North American Envirosystems

BATTERY TEST CHAMBER



4634 Orkney Drive, Missouri City 77459, Texas

North American Envirosystems

SAFETY EQUIPMENT AS STANDARD

Engineered for Safety. Built for Reliability.

NON-SPARKING FAN

Spark resistant aluminum fan is used or an impeller with a casing complying to the standards of a non-sparking blower.



SHEATHED AIR HEATERS



The heaters in the air plenum are stainless steel sheathed with no direct radiation or contact with the test space.



PRESSURE RELIEF VALVE

Incase of an accidental explosion , this valve will avoid excessive pressure build up inside of the test space.



PULL ACTION CLAMP DOOR LOCKS



Additional two locks are provided additional to the main door lock.

AUDIO VISUAL ALARM



An audio visual alarm lamp will alert incase of any alarms in the chamber.

MAGNETIC DOOR LOCK



The magnetic door lock is automatically activated during tests.

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SAFETY EQUIPMENT AS ACCESSORIES

Enhanced Safety. Advanced Monitoring. Complete Protection.

N_2 NITROGEN PURGE SYSTEM

Recommended for Hazard Levels 4-6 with Oxygen Sensor

Nitrogen is purged in the test space to maintain O2 levels as per set value.



O_2 OXYGEN SENSOR

Recommended for Hazard Levels 4-6 with Nitrogen Purge System



Monitors the oxygen concentration in the test space, controls the feed of nitrogen and gives an alarm if exceeds levels.



BURST DISC

Recommended for Hazard Levels 4-7



In case of damage to the battery, large volumes of gas can be released into the test space at a blow. To extract this gas rapidly, a rectangular burst disc is provided on the ceiling of the chamber, which will burst out and release the gas.

ISOLATED SENSORS

Recommended if hydrogen is present



An intrinsic barrier is provided for the sensors placed inside the test space.

CO, H_2 and O_2 Gas Monitoring System

Recommended for Hazard Levels 5-7

An electrochemical sensor is used to measure the CO in the test space. In conjunction with this option, hydrogen monitoring (H2) and Oxygen (O2) is also monitored.
Theoretical data analysis of gas sensor Min and Max values are given below

Slno	GAS Sensor	MIN	MAX	Atms value	Units	Hysteresis	Sensor Range
1	CO	35	200	1 to 3	PPM	5PPM	0-300
2	H2	15	25	0 to 3	%LEL	2%LEL	0-100
3	O2	5	20	21	%VOL	0.2%VOL	0-25

When the amount of gas inside the test chamber exceed the minimum and maximum level an alarm popup in the system

North American Envirosystems

SAFETY EQUIPMENT AS ACCESSORIES

Engineered Accessories. Enhanced Safety. Total Protection.

CHAIN DOOR LOCK

Recommended for Hazard Levels 5-7

A stainless steel based chain linked door lock is provided, to avoid any accidental opening of test space.



HAND WHEEL LOCK

Recommended for Hazard Levels 5-7



A hand wheel type lock is provided along with the standard lock to avoid the door opening incase of an explosion.



PORT PLUG RESTRAINT

Recommended for Hazard Levels 5-7

Incase of an accidental explosion , this restraint will keep the port hole plug in place.



RE-INFORCED FLOOR

Recommended for Hazard Levels 5-7



Additional reinforcement is provided to accommodate heavy batteries on the test space floor.

FIRE SUPPRESSION WATER MIST / LIQUID CO_2 SYSTEM

Recommended for Hazard Levels 5-7

The fire suppression system will be triggered either by an independent freely movable Pt-100 sensor, which can detect any sudden increase in temperature, or by the Gas Monitoring Systems (optional)









- Early detection
- Rapid response
- Minimizes damage
- Protects people & assets
- Enhances test safety

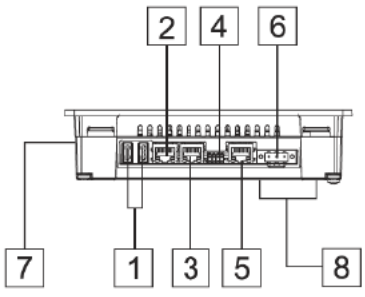
North American Envirosystems

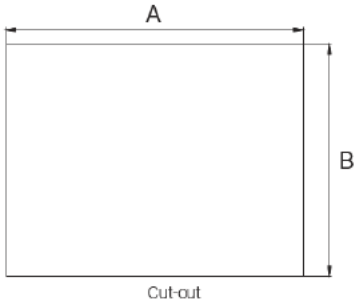
enviCoM™ 4.0

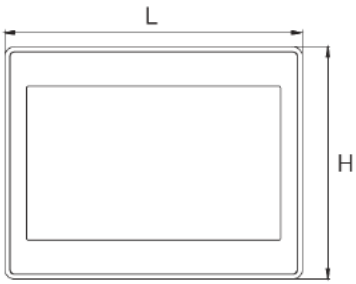
Open architecture control platform for connected environmental testing

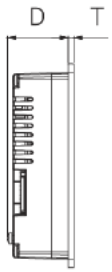


- Industry 4.0 Product Concept
- HW and FW Optimised for Extremely Fast Operation
- System and Project Rapid Boot-Up
- OS Linux RT
- JMobile – the software that powers the X Platform
- CODESYS V3 with Ethernet I/O Stacks
- Multitouch and Gesturing
- Brilliant Display
- Wide Angle Visibility
- Beautiful 16,000,000 Colors
- Resistant to Scratches, UV and Chemicals
- Total Glass Design
- Network Separation possibile via Up to 3 Ethernet
- Networks with different IP addresses
- Plug in Modules for System Expansion
- IECEx, ATEX, DNV-GL, UL certification: Ordinary and Class 1 Div 2







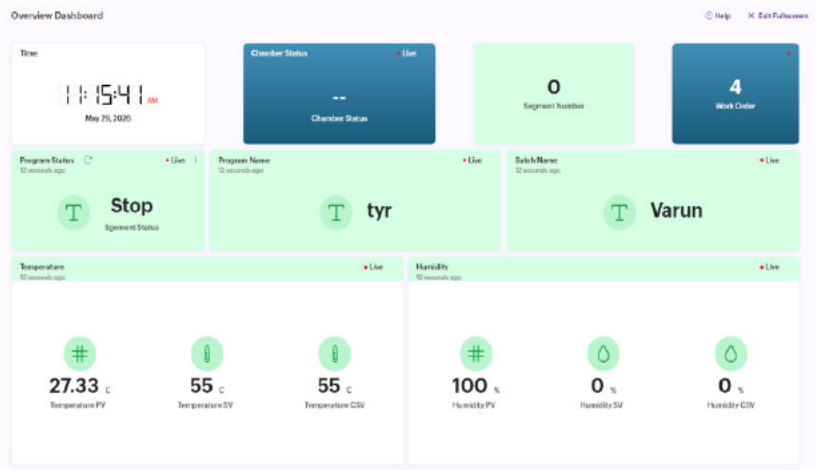


1 USB ports 1 and 2
2 Ethernet port 2 (10/100 Mb)
3 Ethernet port 1 (10/100 Mb)
4 Serial port
5 Ethernet port 0 (10/100/1000 Mb)
6 Power supply
7 SD Card slot
8 2 Expansion slots for plugin modules

Ethernet port	3 (port 0 - 10/100/1000, port 1 - 10/100, port 2 - 10/100)
USB port	2 (Host V2.0, max. 500 mA)
Serial port	1 (RS-232, RS-485, RS-422, software configurable). Max 3 serial ports using plug-in modules.
SD card	Yes
Expansion	2 slot for plug in modules

Levito IOT:

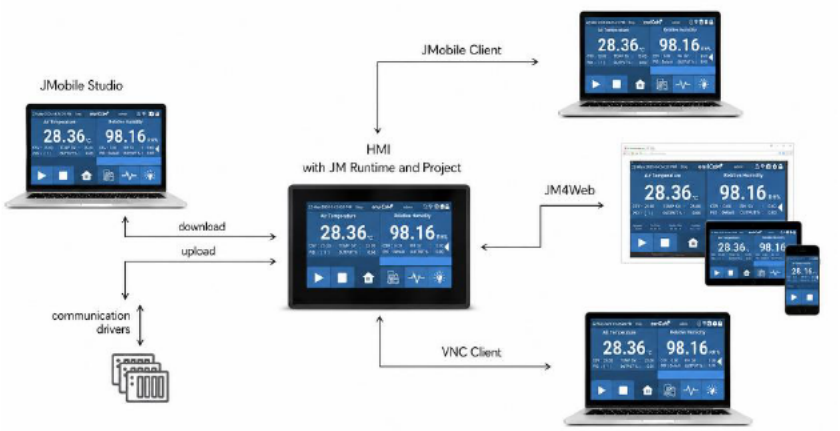
MQTT and IoT cloud layer for dashboards, alerts, and analytics



- MQTT broker enables IoT communication for industrial sensors and machines
- Levito IoT cloud provides real-time monitoring and remote visibility
- Dashboards track temperature, humidity, compressor status, and energy
- Alarm notifications, maintenance reminders, and cycle-end reports
- Cloud backup supports historical analysis and reporting

J-Mobile Remote Diagnostics & Support:

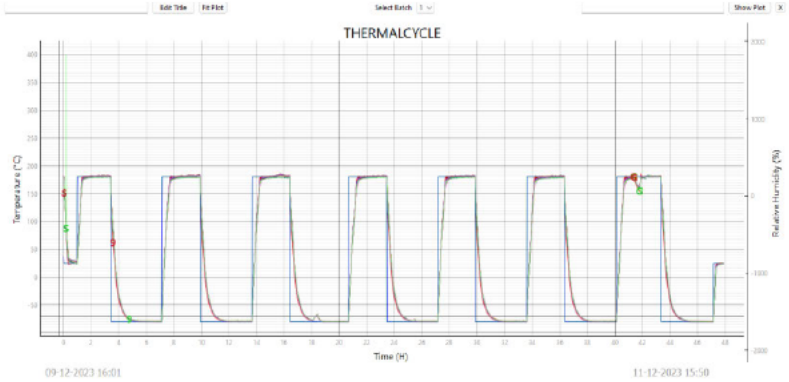
Mobile remote monitoring, notification, and troubleshooting support



- Monitor temperature, humidity, setpoints, and chamber status in real time
- Remote start/stop and basic operational control
- Alarm and event notifications for quick response
- Secure authentication with access-level management
- Remote diagnostics help reduce downtime and speed support

enviCoM™ 4.0 Reports

CSV-to-report workflow with graphs, alarms, events, and PDF output



- Convert CSV batch files into formatted reports
- Generate graphical test data representation with alarm codes
- Create PDF reports with test results and custom report fields
- Produce alarm, event, and historical data reports

TEST STANDARDS

Reliability. Safety. Compliance.
Engineered for a Safer Tomorrow.



EUCAR HAZARD STANDARDS

Hazard Severity Level	Description	Classification Criteria & Effect
0	No Effect	No effect. No loss of functionality
1	Passive Protection Activated	No defect; no leakage; no venting, fire, or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell reversibly damaged. Repair of protection device needed.
2	Defect/Damage	No leakage; no venting, fire, or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell irreversibly damaged. Repair needed.
3	Minor Leakage	No venting, fire, or flame*; no rupture; no explosion. Weight loss
4	Major Leakage/ Venting	No fire or flame; no rupture; no explosion. Weight loss ≥50% of electrolyte weight (electrolyte = solvent + salt).
5	Fire or Flame	No rupture; no explosion (i.e., no flying parts).
6	Rupture	No explosion, but flying parts of the active mass.
7	Explosion	Explosion (i.e., disintegration of the cell)

** Some smoke or gas may be released without flame.*

VARIOUS BATTERY TEST STANDARDS

Description	Classification Criteria & Effect
IEC 62660-2	Reliability & Abuse Testing for Lithium Ion Cells in Electric Vehicles
SAE J2464	EV & HEV Rechargeable Energy Storage System Safety & Abuse Testing
SAE J2929	Safety Standard for Electric and Hybrid Vehicle Propulsion Battery Systems Utilizing Lithium-based Rechargeable Cells
IEC 60086-4	Primary Batteries, Part 4: Safety of Lithium Batteries
UL 1642	Standard for Lithium Batteries
UL 2580	Batteries for use in Electric Vehicles
UN/DOT 38.3	UN Lithium Battery Testing Requirements
IEC 61960	Secondary Lithium Cells and Batteries for portable applications
IEC 62133	Secondary Cells and Batteries Containing Alkaline or Other Non-acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made from them, for Use in Portable Applications
IEC 62281	Safety of Primary and Secondary Lithium Cells and Batteries during Transport
RTCA DO-311	Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems
UL 2054	Household and Commercial Batteries

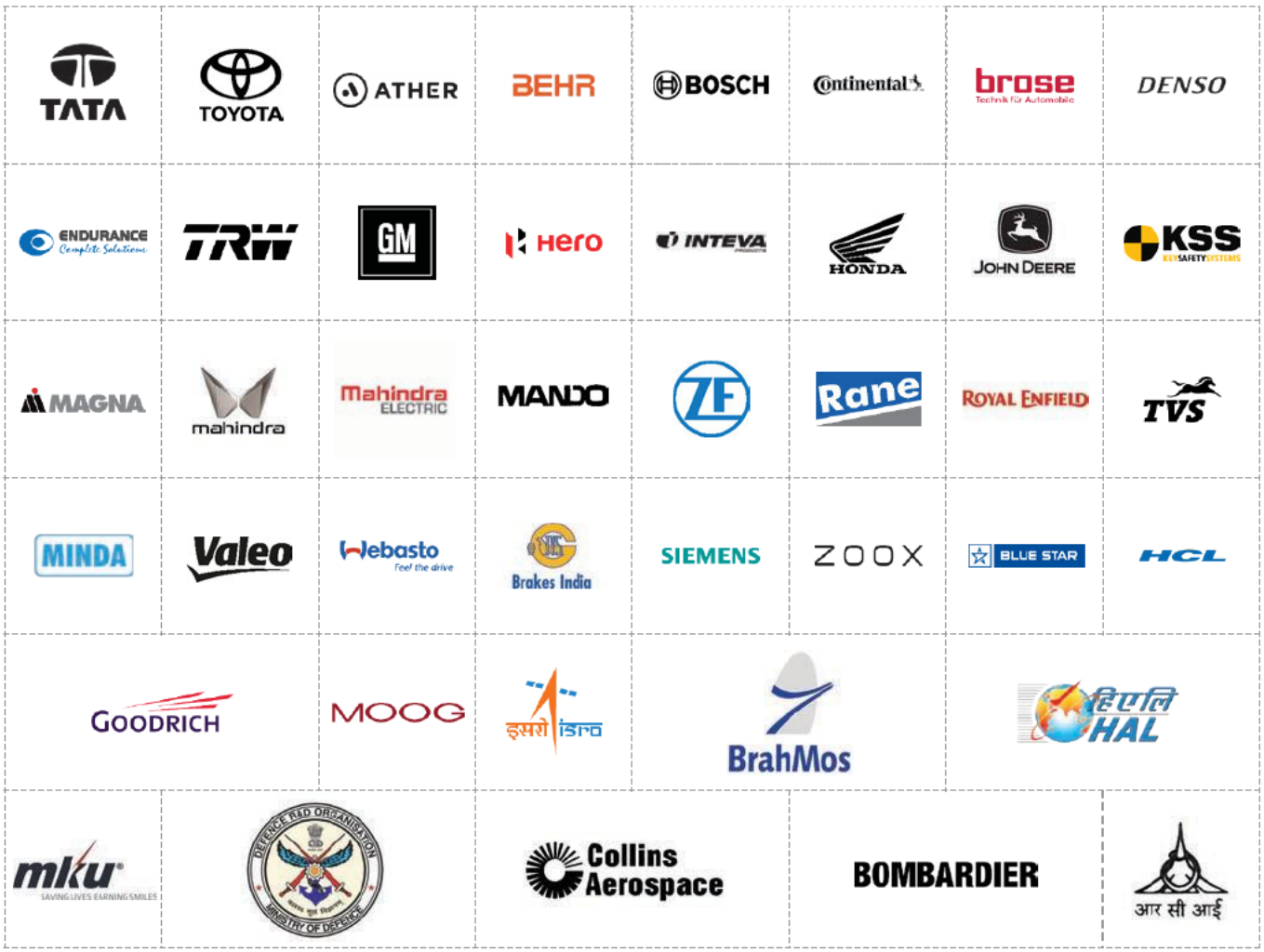
ENGINEERED FOR SAFETY
Tested to global standards for maximum reliability.

COMPLIANCE YOU CAN TRUST
Aligned with international safety regulations.

PERFORMANCE YOU CAN RELY ON
Validated. Certified. Proven.

THEY TRUST US




TATA
TOYOTA
ATHER
BEHR
BOSCH
Continental
brose
Technik für Automobile
DENSO
ENDURANCE
Complete Solutions
TRW
GM
Hero
INTEVA
HONDA
JOHN DEERE
KSS
KEY SAFETY SYSTEMS
MAGNA
mahindra
Mahindra
ELECTRIC
MANDO
ZF
Rane
ROYAL ENFIELD
TVS
MINDA
Valeo
Webasto
Feel the drive
Brakes India
SIEMENS
ZOOX
BLUE STAR
HCL
GOODRICH
MOOG
इसरो
इसरो
BrahMos
हिंदुस्तान एरोनॉटिक्स लिमिटेड
HAL
mku
SAVING LIVES EARNING SMILES
DEFENCE R&D ORGANISATION
MINISTRY OF DEFENCE
Collins
Aerospace
BOMBARDIER
आर सी आई

PRESENCE

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