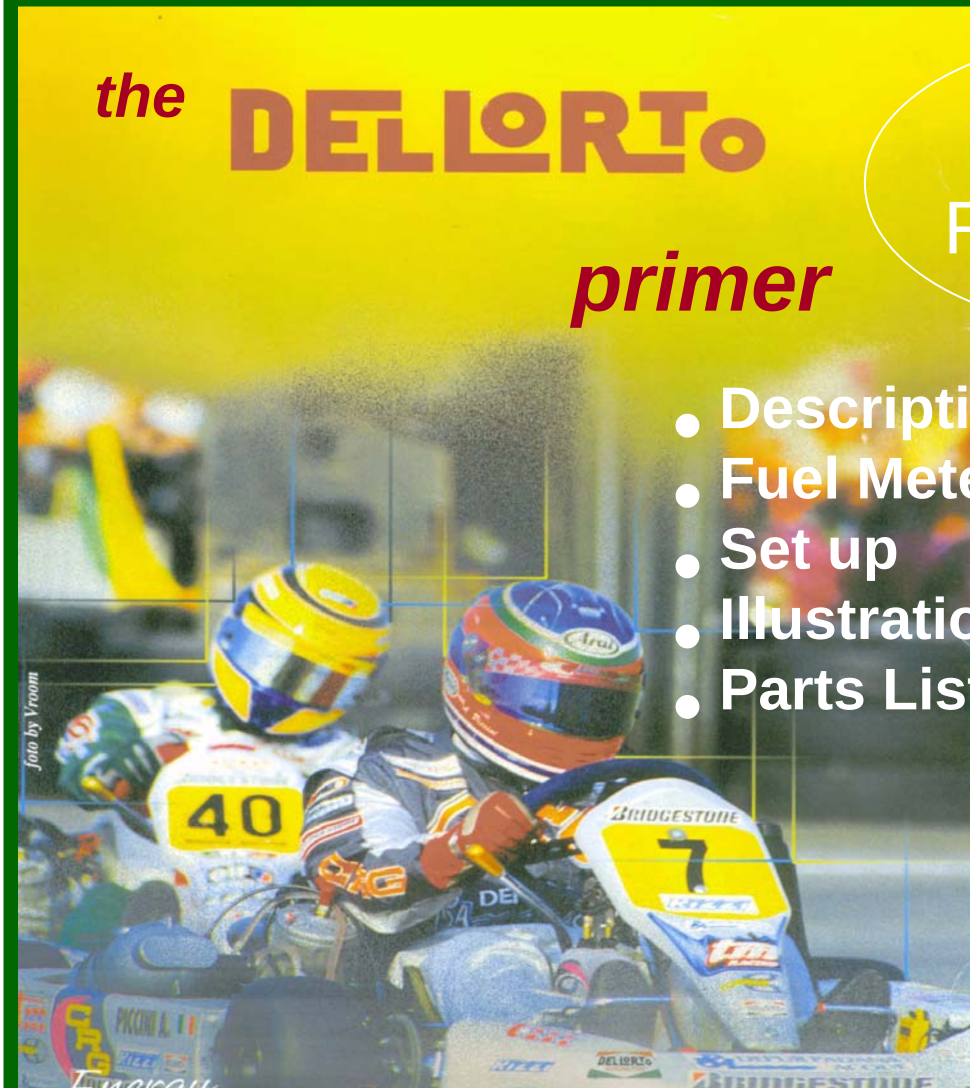
the DELLORTO primer



ICC Rotax *Max*

- Description & Design
- Fuel Metering & Air flow
- Set up
- Illustrations
- Parts Lists & Graphics

WOT

the Main Circuit

Hi Speed

the 4 Phase operating sequence

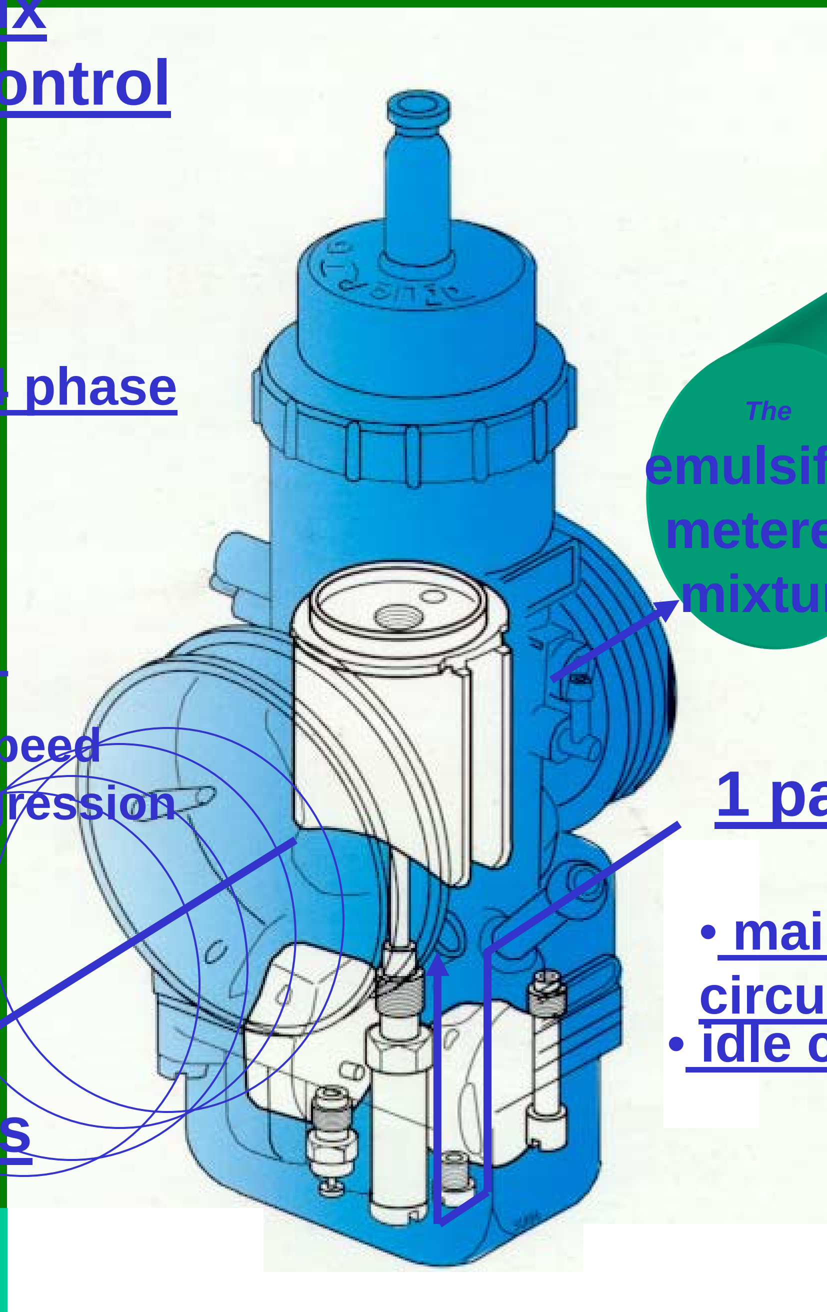
Progression

the Idle Circuit

Idle

2nd edition

- meter
- mix
- control



4 phase

- WOT
- Hi Speed
- Progression
- Idle

14 parts air

The

emulsified metered mixture

1 part fuel

- main circuit
- idle circuit

‘Tuning Map’

Introduction

The *Dell'Orto Primer* is a compilation of data from testing and research looking for answers on 'how to' when setting up the Dell'Orto carburetor for kart competition. As a supplier for Dell'Orto carburetors fuel pumps and parts, knowledge of the product's internal workings and performance is a vital requirement.

As the learning curve developed it became obvious that three basic elements were very important. Understanding the <u>functions</u> of the carburetor, having the ability to <u>read</u> 'signs' and knowing <u>how</u> to make the right changes for maximum performance.

The technical basis for this manual has been taken from known data such as the design and engineering specifications, basic principles and functional descriptions of the systems that are featured in the Dell'Orto *needle* carburetor manual for two cycle engines.

The Dell'Orto carburetor is standard equipment on ICC and Rotax Max engines now being used in 125cc kart competition in North America. This manual attempts to provide the not so technical user a guideline for identifying the carburetor type, the components and the operating characteristics. It also provides 'how to' steps for setting up the carburetor for competition.

The focus of this manual will be on giving the user a basic knowledge of the operating characteristics of the carburetor so that setup is quick but not a hindrance to doing the other important functions of kart set up.

Carburetor set up should be a simple procedure that takes as little time as possible while ensuring that the engine is getting full benefit from the fuel intake system. All phases of operation: *idle*, *progression*, *acceleration* and *full power* require basic settings and are covered in this manual. The *carburetor set up procedure* can be done for every event.

The monitoring of carburetor sensitive conditions is done with the proper equipment. Recording readings for each event will build a useful database. The user can now adjust to changing air conditions for a new set up or use previous entries for quick set up of the carburetor.

The main areas of knowledge are carburetor *function* and determining correct *set up*. There are charts for selecting needle, main jet, idle jet, throttle valve, needle valve and other components containing data for selective tuning. Images and sketches are provided to help understand the basic principles.

Once the set up procedure has been repeated and becomes routine and selective parts have been identified, the requirements for additional air and fuel flow components such as jets and needles should be minimal. Obtaining the maximum power settings will be a function of testing, visual inspection or referring to a previously established setting.

This manual will attempt to explain the functions of the carburetor as designed by the manufacturer. Modifications to the basic unit are not considered as useful or necessary. A basic understanding of the term *stoichiometric* air fuel ratio, the scientific term to define the air fuel ratio for complete combustion, is helpful for understanding the basics of carburetor set up.

Again, the purpose of this manual is to give those that are not so familiar with the carburetor and systems, a basic understanding of the unit; how it works, and the ability to make the determination if changes to the basic systems are necessary for a particular event.

tdb/GFM

Dell’Orto Primer Contents:

Description
ICC - VHSH 30 BS & Rotax Max - VHSB 34 QD
Kart Racing
Technical Features & Design

The Dell'Orto carburetor supplied for 125cc kart applications is described as a 'needle' carburetor. That is, the main fuel-metering component is a tapered needle. The needle functions as the *control* for the correct amount of fuel needed at the various throttle positions required for speed control. The needle is an interchangeable component that meters fuel (to be mixed with air) during main circuit operation. The main circuit is generally described as all operating throttle positions except idle.

Identification: to identify the type & size of the carburetor examine the body for the model designation and air inlet size stamped on the left. You will note on ICC carburetor the letters VHSH and the number 30. 'VH' indicates 'valve' or flat slide type throttle working in a horizontal choke or venturi. The number 30 indicates that the 'inserted' choke diameter is 30 mm. Suffix letters indicate right or left hand positioning of choke and idle controls. Right is D, left is S. Other suffix letters refer model updates. The Rotax Max is identified as VHSB 34 QD.

One notable feature is the removable venturi (sometimes referred to as choke) insert. It is located by two 4mm screws inside the float chamber which position and contain the insert. This allows the design to incorporate one standard body assembly for different size chokes i.e. 34, 36, 38, 39. The flat throttle slide is located in the body and positioned by a plastic guide or insert.

Other features will be the aluminum top or cover, the round CNC machined bore (except Rotax Max that is oval and has plastic cap). The fuel reservoir or float chamber is located on the bottom of the throttle body and contains the 19mm main jet-needle jet access cover. The float chamber is removable for changing of fuel metering components, inspection and maintenance.

The knurled screw and spring assembly located on the side are for manual adjustment of the idle speed. The small slotted screw on the body next to the fuel inlet nipple is the manual idle air enrichment screw. The 12mm nut houses the fuel filter. The choke lever is located aft and above the idle adjustment screw. Two 90 degree down spouts are provided to allow the float chamber to be at atmospheric pressure at all times.

The threaded cover provides access to the throttle slide and needle assembly. This allows for changing of needle type and/or throttle valve. The throttle cable adjustment screw assembly is threaded into top of the cover.

The air intake flange is designed to accept all filters and CIK air boxes with a 64mm internal diameter. The VHSH 30 BS is standard with a 35mm rubber-mounting flange, the VHSB 34 QD is 44mm. !

!

!

The nozzle is the receiving component for the needle jet and protrudes into the venturi forming a partial shroud around the atomizer tip that offers a shield from direct impact of the incoming air charge and aids in the vaporization of the mixture.

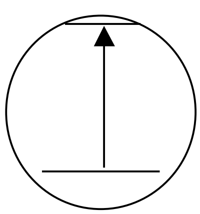
The needle valve assembly is located in the float chamber and can be changed to select the desired flow of fuel into the chamber.

- The control of engine speed is accomplished through the driver with :

The throttle valve and mechanical linkage to throttle pedal – the throttle valve determines the effective area of the flow passage for the various engine speeds required by the driver. The throttle valve for ICC and Rotax Max carburetors is designated as a ‘flat’ valve. It has a fore and aft blade or ‘flyer’.

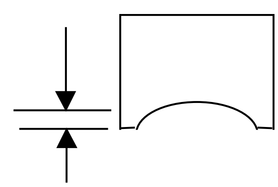
The front flyer is designed with a cutout (arc) on the lower edge. It is measured (an imaginary line through the center of the valve) from the bottom edge to the top of the arc in millimeters. This cutout is calibrated for selective tuning of the acceleration mixture. The rear flyer is straight (no arc). Selecting different numbered valves changes the cutout area. The number refers to the height of the arc in mm. For example a 45 valve has a 4.5mm opening. A 5.0mm opening is a number 50. The larger the number the leaner the mixture during acceleration.

During the progression from idle to acceleration the front blade acts as the venturi element up to and through the high speed as the front edge registers with the top edge of the venturi aperture the lower rear blade continues to provide the depression required to create vacuum.



engine speed control from idle through high speed phase

front blade cutout scheme for selecting air flow



The throttle valve must also act as the air seal between the slide-housing insert and the effective area of the venturi section. The valve is forced to the rear of the guide insert by the incoming air and reduces leakage past the valve assembly and away from the intake tract.

The other components of the throttle valve assembly are the return spring and cover which includes the primary cable adjuster. The cable adjuster is turned in or out to obtain the proper length for the cable when setting primary idle position of the throttle valve. Fine adjustment is done with screw/spring on the side of the valve body. The valve is also the component in which the tapered needle is located.

Operating Principles

The basic functions of the Dell'Orto two cycle racing carburetor work through two separate circuits, the idle circuit and the main circuit. These two circuits must:

- Meter the fuel into the airflow and maintain the optimum air/fuel ratio over the entire operating range of the engine

- Mix or atomize the air and fuel charge properly for ignition and combustion

- Control the power delivered by the engine as required by the driver

  - The primary components that meter the fuel from the float chamber into the airflow are:

1. idle jet
2. tapered needle
3. main jet
4. needle valve
5. needle jet

The above components can be selected (dimensionally) by the user/tuner to obtain the desired operating characteristics. They each have numbers that designate fuel flow rate and physical dimensions.

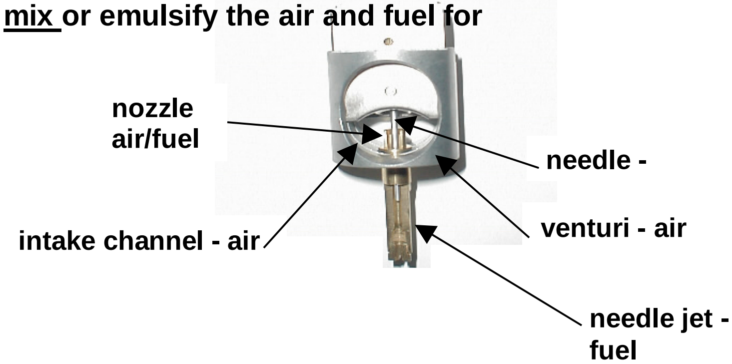
The idle jet is located in the lower carburetor body and is enclosed by the float bowl. The needle jet screws in to the carburetor body.

The tapered needle is held in position by the throttle valve. The main jet screws in to the lower end of the needle jet. The idle jet emulsion tube is located under the idle jet.

A needle valve assembly allows fuel to enter the float chamber when required by the engine. It meters the fuel to the carburetor float chamber from the fuel pump using a needle and seat assembly actuated by floats that rise and lower with the fuel level in the chamber. The needle valve assembly is also interchangeable.

- The primary components that mix or emulsify the air and fuel for combustion are:

  1. intake channel
  2. venturi
  3. nozzle
  4. needle
  5. needle jet

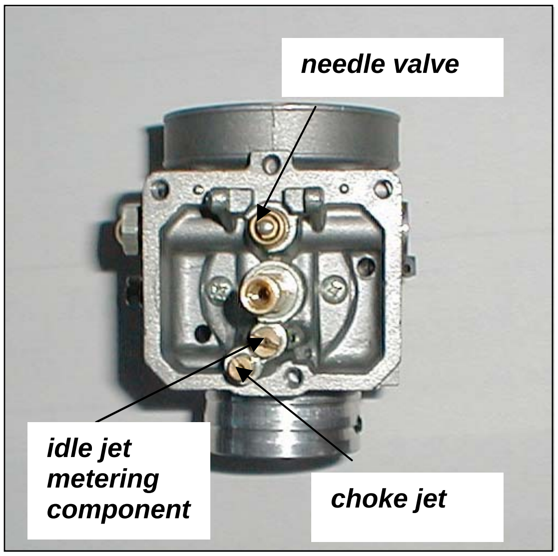


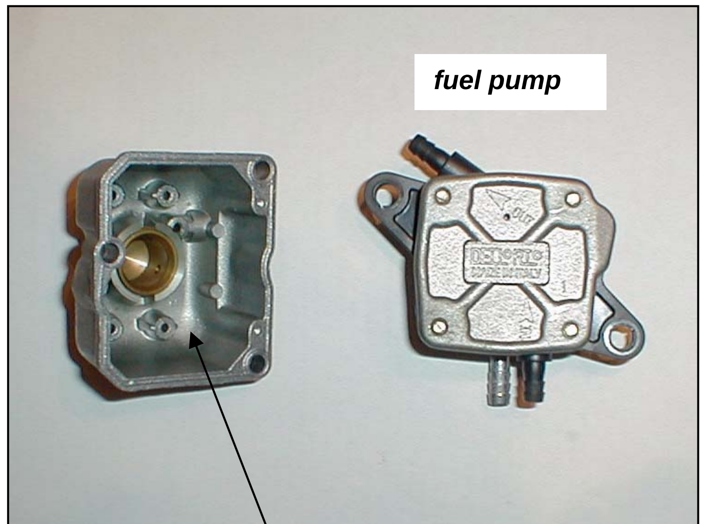
The intake channel is designed as two separate components -
(1) carburetor body,
(2) venturi insert.

Fuel Intake System

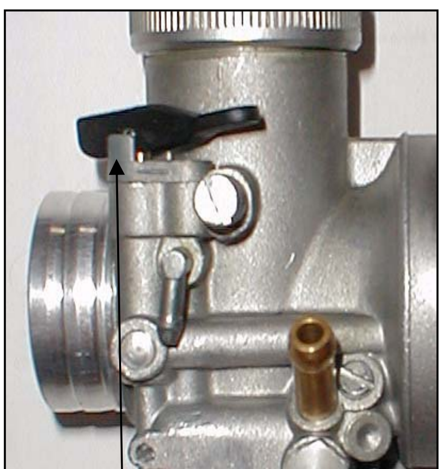
Mixing, metering and controlling engine speed is done with fuel delivery system. The system consists of:

- **the external fuel pump**
- **float chamber – fuel supply reservoir**
- **inlet control – needle valve**
- **idle circuit metering components – idle jet and idle jet emulsifier**
- **cold start mechanism – mechanical controls and choke jet**
- **main circuit metering components – needle jet and tapered needle**



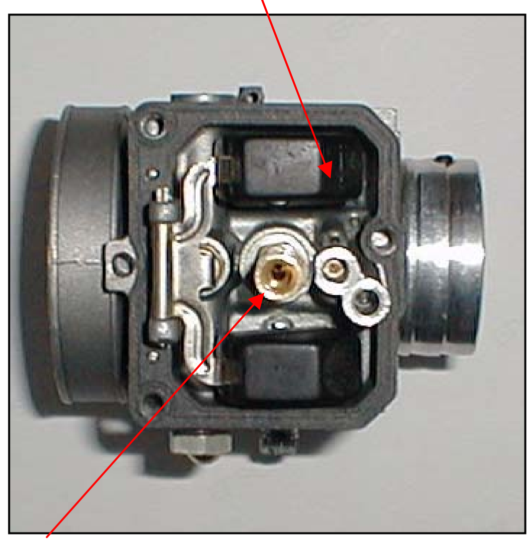


fuel reservoir



mechanical choke lever

needle

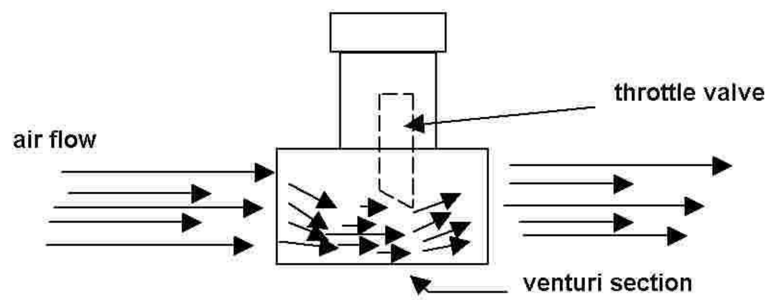


needle jet

The Air Delivery System & Venturi Effect

The fuel delivery system and the air delivery system provide the fuel/air mixture to produce power. Once fuel is drawn into the carburetor fuel reservoir it must be metered into the air intake system to be mixed, atomized or sometimes referred as emulsified with air near the stoichiometric ratio for complete combustion. Stoichiometric is a scientific term to describe the perfect or complete combustion of the A/F mixture. A perfect burn leaves no unburned air or fuel. This ratio depends on type of fuel but would be in the range of 14 parts air to 1 part fuel.

The air delivery system also includes the venturi effect provided by the throttle valve design to introduce fuel into the air stream. The venturi effect creates negative pressure by the incoming air passing under the lower edge of the throttle valve and increasing in speed thereby reducing in pressure at this point. This negative pressure is used to draw fuel from the float bowl,



as incoming air flows through the venturi section the increase in airflow causes a drop in pressure and fuel is drawn through the idle or main circuit into the air stream as atomized fuel. The Dell'Orto needle carburetor differs slightly in that the venturi effect is created by the throttle valve as it moves from closed to open position. Therefore vacuum is relatively high at closed and partial openings then dropping off momentarily until air speed up again during acceleration.

The float chamber remains at atmospheric pressure (14.7 psi) because of the vents located on carburetor body. Understanding the venturi action is important for proper tuning of carburetor. The lack of negative pressure (to draw fuel) during the progression phase of acceleration can create a lean mixture if the main jet is too small (lean peak). Computations to determine if main jet is too small relative to the needle jet / needle tip annulus are sometimes necessary. Determine the annulus or the circular area created by the needle inside the needle jet by:

$$(\text{needle jet number}/2)^2 \text{ X } 3.1416 - (\text{needle diameter}/2)^2 \text{ X } 3.1416 = \text{needle jet annulus}$$

$$(\text{main jet size}/2)^2 \text{ X } 3.1416 = \text{main jet area}$$

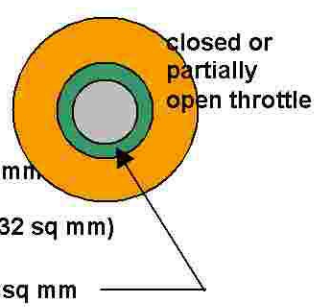
The main jet area should be equal to but not less than the needle jet annulus to avoid 'lean peak' or lean condition during acceleration or low vacuum periods. But, as shown below a typical ICC set up for the TM K9 states that the needle jet annulus is less than the main jet area. Main jetting is a balancing act because the main jet controls the fuel during progression, high speed and WOT phases. But its main function is to meter the mixture at WOT. The formula below shows main jet area larger than annulus at closed & partially open throttle.

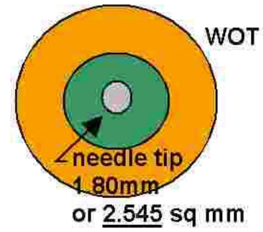
175 main jet (1.75) = 2.405 sq mm

268 needle jet (2.68) = 5.641 sq mm -

K22 needle 'A' section (2.50) = 4.909 sq mm

(needle jet annulus = 5.641 – 4.909 or .732 sq mm)

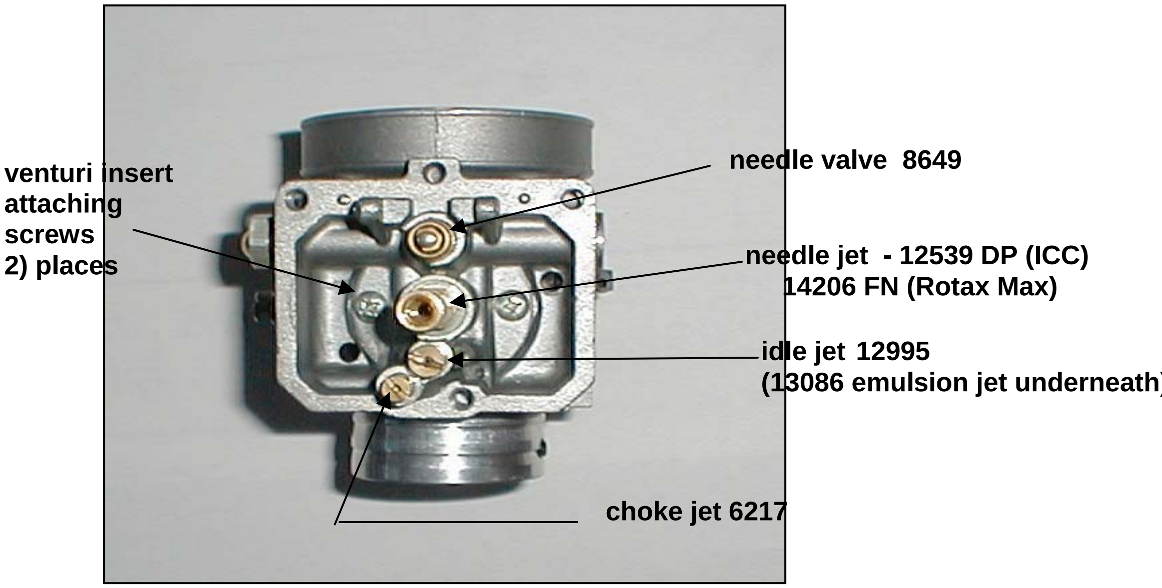




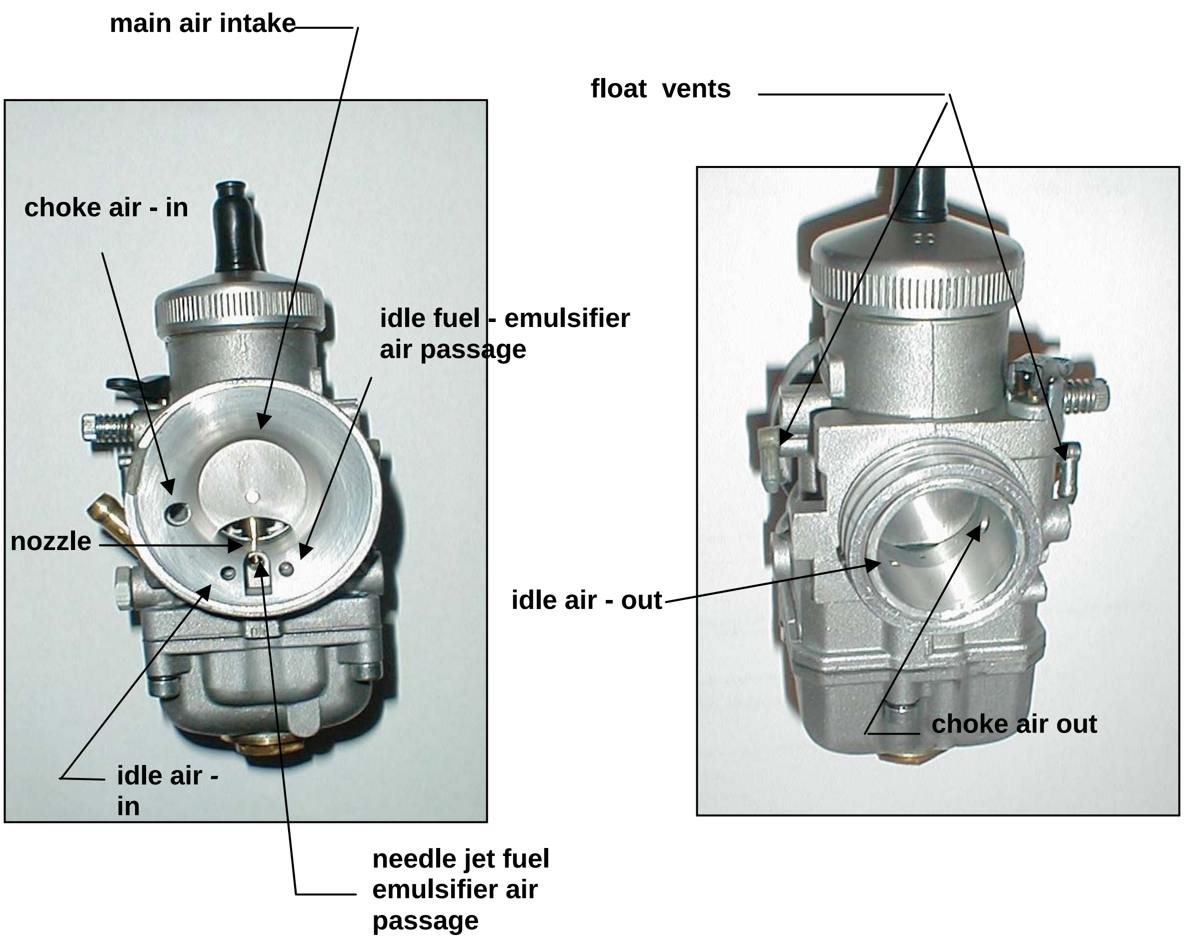
Needle jet 'A' dimension area = .732 sq mm

Vacuum & fuel metering →

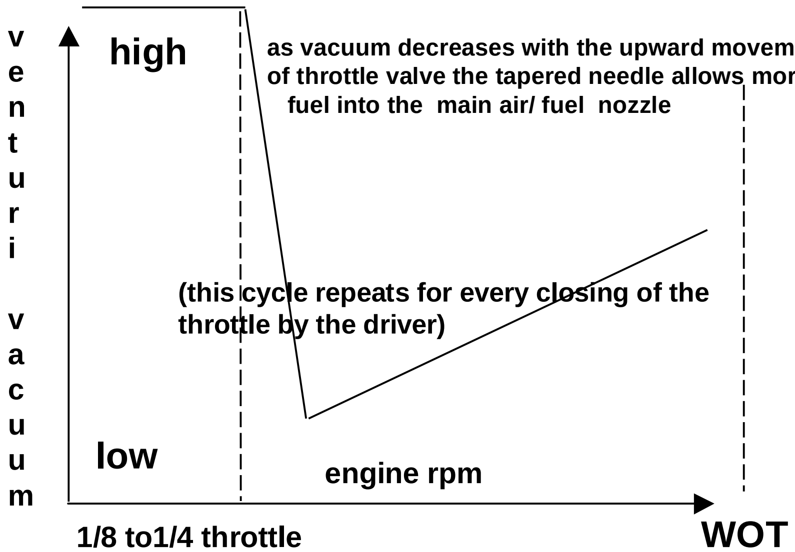
Fuel Metering Passages

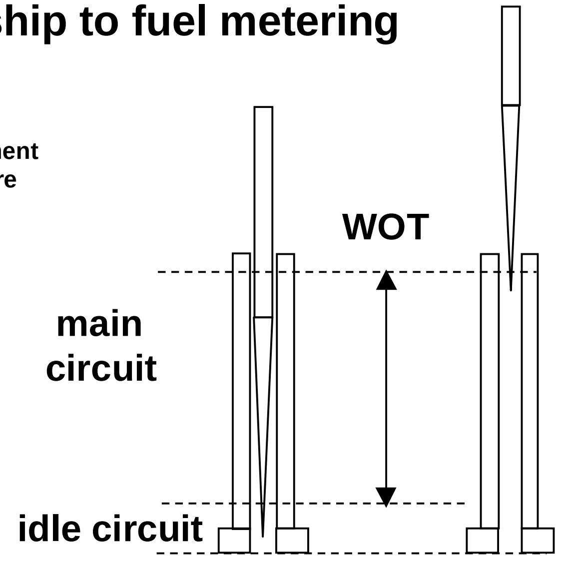


Air Passages



Vacuum signal (strength) relationship to fuel metering

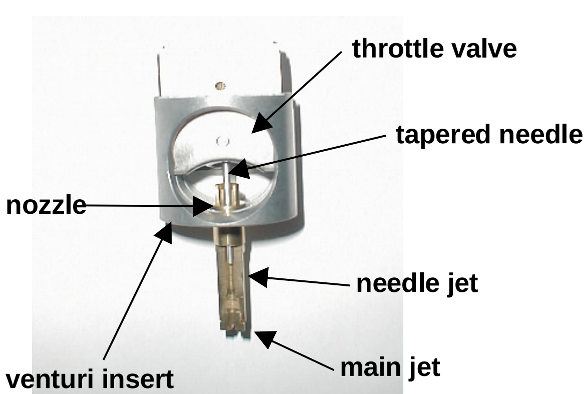




needle positions at idle & WOT

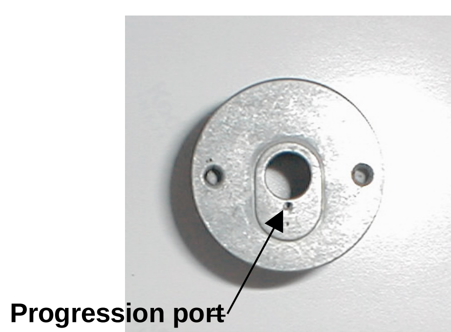
The above illustration shows relationship of the vacuum strength during throttle opening from - idle position to wide open throttle.Notice that vacuum strength decreases sharply as throttle opens and venturi section increases. As the tapered needle begins to move from idle, the idle system functions for approximately1/4 throttle valve opening because of the strong vacuum signal at low throttle openings. As engine RPM increases vacuum also increases allowing more fuel to be inducted into venturi.

Because of the lower vacuum during acceleration, metered fuel increases due to the tapered needle feature. As the needle moves up with throttle valve, vacuum begins to pickup as the engine rpm's increase. Note that vacuum is highest during small throttle openings. The tapered needle feature provides a combustible air/fuel ratio by allowing more fuel into the needle jet and on through the venturi. It is recognized here that the tapered needle is the key element for maintaining the correct A/F ratio throughout high speed and WOT phases of main



the Progression

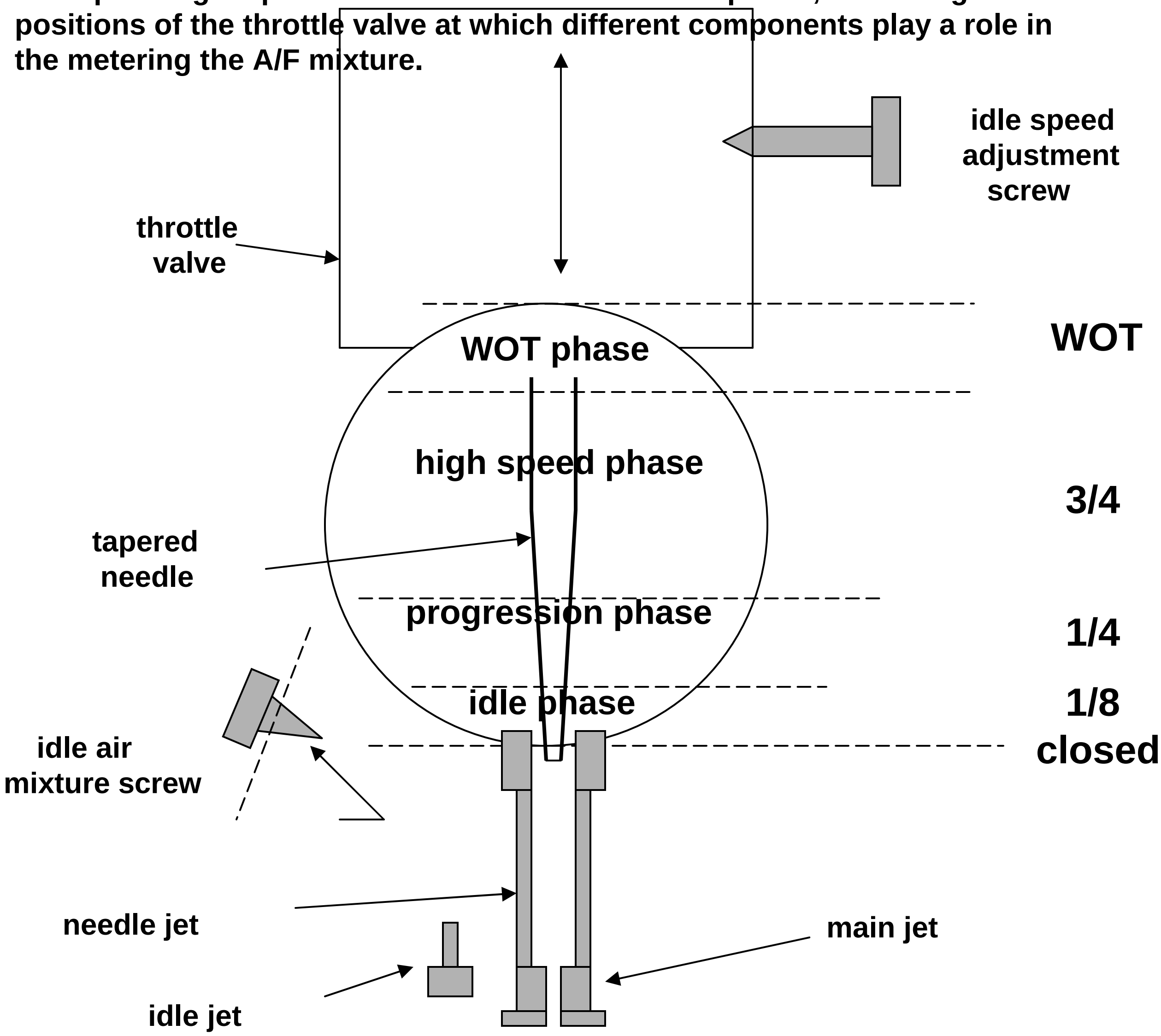
It is during the progression phase of throttle opening that the emulsified fuel from the idle port (downstream of the throttle valve) moving to the main air intake changes direction via the progression port and exits to the venturi (under the throttle valve). This additional charge of fuel is momentarily inducted into the venturi to provide fuel prior to the main circuit taking over.



View from inside venturi insert - atomized fuel exits momentarily under throttle valve into main air passage when acceleration begins. When the vacuum again becomes sufficient (as engine rpm picks up) the main circuit is now in full control.

the 4 phase operation

The operating sequence can be described as four phase, indicating four positions of the throttle valve at which different components play a role in the metering the A/F mixture.



<u>selective tuning components</u>

- **WOT phase - select main jet**
- **high speed phase - select needle jet and / or needle (taper)**
- **progression phase - select idle jet**
- **idle phase - adjust idle screw & idle air mixture screw - select idle jet**

Keys to understanding the set up procedure.

Stoichiometric – complete combustion of the fuel / air mixture. The only residuals are water vapor. It is important to understand that the complete ‘burn’ applies to all phases of carburetor function. In other words mixture of 14 to 1 A/F ratio should be the desired jetting at all throttle positions or the 4 phases of throttle position. The ratio could be 13.8 to 1 or 14.2 to 1 depending on atmospheric conditions.

***Idle set-up*: set idle before tuning main circuit. Any idle speed is OK within the drivers needs. Do idle tests to determine if 14 to 1 is present…. clean, crisp acceleration – no hesitations… engine speed may continue momentarily then drop to normal idle after throttle is closed.**

***Progression set-up*: the progression set up is done during the idle set-up procedure.**

***High speed* set-up: high speed set–up is done during test and/or visibly checking piston for correct burn.**

***WOT set-up*: wide open throttle is the same as the high speed set-up except ensuring that the mixture is rich enough to endure changes in air during the event.**

Remember that the driver can bring the throttle to a WOT position before the engine’s rpm brings vacuum up to full strength. Therefore the fuel / air charge lags somewhat behind a sudden throttle valve opening. As engine speed increases, vacuum increases allowing more air/fuel to the engine. The lag will occur every time the throttle is closed and opened again. Vacuum strength is fluctuating through the shift sequences. If main jetting is too lean engine damage may occur during low vacuum periods. The main jet is always in control of the metered fuel when the main circuit is operating.

When adjusting the carburetor for changes in altitude, select jetting for all phases of operation. Idle/Progression, High Speed and WOT.

Set up – Idle Phase

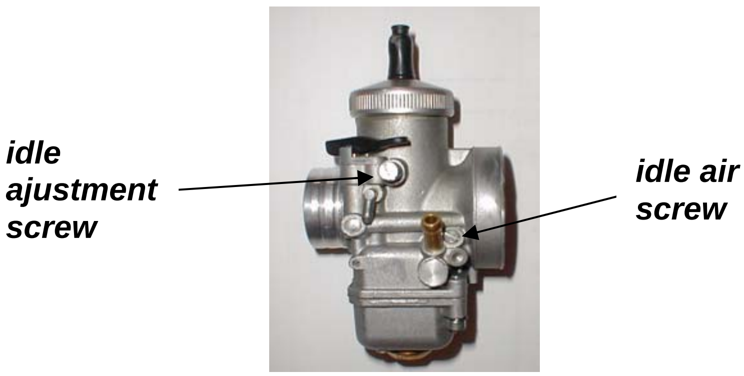
The initial setup for carburetion is done prior to the start of an event. If idle has been previously set then check for any change in idle performance.

- **Start the engine on the stand, let it idle for a moment to determine if idle is smooth and at a acceptable RPM. Idle RPM is normally a driver 'feel good' choice. Set idle with idle adjustment screw.**

Accelerate engine quickly to full throttle. If acceleration is smooth and sharp and engine returns to normal idle then idle settings are correct.

If the engine continues momentarily at a higher than previous set rpm the idle is too lean. If there is hesitation or sluggishness then check air screw (illustration 4) for rich or lean condition as follows:

- ***turn idle air screw clockwise for richer mixture. If acceleration improves mixture is too lean***
- ***turn idle screw counterclockwise for leaner mixture. If acceleration improves mixture is too rich***
- ***to lean mixture beyond capability of air screw install smaller number idle jet 12995XX illustration 3***
- ***to richen mixture beyond capability of air screw install larger number idle jet 12995XX illustration 3***
- ***do not go smaller (in number) with idle jet than the installed idle emulsion tube 13086XX***
- ***illustration 3***



Testing the Idle Setting

- **When the stationary set up has been completed for idle set up, make sure that high speed and WOT throttle jetting is OK for current conditions. The next phase of the set up will require track testing. If the idle setting is correct there should be no hesitation or loading up during pit starts, race starts or cornering exits. Engine should pull hard from closed throttle position. If not, determine if idle mixture is lean or rich and reset. If engine stumbles or goes flat off the turn, selecting a different needle jet may be required.**

During the idle phase metered fuel exits the idle jet downstream of main venturi nozzle

Set Up – Progression Phase

Since the progression phase is controlled with the idle circuit set up is primarily complete when the idle is satisfactory. To enrich progression increase idle jet number.

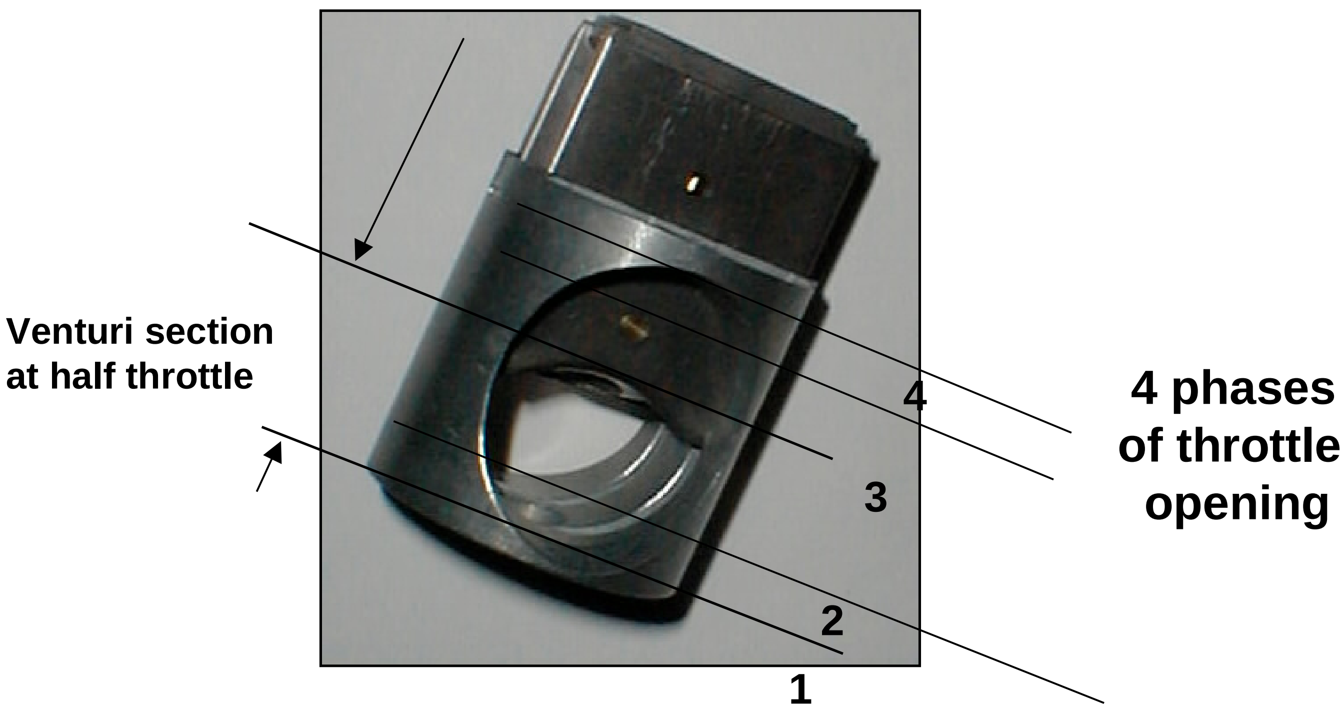
Illustration showing the throttle valve inserted in venturi insert demonstrating venturi effect and the relative 4 phase positions

(things to think about)

Two separate systems are working simultaneously to initiate the transition to the high speed phase from the *progression* phase.

1) *the idle fuel/air metering system and*
2) *the throttle valve system (vacuum) as it begins to draw metered A/F into the main air intake*

The metered fuel charge can lag somewhat behind the sudden opening of the throttle by the driver, at this point care must be taken to ensure that the main jet is not too small or a lean condition can occur momentarily until the vacuum signal strengthens as engine speed picks up. The main jet is not intended to meter fuel during the first 3 phases but will lean mixture if too small.



Note: as the throttle valve moves from closed to open, the venturi area increases. As the engine speed increases, the negative pressure increases as the tapered needle moves up allowing more metered fuel for the higher engine speed.

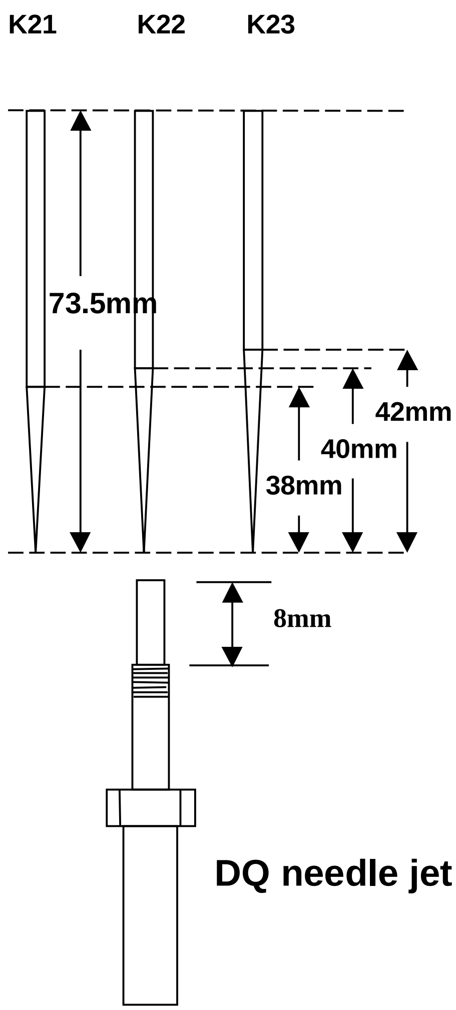
The *needle jet* size and/or the *needle* can be altered to get the desired mixture for the high speed phase of throttle opening.

During this phase the vacuum signal is beginning to strengthen, the needle taper is now exposed to the venturi nozzle and the mixture is proportionately enriched for acceleration to full power

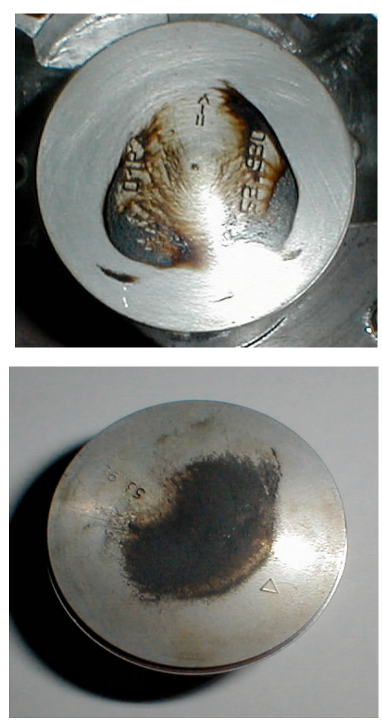
The *needle* can be varied by selecting a larger or smaller 'A' dimension (straight section) for overall increase/decrease in atomized fuel delivered prior to the WOT phase.

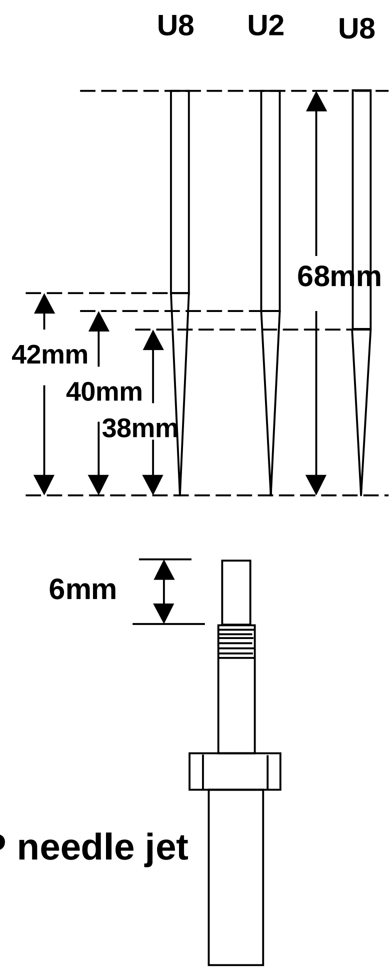
The 'C' or taper configuration can be altered to time the acceleration (earlier or later) as may be required for different track conditions and/or engine/chassis set up. The needle clip position can be altered to fine tune timing of mixture . The K21 would introduce the acceleration earlier during throttle opening, K23 later. Also notice that changing from a DQ / K to a DP / U needle jet / needle set up leans or richens by introducing the mixture earlier or later for acceleration because of the difference in the tube section that protrudes into the venturi nozzle. Interchanging of tube and needle allows finer tuning.

High Speed Phase Set up - ICC*



piston top showing correct pattern & color



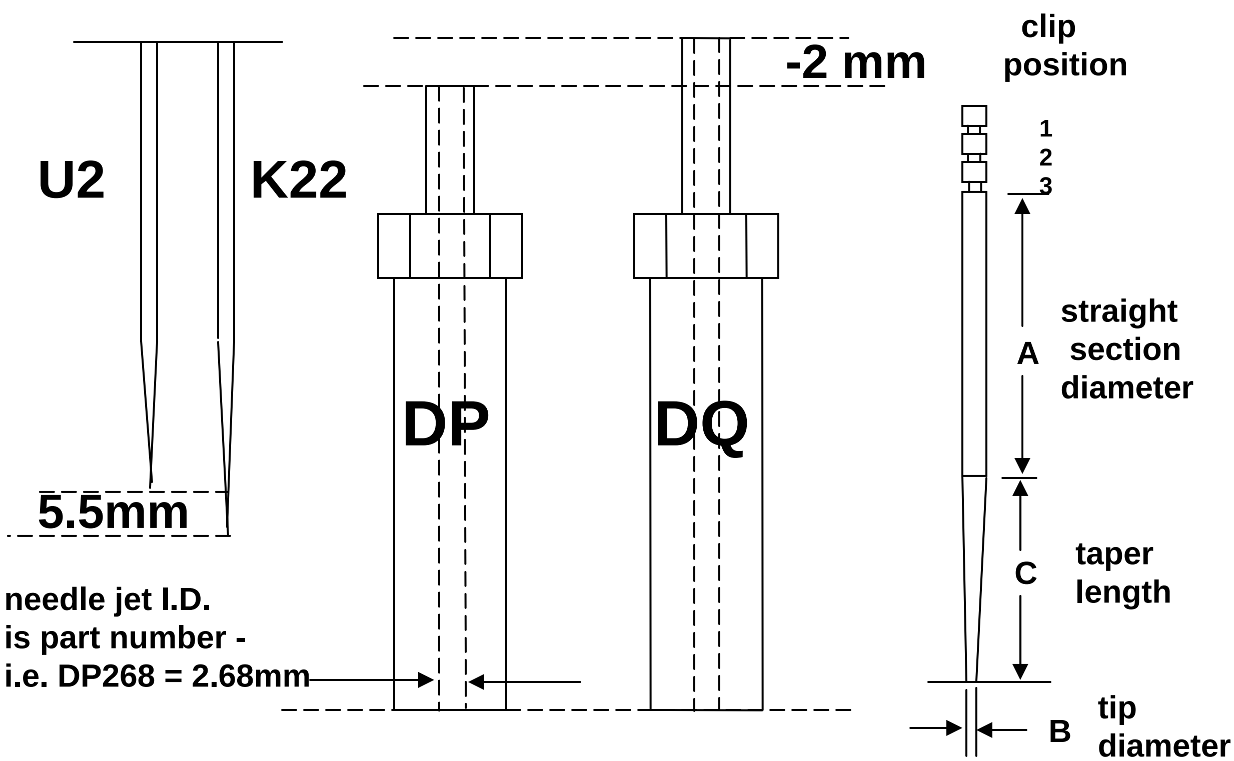


*** same for Rotax Max except FN needle jet & K27 needle**

Needle Jet & Needle

things to think about

**less tube protrusion in venturi nozzle
produces richer fuel delivery during acceleration**

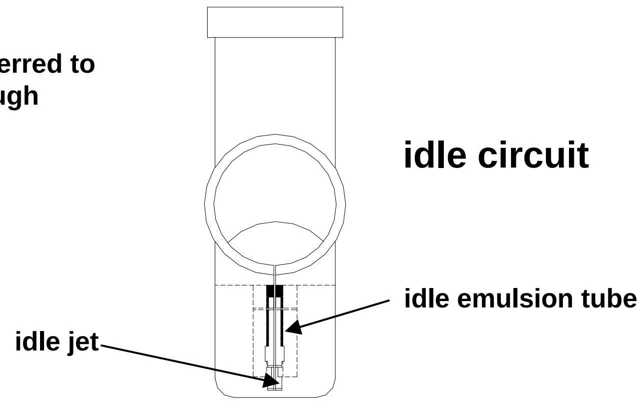


---generally, the K22 needle is matched up with the DQ needle jet --- the U2 with the DP needle jet --- --- the K22/DQ is leaner than the U2/DP during progression into high speed phase ---

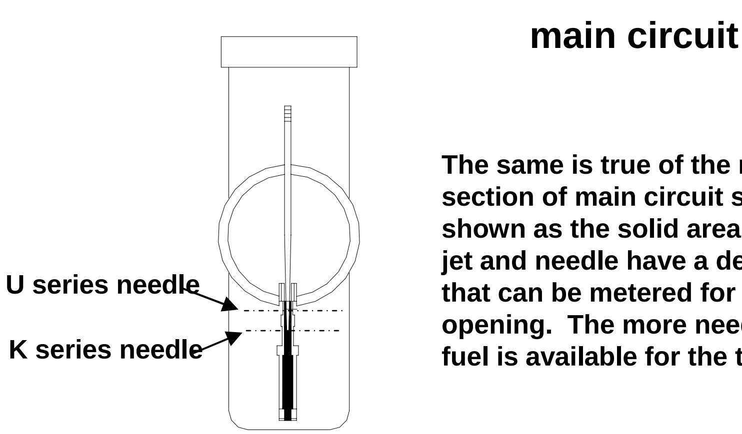
When reviewing needle selection, select only needles with 'A', 'B' & 'C' dimensions for kart application.

The ***idle*** & ***main circuit*** fuel flow 'reservoir' system

When determining selection of jets/needles for the *Idle* and *Main* circuits it should be noted that the idle emulsion tube section is sometimes referred to as a reservoir that is able to supply enough fuel for all idle conditions especially the progression phase when additional fuel is needed for acceleration. The length of the tube adds volume for the fuel needed for idle and progression phases.



Section of idle jet & idle emulsion tube showing 'reservoir' as mounted in carburetor body. The dark or solid area represents fuel available for the progression phase.

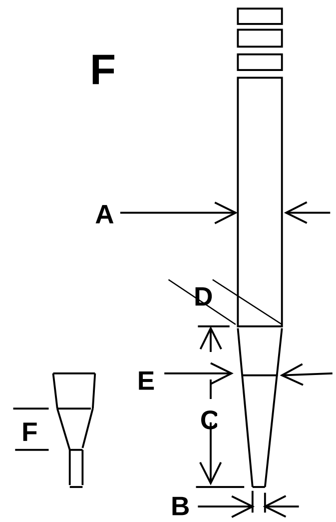


The same is true of the main circuit. The section of main circuit showing the fuel 'reservoir' is shown as the solid area. It is important to note that needle jet and needle have a definite role in the amount of fuel that can be metered for hi speed and WOT phases of throttle opening. The more needle protrusion into the needle jet less fuel is available for the throttle opening sequence.

In the main circuit system it becomes apparent that the U series needle provides more volume while the K series needle reduces volume. The volume can therefore considered to be a timing factor when tuning i.e. more volume - richer - less volume - leaner - during throttle opening.

'K' Needle Features

Type	A Ø	B Ø	C	D Ø	E	F
K1	2.45	1.75	37			
K2	2.45	1.75	42			
K3	2.50	1.50	39			
K4	2.45	1.50	39			
K5	2.45	1.50	37			
K6	2.45	1.75	39			
K7	2.45	1.25	39			
K8	2.50	1.50	37			
K9	2.45	1.50	42			
K11	2.50	1.25	39			
K12	2.48	1.75	32			
K13	2.45	1.25	38			
K14	2.48	1.75	36			
K15	2.50	0.60	36			
K16	2.50	1.75	39			
K17	2.42	1.75	40			
K18	2.50	1.40	38			
K19	2.50	1.40	40			
K20	2.50	1.40	42			
K21	2.50	1.80	38			
K22	2.50	1.80	40			
K23	2.50	1.80	42			
K24	2.50	1.20	38	2.130	18	
K25	2.50	1.00	36	2.150	18	
K27	2.50	1.80	44			
K28	2.50	1.80	41			
K29	2.45	1.25	42			
K30	2.50	1.40	36	2.150	18	
K31	2.45	1.50	36			
K32	2.48	1.70	44			
K33	2.50	1.80	44			
K34	2.50	1.40	40	2.110	18	
K35	2.50	1.40	43			
K36	2.50	1.40	38	2.170	20	
K37	2.50	1.40	39	2.120	18	
K38	2.50	1.40	38	2.130	18	
K39	2.48	1.45	36	2.280	26	
K40	2.50	1.40	40	2.180	22	
K41	2.50	1.40	40	2.140	22	
K42	2.50	1.40	38	2.150	22	

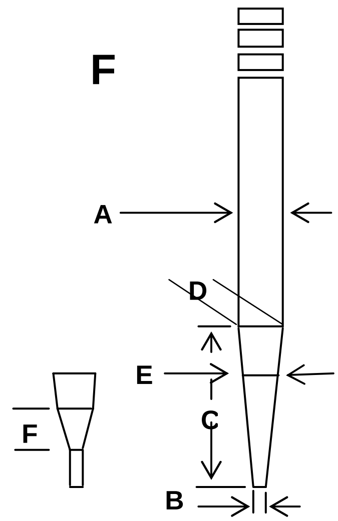


'K' Needle Features

K43	2.50	1.40	42	2.160	26	
K44	2.50	1.40	39	2.060	20	
K45	2.48	1.30	36	2.280	26	
K46	2.50	1.40	40	2.150	20	11
K48	2.48	1.50	36	2.250	25	11
K49	2.50	1.40	39	2.200	26	11
K50	2.50	1.40	39	2.270	26	11
K52	2.50	1.60	39	2.250	25	
K53	2.52	1.60	36	2.250	25	
K54	2.48	1.50	40	2.108	18	
K56	2.50	1.20	38	2.170	20	11
K57	2.50	1.40	37	2.232	26	
K58	2.46	1.60	36	2.250	11	
K59	2.50	1.40	39	2.230	11	
K60	2.46	1.60	39	2.130	25	11
K61	2.44	1.60	39	2.130	25	11
K62	2.48	1.50	39	2.130	25	
K63	2.46	1.60	39	2.100	25	11
K65	2.46	1.60	39	2.160	25	11
K66	2.44	1.60	39	2.160	25	11
K67	2.44	1.60	39	2.100	25	11
K68	2.42	1.60	39	2.070	25	11
K69	2.48	1.60	39	2.100	25	11
K70	2.42	1.60	39	2.040	25	11
K71	2.44	1.60	39	2.070	25	
K72	2.50	1.20	38	2.200	22	
K76	2.46	1.55	39	2.100	25	11
K77	2.46	1.60	39	2.070	25	11
K78	2.48	1.60	39	2.070	25	
K79	2.48	1.60	39	2.040	25	11
K80	2.40	1.60	39			
K81	2.44	1.55	39	2.070	25	11
K82	2.48	1.55	39	2.100	25	11
K83	2.44	1.55	39	2.040	25	11
K84	2.48	1.50	39	2.100	25	
K85	2.48	1.50	39	2.070	25	11
K87	2.48	1.45	39	2.100	25	11
K88	2.56	1.43	32.4	2.120	16.2	
K89	2.48	1.50	39	2.070	25	
K90	2.50	1.75	42			
K91	2.47	1.40	39	2.270	26	
K92	2.50	1.60	38			
K93	2.50	1.60	40			
K94	2.50	1.65	38			
K95	2.50	1.65	40			
K98	2.52	1.80	41			

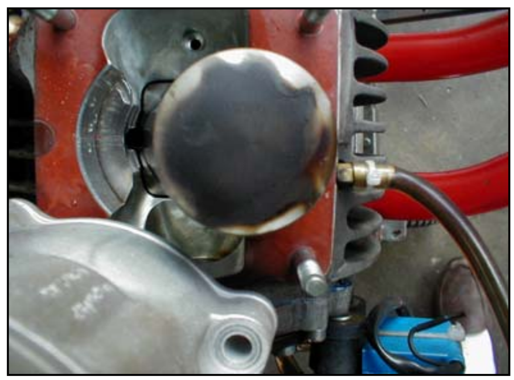
U Needle Features

Type	A Ø	B Ø	C	D Ø	E	F
U1	2.46	1.40	40			
U2	2.50	1.80	40			
U3	2.50	1.40	34			
U4	2.50	1.40	38			
U5	2.50	1.40	40			
U6	2.50	1.40	42			
U7	2.50	1.80	38			
U8	2.50	1.80	42			
U9	2.48	1.00	28	2.11	16	
U10	2.50	1.00	30	2.06	18	
U11	2.50	1.00	28	2.11	16	
U12	2.50	1.40	32			
U13	2.45	1.20	28			
U14	2.40	0.60	28	2.23	2	
U15	2.50	1.20	32			
U16	2.50	1.80	32			
U17	2.50	0.60	36			
U18	2.48	1.00	34			
U19	2.44	1.00	32.6			
U20	2.44	1.00	34.5			
U21	2.44	1.00	36			
U22	2.50	1.00	36.5			
U23	2.46	1.00	36.5			
U24	2.46	1.00	34			
U25	2.48	1.00	36.5			

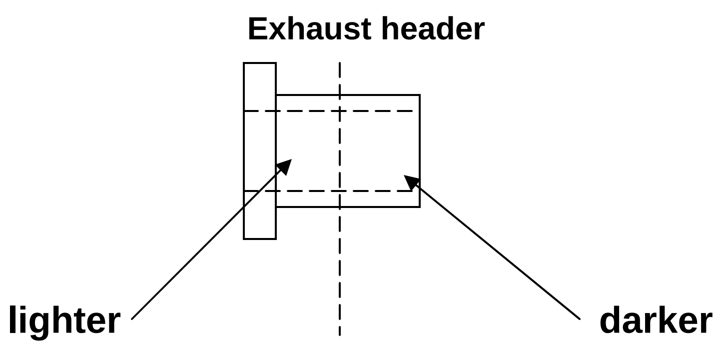


WOT Open Throttle Phase Set Up

The set up procedure for WOT generally will consist of altering main jet only. Again the piston burn color and pattern will determine correct mixture. At this point it may be helpful to know that when skill has been acquired in 'reading' the piston an alternative method for checking for the correct mixture at full power is to read the inside of the exhaust header. This can be done by removing the exhaust pipe and examining the inside of the header for: approximately 50% of I.D. of header closest to piston for a light or medium gray color and the outer 50% a darker gray.



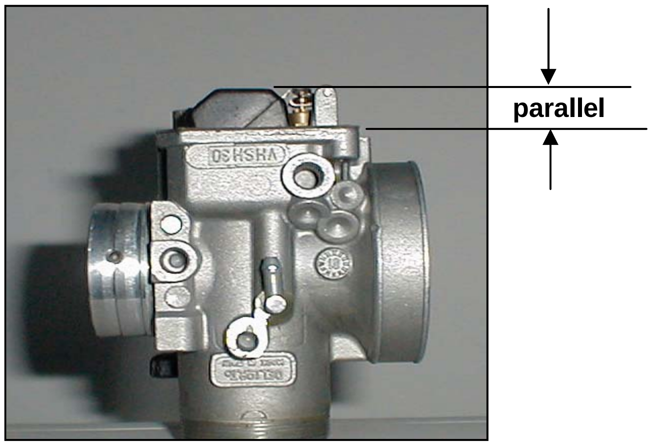
This method or 'read' should be used only after a correlation between the piston read and the header read has be developed by repetitive reads of the piston.



Note: when visually examining piston for pattern and color, oil can be visible on combustion chamber and piston

Setting the Float Level - all Dell’Orto

Normally there is no reason to change the float setting on the from the factory specification. The float level is checked by removing the float chamber cover (3) screws and holding carburetor upside down. Sight along float chamber interface noting that float assembly is parallel with interface.



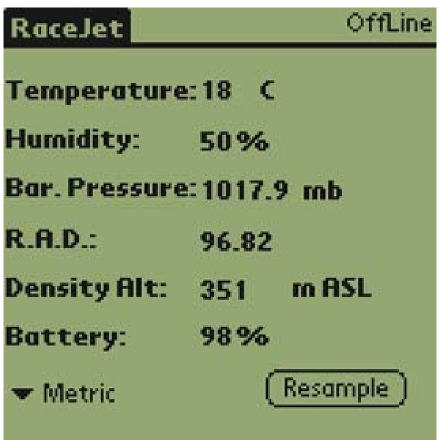
if float assembly is not parallel correct by gently bending tab that connects float(s) to the needle valve assembly

Selecting the Needle Valve

Selecting the needle valve size is generally done by making a calculation that ensures the needle valve will pass enough fuel to supply the WOT phase for continuous operation. The needle valve should bearound 40% larger than the largest main jet used. I.E: if 180 is the maximum main jet required for all conditions then a 250 needle valve is the minimum size that should be installed.

Test Equipment

Kinsler Air Density Indicator



Screenshot of RaceJet Weather Pod Software (in Metric Settings)

The air density gauge is probably the most important piece of equipment for performing carburetor set up. The gauge shown is a modified altimeter converted for reading air density rather than altitude.

Using the gauge to read the A/D during testing or events gives the tuner a solid piece of data for recording changes in atmosphere during the day. Changes in A/D can alert the tuner to make decisions on jetting.

Once the tuner is confident with using his/her gauge readings for selecting the correct jetting the jet data will correspond with all future readings as long as the same gauge is used for each outing. Using readings from other units can result in errors in jetting because different gauges may indicate some variation in readings.

Using the A/D gauge

- **keep unit out of direct sunlight. When testing begins, record reading on dial**
- **do test or practice run**
- **make determination on jetting**
- **when the correct jetting is established, record A/D number for jet(s) size**
  (This number is now the correct setting for all like readings
  i.e. - A/D reads 95 = 165 main jet / K22 needle (position 2) / 268DQ NJ

Note: When determining jet size for changes in air density examine piston top for appearance. If the piston is very dark and damp the mixture is too rich. If the piston is light and dry the mixture may be too lean. Use example on page 12 as a guide. There should be a light coating of oil on cylinder wall and cylinder head.

Simplifying air density readings can be done with the RaceJet Weather Pod. A unit that provides temperature, humidity, barometric pressure, air density, density altitude via a Palm Pilot or Laptop.
For the serious tuner Flexible Fiberoptic Scopes are available for examining the piston and combustion chamber without removing the cylinder head.

Flexible Fiberoptic Scope
(not to scale)

Relative Main Jet

(things to think about)

% throttle

The number indicates relative main jet

needle jet	K48 needle pos (from top)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	WOT
262	1	84	84	84	93	111	127	147	170	189	205	207
262	2	84	84	84	99	117	131	155	177	194	207	207
262	3	84	84	84	105	122	137	163	183	199	207	207
262	4	84	84	92	111	126	146	169	188	204	207	207
264	1	91	91	91	98	116	131	151	173	192	207	210
264	2	91	91	91	104	121	135	59	180	197	210	210
264	3	91	91	91	110	126	141	166	185	202	210	210
264	4	91	91	97	115	130	150	172	191	206	210	210
266	1	96	96	96	103	121	135	154	177	195	210	212
266	2	96	96	96	109	125	139	162	183	200	212	212
266	3	96	96	96	115	130	145	169	188	204	212	212
266	4	96	96	102	120	134	153	175	194	209	212	212
268	1	102	102	102	108	125	139	158	180	197	212	215
268	2	102	102	102	114	130	143	165	185	202	215	215
268	3	102	102	102	119	134	148	172	191	207	215	215
268	4	102	102	108	124	138	156	178	196	211	215	215
		idle		progression				high speed			WOT	

The data illustrates the metering of fuel relative to throttle opening position. It emphasizes the importance of selecting to get as close to stoichiometric as possible or 14 to 1 A/F ratio for maximum performance through all throttle positions.

The main jet controls the amount of fuel in the main circuit

Area - (sq mm) relationships of the needle - needle jet and main jet

Needle	Tip	Area
K20	1.40	1.539
K22	1.80	2.545

Needle Jet	Area
262	5.391
264	5.473
266	5.557
268	5.641

It is important to recognize the mathematics of jetting when tuning the Dell'Orto carburetor. Since fuel metering and timing is controlled by the clearances (annulus) between the needle jet and needle, main jet and needle tip, needle and needle jet features then changes to these components should be made proportionately to the factors that initiate a change such as weather, power requirements and driver preference.

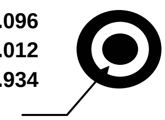
Dell'Orto jetting numbers refer to size of the jet size in millimeters. The data shows the area of the component orifice related to the mating component……. *needle jet* related to the *needle tip* or the *main jet* related to the *needle tip* etc.

Needle Jet size	Needle Jet area -	K20 Needle area	*Annulus =
262	5.391	1.539	3.852
264	5.473	1.539	3.934
266	5.557	1.539	4.018
268	5.641	1.539	4.102

***Annulus = clearance for fuel to pass through the needle jet/main jet but around needle profile**

Needle Jet size	Needle Jet - area	K22 Tip Area	Annulus
262	5.391	2.545	2.846
264	5.473	2.545	2.928
266	5.557	2.545	3.012
268	5.641	2.545	3.096

Needle jet	Annulus
K22/268	3.096
K22/266	3.012
K20/264	3.934



annulus

The tables above show the clearance created for fuel passage by mathematically developing the annulus - needle jet or main jet - needle tip - = area for fuel passage

Main Jet number	Jet Size mm	Area sq mm	difference in sq mm to next jet	percent change from 130 to…	percent change to next jet size	percent change to next jet size
130	1.30mm	1.327	………..	………..	$\boxed{130}$	5.9%
132	1.32mm	1.368	0.041	3.1%	3.1%	5.8%
135	1.35mm	1.431	0.104	7.8%	4.7%	3.8%
138	1.38mm	1.469	0.142	10.7%	2.9%	3.8%
140	1.40mm	1.539	0.212	16.0%	5.3%	5.6%
142	1.42mm	1.583	0.256	19.3%	3.6%	5.4%
<u>145</u>	1.45mm	1.651	0.324	24.4%	5.1%	3.5%
148	1.48mm	1.720	0.393	29.6%	5.2%	3.6%
150	1.50mm	1.767	0.440	33.2%	3.6%	5.2%
152	1.52mm	1.814	0.487	36.7%	3.5%	5.1%
155	1.55mm	1.886	0.559	42.1%	5.4%	3.6%
158	1.58mm	1.960	0.633	47.7%	5.6%	5.3%
160	1.60mm	2.010	0.683	51.5%	3.8%	2.9%
162	1.62mm	2.061	0.734	55.3%	3.8%	4.7%
165	1.65mm	2.138	0.811	62.0%	5.8%	3.1%
168	1.68mm	2.216	0.889	67.0%	5.9%	3.6%
170	1.70mm	2.270	0.943	71.1%	2.4%	2.4%
172	1.72mm	2.324	0.997	75.1%	3.4%	3.4%
175	1.75mm	2.405	1.078	81.2%	3.5%	3.5%
178	1.78mm	2.488	1.161	87.5%	3.3%	2.3%
180	1.80mm	2.545	1.218	91.8%	2.2%	2.2%
182	1.82mm	2.602	1.275	96.1%	2.2%	3.3%
185	1.85mm	2.688	1.361	102.6%	3.2%	3.3%
188	1.88mm	2.776	1.449	109.2%	3.2%	2.1%
190	1.90mm	2.835	1.508	113.6%	2.1%	2.0%
192	1.92mm	2.895	1.568	118.2%	2.1%	3.1%
195	1.95mm	2.986	1.659	125.0%	3.0%	3.0%
198	1.98mm	3.079	1.752	132.0%	3.0%	2.0%
200	2.00mm	3.142	1.815	136.8%	2.0%	<u>200</u>

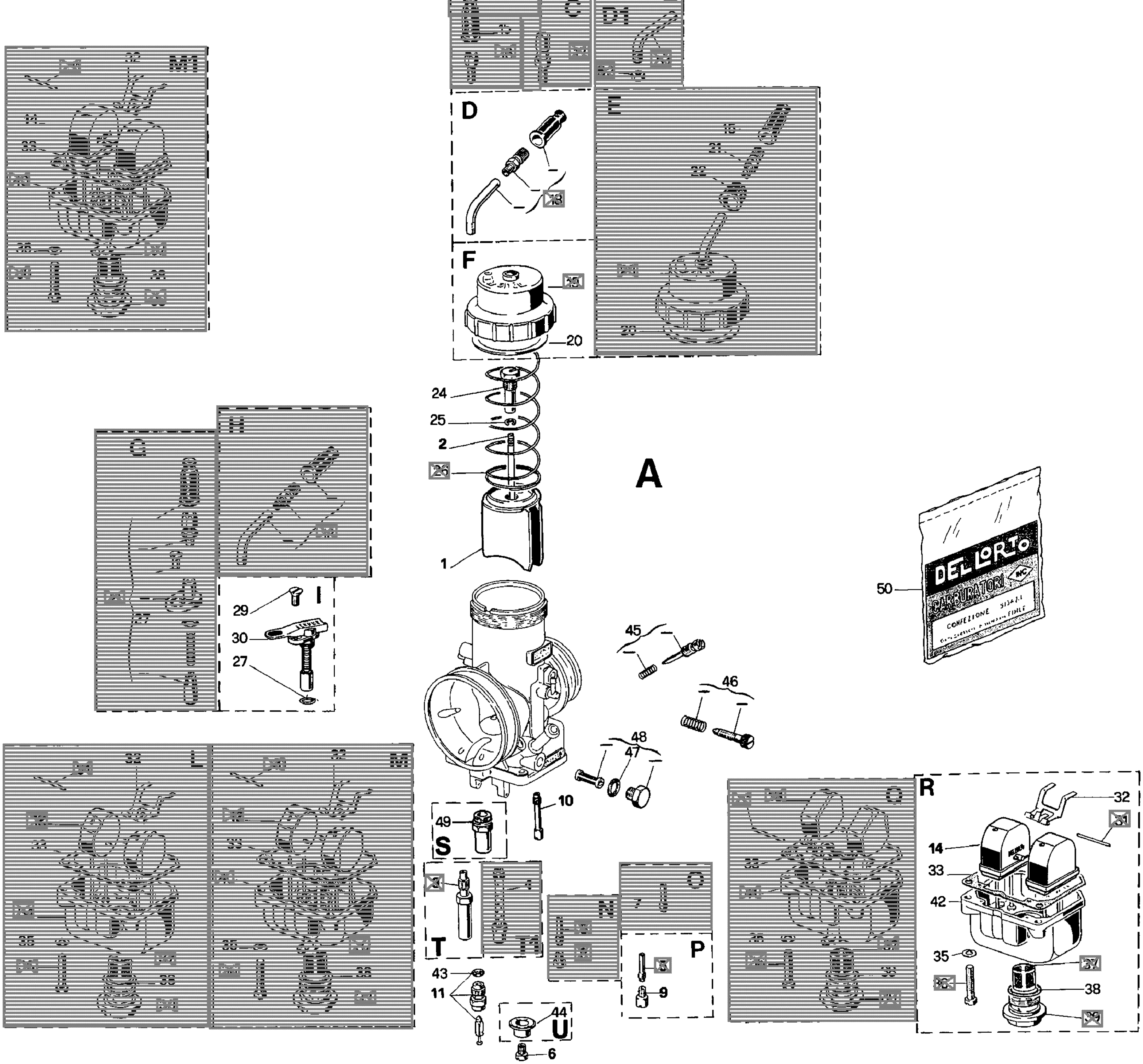
NOTE: use this chart to estimate amount of change for jetting as air density changes

I.E. if you are running a 142 main jet (area 1.583) and before next run the R.A.D.* increases by 5% then look for approximately a 5% decrease in jet size or in this case a 140 (1.539) decreases area by 5.3%

If R.A.D. drops look for closest corresponding larger main jet…… R.A.D. drop 5% then the 145 (1.651) privides a 5.1% increase in jet size

Notice the amount of change - flow - from 130 to 168

*** relative air density**



This is the graphic showing the components used only on the Rotax Max engine. Parts listed as legal for Rotax Max competition are:

K27 needle (2)	30 inner idle tube (5)	30 outer idle jet (9)	5.2 gram float (14)
K54 needle	60 inner idle tube	60 outer idle jet	3.6 gram float
K98 needle			

DELLORTO

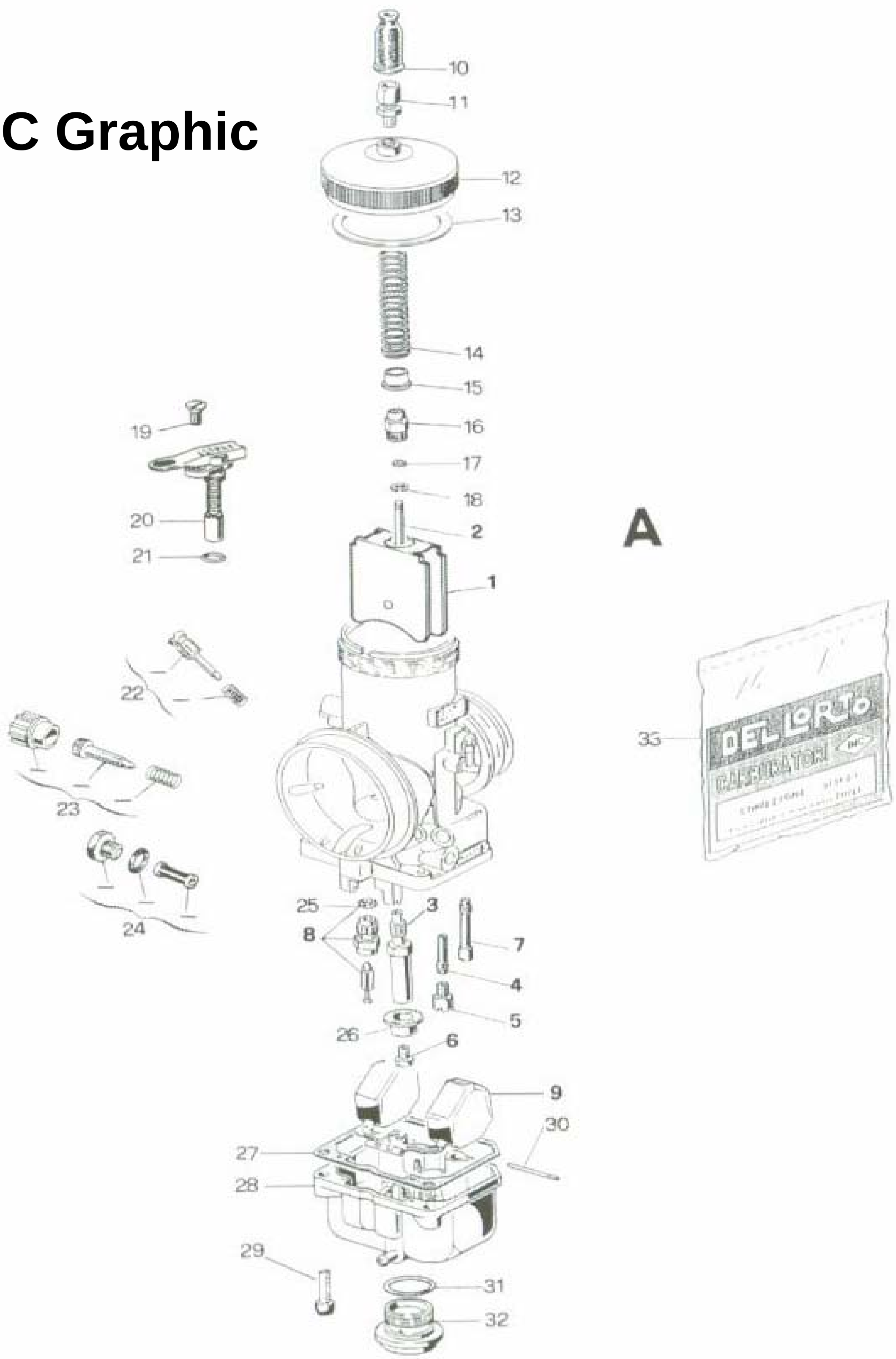
MOTOVEICOLI

Veicolo: Motore Kart FR 125 Max 1997

Regolazione: 09796

N°	Codice	Descrizione	Qta
0	09796	VHSB 34 QD	1
1	1476040 64	VALVOLA GAS	1
2	0853027 08	SPILLO CONICO K	1
4	14206266 28	POLVERIZZATORE FN	1
6	06413168 02	GETTO	1
7	1308630 02	GETTO	1
9	1299530 02	GETTO	1
10	0621760 02	GETTO	1
11	10375150 33	VALVOLA A SPILLO	1
14	1576004 80	GALLEGGIANTE	2
15	1137700 06	CAPPUCCIO	1
20	5261200 77	BUSTA GUARNIZIONI	1
21	0893200 37	VITE	1
22	1333600 06	CAPPUCCIO	1
24	1088900 04	NIPPLO	1
25	0959600 21	FERMAGLIO	1
27	5261200 77	BUSTA GUARNIZIONI	1
29	1175200 36	VITE	1
30	0829400 64	DISPOSITIVO AVVIAMENTO	1
32	1054400 26	BILANCIERE	1
33	5261200 77	BUSTA GUARNIZIONI	1
35	0495700 23	RONDELLA	3
38	5261200 77	BUSTA GUARNIZIONI	1
42	1441500 96	VASCHETTA	1
43	5261200 77	BUSTA GUARNIZIONI	1
44	1254600 52	FONDELLO	1
45	5309100 78	KIT VITE REG. ARIA	1
46	5309000 78	KIT VITE REG.VALVOLA	1
47	5261200 77	BUSTA GUARNIZIONI	1
48	5308900 78	KIT FILTRO BENZINA	1
49	1333900 33	SEDE	1
50	5261200 77	BUSTA GUARNIZIONI	1

ICC Graphic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DEL LORTO
CARBURATORI

ICC Parts List

Item	Part Number	Description
		Selective Fuel / Air Metering Components
1	D16314-50	Valve - throttle (# 50)
	D16314-55	Valve - throttle (# 55)
	D16314-60	Valve - throttle (# 60)
2	D9713-U2	Needle - U 2 1a + 1/2
	D9713-U2	Needle - U 7 1a + 1/2
	D8530-K22	Needle - K22
3	D12539-262	Needle Jet (DP 262)
	D12539-264	Needle Jet (DP 264)
	D12539-266	Needle Jet (DP 266)
	D12539-268	Needle Jet (DP 268)
	D12542-262	Needle Jet (DQ 262)
	D12542-264	Needle Jet (DQ 264)
	D12542-266	Needle Jet (DQ 266)
	D12542-268	Needle Jet (DQ 268)
4	D13086	Tube - emulsion - idle jet (# 45)
5	D12995	Jet - idle (# 45)
6	D6413	Jet - main (# 178)
7	D6217	Jet - choke air (# 60)
8	D8649	Valve - needle (# 250)
9	D12630	Float - # 1
		Non Fuel / Air Metering Components
10	D14050	Boot - throttle cable
11	D8931	Anchor - throttle cable housing
12	D16309	Cap - carburetor
13	*	Gasket - cap
14	D16344	Spring - throttle return
15	D14416	Guide - spring
16	D16311	Anchor - throttle cable
17	D10825	Washer - fiber
18	D9596	Clip - needle
19	D11752	Screw - choke assembly
20	D8294	Choke assembly
21	*	Gasket - choke assembly
22	D53091	Idle air adjuster assembly
23	D53090	Idle adjustment assembly
24	D53089	Fuel filter assembly
25	*	Gasket - needle valve
26	D12546	Cup - fuel baffle
27	*	Gasket - float bowl
28	D14414	Bowl - float
29	D14858	Screw - float bowl
30	D12692	Pin - float pivot
31	*	Gasket - nut
32	D16316	Nut - float bowl
33	D52611	Gasket kit

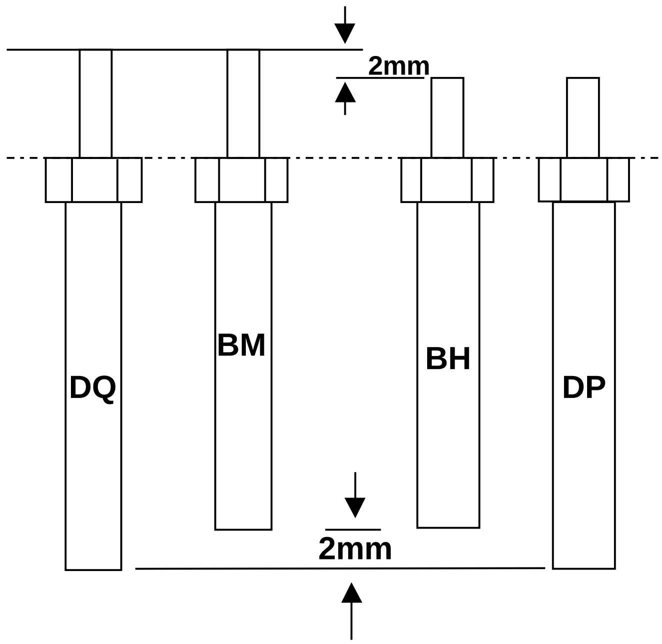
Selective Fuel / Air Metering Components

Part Number	Description	ICC	Rotax Max	Air/Fuel
16314 - 50	Valve - Throttle - 50	VHSH 30		air
16314 - 55	Valve - Throttle - 55	VHSH 30		air
16314 - 55	Valve - Throttle - 55	VHSH 30		air
14760 - 40	Valve - Throttle - 40		VHSB 34	air
8530 - K21	Needle - K21	VHSH 30		fuel
8530 - K22	Needle - K22	VHSH 30		fuel
8530 - K23	Needle - K23	VHSH 30		fuel
8530 - K54	Needle - K54		VHSB 34	fuel
12539 - 262	Needle Jet - DP 262	VHSH 30		fuel
12539 - 264	Needle Jet - DP 264	VHSH 30		fuel
12539 - 266	Needle Jet - DP 266	VHSH 30		fuel
12539 - 268	Needle Jet - DP 268	VHSH 30		fuel
12542 - 262	Needle Jet - DQ 262	VHSH 30		fuel
12542 - 264	Needle Jet - DQ 264	VHSH 30		fuel
12542 - 266	Needle Jet - DQ 266	VHSH 30		fuel
12542 - 268	Needle Jet - DQ 268	VHSH 30		fuel
14206 - 266	Needle Jet - FN 266		VHSB 34	fuel
12995 - 045 Thru 070	Idle Jet	VHSH 30		fuel
12995 - 030	Idle Jet -30		VHSB 34	fuel
6413 - 120 thru 180	Main Jet last digit seq is: 0,2,5,8	VHSH 30	VHSB 34	fuel
6217	Choke Jet - 60		VHSB 34	fuel
8649 - 300	Needle Valve - 300	VHSH 30		fuel
8649				
10375 - 150	Needle Vave - 150		VHSB 34	fuel
12630	Float Asm	VHSH 30		fuel
15760	Float Asm		VHSB 34	fuel
13086 - 045 thru 070	Idle Jet emulsion tube - 45	VHSH 30		fuel
13086 - 30	Idle Jet emulsion tube - 30		VHSB 34	fuel

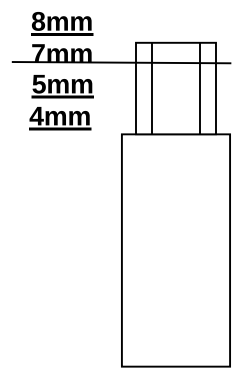
VHSH BS/CS ICC Technical Specification

<u>Atomizer Tube</u>, <u>Needle</u>, <u>Slide</u> & <u>Nozzle</u>

<u>Atomizer Tube Spec</u>



nozzle spec



standard nozzle
7mm

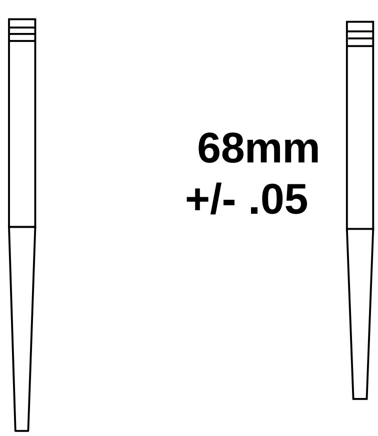
Atomizer tubes for use in the VHSH carburetor

<u>needle spec</u>

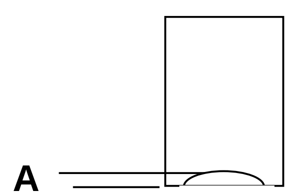
'K' Series **'U' Series**

73.60mm
+/- .05

68mm
+/- .05



<u>slide spec</u>



<u>Slide #</u>	<u>A</u>
30	3.0mm
40	4.0mm
50	5.0mm
55	5.5mm
60	6.0mm

Dell'Orto idle and choke jet Selection Chart - VHSB 34 / VHSH 30

D12995-030	**pilot jet #30**	**D13086-26**	**idle jet emulsion tube #26**	**D6217-040**	**choke jet #40**
D12995-032	**pilot jet #32**	**D13086-30**	**idle jet emulsion tube #30**	**D6217-050**	**choke jet #50**
D12995-034	**pilot jet #34**	**D13086-32**	**idle jet emulsion tube #32**	**D6217-055**	**choke jet #55**
D12995-035	**pilot jet #35**	**D13086-34**	**idle jet emulsion tube #34**	**D6217-060**	**choke jet #60**
D12995-036	**pilot jet #36**	**D13086-35**	**idle jet emulsion tube #35**	**D6217-065**	**choke jet #65**
D12995-038	**pilot jet #38**	**D13086-36**	**idle jet emulsion tube #36**	**D6217-070**	**choke jet #70**
D12995-040	**pilot jet #40**	**D13086-38**	**idle jet emulsion tube #38**	**D6217-075**	**choke jet #75**
D12995-042	**pilot jet #42**	**D13086-40**	**idle jet emulsion tube #40**	**D6217-080**	**choke jet #80**
D12995-044	**pilot jet #44**	**D13086-42**	**idle jet emulsion tube #42**	**D6217-120**	**choke jet #120**
D12995-045	**pilot jet #45**	**D13086-44**	**idle jet emulsion tube #44**		
D12995-046	**pilot jet #46**	**D13086-45**	**idle jet emulsion tube #45**		
D12995-048	**pilot jet #48**	**D13086-46**	**idle jet emulsion tube #46**		
D12995-050	**pilot jet #50**	**D13086-48**	**idle jet emulsion tube #48**		
D12995-052	**pilot jet #52**	**D13086-50**	**idle jet emulsion tube #50**		
D12995-054	**pilot jet #54**	**D13086-52**	**idle jet emulsion tube #52**		
D12995-055	**pilot jet #55**	**D13086-54**	**idle jet emulsion tube #54**		
D12995-056	**pilot jet #56**	**D13086-55**	**idle jet emulsion tube #55**		
D12995-057	**pilot jet #58**	**D13086-56**	**idle jet emulsion tube #56**		
D12995-058	**pilot jet #57**	**D13086-58**	**idle jet emulsion tube #58**		
D12995-059	**pilot jet #59**	**D13086-60**	**idle jet emulsion tube #60**		
D12995-060	**pilot jet #60**	**D13086-62**	**idle jet emulsion tube #62**		
D12995-061	**pilot jet #61**	**D13086-64**	**idle jet emulsion tube #64**		
D12995-062	**pilot jet #62**	**D13086-65**	**idle jet emulsion tube #65**		
D12995-063	**pilot jet #63**	**D13086-66**	**idle jet emulsion tube #66**		
D12995-064	**pilot jet #64**	**D13086-68**	**idle jet emulsion tube #68**		
D12995-065	**pilot jet #65**	**D13086-70**	**idle jet emulsion tube #70**		
D12995-066	**pilot jet #66**	**D13086-72**	**idle jet emulsion tube #72**		
D12995-068	**pilot jet #68**	**D13086-75**	**idle jet emulsion tube #75**		
D12995-070	**pilot jet #70**				
D12995-072	**pilot jet #72**				
D12995-075	**pilot jet #75**				
D12995-080	**pilot jet #80**				
D12995-085	**pilot jet #85**				
D12995-090	**pilot jet #90**				
D12995-095	**pilot jet #95**				
D12995-100	**pilot jet #100**				
D12995-101	**pilot jet #101**				
D12995-102	**pilot jet #102**				
D12995-104	**pilot jet #104**				
D12995-106	**pilot jet #106**				
D12995-108	**pilot jet #108**				
D12995-110	**pilot jet #110**				
D12995-112	**pilot jet #112**				
D12995-114	**pilot jet #114**				
D12995-116	**pilot jet #116**				
D12995-118	**pilot jet #118**				
D12995-119	**pilot jet #119**				
D12995-120	**pilot jet #120**				
D12995-122	**pilot jet #122**				
D12995-124	**pilot jet #124**				
D12995-126	**pilot jet #126**				
D12995-128	**pilot jet #128**				
D12995-130	**pilot jet #130**				
D12995-132	**pilot jet #132**				
D12995-135	**pilot jet #135**				

Tuner Tips
‘throttle position method’

Looking at the carburetor function from the ‘throttle position’ or from *idle* to *WOT*, may help to tune for a *specific set* up. We can establish definite parameters for tuning by defining the factors that will continuously change from day to day and track to track:

- **Track layout - track length, number of turns, length of straight(s), turn radius etc.**
- **Weather conditions - *Weather conditions* are air density (density altitude) and no doubt dry or wet track surface.**
- **Engine load - the amount of work that the engine can do in a given amount of time. The factor here will be gear ratio. A high numerical ratio (short track) will allow the engine to accelerate easier or faster.**

Next: throttle input from the driver controls engine power. Throttle position will give us the starting point for determining tuning changes. I.E. if the engine is not performing at small throttle opening then we can start with the idle or progression circuit. Looking at the throttle opening from closed to fully open we can use a window as an example for determining where to tune at a given opening:

- **at the closed position the only phase working is the *idle* circuit**
- **from idle to partially (approximately 1/4) the *progression* phase of the main circuit**
- **at approximately 1/4 to 3/4 the *high speed* phase of the main circuit is working**
- **at full throttle the *WOT* phase of the main circuit is working**

The throttle valve cycle starts at the closed window position then moves to various positions of intermediate opening and then to a fully open window. At the closed window position (*idle*) the engine must idle at a comfortable idle speed but since the idle jet/atomizer tube/throttle cutout assist in the *progression* phase, idle is important. The *progression* is a smaller portion of the window opening and tuning is done mainly with the *idle* circuit to get acceleration stated properly with no hesitation.

During *hi speed* opening it becomes apparent that the window will be open for the longest duration of time for a complete <u>*close*</u> / <u>*open*</u> / <u>*close*</u> cycle. It is this window that tuning can be focused for possible performance gains. Tuning in this window will be done mainly with the needle and atomizer tube. The needle features: A -straight dimension, B - tip diameter & C - taper length. The atomizer tube features: length of tube that extends into the float chamber, length of tube that extends into the nozzle and I.D. of the tube.

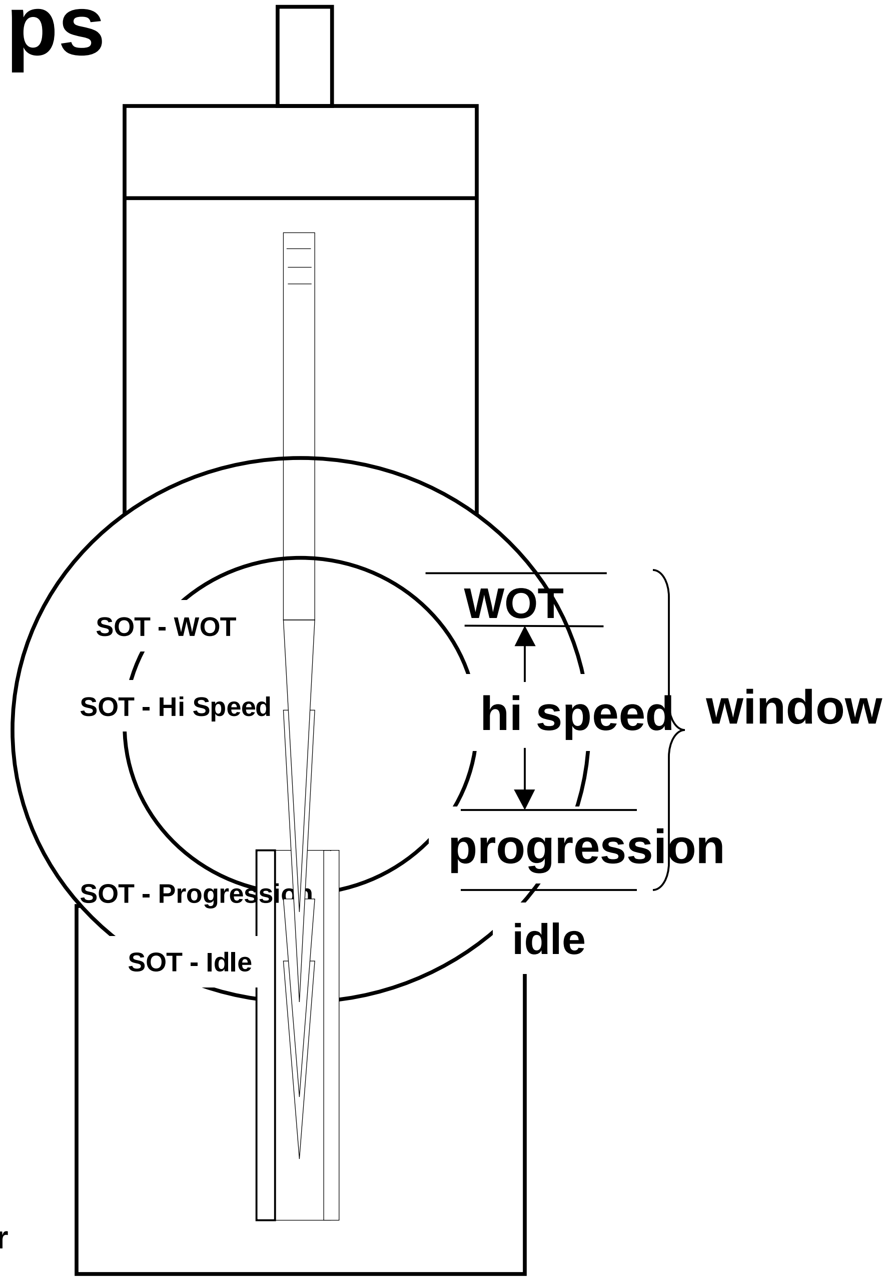
Note also that atomizer tube design contributes to the timing of the fuel reaching the engine. A short upper nozzle portion of the atomizer such as the DP is considered a richer selection for acceleration (*progression*) since the fuel will be delivered to the engine sooner. The DQ with the longer upper nozzle portion is considered leaner during acceleration. Essentially the <u>amount</u> and <u>timing</u> of the fuel are the key elements for getting proper tuning results in the high speed phase.

When tuning within the *high speed* phase, track configuration and gearing should be considerations for establishing tuning changes. Tracks that are shorter and tighter may require more fuel quicker to provide maximum power for handling and ‘squirting’ between corners. It may be desirable to bring fuel to the engine sooner by using a needle with longer ‘C’ dimension (taper) or a atomizer tube with a shorter upper nozzle.

Tuning in the *high speed* phase will improve performance through a wider band of throttle position and lap times may be improved considerably. Remember that the *amount* and *timing* of the fuel mixture is the key to maximum throttle response. Note also that even though the driver perceives the throttle position as being wide open most of the time the carburetor phases all have to be accomplished each time the throttle is closed and opened again.

Note: the main jet should meter fuel only during the WOT phase I.E. if the main jet is too small it can lean the *progression* and *high speed* phases. Weather will be a tuning factor regardless of which phase is being tuned. So try tuning in the *high speed* phase. It may yield surprising results.

Tuner Tips



SOT = Start Of Taper

throttle ‘window’ sketch

Wrap Up

Success with tuning the Dell'Orto carburetor is largely dependent on the user's understanding of the design and operating functions. Knowing what is happening at different throttle openings is key to making fine adjustments. On the other hand, the Dell'Orto will operate as delivered very well with only minor adjustments to the air / fuel systems. The availability of jetting, airflow components and other parts make this carburetor a tuners delight while also providing the non-tuner a basic carburetor system that requires simple adjustment when time is of the essence.

Understanding the 4 phase operation, the venturi effect and what the interrelationship is with the fuel / air metering components, will make tuning a fairly easy task. If the operating system (IDLE to WOT to IDLE) is understood as a single cycle occurring each time the throttle is opened, closed and opened again then finding the correct settings for all the phases will be much easier.

Thinking 'stoichiometric' will aid in obtaining maximum performance from the carburetor. The so-called 'perfect' burn is normally unattainable with the carburetor fuel induction system. Fuel injection systems can approximate stoichiometric because of the ability to 'sense' airflow, air mass etc. But thinking 'perfect' will help the tuner with the needle carburetor because the correct A / F ratio is will be desired for all phases of operation.

'Choosing your options' will be helpful when making tuning choices. If the idle is too rich you have the options of, selecting a leaner idle jet or selecting a leaner throttle slide. If the high-speed circuit is too lean, select a richer needle ('A' dimension) or a richer needle jet. Testing selections may prove one choice better than the other.

The Dell'Orto carburetor is designed to be adjusted for the various environments that are encountered. Testing and tuning is a 'must' to get maximum performance.

Set Up is not an 'exact science' until all 4 phases are tuned for maximum performance. To this point it is a moving target.

tdb/GFM

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instantly access weather condition,
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• Max Jet - Rotax Max Jetting Software

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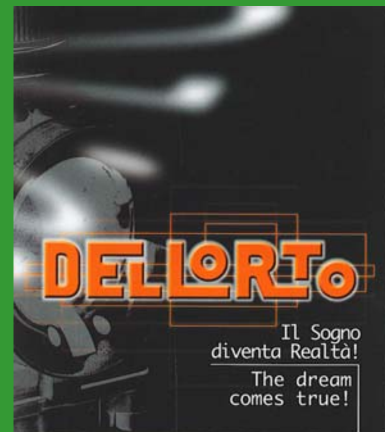

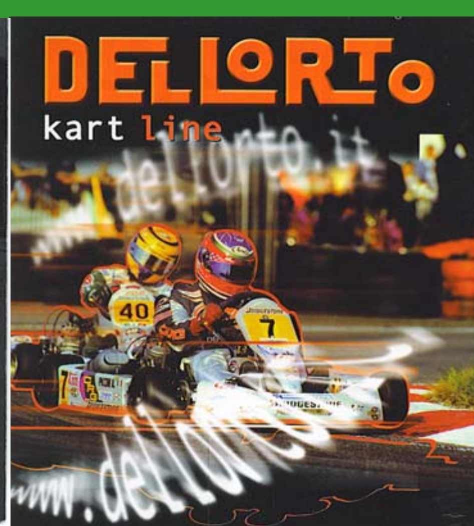

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