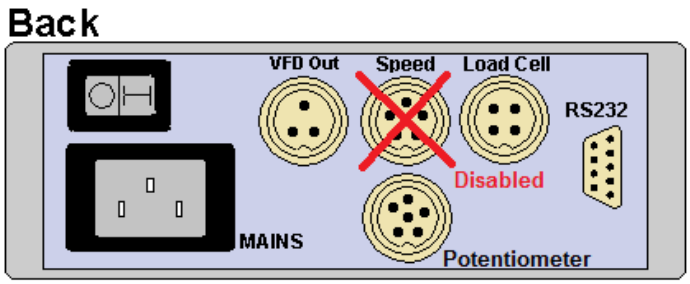
Connection to Power Grid

Shock Analyzer Data Acquisition Unit: is rated for **230 VAC / 50 Hz.**

VFD and Motor: By default the VFD and Motor are 380VAC rated (3-phase). It is possible to use a 230V VFD. The motor should be reconfigured to work at 230V



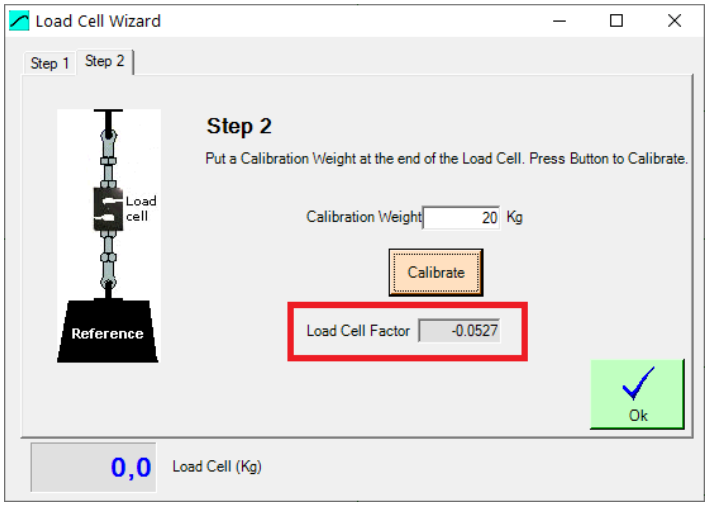
- Connect the Shock Analyzer DAQ to 230V
- Connect the Load cell (4 pin) and Potentiometer (6 pin) cables to the DAQ
- Connect the VFD control cable (3 pin) to the DAQ
- Install the VFD in the wall, connect it to 380V 3-phase grid (if available),
- **PRESS THE RUN BUTTON** so it starts its normal operation. The SW will set the suitable PWM signal for each speed

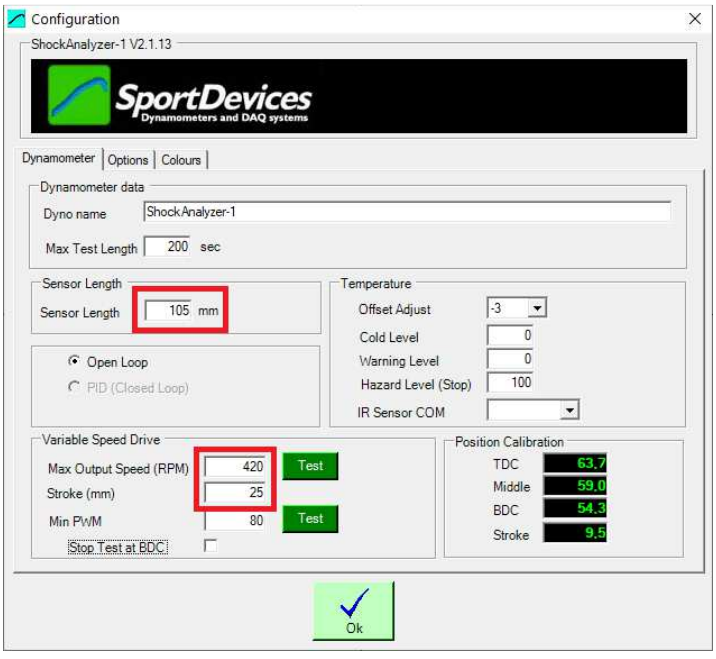
Configuration

Install the latest SW available (current version at the moment is 2.1.13)
http://sportdevices.com/download/shock/ShockAnalyzer21.13.msi

The following settings are provided with each Shock Analyzer Machine:

- **Load cell** calibration: each machine can have a slightly different value, a typical value can be about 0.058, and in some cases it can be negative. **We attach this value to the invoice**.
- **Potentiometer length**. Typically 105 mm
- **Max RPM** (SW ver 2.1.13), typically 420 RPM. Previous versions do a direct calibration in mm/s, but it changes every time the stroke is changed.
- **Stroke**, the machine comes adjusted to 25 mm, but the user can change it anytime
- **Min PWM,** it is the minimum output so the machine moves at low speed. Most machines will move with **80** (out of 1000), but if the shock is very heavy it may need a higher value.





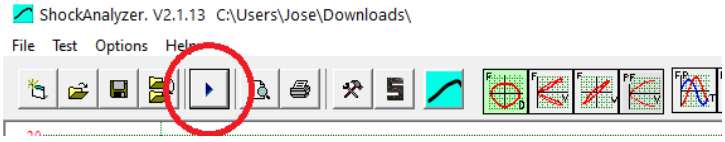
Performing a "Spring Test"

As most shock absorbers have pressured gas inside, the SW provides a tool to measure the force offset (at the middle position of the stroke) and the "spring" slope (the effect of each compressed millimeter over the force).

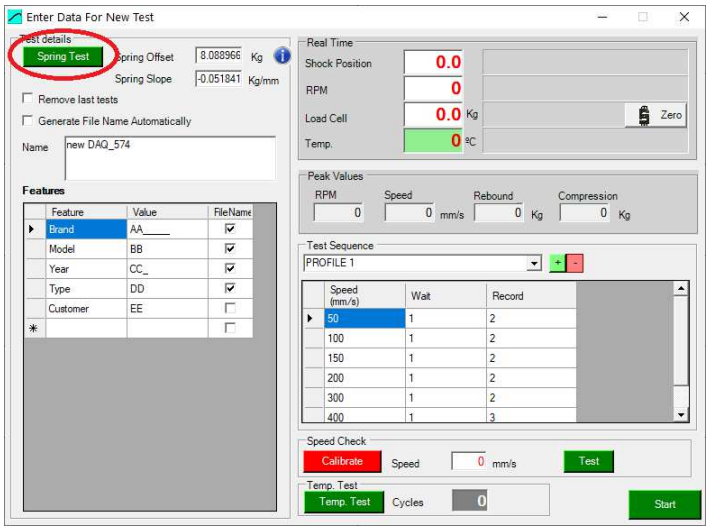
This is specially important with pressured forks (for instance from mountain bikes) in which the pressure has a similar amount to the hydraulics effect (both spring offset and constant are big). Also for any shock absorber which still has the spring installed (although it is preferred to use the machine without springs)

The test moves the shock absorber at the lowest speed available as at low speeds the force measurements should be only caused by the spring effect (gas) not to the hydraulic effect, which is related with speed.

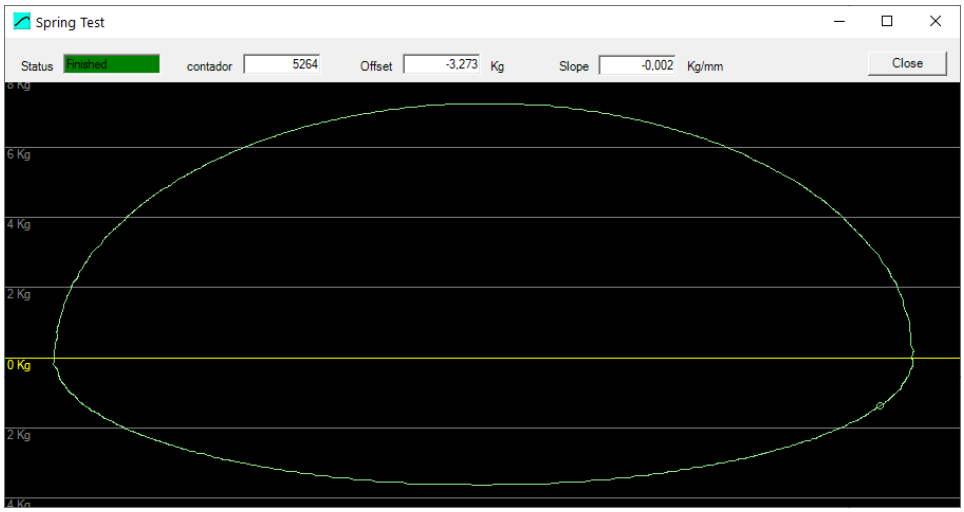
Press F5 or "Start" button



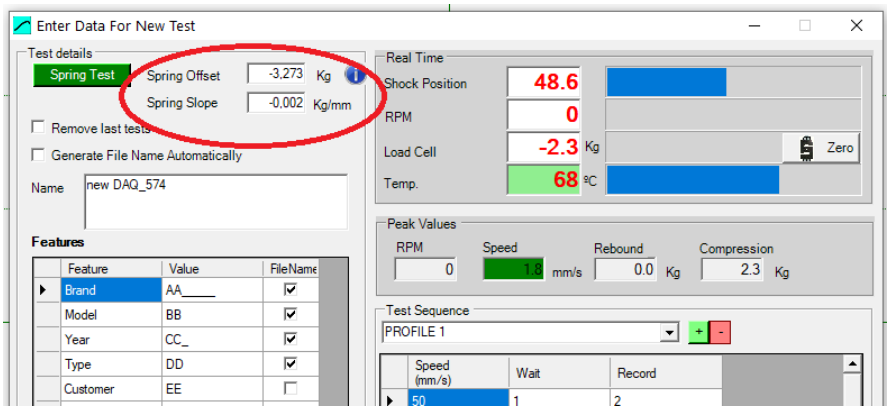
Start the Spring Test



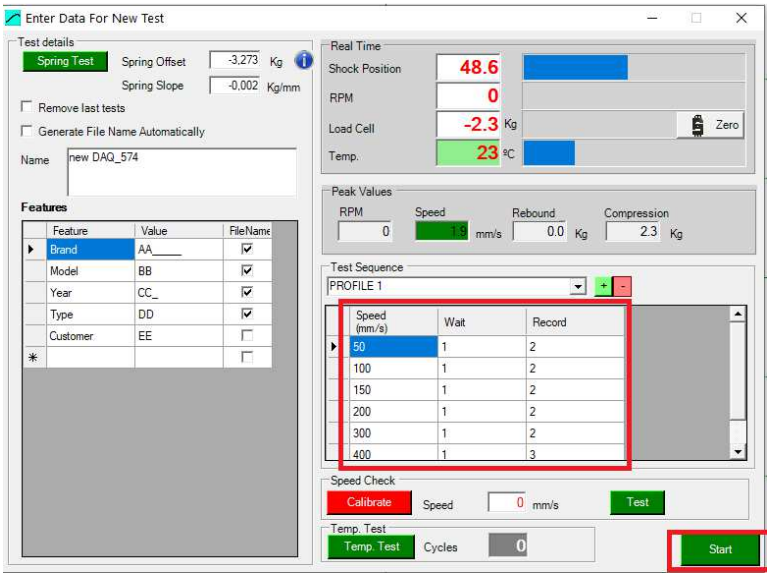
Normally the machine will perform 2 or 3 turns at low speed



The test will provide the spring offset and slope

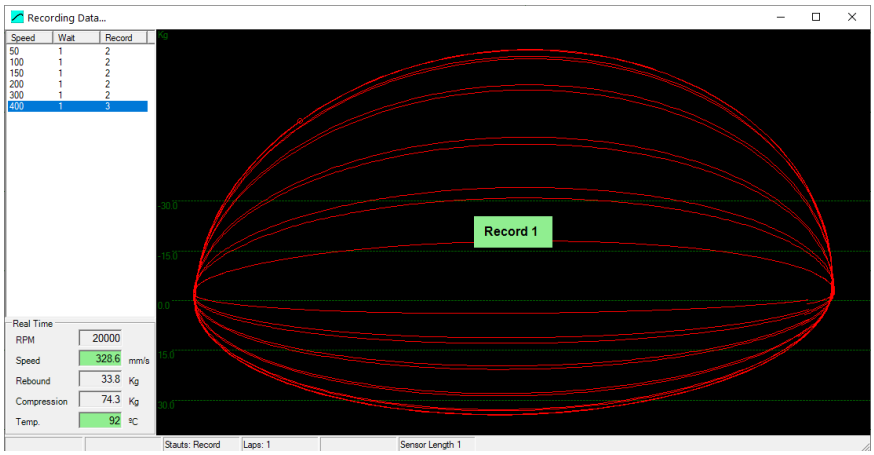


Shock Absorber Test Run

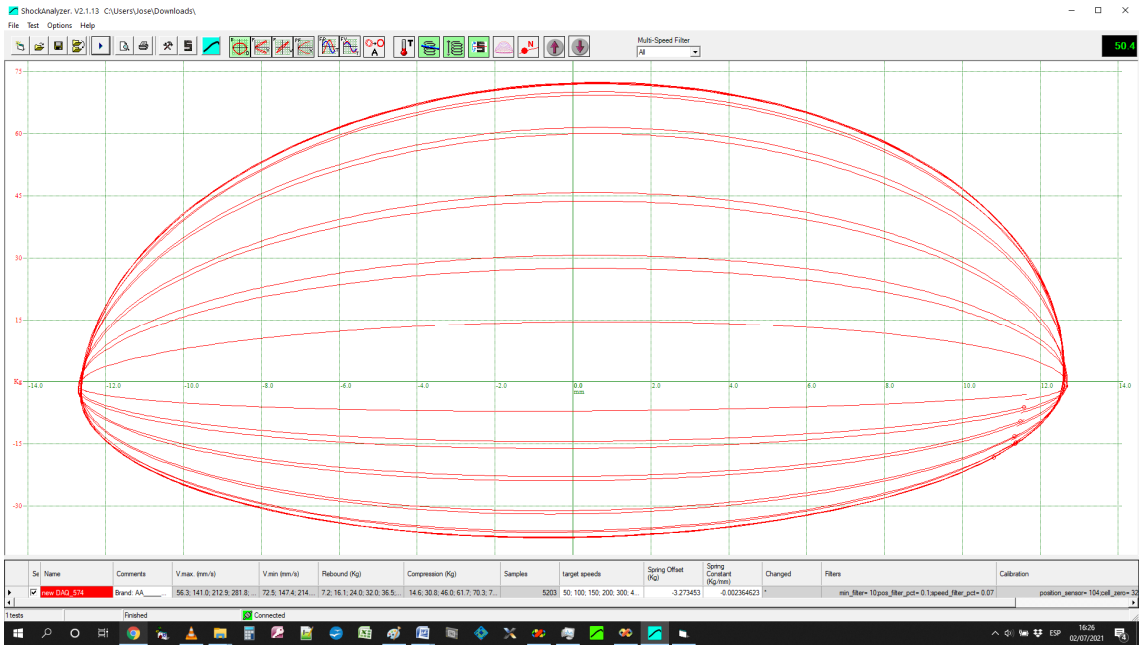


- Enter the test name and details
- Enter the test sequence in order: speed, wait loops (1), record loops (1 to 3 normally)
- Press Start Button

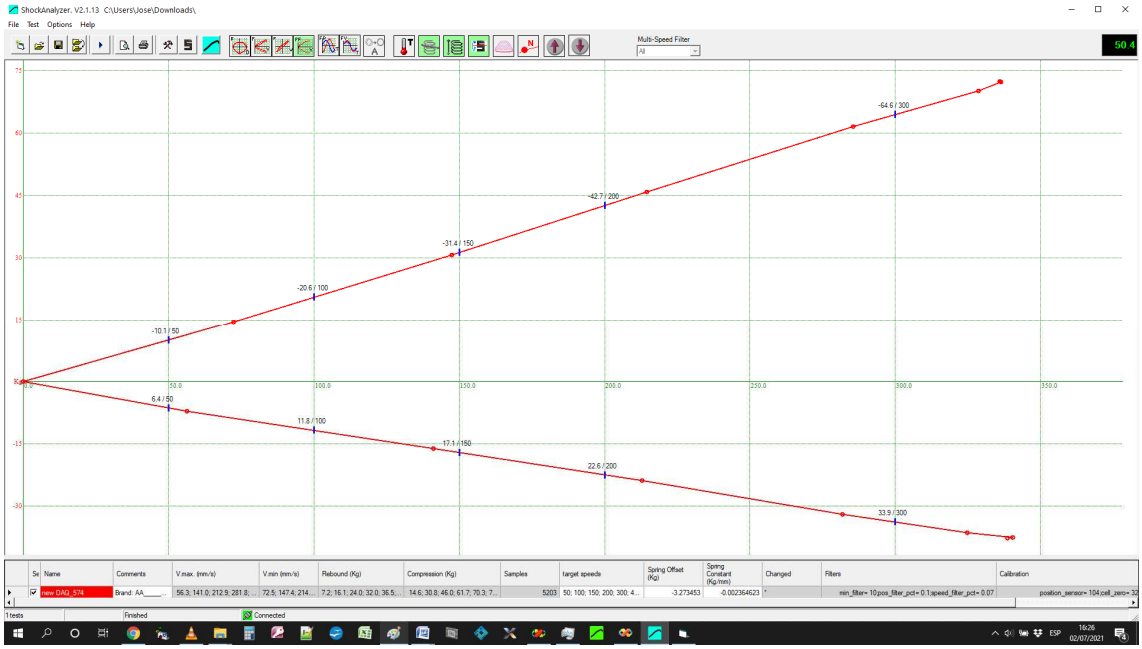
The machine will start to execute the whole test sequence at different speeds



Results

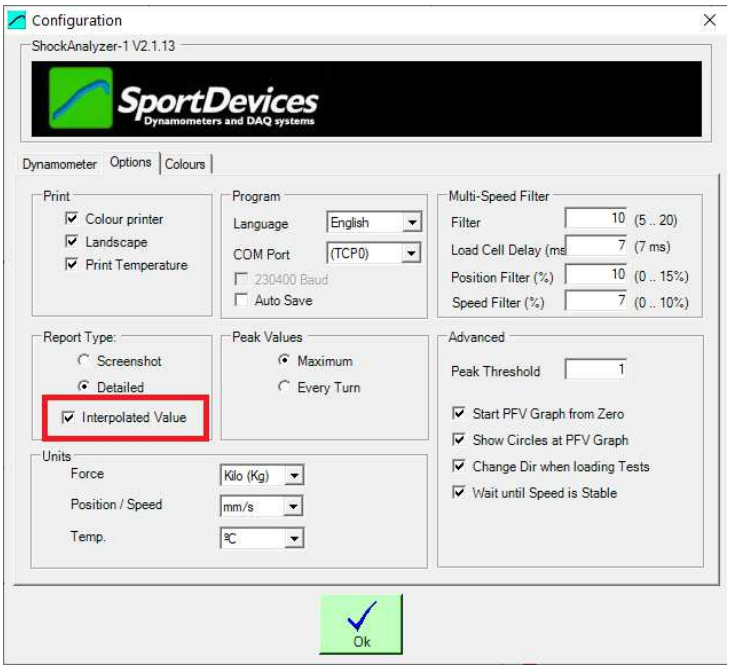


This is the typical Force vs Position Diagram

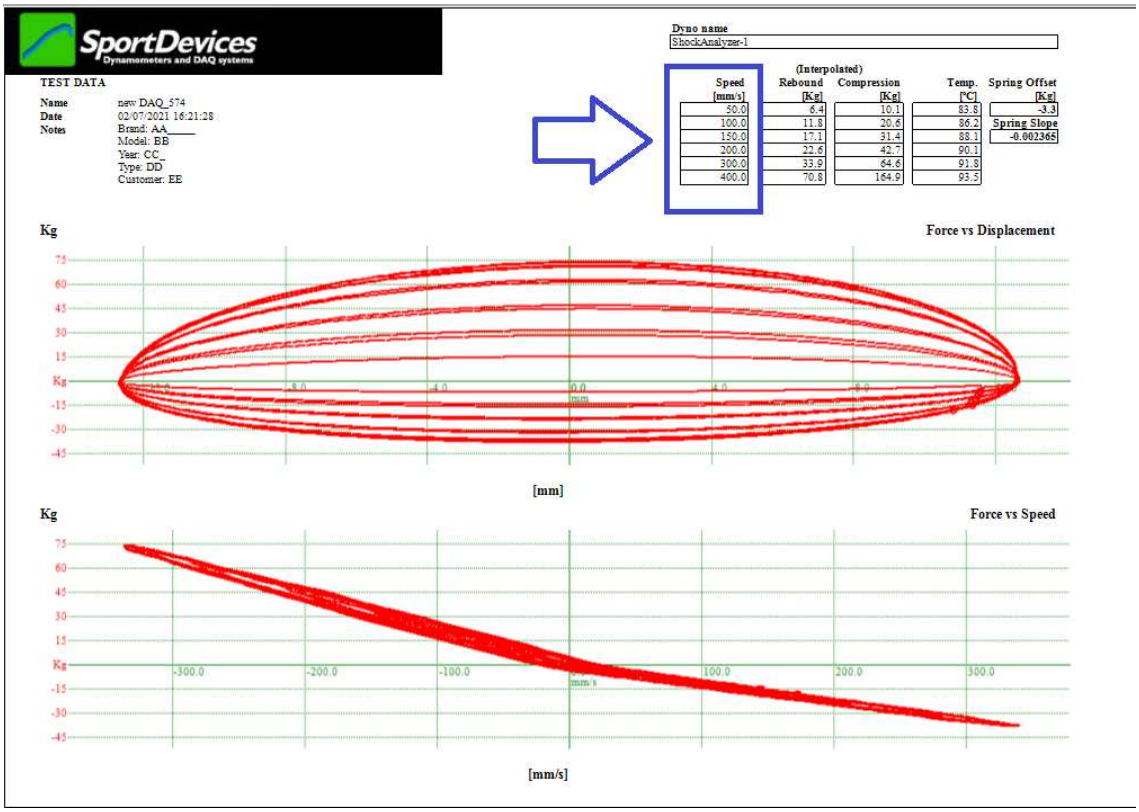


And this is the typical Peak Force vs Velocity diagram

Normally if the machine is correctly calibrated (top RPM and stroke) the red points (measured speed and force) will be close to the blue lines (interpolated values)
At the end of the day, the interpolated values (blue lines) provide better information because they provide a force measurement at the specified velocity points, so the user can compare the forces at the same speed.



When printing the interpolated values are also preferred so the reports can be compared at the same speeds (not at the measured speeds, which can be a bit different at each test)



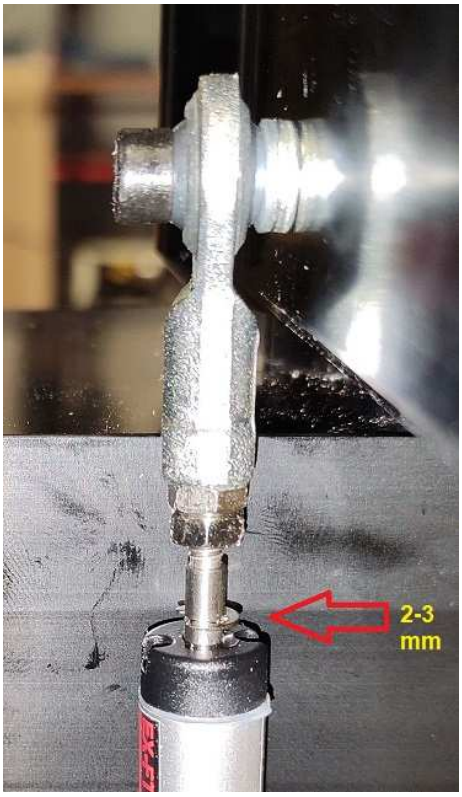
Shock Absorber Machine Top Stroke Adjustment (if using 100 mm stroke)

As the shock analyzer machine has a rotary drum that allows max 100 mm stroke, and the potentiometer is rated for 105 mm, when the top stroke is used it is necessary to ensure that the potentiometer is correctly adjusted before starting a run.

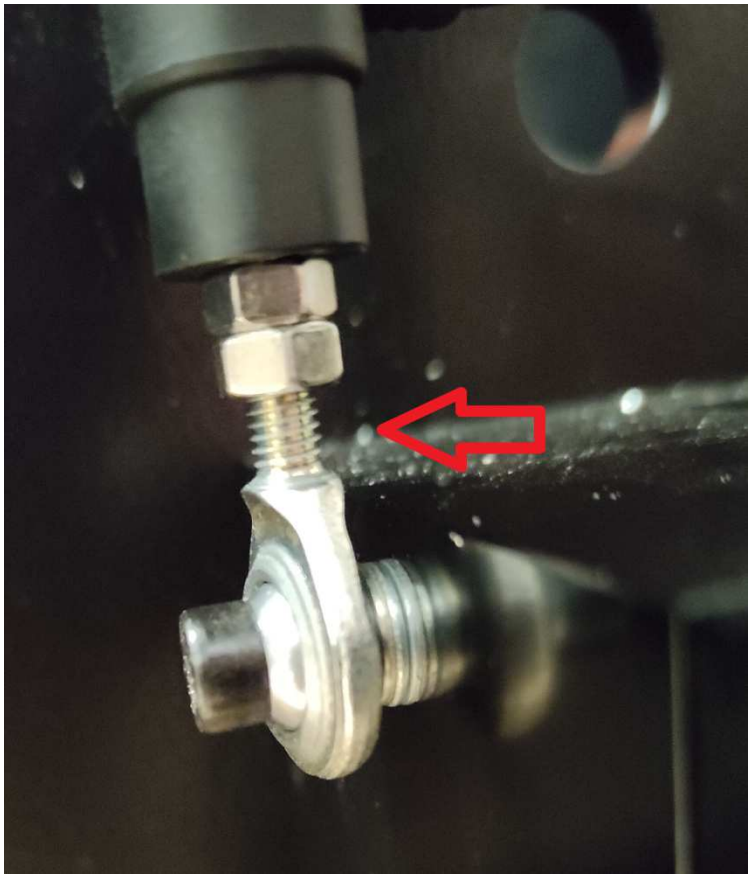
Use an Allen key to move manually the rotary drum (no shock absorber installed)

Set the drum in the Bottom Dead Center

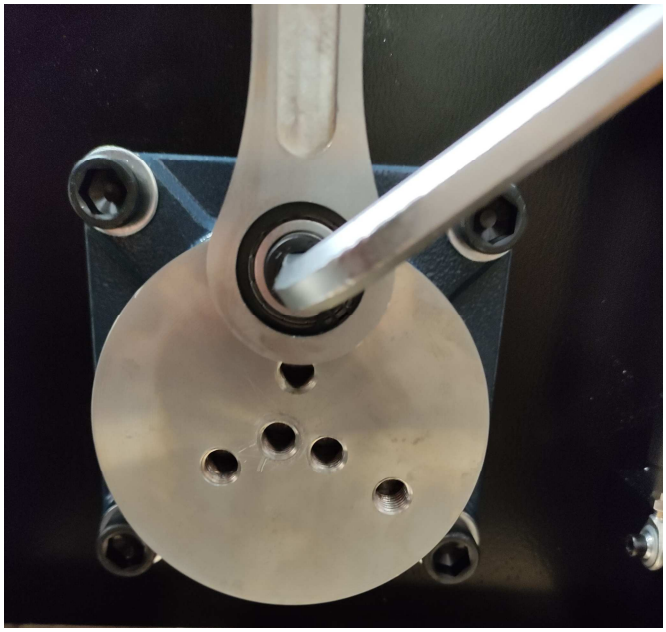
Check that the remaining stroke is about **2-3 mm** to the circlip in the closest position (BDC)



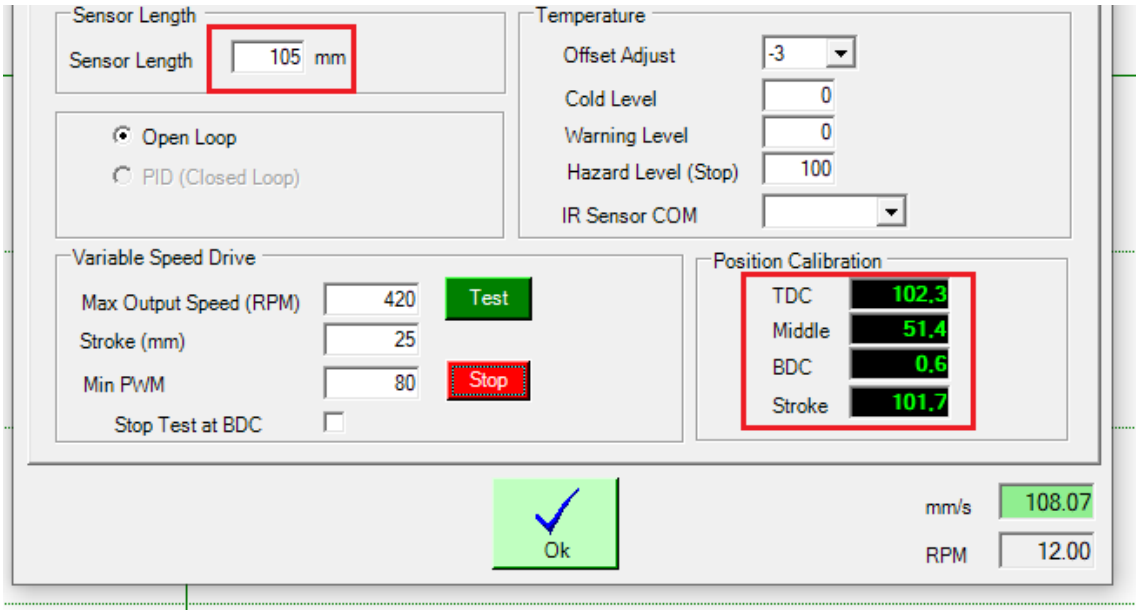
Most of the **adjust should be performed in the bottom balljoint**, it should have about 5-6 mm of free thread. **The potentiometer comes with this thread totally hidden, thus these 5-6 mm will not be available when the machine tries to reach the TDC and will damage the potentiometer!**



Once the BDC position is adjusted, move manually the drum carefully to the upper position (TDC). The potentiometer should move freely up to the open most position



Once it has been verified that the movement is totally smooth in all range, the user can perform the “Min PWM” test which will recalibrate the position fields. Normal values should be similar to the ones shown here. Please note the BDC, it should be 0.3 to 1.5 approx.


Sensor Length
Sensor Length
105
mm
Open Loop
PID (Closed Loop)
Temperature
Offset Adjust
-3
Cold Level
0
Warning Level
0
Hazard Level (Stop)
100
IR Sensor COM
Variable Speed Drive
Max Output Speed (RPM)
420
Test
Stroke (mm)
25
Min PWM
80
Stop
Stop Test at BDC
Position Calibration
TDC
102,3
Middle
51,4
BDC
0,6
Stroke
101,7
Ok
mm/s
108.07
RPM
12.00