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ADL-Lite Dyno Valve Control Kit for SuperFlow Brakes. Includes: Control Panel, 12V motor Worm-Drive replacement for the 'capacity' valve, Fixed Outlet manual ball valve, Tach converter module, and hardware.

This system attaches to your existing SuperFlow absorber and will provide a significant improvement in Dyno Load control. It is not a speed control but a stabilizing Load Control.

ADL-Lite will automatically load the engine as you pickup the throttle, until a stable Engine speed is reached. You can not set a speed but you set a trial Load and then see where the engine wants to run. Then you can change the engine speed by turning the LOAD Knob and then keep the Load knob as set. Now as you smoothly pull back the throttle to an idle It will automatically unload the engine. Now if you pick the throttle up smoothly again the engine should again stop close to the RPM previously set. Torque sweeps are easy to make, UP and DWN, and anyone can now 'run the dyno, if everything is set right..

Note: All dyno controls will become unstable at speeds where engine has a steep torque rise when coming 'on the cam' or 'pipe'. You can sweep through this range, but not hold a steady speed. This is due to a dyno limitation, not a control problem. The dyno is most stable from Torque peak on up past the Power peak.

Installation: This is a kit where you need to wire your 12 Volt battery and the worm drive motor with #12, or larger, wire. Also you will need #12 pair of wires back to the motor drive. You will need to patch the 60 tooth Tach input signal to the divider module to sense the engine's rotation. We provide a complete replacement for the existing Super T-handle fixed capacity valve.

You then remove the existing SuperFlow outlet control valve, disconnecting the AMP connector, and replacing this with our Fixed (but adjustable) Hi Pressure 3/4" Ball Valve. There is a scale to show and mark positions to accurately reset.

The Tach module is programmed for the Pulses/Rev of your tach generator so that the signal output is One pulse/Rev indicated by a green LED indicator on the Tach Module.. When the engine is running these LEDs should be ON continuously. The ADL-Lite requires a reliable sensing of engine rotation.

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. This would be to the Record Data switch on the Super Console.

ADL- Lite for SuperFlow 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 the moving edge of a retro-reflective patch or pulse from the tach converter module. The trigger LED will flash under 950 RPM and be on steady when the engine is running at higher RPM.

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, but 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 function/operation.

The unit can actuate a remote 12V Emergency Stop Relay to enable or disable the engine ignition and fuel system. You can use common automotive 12V 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 and held. 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.

To do a steady state test, at a fixed RPM, turn the Rate Knob to STOP and simply push the Up or Down Rocker (or remote) switch will command a data read output.

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 engine dyno. 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, even while the engine is running to recheck the closed position.

Dyno Set Up considerations for SuperFlow Dynos.

Settings for Dyno LOAD and Sweep RATE are set using 'trial and error' adjustments.. Quick to do..

You must have enough water flow to Hold your engine power. Generally you need about 10 GPM per 100 BHP. The pump pressure and flow depends on keeping the SF Water Supply tank full. Twice the power requires twice the flow to keep temperature in range.

The MOST Important adjustment on your SuperFlow Brake is a properly sized outlet flow restrictor. It is opened so that the internal water temperature never exceeds 125 DegF (50C). But Do not have Too much Water flow since the dyno struggles and the ADL Control needs to turn more than needed.

You should have the inlet water as cool as practical, which means you also use less water. Avoid pumping hot outlet water back into your supply tank, unless you have a means to cool this water.

You need to provide a good 12V (or more) Dyno battery and #12 cables or #10 if long lines...

ADL-Lite Dyno Valve Control Kit for SuperFlow Dynos..

The ADL-Lite Inlet Valve replaces the existing fixed 'Capacity' Valve. This new valve controls the water flow from the boost pump into the absorber cavity. In contrast, SuperFlow fixes this valve and controls the flow output..

You do Not need to use the SF fine, restrictive, inlet suction filter. Just use a window screen size filter to keep out big pieces (from clogging the inlet valve seat).

DEPAC has shown that controlling the Inlet flow and having a fixed (but adjustable) outlet valve works better and the loads are smoother. The ADL-Lite control works very well and provides load sweeps that are smooth, natural, and inertial-like.

DEPAC ADL controls engine load and does NOT provide any speed control. You set the speed by turning the LOAD Knob. We believe it is best to let the Engine determine its own speed against a stable consistent load and have Stable Load sweeps allowing the engine to accelerate the way does naturally.

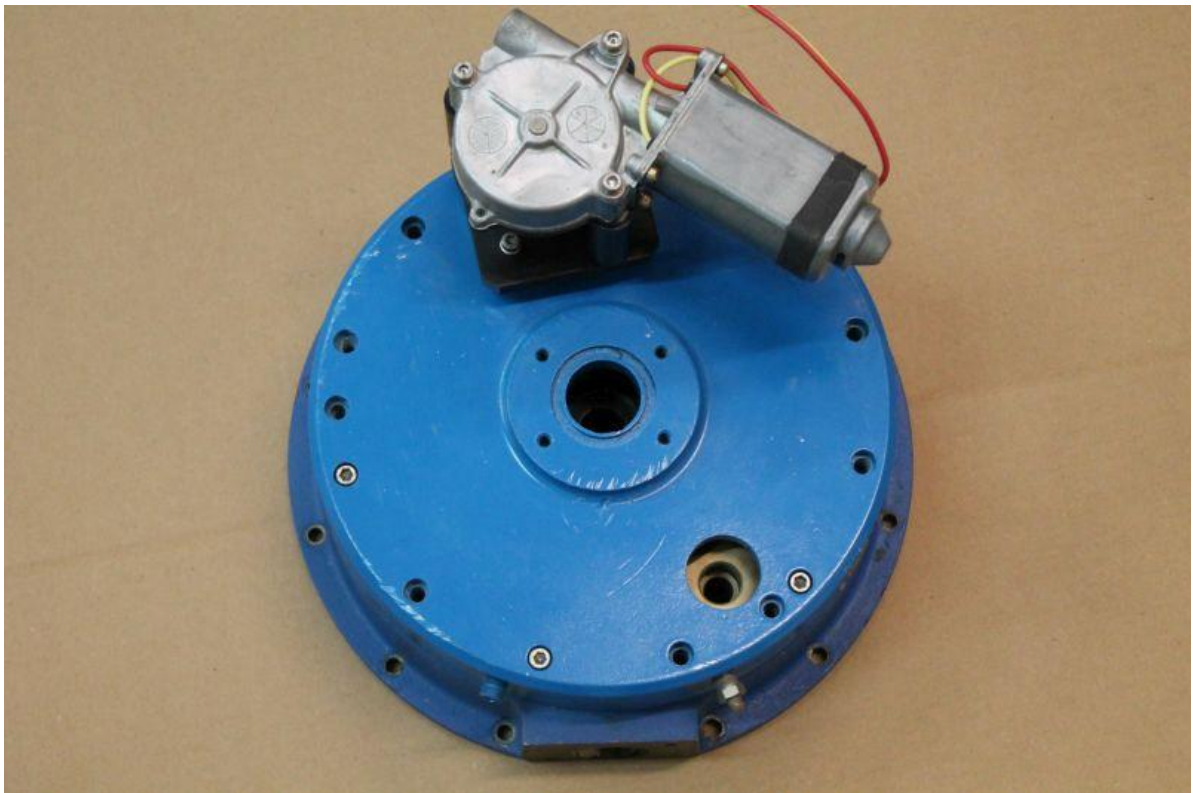


Inlet Valve Mounting procedure: First remove the existing SF capacity valve and cleanup the mounting hole corrosion. Our valve comes in two assemblies. The actual plunger valve mounts using three 1/4 x 20 caps screws supplied. Because of dyno manufacturing tolerances these 3 bolts may have slightly different positions. We have enlarge our mounting holes to compensate. (but it may require more to align).

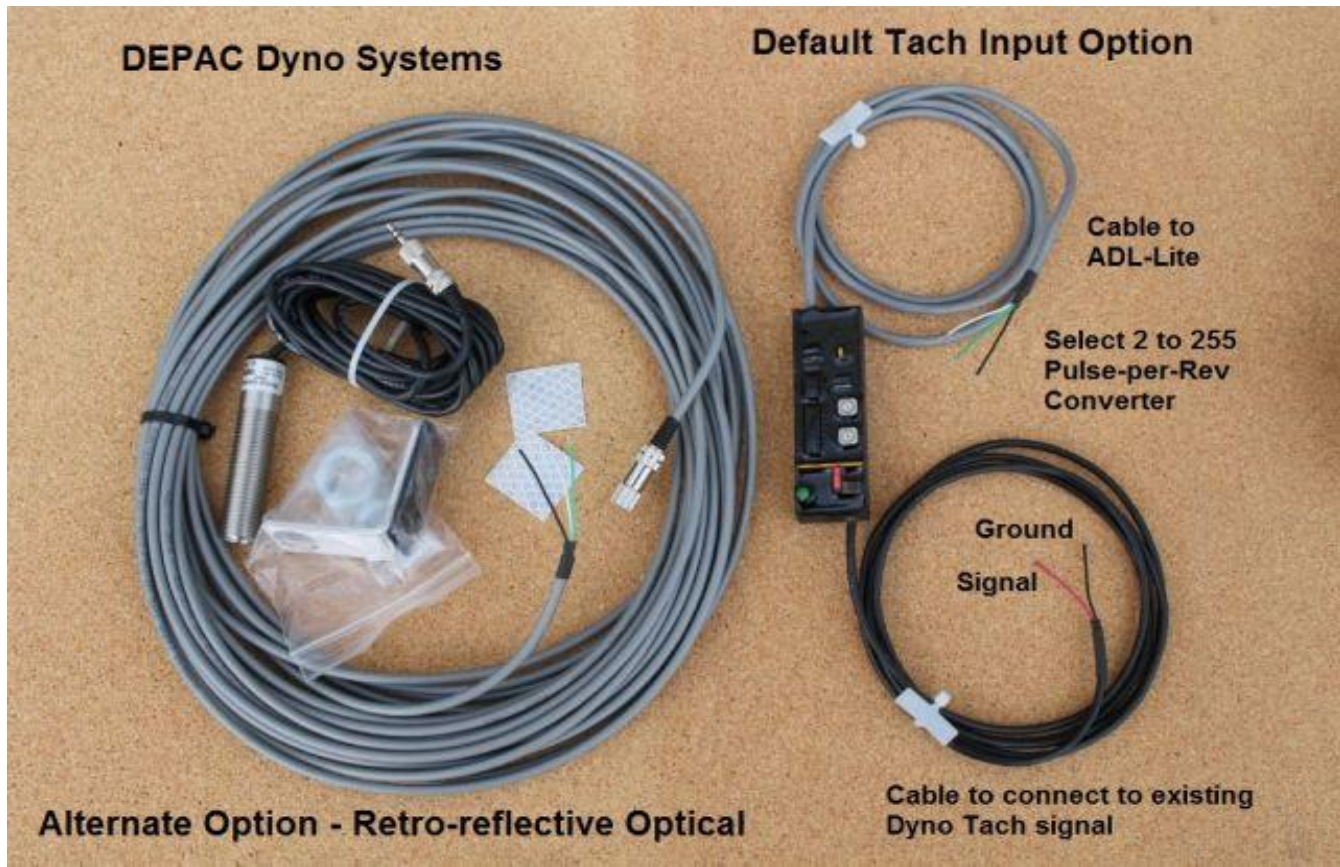
It is important to have the valve plunger centered on the valve seat. Start with the Plunger pulled in. Grease the O-ring and insert the new valve flat against the back cover. Rotate and see how well the 3 bolt holes line up. Hopefully they are close. Put in the 3 bolts but do not tighten. Now turn in the plunger until you feel it bottom on the seat. Hopefully you have enough movement in the mounting holes to allow you to then center the plunger on the seat. Snug the screws to hold this position and back off the plunger a bit.. Now you can torque the caps screws to spec. The plunger should be easy to turn out.

Now take the motor support part of the valve and grease the sliding key-way shaft coupling and slide the motor onto the valve assembly and rotate to match the next picture. Use the four 10-32 cap screws to mount this final assembly.

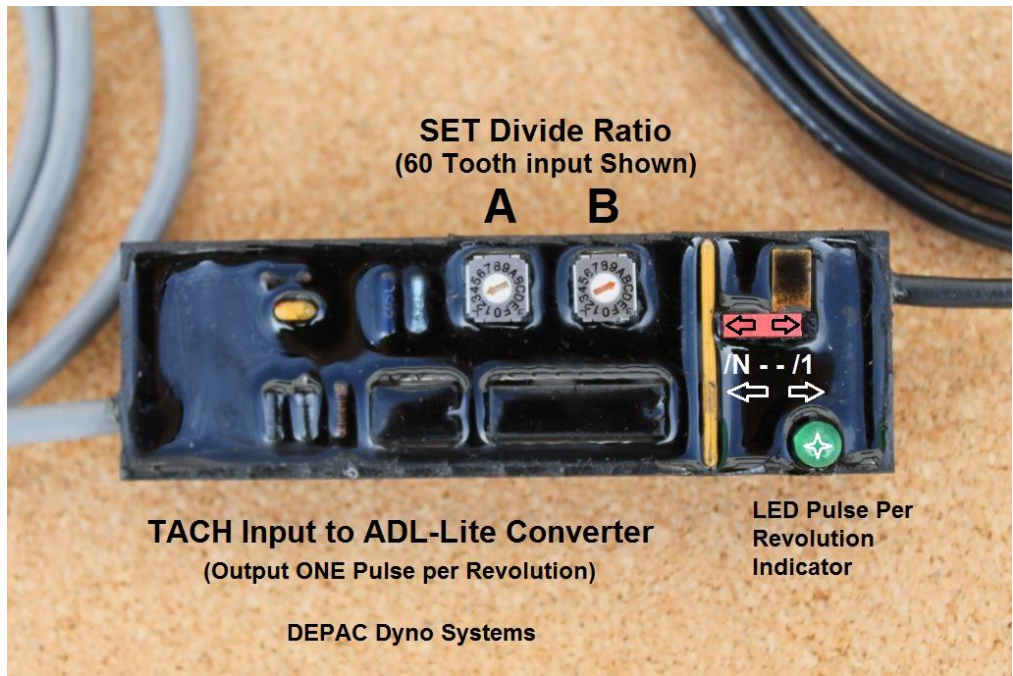
Outlet Valve Mounting: The new valve mounts in either 2 or 4 bolt SF Absorbers. We provide 1/4x20 bolts for the older 2 bolt pattern but the newer 4 bolt pattern uses 1/4x28, supplied. The outlet fixed restrictor valve is a high pressure Ball Valve. As such the setting is very sensitive and Not Linear. We have a special indicator mounting plate and valve handle, with a locking wing-nut. Movement is restricted so that the valve never closes and does not turn past the point where more opening does not make much difference. Notice the valve is constructed that couples the shaft to the ball with some dead-band movement. **The Nut is NOT Loose so don't try to tighten.** Use the plate to mark positions to return back to. Always turn the valve in one direction only, to eliminate the dead-band slop. A few degrees on this valve can make a big difference in outlet flow restriction. Use a rubber hose to direct the water far enough into the sump tank to reduce splashing.



Tach Input options: ROS Optical - - - OR - - - Tach Divider Module



For 60 PPR (AB) is set to (3B) Hexadecimal for decimal number 59
 For 50 PPR (AB) is set to (31) Hex for decimal 49



Application of the Standard Tach Input divider module: The SF dyno has a 60 tooth magnetic Tach sensor and so we use the module that accepts this Tach signal and outputs One pulse per Revolution for the ADL-Lite controller. You must tap into the existing SF Tach signal cable. The Red wire is the hot signal input and Black is the ground side. You can pick up this signal at either the remote 4 pin connector (Red to Pin1, Black to Pin2) or inside the console.

This module can be set to convert 2 to 255 pulses with A and B switches. Here it is set in Hex code 3B to skip 59 Tach pulses and pass the 60th pulse to the ADL-Lite Controller.

Application of the Optional Optical Tach pickup. We supply an Optional retro-reflective optical detector to sense each turn of the dyno. Also 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 more than 1 millisecond and more than +1.5 Volts.

A 25 foot long wire cable is provided with a phone connector to interface with a sensor. White = +5V Power, Black & Shield = Ground, Green = +1.5V Pulse on edge sense. Optionally, use the **Tach Pulse IN** for 0 to +5V pulses (5 to 95% duty cycle).

Applying the ROS optical sensor: The ADL-Lite needs to reliably sense every turn of the engine dyno. The supplied optical reflective sensor sends out a Red collimated light beam and a sensitive detector senses light reflected back from a surface. The ADL-Lite ROS sensor gap can be between _____ and _____ for maximum flexibility.

A piece of special retro-reflective tape is provided. The ADL Triggers on the moving transition edge of the reflector tape. The tape can be on the drive coupling or drive shaft, on the flywheel, on the front dampener, or anything large enough to reliably detect each turn of the engine/dyno. Mount the sensor slightly off-angle to avoid any direct reflection from a shiny surface.

The ADL-Lite panel has an orange trigger LED indicator. The trigger LED will flash ON only when the sensor 'sees' the moving edge of the retro-reflective patch. You can easily test the sensor while the red beam is on the reflective patch. Just pass your hand to break the beam and then see the trigger LED flash for a moment. The reflective tape/patch is on any engine moving part. The trigger LED should be ON continuously when sensing the engine is running.

Make sure the sensor and cable will be protected from damage. Make sure ROS lens and the reflective patch is clean of any dirt. Periodically test for proper sensor operation by breaking the beam, with your hand, while the red beam is 'shining' on the stationary reflective patch.

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

Tricks and tips..

The ADL-Lite has a lower RPM limit of 950 RPM, below which the valve will close. This setting works well for typical race engines. But If you are running Stock Gas or diesel engines that run at a lower RPM The Control needs to open the valve sooner (or quicker) on speed and be able to Load more at lower RPMs. This is easy to do by just fooling the ADL-Lite that the engine is running faster than it actually is. If you have a 60 tooth dyno speed tach pickup, you can program the Tach module to 30. Now the lowest RPM that the Control will operate will be cut in half to 475 RPM and be able to supply twice as much water to the brake as needed to Load a lower RPM engine.

When using the ROS Optical sensor you just need to apply 2 retro-reflective patches 180 degrees apart on a shaft or flywheel starter gear.. So the Control 'sees' 2 pulses per Rev. You can continue on the approach for even lower speed engines.

Conversely if you are testing a very high RPM engine you may need to fool the Control by programming 90 into the Tach module, so the valve opens 60/90 as much.

NOTE. The Tach divider module is always programmed (by two HEX switches) to be one less than the desired divide ratio. For 60 PPR you program in 59. This means the divider will skip 59 pulses and allow the 60th pulse through to the Control.

You can use the 4 pulses per rev on a crank fire system by setting 03 into the Module. The module can also accept a 'pass through' of a single pulse per rev by using the red slide switch on the module (set to /1 instead of /N).

So you can adjust the operating range of the ADL-Lite for a wide range of engines and Dyno testing.

Steady State Testing (Hold Speed): The Data Switch output is closed whenever the LOAD Switch is pushed UP or DOWN. If you need to do a steady state pull, without a Load sweep, simple **turn the RATE control to STOP**. The valve will not move and so pushing the LOAD switch either Up or Down the data command switch will close so your data system will record this steady speed only. If you have an averaging system, like the DEPAC, the longer you hold this switch down the longer the data will be averaged, for a more significant result..

Note that the optically-isolated data out switch is for low power use and is 5 Ohms when closed and is intended for low power logic inputs. Trying to have this switch operate a big load, like a relay, may burn it out.

ADL- Lite Upgrade Operation for a SuperFlow brake dyno:

The SuperFlow dyno pumps its own water and doing this results in more inherent stability (Load to the Cube of the RPM) than the common water brakes that work from a fixed water pressure and control valve (Load to the Square of the RPM).

The ADL-Lite for the SuperFlow dyno controls the inlet (capacity) valve between the boost pump and the vortex brake rotor/stator. We now use a fixed outlet flow control ball valve. This method is exactly opposite, and far better, than the original speed control design which was much more erratic than with our better method..

Setting up a dyno is mostly trial and error and keeping in mind these goals.
Keep the dyno Water less than 125 DegF AND have the valve open 1 to 2 turns.

For High Torque/BHP Engines. The MOST important factor is to **never allow the water inside the dyno to exceed 125 Deg F or 50 Celsius.** This is directly controlled by the size of the outlet flow valve. Use the supplied Hi Pressure Ball-Valve to make easy adjustments to have enough water flow to keep the dyno temperature to not exceed 125 Deg F.

BUT, It is also important to **Not flow too much water.** The dyno just does not work well when 'flooded' with too much water. **SO, Close off the outlet** until you have at least 110 DegF water temperature. The SF Dyno works best when the dyno water is between 110 DegF and 125 DegF.

Once we have the proper outlet water flow we need then to control the inlet flow.

The ADL-Lite system works best when we control the 'capacity' valve between 1 and 2 turns. If the valve opens less than one turn, when loading your engine near peak torque/load, we need to open the outlet valve for more water flow.

Low Torque/BHP Engines. The ADL-Lite control works best between one and 2 turns. For small engines this valve may open less than 1 turn. If you open the outlet valve more, the inlet will then open more and so have a better range of motor control, by forcing more water through the dyno. The dyno water will be cooler and that is OK. Most important is having the ADL-Lite valve open more than one turn.

NOTE: The Hi-Pressure ball valve has hysteresis (dead band) and so to move to close you need to close more and then to open to your setting mark. So always move the valve in one direction to compensate for the dead band movement. Also mark the base plate so you can return to the same setting latter.4, for your different power engines.

ADL-Lite Dyno Valve Control Kit for SuperFlow Dynos..

Outlet Valve setting procedures: TWO Most important factors

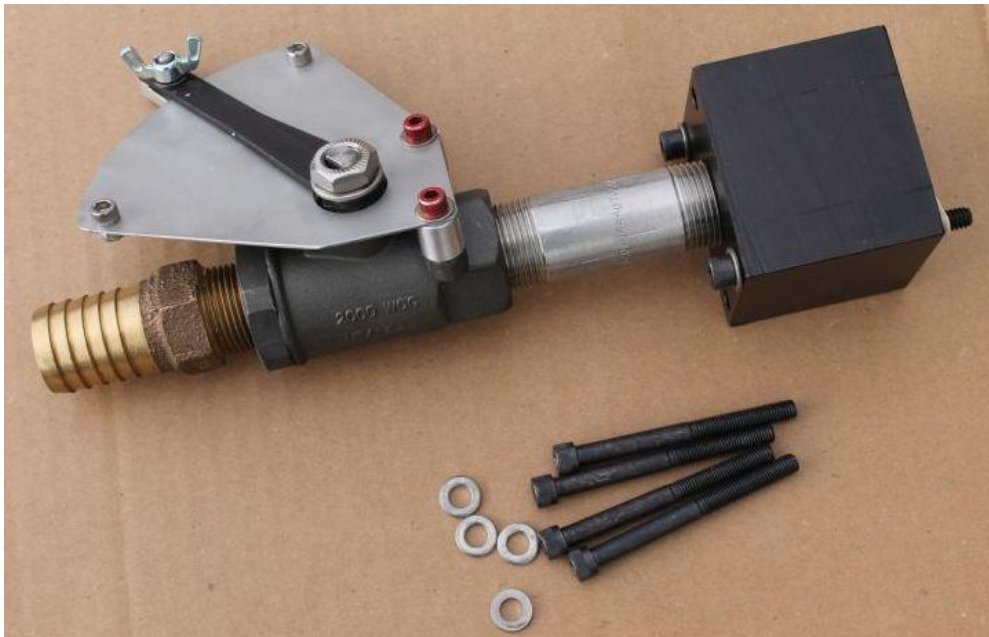
First.. Whatever you did before to run your SF dyno is completely changed with the ADL-Lite control. Load control, Not Speed Control. Adjusting the outlet restriction to satisfy the next 2 considerations.

- 1. Temperature control:** Open to keep temperature less than 125 F.
- 2. Load Range control:** Open the outlet valve so that the Inlet Control valve turns more than One turn at Full Engine Load.

Number 1 affects testing High Power engines.

Number 2 needs to be satisfied for low power engines. Here Temperature is not a factor. Excess water flow is needed so the Inlet valve turns more than 1 turn. Then the Motor control works much better.

Also Understand a change in Outlet Valve will affect the ADL-Lite LOAD knob setting. The ADL Lite starts with inlet Closed and progressively opens as the Speed increases. Turn the LOAD Knob to set the engine RPM. Keep this setting and then pull the throttle back to idle. The Inlet valve automatically closes. and unloads the engine when returned to idle. Throttle up should return the engine to the set RPM.



Mark the coupling so that you can observe how much the valve opens from No-Load (idle) to Full Load. If less than One turn then open the outlet valve some to cause the valve to increase water flow. Excess water flow into SF dyno is OK..