>From derekdrew@aol.com Thu Mar 31 23:22 PST 1994
Subject: Vanagon Syncro Alignment Specs

Dear Friends,

The VW service manual for the Vanagon was updated in 1990 to include a different method for calculating the proper alignment specs for the Syncro Vanagon. Owners of the earlier service manuals for the vanagon will miss these new specs. The specs are contained on page 44.3a of the service manual. If your manual does not contain this page and these specs, you will not have the updated information on how to correctly align your syncro.

If you rely on someone else to select the proper specs for the Vanagon Syncro, you have a problem as well. This is because the company that makes almost all alignment machines in the country, the Hunter company, put in the wrong specs for the front of the Vanagon Syncro. I actually located the clerk in Hunter who misinterpreted a symbol in the Vanagon repair microfiche and who admitted he made a mistake. Over time--a very long time--he said he would try to get the specs on the Hunter machines corrected, but he admitted that in the mean time repair mechanics around the country would be setting the Vanagon Syncros in their shop to the improper alignment specs.

I recalculated all values and came up with the following specs, which are proper for the Camper model. If you don't have the camper model, you should obtain page 44.3a of the service manual and perform your own calculations as your specs will be slightly less aggressive than these due to the lighter weight of your vehicle.

If you take your Vanagon Syncro into an alignment shop and say, "give me an alignment," there is a 5% chance you will get a proper alignment, and a 95% chance the mechanic will use either:

a) the faulty specs in many Hunter alignment machines or b) the earlier, easier to figure,alignment specs used before page 44.3a was issued. As a matter of fact, the guy at the Hunter alignment company told me that the methodology in page 44.3a was too difficult to input into the standard format of the Hunter alignment machine computer systems, and so the proper procedure would never appear on those machines. The proper procedure involves measuring the ride height of the vehicle and calculating the proper alignment spec based on that. The measurement is taken by measuring the distance between the wheelwell and the center of the wheel.

Once you are able to obtain the proper specs, there is another problem in forcing your mechanic to follow your specs and not those in the Hunter machines. You have to tell the mechanic that the vehicle has been modified or make up some story or he will simply ignore your specs and use those in the machine. One way to force the mechanic to be honest is to insist on a print out from the Hunter machine showing your actual alignment specs after the operation. You can then compare these specs to those you provide him to check whether he has done the job right.

The alignment is difficult enough on a Vanagon Syncro that there is a strong possibility the mechanic will use either, a) the hunter specs, or b) your specs, whichever he is able to achieve first, unless you beat him up to not do so.

The following specs should be read with a proportional font text reader in order for the columns to line up correctly. Again, the following is for the camper model, or other very heavy model vanagons. The rest of you will have to make up your own chart after consultiing page 44.3a.

Before giving you the specs, a disussion of how to lift the van is in order. Since I regularly drive my Vanagon Syncro Camper on rough terrible roads and bash the underside, I have undertaken to lift it a bit. I lifted it about 1" by buying BF Goodrich Radial All-Terrain tires, in light truck size 27 x 8.50 for the 14" alloy rims. (I love these bigger tires, and they provide excellent handling because the sidewalls are relatively stiff, but they kill the performance of the motor due to their effect on the gearing. You will feel like you are in a 1970s era bus again, but I feel the tradeoff is well worth it for my application).

Another method I used to raise the van is to raise the rear end. I did this as follows: in between the rear springs and the body of the vehicle there is a small doughnut sized wedge of about 3/4 inch thickness. I went to the dealer and bought a pile of these little wedges and put 2 or 3 more on each side of the rear of the vehicle. I am still puzzling over how to lift the front of the vehicle so right now it tilts down at the front a bit. Any ideas on how to easily lift the front of a Syncro Vanagon, guys?

----------BELOW IS WHAT YOU GIVE THE ALIGNMENT MECHANIC----------

VANAGON SYNCRO --'86-'91
ALIGNMENT SPECS FOR CAMPER MODEL WITH DUAL BATTERIES UP FRONT

[Proper specifications for camper are NOT INCLUDED on Hunter machines. Use the following.]

ORDER OF WORK

Alignments MUST be performed in the following order to avoid one adjustment from changing other adjustments:

1st Castor
2nd Camber
3rd Toe

SPECIFICATIONS -- 30-40% laden

Left Front			Right Front	
Min	Max.		Min.	Max.
-0.27	+0.40	Camber	-0.27	+0.40
+3.8	+4.4	Caster	+3.8	+4.4
-0.033 (-0.017")	+0.033 (+0.017")	Toe Toe (inches)	-0.033 (-0.017")	+0.033 (+0.017")

	Front	
	Min.	Max.
Cross Camber	0	0.3
Cross Caster	0	0.5
Total Toe	-0.07	+0.07
Toe in inches:	(-0.033")	(+0.033")
Setback	0	0.5

Left Rear			Right Rear	
Min.	Max.		Min.	Max.
-0.67	0.00	Camber	-0.67	0.00
-0.08 (-0.04")	+0.26 +(0.13")	Toe (each) (in inches)	-0.08" (-0.04")	+0.26 +(0.13")

	Rear		
	Min.	Max.	FINAL
Cross Camber	0	0.3	This page
Total Toe	-0.16	+0.52	based on
total toe in inches:	(-0.08")	+(0.26")	measurement
Thrust angle	-0.10	+0.10	page 44.3a

Notes on calculations (for your own use/reference)

1. Calculating front camber spec:

Notes: The front camber spec for the regular Vanagon peaks in the middle and then comes back down. However, for the Syncro the spec seems to drop directly. My figure should probably be centered around zero. Thus:

+5' +- 20' is a good compromise
Range in degrees is 0.7*.

This translates into:

+0.0825* ±0.334

This translates into:

+0.4165 -0.2515

2. Calculating the front castor spec:

Set arbitrarily at halfway between published spec and halfway point.

3. Calculating the rear camber spec:

Empty		Full
+0.25	Max	-0.50
-0.25	Nominal	-1.17*
-0.42	Min.	-1.84

Has a 0.67* spread.

So, set this at -0.00 max.
-0.67 min.

4. Calculating the rear toe spec:

Empty	Full
+0.125"	
-0.041"	

WEIGHT INFORMATION:

Premise: The empty non-camper syncro weighs in at between 3,641 and 4,000 lbs. depending on the model. The max weight is 5512. The halfway point is therefore between 4577 and 4894 lbs.

My vehicle weighs in at about the halfway point, since I weigh 4680 empty. Being conservative, I will produce a set of alignment specs for a vehicle 33% laden.

RANDOM WEIGHT STATISTICS:

	TOTAL	Front Axel	Rear Axel
Syncro Camper			
GVWR	5512	2866	3042
Empty	3950		
Actual	4620?	2310?	2310?
Pub. curb R&T	4000	1972	2028
Pub. curb C&D	4000		
Extrapo camper	4350		
Non-Syncro Camper			
Empty	3960		
Full	5280		
Cargo weight	1320		
Non-Camper Syncro 2.1 litre			
Empty	3661 (3689)	1793	1867
Observed empty	4045 (4109)	1982	2063
Cargo weight	1929		
Implied GVWR*	5590		

(*meaning empty + cargo)

Non-Syncro, Non-Camper

Empty 3670

Road and Track states that Syncro adds 330 lbs to the 3670 non syncro Vanagon and the camper adds 350 lbs as well.

TRANSLATING DEGREES, MINUTES, AND INCHES:

Degrees		Minutes		Inches
0.01*	=	0.6'	=	0.005"
0.0165*	=	1'	=	0.00825"
0.025*	=	1.5'	=	0.0125"
0.05*	=	3'	=	0.025"
0.10*	=	6'	=	0.05"
0.167*	=	10'	=	0.0825"
0.25*	=	15'	=	0.125"
0.5*	=	30'	=	0.25"
0.75*	=	45'	=	0.375"
1*	=	60'	=	0.50"

Degrees devided by 2 = inches

2* = 1.00"
3* = 1.50"
4* = 2.00"
5* = 2.50"

Inches to Minutes

1.00" = 15'

Derek Drew
487 Columbus Ave. #3R
New York, NY 10024
212-580-4459
Internet: derekdrew@aol.com