NEOMETRIX

Portable Cylinder Nitrogen Trolley With Booster

Product Catalog

www.neometrixgroup.com

About us:

Neometrix Defence Celebrating 20 Years of Excellence! For the past two decades, Neometrix Defence has maintained its position as a premier provider of advanced test benches and rigs.

Our accreditation by the Directorate General of Aeronautical Quality Assurance, India (DGAQA) and Defence Research & Development Organization, India (DRDO) underscores our commitment to upholding the highest international defence industry standards.

Counting the Indian Air Force/Army/Navy, Ministry of Defence, Hindustan Aeronautical Limited, and DRDO among our esteemed clientele, we are recognized for delivering state-of-the-art solutions and unwavering performance reliability.

Strengths & Capabilities:

Neometrix Defence is a powerhouse of engineering brilliance, proudly serving every Indian Air Force station and partnering with the Indian Army, Navy, Railways, BARC, NPCIL, and ISRO. With a team of over 100 elite engineers and visionary founders from IIT Kanpur and IIT Delhi, we harness cutting-edge technology to set the gold standard in mechanical engineering.

We Don't Just Meet Industry Demands – We Define Them!

- We have established our presence in all Air Force stations across India. With the Indian Air Force as our leading customer, we are dedicated to upholding the highest standards of excellence in the aerospace industry.
- Our extensive clientele extends beyond the defence industry, including projects with the Indian Army, Navy, Railways, BARC, NPCIL, ISRO, and more. In essence, we excel in all aspects of mechanical engineering!
- Our team comprises over 100 graduate engineers, supported by a cutting-edge manufacturing site equipped with state-of the-art machinery, enabling us to meet the highest Engineering standards.
- The founders of our company are distinguished graduates from IIT Kanpur and IIT Delhi, bringing extensive expertise and a wealth of engineering knowledge to Neometrix Defence.

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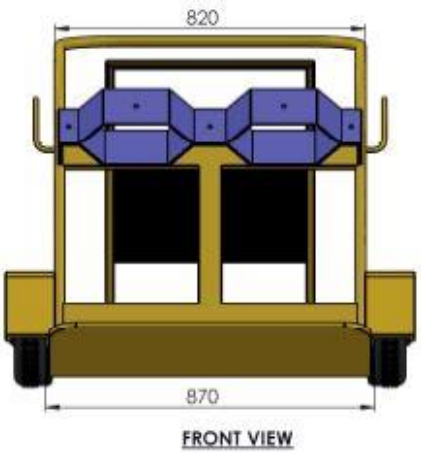
Introduction:

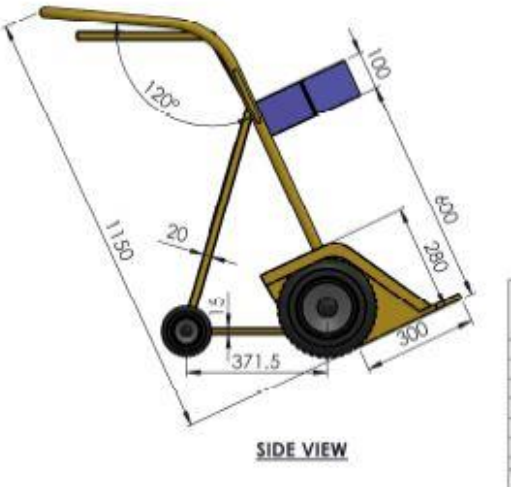
The Portable Single Cylinder Nitrogen Trolley with Booster is a purpose-built, field-deployable system engineered for rapid pressurization and precision control. At its heart lies a two-stage Haskel pneumatic booster that converts a single, industry-standard nitrogen cylinder (200–250 bar) into a high-pressure source capable of delivering up to 415 bar (6 000 PSI). This 75 : 1 boost ratio not only ensures swift ramp-up to target pressures but also maintains pulsation-free flow with better than ±1 % full-scale accuracy—critical for leak-testing, burst-testing, and calibration tasks.

Encased within a powder-coated mild-steel frame, the booster assembly sits on heavy-duty pneumatic swivel casters and is topped with an ergonomically designed handle, allowing a two-person team to manoeuvre confidently over rough workshop floors, service-vehicle decks, or confined test-bay aisles. All control elements—including the drive-air regulator, isolation and vent valves, and three stainless-steel (SS-316) pressure gauges—are logically arranged on a front-panel mimic, color-coded and labelled with intuitive pictograms. This layout minimizes operator training time and helps prevent mis-settings, even in low-light or high-noise environments.

With its compact footprint (690 × 645 × 1 150 mm) and modular skid-mount design, the trolley can be quickly detached for bench-mount use in static labs or retrofitted with longer hoses, remote-mount gauges, or digital transducers for automated data logging. Comprehensive safety features—dual redundant relief valves, mechanical gauge over-range stops, and a key-lock isolation on the drive-air supply—ensure that even under rapid cycling or neglected maintenance, over-pressure conditions are contained, and operator risk is minimized. Together, these qualities make the Portable Nitrogen Trolley with Booster an indispensable tool for maintenance crews, R&D laboratories, and commissioning teams across industrial, aerospace, and Defense sectors.



FRONT VIEW



SIDE VIEW

Purpose & Applications:

Industrial Leak & Burst Testing

- This trolley-mounted booster system excels at verifying the integrity of hydraulic and pneumatic assemblies by subjecting them to controlled high-pressure nitrogen. In routine leak tests, the system pressurizes valves, manifolds and piping up to 415 bar, while the pulsation-free output allows detection of micro-leaks down to 0.1 bar/minute. For burst testing, components are ramped to 1.2–1.5 times their nominal working pressure—in a single, uninterrupted pressurization sequence—to validate safety margins without the risk of rapid decompression. Operators benefit from the high-resolution SS-316 outlet gauge (±1 % FS) and the micrometre regulator, which together enable gradual pressure steps for precise characterization of crack-initiation and structural failure points.

Aerospace Accumulator Charging

- In aerospace maintenance and overhaul facilities, nitrogen-charged accumulators and shock absorbers demand exacting pressure fill procedures to guarantee flight safety. This booster trolley provides the capacity to charge accumulator volumes from 0.5 L to 50 L at pressures up to 415 bar, with repeatable accuracy within ±0.5 bar. The quick-disconnect fittings allow swap-out between different accumulator sizes within seconds, minimizing aircraft downtime. A calibrated, traceable gauge enables documentation of each charging cycle for regulatory compliance, while the clean, dry nitrogen output prevents moisture-induced corrosion inside gas chambers. The compact footprint of the unit allows it to be wheeled directly into hangar bays or retrofitted into ground-support equipment trolleys, streamlining logistics in busy MRO environments.

Field Service & Commissioning

- Oil & gas operators and pipeline contractors rely on rapid on-site pressure testing during pre-commissioning and maintenance campaigns. This portable booster is used to pressurize valve skids, manifold assemblies, and pipeline segments to commissioning pressures (typically 250–350 bar) to verify weld integrity, flange seal performance, and valve shut-off characteristics. The pneumatic-drive configuration tolerates dusty or humid environments, and its pneumatic wheels handle gravel pads or uneven service-vehicle platforms. With minimal setup—simply connect a nitrogen cylinder, plug in a filtered air supply, and open the inlet valve—technicians can complete a full test cycle in under 10 minutes. The vent valve permits fast depressurization for staging multiple test points per day, helping contractors meet tight commissioning schedules

Key Features:

75: 1 Boost Ratio

- The dual-stage Haskel booster amplifies inlet nitrogen pressure by a fixed 75: 1 ratio, transforming 6 bar of drive air into up to 415 bar of output. A micrometre-style regulator knob provides tactile, 1 bar-resolution adjustments, allowing operators to dial in exact test pressures for critical leak-and-burst evaluations.

Dry-Filtered Drive Supply

- Inlet air (or secondary nitrogen) passes through a 40 µm stainless-steel sintered filter before entering the booster, trapping particulates that can erode piston seals and valve seats. This contamination control extends service intervals—filter elements last 6 months to a year under normal use—and preserves the booster's ±1 % accuracy over thousands of cycles.

Safety Relief & Gauge Protection

- A primary safety relief valve opens automatically at 405 bar to prevent over-boost scenarios, while a secondary burst disc at 430 bar provides a fail-safe in extreme conditions. All SS-316 pressure gauges incorporate mechanical over-range stops (15 % beyond full scale) to shield delicate Bourdon tubes from shock loading, minimizing gauge replacements and downtime.

Ergonomic Control Panel

- All valves, regulators, and gauges are mounted on a front-facing mimic plate with color-coded handles (green for drive, yellow for inlet, red for vent) and laser-etched pictograms..

Quick-Connect Hose System

- A 15 m, 6 mm-OD stainless-steel braid hose connects via ISO 7241 Series B quick-disconnect couplings, enabling tool-free swap-outs in under 5 seconds.

Rugged Mobility

- The trolley frame is built from powder-coated mild steel with integrated skid-mount points, and rolls on 200 mm pneumatic swivel casters designed to traverse gravel, concrete, and service-vehicle decks. A textured, angled push-handle minimizes operator fatigue, while a compact 690 × 645 × 1 150 mm footprint ensures access through standard doorways and narrow test-bay aisles.

Technical Specifications:

Parameter	Specification
Boost Ratio	75 : 1
Drive Pressure	6 bar min., up to 16 bar
Drive Flow Demand	60 SCFM
Air Filtration	40 µm SS sintered filter
Max Outlet Pressure	415 bar (6 000 PSI)
Accuracy	±1 % full-scale after stabilization
Inlet Gauge	0–280 bar (±2 bar)
Outlet Gauge	0–4 000 bar (±20 bar)
Hose	15 m × 6 mm OD SS braid, 400 bar WP
Dimensions (L×W×H)	690 × 645 × 1 150 mm
Weight	~75 kg (incl. hose & gauges)
Materials	Powder-coated MS frame; SS-316 valves, fittings, gauges
Op. Temp.	–20 °C to +60 °C

System Components & Architecture:

- Pneumatic Drive Module
    - Quick-release 40 µm stainless-steel sintered filter for Class 2 particulate removal
    - Spring-loaded drive-air regulator with integrated pressure gauge for fine pressure control
    - Two lockable 316 SS ball valves:
        - Drive-supply isolation for maintenance
        - Vent valve to exhaust residual pressure without hose disconnection

All metal-to-metal seals and 316 SS fittings for leak-free operation up to 16 bar

- High-Pressure Booster Module
    - Single-stage Haskel balanced-piston booster for pulsation-free output
    - Low-dead-volume manifold design for rapid pressurization and venting
    - High-cycle stainless-steel valve stack rated for millions of actuations
    - Micrometre-style regulator knob for 1 bar resolution on outlet pressure
    - Three SS-316 Bourdon gauges (drive, inlet, outlet) with mechanical over-range stops
    - Removable cover plates for quick access to internal components and lubrication
- Frame & Mobility
    - Powder-coated mild-steel skid-mounted frame with fork pockets and tie-down points
    - Four 200 mm pneumatic swivel casters with sealed bearings and polyurethane tread
    - Textured ergonomic handlebar at hip height for comfortable steering
    - Rubber-isolated mounting brackets to dampen vibration and protect internals
    - Zinc-phosphate pretreatment under powder coat for enhanced corrosion resistance
    - ASME Section IX–compliant welds for structural integrity in harsh environments

Installation & Maintenance

Site Requirements

- Drive air: 6–16 bar dry, 40 µm filtered @ 60 SCFM
- Environment: 10 °C–40 °C, indoor/dust-free

Routine Checks & Schedule

- Daily: Inspect hoses, gauge integrity, quick-disconnect seals
- Monthly: Lubricate booster seals; verify pressure-drop across filter
- Quarterly: Replace drive filter element; test safety relief & burst disc
- Annual: Full leak test; sensor recalibration; SSGA-approved grease refresh

Operational Workflow

Setup: Mount N_2 cylinder, connect drive air, verify valve positions.

Priming: Open inlet valve, set drive regulator to ~6 bar until outlet gauge reads cylinder pressure.

Boosting: Increment drive air to reach test pressure; fine-tune via micrometre knob.

Testing: Connect UUT with quick-disconnect; monitor stability for leak/burst protocols.

Vent & Change-Out: Close drive air, open vent valve, disconnect hose, swap UUT.

Safety, Compliance & Quality:

- Dual Relief System: 405 bar safety relief + 430 bar burst disc
- Gauge Over-Range Stops: Mechanical pin protection
- Lockout Provision: Keyed drive-air isolation
- Standards: ISO 4413, ISO 13849-1 Cat. 3, IEC 60204-1
- Traceability: Serialized frame, QA/QC digital logs, weld radiography