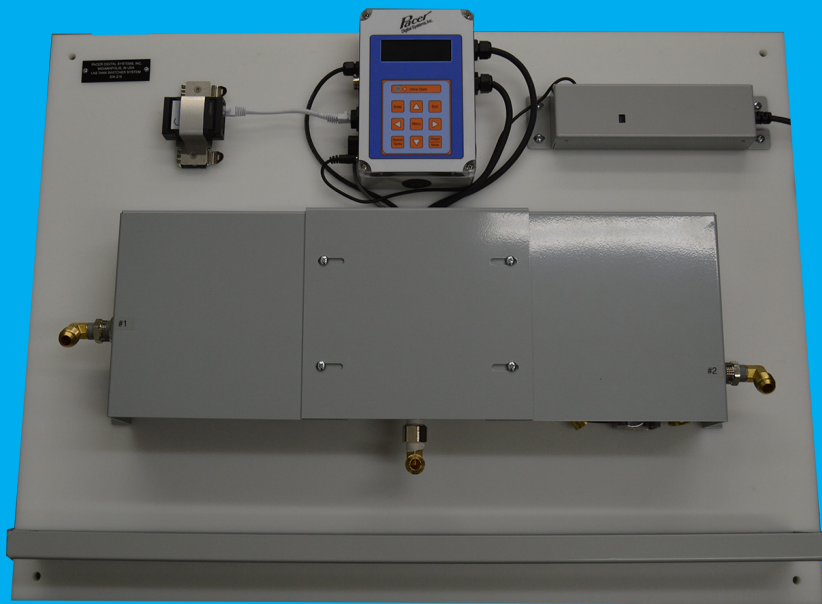


# Universal Tank Switcher

## Liquid Nitrogen Supply Management System



The TSH-2 Series Universal Tank Switcher provides advanced new features for the management of LN<sub>2</sub> Supply Cylinders. These features include:

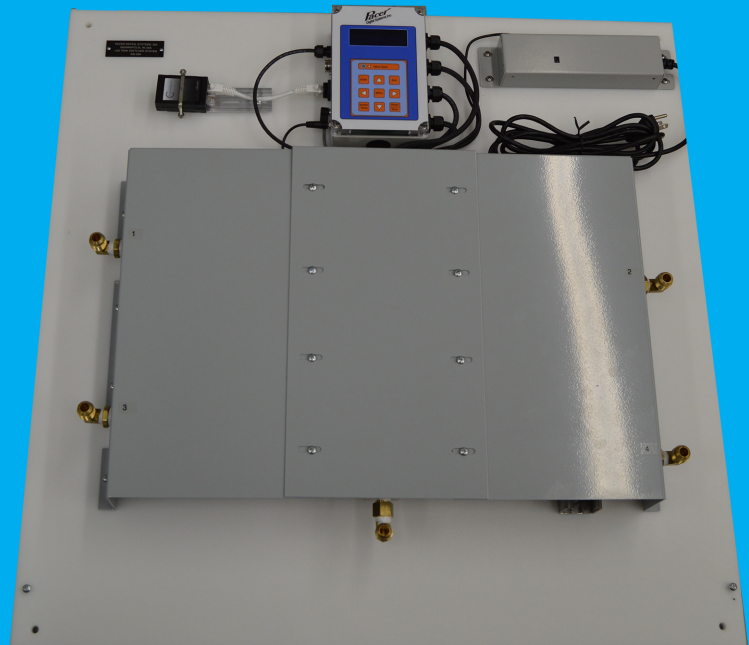
- Pre-configured modes for supplying cryogenic freezers and environmental chambers.
- Pre-configured mode for managed fill applications.
- 2,3 or 4 Valve configurations.
- A Defog feature allows the switcher to operate in coordination with a freezer, optimizing efficiency.
- A Vacuum Fluorescent Display indicates the status of supply cylinders, the manifold pressure and the sensor state.
- A menu system provides for easy adjustment of parameters.
- A drip tray prevents moisture from creating hazardous conditions.
- 12 VDC Solenoid Valves provide good flow and quiet operation.

- A universal power supply for operation anywhere in the world.
- A modular design for easy maintenance.
- Connectivity to the ciSmart Cloud platform provides global real time status on the LN<sub>2</sub> supply and error conditions.

The system utilizes a hybrid sensing technology, which provides accurate information on the liquid nitrogen supply while at the same time optimizing the use of the liquid nitrogen.

The TSH-2 Series also has the capability for easy expansion. Multiple tank switchers can be connected together through the Cryowire communications channel, allowing for the management of a large number of supply cylinders.

The ciSmart Cloud platform allows notifications by email, text or a voice call to lab personnel or gas suppliers when the Liquid Nitrogen supply gets low.



# SPECIFICATIONS

## TSH2 Series

<b>Control Type:</b>	Low Pressure LN <sub>2</sub> Supply Switch-over System.
<b>Configuration</b>	
Control Capability:	2, 3, 4 valves per manifold.
System Pressure:	22 -35 psig
Compatibility:	Works with all brands of Cryogenic Freezers.
Expandability:	Yes - Manifolds can be added using CryoWire Secure™ Communications.

<b>LN<sub>2</sub> Detection</b>	
Sensor Type:	1-Thermistor Fixed
Range:	Liquid N <sub>2</sub> / N <sub>2</sub> Gas

<b>Pressure Measurement</b>	
Range:	0 - 100 psig
Accuracy:	< +/- .5% BFSL
Over Range Protection:	200 psi
Burst Pressure:	500 psi

<b>Electrical</b>	
Power Supply Input Voltage, Power:	100-240 VAC, 60W
Power Consumption (max):	50 W
Power Consumption (continuous):	25 - 50 W
Input Frequency:	50/60 Hz
Output Voltage:	12 VDC
Control Input Voltage:	12 VDC
Power Cord:	Available for all countries

<b>Solenoid Valve</b>	
Input Voltage:	12 VDC
Power:	40.6W
Flow:	1/2" orifice: 3.5 Cv Flow Rate

<b>Communications</b>	
Protocol:	CryoWire Secure™
Number of communication ports:	1

<b>User Interface</b>	
Display Type:	Vacuum Fluorescent Display (VFD)
Buttons:	9

<b>Control Tests</b>	
Power Up Self Tests:	Control System Check
Flow Sensor Status:	Yes
Pressure Transducer Status:	Yes
Valve Status:	Yes

<b>Alarms</b>	
Supply Cylinder(s) Empty	Audible Alarm Retrigger
Flow Sensor Error Alarm	Visual Alarm Indicator
High Pressure Alarm	Remote Alarm Delay
Audible Alarm	Communications Alarm
Power Failure (Remote Only)	

<b>Data Collection</b>	
LN2 Supply Information:	Yes
Alarms:	Yes
Memory:	4 Mb
Date/Time Stamp:	Yes

<b>Features</b>	
Supply Pressure Correction:	Yes
ciSmart Cloud Access:	Yes
Notification Capability:	Yes
Gas Bypass Capability:	Optional
"Smart" Fill Capability:	Future
Preset configurations:	Future
Coordinated Fill Management:	Future

<b>Dimensions</b>	
Manifold Width	32" (813mm)
Manifold Height - 2 valve	24" (610 mm)
Manifold Height - 4 valve	32" (813 mm)
Manifold Depth	4.25" (108 mm)
Manifold Weight - 2 valve	47 lbs (18.1 kg)
Manifold Weight - 4 valve	57 lbs (25.9 kg)
Control Width	4.75" (121 mm)
Control Height	7.25" (184 mm)
Control Depth	2.00" (51 mm)
Control Weight	1.0 lbs (.45 kg)

<b>Part Numbers</b>	
TSH21	2 Valve Manifold
TSH22	3 Valve Manifold
TSH23	4 Valve manifold

