



DG TECHNOLOGIES DPA HEALTH Secure Predictive Maintenance Software User Manual

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DG TECHNOLOGIES DPA HEALTH Secure Predictive Maintenance Software User Manual



This document describes the DG Technologies/DPA HEALTH™ tool. DPA HEALTH is a predictive analytic tool

that accesses the current condition of the vehicle's starting circuit, charging circuit, and battery pack.

DPA HEALTH collects the vehicle digital data using the ECU CAN message data, along with analog or digital signals from sensors and actuators. This provides a complete picture of the vehicle's electrical system health for analysis or diagnosis of the user's specific concerns.

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IMPORTANT

To ensure your success with this product, it is essential that you read this document carefully before using the hardware and software.

Damage caused by misuse of the hardware and software is not covered under product warranty. When using this manual, please remember the following:

This manual may be changed, in whole or in part, without notice.

DG assumes no responsibility for any damage resulting from the use of this hardware or software.

Specifications presented herein are provided for illustration purposes only and may not accurately represent the latest revisions of hardware, software or cabling.

No license is granted, by implication or otherwise, for any patents or other rights of DG or of any third party.

Introduction

Electrical System Health Monitoring: Modern vehicles are becoming more electrified and integrated with multiple ECUs and sensors, which make them smarter in terms of engine decisions, performance, fuel efficiency, security, safety, and stability.

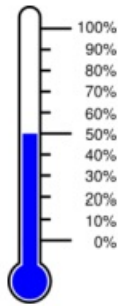
DPA HEALTH provides a portable diagnostic solution for your vehicle's electrical applications. It is a predictive analytic tool that accesses the current condition of primary electrical system:

Battery / Battery pack health Starting System health Charging System health

DPA HEALTH is based on a TMC Position Paper (2018-3 "Automatic Monitoring of Electrical System Health Monitoring). The condition of the electrical system is assessed by combining circuit analysis with statistical analysis. When paired together, these two fundamentally sound sciences quantify the state of health (SOH) for batteries, alternators, starters, and electrical cables. The use of vehicle CAN communication network allows for downloading of data, scheduling of maintenance and integration with other fleet management systems.

Recommended Usage of DPA Health For best and accurate results

Ambient Temperature should be above 50-degree Fahrenheit (50 °F). The battery pack should have a voltage of 12.0 volts or higher. On vehicles with capacitor starting systems the batteries can only be tested by isolating (disconnecting) the capacitor start system.



Temperature: Above 50 Degrees F

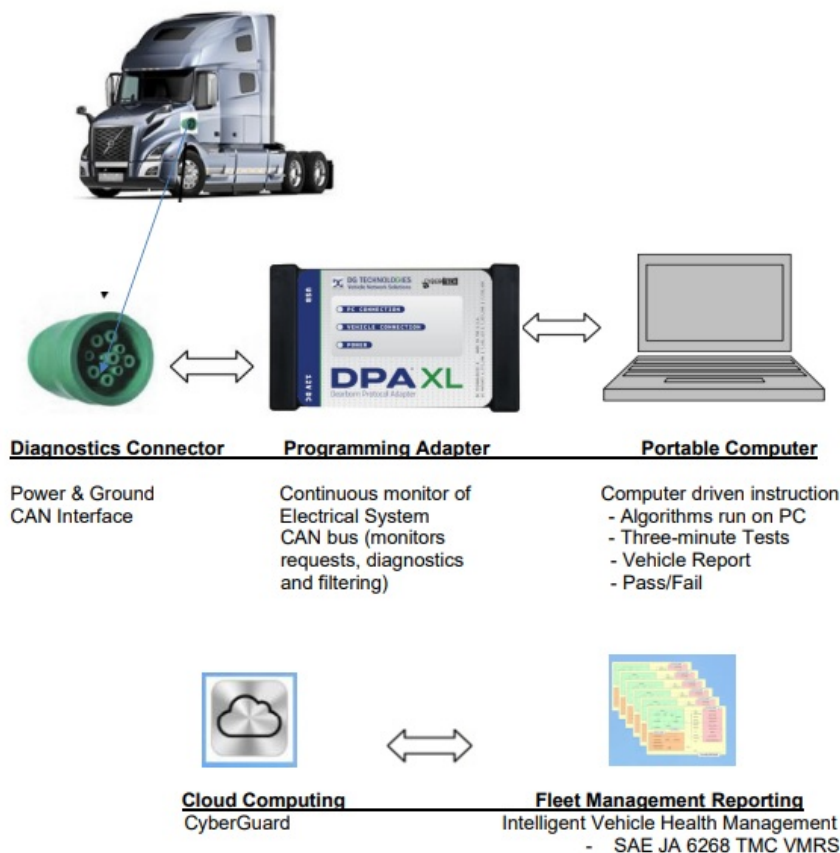


Voltage: Above 12 volts

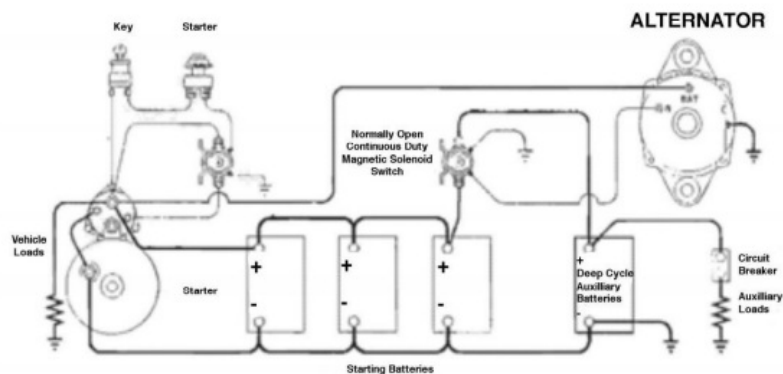
1. Cold weather starting aids such as battery warmers, heaters for block, fuel, oil pan and inlet air grid heaters can adversely affect the test results. Testing at temperatures above 50 °F is recommended.
2. Battery packs with the initial voltage below 12.0 volts will return the message "Charge and Retest". Charge the batteries using the manufactures recommendations and allow resting time before The rest time is usually 4 hours before conducting a retest.
3. On vehicles with capacitor start systems (ultra-capacitors or super capacitors) the capacitor unit must be isolated (disconnected) before starting the test.

DPA HEALTH

Illustration DPA HEALTH Configuration:



Primary Electrical System (PES)



Typical configuration – Medium and Heavy-Duty

DPA HEALTH Quick Reference Conditions Chart

Battery Conditions	State of Health (SOH), State of Charge (SOC)
Abnormal Current	Internal battery leakage, parasitic
Starter Prognosis	Power and Energy Profile, Trend Analysis,
Cables	Abnormal high voltage drop of Battery / Alternator / Starter due to corrosion or loose connections
Alternator	Over/Under charging and abnormal waveform

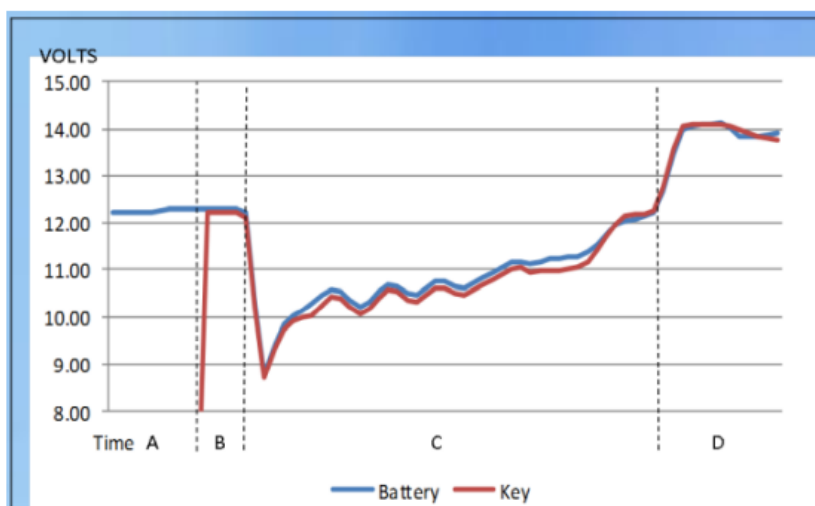
How DPA HEALTH Works

The application guides the technician through a series of steps that exercises the electrical system in four phases of operation

A – Key OFF B – Key ON

C – Start Engine Cycle D – Charging Cycle

Date is recorded in each of the four phases. It takes approximately 3 minutes.



The DPA Health analysis is done in the cloud and reported back to the technician on the PC within seconds of completing the test sequence.

Features – This application is designed to work with a laptop and DG Technologies DPA XL. The following status data is displayed after hooking up to the vehicle from the DG Technologies DPA XL and opening the DPA Health Application;

DPA HEALTH Report

The state of health for each system test is color coded, **Good, Marginal, Suspect.**

- **Good:** SOH is No maintenance is required.
- **Marginal:** There was a problem running the test and/or missing data. Marginal is accompanied with an instruction such as Charge batteries/retest, Retest or
- **Suspect** Conditions warrant that maintenance should be

Vehicle Data:

Date of Test Vehicle VIN Vehicle ID Odometer Reading Engine Hours Vehicle Faults

- Active
- Inactive Temperatures
- Ambient
- Initial Coolant

Battery Pack: Good, Marginal, Suspect

Battery Voltage

- Initial state of charge State of Health
- Remaining Life expressed as a percentage (%) Rated Cold Cranking Amps (CCA)

Estimated Cold Cranking Amps (CCA)

Starting Circuit: Good, Marginal, Suspect

Minimum Crank Voltage Average Crank Voltage Cranking Time
Suspect Condition if present
Cranking Voltage

- Minimum
- Average Cranking Time

Charging Circuit: Good, Marginal, Suspect

Charging Voltage at battery Suspect Condition if present

Setup and Operation – Several features contribute to this area:

Operation utilizing a standard Windows based laptop (not available for Apple/MAC PC's) Easy to use

- Device configuration is performed automatically Data analysis and file management
- Securable custom functionality available

Automated secure cloud data storage allows access via internet Suitable for fleet data collection and management
Software – Several items contribute to this area:

DPA HEALTH

DPA XL Software installed Truck-connect dashboard

Benefits –

Reduced PM time (3-4 minutes verses 45 minutes for RP129)

Provide an off-board diagnostic and prognostic of the primary electrical system (battery, starter, alternator and cable) through the vehicle diagnostic connector

Report generation

Data files automatically transferred to Cloud Dashboard Data Storage

- Data storage large enough for large vehicle fleets

Automated DG Technologies Server Data Storage allows access via internet State of health analysis of:

- Charging Circuit
- Battery Pack

o Starting Circuit

Use Case – examples:

Vehicle Data Storage Fleet data collection

Fleet application, with analytics Complete Electrical System testing

Technical Aspects– examples:

ECU communications

Services and full electrical diagnostic data Emission sensor signals

Auto-baud detection on all channels at power-up

Hardware Requirements



Computer with a wireless connection Windows 10/11 8 GB RAM32 GB or more free disk space Not available on Apple or Mac Pc

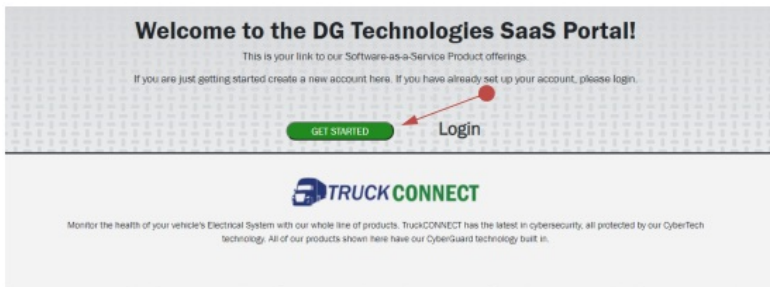
For New DPA HEALTH Connect Subscribers:



Step 1 – From the Truck Connect portal, choose [GET STARTED].

A registration form titled 'Please tell us about yourself:'. It includes a red 'Name' field with a 'Required' label. Below are fields for 'Email', 'Phone', and 'Organization Name'. There are two dropdown menus: 'What service are you interested in?' and 'What is your role within your organization?'. At the bottom is a green 'SEND' button with an arrow icon. A red dot with an arrow points to the 'SEND' button. Below the button is a link that says 'Already have login credentials?'.

Step 2 – Enter all required information so that our sales team can contact you, and select [SEND].



Step 3 – From the DG Technologies Truck Connect Portal, select **DPA Health**.

Step 4 – A series of screens will appear to download the DPA HEALTH application. After successfully loading the application the following Desktop Icon will appear



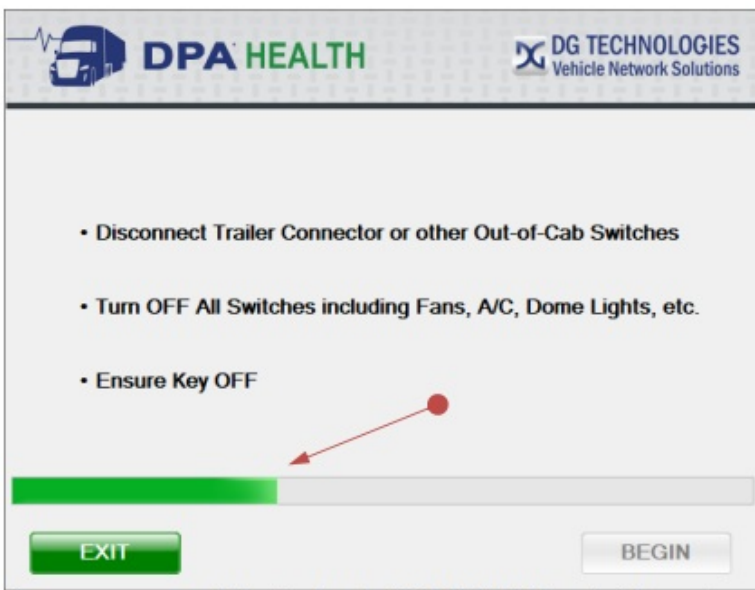
Main Login and Subscription Verification

After you receive your credentials from DG Technologies, enter your username and network password. Select [LOGIN]. to enter the DPA HEALTH application. The active subscription and cloud connection verification progress bar will be displayed after selecting [LOGIN]. Select [EXIT] to leave the application

Initial Setup Screen



After all connections/switches have been disconnected or turned off, select [BEGIN] to start the DPA HEALTH system. Select [EXIT] to leave the system.



Program progress will be displayed. DPA HEALTH is collecting and processing vehicle data during the Key Off sequence. Follow on screen instructions.



Follow all on screen instructions in the test sequence and select [OK].

Vehicle Information Entry

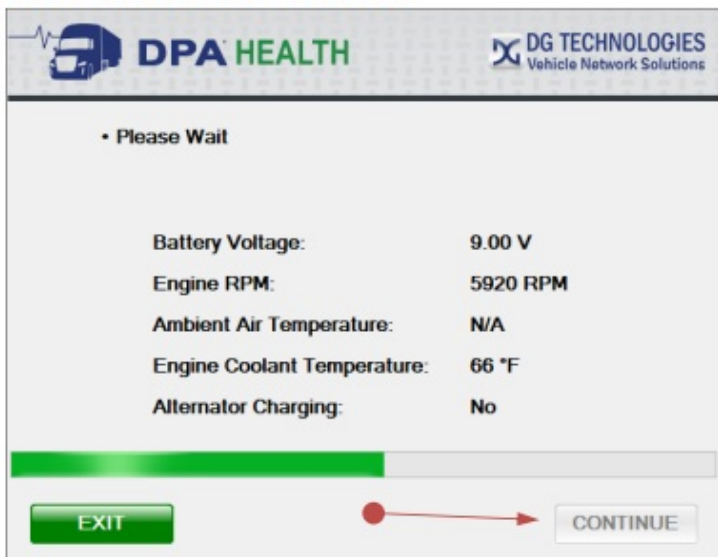
The screenshot shows the 'Vehicle Information Entry' screen. The title is 'Please fill out All Fields'. The form contains the following fields and values:

- Name or Company ID: DGTech
- Vehicle Number: (empty)
- Number of Batteries: (empty)
- Auxiliary Batteries: No
- Battery CCA Rating: (empty)
- Do these components have OEM original part numbers?
 - Starter: Don't Know
 - Alternator: Don't Know
- VIN: (empty)

At the bottom, there are 'EXIT' and 'CONTINUE' buttons. A red arrow points from the 'CONTINUE' button to the 'EXIT' button.

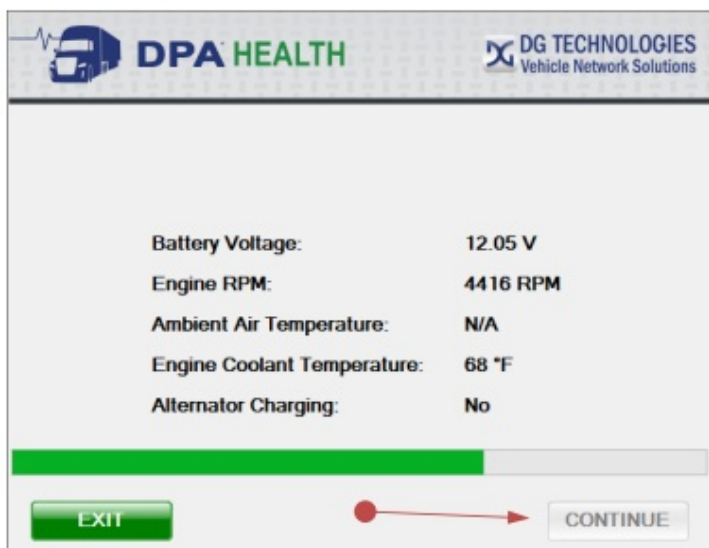
Next the 'Vehicle Information Entry' screen will be displayed. When required, please enter correct data for all items. When complete, select [CONTINUE].

Test Initialization Screen



Select [CONTINUE] to advance the test.

Start Engine



For the next part of the sequence, make sure all accessories are off and start the engine as instructed. Select [CONTINUE].

Accessory Activation

DPA HEALTH **DG TECHNOLOGIES**
Vehicle Network Solutions

Battery Voltage: 12.05 V
 Engine RPM: 4416 RPM
 Ambient Air Temperature: N/A
 Engine Coolant Temperature: 68 °F
 Alternator Charging: No

EXIT CONTINUE

For this part of the test sequence, turn on all switches and accessories. Headlights, Blower Motor, Radio, Flashers, etc. when test is complete, select [CONTINUE].

DPA HEALTH **DG TECHNOLOGIES**
Vehicle Network Solutions

INFORMATION

Files have been uploaded successfully.
 To see the results go to <https://www.truck-connect.com/>

OK

EXIT BEGIN

- When test is complete, user will be prompted that files have been uploaded and allowed to continue to the [BEGIN] screen.

Test Results Screen (PC)

REPORT

December 01 2021

Vehicle Number	14
VIN	
Odometer	8795
Engine Hours	3281
Ambient Temp	65 °F
Coolant Temp	77 °F
Active Faults	No
Inactive Faults	No

Charging Circuit - SUSPECT - Schedule Maintenance

Charging Voltage @ battery (Mean)	12.94 V
Suspect Conditions	The voltage signal is noisy. The voltage standard deviation exceeds 0.30 volts during high idle.

Battery Pack Charge & Retest

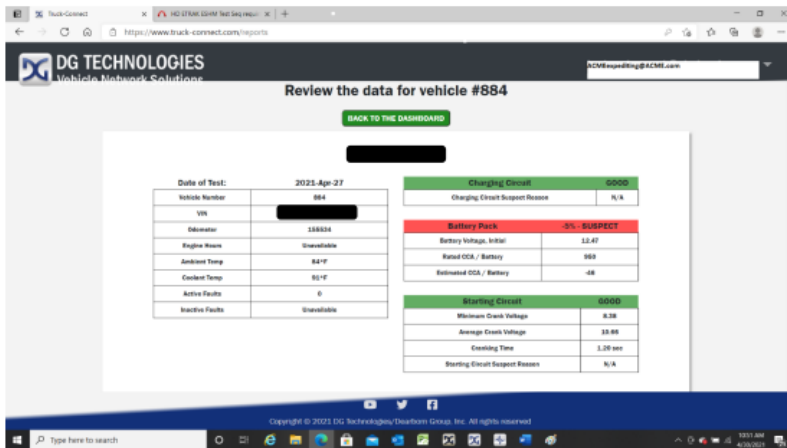
Initial Voltage	11.49 V
Battery SOC	N/A
Battery SOH	N/A
CCA Estimated	950
CCA Rated	950

Starting Circuit GOOD

Minimum Crank Voltage	9.14 V
Average Crank Voltage	10.03 V
Cranking Time	0.55 sec
Suspect Condition	N/A

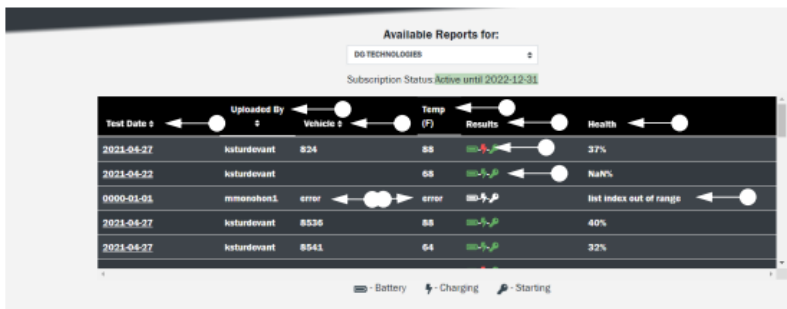
EXIT NEW TEST

DPA Health Dashboard



This screen displays the DPA Health Dashboard

Available Test Reports



- If a number of Test Results are available, they may be selected from this
 - Test Date – displays the date when the data was taken
 - Updated By – displays the name of the person who updated the data
 - Vehicle – displays the vehicle #
 - Temp – displays the temperature at which the data was taken
 - Results – displays specific battery, charging, and starting information
 - Health – displays specific data related to vehicle condition
- The cursor may be moved over any specific item to display data stored for that selection
 - All items in “red” display “out of range etc.” data
 - In the example shown, the engine speed was in the wrong range
 - Items in “green” are in the correct range
- If “Error” appears on the Test Reports screen:
 - There is an error or errors in the data reported
 - Perform the test again with the proper test parameters

Technical Support and Return Merchandise Authorization

After reading and following the troubleshooting and validation procedures in this document please check the FAQ page at www.dgtech.com/faqs or www.truckconnect.com. If you are still not able to resolve an issue, please feel free to contact DG technical support. For users in the United States, technical support is available from 9 a.m.

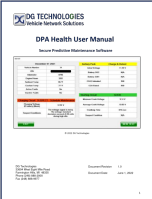
to 5 p.m. Eastern Time. You may also fax or e- mail your questions to us. For prompt assistance, please include your voice telephone number.









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References

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