

LTBR //X

Large Engines Diesel Test Bench



Authorized Solution for
Schaeffler / Continental



CloudX AZO

LTBR //X

Large Engines Diesel Test Bench

The Flagship Diesel Test Bench for Marine, Locomotive, Power Generation, Mining and Heavy-Duty Industrial Engines.



CZ Modular Workbench with Multi-drawer+ shelf options:
organized adapters and fittings storage.



LTB | PLATFORM

LTBR-X

SPECIALISTS SOLUTIONS

OVERVIEW

LTBR **X**

MARINE · LOCOMOTIVE · POWER GENERATION · MINING
· OFF-HIGHWAY · DUAL-FUEL

From Shipyard to Power Plant.
From Locomotive to Mine site.

ENGINEERED FOR THE ENGINES
THAT NEVER STOP

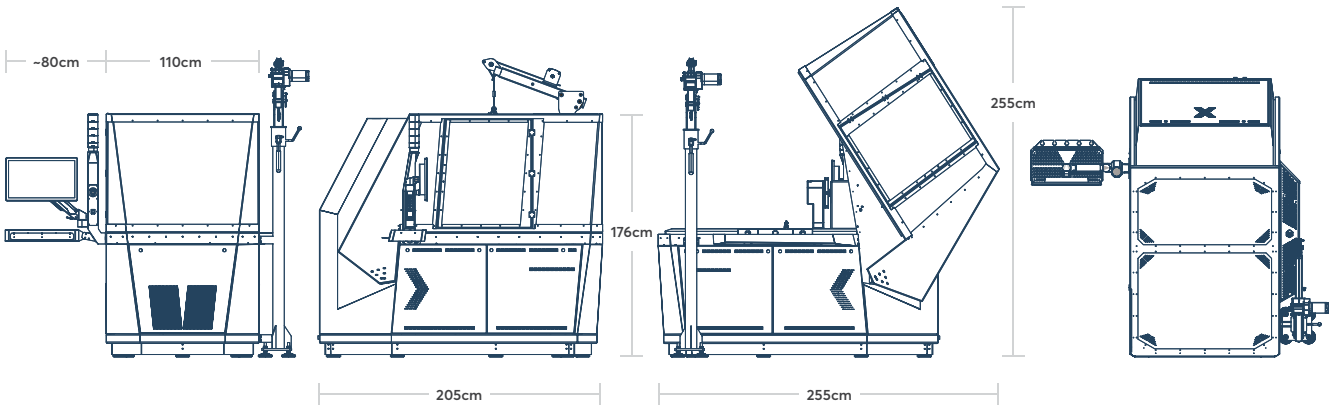
The LTBR-X is more than a test bench. It's the partner that keeps the world's most demanding engines running across oceans, across continents, across decades of service life.

Built by specialists. Trusted by specialists. Engineered to outlast everything else in the workshop



SPECS & METRICS

Weight	1,640kg	Voltage	380-480 V · 3P+PE · 50/60 Hz	Current	125 A
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TOTAL SYSTEM COVERAGE

- **All major large-engine systems on one platform:** Marine CR · Locomotive · Power-Gen · Mining · Off-Highway · Dual-Fuel pilot
- **Drive Power:** 45 kW / 60 HP. Built for large-bore, high-displacement pumps and injection rigs
- **Pressure capability up to 3,000+ bar.** Engineered for the highest-pressure injection systems in the industry
- **EU6 / EU7 / IMO Tier III testing standards*.** Future-proof from day one
- **11,000+ part numbers** in the factory database, continuously updated through CloudX
- **User database:** Built-in Test Plan Editor, made for OEMs, Classification Societies, Marine Reman Specialists and Engineering labs
- **2-Stroke and 4-Stroke coverage:** including selected next-generation dual-fuel and methanol-ready platforms
- **Nine out of nine top diesel power engine OEMs:** Cummins, Caterpillar, MAN, MTU/Rolls-Royce, Wärtsilä, Mitsubishi, Volvo Penta, HiMSEN, Doosan

ENGINEERED FOR PRECISION

- **Reinforced flatbed base:** exceeds standard industry test-bench geometry for large-diameter pump support
- **Integrated waste tank** with injector and pump flushing system: clean cycles, every cycle
- **Advanced closed-loop temperature control:** EU6 / EU7 / IMO Tier III compliant
- **Comprehensive hydraulic control panel:** oil supply, low-pressure feed, vacuum regulation and Cambox hydraulic setup, all in one interface
- **Accessible HP rail system & DRV:** convenient maintenance access, low-downtime service
- **Powered by CloudX:** every result encrypted, cloud-stored, and accessible anywhere. GDPR-compliant. No third-party sharing. Industry 4.0 ready.
- **AZO operating system:** the most intuitive, user-friendly HMI on the market

OEM-AUTHORIZED. OEM-TRUSTED.

Authorized by **Schaeffler / Continental** and built to OEM testing standards across **Bosch, Delphi, Denso, Stanadyne, Caterpillar, Liebherr, Woodward, Rolls-Royce/MTU, L'Orange, and Cummins** platforms. Additional Authorizations pending.

AFTERMARKET-READY. INDUSTRY-CONNECTED.

CLOUDX REPAIR HUB: Certified Third-Party Repair Solutions

Built to complement the large-engine market: not compete with it.

- ✓ Hard-to-source parts from trusted third-party suppliers: critical for legacy marine and locomotive platforms
- ✓ Test plans not published by OEMs: complemented by third-party specialists
- ✓ Calibrations and repair guides from approved specialists
- ✓ Co-branded with our third-party partners: visibility and trust on both sides
- ✓ OEM testing stays primary: the Repair Hub fills the gaps
- ✓ Optional and clearly marked: you decide what to use

ERGONOMICS

- **Three-side workspace access** with transparent protective hood: full visibility, full safety
- **22" industrial-grade Android HMI** (fully adjustable)
- **Easy pump and Cambox mounting** (portable trolley and attached electric machine-crane)
- **Fast Cambox setup** (EZO Kit)
- **Versatile injector rail** with illuminated multilayer spray chamber: fully adjustable for any large-engine injector geometry
- **HP-hose-free injector system** (fully adjustable)
- **Intuitive cable and hose management**
- **Auxiliary racks and shelves** (optional)

LTBR

INDUSTRIES · WHERE THE LTBR-X EARNS ITS PLACE



Wherever a diesel engine has to run 24/7, under harsh conditions, in remote sites or in the world’s most demanding logistics chains, the **LTBR-X** is the bench specialists trust to keep it running.

NINE OUT OF NINE

The LTBR-X covers all top nine diesel power engine manufacturers in the world. From data-center backup generators to ocean-going propulsion. Not a subset. Not a selection.

	Manufacturer	LTBR-X Coverage
1	Cummins	✔ QSK19 / 45 / 60 / 78 / 95, QSV81/91, X15, ISX15, QST30
2	Caterpillar	✔ 3500 Series, C175, 3406, C7–C32, full HD and large-engine lineup
3	MAN Energy Solutions	✔ L+V Series (L21/31, L23/30, L27/38, L+V32/40, L+V48/60), 49/60DF
4	Rolls-Royce Holdings (MTU)	✔ Series 2000, Series 4000, Series 8000
5	Wärtsilä	✔ 20, 26, 32, 34, 38, 46 / 46F / 46DF, 50DF
6	Mitsubishi Heavy Industries	✔ UEC, S-Type, KU Series, marine & stationary
7	Volvo Penta	✔ D-Series marine (D5–D16), IPS, EVC platforms
8	Hyundai Heavy Industries (HiMSEN)	✔ H21/32, H25/33, H32/40, H35/40, H46/60
9	Doosan	✔ DV, DP, DL Series, marine, gen-set, industrial

The complete top tier.

The complete coverage.

The complete bench.



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INDUSTRIES

FLAGSHIP BENCH

01. MARINE & SHIPPING

From medium-speed propulsion to large auxiliary diesels and modern dual-fuel platforms engineered for shipyards, classification societies, marine service centers and dockyard reman shops. Coverage spans MAN, Wärtsilä, Caterpillar Marine, MTU, Cummins Marine, Yanmar, MaK, HiMSEN, Niigata and Mitsubishi.

02. LOCOMOTIVE & RAIL

Built for depots that keep freight and passenger fleets moving. EMD 645 / 710 series, GE / Wabtec Evolution, Cummins QSK rail, MTU 4000/8000 rail, Caterpillar 3500 rail, cam-driven, common-rail and dual-fuel locomotive systems on the same platform.

03. POWER GENERATION

Prime, standby, continuous-duty. From small commercial backup to multi-megawatt power plants. Tests Cummins, Caterpillar, MTU, MAN, Wärtsilä, Perkins, Mitsubishi, Doosan, Yanmar and Volvo Penta gen-set fuel systems with the precision their uptime demands.

04. MINING & OFF-HIGHWAY

The largest engines on the planet, Cat 3500 & C175, Cummins QSK19 / 45 / 60 / 78 / 95, MTU 4000/8000, Liebherr. Where downtime isn’t measured in hours but in lost production tons. OEM-grade precision, in the workshop.

05. HEAVY-DUTY INDUSTRIAL & STATIONARY

Process plants, oil & gas, military installations, agricultural and forestry machinery. Wherever a large diesel runs continuously and reliability is non-negotiable.

06. DUAL-FUEL & NEXT-GEN PLATFORMS

Future-ready architecture for the energy transition. Supports diesel-pilot dual-fuel on Wärtsilä, MAN, MTU and Caterpillar with selective coverage for methanol-ready (ME-LGIM) and LNG-ready (ME-GI / ME-GA) systems through specialized fixtures and adapters.

LTBR //X

PUMPS

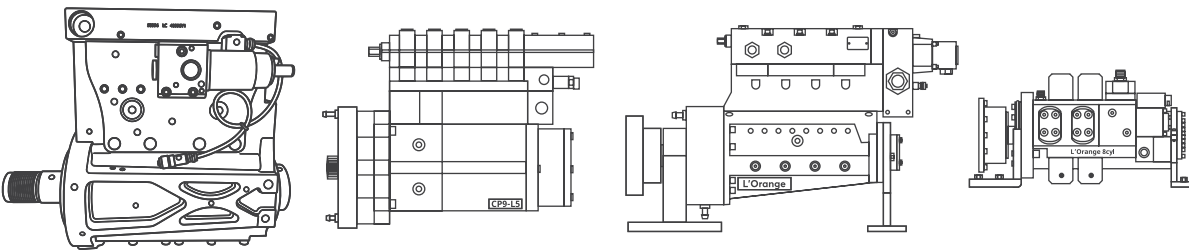
Universal high-pressure testing for every Large-Engine Diesel pump in production worldwide, marine, locomotive, mining and power generation.

Test Time: 5-25 min

Max RPM: 5,000

Pressure: up to 3,000+ bar

Database: 4,500+ part numbers
continuously online updated



Pump Testing Capabilities

FEATURES

- **Tested to OEM Standards:** built to Bosch, Delphi, Denso, Caterpillar, L'Orange, Cummins, MTU procedures
- **Database:** 4,500+ Part Numbers, continuously online updated
- **Drive Power:** 45 kW / 60 HP, covers the largest CP9, CPN5/6, XPI 3-cyl, L'Orange DCO and large-bore unit pumps in the market
- **Lubrication Supply / Drainage System:** no mess, no oil waste (aCPL)
- **CAN-Bus Communication Protocol**
- **Dual Measurement System:** up to 4,000 L/H, sized for large-engine flow rates

TESTS PERFORMED

- Flow vs Pressure
- Flow vs Speed (RPM)
- Multiple Conditions, Torque, Power Tests up to 5,000 RPM
- Control Valves Performance (PCV, VCV, IMV, EAV, ZME, SCV, ESV)
- Smart Sync Control Valve [EU6] Actuation: Bosch CP9, Denso HP6/HP7, Schaeffler / Continental HD platforms
- Return Flow Measurement
- Seal Integrity
- IP: Transfer Pump Pressure (automatic)
- VAC: Transfer Pump Vacuum (automatic)
- Control Valve Electrical / Insulation Tests
- Pressure Curve Visual Analysis (plunger)
- Pump Pressure Sensor Test

Brand	Platforms & Applications
Bosch	CP9, CPN5, CPN6, CB18, CRSN3-22, CR-LE – heavy-duty and large-engine common rail
Caterpillar	C-HPCR – C9.3, C13, C15, C18, C27, C32, 3500 Series HPCR variants
Cummins XPI	XPI 1-cyl, 2-cyl, 3-cyl – ISX15, X15, QSX15, Scania DC13/DC16
MTU / L'Orange	DCO Series, L'Orange Common Rail with integrated accumulator – Series 4000, Series 8000
Denso HD	HP6, HP7 – heavy-duty marine and industrial common rail
Delphi HD	DFP6, DFP7, DFP8, DFP9* – commercial-vehicle and large-engine variants
Stanadyne	DCR (1 / 2 / 6 piston) – agricultural, marine, industrial
MAN / Wärtsilä	Medium-speed common rail unit pumps – L+V32/40, L+V48/60, 32/44CR
Yanmar / HiMSEN / Doosan / Niigata	Marine medium-speed pump platforms

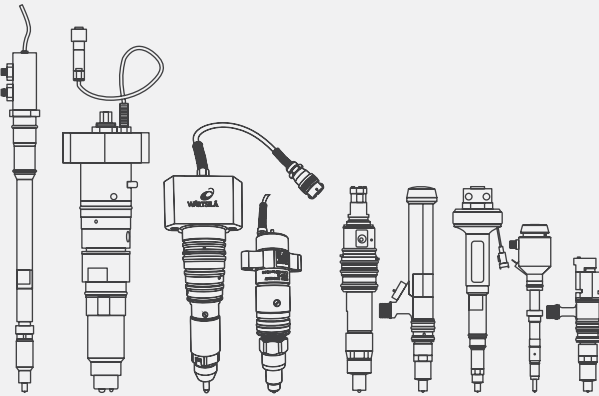


LTBR //X

Complete testing and coding across every Common Rail Diesel injector platform, from large-engine marine CRIN-LE to locomotive, mining and Gen-set common-rail and unit injectors.

Full testing and coding extending the LTBR-X across every large-engine injection architecture in modern global service.

Brand	Platforms & Applications
Bosch CRIN-LE / CRIN4.2X	Large-engine common rail – MTU, Liebherr, MAN, Wärtsilä HD applications
Cummins / Scania XPI	ISX15, X15, QSX15, Scania DC13 / DC16 – solenoid common rail
Caterpillar	C9.3, C13, C15, C18, C27, C32, C175, 3500 Series (3508 / 3512 / 3516)
Caterpillar MEUI / EUI	3406E, C10, C11, C12, C13, C15, C16, C18, 3176C
MTU / L'Orange	Series 2000, Series 4000, Series 8000 unit injectors and CR injectors with integrated reservoir
Delphi	F2x, F3x, C2i / C3i / C4i – HD common rail; E1, E3 unit injectors
Denso HD	G4X / G3X large-engine common rail
Detroit Diesel	DD13, DD15, DD16 (HD common rail); Series 50, Series 60 EUI
Cummins HPI	Pre-2010 ISX15, QSK19 / QSK60 / QSK78 (HHP-HPI cam-driven)
EMD (Electro-Motive Diesel)	645 / 710 Series – locomotive injectors
GE / Wabtec	FDL Evolution Series injectors – locomotive
HiMSEN / Doosan / Yanmar / Niigata / Mitsubishi	Medium-speed marine and stationary unit injectors



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Injector Testing Capabilities

FEATURES

- **Tested to OEM Standards**
- **Testing and Coding Time:** 6–20 min
- **Pressure:** up to 3,000+ bar
- **Database:** 6,500+ Part Numbers, continuously online updated
- **OEM Authorized Test Bench:** Schaeffler / Continental authorized; additional authorizations pending
- **EU7 / IMO Tier III Compliant Architecture:** ready for next-generation large-engine injector platforms
- **Full Injector Coding:** Bosch IQA/IMA/ISA/IMA4.2, Denso QR, Delphi C2i/C3i/C4i/F2x/F3x, Cummins XPI, CAT (TRM file), QSK
- **Up to 9 multiple-injections** (pilot / main / post), fully configurable
- **Illuminated multilayer spray chamber:** real-time spray pattern analysis during testing

TESTS PERFORMED

- Electrical (Coil / Piezo)
- Insulation Test
- Back-Leak (Static / Dynamic)
- ISA Detection
- Volumetric Flow Measurement (All Operating Conditions)
- Nozzle Opening Pressure (aNOP)
- Nozzle Opening & Closing Response Time (RSP – eRSP)
- EU6 / EU7 Technology Testing
- DFI Mapping (Full Spectrum)
- NLT / LKT: Nozzle Leak Test
- Low Pressure Testing 0–10 bar
- Spray Pattern & Atomization Validation
- Dual-Coil Testing (Delphi E3, HD platforms)

CAMBOX

LTBR //X

EUI • EUP • UI • UP — CAMBOX

Multi-profile camshaft drive testing for every major Electronic Unit Injector, Unit Pump and Unit Injector platform in large-engine, marine, locomotive and HD service.

Testing and Coding Time: 6–20 min

Injector Coding

for Delphi E1, E3, F2x, F3x*, CAT (TRM file), HD platforms

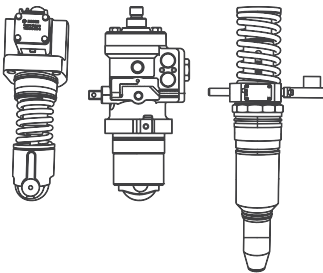
Database: 1,250+ Part Numbers

(Cambox-specific), continuously online updated

Brand	Platforms & Applications
MTU / L'Orange	Series 2000, Series 4000 – unit injectors (cam-driven)
EMD (Electro-Motive Diesel)	645 / 710 Series – locomotive unit injectors
GE / Wabtec	FDL Evolution Series – locomotive injectors
Cummins HPI (cam-driven)	Pre-2010 ISX15 / Scania 12L (HD-HPI); QSK19 / QSK60 / QSK78 (HHP-HPI)
Caterpillar EUI / MEUI	3406E, C10–C18, C27, C32, 3176C, 3500 Series MEUI variants
Caterpillar MUI	Legacy mechanical unit injectors (3406A/B, off-highway, marine)
Cummins CELECT EUI	L10, M11, N14
Detroit Diesel EUI	Series 50, Series 60, DDEC IV / V / VI / VII
Volvo / Mack / Renault EUI	D11, D12, D13, D16 (E1 / E3 platforms); Mack E7, E-Tech, ASET
Delphi EUI / EUP	E1 (Volvo A-Series, Land Rover TD5), E3 (Euro 6 twin-solenoid – Volvo D11/D13/D16, DAF Smart, Renault)
Bosch UIS – HD / Off-Highway	Mercedes Axor / Atego / Actros, DAF, Iveco Cursor / Stralis, Scania, MAN, Renault, Deutz
Wärtsilä / MaK / Sulzer	L'Orange / Woodward unit injectors – medium-speed marine and stationary
HiMSEN / Doosan Marine	Medium-speed marine and power generation unit injectors
Yanmar Industrial / Marine	Mechanical and electronic unit injection – industrial, agricultural, marine
John Deere PowerTech	4045 / 6068 / 6090 / 6125 / 6135 – marine, gen-set, off-highway
Navistar / International	DT466E, DT530E, T444E, HT530, MaxxForce 7 / 9 / 10 / 11 / 13

FEATURES

- Tested to OEM Standards
- Cam Angle Precision via Closed-loop System
- Quick cam setup. No Mess, No Oil Waste (EZO-Kit)
- 12 Separate Cam Profiles
- Cummins HPI / QSK / ISX 16-bar Supply Control Circuit using OE Valves (LP-EXT-Control)
- Expandable to new systems as next-generation large-engine architectures emerge



TESTS PERFORMED

- Electrical (Coil & Piezo)
- Insulation Test
- Volumetric Flow Measurement (All Operating Conditions)
- Nozzle Opening & Closing Response Time (RSP – eRSP)
- Valve Response Time (aBIP)
- Piston Leak Check
- Multiple-Injection Profiles (Pilots / Mains / Posts)
- Spray Pattern & Atomization Validation
- Dual-Coil Testing (Delphi E3)
- HPI BIP timing, injected volume at multiple cam speeds and loads



CAM-DRIVEN TESTING & TWO CAMBOX PLATFORMS

- **HK1400A Cambox:** Carbon Zapp integrates Hartridge's industry-recognized HK1400A as the mechanical heart of our cam-driven testing platforms, chosen for its proven flexibility across cam profiles and the quality standard it represents. It covers the majority of electronic unit injector, unit pump and cam-driven architectures in global service.
- **Carbon Zapp LCB-1000, the Large-Engine Cambox:** Engineered Exclusively for the LTBR-X, dedicated to the cam geometries, drive torques and injector dimensions of marine, locomotive and power-generation platforms that fall outside general-purpose cam-driven coverage.

The two optional platforms are the HK1400A for broad multi-platform coverage, the LCB-1000 for large-bore applications. Both run on the same AZO software, hydraulics and control architecture, with a UIS database exceeding 1,250 part numbers.

Selective coverage of next-generation electronically controlled 2-stroke dual-fuel and low-carbon-ready platforms, covering the modern systems driving the maritime energy transition.

Brand	Platforms & Applications
WinGD X-DF Series	Dual-fuel low-speed engines for container vessels, tankers, bulk carriers — pilot-injection fuel system
MAN ME-GI / ME-GA	LNG dual-fuel low-speed marine — pilot-injector and electronic control system testing
MAN ME-LGIM	Methanol-ready 2-stroke — selective coverage for next-gen low-carbon platforms
MAN ME-C (Electronic)	Standard electronically controlled 2-stroke fuel system support
WinGD RT-flex	Electronically controlled common-rail 2-stroke marine — comprehensive fuel system coverage

COMPONENTS

LTBR //X

FSC · FUEL SYSTEM COMPONENTS

Integrated diagnostics for HP and LP components: valves, rails, sensors, pump-heads, pumps and regulators, across every large-engine platform.

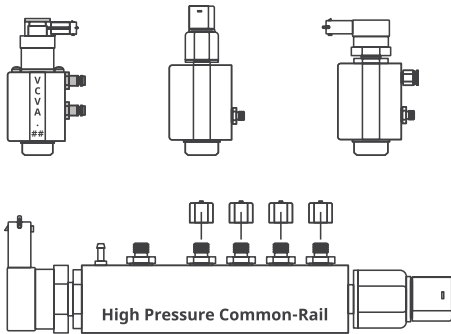
Integrated FSC Diagnostics

Dedicated test plans for every major valve, rail, sensor and high-pressure head on the market. Modular FSC kits unlock the hardware you need, purchased separately, configured around the components you service. Software, database and workflow already inside AZO.



EXPANDABLE ARCHITECTURE
· ENGINEERED FOR TOMORROW

As large-engine technology evolves toward dual-fuel, methanol, ammonia and hydrogen pilot ignition, the bench evolves with it: additional rail configurations, specialized fixtures and modular AZO software packages extend coverage as your operations grow.



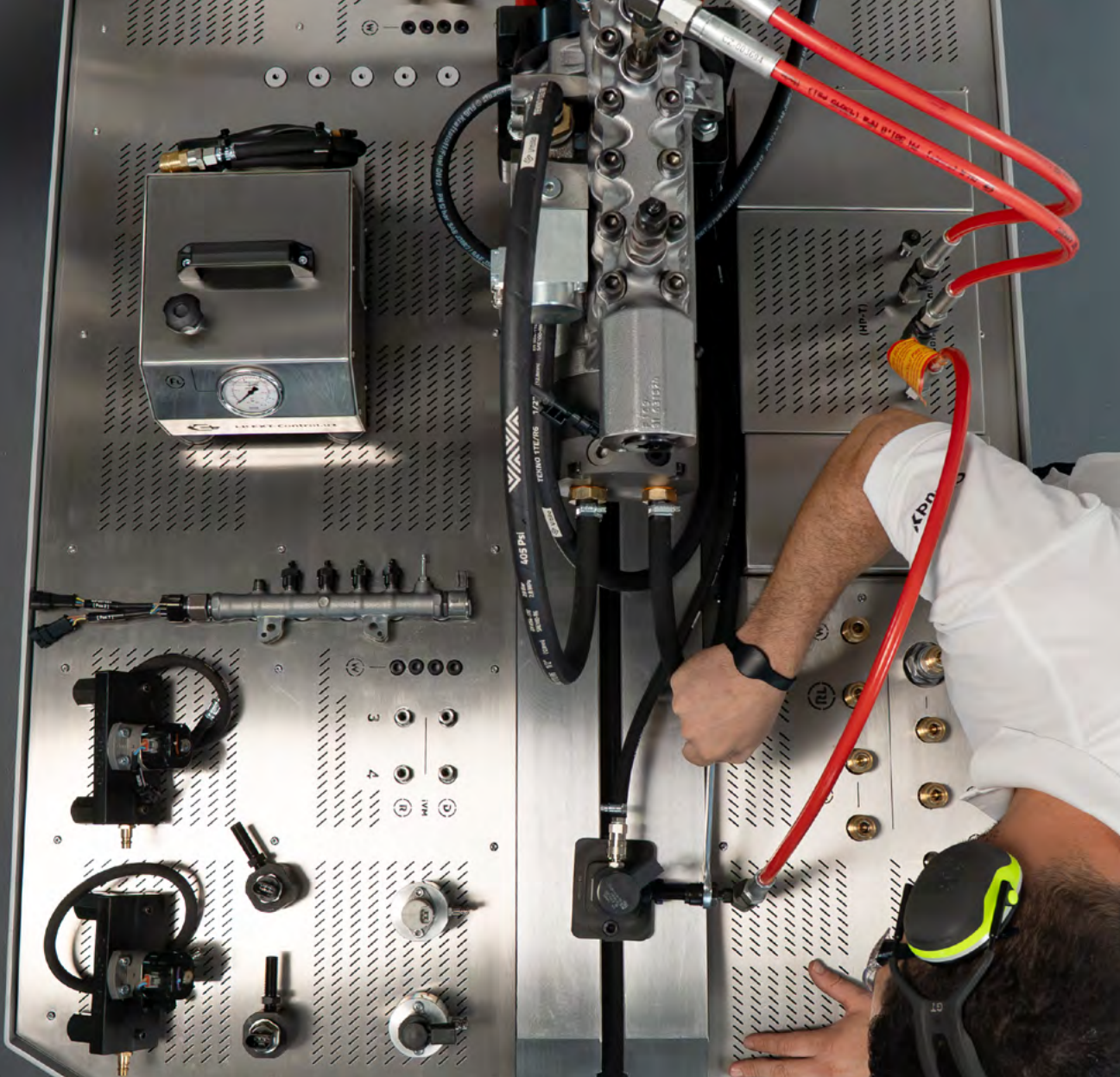
FSC Test Capabilities

FEATURES

- **Electrical Tests:** Resistance, Insulation, Current Draw, Response Time
- **Hydraulic Tests:** Pressure Regulation, Flow Characterization, Leak Detection
- **Closed-Loop Validation:** DRV / ZME / VCV / PCV / IMV / SCV / ESV Operating Curves Against OEM Data
- **Sensor Verification:** Pressure Sensor (RDS) Curve Plotting and Tolerance Check
- **CP-LE Head Diagnostics:** Low / High Pressure Side Validation across large-engine pump heads

Why It Matters

FSC failures are often misdiagnosed as pump or injector failures. Testing the FSC components first saves the customer the cost of replacing the wrong part. The LTBR-X is the only large-engine bench with fully integrated FSC diagnostics.



Component	Coverage
RPS / RDS – Rail Pressure Sensor	Bosch, Delphi/BorgWarner, Denso, Schaeffler / Continental, Hitachi, Sensata – electrical signal linearity, port integrity, drift vs reference gauge
DRV / PCV – Rail Pressure Control Valve (rail-side bleed)	Bosch CP3 (PCV-only & CPC variants); Vitesco/VDO PCV on PSA/Renault rails – opening pressure, hysteresis, leak-off rate
DBV / PLV – Pressure Limiter Valve (mechanical, rail-side)	Bosch CR commercial-vehicle and large-engine rails (CPN/CP5/CP9), Denso HP3/HP4/HP6/HP7 rails, Delphi DCR rails – opening-pressure threshold, reseal behaviour
ZME / MPROP / FMU – Suction Metering Unit (Bosch)	Bosch CP3, CP4, CP5, CPN1/2/3/5, CPN6, CP9 – PWM duty-cycle response, flow vs current, leak-down
IMV – Inlet Metering Valve (Delphi)	Delphi DFP1 / DFP3 / DFP4 / DFP6 / DFP7 / DFP8 and UPCR; Stanadyne DCR – PWM response, flow curve, electrical resistance
SCV – Suction Control Valve (Denso)	Denso HP2 / HP3 / HP4 / HP6 / HP7 (normally-open & normally-closed linear-solenoid variants) – response time, current draw, pump-learning compatibility
ESV – Electric Suction Valve (Bosch HD / large-engine)	Bosch CPN3 / CPN5 / CPN6 / CP9 – fast-response solenoid, current profile, response time
HPI Unit Injectors – High-Pressure Injection (Cummins cam-driven)	Cummins HD-HPI (pre-2010 ISX15 / Scania 12 L) and HHP-HPI (QSK19 / QSK60 / QSK78) – solenoid drive, BIP timing, response time, injected volume, return flow
XPI Common-Rail Injectors / Pump (Cummins / Scania post-2010)	Cummins XPI on 2010+ ISX15 / X15 / X12 / ISX12; Scania XPI – common-rail solenoid injector test, trim-code generation
Common Rails	Bosch, Delphi, Denso, Vitesco/VDO – static pressure-hold decay, external/internal leak, sensor port integrity, PLV opening pressure, DRV functional test
CP-LE High-Pressure Heads / Pump Elements	L/P feed & H/P delivery test, plunger seal leak-down, suction-stroke performance, plunger return / cam-follower behaviour – across large-engine pump heads
Transfer / Lift Pumps	Internal pressure, suction vacuum, flow-vs-pressure curve, internal regulator setting – across all CR platforms and standalone in-tank / in-line marine and locomotive lift pumps

AZO

The intelligence inside every Carbon Zapp machine.

Every Carbon Zapp X-Series bench is driven by AZO, the software platform at the heart of the machine's powerful touchscreen HMI. AZO turns complex injection diagnostics into a guided, fully automatic process: select the component, mount it, and let the machine run the complete OE-level test plan, from actuation and leak checks to dynamic precision flow measurement and coding. The result is expert-level diagnosis, delivered consistently, regardless of who is operating the bench.



AZO on the X-Series touchscreen HMI: one interface for every test, every system, every brand.

Built for the operator.

Fully automatic testing.

Guided sequences take the component from mounting to final verdict in minutes, with no guesswork. Live actuation signals for advanced analysis and R&D work.

Fast by design.

Complete test cycles measured in minutes, not hours, e.g. **4 Bosch CRDi injectors tested and coded in 8–10 minutes, Delphi C4i in 10–15 minutes, 4 GDi injectors tested and coded in 8–10 minutes; pumps in 5–15 minutes.**

Clear, sellable reports.

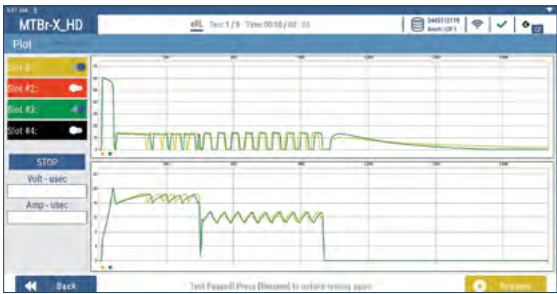
Color-coded pass/fail results per component, a single-page quick report for the customer or a multi-page analytic report for the specialist. Pick your slots with a tap, print or share on the spot, tablet-easy, workshop-fast, and simply incomparable to anything else in the market.

Real-time oscilloscope.

Live actuation signals for advanced analysis and R&D work.



The fail-track color report, results your customer understands at a glance.



The live oscilloscope view, every actuation, every microsecond.



Every connection, mapped on screen: numbered points, exact part numbers and adapters for each component, mount, connect and test with zero guesswork.

One database. Every system.

Complete OE & CZ database.

Test plans for all makes and types, continuously updated:

- CRDi** - Common Rail Diesel Injectors
- CRp** - Common Rail Diesel Pumps
- EUi/EUp** - Electronic Unit Injectors & Pumps
- HEUi** - Hydraulic Electronic Unit Injectors
- GDi** - Gasoline (High & Low Pressure) Injectors
- GDP** - Gasoline Rotary & Piston High Pressure Pumps
- Marine & Large Engine components**

Your tests, your rules.

User-defined test plans and developer-level customization alongside the factory database, shared to all your Carbon Zapp machines effortlessly.

Machine self-diagnosis.

AZO continuously monitors all the critical points of the bench, sensors, pressures, actuation circuits, and reports the machine's own health before it can affect your results.

Always connected.

On-board Wi-Fi and LAN connectivity for updates, printing, sharing and the live CloudX link.

Always current.

Software and database updates delivered over the air, powered by CloudX (see next spread).

CloudX

Your machines, beyond the workshop walls.

CloudX is Carbon Zapp's IoT cloud platform the natural extension of AZO. Every connected bench becomes part of a secure cloud environment where data, updates, features and support flow both ways. Fully Industry 4.0 compliant, CloudX means the machine you buy today keeps gaining capabilities tomorrow, without a single technician visit.

What CloudX does for your business

Live updates.

Database and software updates arrive online, automatically, your bench always tests to the latest specifications.

Complete cloud backup.

Machine data, settings and test history safely mirrored in the cloud, recover everything in minutes.

Features on demand.

Activate new capabilities instantly, online, forever or on a Pay-As-You-Go basis, and invest only when the work demands it.

Remote monitoring & reports.

Check machine status and generate, file and print test reports from anywhere, on any device.

Fleet management.

Run one bench or twenty: manage every machine, user and location from a single account.

Smart maintenance.

Notifications on your phone for oils, filters and service intervals, before downtime finds you.

24/7

Machine visibility from any device

1 Account

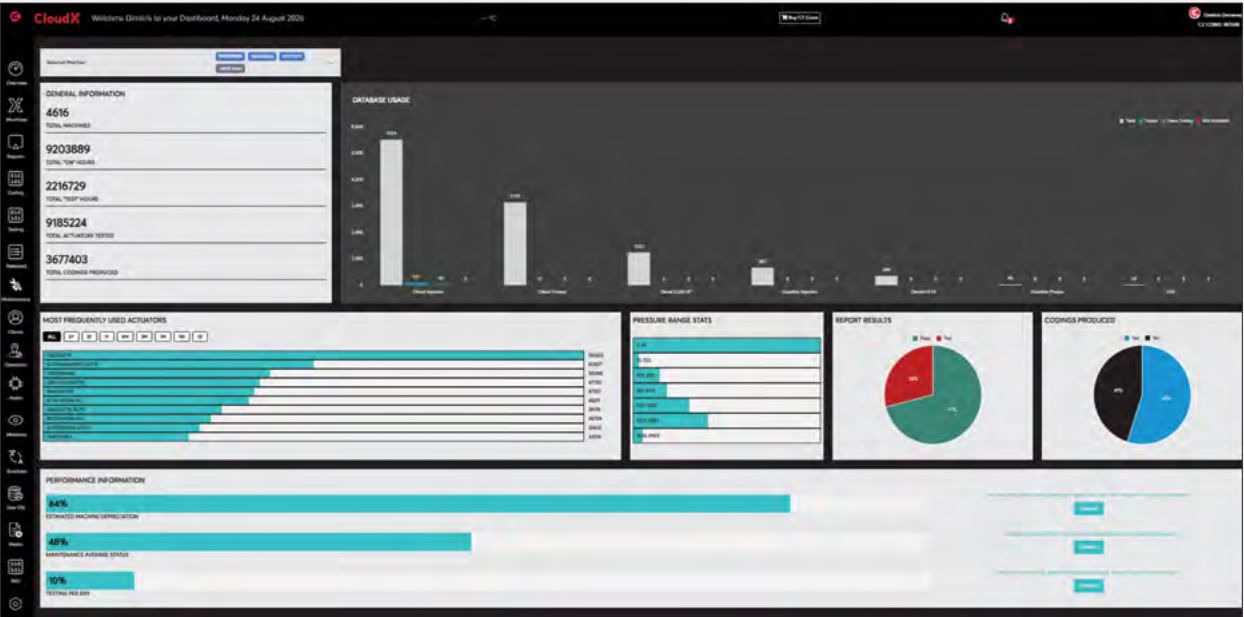
Your entire machine fleet

Minutes

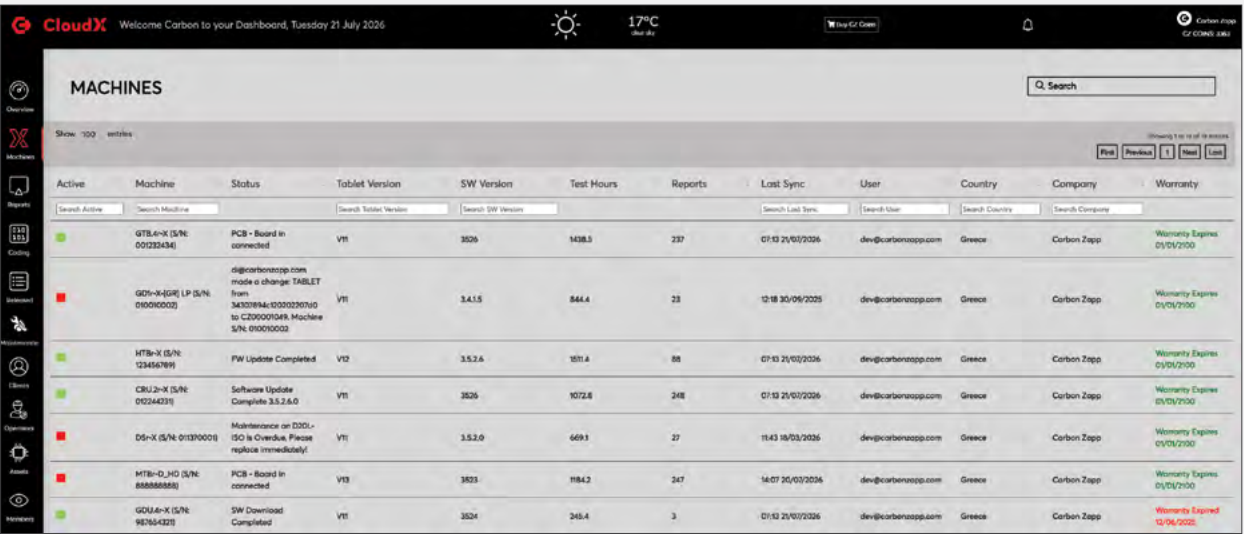
To activate a new feature online



CloudX
is Carbon Zapp IoT Cloud
computing Platform.



The CloudX overview at cloudx.carbonzapp.com Your job in numbers.



The screenshot shows the 'MACHINES' dashboard with a table listing machine details. The table has columns for Active status, Machine ID, Status, Tablet Version, SW Version, Test Hours, Reports, Last Sync, User, Country, Company, and Warranty. The data is filtered to show 100 entries.

Active	Machine	Status	Tablet Version	SW Version	Test Hours	Reports	Last Sync	User	Country	Company	Warranty
Active	0784-N (S/N: 00030434)	PCB - Board in connected	V71	3.0.6	1438.3	237	07/13 21/03/2026	dev@carbonzapp.com	Greece	Carbon Zapp	Warranty Expires 01/05/2030
Active	020-N-GR (LP (S/N: 00000000)	made a change: TABLET from 3430784-N-GR to C200000048. Machine S/N: 010000003	V71	3.1.1.5	844.4	23	12/18 30/06/2025	dev@carbonzapp.com	Greece	Carbon Zapp	Warranty Expires 01/05/2030
Active	HT8-N (S/N: 123456789)	FW Update Completed	V12	3.5.2.4	101.4	88	07/13 21/03/2026	dev@carbonzapp.com	Greece	Carbon Zapp	Warranty Expires 01/05/2030
Active	CRU-2-N (S/N: 00244331)	Software Update Complete 3.5.2.6.0	V71	3.0.6	1072.8	248	07/13 25/03/2026	dev@carbonzapp.com	Greece	Carbon Zapp	Warranty Expires 01/05/2030
Active	D5-X (S/N: 01030000)	Maintenance on DDL - ISO is Overdue. Please replace immediately!	V71	3.5.2.0	669.1	27	11/43 18/03/2026	dev@carbonzapp.com	Greece	Carbon Zapp	Warranty Expires 01/05/2030
Active	HT8-N (S/N: 88888888)	PCB - Board in connected	V13	3.0.3	1184.2	247	14/07 30/03/2026	dev@carbonzapp.com	Greece	Carbon Zapp	Warranty Expires 01/05/2030
Active	020-N (S/N: 98765432)	SW Download Completed	V71	3.0.4	245.4	3	07/13 21/03/2026	dev@carbonzapp.com	Greece	Carbon Zapp	Warranty Expires 01/05/2030

The CloudX fleet dashboard at cloudx.carbonzapp.com Every machine, status and info in one secure view.



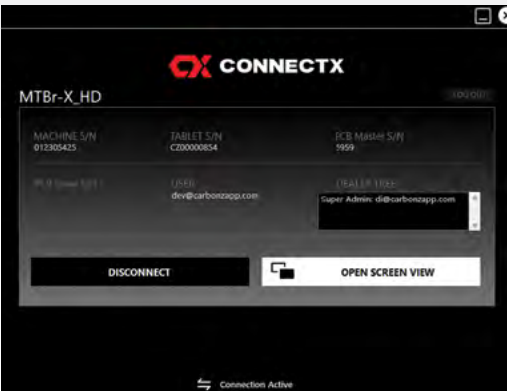
cloudx.carbonzapp.com
carbonzapp.com

EXPERT FEATURES

CloudX unlocks three expert-level extensions
ConnectX, API Integration and the Repair Kit Solution (RKS).



A ConnectX session in progress: the machine's screen, live, wherever support happens to be.



ConnectX

Support at the speed of a click.

ConnectX gives authorized eyes and hands on the machine, remotely and per account. When something needs attention, whether a question, a setting or a fault, Carbon Zapp support, your distributor or your own fleet manager can securely connect to the bench and act immediately. No travel, no waiting, no lost workdays.

Instant troubleshooting.

Direct remote assistance from the Carbon Zapp factory or your local distributor, right on the machine screen.

Fleet control.

Fleet managers reach any machine in their network to monitor, adjust, update or resolve, from anywhere.

Per-account access.

Connections are permission-based and tied to accounts: you decide who can reach which machine.

Minimum downtime.

Most issues are resolved in a single remote session. The bench is back to testing the same day.



API Integration

Your test data, in your business systems.

Test data shouldn't stop at the bench. The CloudX API bridges your machines to your own IT environment, so results, reports and machine information flow automatically into the systems your business already runs on: ERP, workshop management, quality and warranty platforms.

Automated workflows.

Test results attach themselves to job cards, invoices and warranty files. No re-typing, no lost paperwork.

Built for scale.

Ideal for remanufacturers, OE service networks and multi-site operations with existing infrastructure.

Secure by design.

Data travels over the same secure cloud environment that powers CloudX.



From the test chamber to your ERP: one connected data path, no manual steps.



Repair Kit Solution

The authorized channel

For kit providers

Deploy to your network.

Publish your repair kits, data and test plans directly to your authorized workshops through CloudX.

Control who buys.

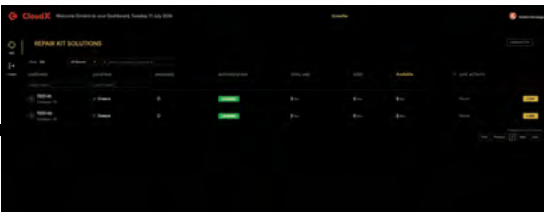
Entitlements are managed per user: only your authorized network can access and purchase your kits.

Protect your brand.

Every kit is diagnosed and validated on a Carbon Zapp bench, against your specifications. Quality and warranty stay in your hands.

A complete, branded solution.

From kit deployment to the final test report, the whole workflow carries your brand, a professional, consistent outcome across your entire network.



The RKS area in CloudX: providers publish, workshops access, and every kit is tested the authorized way.

For workshops

Genuine kits, on the bench.

Access authorized repair kits with the matching test plans, right where the work happens.

No more parts hunting.

Become an authorized workshop with any of the available providers for your systems, the right kit is always one click away.

Certified results.

Diagnosis and post-repair testing follow the provider's approved procedure, every repair leaves with proof.

One machine. One platform. The complete ecosystem.

AZO runs the test. CloudX connects the machine. ConnectX keeps it running. The API brings the data home. RKS closes the loop between component, kit and certified repair. Together, they turn a Carbon Zapp bench into a business platform.



Built to Move the Industry Forward.

From advanced testing equipment and connected intelligence to technical expertise and global support, Carbon Zapp brings every solution together in one complete ecosystem.

Let's Connect and Discover Future Opportunities.



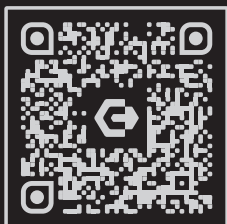
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