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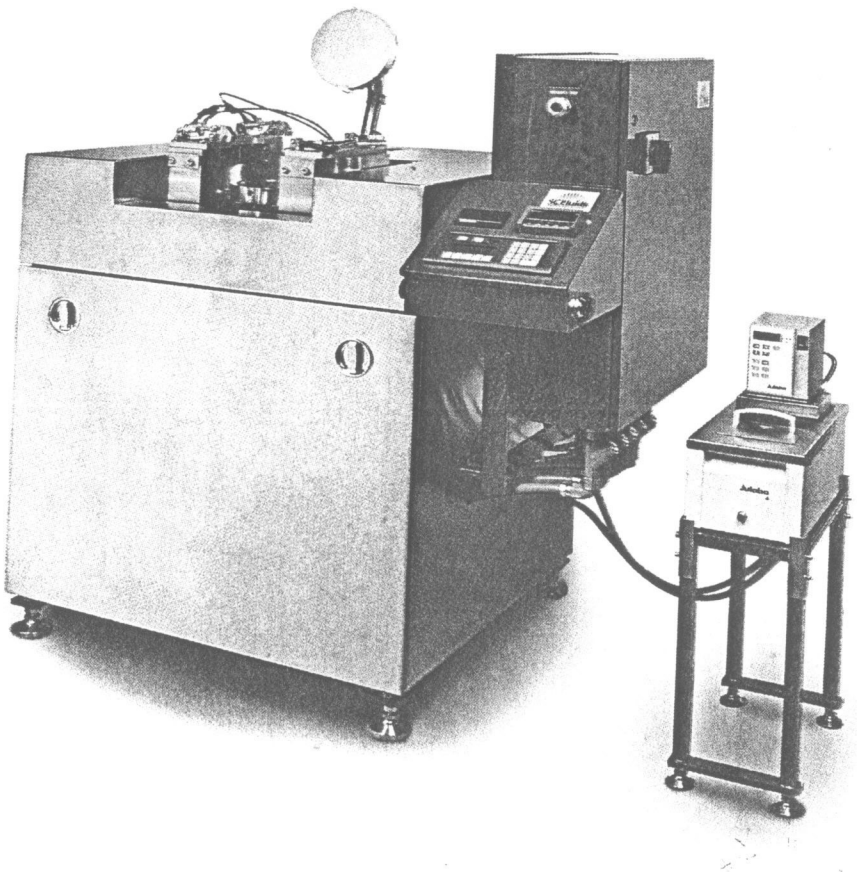
Supercritical CO_2 Dryer
CPD 1100 Series

Reference Manual

Revision 2.0



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1 Frame

Description:	steel frame, protecting stainless steel skins on all sides
Finish:	paint using Shermin Williams epoxy primer E61A280 and top coat Polane B F63L16
Color:	Circuit Blue
Footprint:	app. 35" x 53"
Skins:	brushed stainless steel skins on front and sides, front skin with quick opening, back has panel with facility hook-ups
Cover:	brushed stainless steel cover to enclose gear mechanism

2 Process Chamber

Description:	double wall stainless steel chamber with patented motorized clamp shell closure mechanism and automated lid lift
Max. Pressure Rating:	1600 psig (110 bar)
Max. Temperature:	150°F (65°C)
Safety:	- pressure chamber tested to ASME Section VIII Division I unfired pressure vessel code to 1600 psi; - safety latches lock clamp shells preventing accidental opening and simultanously interlock actuation of inlet valves; - rupture disk with setting at 1600 psi.
O-Ring:	Urethane
Heating:	water, water heater included
Cooling:	water, customer provided
Sample Size:	≤6.00" O.D., ≤0.2" high

3 Valve System

Description:	The inlet valve system consists of high purity valves and electropolished stainless steel tubes. It is configured as a module, which is assembled and welded in a cleanroom environment of class 100. All interconnecting tubes are orbital welded, removable connections are VCR fittings. The outlet valve system consists of standard valves (shut-off and metering) for dilution and vent, electropolished tubes and Swagelok fittings. The system discharge line, the rupture disk line, the dilution line and the vent line are combined in a manifold ending in a separator bottle to extract the methanol. There is only one exhaust line to be hooked up to the exhaust system of the lab. Pressure and temperature gauges are used to automatically run the process. All shut-off valves are operated with pressurized air.
Inlet Valving:	consists of: - cylinder connection, ¼" male VCR bulk head fitting

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- manual main shut off valve
- CO_2 cylinder particulate filter (0.5 µm)
- pressure regulator with inlet and outlet pressure gauges, convenient access from front side of tool
- manual system discharge valve
- high flow and low flow shut-off diaphragm valve
- high flow and low flow metering valve with micrometer thumb screws
- point-of-use particulate filter (0.003 µm)
- cross over fill valve (diaphragm)

Outlet Valving:
- vent and dilution shut-off valves
- vent and dilution metering valves with micrometer scales
- tension loaded, solid metal, prebulged rupture disk

Solvent Separator:
- drain tab located on left side in the back of the frame within tool footprint
- liquid level sensor to monitor fill level, interlocks with tool, does not allow further runs if separator is full
- solvent drain to empty separator

Pressure Gauges:
- 1 manual pressure gauge (0 ... 3000 psi) with 2" face
- 1 pressure transducer

Temperature sensor: type T thermocouple located at bottom of chamber

4 Electrical

4.1 Controls

Description: the control system consists of
- operator console (detachable for shipping/moving)
- PLC controls
- motor drives
- valve solenoids

Number of Recipes: 10 can be stored

Displays on Operator Console:
- 1 green indicator lamp: RUN
- 1 yellow indicator lamp: LOW LEVEL ALARM
- 1 red indicator lamp: HIGH LEVEL ALARM
- temperature
- pressure
- operator display for recipe input and displaying of process steps

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4.2 Power Connection

Power: 115 V single phase, 60 Hz, 40 Amps

5 System Safety

- system electrically wired to meet Class 1, Division II code requirements of the NFPA and NEC
- E-stop button to interrupt process run, brings tool into safe condition
- operator is required to push two buttons with two hands simultaneously to close process chamber

6 Facilitation

Water:	filtered 3 gpm (minimum) @ 10 – 40 psig, connection required: 3/8" or ¼" hose barb, connection on tool: male 5/8-16 thread with 45° flare - cooling: 60 - 65 °F at inlet (customer provided) - heating: closed loop water heater included, factory setting: 85 °C
CO_2:	liquid CO_2, SFC grade w/helium head space (2000 psi) and eductor tube (customer supplied), connection on tool: ¼" male VCR bulk head fitting
Compressed Air:	clean, dry, filtered, 0.5 scfm @ 60 – 80 psig, connection required: ¼" air hose, connection on tool: quick disconnect
Separator Drain:	connection on tool: 3/8" Swagelok fitting on manually operated ball valve
CO_2 Exhaust:	connection on tool: KF 50 flange, required exhaust flow rate: 30 cfm
Hood Vent (optional):	connection on tool: KF 50 flange, required exhaust flow rate: 100 cfm
Weight:	approx. 1200 lbs
Process Fluid:	Methanol, Acetone, IPA, etc. (customer supplied)

7 Acceptance

SC Fluids will test electro/mechanical assemblies for compliance to above specifications and will supply test results with documentation. A functional test of the completed machine will be run at SC Fluids.

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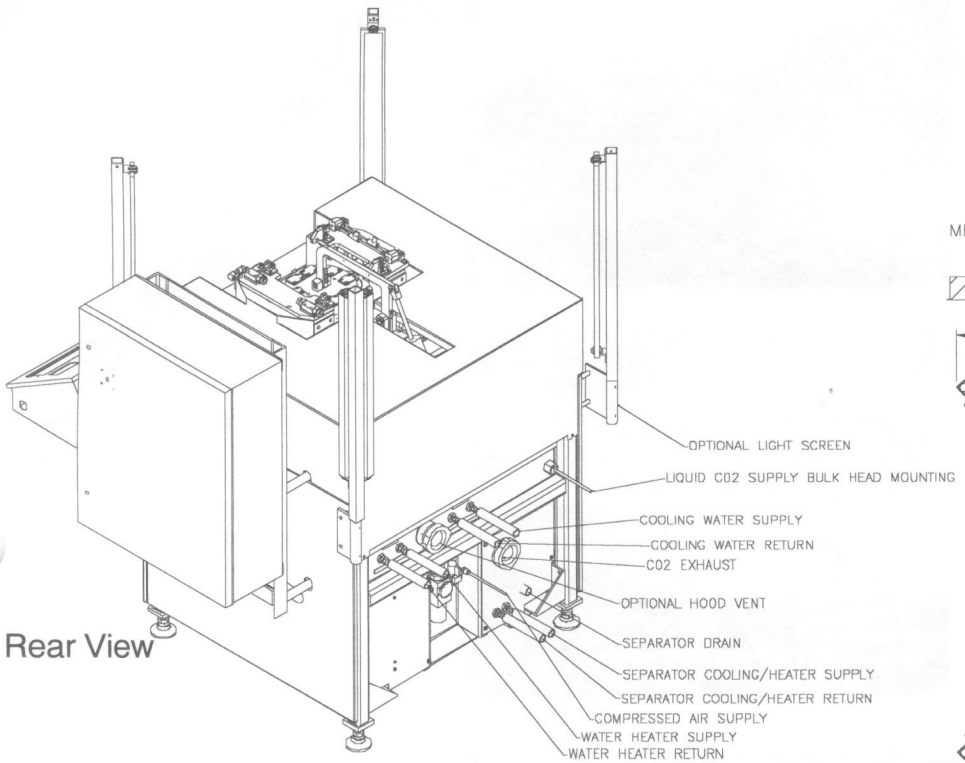
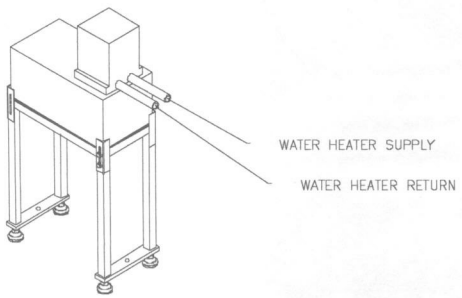
9 Dimensions and Floor Space Requirement

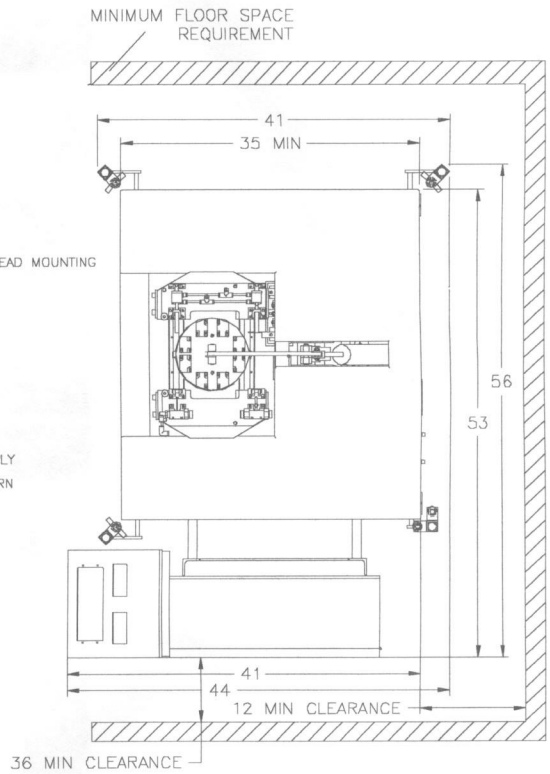
(dimensions in inches)



Rear View



Water Heater



Top View