In order to work out the relative needle valve aperture to venturi aperture, you need to establish the size of needle jet, and size of needle and size of needle within the jet during the appropriate phase of the slide operation. The ¼ to ¾ operation attributed to the needle jet is based on area of venturi open rather than vertical movement of the needle and the relationship between the two require calculations that are out of my comfort zone. I found a calculator to do this online @ handymath.com (you can easily work area of segment as this is simply a quarter of the total, turning this into a segment height is where you need the calulator.

So the first job is to manually measure the needle in full open and closed positions against the top of the emulsion tube, as this is possible to mark through the front of the carburettor.
Next you must meaure the distance between the top of the emulsion tube and the top of the needle jet.
apply this correction factor and draw sketch of needle to help.

Next work out area of venturi, and the ¼,1/2 and ¾ areas from this.

Using calculator (handymath.com) work out segment heights for these.
Given that these segments essentially are vertical movments from the (now defined) point on the needle which intersects with the top of the needle jet when the slide is fully down, these can be marked on the needle and the needle measured to establish the diameters at those points.

	RHM twin carb
Needle jet (size is diameter	0.108
main jet used	280
Main jet diameter	0.057
needle no	6
needle notch from bottom as 1)	4
distance from bottom of needle to max open position (relative to top of needle jet)	0.507
venturi diameter of carburettor	1
area of venturi	0.7854
¼ venturi area	0.19635
½ venturi area	0.3927
¾ venturi area	0.58905
¼ lift height	0.298
½ lift height	0.5
¾ lift height	0.702
¼ lift needle dia	0.098
½ lift needle dia	0.0925
¾ lift needle dia	0.087
flow area at needle jet at ¼ lift	0.00161813
flow area at needle jet at ½ lift	0.0024411376
flow area at needle jet at ¾ lift	0.0032166225
fuel/air ratio at ¼	
fuel/air ratio at ½	
fuel/air ratio at ¾	

Table 3 : needle /needle jet ratios at varying lifts

	needle dia	needle area	needle jet dia		available area	
¼ throttle (1.209 from end)	0.098	0.007543942	0.108	0.009162072	0.00161813	
½ throttle (1.0007 from end)	0.0925	0.0067209344	0.108	0.009162072	0.0024411376	
¾ throttle (0.805 from end)	0.087	0.0059454495	0.108	0.009162072	0.0032166225	
			main jet area	0.0025520895		
			if needle jet area exceeds main jet area at ¾ then substitute main jet size for final calculation			

Air to fuel ratio

	so	venturi area open	Needle area open (Auto input from table 3)	percentage ratio (fuel to air)(calculated)	difference between phaes
	¼	0.19635	0.00161813	0.82%	
	½	0.3927	0.0024411376	0.62%	0.20%
	¾	0.58905	0.0025520895	0.43%	0.19%
			Looking for these to be similar		