DTS POWERMARK DATA ACQUISITION UPGRADE

Update your DTS Powermark engine dyno with SuperFlow's advanced WinDyn 3.2 Data Acquisition System and take advantage of the latest software and data acquisition features available.

Overview

The DTS Powermark engine dynamometer carries a reputation as the most durable water brake engine dynamometer available. Most DTS Powermark customers have operated their dynos for 20+ years without replacing a bearing or seal in the absorber and as a result these dynamometers command a premium on the used market. The problem is the data acquisition system was designed in 1988 with components from the early 1980s so it lacks features and capacity to adequately test modern engines and the majority of the electrical components required to service the data acquisition and control system are no longer available.

To help, we've developed a conversion kit to replace the dated DTS Powermark electronics with our latest WinDyn 3.2 data acquisition and control system. This upgrade allows DTS dyno owners to keep the functional mechanical portion of their dynos and upgrade to the latest

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WinDyn data acquisition and control system making the dyno perform like a new SF-Powermark for less than half the cost.

The SF-PM-C conversion package includes:-

- New sensor box with 139 user configurable data channels
  - 16 channel thermocouple panel
  - 10 channel pressure panel
  - 2 pre-configured air fuel inputs (0-10v)
- New control console to control tests, control engines and control the entire test cell
- New computer system factory configured with WinDyn 3.2, two 22 in. LCD monitors and a color printer
- Remanufactured control valves with new stepper motors for full PID control
- New operator desk with integrated throttle handle and cable replaces the existing electric throttle

The current WinDyn system is ¼ the size and 100 times more powerful than the SF-901 giving you more data channels, better testing methods, higher resolution test data and a suite of modern testing tools to get the most out of your engines. WinDyn is easy to use, ready to run and ready to adapt to your needs.

Major benefits of the SF-PM-C conversion package

- Keep the functional mechanical portions of the SF-901, saving money
- Data acquisition rates up to 2,500Hz - an increase of 100 times over the previous 20Hz rate for higher resolution data and finer analysis of engine performance
- Improved engine control for excellent repeatability
- Feedback loops on both control valves allows fine tuning of control scheme to specific power and RPM levels
- Automated, ready to run test profiles with user defined sweep rates
- Ability to integrate automatic throttle controllers or send a control out signal for fly-by-wire throttle
- Advanced data analysis features
  - playback any saved test
  - plot or overlay up to 10 tests at a time on the graph

  - plot multiple channels at a time, for example plot air fuel ratio and torque
- Migrate from an obsolete DOS computer to a modern Windows environment
- Windows file structure - save virtually unlimited numbers of tests with no limit on the number runs in a folder (family)
  - Save data in folders organized by customer name or engine type including multiple subfolders
  - Email data files or export data into a customer data pack that customers can take with them
  - Analyze or store data on any Windows computer for better file back up

Onsite Installation and Training

The package includes three days of onsite installation and training by a SuperFlow service engineer. While onsite our engineer will:

- Run baseline tests on the DTS Dyno for verification after the upgrade
- Remove the legacy data acquisition and controls
- Install the SF-PM-C data acquisition and control system upgrade
- Integrate existing sensors you wish to keep (temperature, pressure, air/fuel, etc.)
- Configure the newly upgraded system for your application
- Run comparison tests after the upgrade for verification
- Spend two days training on the function and operation of the new system

Data Acquisition

WinDyn Control and Data Acquisition System

SuperFlow's WinDyn® Software is the most feature rich system available for dynamometers today. We've included all the tools you need to make a SuperFlow® dynamometer a successful piece of your business. WinDyn® is preconfigured with industry standard tests to get you up and running quickly. But, we didn't stop there. We've also developed powerful configuration and test editors that offer you complete, customized control of the dynamometer, the test cell and the tests you're running.

WinDyn's® available 76 measured channels and 35 calculated channels let you measure and analyze data to make your products better. Our advanced electronics sample data at rates between 1,000 and 2,500 Hz depending on the channel and display it at 100 lines per second so you're sure to see the entire picture. The built in data analysis tools let you see data in a way that makes sense, and like the rest of WinDyn®, data analysis is completely user-configurable should you choose. Start Testing Quickly WinDyn® comes preconfigured with standard tests to get you testing quickly. Pre-defined test groups automatically configure the dynamometer for standard testing. Simply select the one that matches your current needs and you're ready to run.

Test Groups

A test group is a WinDyn® file that completely configures the dynamometer for testing. By using test groups you ensure that all tests are run in the same way, regardless of the operator. Test groups configure the following:

- All channels being monitored (measured, calculations, constants and interpolations)
- Screen group of up to ten real-time data monitoring screens

- Safety limits (if desired) to protect your engine
- Test profiles (acceleration, step, steady state, break-in, life cycle, track simulation, custom, etc.)
- Sensor calibrations
- Relay controls for test cell functions (lights, pumps, fans, ignition, etc.)
- PID control parameters
- Test specifications (starting and ending speeds, engine specs, test notes, etc.)

Completely Customizable

In addition to the standard ready to run configuration supplied from the factory, you can customize WinDyn® in any manner you'd like. Write custom test profiles, design custom screen groups, add a company logo to data plots, setup print preferences for graphs and tabular data, add additional sensors or integrate emissions equipment quickly and easily. The best part about WinDyn® is its versatility: it comes fully loaded and ready to run all the standard tests you need, plus gives you the power to configure tests any way you prefer. Learn more about our advanced editors.

Test Profiles

Test profiles are a series of commands that automatically perform a test. WinDyn comes loaded with standard test profiles including acceleration, step, steady state and break-in, but the Test Profile Editor gives you the ability to write any custom test you can imagine.

Here are some examples of what WinDyn users are already doing-

- Automated one-touch tests that control every detail like-
  - powering on pumps and fans
  - powering ignition
  - turning on fuel
  - checking critical parameters like oil pressure and water temperature before
  - beginning a test sequence
  - ending the test
  - stopping the engine
- Cyclic durability tests to check engine belt life
- Reverse acceleration to simulate tractor pulling

- Transmission durability tests on chassis dynamometers
- Slope simulation
- Track lap simulation for the Pikes Peak Hill Climb, Charlotte Motor Speedway and others
- Pass/Fail tests for air filters and catalytic converters on the SF-1020SB
- Automated chassis dynamometer tests with throttle actuators
- 300 hour diesel engine durability tests
- Urban drive cycle tests
- Emissions tests

Configuration Editor

The configuration editor gives you the power to create the custom test environment you desire.

This powerful Windows® based editor allows you to define-

- Channel Definition (name, units, format, filtering, formulas, etc.)
- Control Channels (close-loop controllers for load, throttle, flow, etc.)
- Display Channels (in any language)

Once you're happy with your custom configuration, it's saved so the dynamometer can quickly be configured to your specifications before every test.

Safety Limits Editor

Safety limits prevent problematic situations like low oil pressure or overheating from damaging your engine or vehicle. They are completely user-configurable by channel (exhaust temp, oil pressure, water temp, etc.), by critical value and by resulting action. You can even setup a multi stage rev limiter. Limits are constantly monitored and if triggered the post mortem feature kicks in to provide a snap shot of data before and after the limit was triggered to assist you in deter-mining what happened to the engine.

Test Data Perfected

WinDyn® is packed with data analysis tools that make analyzing your engine or vehicles performance easy. For each test you can view up to 10 user-defined pages in tabular format, graphical format or side-by-side. Additionally, up to 10 saved tests can be overlaid on a graph enabling you to make informed decisions quickly. Like all other WinDyn® features, all the data

viewing capabilities are customizable. The test group defines which data is on each of the ten pages and on each page's graphs. You can change this at any time, even after the test is completed.

Want to see an area of a graph in more detail? Drag a box around the area you want to see and WinDyn® immediately zooms and re-scales that portion of the graph for easy comparison. Plots are easily enhanced with your company logo before printing. They can also be exported as a bitmap or JPG for emailing to customers or posting to your website. If WinDyn's® data analysis tools aren't enough for you, export your test data to Microsoft Excel® for custom post-test analysis.

Customer Data Packs

Your customers are why you're in business. With WinDyn's® Customer Data Pack feature you can instantly create a file with their test data and the WinDyn® data viewer so they can take their results home. This data viewer includes all the same analysis tools as WinDyn® so your customers will be assured of their results.

SuperFlow Explorer

Managing data files is crucial to finding your data efficiently. The SuperFlow® Explorer, located under the tools menu, allows you to quickly navigate to the correct data, view it, plot it or print it with the click of the mouse. It can browse all folders, networks and the desktop and also create, rename, copy, move delete and manage all system folders.

Test Playback

WinDyn® allows you to replay stored tests with all meters and screens active just as they were during the original test. You can print any or all WinDyn® screens and data to most Windows® supported printers.

Sensor Box

The SuperFlow sensor box is the brain of the 139 channel WinDyn data acquisition system. Its advanced electronics measures high-resolution data at up to 2,500 Hz depending on the channel and sends the data to the operator station via a simple Ethernet connection for live monitoring.

The SuperFlow sensor box houses the data acquisition and control boards that makeup the 139 channel WinDyn data acquisition system. Its advanced electronics measures high-resolution data at up to 2,500 Hz depending on the channel and sends the data to the operator station via a simple Ethernet connection for live monitoring. The only connections between the test cell and operator control room are three Ethernet cables making installation simple. The sensor box is modular and is expandable at any time. Eight expansion bays are ready to accept expansion panels for additional temperature, pressure, analog voltage or frequency inputs. Most SuperFlow engine dyno packages includes a ten-channel pressure panel and a sixteen channel temperature panel and sensors as a starting point.

The included weather station uses a barometric pressure transducer, air temperature sensor and humidity sensor to measure atmospheric conditions continuously throughout the test and calculate the proper weather correction factor. Standards like STP, SAE, ECE and DIN are built in and user selectable, the configuration editor can also be used to write custom correction factors.

The sensor box also house the controllers that provide SuperFlow's legendary closed loop PID control. Its flexible dual-mode control scheme allows either the dyno or the throttle to control to speed, torque, power, manifold pressure or any other channel of your choosing. Sophisticated logic lets each controller use up to four different control modes and parameter settings.

The sensor box can either be mounted to our test cell boom system or to the wall using the wall mount bracket.

Control Console

The control console is the main interface between the operator and the entire engine test cell environment. Front and center on the console is a touch screen where operators select the type of test and enter parameters like starting and ending speeds. When the test is active on screen prompts guide the operator through the test.

Three manual control modes are available using the control know mounted in the console. This controller allows manual control to torque, RPM or percentage of load which keep operators in control during break in and warm up routines and when an automated test profile is not activated.

The engine control panel in the center of the console provides the operator with four relays to control ignition, fuel pump, starter and one auxiliary button commonly used for electric water pumps. Four more relays could be added to the console for additional control functionality.

Six rocker switches in both upper corners of the console are used to wire in test cell equipment like lights, pumps, fans and heaters so you never have to leave the console to start up or shut down the test cell. A 30ft. wiring harness with mating connector to the console and schematic is included to wire in your test cell equipment.

Lower right on the console is a keyed power switch to power off and lock-out the dynamometer at the end of a shift and the large E-stop button will shut down the entire operation in case of emergency.

Call or email Promand today to discuss your application and dyno test requirements in detail.

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