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General TDI Discussion - A3/B4 TDIs This is a general discussion about A3/MkIII Jetta/Golf (<99.5) and B4 Passats (96,97) TDI's. Non TDI related postings will be moved or removed.


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#1

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B4 Passat TDI MFA Conversion (Revised)



Introduction

It is possible to have an MFA trip computer in a North American B4 Passat TDI by installing and modifying an instrument cluster from a Passat GLX VR6, GLS 2.0L (w/ optional MFA), or, for Canadian cars only, a Euro TDI. Unlike A4s, B4 instrument clusters cannot be easily reprogrammed for country codes. Because of this, U.S. B4s should use U.S.-spec. GLX/GLS (w/ MFA) clusters only. Canadian cars can use Canadian-spec. GLX, GLS (w/ MFA), or European-spec. TDI MFA clusters.

MFA display functions include: Clock, Elapsed Time, Miles (km.) Driven, Average MPG (l/100 km.), Average MPH (km./h.), Oil Temperature, and Outside Air Temperature. The MFA is switchable between 2 simultaneous trip modes. Trip 1 resets automatically after 2 hours of non-operation and can be manually reset. Trip 2 can run continuously (during operation) for up to 10,000 miles/100 hours/264 gallons before it automatically resets and can be manually reset. This provides very useful "trip-within-a-trip" capability.

The conversion isn't quite plug-and-play, but the rewards are worth the effort.

Overview

The B4 TDI already has the ECM signals and most of the wiring in place to operate the MFA. Basically, you will be adding a used or rebuilt GLX or GLS instrument cluster, MFA controller/wiper switch, pulse frequency adaptor (required w/ GLX, optional w/ GLS clusters), 2 sensors, and assorted wiring and connectors. You will remove your TDI instrument cluster, perform partial disassembly of both clusters, interchange 2 parts and add a new part. There is a small bit of PC board soldering required. If using a used cluster, you may want your odometer mileage reprogrammed by a specialty speedo shop to reflect your current mileage (rebuilt clusters from the dealer can be ordered with the car's current odometer reading). You will then make 2 small wiring harnesses and install them along with your new cluster, MFA controller, and 2 sensors.

Conversion Issues

1. Tachometer (GLX & GLS) - When an unmodified GLX cluster is installed in a TDI, the MFA works perfectly (after adding missing wiring, controller and sensors), but the tach is no longer accurate. It reads 33% lower than it should in its new 4 cylinder environment. The tach calibration cannot easily be reprogrammed, but the tach can be made to read correctly by inserting a pulse frequency adaptor inline with the ECM's tach signal and installing your original TDI cluster's tach face in the GLX cluster. GLS clusters can be installed in 2 ways:

a) Without the pulse frequency adaptor. The stock GLS tach face is utilized and graphically modified to show a lower, TDI-appropriate redline.

b) With the pulse frequency adaptor. This approach is identical to the GLX option.

NOTE: There is a discussion on the first page of this thread about editing the cluster controller chip to correct the tach readout in GLX clusters & GLS clusters using a TDI tach face. Chip editing would also allow display of English measuring units w/ Euro or Canadian clusters and metric units for US clusters. Chip editing would eliminate the need for a pulse frequency adaptor. To summarize: an experienced cluster programmer and TDI Club member attempted to edit the chip on my B4 cluster and was unable to get beyond the chip's read-only status. Although this was the first B4 cluster on which he had attempted an edit, he had not had this issue with A3 cluster chips he had successfully edited. This may not be definitive proof that the chip cannot be successfully edited, but until someone can not only edit the chip, but make a GLX cluster read correctly with a TDI tach face plate's wider sweep range, the pulse frequency adaptor remains the best method for tach reading correction.

2. MIL - The GLX/GLS cluster's MIL LED bulb is the 3rd one in the right LED bank, which is the same location as the TDI cluster's glow plug indicator LED. When an unmodified GLX/GLS cluster is installed in a TDI, the GLX/GLS MIL is fed by the TDI ECM's glow plug indicator signal and works correctly, but there is no MIL function for the cluster at all.

For proper MIL functionality:

'96-'97 GLX clusters require soldering in an LED, 2 resistors and a signal wire. TDI warning light layout/labeling remains unaltered.

'96 GLS clusters require soldering in an LED and a signal wire. TDI warning light layout remains unaltered.

'95 & earlier GLS & GLX clusters are significantly different internally and require adding an LED bulb and hardwiring it to the circuit board; a different procedure than for the later clusters. TDI warning light layout is altered and incorrectly/not labeled.

Euro TDI clusters have a glow plug light, but no MIL. I have no experience with these so I can't predict the difficulty of achieving MIL function.

3. Odometer - Odometer display values are stored in the cluster's memory, not the ECM's. When you change clusters, you change odometer values.

Used Cluster: You can have the GLX/GLS cluster's mileage value rolled forward or backward to match the car's current value by a specialty speedo shop like [Palo Alto Speedometer](#) or TDI Club member ele28. Reprogramming cannot be done by a VAG-COM or the dealer.

Rebuilt Cluster: If you go with a rebuilt cluster from the dealer, the cluster can be ordered by the dealer with your current odometer value. Most dealers don't know that the mileage can be ordered pre-programmed with these rebuilt clusters (its done at the local VW parts warehouse or distribution center), so you may have to educate your dealer by having the parts department manager call the warehouse/distribution center and verify that they can reprogram the rebuilt clusters they have in stock. I have a good working relationship with my local parts department and was able to order the cluster directly through them,

without having to go through the service department, but you might not be so lucky. If you have to go through the service department, they might not be willing to order and install an "incorrect" model cluster for your TDI. So do try to order it directly through the parts department. If parts or service can't or won't order it with the correct mileage (default mileage on rebuilt clusters is 0.0), you can always have it done by a specialty speedo shop. The upside of going with a rebuilt cluster vs. used is that you avoid the possibility of winding up with a cluster damaged by low voltage, which is not uncommon for B4 clusters. The downside is cost. A substantial core charge is required since you are not exchanging "like-for-like" clusters, although this cost may be mitigated somewhat by not having to have the cluster odometer mileage reprogrammed at significant cost (There is usually no extra charge for ordering a rebuilt cluster from the dealer with reprogrammed odometer mileage).

4. Fuel Consumption Inaccuracy - When a GLX/GLS cluster is installed, the MFA MPG readings will probably be significantly optimistic, depending on driving conditions and whether or not you have engine mods and/or are using biodiesel. The error can be reduced (to about + or - 1.5%) by adapting the fuel injection pump's IQ value with a VAG-COM. A physical IQ range adjustment may be required as well.

Parts Required

1. '96/'97 GLX , '96 GLS (w/ optional MFA), '95 & earlier GLS (w/ optional MFA) or '95 & earlier GLX Instrument Cluster

'96/'97 GLX p/n 3AO-919-930F (5-spd. U.S. market). Do NOT use p/n 3AO-919-035H ('95 5-spd. U.S.). See "MIL", above and "Advantages/Disadvantages", below.

'96 GLS (w/ optional MFA) p/n ? (5-spd. U.S. w/ MFA). See "MIL", above and "Advantages/Disadvantages", below.

'95 & earlier GLS (w/ optional MFA) p/n ? (5 spd. U.S. w/ MFA). This is a significantly different cluster than the '96 GLS. See "MIL", above and "Advantages/Disadvantages", below.

'95 & earlier GLX p/n 3AO-919-035H (5-spd). This is a significantly different cluster than the '96-'97 GLX. See "MIL", above and "Advantages/Disadvantages", below.

Used - If you don't have a local source, try Car-Part.com.

Rebuilt from dealer. No longer available new. See "Tachometer issues", above.

Euro-spec TDI cluster (for Canadian cars only), see [this thread](#) for a possible supplier.

Note: this is an A4 MFA thread. These do not have an MIL and may or may not allow MIL function using the procedures described here.

Advantages/Disadvantages for each cluster:

A '96-'97 GLX cluster must use the pulse frequency adaptor and requires soldering in 2 resistors not needed for the '95 or '96 GLS, but will be more available in the used market than either of the GLS clusters.

A '96 GLS w/ optional MFA is an easier, lower cost choice for this conversion because you don't have to install the pulse frequency adaptor (if using the GLS tach face) or the 2 MIL-enabling resistors that the GLX requires. There are 2 downsides with the '96 GLS: 1) They may be extremely rare in the used market (and as a dealer-rebuilt). 2) You cannot use the TDI tach face (with its stock-appearing, wider sweep) with a '96 GLS cluster without also using the pulse frequency adaptor. So you can either graphically modify the GLS tach face's "too high" redline or leave it alone if it doesn't bother you. The MFA was an option on the GLS, so, when getting a used one from a wrecking yard, you should confirm that the cluster you choose has an MFA by measuring the size of the LCD display window for the MFA/clock. It should be about 2"W X 7/8"H (vs. 1 1/4"W X 1/2"H for the non-MFA cluster). Used GLS clusters w/ optional MFAs will be much less plentiful than GLX clusters in the wrecking yards and may have limited availability rebuilt from the dealer.

A '95 & earlier GLS cluster w/ optional MFA is a less desirable option. It cannot use the TDI tach face without also using a pulse frequency adaptor and the TDI tach face requires modification in this earlier cluster. This cluster does not have a provision for a 5th LED in the right hand warning light bank and so the MIL LED gets hardwired into an unused spot in the left bank, a different procedure than in the later clusters. Compounding the problem is the fact that the TDI surround trim panel (with correct TDI warning light labeling) cannot be used in this earlier cluster, which results in mislabeled/non-labeled warning lights and a non-factory TDI appearance.

A '95 & earlier GLX cluster is the least desirable option. It has all the disadvantages of the '95 GLS cluster, above, plus it eliminates the option of not using the pulse frequency adaptor for the tach.

2. MFA Controller/Wiper Switch - p/n: 535-953-519-B-01C

3. Oil Temperature sensor - p/n: 1HO-919-563

4. Outside Air Temperature sensor - p/n: 357-919-379-A. This is optional. If you want to save some labor time and don't care about having an outside air temp. display, the MFA will work fine without it.

5. Pulse frequency adaptor - [Dakota Digital SGI-8](#). *NOTE: A pulse frequency adaptor is not needed if you are using a '95/'96 GLS cluster and not using the TDI tach face with it.*

6. Multi-Pin Connectors and Wire - These are for fabricating the wiring harnesses for the MFA controller switch and outside air temperature sensor. Part #s:

(1) 1HO-953-634 (MFA switch connector plug)

(1) 357-907-968 (MFA switch connector plug)

(1) 357-972-752 (Outside Air Temp sensor connector socket)

(6) 000-979-133 (connector wire w/terminals)

(2) 357-972-741 (wire seals for 357-972-752)

Bulk 18 gauge wire

7. yellow LED lamp & 2 resistors (820 ohm & 1.5K ohm, 1/4 or 1/2 watt). You can use a new bulb or transfer the one from your original cluster. The resistors are not required when using a '96 GLS cluster.

Step-by-Step Instructions

NOTE: The following describes a conversion using a '96/'97 GLX or a '96 GLS cluster only. '95 GLS/GLX clusters are significantly different internally and, though discussed above, are not covered in the instructions.

A. Installing the MFA Controller/Wiper switch & harness

1. Disconnect the battery

2. Remove the driver's side under-dash panel and knee bar.

3. Remove the 2-piece steering column shroud trim.

4. Remove the air bag. After removal, make sure to set the unit down with front side facing UP.

5. Remove the steering wheel. Do not allow the clockspring to rotate.

6. Disconnect/remove turn signal switch, then wiper switch. Slide the 3rd TS switch connector off its locating groove under the steering column before removing switch.

7. Fabricate a 4-wire harness (approximately 32" long) for the MFA controller/wiper switch. Use P/Ns 1HO-953-634, 357-907-968 and (4) 000-979-133 as the connector plugs and terminals/wire. Unsnap, then unhook and rotate the fuse/relay panel down so that the backside is exposed. The panel should now be upside down, oriented as shown in Figure 1.

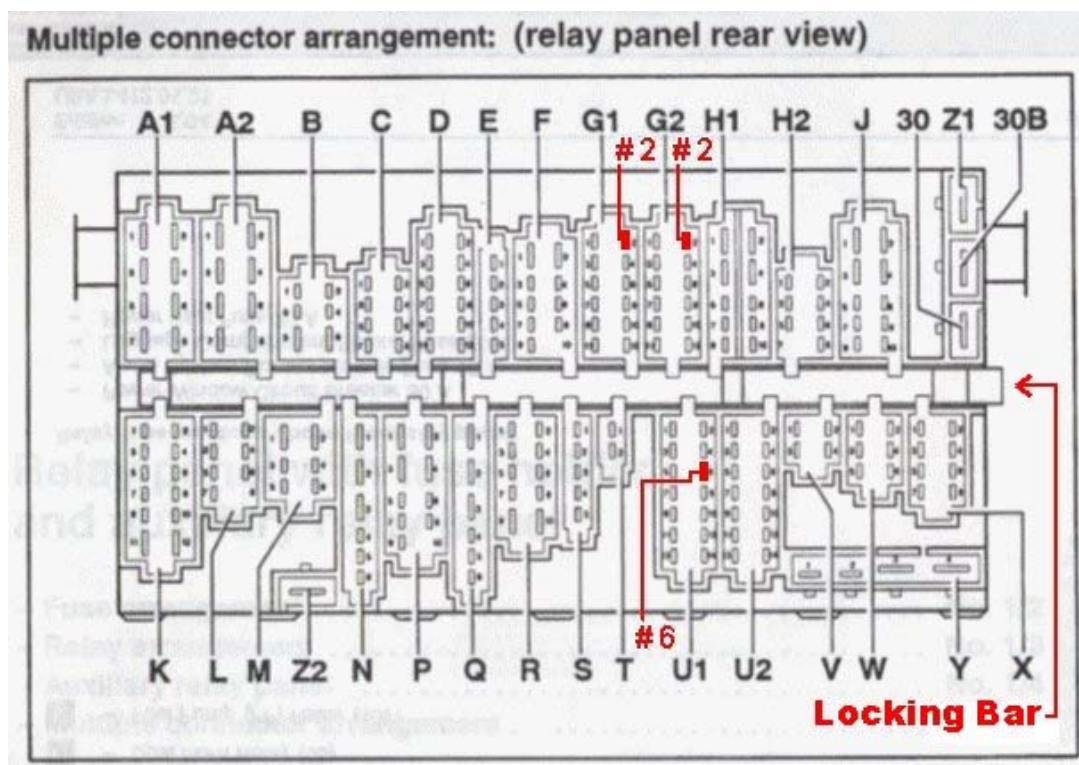


Figure 1

The 1HO-953-634 connector plug has pin numbers stamped on it. The 357-907-968 connector plug does also, but the numbers are hard to read. Pin numbers for 357-907-968 are shown in Figure 2. View is of the wire end of the plug.

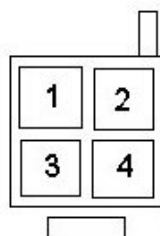


Figure 2

The relevant harness connections are as follows:

MFA controller pin wire color _____ **1HO-953-634 pin #** _____ **357-907-968 ("V" plug) pin #**

blue	1.....	V/2
white	2.....	V/1
black	3.....	V/3
red	4.....	V/4

8. Install MFA controller/wiper and turn signal switches and new harness. The relay panel end of the harness connects to the "V" socket in Figure 1. In the middle of the passenger's side end of the relay/fuse panel there is a rectangular bar, flush with the panel side end (see Figure 1). This bar extends throughout the width of the relay panel and locks all of the connector plugs to the panel at their inner ends. Before installing the "V" plug, pull this bar out (toward the passenger's side) to unlock all connector plugs. Push it back in after installing the "V" plug. The MFA controller's 4-pin connector slides onto the 2 slots under the steering column right next to the turn signal switch connector you slid off previously.

9. (Optional) Replace shear bolt that clamps the ignition switch/steering column bearing housing to the steering column tube. You will probably find that this shear bolt is loose, which causes excessive movement of the steering shaft and allows the steering wheel to be rocked up and down. A shear bolt was apparently used as a theft deterrent, but you can replace it with a proper socket head or hex head capscrew and

install it with Locktite or a lock washer. Remove the shear bolt by grinding or filing a slot in the "head" of the bolt and loosen it with a screwdriver. It may already be loose enough to turn with your fingers.

B. Remove TDI instrument cluster

1. Remove dash trim panel. Remove the 3 vent registers by grabbing the middle vane of each register on one side with needle nose pliers. Pull straight out until that side releases. Then repeat on the other side of each register. Remove the headlight switch panel by inserting a feeler gauge (.025"-.030") or other thin tool into the gap between the upper edge of the switch panel and the trim panel above it (just below the left hand vent register) at a point just to the left of the graphic symbol for the instrument lights rheostat. After pushing feeler gauge in and to the right to release the panel switch retaining pin, remove the switch panel. Remove 5 trim panel retaining screws and, then, the panel. Slide diagnostic connector out the rear of the trim panel.

2. Disconnect/remove the instrument cluster. Remove the retaining screw on each side of the cluster. Pull the cluster straight out; it's 2 lower locating pins will release from the dash surround. Unplug the 2 connectors from the rear.

C. Partially disassemble TDI cluster.

1. Remove cluster lens and black gauge surround trim panel.

2. If using a GLX cluster (or '96 GLS cluster when using a TDI tach face), remove the tach needle and face plate. Use the procedure described in section D, below. This is not required if using a '96 GLS cluster with its original tach face.

D. Partially disassemble GLX/GLS instrument cluster

1. Remove clear lens and black instrument surround.

2. Remove all gauge needles and face plates. First, rotate each of the speedo, temp., & fuel gauge needles to their respective stops. While lightly holding each needle against its stop, mark a pencil line on the face plate where the needle points when at its stop. Now try to remove the needles. Using *moderate* torque, cautiously try to rotate them on their spindles when against their lower stops. Be careful here; some needles may have a very tight press fit and may snap off before they will turn, so use only *moderate* torque to try to rotate them. If the needles won't break free and turn with moderate torque, **STOP**. If they do turn, continue to turn while gently pulling up and they will pop off. If they **did** come off, skip to Step 3.

If the needles **didn't** come off, you now must remove them by pulling straight up without rotating. The first time you do this (you will be doing it at least twice) you may pull apart the 2-piece servo motor casings beneath the face plates rather than pull the needles off their spindles. Don't worry, its not uncommon, but it will feel like you have broken them. Usually the casings at first become only 1/2 separated and the spindle/needle will be floating around at an angle. Just continue to pull straight up (not at the angles at which they're leaning) until they feel like they are free (Note: the needles have probably still not separated from their spindles...but the casing halves have separated). Since the face plate for the 2 gauges and speedo is one unit, you will have to finesse this a bit, trying to pull each of the 3 needles a like amount in stages. Once all casings are separated (or needles pulled from spindles...or a combination of the two), remove the 2 face plates. Pull needles off of any spindles/casings that came off as a unit with the face plates. Don't lose the rectangular spring washer installed between the spindle and the upper casing half. Reassemble any separated servo motor casings. Make sure that the dark grey plastic reduction gear is installed on its shaft in the center of the lower servo motor casing. If not installed, it got pulled off when the casings were separated. Find it and reinstall it, making sure that the small pinion gear in the center faces up (the other side has a boss that is about the same size as the pinion gear, so look carefully). Now install the spindle (with integral reduction gear) into its bore. Rotate the spindle/gear so that the stop tab on the gear will fall into the free rotation (1:00 to 11:00) section of the circumferential groove located in the underside of the upper casing (rather than the 11:00 to 1:00 "stop" area) when the upper casing half is reinstalled (see Figure 3). Now install the rectangular spring washer on the spindle/gear, convex side toward the gear, oriented so that it will be located and kept from turning by the rectangular depression in the underside of the upper casing half (see Figure 3). Now install the upper casing half carefully over the spindle to reintegrate the servo motor casing.

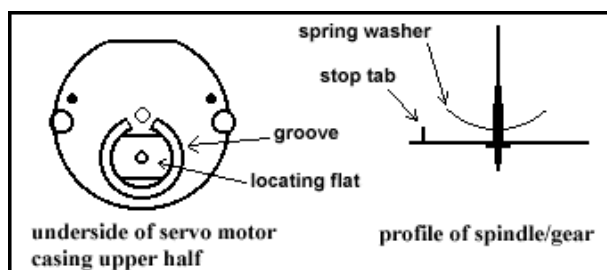


Figure 3

3. Remove the cluster PC board from its housing. Remove the 2 torx screws in the upper left corner of the board. Locate the 6 board retaining tabs. See Figure 4.

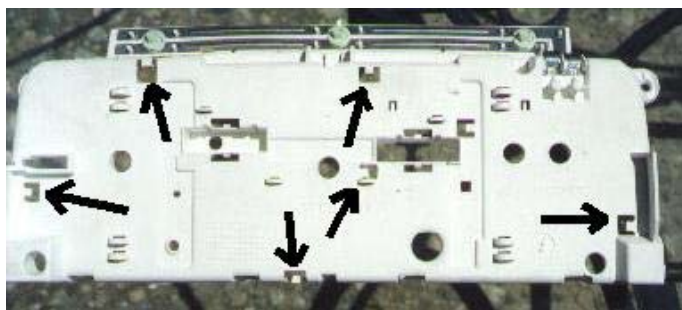


Figure 4

From the front, release one tab at a time, lifting the board slightly to rest it atop that tab, and continue around the periphery to the next tab, until all are tabs are free (the 6th tab in the middle, accessible from the back of the housing, is probably not actually retaining the board, but check to make sure). Remove the board.

E. Install yellow LED bulb, resistors and signal wire.

1. Solder in yellow MIL LED bulb in the unused far right location. *NOTE: If you don't have board soldering experience or a 'solder sucker' device, I recommend farming this job out to an electronics technician.* If not using a new LED, desolder/remove original TDI MIL LED bulb. Observe proper LED orientation as shown on the molded graphic located between the 3rd & 4th LED on the right hand LED holder bank.

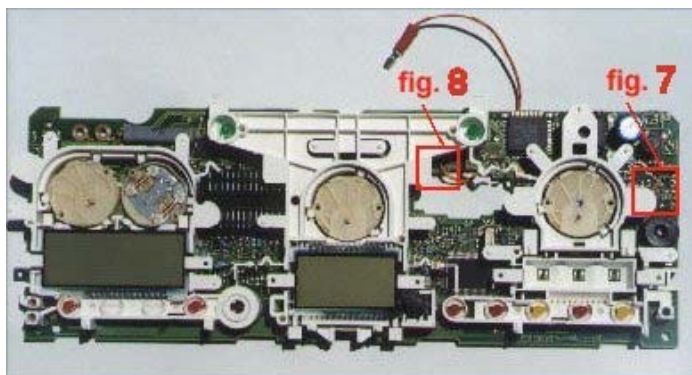


Figure 5

2. Solder in the 2 resistors as shown in fig. 7 (inset from Fig. 5). These enable the MIL LED. Skip this step if using a '96 GLS cluster.

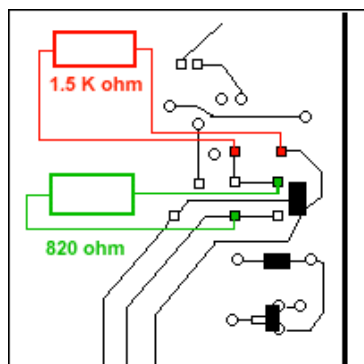


Figure 7

3. Solder in an MIL signal wire as shown in fig. 8 (inset from Fig. 5). Install from the front side. Install a male pull-apart connector on the other end. This will connect to what is now the only wire on the second 28-pin connector on the cluster wiring harness.

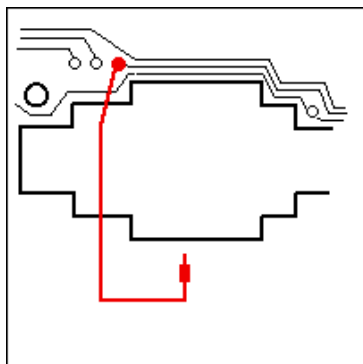


Figure 8

F. Reassemble the GLX/GLS cluster.

1. Reassemble in reverse order. Thread the MIL signal wire out the back of the housing. The 2 Torx screws are tightened before installing the gauge faces. If using a GLX cluster or '96 GLS cluster w/ pulse frequency adaptor, install the tach face from your TDI cluster. '96 GLS clusters not using a PFA, use the GLS tach face with graphic modification to the redline (optional). You may want to print out a small solid black rectangular graphic on a self adhesive mailing label that will cover over the "Unleaded Fuel Only" text on the fuel/temp gauge face. When installing gauge needles, first turn the spindles to their respective lower stops, then **JUST BARELY PRESS THE NEEDLES ON**. You will need to remove the needles again without pulling the servo casing halves apart, so they should just be installed to a minimum depth that will allow them to rotate on their spindles when at their lower stops. For now, set the needles at the index marks you made (@ "0" for the tach needle), but you will be reindexing them. Install the black instrument surround from your TDI cluster (with correct warning light identification), but **NOT** the clear lens at this point. Wire tie the MIL signal wire to the cluster housing.

G. Install pulse frequency adaptor

- 1. Mount the Dakota Digital SGI-8.** Wire-tie it to the HVAC duct below and to the right (passenger's side) of the back of the light switch. There is a flat area of the duct facing forward.
- 2. Wire the tach drive signal.** Locate the white tach signal wire. It runs from the #6 pin of the U1 harness connector on the back of the fuse/relay panel (see Figure 1) to pin #10 of the instrument cluster harness connector. Splice into this wire and run it to the "Sig. In" terminal of the SGI-8 and return it to the splice via the "OUT1" terminal.
- 3. Wire the Power and Ground.** A convenient source for switched ignition voltage is the TV5 Terminal Wire Connector. Its the only yellow 4-terminal Terminal Wire Connector stacked on top of the fuse/relay panel. A convenient ground for the "GND" terminal of the SGI-8 is the round, brown multi-terminal ground point located above the driver's kick panel area near the fuse/relay panel.
- 4. Set Calibration.** Adjust calibration correction with the up and down switches.
- 5. Test for low voltage signal dropout** The SGI-8 is sensitive to voltage drop. You may

find that the tach reading will momentarily drop to zero when putting a large electrical load on the system. With engine running, try simultaneously opening all 4 windows with headlights on and see if the tach needle drops for a split second. If so, and it bothers you, you can wire 12V+ to the SGI-8 directly from the battery via an ignition-controlled relay, but this isn't necessary as the dropout doesn't hurt anything.

H. Installing Oil Temp. sensor

1. Install in oil filter/cooler adaptor. On top of the oil filter/cooler adaptor you will find an unused, plugged port in addition to one or two oil pressure senders. Install the temp sensor in the unused port, then locate and connect the female spade terminal at the end of a solid black wire which should be floating somewhere above the filter adaptor.

I. Installing Outside Air Temp. sensor. (Optional - if not installing, skip to section J).

1. Locate the sensor input wires. On the back of the fuse/relay panel, locate the brown/white and white/red wires that originate from pins G1/2 and G2/2, respectively (see Figure 1). These wires may either be taped together, bare-ended and unconnected at their other ends or they may have a 2-pin connector plug.

2. Make a harness. This is a long 2-wire that runs all the way to the passenger side lower corner of the front bumper cover valance panel. Connect your harness to the 2 input wires and run it up to the upper part of the firewall, directly behind the center of where the instrument cluster resides. Here you will conveniently find a rubber grommet (where a speedometer cable once went on B3 models). Run your harness through the grommet, through the cowl well and out through the second grommet in line with the first on the other side of the well. From here, thread it along the passenger side of the engine compartment and down the front corner to the 3/8" hole in the passenger side lower corner of the valance panel (directly beneath the tow hook), where the sensor snaps in from the back.

3. Install and connect the sensor. Install the 357-972-752 connector socket (w/ 357-972-741 seals) to the end of the harness and connect the sensor. You also should wire tie the harness to the A/C hose above the sensor location, since the sensor is not very securely located and may pop out of its hole if you scrape the underside of the valance on something. This way it won't drag on the ground if that happens.

J. Install Cluster

1. Reassemble under dash items. Rehang fuse/relay panel. Reinstall knee bar and under dash panel.

2. Install cluster. Cut off the second 28-pin instrument cluster harness connector (the one with only 1 wire) and install a female pull-apart connector on that wire. Connect/install the cluster (be careful handling it, since the clear lens is off and you could damage the needles).

3. Reinstall steering wheel, airbag and column shroud. Make sure yellow air bag lead fits into slot in the column shroud. Turn ignition to "on" before reconnecting the battery.

4. Check MFA and MIL function. Hopefully the odometer reading is what you expected. With ignition on/engine off and MFA reset, the MFA should display 1:00 clock, 0 elapsed time, blank MPG, blank MPH, 0 miles, blank oil temp. (if below 120 degrees) and ambient temp (unless you didn't install the sensor, in which case, the display will be omitted entirely).

K. Calibration

1. Calibrate Tachometer. For GLX and '96 GLS clusters using a pulse frequency adaptor, hook up your VAG-COM and check RPM vs. tach readings @ 1,000/2,000/3,000/4000 RPM. If the readings are off, make sure the tach needle is at "0" when rotated fully counterclockwise to its lower stop and correct as necessary. If its still off, readjust the SGI-8 calibration buttons.

'96 GLS clusters using the GLS tach face shouldn't require calibration.

2. Calibrate Odometer. Generally, if using stock OD tires, the odometer should be pretty accurate. Test with a GPS, speedo dyno, or mileage markers that are known to be accurate. If its significantly off, it can be corrected by installing a Dakota Digital SGI-5 adaptor inline with the VSS signal, but this would be an unusual condition with stock OD tires. An odometer correction will require re-calibrating the speedo, so make sure you check the odometer before the speedometer.

3. Calibrate Speedometer. Your speedo is most likely optimistic. You can calibrate the speedo using a GPS, speedo dyno, or the MFA itself. Correction involves re-indexing the needle below "0" when at rest. It looks a bit odd at rest, but once in motion, the speedo reads accurately.

Calibrating with the MFA: Unlike the speedo, the MFA displays average speed without built-in optimism. So as long as the odometer proves to read accurately, so will the MFA average speed readings. Re-indexing the needle will make a linear change to the speedo (i.e., the differences in accuracy between high and low speeds will be identical to what it was before re-indexing, but it will be more accurate at all speeds). So, choose a speed at which you would like the speedo to be most accurate (I chose 65 MPH). Set your MFA to display avg. MPH and, while maintaining that exact speed (according to your speedo), reset the MFA and maintain the exact speed until the MFA displays a speed value. Stop and re-index the speedo needle on its spindle. Recheck and repeat until its accurate. Also check at a different speed to make sure there are no linearity problems.

4. Calibrate fuel gauge (optional). This is really personal preference. I like the fuel gauge to read just to the "full" line when the tank is full, and to the "0" white line as the car sputters to a stop. Suit yourself.

5. Calibrate MFA's MPG readings. MFA fuel consumption reading is calibrated by adapting fuel injection pump Injection Quantity (IQ) by trial and error. The use of larger injectors, chips, biodiesel, or other engine modifications will affect MFA accuracy, so before calibration, make as many of the changes you plan to make to engine and/or fuel as you can, or be prepared to recalibrate with future changes. First, make sure that the odometer reads accurately so you don't compound fuel measurement error with distance measurement error. Then, for the next several fillups, compare MFA average MPG readings (in Trip 2, measured for the duration of each tank only) with accurate, consistent station pump readings (i.e., at the same station, at the same dispenser w/ the same car orientation and load, tank vented to the top). Then adjust pump IQ to correct after each fillup. If MFA readings are optimistic (higher, numerically, than actual), increase pump IQ (numerically). Reduce IQ if readings are lower than actual. An initial IQ setting of 3.8 mg/R is a good place to start before your first calibration fillup. Unfortunately, this can be a lengthy process of trial and error. And remember, the MFA fuel consumption function is not intended to be a highly precise measurement; its a rough interpretation of actual consumption and ranges above and below actual, depending on driving conditions. I've been able to get accuracy down to + or - 1.5%. "Your mileage may vary".

L. Finishing up

1. Finish cluster assembly. Make sure that, when finally pushing needles on more securely after final calibration, you did not change the calibration! If not, then remove the cluster and re- install the clear lens and reinstall the cluster. Disconnecting the cluster will erase all accumulated values, of course.

2. Reinstall instrument panel trim. And you're done! Enjoy your MFA!

Last edited by Chris Bell : February 26th, 2008 at 10:27.



March 1st, 2005, 16:11

#2

Rammstein

Veteran Member

Join Date: Sep 2002

Location: Montréal, Québec, Canada

Revised B4 MFA conversion article

You're my hero Chris!!!!!!!!!!

I also wanted to get the original tach back, bought another cluster to do the swap...

I'll read your revised DIY with great interest! 😊 😊



March 1st, 2005, 16:47

#3

twob4s

Veteran Member

Revised B4 MFA conversion article

Awesome!!!

Join Date: Nov 2004
Location: Madison, WI

By the way, you refer to Palo Alto Speedometers...any idea if they would do a cluster conversion?



March 2nd, 2005, 02:40

#4

TdiYardie

Veteran Member

Join Date: Jul 2003
Location: Central Florida

Revised B4 MFA conversion article

This is EXACTLY what I was hoping to do! Now that this writeup is out, all I need is to source the remaining parts! I have a GLX cluster 3AO 919 035 H, I forgot what year GLX it came out of. The p/n is different from the discontinued one you mention, however it does have the MFA and is buit by Motometer. Should I be concerned?

Thanks



March 2nd, 2005, 04:17

#5

jck66

Veteran Member



Join Date: Jan 2001
Location: Greenwich, CT, USA

Re: Revised B4 MFA conversion article

Thank you Chris! 😊



March 2nd, 2005, 05:34

#6

Chris Bell

Veteran Member

Join Date: Feb 2000
Location: Santa Barbara, CA

Revised B4 MFA conversion article

Quote:

Awesome!!!

By the way, you refer to Palo Alto Speedometers...any idea if they would do a cluster conversion?

Unfortunately, no they won't.



March 2nd, 2005, 05:36

#7

Chris Bell

Veteran Member

Join Date: Feb 2000
Location: Santa Barbara, CA

Revised B4 MFA conversion article

Quote:

I have a GLX cluster 3AO 919 035 H, I forgot what year GLX it came out of. The p/n is different from the discontinued one you mention, however it does have the MFA and is buit by Motometer. Should I be concerned?

Thanks

It shouldn't be a problem. It may an automatic cluster.



March 2nd, 2005, 11:22

#8

[TdiYardie](#)

Veteran Member

Join Date: Jul 2003
Location: Central Florida **Revised B4 MFA conversion article**

Thanks. It does not have the gear selection window. I'm looking forward to picking up the remaining parts.



March 3rd, 2005, 18:50

#9

[ele28](#)

Veteran Member

Join Date: Dec 2000
Location: chicago **Re: Revised B4 MFA conversion article**

Any A3/B4 cluster can be reprogrammed for country code and # of cylinders, I did this with MFA on my A3 Jetta using VR6 cluster, its just a matter of small change in the software, its pretty simple.



March 3rd, 2005, 19:15

#10

[Rammstein](#)

Veteran Member

Join Date: Sep 2002
Location: Montréal, Québec, Canada **Re: Revised B4 MFA conversion article**

Could you elaborate please?



March 3rd, 2005, 19:48

#11

[ele28](#)

Veteran Member

Join Date: Dec 2000
Location: chicago **Re: Revised B4 MFA conversion article**

All data like country code is implemented in the software in HEX code, for example when you read the chip and look in to the code, US is 02 CAN is 20 UK is 49 and EU is 48, this code is related to the clock (12/24) and service reminder (only EU and UK have this when recoded) then if you look further you will notice number of cylinders (4 cyl is 80, when 6 cyl is C0, and the similar thing with impulse # 6056 is for VR6 in hex is 17A8)so if you compare data from TDI cluster and VR6 MFA you will notice how its done.



March 4th, 2005, 05:32

#12

[jck66](#)

Veteran Member

Join Date: Jan 2001
Location: Greenwich, CT, USA **Re: Revised B4 MFA conversion article**

Could you elaborate more please? Read the chip? ???



March 4th, 2005, 06:32

#13

[Chris Bell](#)

Veteran Member

Join Date: Feb 2000
Location: Santa Barbara, CA **Re: Revised B4 MFA conversion article**

Do you need a HEX-COM interface to read the cluster? A KEY-COM interface won't read it



March 4th, 2005, 08:05

#14

[ele28](#)

Veteran Member

Join Date: Dec 2000
Location: chicago



Re: Revised B4 MFA conversion article

Inside this cluster is chip 93C56, to read this programmer is needed, VAG won't work



March 13th, 2005, 18:58

#15

[twob4s](#)

Veteran Member

Join Date: Nov 2004
Location: Madison, WI



Revised B4 MFA conversion article

I am confused why a pulse frequency adaptor would be necessary for a GLS cluster as it also has four cylinders. I assume because of different spacing on the tach face?



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