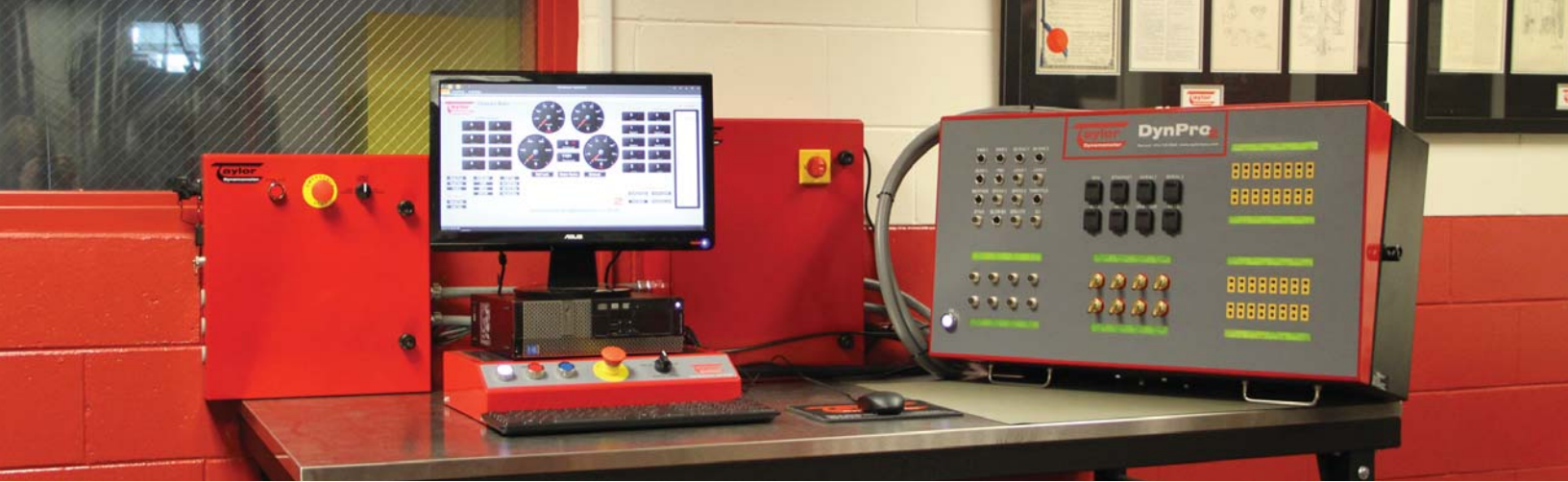




DynPro²

Data Acquisition and Control System

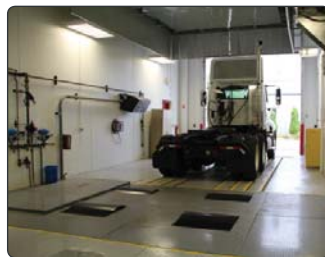


DynPro₂

DynPro₂ is a state-of-the-art Data Acquisition and Control System for your engine, vehicle and industrial component testing needs. Automate the industrial controls for a room, test cell, even your entire test cell facility, allowing you to integrate room temperature, lights, safety interlocks and much more into your overall testing process. DynPro₂ is simple to use but flexible enough for the most rigorous applications.

DynPro₂ features and benefits include:

- One common platform for all testing applications
- Quick operation - start testing in just 3 clicks
- Adaptable to meet your testing requirements
- Role-based access control
- Convenient, centralized management of all testing information
- Test Profiles that run automatically by the system
- Sophisticated graphical and numerical data analysis tools (data sample rate 100 hz)
- Quadrature encoder device provides four distinct channels of real-time measurements
- Professional, customizable reporting and processing
- Programmable channel alarms and intelligent safety features
- Closed Loop Control with simple Proportional, Integral and Differential (PID) tuning (update rate 100 hz)
- MASC Editor functionality specifies what to measure and how your test equipment should perform
- Support for engine and vehicle communication protocols (ECM interfacing)
- Fully configurable, yet easy to use
- Easy integration with data, system controls and other measurement equipment and services



One common platform

Control all applications within your facility including engine, chassis, hydraulic components, other closed loop control and data acquisition and control applications.

Quick Operation - Start testing in just 3 clicks!

Click 1
Select the *Install Project* shortcut.

Click 2
Select the project file.

Click 3
Select the test to run.

LOAD CONTROLLER Manual: 0%

THROTTLE CONTROLLER EngSpd: 1400 RPM

Taylor Dynamometer DynPro2
www.taylordyno.com • Milwaukee, WI U.S.A.

Sample test screen

Adaptable to meet your custom testing requirements

Accurate, real-time instrumentation for monitoring your desired combination of testing parameters.



Screen customization examples



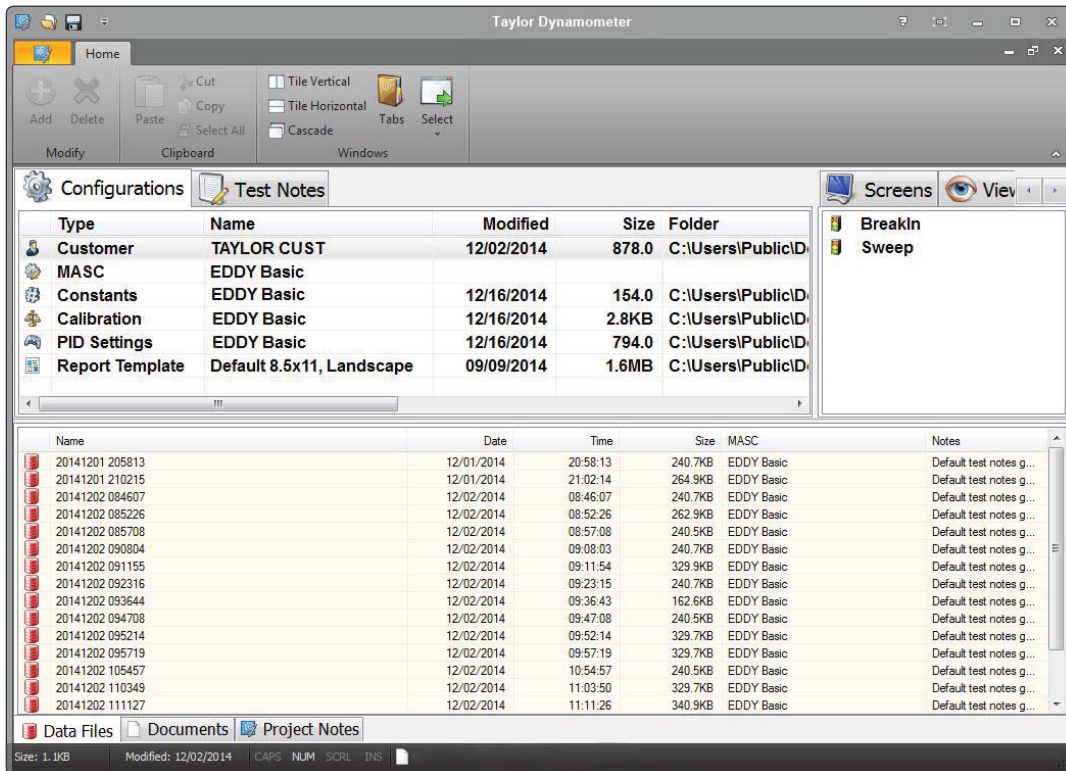
Instrument customization examples

Real-Time Instrumentation features include:

- The ability to create multiple data screens
- The ability to change your screens to your specific needs at any time, even while a test is running
- A variety of instruments including buttons, gauges, thermometers, digital clocks, LED indicators and more
- Graphing modes including Strip and X-Y charts
- Various shapes (1D and 2D) can be drawn on graphs to help reference: data lines; min/max zones; hill profiles and driver's trace
- Customizable colors, labels, orientations, backgrounds, borders, styles and more
- Data screens that auto-scale to Windows® screen resolutions

Convenient, centralized management of all your testing information

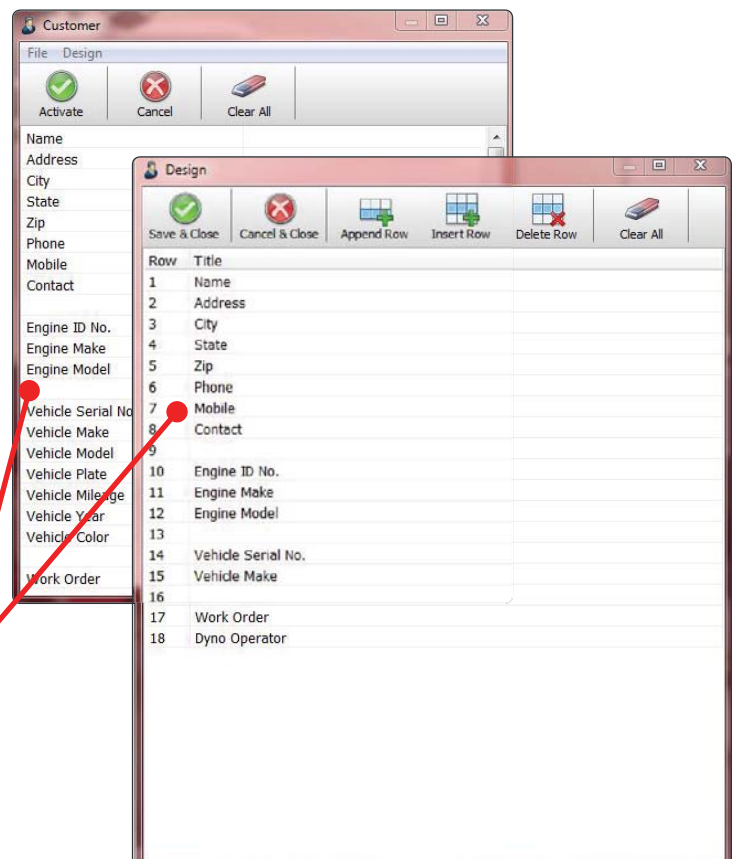
The Test Project feature allows you to organize all your items including data, notes and documents related to a particular customer, engine or vehicle. All information is stored in a single place for easy reference and use.



Test Project screen

Additional Test Project features include:

- Quick and easy test setup
- An automatic update process which adds results to your project automatically
- Easy lookup for viewing and graphing information
- Project configuration allows customization of settings, files, customer data, vehicle and engine information, even custom user-specific data



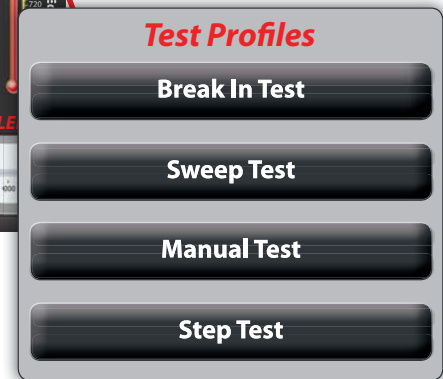
Customize your data screens with the data you want to capture

Automate system behavior

Create custom Test Profiles such as: break in tests, sweep tests, manual tests, step tests, road simulation tests, etc. with just a click of a button.



Sample user screen with Test Profiles



Driver's Trace

A graphical representation of an automated test cycle with a cursor/mark identifying to the driver where they are. This visibility allows the driver, acting as the controller for the requirement, to maintain the proper position (set point) of the vehicle under test during the test profile. Most commonly, the operator will be controlling vehicle speed during a programmed load test cycles (hill simulations, acceleration, deceleration requirements and more).

Specify automated system behavior in a table format

Reference Tables are spreadsheet-based CSV files that you can create and edit to accommodate your testing needs. They are especially useful when you need to simulate real-life driving conditions from mapped or official data specifications. When this is the case, it is convenient to specify the test criteria in a separate CSV table created from the mapped/official data source. This greatly simplifies creation of the test profile, and allows the same test to be run with various CSV tables according to the testing requirements.

Additional features include:

- Ramp control setpoints
- Adjust control modes
- Adjust channel alarm thresholds
- Record test data (and access other DynPro2 functionality)
- Automate test cell/environment
- Execute Reference Tables with test command button

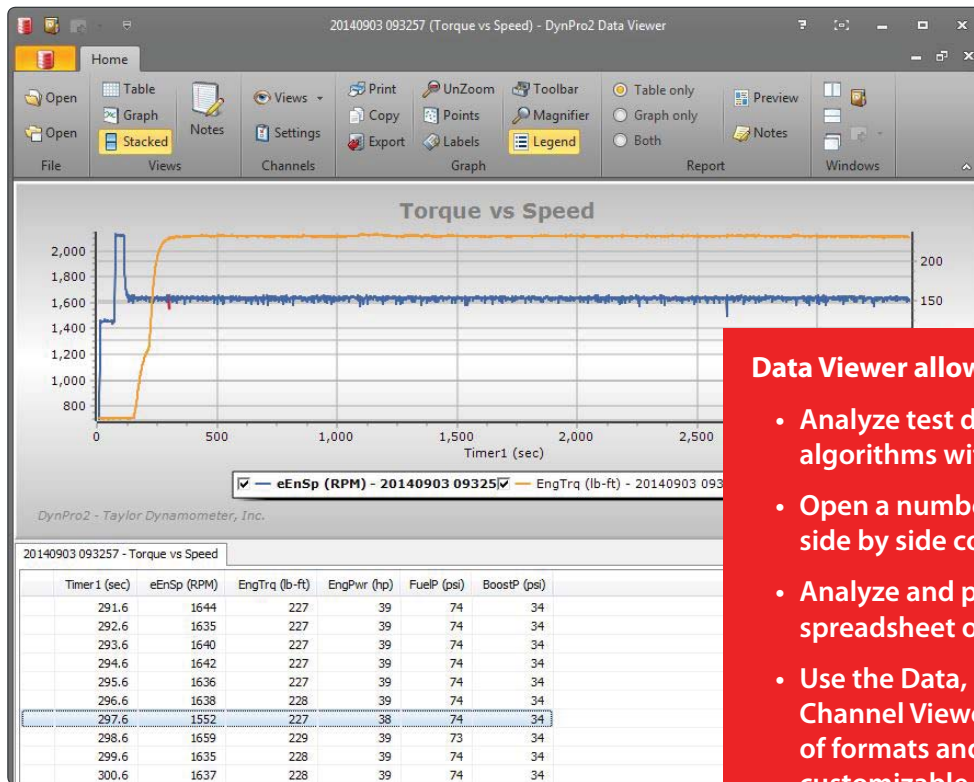
The screenshot shows a spreadsheet with a table of test data. The table has 8 rows and 6 columns. The first row contains headers: 'dpRefTable', 'x=SysSeconds', 'refOut=tSeconds', 'MaxTrq', and '2000 Max'. The subsequent rows contain numerical data for 'SysSeconds', 'Speed(%)', 'Torque(%)', 'VehSpd', and 'DynoTrq'.

	A	B	C	D	E	Max
1	dpRefTable	x=SysSeconds	refOut=tSeconds	MaxTrq	2000	Max
2						
3	SysSeconds	Speed(%)	Torque(%)	VehSpd	DynoTrq	
4	1	0	0	0	0	0
5	2	0	0	0	0	0
6	3	0	3.67	0	73.4	
7	4	0	47.69	0	953.8	
8	5	3.11	59.41	1.8038	1188.2	

Sample CSV file

Sophisticated graphical and numerical data analysis tools

The Data Viewer tool helps you get the most out of your test data with a variety of displays, formats and configurations.



Data Viewer screen

Data Viewer allows you to:

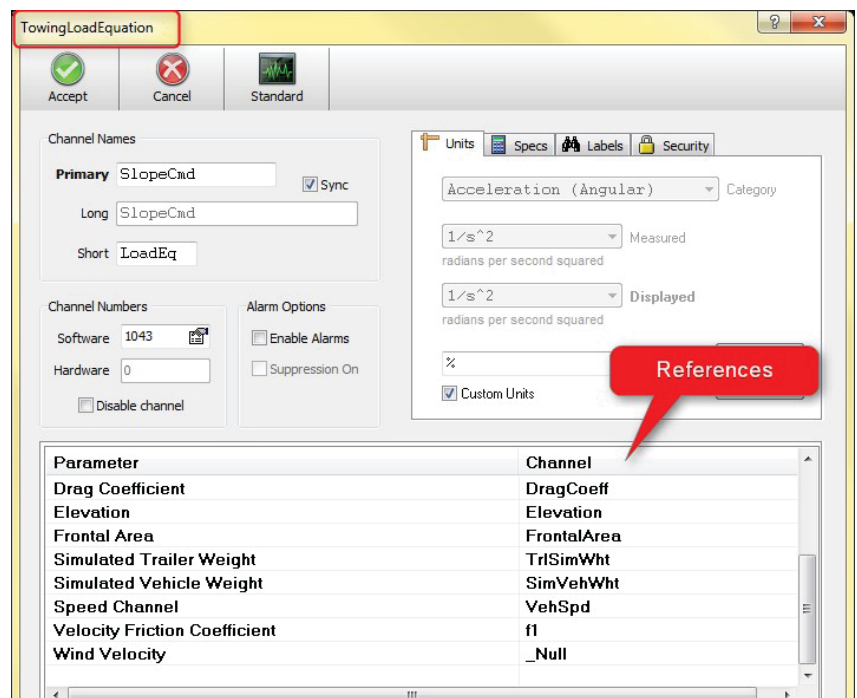
- Analyze test data using a library of algorithms with pass/fail criteria
- Open a number of files simultaneously for side by side comparison
- Analyze and print test data in either spreadsheet or graphical formats
- Use the Data, Spreadsheet, Graph or Channel Viewer, each features a variety of formats and configurations fully customizable to fit your needs

Compute real-time statistics

Compute a real-time statistic (e.g., Average) from a sample of >1 data points produced by another channel (or channels). Or compute a predefined equation that requires real-time computation speed beyond that offered by other means.

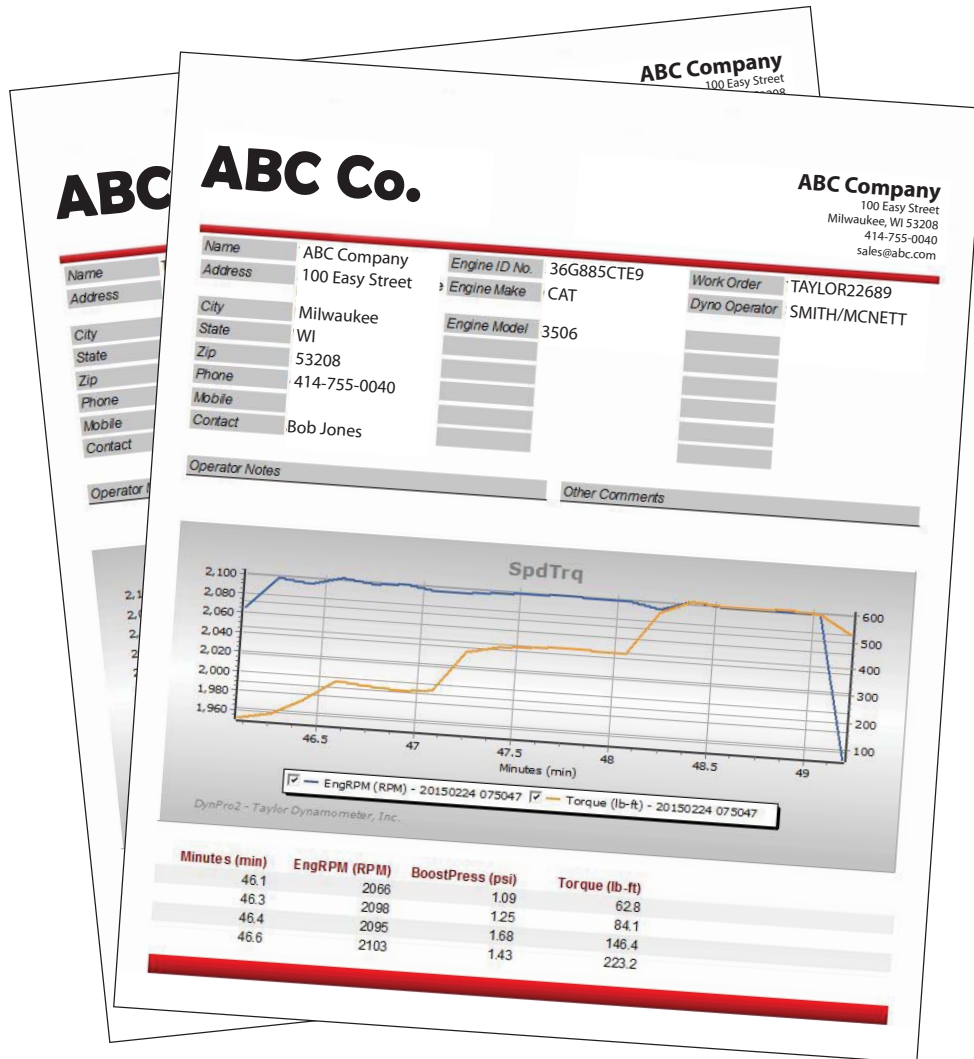
Statistic-type channels include:

- Acceleration
- Accumulated Count
- Towing Load Equation
- Track Road Load



Towing Load Equation Screenshot

Professional, customizable reporting and processing



Sample report

Professional reports and processing features customized for your company and your customers.

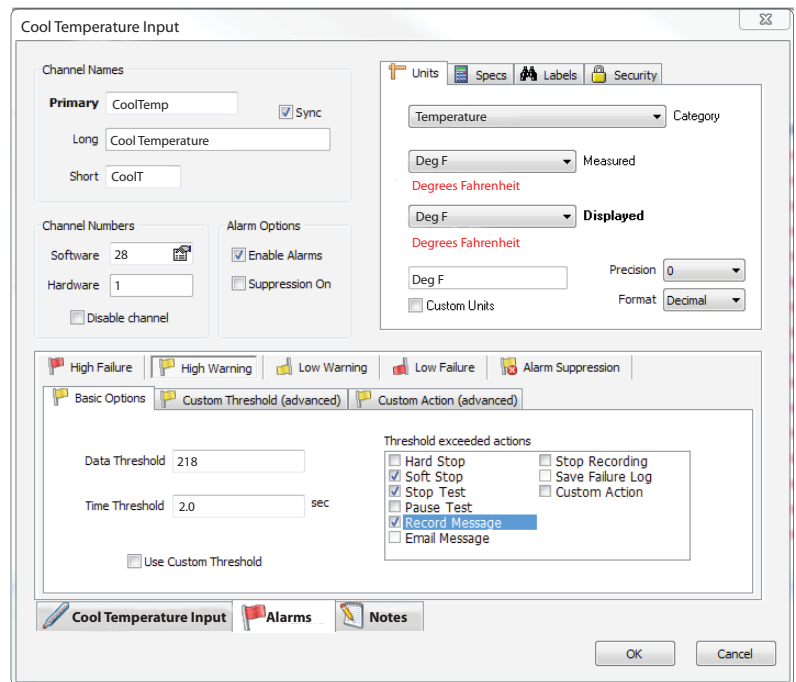
- Create your own layouts or select from several templates
- Report formats include graph and table
- Customize with colors, fonts and logos
- Functionality to export data to text, Excel®, HTML table, JSON and open document formats
- File Averaging - run a few tests and quickly average the results together to create a good baseline of the engine or vehicle for further testing
- Alignment Downsampling - generate test data aligned on exact, even speed points (every 100 rpm). This allows test data to be viewed and graphed in a usable and industry standard mode, while maintaining the highest accuracy possible

Programmable channel alarms and intelligent safety features

Maintain the health of your system and equipment with channel alarms and intelligent safety features.

A few features include:

- Settings for high warning, high failure, low warning and low failure
- Alarm suppression holds off tripping alarms until the value of a defined reference channel has exceeded the data threshold for the specific amount of time specified (time threshold)
- Predefined and custom fault actions:
 - Hard stop
 - Soft stop
 - Stop test
 - Pause test
 - Record message
 - Email message
 - Stop recording
 - Save failure log
 - Custom action



Easy channel alarm setup

Easy to set up channel alarms that provide notifications on your system's performance



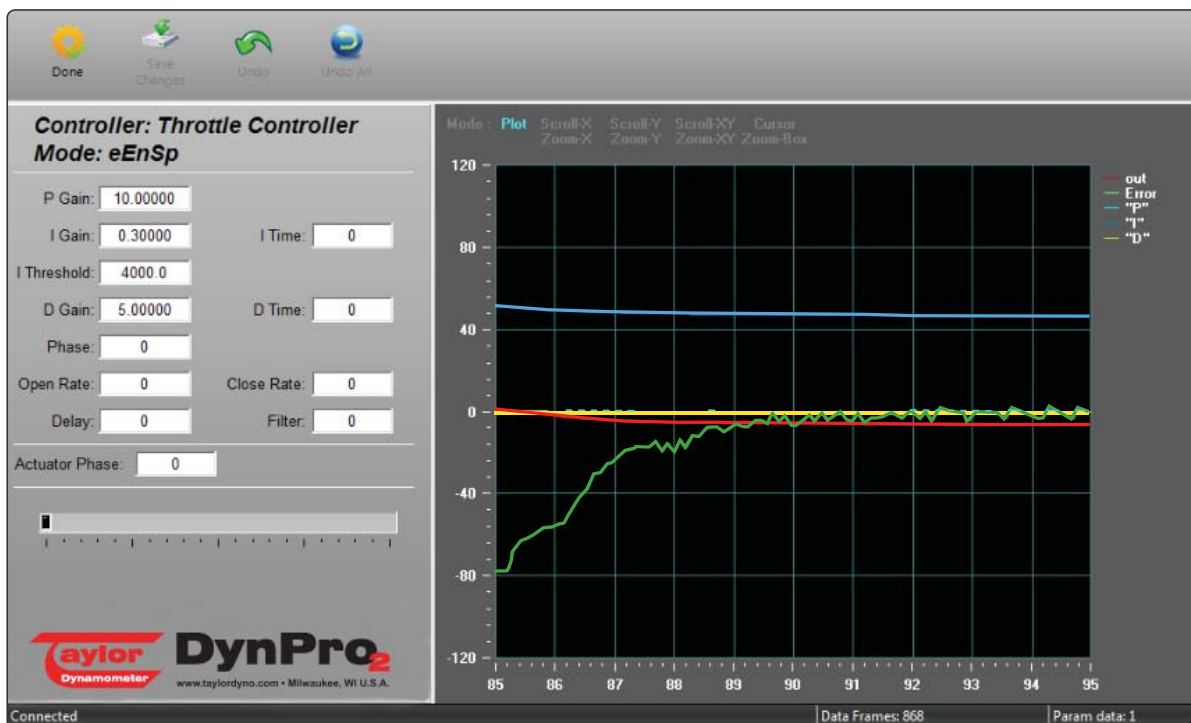
User screen with 4 channel alarm notification examples

Closed loop control

DynPro₂ uses a PID (proportional, integral, derivative) control algorithm when closed loop control is needed for output channels such as dynamometer load, throttle and temperature controllers. A PID file is generated when tuning these controllers for optimal performance in your system. DynPro₂ can operate 9-12 closed loop controllers at the same time.

A few features include:

- Saving PID files for use in multiple projects
- Control multiple Data Acquisition and Control (DAC) outputs under a single closed loop
- PID value adjustment with the slide-bar assistance
- Graphical display provides an instant visual of the reaction or response the PID Tuner changes have on the control of the DAC channel(s)



PID screen and slide-bar

Your road map to success

The MASC Editor (Master System Configuration) is the user interface for the DynPro₂ configuration system. The MASC Editor specifies what the test equipment is measuring and how the test equipment should perform.

The output of the MASC Editor is a .masc file that is installed into both DynPro₂ and the sensor box, thus configuring your test equipment for use. The MASC file is the master file that is used by most other hardware and software components in the test equipment to ensure that the test equipment appears and performs according to design.

ECM interfacing

The DynPro₂ Data Acquisition and Control System communicates with electronic engines through Taylor Dynamometer's Multi-Protocol Interface Device (MPID) using the supported protocols listed below:

- J1708/J1587
- J1939
- OBD-II
 - SAE J1850 VPW
 - SAE J1850 PWM
 - SAE J2284/ISO 15765 (CAN)
 - ISO 9141-2
 - ISO 14230-4 (KPW2000)

Standard ECM databases are available that can be easily modified to accommodate your proprietary ECM data

J1708/J1587 setup screen

The main window shows 'ECM Parameter' configuration. A red circle highlights the 'Units' button, which opens a secondary window titled 'Easy unit conversion'. This window allows selecting a 'Category' (Pressure), a 'Measured' unit (psi), and a 'Displayed' unit (inH2O). It also includes fields for 'Precision' (2) and 'Format' (Decimal).

Below the main window, a 'J1708/J1587 Parameters' window displays a list of parameters:

Name	Long Name	PID
eBARO	eBarometric Pressure	108
eBlwrBypseVPs	eBlower Bypass Valve Position	72
eBoostP	eEng Turbocharger 1 Boost Pressure	102
eBrakeAppP	eBrake Application Pressure	116
eBrakePrmryP	eBrake Primary Pressure	117
eBrakeSondP	eBrake Secondary Pressure	118
eBtryPt1Vlt	eBattery Potential VoltageSwitched	158
eClCylActS	eClutch Cylinder Actuator Status	34
eClntFltrDfP	eCoolant Filter Differential Pressure	112
eClPltWrCnd	eClutch Plates Wear Condition	36
eCltchCylPs	eClutch Cylinder Position	33
eClutchP	eClutch Pressure	123
eCompBrng	eCompass Bearing	165
eCoolantLvl	eEng Coolant Level 1	111
eCoolantP	eEng Coolant Pressure 1	109

Easy unit conversion

Quick setup database

Alarm settings

The window shows 'Alarms' configuration for 'J1708/J1587'. It includes tabs for 'Basic Options', 'Custom Threshold (advanced)', and 'Custom Action (advanced)'. Under 'Basic Options', there are fields for 'Data Threshold' (18.000) and 'Time Threshold' (0.000 sec). A 'Use Custom Threshold' checkbox is present. The 'Threshold exceeded actions' section includes a list of checkboxes: Hard Stop, Soft Stop (checked), Stop Test, Pause Test (checked), Record Message (checked), Email Message, Stop Recording, Save Failure Log, and Custom Action.

Alarm settings



Full control of your room, test cell or test cell facility

DynPro₂ is highly configurable yet easy to use. No programming experience is needed to configure your system. The Integrated Definition Language (IDL) is the programming language built into DynPro₂. With DynPro₂'s sophisticated configuration tools, DynPro₂ can adapt to meet your custom testing requirements, without the need to learn IDL. For the more advanced user, you can use IDL to specify custom mathematical equations, automate repetitive tasks and perform a wide variety of other system configuration jobs.

DynPro₂ offers a public Application Programmer's Interface (API), so you can integrate data, system controls and other services into other software packages or products that you already use (e.g., National Instruments® LabVIEW).

DynPro₂ configuration options include:

- Automating room/facility control (fans, pumps, lights, etc.)
- Custom behavior for predefined system events (power up or power down)
- Execute custom IDL code each time DynPro₂ starts up (for example: run a program, open a document, set channel values, start a test, etc.)
- Custom actions for channel alarms events
- Creating libraries of custom mathematical functions and system actions
- Provide solutions for custom orders with less engineering costs

DynPro₂ Packages

Description	Bronze	Silver	Gold
PC with 1 single monitor	✓	✓	✓
	Sensor Box	Sensor Box	Sensor Box
Pressure Channels	2	8 with Dual LCD modules for displaying channel names, ranges, etc.	8 with Dual LCD modules for displaying channel names, ranges, etc.
Pressure Transducers			
PSIA 0 - 20 (-14.7 to 5.3)	1	1	1
PSIA 0 - 75 (-14.7 to 60.3)	-	1	1
PSIA 0 - 150 (-14.7 to 135.3)	-	4	4
PSIA 0 - 200 (-14.7 to 185.3)	1	1	1
PSIA 0 - 500 (-14.7 to 485.3)	-	1	1
Thermocouple Input Channels	4	16	32
Dual LCD Modules for displaying channel names, range, etc.	-	✓	✓
Standard Type-K Thermocouple Connectors	✓	✓	✓
Barometric Pressure Sensor	1	1	1
Dyno (1 Torque, 1 Frequency)	1	1	1
Load Cell	-	-	2
Speed (Frequency, Encoder, Optical Tach)	1	1	2
Throttle - Closed Loop Control	1 (DAC 0-10 Vdc/ 4-20 mA)	1 (Digital Output, 1 DAC 0-10 Vdc/ 4-20 mA)	1 (Digital Output, 1 DAC 0-10 Vdc/ 4-20 mA)
DAC/Digital Input - Closed Loop Control (0-10 Vdc/4-20 mA)	-	1	2
PWM Output - Closed Loop Control*	-	-	2
Analog Input (0-10 Vdc)	2	2	1
Digital Input/Digital Output	-	-	1
Fuel Measurement	1	1	1
Blowby (0-10 Vdc or Frequency)	1	1	1
Weather Station	1	1	1
Opacity (0-10 Vdc)	1	1	1
Additional Analog Inputs			
Dual LCD Modules for displaying channel names, range, etc.	-	-	✓
Analog Input (0-10 Vdc)	-	-	8
Network/Peripheral Connections			
Wireless Router	✓	✓	✓
Port USB Extender	-	4	4
ECU	1	1	1
Ethernet	1	1	1
Serial	-	1	2
RJ-45 Programming	1	1	1
USB	-	1	2
USB Programming	-	1	1
	Channels Below Reside in Sensor Box	Dyno Connection Enclosure	Dyno Connection Enclosure
Input Channels			
Torque	3	4	4
Frequency	6	4	4
Voltage Input	-	5	5
Type-K Temperature	-	4	4
Controller Outputs			
DAC - Closed Loop Control (0-10 Vdc/4-20 mA)	3	4	4
PWM Output - Closed Loop Control*	4	4	4
Digital I/O			
Digital Input	6	8	8
"Low Side Drive" Relays (Max. 8 Amps)	5	8	8
Ignition Relays (Max. 8 Amps)	1	1	1
Starter Relays (Max. 8 Amps)	1	1	1

*PWM Output is a RS422 Level Signal (not TTL)

(414) 755-0040 www.taylordyno.com



DynPro₂ Silver Sensor Box

DynPro₂ support equipment and accessories

Taylor Dynamometer provides support equipment and accessories that complement the DynPro₂ system including (but not limited to):

- Airflow measurement
- Analog inputs
- Blowby measurement
- Dynamometer control equipment
- Dynamometer instrumentation
- Emissions gas measurement
- Equipment mounting configurations
- E-stop button kit and alarms
- Fuel measurement
- Hose kits
- Independent speed measurement
- Pressure kits
- Temperature inputs
- Test Cell environment measurement and control
- Test Cell safety
- Throttle control
- Weather station

DynPro₂ can be connected to any 0-10 Volt DC or frequency output device and is capable of communicating with almost any serial, CAN, USB or Ethernet interfaced device.

The data acquisition and control system offered here includes a software license that allows the system to operate and collect data. Please be aware that the license initially installed is a temporary license that is only active for 120 days from the date of shipment from Taylor Dynamometer. You must contact the Taylor Dynamometer Customer Support Team before the 120-day license expires to obtain the license key to update to your permanent (regular) license. The system will shut down and become non-operational should the system registration key (license) expire. The purchased equipment must be paid for in full prior to obtaining the valid and permanent license key.

Everything you need to succeed

