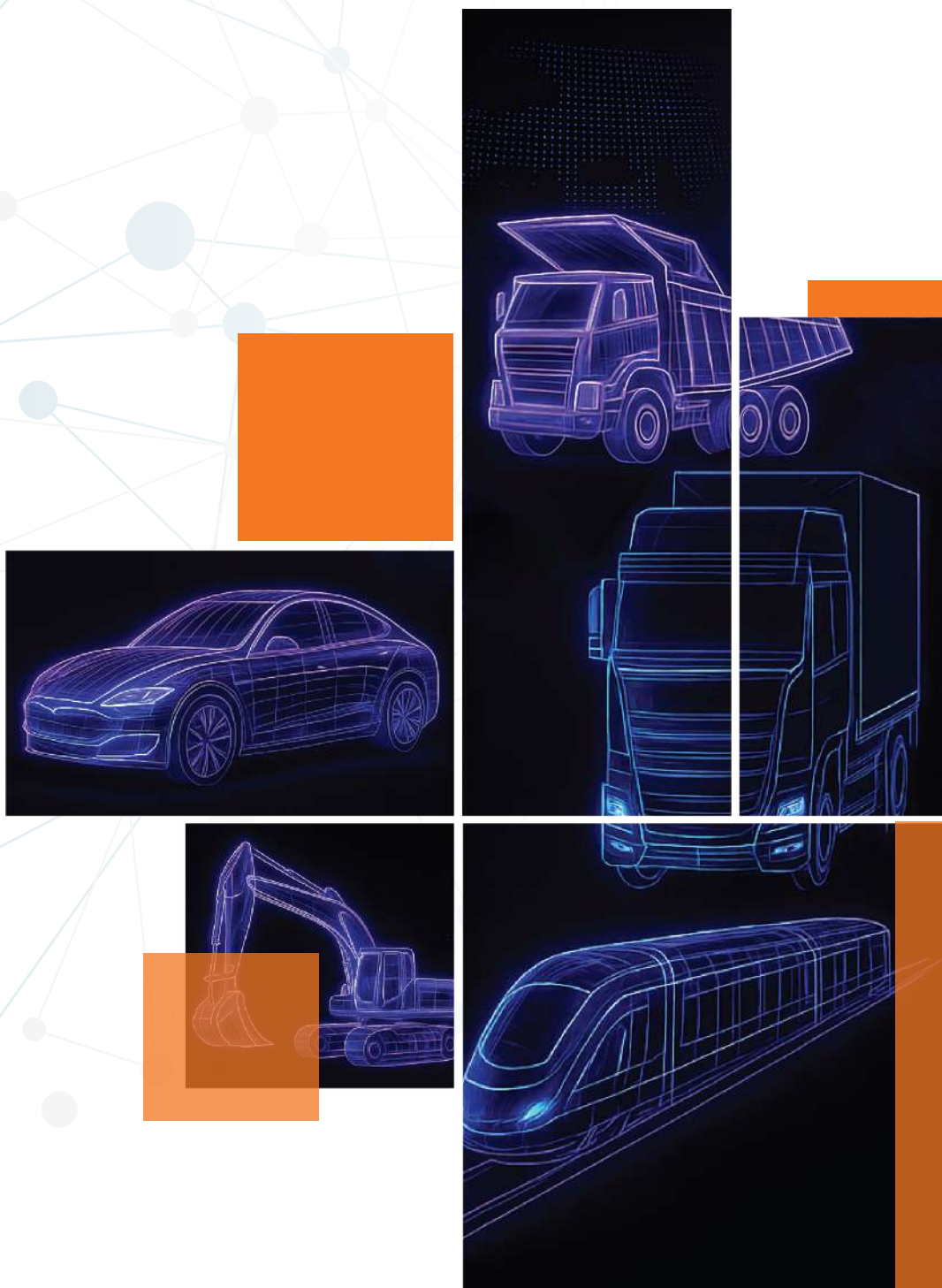




YOUR TRUSTED PARTNER IN AUTOMOTIVE TEST SOLUTIONS

Advanced Verification & Validation for a Smarter Future...



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Our Global Footprint

Defined by TMCS Excellence



TMCS's global footprint reflects our commitment to innovation, precision and engineering excellence. As an **NI Authorized System Integrator**, we deliver world-class automation, testing and validation solutions across automotive, aerospace, defense, industrial automation and renewable energy sectors.

Our collaborations with leading technology partners and global clients showcase our ability to provide scalable, reliable and future-ready systems.

TMCS continues to expand its presence worldwide empowering industries through trusted integration and technical excellence.

9+

**Fortune 500
Companies
Served**

500

**Projects
Executed**

8+

**Global
Coverage**

80+

**Team
Members**

Company Highlights

OVERVIEW

Established in 2013, TMCS is a leading provider of industrial automation, test, measurement and control solutions that empowering clients to achieve superior technological performance. As a trusted NI System Integration Partner, TMCS specializes in developing customized solutions that seamlessly integrate advanced measurement hardware, intelligent software and precision control architectures.

Today, TMCS stands as a global technology partner to industries including Automotive, Aerospace, Defence, Appliances and more delivering innovation, reliability and excellence across projects.

VISION

To be a global leader in
Test & Measurement,
delivering innovative and
reliable solutions worldwide.

MISSION

Delivering value-driven,
on-time Test & Measurement
solutions for Manufacturing
and R&D globally.

Message Co-Founder & CEO



I believe Indian engineering can stand shoulder-to-shoulder with the world's best. With the right vision and commitment, we don't just follow global standards, we have the capability to define them.

At TMCS, our mission is to engineer advanced test and automation solutions that help industries innovate with speed, safety and confidence. From automotive and aerospace to defence and heavy engineering, we enable clients to validate and scale with reliability. Founded on the belief that Indian engineering can match global standards, TMCS has delivered high-value test systems across international markets by integrating NI platforms, PLCs and custom electronics into unified ecosystems.

Looking ahead, our vision is to lead the future of validation and automation through AI-driven, cloud-enabled systems and digital twin capabilities showcasing the strength of Made-in-India engineering on the global stage.

Why TMCS?

Trusted engineering partner delivering smart, reliable and scalable solutions for complex test challenges.



Decade of Excellence

Partnering globally through technology and trust.



Certified Professionals

Skilled LabVIEW Architects & Developers.



Authorized NI Partner

Certified System Integrator for scalable test solutions.



Compliance Driven

CE-certified systems built to global standards.



Industry Leadership

Trusted by 9+ Fortune 500 global clients.



Technology

Customized solutions powered by cutting-edge in-house tech



Domain Expertise

10+ years across transportation, aerospace & defence.



Supply Chain Solutions

Empowering global supply chains with localized support



LabVIEW Excellence

NI & third-party hardware integration expertise.



Global Presence

Offices in Pune, Hyderabad and Germany.



Processes

Driven by improvement, focused on satisfaction.



Timeliness

Timely, complete and transparent project delivery.

Industries We Serve



Automotive & EV

Powering innovation in Automotive & EV with advanced testing, automation and engineering solutions.



Aerospace & Defence

Trusted partner for Aerospace & Defence industries with scalable, indigenized testing solutions.



Appliances

Providing smart test and automation solutions for Appliances to ensure quality and reliability.



Power Electronics

Delivering end-to-end test automation for Power Electronics to ensure efficiency and reliability.



Medical Devices

Ensuring precision and reliability in Medical Devices with advanced test and automation solutions.



HCV & Construction

Supporting HCV (Heavy Commercial Vehicles) & Construction sectors with efficient, high-quality test and automation solutions.

Our Services

-  Automated Test Equipment (ATE)
-  End-of-Line Test (EOL)
-  Hardware in Loop (HIL)
-  High Speed Data Acquisition
-  Panel Engineering
-  Indigenized Defence Equipment
-  Software Development
-  Resource Deployment
-  Trainings

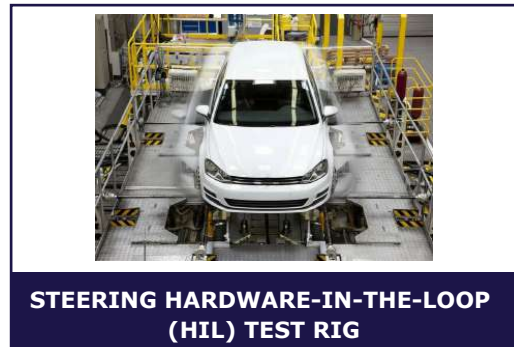


Case Studies

Explore our leading Automotive & EV projects. Proven solutions delivering smarter testing, Automation and engineering excellence.



VCU TEST BENCH



STEERING HARDWARE-IN-THE-LOOP (HIL) TEST RIG



ABS SOLENOID TEST BENCH



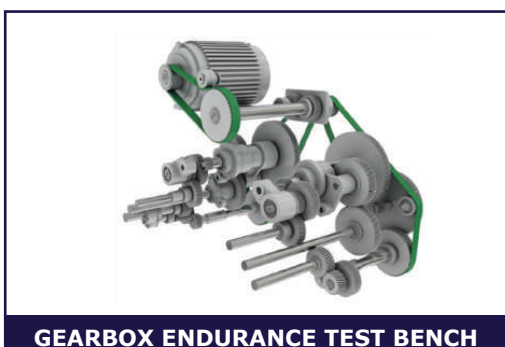
E-AXLE - AXLE TEST BENCH



LINE TRACEABILITY & ASSEMBLY LINE MONITORING



POWER WINDOW REGULATOR



GEARBOX ENDURANCE TEST BENCH



BLDC MOTOR DRIVE

VCU Test Bench



SPECIFICATIONS / FEATURES

- Executes predefined sequences for ECU verification
- Supports CAN communication protocol
- Captures test results for traceability and quality control
- Protection mechanisms to prevent damage
- Modular, CE-compatible and easy to maintain

CHALLENGE

Functional validation of 2-wheeler ECUs is performed at the production end-of-line to ensure reliable performance and compliance with quality standards. The process involves accurate testing of digital, analog and communication signals to verify proper functionality. It is designed to reduce test cycle time while maintaining high levels of safety, consistency and traceability throughout the production process.

SOLUTION

TMCS developed a dual-station electromechanical EOL test bench with modular and CE-compliant design. The system integrates NI hardware, LabVIEW software and NI TestStand to execute predefined test sequences and verify ECU functionality. Adjustable fixtures and cross-ferruling support multiple ECU variants efficiently.

TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
CAN-based DUT Identification	Verifies device communication and identification via CAN protocol.
Digital & Analog Input Testing	Ensures accurate response of input channels under test conditions.
Load Test / Digital Output Check	Validates output performance and load-handling capability.
Fault Insertion Unit (FIU) Test	Simulates fault conditions to assess system robustness.
Calibration Test	Confirms signal accuracy and sensor calibration integrity.
Electromechanical Functionality	Tests operational behavior of mechanical and electrical systems.

TECHNOLOGY USED

- NI Hardware & LabVIEW Software
- NI TestStand for test sequencing
- Modular fixture design with high accuracy



Steering Hardware-in-the-Loop (HIL) Test Rig



SPECIFICATIONS / FEATURES

- Deploy and run stimulus profiles with single-click operation
- Real-time data visualization in multiple graphical formats
- User-configurable parameter logging and data saving
- Safety controls including Emergency Stop
- Modular and scalable architecture for EPAS/HPAS

CHALLENGE

The system is designed to validate and test the performance of Electric Power-Assisted Steering (EPAS) and Hydraulic Power-Assisted Steering (HPAS) systems under real-time conditions. It ensures accurate simulation of vehicle dynamics using multiple actuators and complex control logic, while reliably logging critical parameters. Additionally, it provides operator-friendly control and integrated safety mechanisms for efficient and secure testing.

SOLUTION

TMCS developed a PC-based HIL test rig with application software built in LabVIEW and integrated with NI VeriStand for real-time control. The system interfaces with NI PXIe hardware, Instron controllers and multiple hydraulic actuators to simulate steering dynamics. Operator GUI allows deployment of test profiles, monitoring real-time data, and recording results for analysis and traceability.

TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
Steering Input Simulation	Performs real-time simulation of steering commands and feedback.
PID Control Testing	Validates proportional-integral-derivative control performance.
Signal Response Verification	Checks analog, digital and CAN signal accuracy and timing.
Multi-Actuator Validation	Tests coordinated functionality of multiple actuators
Data Logging & Analysis	Records and analyzes critical performance parameters.

TECHNOLOGY USED

- NI VeriStand & LabVIEW 2020
- PXIe DAQ hardware
- Real-time model interface toolkit for C/C++ and Simulink models



ABS Solenoid Test Bench



SPECIFICATIONS / FEATURES

- Pressure control solenoids used to manage pneumatic brake pressure via electrical control.
- Data acquisition of temperature and current through NI hardware.
- Graphical representation of performance for solenoid DUTs.
- Automated ON/OFF control signals for solenoid operation.

CHALLENGE

Testing Anti-lock Brake System (ABS) solenoids requires precise measurement and control of pneumatic brake pressure, temperature, and current across multiple DUTs.

SOLUTION

TMCS developed a custom ABS Solenoid Test Bench integrating NI Hardware for data acquisition and control. The system features a dedicated panel for NI hardware. It automates data capture and analysis for multiple solenoids simultaneously, ensuring high precision and repeatability.

TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
Pressure Response Analysis	Evaluates system performance under varying pressure conditions.
Temperature Monitoring	Tracks thermal behavior to ensure stable operating conditions.
Current Consumption Analysis	Measures electrical load and efficiency during operation.
Solenoid Functionality Test	Validates ON/OFF operation and response of solenoid components.

TECHNOLOGY USED

- NI DAQ Hardware: Real-time measurement and control.
- LabVIEW Software: Automated test, control, and visualization.
- Pneumatic System: Precise brake pressure regulation.
- Signal Conditioning: Enhances accuracy, reduces noise.
- Temperature Sensors: Monitor solenoid temperature.



E-Axle Test Bench



SPECIFICATIONS / FEATURES

- Variable input speed settings for versatile testing
- High-precision torque transducers and encoders
- Accurate oil filling and drainage system (forced or gravity)
- Hydraulic actuation of internal brakes
- Adaptable for multiple axle types and variants

CHALLENGE

Automotive manufacturers require precise and reliable testing of rear axles for passenger, commercial and heavy vehicles to ensure performance, safety and quality on the production line. Challenges included handling multiple axle variants, accurately measuring torque and RPM and integrating oil dispensing and braking systems for comprehensive validation.

SOLUTION

TMCS delivered a customized E-Axle Test Rig equipped with advanced measurement and control systems. The solution integrates NI hardware for signal conditioning and acquisition, LabVIEW for application software development, PLC control, and MySQL database for test data management. The rig is designed for adaptability across axle types and variants, with precise torque measurement, braking and oil management systems.

TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
RPM Measurement	Direction of rotation, torque
Braking Performance	Pressure, torque, noise
Differential Lock Test	Torque distribution, vibration
Gear Ratio Validation	Speed ratio accuracy, rotational direction

TECHNOLOGY USED

- NI Hardware – Precision data acquisition
- LabVIEW – Test automation & control
- PLC System – Real-time operation
- MySQL – Data management
- Torque & RPM Sensors – Performance validation



Line Traceability & Assembly Line Monitoring



SPECIFICATIONS / FEATURES

- QR-based traceability across all variants and assembly stages.
- Automated verification and torque logging.
- Real-time PLC–LabVIEW data monitoring.
- Intelligent production planning with BOM-based part tracking.
- Live dashboards, validation, and automated reporting through SCADA.

CHALLENGE

The system enables simultaneous monitoring of multiple scanners, weighing stations, test boxes and nut-runners across the production line. It efficiently detects faults such as incorrect parts or scans and facilitates smooth switching between different models once the target production quantities are achieved.

SOLUTION

TMCS implemented a LabVIEW-based DAQ & SCADA system leveraging OPC-UA protocol for tag monitoring, event generation, and production validation.

TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
Part Matching & Validation	Real-time verification of part compatibility at each station.
Torque & Assembly Verification	Confirms proper torque application and assembly accuracy.
Alarm & Error Detection	Generates alerts for incorrect or missing components.
Production Sequence Validation	Validates process order and logs production reports.

TECHNOLOGY USED

- LabVIEW SCADA: Real-time monitoring and control.
- OPC-UA: PLC–LabVIEW data communication.
- PLC System: Controls scanners, nut-runners and test boxes.
- QR Traceability: Identifies parts and variants.
- Torque Monitoring: Records torque for each assembly.
- BOM Validation: Verifies correct part matching.
- Data Logging: Enables full process traceability.



Power Window Regulator



SPECIFICATIONS / FEATURES

- Real-time monitoring of current, displacement and sound.
- Auto detection of false reversals and cyclic behavior.
- Motor noise analysis in an acoustic chamber.
- Variant-based testing with tolerance limits.
- Pass/fail reports with live graphs and data logs.

CHALLENGE

The client required a comprehensive system to test power window regulator motors. The challenges included measuring motor current, detecting false reversals, monitoring cyclic behavior and capturing sound of the motor/mechanism in a soundproof chamber. The system needed to ensure accuracy, reliability and compliance with automotive standards.

SOLUTION

TMCS developed a PC-based DAQ System integrated with PLC and NI Hardware. The software was implemented using LabVIEW, providing a secure, user-friendly interface. The system allowed real-time monitoring, logging, and analysis of parameters, including current, displacement and sound. Variant-specific settings and tolerance bands were incorporated for precise testing.

TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
Cyclic Behavior Detection	Monitors motor current using NI PCIe to detect performance issues.
False Reversal Detection	Monitors window displacement and current to detect abnormal reversals.
Sound Detection	Analyzes motor noise in an isolated chamber using microphones.
Diagnostic Checks	Validates analog inputs, PLC signals, and power supply integrity.
Reporting & Analysis	Generates detailed pass/fail reports, live graphs, and test data trends.

TECHNOLOGY USED

- NI PCIe DAQ: Precise data measurement.
- LabVIEW: Control, visualization, and logging.
- PLC Integration: Automation and signal validation.
- Sound Capture: Microphone in acoustic chamber



Gearbox Endurance Test Bench



SPECIFICATIONS / FEATURES
High-cycle automated endurance testing for gearboxes
Accurate measurement of input/output RPM, torque, and power
Configurable number of cycles per gearbox
Real-time monitoring of temperatures and operational parameters
Modular and scalable design for different gearbox variants

CHALLENGE

The testing process ensures the long-term reliability and functional accuracy of automotive gearboxes under repeated operational cycles. It involves simultaneous monitoring of multiple performance parameters, including input and output power, RPM and temperature. Additionally, the system detects leakage, verifies proper oil filling and validates transmission performance under high-cycle endurance conditions to guarantee durability and consistent operation.

SOLUTION

TMCS developed an End-of-Line (EOL) Gearbox Test Bench with an integrated DAQ system capable of executing automated endurance tests. The gearbox is actuated via a motor-driven shifter, with the motion path taught once and repeated for up to 100,000+ cycles. The system captures critical operational data during each cycle to assess performance and durability.

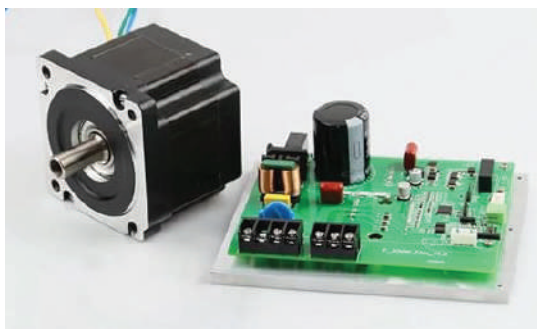
TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
Oil Filling Verification	Ensures correct oil level and filling accuracy in the system.
Leakage Testing	Detects and validates any potential oil or fluid leaks.
Transmission Functionality Testing	Ensures smooth and reliable transmission performance.
Input/Output RPM & Power Measurement	Measures input/output shaft rotation speed and power levels.
Gear Ratio Verification	Confirms signal accuracy and sensor calibration integrity.

TECHNOLOGY USED

- LabVIEW-based application software for test control and logging.
- Motorized actuator for automated gear shifting.



BLDC Motor Drive



SPECIFICATIONS / FEATURES

- Test 12 DUTs simultaneously
- Automated report generation
- High-precision measurements
- Reduced operating and testing time
- Easy maintenance and setup
- Optimized system performance

CHALLENGE

Endurance testing of multiple drives simultaneously requires precise measurement of electrical and thermal parameters, automated data acquisition and accurate reporting. Manual testing risked errors, slow throughput and inconsistent results across multiple DUTs.

SOLUTION

TMCS developed a custom DAQ system capable of testing 12 DUTs (Drive) simultaneously. Each DUT is equipped with programmable power sources, DC load banks, thermocouples and communication interfaces. The system integrates LabVIEW software, industrial PCs, and specialized hardware for data acquisition and control. Parameters such as voltage, current, power, overload/no-load voltages are measured automatically for all DUTs.

TEST TYPE	DESCRIPTION / PARAMETERS MONITORED
Temperature Rise Test	Monitors motor winding temperature at full load.
KWH Test	Measures power, voltage and current of each motor.
Line Regulation Test	Checks drive stability under varying input voltage at constant load.
Load Regulation Test	Evaluates drive performance under varying load at constant voltage.

TECHNOLOGY USED

- LabVIEW Software for automation and data acquisition
- Electric energy meters & RPM meters
- Industrial PC and DAQ hardware
- Thermocouple input modules
- Panel-mounted hardware for centralized control



Awards Recognitions



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Quality –
ISO 9001:2015 Certified by
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Together Towards
Progress –
Celebrating Innovation
and Excellence at
SIAT 2024



TLC 2019 Pune –
Recognizing commitment,
inspiring excellence and
celebrating true
contribution



Committed to Excel –
Showcasing Innovation
and Indigenisation
Excellence at
NAIS-2025, Kochi



Honoring Esteemed
Exhibitors of Auto EV
India 2024 –
Driving Innovation in
Automotive & EV
Technology



Appreciating TMCS for
professionalism and
commitment in building
success with SPXFLOW



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blood donation –
Spreading awareness,
saving lives and
inspiring hope

AutoHIL

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Experience real-time VCU-HMI interaction with live simulation of charging, faults and vehicle functions like ignition, brake, gear and drive modes. Features include fault injection, CAN-based control, automated testing and visual feedback for validation, analysis and R&D applications.

Let's Connect!



Revolutionize Your Industry Today

Your trusted partner for automation, testing and system integration. We specialize in delivering innovative, reliable and scalable solutions for industries seeking excellence in test, measurement and control systems.

Our expert team is ready to understand your requirements and provide tailored solutions that enhance performance and efficiency. From concept to commissioning.

TMCS ensures seamless execution and long-term support.



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