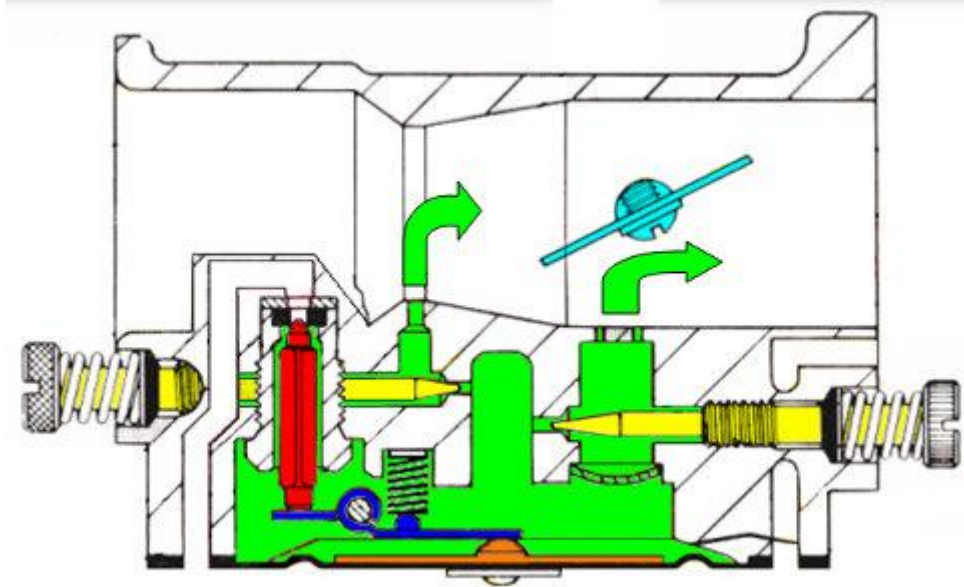


SET-UP DIAPHRAGM *version PRO*

How it works?

The diaphragm carburetor has two circuit to provide the fuel. These are two elementar circuits commanded from the depression that is created in the venturi of the carburetor, and where there is the throttle, and regulated from the opening of low and high screw.



Since that these circuits are elementars, the quantity of fuel provided is linked exclusively at the phisical conditions that are created, and this doesn't allow to obtain the optimal air/fuel ratio in all the operation conditions, and therefore will be necessary to search a compromise.

The only element that can modify this compromise, is the spring of contrast to the diaphragm, in fact the diameter of the bush of the needle valve often is fixed for regulation or fiche.



In this version PRO we've concentrated our work on this aspect, to give the possibility to mechanics and tuners to study new setting, using different springs, or modifying the needle seat diameter, and being able to see how changes the carburation in the different operation zone in function of the spring used.

This will allow to find the springs most adapted to optimize the carburation in the operation areas that time by time are most important in function of the track features, of the driving style, etc.



Since that in these carburetors are used spring very little, the measure of their stiffness isn't easy, for this reason in the software the spring stiffness is calculated automatically simply entering the free length of the spring, the diameter of the needle seat, and the pop-off opening pressure that you can measure with the specific gauge.

SOFTWARE - INPUT DATA and FUNCTIONALITIES

SET-UP DIAPHRAGM HW-27A - X30 - version PRO by NT-Project

Open **START** **OUTPUT** Save Print Info **File 1** **File 2**

Reference curve: ☒ auto ☐ user
Automatic Calculation ref. DEF ☐

displacement [cm3]
 min speed [rpm]
 max speed [rpm]
 oil mixture [%]
 intake efficiency
 crankcase efficiency
 filter efficiency

overheating ☐
 rain filter cover ☐

low screw hours minutes
 high screw
 opening pressure [bar]

pressure [hPa]
 temperature [°C]
 humidity [%]
 max speed [km/hr]
 max power [HP]
 max engine speed rev/min
 total weight [kg]
 throttle up

NTPROJECT
 SET-UP DIAPHRAGM HW-27A - X30 - version PRO

The data entry area of the software is essentially divided into four parts: engine - carburetor - atmospheric conditions - track characteristics and driver's driving style

ENGINE



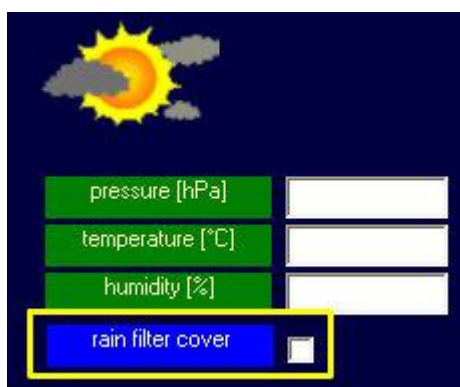
This area contains data useful for defining the engine's characteristics and operating conditions. This is essential because the carburetor's response is inextricably linked to engine demand. The PRO version also allows you to report any conditions that cause excessive engine overheating, allowing you to manage it appropriately with appropriate carburetion.

CARBURETOR



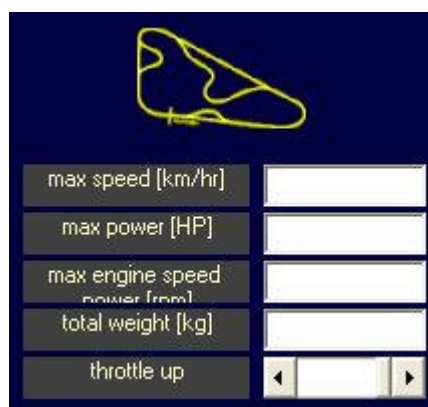
In this area, you can enter the carburetor calibration or the one you want to analyze. Furthermore, if you have a tool that allows you to check the diaphragm opening pressure, you can also enter these values to adjust the calibration to the diaphragm's operation.

WEATHER CONDITIONS



In this area, you enter the weather conditions for which you want to calculate the carburetion. In the PRO version, you can also notify the software if rain is present, which would then affect the conditions and efficiency of the filter, requiring calibration changes to achieve optimal carburetion.

TRACK and DRIVING STYLE



Track characteristics as well as the driver's driving style, often require refinements to the carburetor setup. Therefore, the PRO version can take into account different drivers throttle settings (on/off or more gradual), or if the final gear changes from one track to another, simply enter the new top speed.

ENGINE DATA AREA

OPERATION CONDITION

min speed [rpm]	
max speed [rpm]	
oil mixture [%]	
overheating	☐

Depending on the track's characteristics and the driver's driving style, the engine will operate predominantly at certain speeds, so the carburetion will be optimized for these specific conditions. The percentage of oil in the mixture will also be considered, which influences the amount of fuel entering the venturi. Any overheating issues will also be taken into account, which can be mitigated with appropriate carburetion.

FEATURES and TUNING LEVEL

intake efficiency	
crankcase efficiency	
filter efficiency	

Each engine has specific characteristics that significantly influence carburetor response. Thanks to its fluid dynamics expertise, NT-Project has defined two parameters that allow this aspect to be taken into account and therefore optimize carburetion based on the characteristics and level of preparation of the engine to which the carburetor is applied. NT-Project recommends these parameter settings to the user based on their engine, while in special versions dedicated to single-brand categories, the parameters are already preset.

INTAKE SILENCER or FILTER

The type of intake silencer or filter applied to the carburetor, in addition to affecting engine performance, significantly influences the carburetor's behavior. The SET-UP Diaphragm software also takes this aspect into account and allows you to manage carburetion according to the type of filter used and its efficiency.

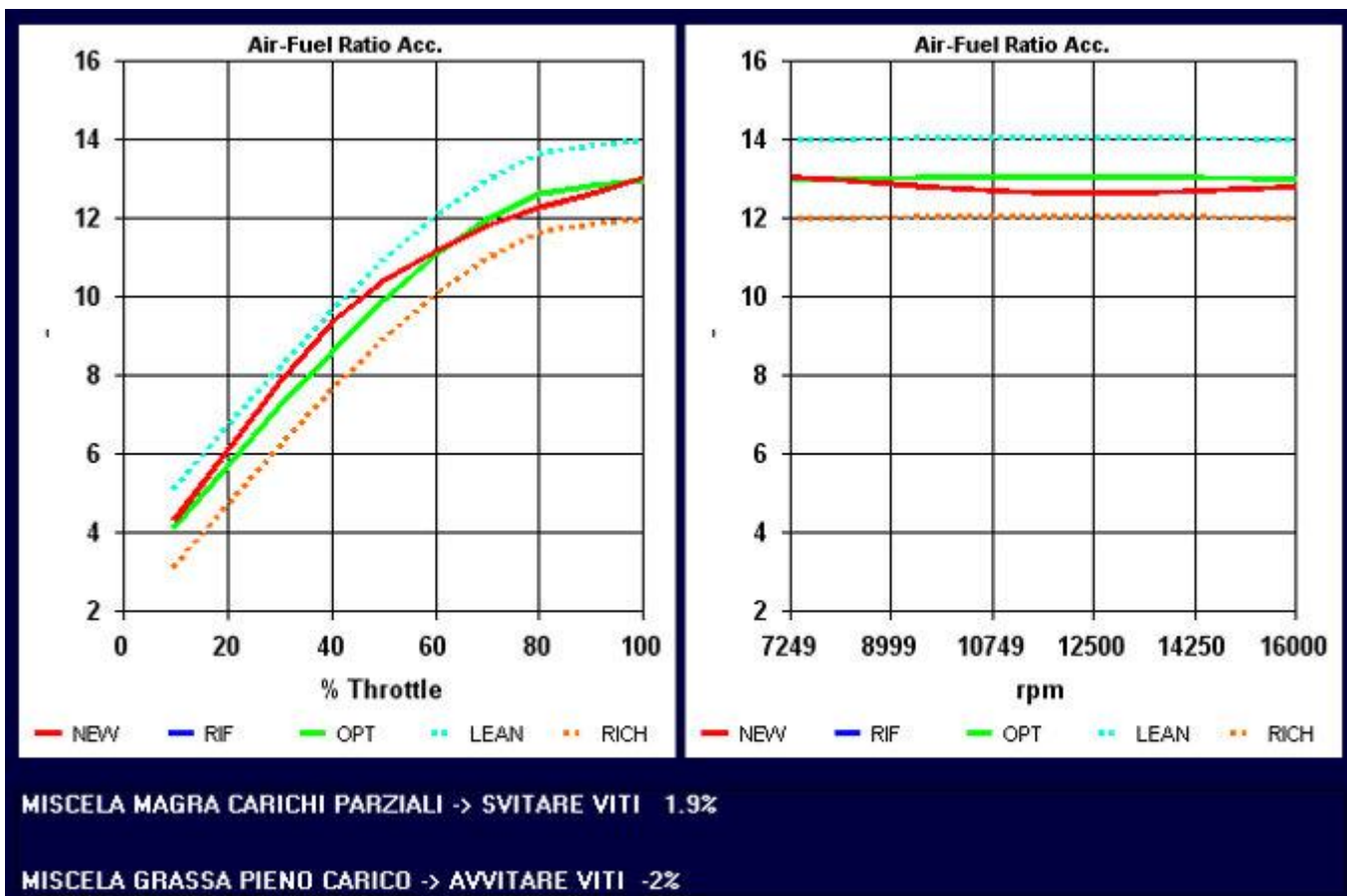
SOFTWARE OPERATION - MANUAL MODE

After entering the required data, the calculation can be started.

In a few moments the software will show a graph with the carburetion that the carburetor offers based on the calibration and atmospheric conditions that have been entered (red line).

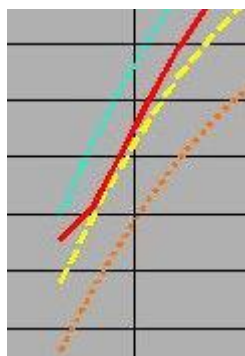
This carburetion is compared with what should be optimal for the engine under those operating conditions (green line).

Also shown are limits indicating too lean (blue dotted line) or too rich (orange dotted line) fuel mixtures.

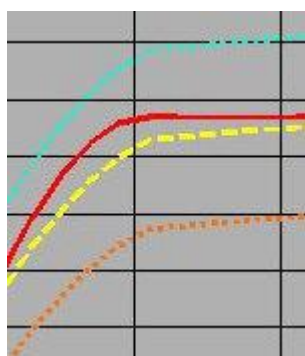


This graph covers the entire engine operating range, so you can evaluate how the carburetor responds at throttle opening, throttle overrun, and full load. This will allow you to adjust the calibration settings to find the best possible compromise across all operating areas.

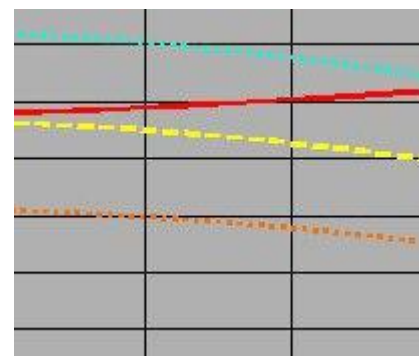
LOW ENGINE SPEED
THROTTLE OPENING



MEDIUM ENGINE SPEED
OVERRUN



HIGH ENGINE SPEED
FULL LOAD

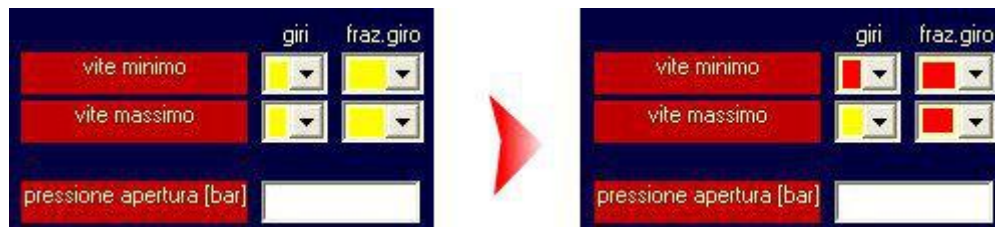


MIXTURE LEAN PARTIAL LOAD -> OPEN LOW SCREW 1.9%

MIXTURE RICH FULL LOAD -> CLOSE HIGH SCREW -2%

In addition to the graph, the software shows clear indications on where it is best to intervene to optimize the carburetion.

Thanks to the graph and the software indications, in just a few steps you can determine the calibration changes that allow for optimal carburetion both at partial loads (first opening and passage) and at full load.



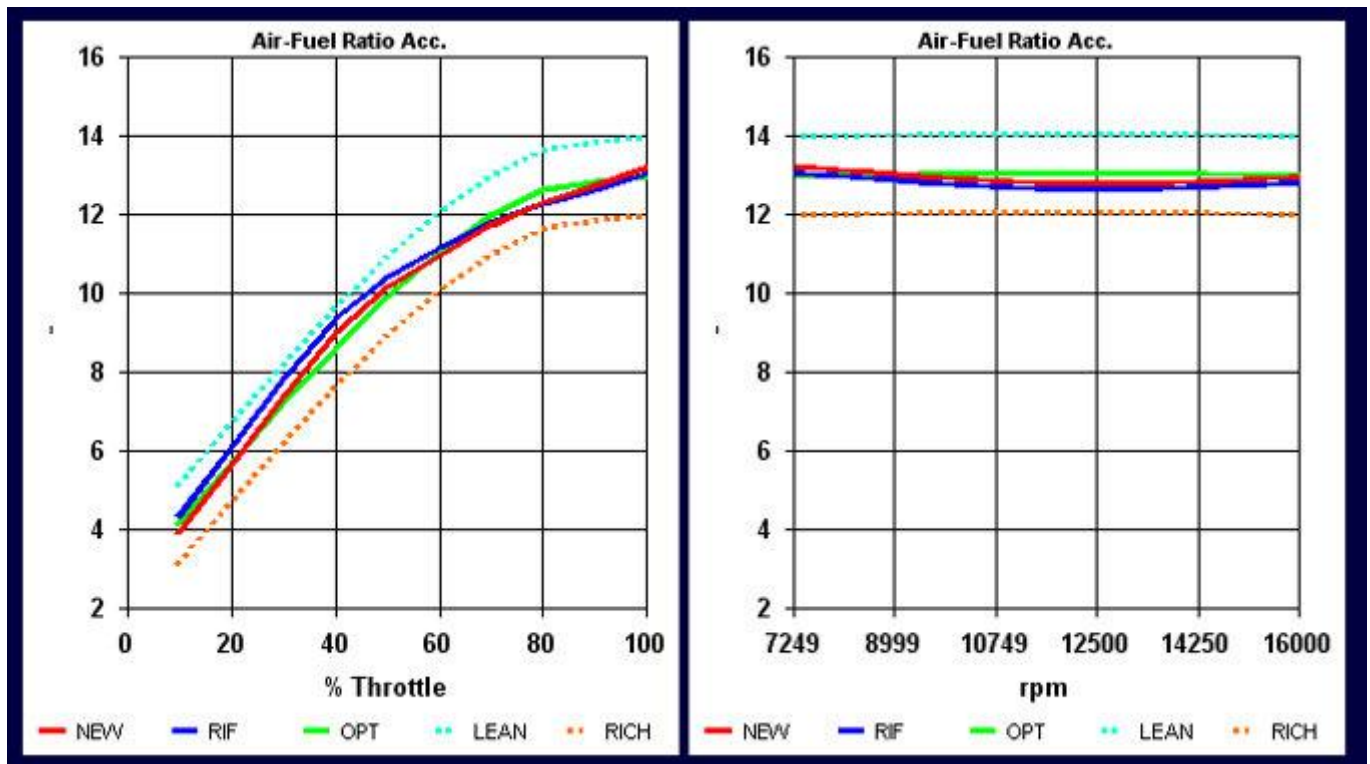
Once you have made the appropriate changes to the calibration, the software will tell you that the carburetion is OK and will show you in the graph the carburetion you obtained with the new calibration (blue line).

MIXTURE OK PARTIAL LOAD -.3%

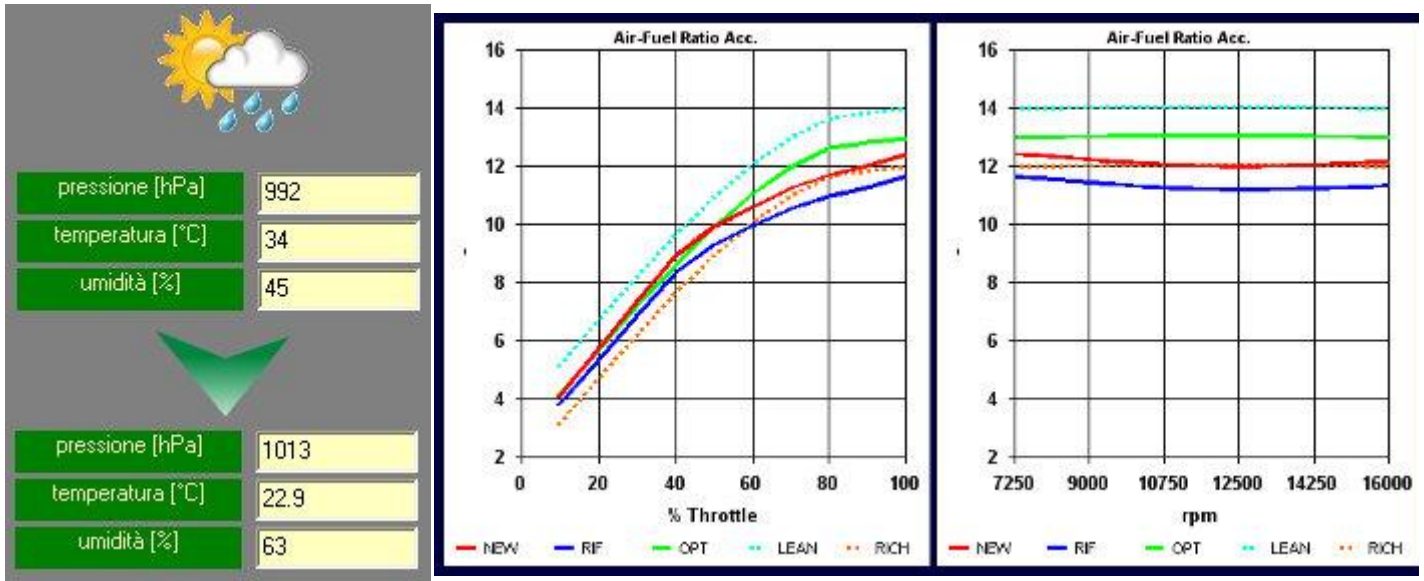
MIXTURE OK FULL LOAD -.8%

In addition to the indications, a percentage value is shown which indicates how much the carburetion on average differs from the optimal one, this will allow you to evaluate further changes to reach an even better compromise.

Thanks to the software, it was possible to find the best calibration compromise to have a carburetion that is as close as possible to the optimal one in all operating conditions.

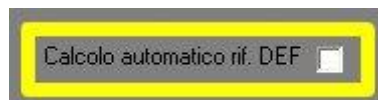


BEST SETTING WITH DIFFERENT WEATHER CONDITIONS



As weather conditions change, the calibration you once thought was optimal is no longer optimal, as carburetion is extremely sensitive to changes in pressure, temperature, and humidity. The software allows you to instantly re-adjust the calibration to the new conditions; by entering the new weather data, it provides you with instructions for modifying the calibration and thus regaining the optimal carburetion for your engine.

SOFTWARE OPERATION - AUTOMATIC SETTING CALCULATION



The PRO version of the SET-UP Diaphragm software, in addition to providing the graph and indications for obtaining the optimal setting in different conditions, also automatically calculates the main changes that should be made to obtain the optimal carburetion.

	hours	minutes	auto 98%
low screw	1	0	1 5
high screw	1	35	1 31

The software automatically calculates the new adjustments that the low and high screws must have to provide optimal carburetion in the new conditions.

In diaphragm carburetors where the high-speed screw is replaced by a jet, the software automatically calculates the new jet value.

Summarizing what we have seen in this short presentation, the software SET-UP DIAPHRAGM version PRO allows to obtain with precision and velocity:

- **OPTIMAL SETTING OF THE CARBURETOR FROM ZERO;**
- **SETTING REFINING FOR ALL THE OPERATION CONDITIONS;**
- **BEST CARBURETOR SETTING IN ALL THE WEATHER CONDITIONS;**
- **BEST CARBURETOR SETTING WITH ENGINE or FILTER MODIFICATIONS.**
- **AUTOMATIC CALCULATION CARBURETOR SETTING;**
- **BEST CARBURETOR SETTING IN FUNCTION OF TRACK FEATURES and DRIVER DRIVING STYLE;**
- **BEST CARBURETOR SETTING IN CRITICAL CONDITIONS (engine overheating, rain).**
- **PRINT OF THE RESULTS.**

