

# AXILINE 97000

BY SUPERFLOW

TRANSMISSION DYNAMOMETER



SHOWN WITH WINDYN & AUTO SHIFT OPTIONS

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1.888.442.5546

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## OVER 50 YEARS OF EXCELLENCE

What started with the DynaDrome, by Delta Dynamics, circa 1958 has evolved into the most respected brand in light and medium duty transmission testing today: Axiline®, from SuperFlow®. Axiline's® roots date to the industries beginnings, and we are still here today because of one thing, focus. From the engine to the transmission, from the driveshaft to the axles, and throughout the entire drive train rebuilding and testing process we never lose sight of our commitment to improve the bottom line of our customers. This allows us to continually offer the latest, most efficient transmission testing products in

the industry. It also doesn't hurt to back these products with the most respected customer service department in the industry. We strive to find innovative methods to increase customer capabilities and pioneer new technologies. Today, with more than 20 U.S. and foreign patents registered, SuperFlow® is still leading the way in the art and science of transmission testing and rebuilding. From start to finish no other company can provide a turn-key solution backed by more than 50 years of transmission testing excellence.

## WORLDWIDE RECOGNITION

The SuperFlow® brands of transmission test equipment (Axiline® & Hicklin®) are installed at over 1000 customer sites in 52 countries around the world. Our customers know that our track record of excellence and our broad knowledge of transmission testing is evidenced by our expertise and skill in delivering world class test equipment. We've designed machines for the US Military and leading automotive manufacturers to ensure that the transmissions they manufacture or rebuild meet their exacting standards.

Our experience over the last 50 years has granted us the opportunity to work closely with the most respected companies in the transmission business to develop a line of products that deliver unmatched results. From handheld diagnostic testers and shifters to full blown transmission dynamometers with advanced data acquisition systems, SuperFlow® has the products you need to get the job done. Come see why thousands of companies worldwide have already chosen SuperFlow® for all of their transmission testing needs.

## SUPERFLOW'S MANY INDUSTRY FIRSTS

**WE WERE THE FIRST**

To use electric drives on transmission dynos

**WE WERE THE FIRST**

To install eddy current load units on transmission dynos

**WE WERE THE FIRST**

With data acquisition and control

**WE WERE THE FIRST**

to introduce a valve body tester and solenoid tester in one unit: The Axiline® VBT 8000



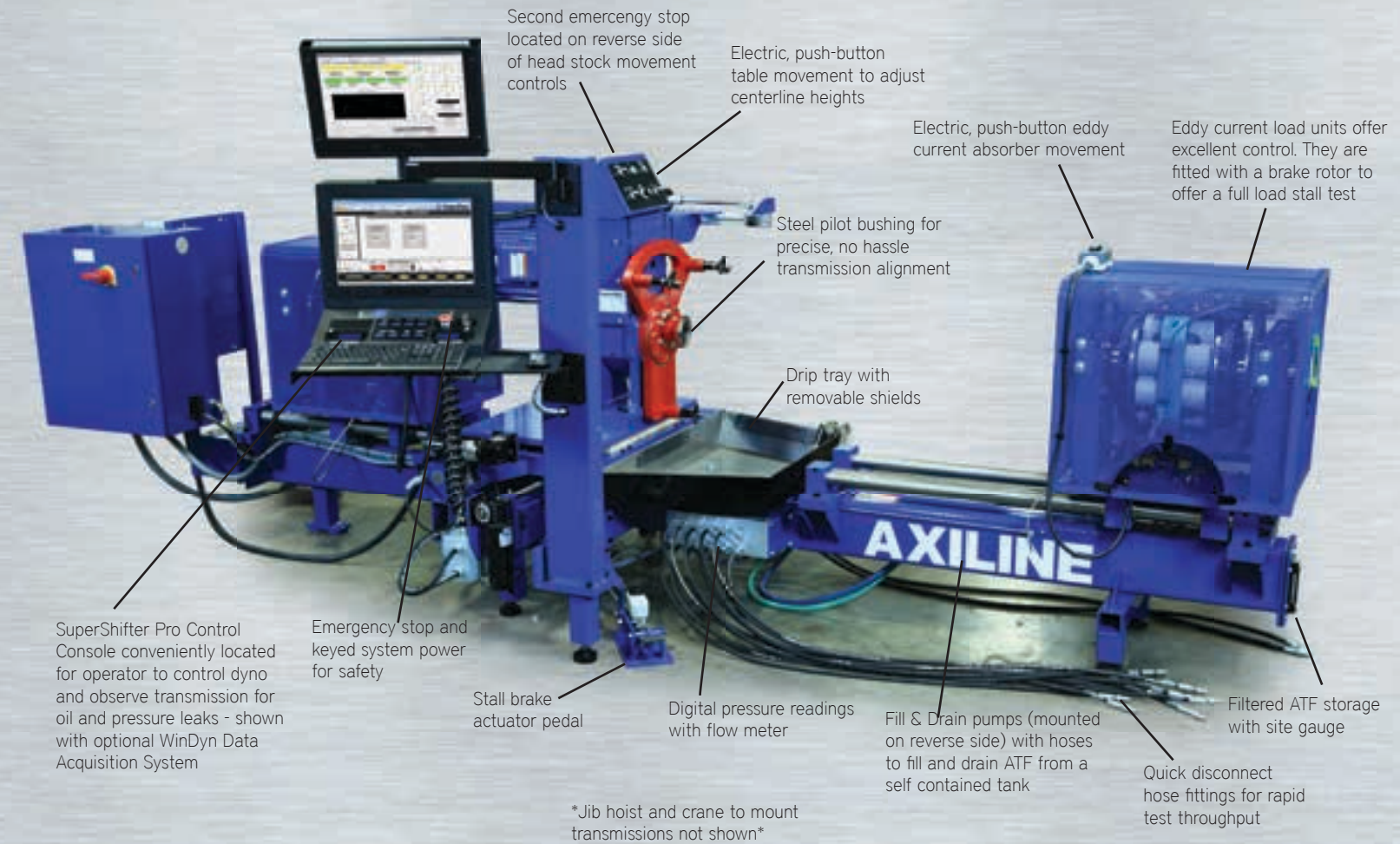
## AXILINE® 97000: STANDARD FEATURES

- High-output, electric-drive, 40 horsepower motor with advanced control strategies to accurately mimic transmission inputs from internal combustion engines
- Eddy current power absorption units for dynamic loaded testing to simulate real world driving conditions
- SuperShifter Pro® Operator Console and Software for shift control and and dyno control
- Jib crane & hoist for fast and simple transmission mounting and dismounting (holds up to 350 lbs.)
- Drip trays with removable shield
- Stall brake with foot activated control (optional digital control from console also available)
- Fill & drain pumps with hoses to fill and drain filtered ATF from the 97000'S self contained tank
- Electric shuttle motors with push button operation easily position absorbers and input drive for different transmission configurations
- Complete tooling kits with dowel pins for precision transmission alignment eliminating any chance of damaging pumps and pump bushings
- Steel pilot bushings for precise, no hassle transmission alignment
- Quick disconnect hose fittings for rapid test throughput

## DIGITAL FOR EASE & ACCURACY

The Axiline® 97000 features full digital control for highly accurate and repeatable testing. It adapts to most all domestic and foreign front-wheel-drive, rear-wheel-drive, transverse, manual, and CVT transmissions. The 97000 tests transmission line pressure, shift point and response, downshift and converter lockup, stall speed and more all under simulated vehicle load conditions. The standard SuperShifter Pro® operator console gives the operator full digital control of both the dyno and the transmission with

potentiometers for load and speed. The console is conveniently mounted on swinging arms so the operator can spot oil and pressure leaks, check hydraulic and system controls, and make minor adjustments while the transmission is mounted on the tester. The 97000 can be upgraded with a WinDyn® Data Acquisition system for powerful automated testing features and full post test data analysis, graphing and replay functions.



## VERSATILE & UPGRADABLE

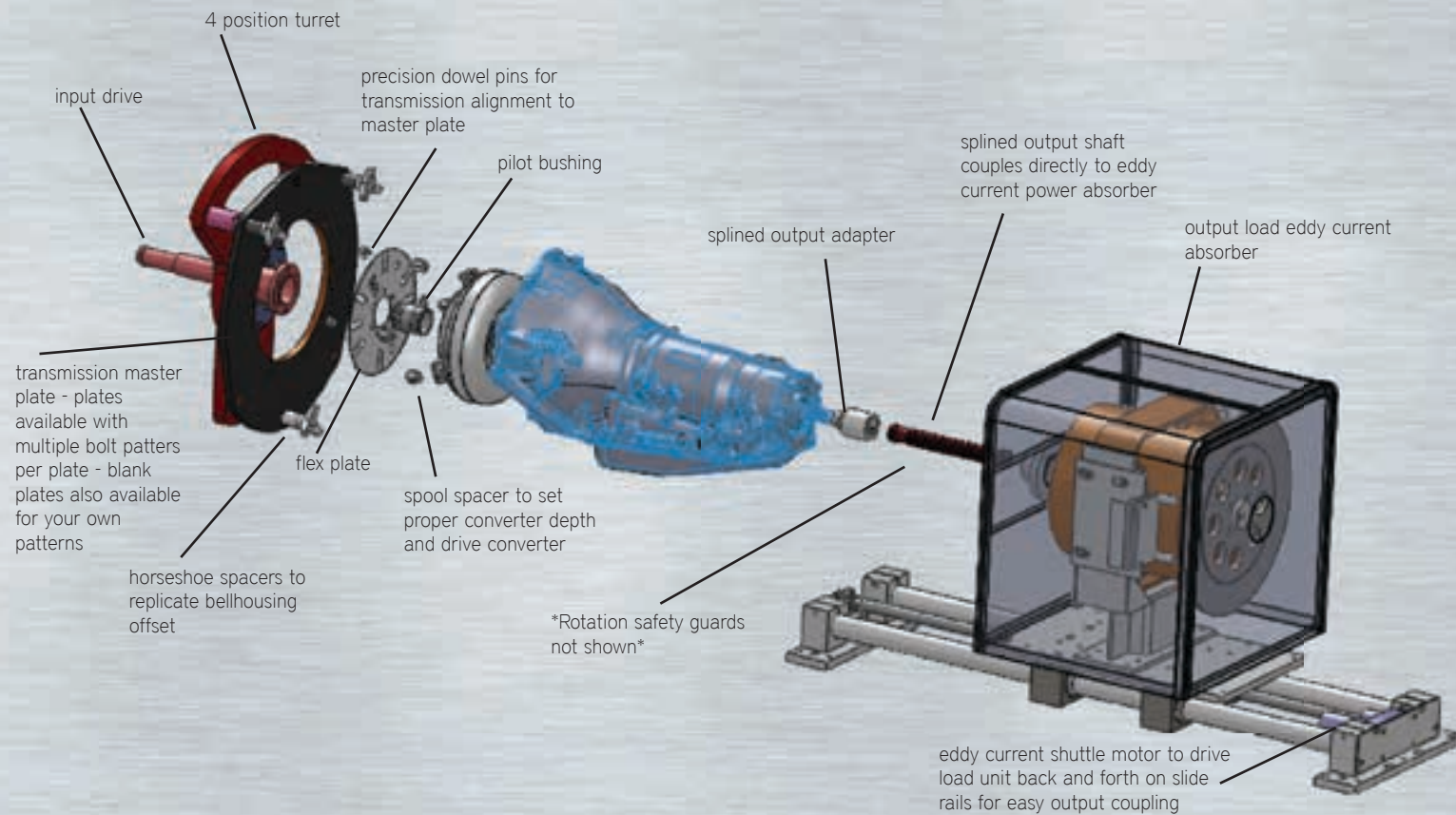
The 97000 features a state-of-the-art design that allows owners to easily upgrade as testing needs change. The dyno comes standard with the ability to test most all domestic and foreign front and rear-wheel-drive transmissions. All-Wheel-Drive capabilities also available at any time.



## PRECISION ALIGNMENT ADAPTERS

SuperFlow's precision alignment tooling guarantees that the transmission input shaft and torque converter hub will be properly aligned with the input drive motor on the dynamometer. This prevents conditions found on other dynamometers where misalignment of the transmission input causes pump failures and ruins pump bushings and converter hubs on new rebuilds during testing. The multi position turret holds the transmission master plate centered to the input drive. The flex plate bolts to the back of the torque converter using spool spacers to set

converter depth and also drive the converter. The pilot bushing aligns the torque converter and flexplate to the input drive. The transmission is then mounted to the master plate using precision dowel pins for alignment. Once the transmission is mounted, the splined output adapter is installed and the electric shuttle motors drive the load unit up to the output shaft. Detailed setup sheets show operators how to properly mount different transmissions. All pieces are outlined in the diagram below.



## PUSH BUTTON MACHINE CONTROLS

The SuperShifter PRO Operator Console includes several features to make operating the Axiline 97000 easy and safe. Two setpoint controllers allow for manual adjustment of input speed and output load. Input speed is set in RPM using the rotary knob. The knobs adjustment range can be set to fine, medium and coarse adjustment directly on the touch screen next to the knob. The load control knob can be set to control to either percentage of load from 0-100% or to output torque in lb.ft. on machines equipped with output torque measurement. This knobs adjustment range can also be set for fine, medium or coarse adjustment. Eight buttons provide complete control of common machine and transmission functions like;

solenoid control on/off, upshift, downshift, TCC lockup, input motor forward, input motor reverse, brake on/off and table motion power. Button status is shown with the indicator light above each button. The red e-stop button is easy to access in case of emergency. Keyed system power can be used for lock out, tag out and is also popular with technical schools to disable the machine when instructors are not present. The entire operator console is mounted to the side of the 97000 on a swinging arm so during operation the user can visually monitor the transmission for leaks. When not in use the console can be swung out of the way to change transmissions on the dyno.



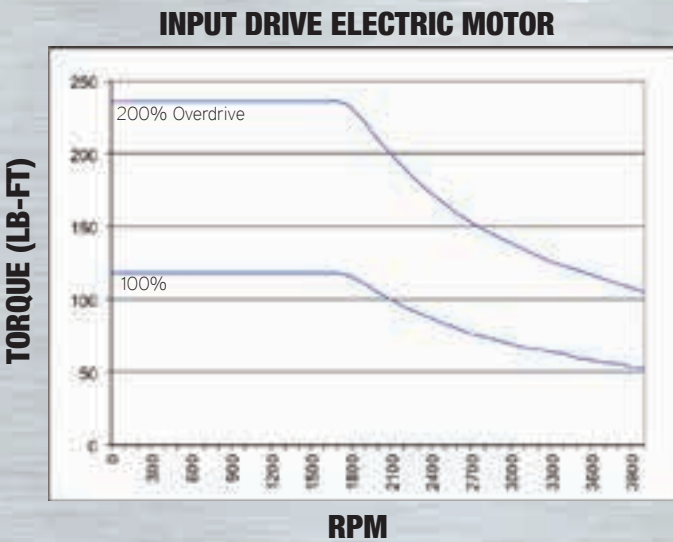
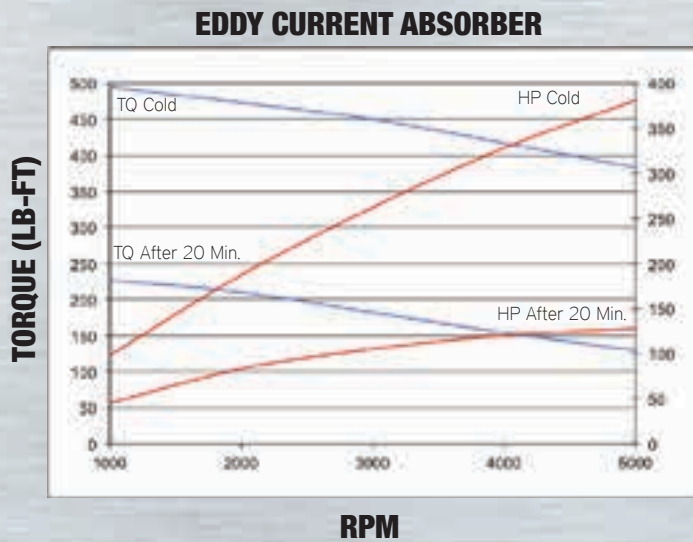
Manual load controller. Set % of load from 0-100 or set load to output torque (when equipped). Rotary knob can be set to fine, medium or coarse adjustment.

Solenoid Control on/off - Up Shift - Down Shift - TCC/Lockup on/off  
Motor Forward - Motor Reverse - Brake on/off - Table motion enable

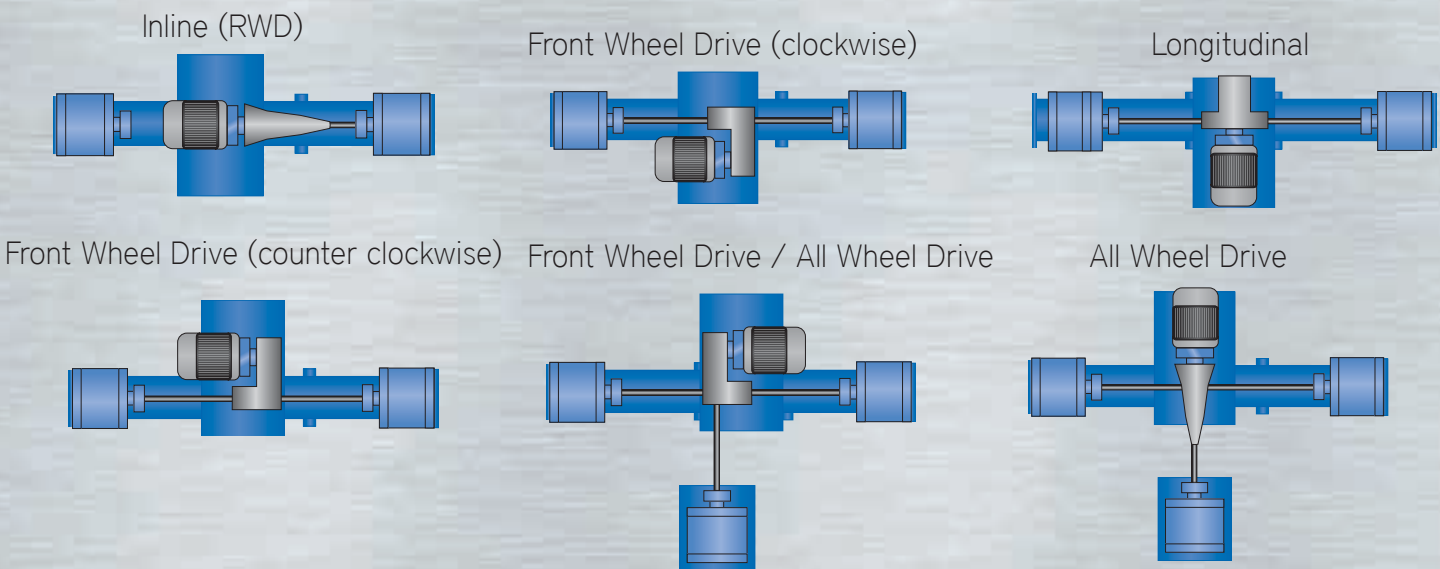
Input RPM speed controller. Set speed in RPM of input motor. Rotary knob can be set to fine, medium or coarse adjustment.

USING THE 97000 YOU CAN TEST

- ☞ All gears - planetary, sun, etc
  - ☞ Noise - mechanical hydrosonic
  - ☞ Hot & cold testing
  - ☞ All available pressure ports
  - ☞ Shift points
  - ☞ Front pump capacity - flow pressure
  - ☞ Leaks - internal, external
  - ☞ Stall speed - forward, reverse
  - ☞ Throttle valve pressure
  - ☞ Automatic & manual upshift, downshift
- ☞ Vacuum pressure modulator
  - ☞ Solenoid functions
  - ☞ Converter - lockup and non-lockup types
  - ☞ Output & internal loading
  - ☞ RPM test - left and right outputs
  - ☞ Converter and cooling line temperature
  - ☞ Flow metering of cooler line temp
  - ☞ Hydraulic function of the governor, clutch, valve body and overdrive
  - ☞ Kick down
  - ☞ And more



OPTIONAL CONFIGURATIONS



SPECIFICATIONS

|                           |                                                                                                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>POWER REQUIREMENTS</b> | 220/240 V 3-phase, 50-60 Hz or 460/480 V, 50-60 Hz & 110/120V Single Phase (380 V available upon request) |
| <b>AIR REQUIREMENTS</b>   | 1/2" lines (12.8 mm), 100 psi (689.5 kPa) minimum                                                         |
| <b>WEIGHT</b>             | 4,000 lbs. (1,814 kg)                                                                                     |
| <b>DIMENSIONS</b>         | 75 in. x 178 in. x 98 in. (191 cm x 452 cm x 248 cm) *includes jib crane                                  |

INPUT DRIVE (PRIME MOVER)

|                        |                       |
|------------------------|-----------------------|
| <b>TYPE</b>            | Direct-drive AC motor |
| <b>POWER</b>           | 40 HP (30 kW)         |
| <b>CONSTANT POWER</b>  | 1,750 to 3,600 RPM    |
| <b>CONSTANT TORQUE</b> | 0 to 1,750 RPM        |
| <b>MAXIMUM SPEED</b>   | 3,600 RPM             |

EDDY CURRENT POWER ABSORBER

|                      |                                                                                                                                                            |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TYPE</b>          | Air Cooled, bidirectional                                                                                                                                  |
| <b>INERTIA</b>       | 23.3 lb-ft <sup>2</sup> (.98 kgm <sup>2</sup> )                                                                                                            |
| <b>MAXIMUM SPEED</b> | 5,500 RPM                                                                                                                                                  |
| <b>PEAK TORQUE</b>   | 1,000 RPM, Cold: 495 lb-ft (671 N-m)<br>1,000 RPM, Hot: 227 lb-ft (308 N-m)<br>5,000 RPM, Cold: 385 lb-ft (522 N-m)<br>5,000 RPM, Hot: 129 lb-ft (175 N-m) |

## SUPERSHIFTER PRO® CONTROL CONSOLE

The SuperShifter Pro® operator console is included on the Axiline 97000. It gives users a simple digital interface to control both the dyno and the transmission they are testing along with 8 programmable buttons for machine controls and 2 rotary knobs for easy input RPM and output load adjustment. Five screens within SuperShifter PRO provide the necessary tools to fully develop, test or diagnose transmissions. Popular features of SuperShifter PRO include; individual control of up to 12 solenoids, built in resistance tests and manual shift tests to diagnose under performing solenoids and other conditions that lead to harsh shifts. The easy-to-read digital displays for pressure switches, RPNDL,

input RPM, left output, right output and gear ratio make it easy to understand how the transmission is performing. Input RPM can be selected manually or closed loop PID controlled to RPM. Output load can also be selected manually as % of load or closed loop PID controlled to output torque. Electronic pressure control solenoids and lockup solenoids can also be tested and controlled via the on screen interface. The console is mounted on swinging arms so it can be moved out of the way while changing transmissions.



The operator console includes 8 programmable buttons for functions like trans fill/drain, motor power and motor direction. The built in computer runs SuperShifter PRO and the e-stop button and keyed power switch provide operator safety. The Manual Shift Screen shown above allows users to command transmission gear while manually controlling input speed and output load. The auto cycle feature shifts through the gears and holds each gear for selected time in seconds. Operators can control input speed and output load with sliders on screen or the knobs on the console during this test. The manual shift screen is typically used to warm up transmissions for automated tests and perform quick function tests of the newly rebuilt transmission.



Manual Solenoid Control Screen provides manual control of individual solenoids during shifting. The simple click-to-edit frequency ranges provide fast adjustment of solenoid response. Sliders can be pre-set and applied at once to manually simulate a gear shift or adjusted real time individually to highlight individual solenoids affect on flow.

## SUPERSHIFTER PRO® FEATURES

- ▮ Precise control of input speed and output load
- ▮ Individual control of up to 12 solenoids
- ▮ Tests most modern late-model transmissions
- ▮ Transmission lookup tool that searches by make and model
- ▮ Built-in solenoid current & resistance tests
- ▮ Real-time digital displays for:
  - PRNDL (when available)
  - RPM
  - pressure switches (when available)
  - TOT (when equipped)
  - gear ratio
  - clutch pressures
  - machine pressure
- ▮ Continuously monitors all critical parameters
- ▮ Modulated duty cycle and frequency range
- ▮ Edits shift files for customized testing
- ▮ Computer controlled
- ▮ Learn and save mode to expedite solenoid testing
- ▮ Auto Shift (time delay)
- ▮ PWM programming screen with delay
- ▮ Hot & cold solenoid pass/fail testing
- ▮ Eddy current load unit control
- ▮ Pump and machine on/off control
- ▮ Motor direction control
- ▮ PID setpoint control of input speed
- ▮ Continuing software updates
- ▮ Current measurement at 16-bit resolution



Solenoid Test Screen provides automated hot and cold solenoid pass fail testing of each solenoid's resistance. Two parameter sets can be stored in the same test file so the operator only has to select a cold test or hot test and the machine will generate pass/fail results based on the correct parameters. The results include solenoid name, its pass/fail result, and its resistance. Test parameters are click-to-edit so setup is quick. Parameters can be modified for single use or memorized for future use on the same type of solenoid.



Data Screen displays all pressures, temperatures, flows and speed sensors from the transmission. Individual control of solenoid duty cycle from this screen shows pressure change in one clutch at a time. Built in shift tests allow the user to manually command the gear while modifying duty cycles to study the effect on system pressure and flow.

## WINDYN® DATA ACQUISITION & CONTROL SYSTEM (optional)

WinDyn® is a complete Data Acquisition and Control System available for all SuperFlow® Transmission Dynamometers and Valve Body Testers. Upgrading the Axiline 97000 to WinDyn® provides users with unmatched capabilities for automated testing, live data monitoring and customizable post test reporting. Live onscreen digital displays can be customized on up to 10 screens for screen displays dedicated to different transmissions. Screen features include; digital meters, panel meters, live traces and bar graphs and they are fully customizable so your live test data is presented in a way that makes sense to you. All of WinDyn's digital displays include custom color ranges for visual alarms to represent high and low temperatures, pressures or other conditions the operator needs to be aware of right away. Post test analysis

is fully configurable also with customizable graphs of test data and automated test data print outs to pack and ship with each transmission so your customers know the unit was fully tested. Shift lag and shift time can be monitored and recorded to see how solenoid duty cycles and frequencies affect shift performance. The Pro Report feature checks test data against user defined high and low values and triggers a notification for the operator while the test is running. The operator can then choose to retry, abort or ignore based on the failure so if it isn't a harmful failure the test to that point isn't wasted. After the test Pro Report highlights any parameters that failed so operators can quickly diagnose problems or move on to the next unit.

## WINDYN® FEATURES & CAPABILITIES

- Custom, user-defined screens
- Custom, user-defined tests
- Real-time data viewing
- Test playback mode
- Full graphing capabilities (bar, X-Y & strip charts)
- Graph overlays for multiple test comparison
- 12 solenoid control channels
- 8 high speed 0-10V DC analog inputs
- 4 high speed 0-10V DC analog outputs
- 4 thermocouple inputs (type k)
- 4 thermistor inputs (for items like transmission oil temperature)
- 4 frequency inputs (configurable for mag pick-up or TTL)
- 16 digital inputs
- 16 digital outputs
- 2 load cell inputs
- 1 USB port for device
- 1 USB port for host
- Ethernet for WinDyn® 10/100 mHz
- Network ready
- 3 RS232 Serial com ports
- Current measurement at 16-bit resolution

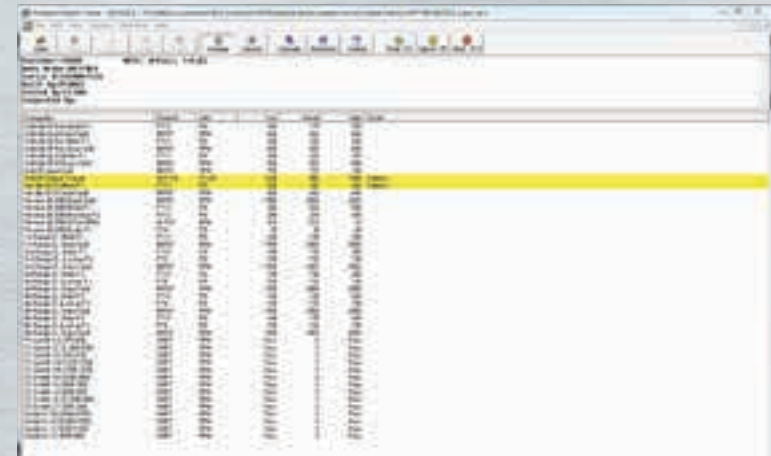
### OPTIONAL

- 16 pressure inputs
- 16 0-10V DC inputs
- 1 load cell input
- 12 relay outputs
- 2 PWM outputs



On WinDyn equipped machines the operator console is equipped with a second monitor for WinDyn's live display and analysis features. Operators still have the convenience of push button controls and knobs to adjust input speed and output load, plus all the features of the standard console listed on pages 10-11. A typical automated WinDyn test is outlined below, however, WinDyn tests are fully configurable so you can modify or create new ones to test transmissions according to your individual preferences.

- PRNDL detent check
- Cold test - run through the full RPM range in each gear while cold
- Warm up sequence automatically varies input speed and output load to bring transmission to operating temperature
- Hot test - final run through the full RPM range in each gear while hot
- Measure shift lag (time in seconds for shift to start) and shift time (time in seconds from start of engagement to full engagement)
- Automatic Pro Report pass/fail data screen of recorded test data against preset min/max ranges



WinDyn's Pro Report feature lets operators quickly tell what parameter failed during the test, see its value and see the low and high value that was supposed to be met. Preset ranges determine the color indicator on the line that failed. This report can be saved, printed or sent to a network database. The report above shows failures against two parameters as indicated by the yellow highlights on the report.



The test profile screen in the SuperShifter PRO console allows users to select and run automated transmission tests on machines equipped with the optional WinDyn Data Acquisition & Control System. Automated tests generate pass / fail test reports based on users parameters for the test unit. Tests that trigger fail conditions mid test will ask the operator to retry, abort or ignore the test so failures near the threshold don't require the entire test to be rerun.

## OPTIONAL EQUIPMENT

### INPUT TORQUE

This custom input shaft is instrumented with dual torque transducers to measure torque directly before the converter for highly accurate readings. 60 pulse per revolution encoder. 450 lb-ft rating.



### INLINE COOLER

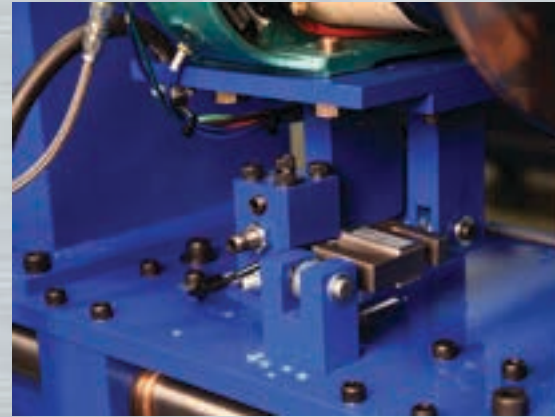
The inline oil cooler connects to the transmission cooler lines to maintain proper oil temperature during extended test sequences. It is ideal for long test sequences or endurance testing.



More options available, call 1.888.442.5546 for more info.

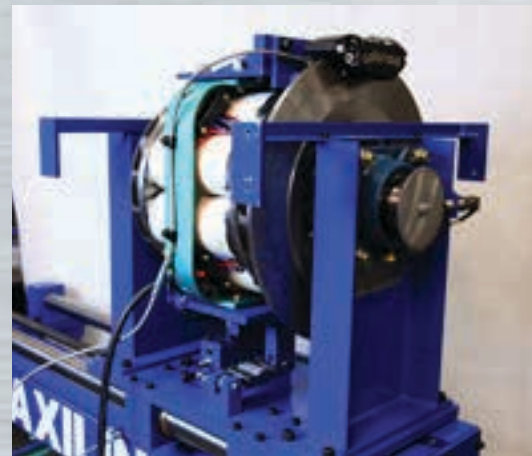
### OUTPUT TORQUE

Optional load cell mounted to output load units to measure static or dynamic output torque.



### AUTO STALL

The eddy current brakes on the 97000 are outfitted with hydraulic disc brakes to test stall speed. Auto Stall automates this process by replacing the foot operated stall pedal with an electronic actuator controlled by a button on the console or in WinDyn.



## OPTIONAL EQUIPMENT

### AUTO SHIFT

This linear shift actuator controls the manual detent position of the transmission. Since it uses a cable, Auto Shift can connect to most every transmission. It can also be fitted with torque measurement, up to 50 lb-ft.



### ADAPTER PLATES

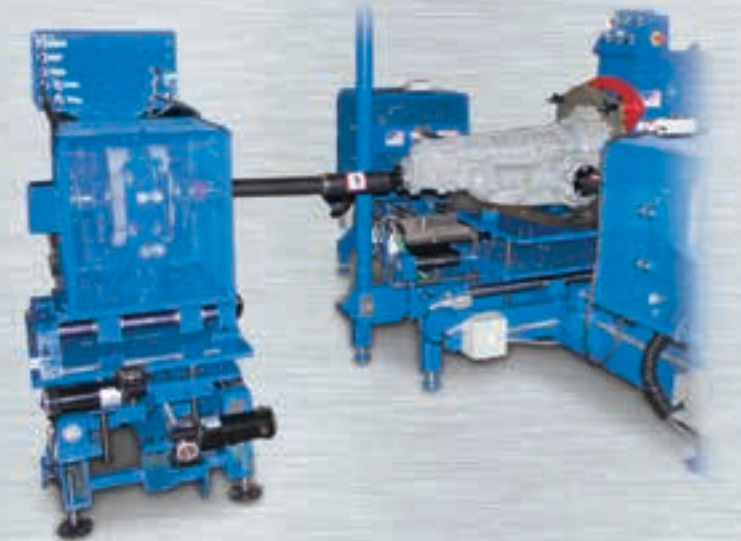
Choice of 15 precision alignment adapter packages to ensure pinpoint transmission alignment. Prevents conditions found on inexpensive dynamometers where misalignment of the transmission input causes pump failures and ruins pump bushings and converter hubs on new rebuilds. Master plates shown below for FRW and RWD transmissions. Blank adapters are also available to machine your own patterns.



More options available, call 1.888.442.5546 for more info.

### AWD LOAD UNIT

The AWD Third Load Unit equips the 97000 to test most AWD transmissions. The floor mounted unit is equipped with an eddy current absorber. A potentiometer and controller in the console controls power and sets load percentage. On screen digital displays show load percentage, output torque (if equipped) and speed. An adjustable side-to-side and up/down table shuttle moves 10" (25cm) side-to-side from center and 3 1/2" (8.9 cm) up/down from center.



WinDyn CAN Control Option - WCC

SuperFlow’s WinDyn data acquisition system offers an optional WinDyn CAN Control (WCC) feature to fully test and control electronically shifted valve bodies on any transmission dynamometer or valve body tester equipped with a WinDyn system. Here is how it works: WinDyn provides control of the transmission dynamometer, simulates vehicle inputs needed for the TCM to operate and shift, and runs the test sequence defined by the operator for the machine to perform a complete test cycle with the transmission shifting as it would in a vehicle. TCM data is received via a CAN network and recorded in WinDyn for full data acquisition, graphing, analysis and test script control all from the WinDyn computer and operator station.



Mechatronic TCM Outputs to WinDyn

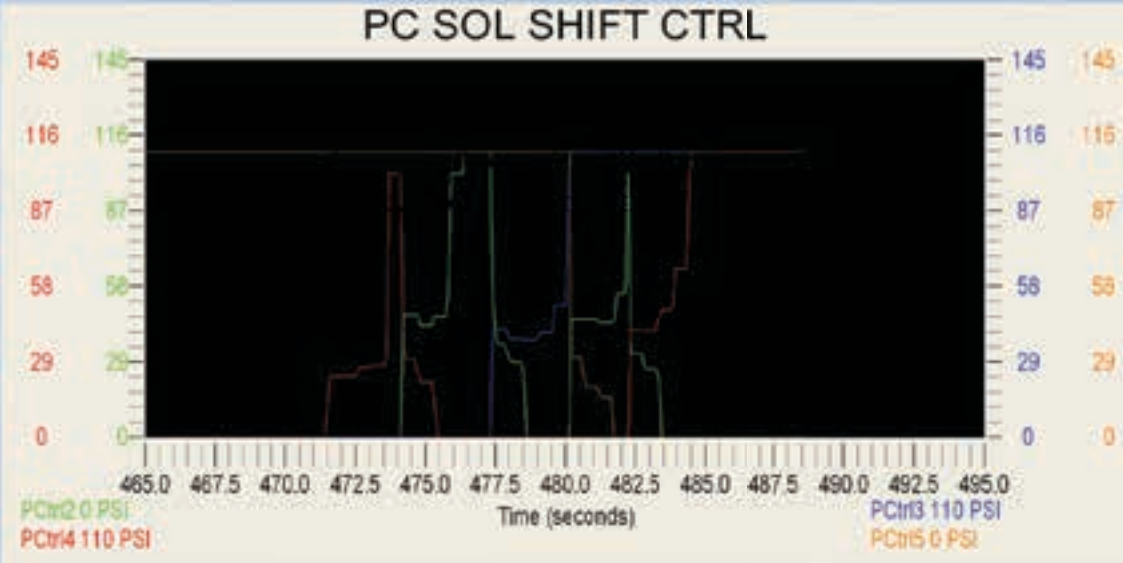
Monitor the following transmission characteristics directly in WinDyn when available for full data acquisition and analysis features

- Output shaft speed
  - Input shaft speed
  - Shift selector position
  - Commanded gear
  - Actual gear
  - Sump temperature
  - Gear ratio \*
  - Commanded clutch pressures \*
  - Clutch fill volumes \*
- Clutch fill time \*
  - Commanded solenoid currents \*
  - Adapted pressure offset \*
  - Shift times \*
  - Pressure switch states \*
  - Diagnostic codes if active or stored \*
  - Engine description \*
  - Repair shop code \*

Note: transmission characteristics listed vary depending on data available from the transmission manufacturer’s programming of the TCM.  
\* = optional features

Available Mechatronic Applications

- DSG
    - DQ200
    - DQ250
  - ZF
    - 6HP 19 - BMW 2005 - 2011
    - 6HP 21 - BMW 2007 - present
    - 6HP 26 - Land Rover 2005 to present (non electronic shift)
  - BMW
    - 6L45
- General Motors
    - 6L50
    - 6L80
    - 6L90
    - 6T40
    - 6T45
  - General Motors / Ford
    - 6T70



The data playback above is showing an automated WinDyn test profile where WinDyn is automatically shifting the transmission as the input RPM increases and decreases. The colored lines are live traces of the pressure control solenoids turning on and off to command a shift. What this live CAN stream is showing is the commanded pressures required from the solenoids to achieve shifts when the Mechatronic unit requires a shift. Data labels in the two bottom corners show actual pressure at the current point in the test.

Ask us about adding the Mechatronic Control Option to your existing valve body tester or transmission dyno, even if it was made by another manufacturer.

## OTHER TRANSMISSION TESTING PRODUCTS

### AXILINE VBT 8000



The Axiline VBT 8000 digital valve body tester sets the standard for both high volume and R&D valve body testing. Available with WinDyn Data Acquisition and Control System for fully automated testing.

### AXILINE SOLX PRO



The Axiline SolX PRO solenoid tester is computer controlled for automated or manual solenoid flush, test and R&D work.

## TORQUE CONVERTER REBUILDING SYSTEMS



SuperFlow's Torque Converter Rebuilding Systems (TCRS) provides a full line of torque converter remanufacturing equipment including welders, balancers, bonders, air test stands, hub run out checkers and end play gauges.

### HICKLIN EDECT



The Hicklin EDECT heavy duty transmission dynamometer is designed to test heavy truck, off road and military transmissions. Also available in custom cross drive configurations for testing military cross drive transmissions.

### SUPERSHIFTER



The SuperShifter is a handheld transmission shifter and diagnostic tool designed to function test and shift transmissions in the vehicle to reduce R&R time.

### AXILINE 66K



The Axiline 66K is a medium duty transmission dynamometer designed for testing at the higher horsepower ratings required by modern automotive and light truck transmissions.

### AXILINE 99010



The Axiline 99010 transmission dynamometer is designed with a clutch system to test manual-shift, rear-wheel drive automotive and light truck transmissions.

### AXILINE 84000



The Axiline 84000 transmission dynamometer is designed to test manual-shift, heavy-duty truck transmissions like Fuller, Meritor, Rockwell, Spicer and ZF.

More products available, call 1.888.442.5546 for more info.

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# SUPERFLOW® DYNAMOMETERS & FLOWBENCHES

## AXILINE® 97000 TRANSMISSION DYNAMOMETER

SuperFlow® is a global market leader specializing in high-performance automotive testing and rebuilding equipment. Since the early 1970's SuperFlow® products have been used daily by professional engine builders, the military, technical schools, professional race teams, speed shops, transmission rebuilders, universities, and leading automotive manufacturers to produce powerful

and efficient vehicles. Our commitment to providing the best products and service at a great value has given us the opportunity to work with some of the most notable companies in the automotive industry. Come see why thousands of businesses have already chosen SuperFlow® for all of their testing needs.

CALL 1.888.442.5546 for more information on the Axiline® 97000 Transmission Dynamometer.

Or visit us at [superflow.com](http://superflow.com)



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For Europe sales & service please call +32-3-4846511 or email [info@superflow.be](mailto:info@superflow.be)

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Equipment configuration is subject to change at anytime without notice and may not match what is shown in this brochure.

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