

DEPAC Dyno Systems 201 Mill St. Rome NY 13440 (315) 339 -1265
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ADL-Lite Dyno Valve Control Kit for Stuska Globe Valve. Includes:
Control Panel, Worm-Drive 12V Motor, Remote optical pickup-cable, hardware.

This system attaches to your existing Stuska flow control globe valve and existing plumbing and provides a significant improvement over hand controlling your dyno. It will automatically load the engine as you pickup the throttle, until a stable Engine speed is reached. You can change the engine speed by turning the LOAD Knob. It will unload the engine as you smoothly pull back the throttle to an idle. Torque sweeps are easy to make and anyone in your shop can now 'run' the dyno.

Note: This ADL Lite version is not as Fast or as Precise as our Full ADL Control system. It is not expandable like the full version to programmed Simulations. The system will naturally become unstable at RPMs where engine has a steep torque rise when coming 'on the cam'. You can sweep through this range, but not hold.

Installation:

This is a kit where you need to wire your 12 Volt battery power and the worm drive motor with #12, or larger, wire. You will need to install an optical pickup and a mark to sense the engine's rotation (once/rev). You will also need to fabricate a secure bracket so that the worm drive can turn your Stuska gate valve. We provide the special coupling that will screw onto the rising valve stem.

For the quickest installation, you can mount the Worm-Drive motor on your current hand valve location. Latter you can move the valve close to the brake for better control response. You need to have the water supply as close as practical to minimize water flow inertia. Keep the total length of water lines from water supply to dyno as short as possible. Long lines will cause the control to be sluggish.

This system works with the rising Stem Stuska Globe Valve. We supply mounting plates for the motor that can resist twisting force as the valve is opened and closed. Make sure the packing is not too tight or too loose.

The system uses a reflective optical sensor to see a contrasting mark on any part turning at engine speed. This can be on your front dampener, flywheel, or drive shaft. A white mark against a flat black background works as well as a flat black mark on a white background. You can use a 1" wide piece of white vinyl electrical tape or white paint. Make sure the black background is dull and non-reflecting.

The sensor needs to be securely mounted with a gap of 1/8". Light from the sensor is infrared and cannot be seen. The control requires a reliable signal and is indicated by the Trigger LED. Turn the engine by hand to see the ON/Off indication of the Trigger LED. This LED should be ON when running the engine. Trigger point is +1/4 Volt. Use a DVM to test OPTO Tach In (on white mark) is +1/2V or more.

The system provides a switched output that closes whenever the UP or DOWN rocker switch is pushed. Use this to interface to your data collection system.

ADL Lite Dyno Control Operation:

Turn the E-Stop knob (to pop-up) to ON. The valve motor will quickly open some and then turn to close. It is seeking where the valve stops turning as it closes and then the Green light turns ON. The system now knows where the valve is closed.

The trigger LED indicates when the optical sensor sees a piece of white vinyl tape against a flat black background. You can also use 'White-Out' but make sure the black background is dull and non-reflecting. The trigger LED will flicker under 950 RPM and be on steady when the engine is running higher.

The Power On Green LED indicates other diagnostic functions. It will blink off when the motor moves to close the valve and come back ON for normal operation.

The Valve will close whenever the engine RPM is less than 950 RPM. At any time the engine is running you can Command the Valve to seek its closed position by turning the Load Knob momentarily to Zero and note the Green LED turn off.

The Valve can be turned manually with the Load knob, only when the engine is stopped, by turning the RATE Knob to Zero and then Pushing either the UP or DWN sweep switch. Use this mode to test the valve for proper operation.

The unit can actuate a remote 12V Emergency Stop Relay to enable/disable the engine ignition and fuel system. You can use common automotive relay(s).

The system provides an isolated switch output to be used by a data collection system. Anytime the UP or DWN sweep switch is pushed this output will drop from open circuit to less than 5 ohms, for low power signal switching only.

When the engine is loaded (part or full) you can adjust the engine RPM by simply turning the LOAD knob. The RATE Knob sets the Rate-of-Change of the LOAD auto-sweep when the UP or DWN switch is pushed. The Load Sweep Rate scale is linear from 0 to 10. For steady state (static) tests, turn the RATE knob to zero (for No Sweep). If using the Test Output Switch when you push either UP or DWN switch you will command your data system to record.

Make sure that the Globe valve packing is not too tight, preventing the motor from turning the valve and/or seeking the closed position. Make sure there is no binding when the worm drive tries to turn the valve. Use the Manual valve function to exercise the motor valve and sense possible binding. The Special coupling will work with the Stuska rising stem valve to full opening. Flats provided for 1/2" wrench.

There are natural delays in loading/un-loading because of water flow and the time needed to move the valve. Pick up the throttle smoothly to prevent over-revving. Also pull back the throttle smoothly to let the dyno water drain and prevent the engine from having an excessive load at idle (too much water in the brake).

If the Tach signal is lost, while the engine is under load, the valve will move to close. Always use a Rev-Limiter on any dynoed engine. The Valve will close when there is no tach signal (lost) or the engine speed is less than 950 RPM.

Turning the Load Knob to zero will also command the valve to close.

DC Battery power: Use #12 wire to your 12V Battery supply. Run #10 or larger for longer than usual cable runs. Best performance comes having 12 to 14Volts to drive the motor valve. A weak battery voltage will cause the valve to run slower at reduced control performance. You can run as high as 16Volts for better response.

Application of the Optical Tach pickup. We supply a retro-reflective detector to sense each turn of the dyno. You can also use a sensor that can provide a clean voltage pulse (0 to +V) indicating every turn of the dyno. These can be light beam breaker or active magnetic sensors providing a (0-5V) pulse output. The pulse width needs to be 1 milliseconds or more.

A 25 foot long 4 wire cable is provided with a connector to interface with a sensor. White = +5V Power, Black = Ground , Red = LED drive current, Green = +2V Pulse. Use the **Tach Pulse IN** for 0 to +5V pulses (5 to 95% duty cycle).

Applying the ADL-Lite Retro-Reflector Sensor: Optek OPB-755TZ The ADL-Lite needs to reliably sense every turn of the engine dyno. The supplied optical reflective sensor sends out an invisible infrared light beam and a sensitive detector senses light reflected back from a surface. There is an optimum distance to detect light reflected from a surface. The ADL-Lite sensor gap needs to be close to 1/8" for best response.

A high Contrast between light/dark (black/white) is needed. The ADL Triggers on a transition from light to dark. The contrasting 'mark' needs to be 1/2" wide or more. This mark can be on the drive coupling or shaft, on the flywheel, on the front dampener, or anything large enough to reliably detect each turn of the engine/dyno.

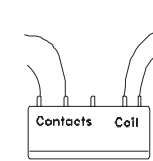
A piece of White vinyl electrical tape can be used. White stick-on labels and paper White-out can be used. A flat shiny surface obviously works the best, but you need to have better angle alignment. Make sure the black background is dull (flat black) and not shiny. (A shiny black surface can 'mirror reflect' light very well).

The ADL-Lite panel has a trigger LED indicator. Use this to test different contrasting surfaces. The Trigger LED will come ON when the reflective sensor 'sees' a white or light reflective target. Take samples you want to use and test holding them near the sensor. Check the strength of the signal by increasing the distance from the 1/8" optimum outward. If the Trigger LED is still ON when out to 1/4" gap or more then this should work reliably. Make sure the background, dark surface, turns the LED OFF and remains off when you move the sensor closer to 1/8" from the surface. Do NOT try to use 'Reflective tape', which only reflects light back to the light source.

We supply a steel angle bracket to accept the Optek sensor. It is a good start to use for your actual mount which needs to be secure. Make sure the sensor and cable will be protected from damage. Make sure your Mark will have good contrast over time and to clean any dirt from the optical sensor. Periodically test for proper sensor operation.

Turn the engine over by hand to see the Trigger LED turn ON & OFF.

Relay Contacts to Enable Ignition and Fuel Pumps



Emergency CUT-OFF Relay

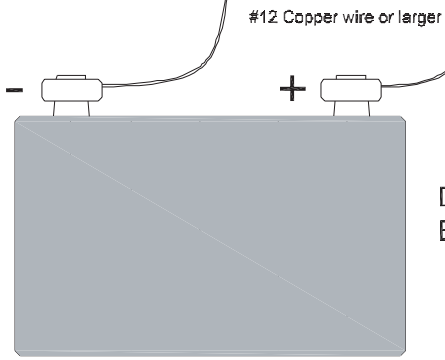
Use to Cut-Off FUEL and IGNITION

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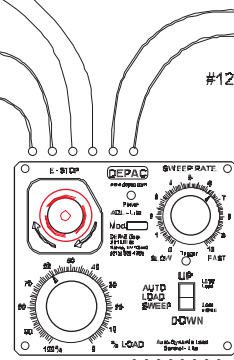
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ADL- Lite Dyno Control

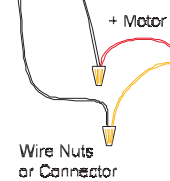
Water OUT TO Dyno



Dyno Battery

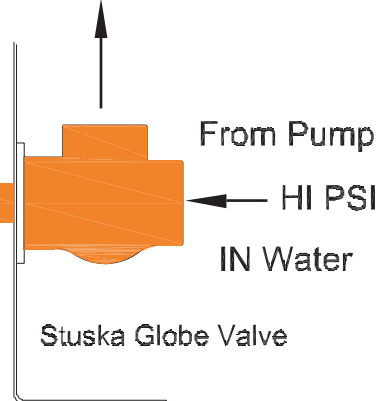


#12 Copper Wire



Coupler-Adaptor

ADL-Lite Worm Drive



Engine Rotation

Reflective Optical Sensor

1/8" Gap

Paint or Tape

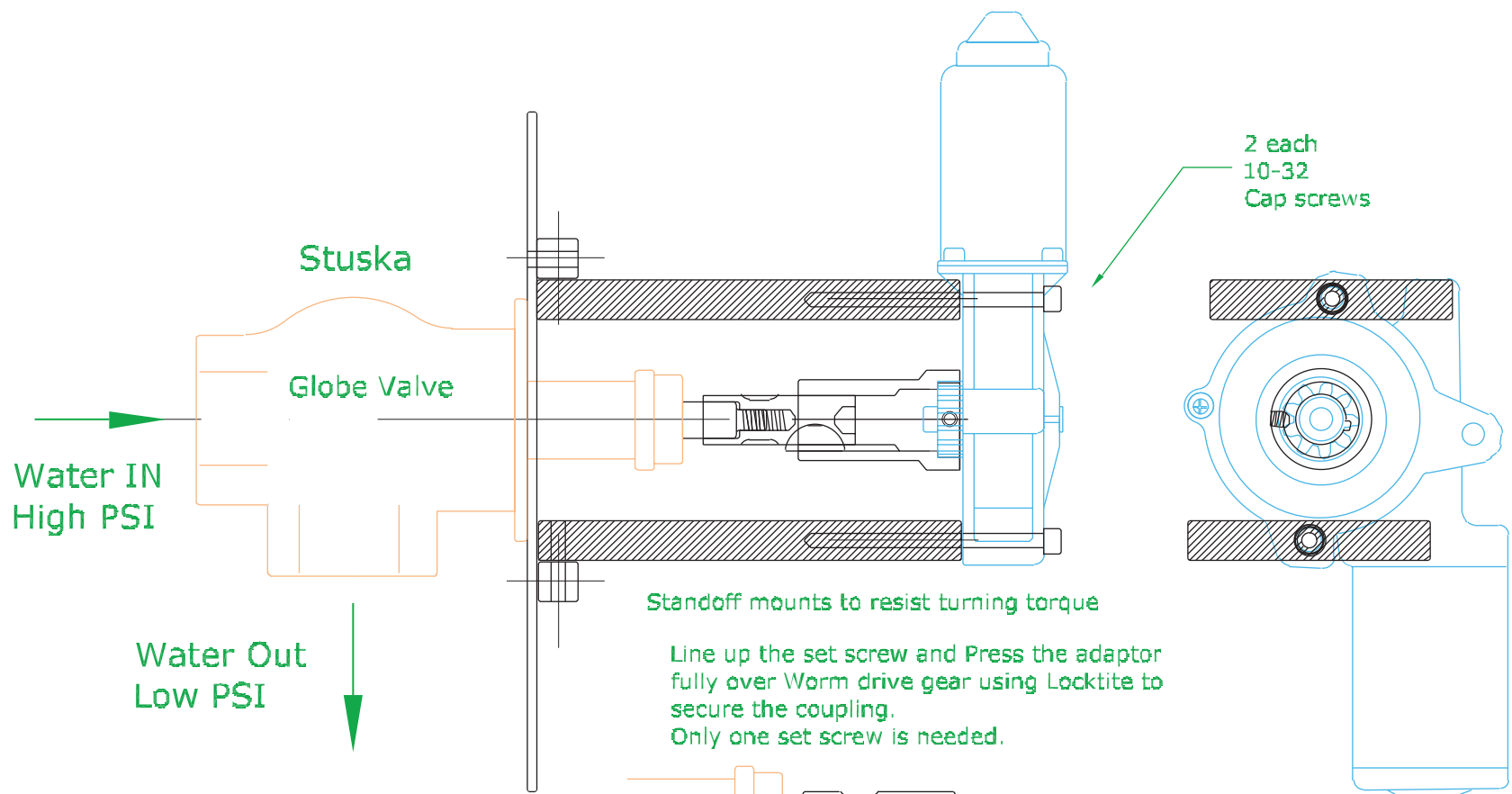
Flat Black Background

Use WHITE Mark Against Black Background or BLACK Mark Against Shiny or White Background

Switch Output to DATA System
Closed when either UP or DWN is Pushed

Normal Rotation

Rear



2 each
10-32
Cap screws

Water IN
High PSI

Stuska

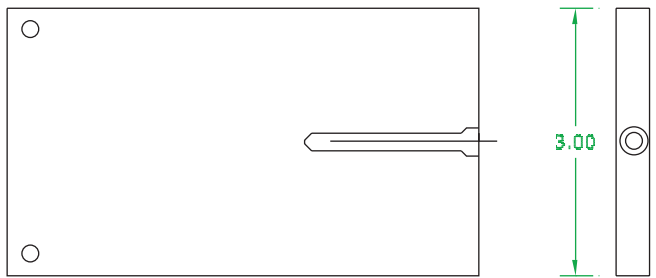
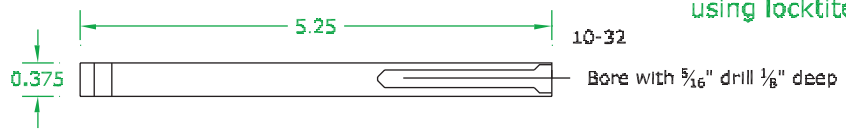
Globe Valve

Water Out
Low PSI

Standoff mounts to resist turning torque

Line up the set screw and Press the adaptor fully over Worm drive gear using Locktite to secure the coupling.
Only one set screw is needed.

Screw adaptor on valve shaft using locktite and 1/2" wrench



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