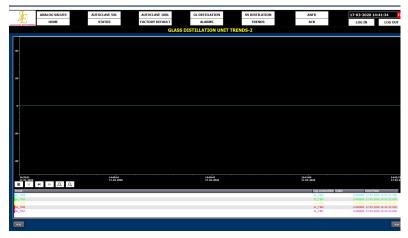
## **AUTOMATION AND INSTRUMENTATION**



**Graphical View with flow diagram of plant** 



PLC Controller parameter setting screen



Online graph of process parameters

### **AUTOMATION AND INSTRUMENTATION**

Automation from Single process plant to Multiple Plants with common controller, multiple screens & with 21CFR part 11 compliant SCADA solutions.

Automation increases the reproducibility and productivity of complete chemical processes by automated runs.

Jagdamba Enterprise adapts and integrates commercially available up-to-date technology of leading suppliers which fulfill current technical guidelines and directives as per 94/9/EC regarding flame proof or ex proof equipment for installation in chemical plants and laboratories where Ex Zone specifications are required.

Non Ex proof IP65 panel solutions with various MOC options like SS, GRP, MS powder coated is also provided as per requirement.

Automation is often customized as per the complexity requirement of process plants.

Jagdamba provides solutions which cover control of single and multiple processes & devices.

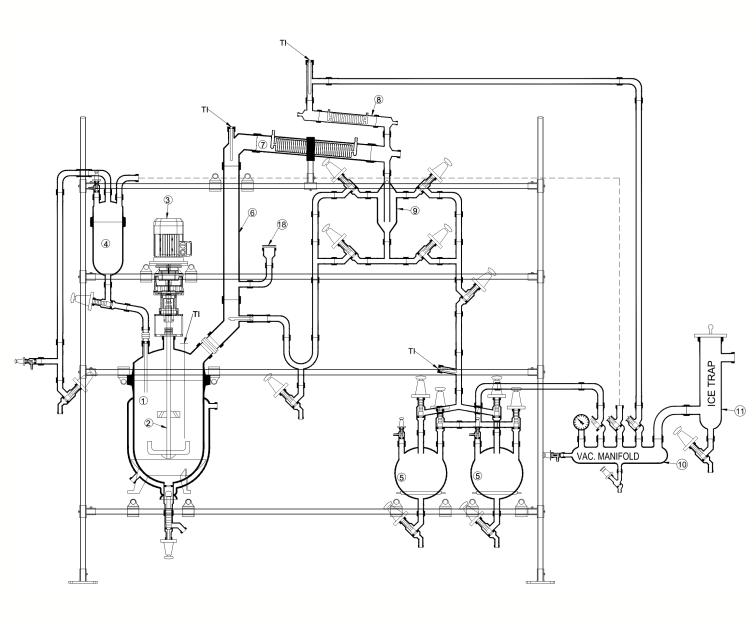
Customized PLC for chemical plants cover basic control functions:

- · Stirrer Speed
- · Vacuum / Pressure
- · Temperature Control
- · Temperature Control Unit
- Data logging with export in ASCII format (\*.csv)
- · Customized reporting

We also provide Advance measurement & control functions depending on the requirement as:

- · Level / Volume
- · Flow
- · рН
- Dozing pump
- · Reactor Weighing
- · Gas mass flow measurements & control

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