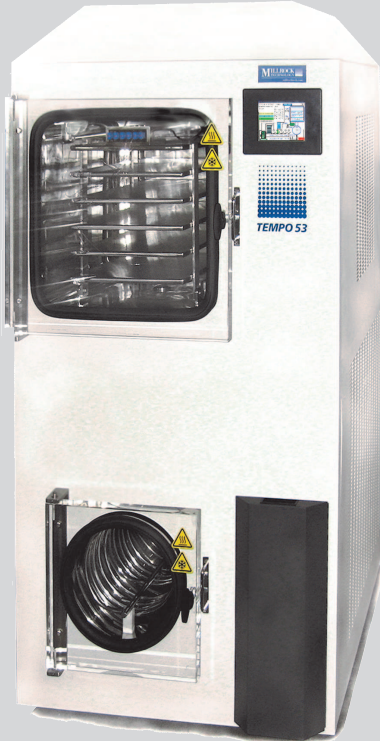


Freeze Dryer / Lyophilizer



Since the 1950's the Millrock team has been manufacturing freeze dryers. Combining our freeze drying knowledge with the latest technology, we offer the most advanced and easy to use and reliable freeze dryers available.

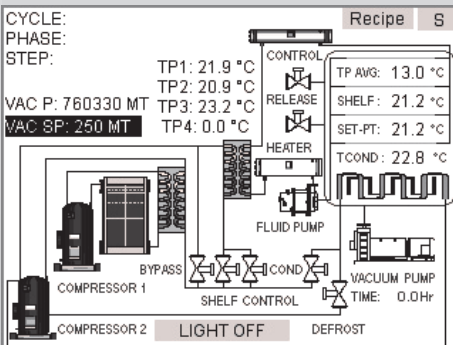
The Titan control system combines the latest PLC hardware and software for the most user friendly interface available.

A superior shelf system and exposed coil condenser make the TEMPO a high throughput system for laboratory and small production batch applications.

The 12" x 24" shelves offer more shelf to shelf spacing than competitive units for more versatility.

The exposed coil condenser eliminates vapor bypass that is common with 'cold wall' style condensers. During the freeze drying run the condensing surface area increases making vapor trapping more efficient.

Titan - PLC Control System



- Synoptic Screen
- Manual and Automatic Mode
- Automatic System and Leak Rate Testing
- Ethernet Connectivity for Remote Access and Data Acquisition

Some Common Applications

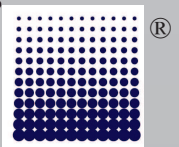
- Biotech and Pharmaceutical
- Tissue Banking
- Industrial
- Research
- University
- Government

Standard Features

Control System	Titan™ PLC with Touch Screen
Shelf Temperature Range	-48C or -65C to +65C
Shelf Heat Transfer	Hollow - Fluid Filled
Shelf Size and Finish	12" x 24" , 316L, 20 Ra or better
Shelf Area	2 sq ft to 10 sq ft
Shelf Assembly	Bulk or Hydraulic Stopping
Condenser Temperature	-53C or -85C
Condenser Capacity	30L
Condensing Rate	14L in 24 hours
Condenser Style	Exposed Coil
Vapor Port	4" Standard, 6" Option
Compressors	3.5HP Scroll (-53C) 2 x 2HP Hermetic (-85C)
Defrost	Hot Gas
Vacuum Control	Pirani w/Solenoid & Needle Valve
Gas Backfill	Included
Product Sensors	Two Standard Option for Four Additional
Cabinet	35"W x 42"D x 72"H
Electrical	230V/60Hz or 200V/50Hz, 1PH
Optional Vacuum Pump	195 LPM—30A 395 LPM—40A

System Performance

- Shelf pull down from +20 to -40C in less than 40 minutes
- Vacuum pull down to 100 mT in less than 20 minutes
- Vacuum leak rate less than 30 mT per hour



Tempo Equipment Design Features

- PLC with Touch Screen standard
- No proprietary microprocessors
- Ethernet Connectivity
- 316L on all wetted parts
- Large shelves for more product capacity—12" x 24" each
- High shelf fluid flow for the best temperature uniformity
- Hydraulic stoppering (10 PSI)—no bladders or cables
- Exposed coil condenser design to prevent vapor bypass which can destroy vacuum pumps (a common problem on externally wrapped condensers)
- High reliability compressors
- CFC-Free, Non-proprietary refrigerants
- Hot gas defrost
- Two product thermocouples standard or upgrade to six
- Oversized air-cooled condenser to minimize the affect of changing ambient temperatures
- Built-in validation port
- Vacuum control and gas backfill standard

Titan™ PLC Control System

The Titan provides automatic freeze-drying, defrost, system and leak rate testing. The control system can be accessed via an Ethernet connection for remote control and data collection.

- 6" STN Monochrome Touch Screen
- Unlimited Program Storage via Compact Flash or USB
- Ethernet Connectivity for Remote Access
- Remote Recipe Generation, Remote Data Logging
- Full Alarm Notification with Active Response
- Sample Recipes Included

Option

- Color touch screen

Available Options

6" Vapor Port	Isolation Valve
Shelf Latching Plates	Additional Product Probes
Advanced Vacuum Control	Capacitance Manometer
Moisture Sensor	LN2 Trap
Clean Room Configuration	Acid Trap
Manifold for Flask Drying	Extended Warranty
IQ/OQ Documentation	Water Cooled
FAT and SAT	230V, 50Hz

Note: Specifications subject to change without notice.
All specifications based on 20C ambient on 60Hz

Shelves	Spacing	Area (sq ft/sqM)
1	11.5/292	2/.186
2	5.5/139	4/.373
3	3.5/89	6/.559
4	2.5/63	8/.746
5	1.9/48	10/.932

Vial Capacity

Vial ml	Dia mm	Ht mm	1	2	3	4	5
2	16	41	730	1460	2190	2920	3650
5	22	48	398	796	1194	1592	
10	24	58	336	672	1008	1344	
20	29	71	220	440	660		
50	43	81	91	182			
100	52	92	66	132			

Bulk Fill (liters)

	1	2	3	4	5
10mm deep	1.8	3.6	5.4	7.2	9.0
15mm deep	2.7	5.4	8.1	10.8	13.5
20mm deep	3.6	7.2	10.8	14.4	18.0

Freeze Drying	10 Freezing Steps 16 Drying Steps with Pressure Control 1 Step Secondary Drying 1 Step Final Drying Alarms, Recipe Management, Data Logging
Manual	Individual switches for shelf, condenser, vacuum, isolation valve and release. Single set-points for shelf and set-point.
Defrost	Automatic timed hot gas.
System Test	Performance evaluation of shelf, condenser, vacuum, heating, and control.
Leak Rate	Automatic testing of leak rate.
Maintenance	Independent operation of components, with troubleshooting and calibration.

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Tempo Series



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