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PDC-01

Subaru Programmable DCCD Controller

MANUAL V1.07

Safety Precautions

We have included certain symbols in this manual that will serve as precautions that should be followed. The symbols are defined as follows:

If not followed as stated, it may result in injury to user, product malfunctioning, and damage to vehicle.

Do not drop this unit, as it may cause malfunctions to both vehicle and unit.

Never tamper or open casing, as it may lead to shock, electrical fire and malfunction.

Installation should be performed by skilled installer.
Keep unit away from water and direct sunlight.

Be careful when operating unit while driving, to avoid accidents.

Stop immediately if there is a sign of smoke or burning smell.
Only use unit for initially intended purpose,
Never install unit in a vehicle other than one that is listed.
This unit is designed for vehicles with 12V DC and negative ground.
Disconnect negative terminal before installation.
Connect wiring exactly as shown in this manual.

DANGER

If not followed as stated, result may cause DEATH or severe injury to the user.

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Introduction

Thank you for purchasing the Neetronics Programmable DCCD Controller. In order to properly use this unit, please be sure to read this manual thoroughly before installing. This unit is intended for use on Subaru vehicles equipped with a Driver Controlled Center Differential (DCCD).

The new Subaru PDC-01 DCCD Programmable Controller Unit from Neetronics is a must have for all conversions to any 6-speed or 5-speed transmissions with DCCD, or for those who want to upgrade the controller on their earlier model transmissions with EMCD. This little marvel of engineering is easy to install and will allow you to make full use of the capabilities of your transmission and your active differential.

The Neetronics controller turns your transmission and differential into a programmable active unit, giving you the freedom to set up the car to your specific requirements from full out Track Racing, Rally, Rally-X, Ice Racing and Solo II or to your street preference.

- Incremental steps of central differential lock from 0 to 100% can be selected simply by turning a thumbwheel (selection wheel).

- The display constantly shows the selected value, avoiding any misconception.

Different rates of differential lock-up can be preset for the following parameters:

Throttle position, Speed, Brake and Handbrake.

If you use your Subaru to compete in any form of motorsports, the Neetronics PDC-01 Controller will give you the edge that you have been looking for.

Finally you will be able to use the transmission and the active differential as they were intended and gain those valuable seconds.

Parts List

This kit comes complete with a "thumbwheel" switch to quickly select a duty cycle and the Microprocessor Controlled Main DCCD Control Unit with program buttons. With the help of these buttons, you are able to program the PDC-01.

A 4' length of red 22 gauge wire is included with this kit to connect the DCCD to a 12V power supply.

The PDC-01 kit is covered by a standard warranty for 6 months against manufacturer defects from the date of purchase.

Extended warranty of 12 months is available on the PDC-01 if installed by a "Neetronics" certified distributor/installer.

For any warranty to take effect, Neetronics must receive your registration form within 30 days of the PDC-01 Kit original purchase date.

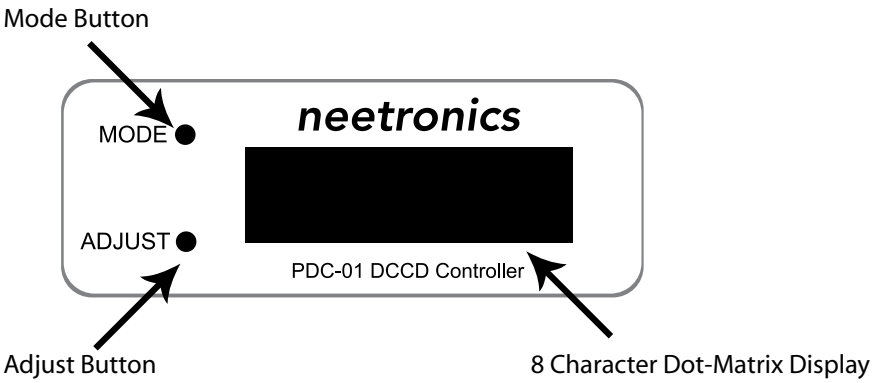
For updates, changes and suppliments, such as visual guides and videos like "Tuning Tips for the PDC-01 Differential Controller", please visit:

www.neetronics.com

Pictures

Neetronics PDC-01 DCCD Controller version 1.07

DCCD Controller
The front of the PDC-01 is equipped with 2 program buttons and a display. With the help of these buttons, you are able to program the PDC-01

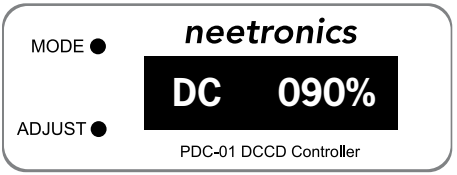


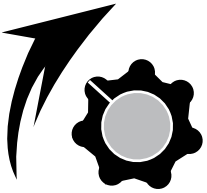
The back of the PDC-01 is equipped with 4 feet of color-coded wiring, to enable easy, quick, and proper installation.

The PDC-01 "Thumbwheel" Switch
Switch for quickly selecting output duty cycle.

Display Modes & Menus

On power up the display will enter the DC monitor mode (Duty Cycle monitor mode). In this mode the display will indicate the current Duty Cycle being output to the DCCD.





Adjust Duty Cycle from 0% - 100%
by using the Thumbwheel Adjustment Switch

Warning: Running at high duty cycles for prolonged periods may cause damage to unit and to center differential

Pushing the "MODE" button will toggle the display through several menus. In some menus the "ADJ" or "ADJUST" button allows the user to make adjustments. No adjustments will be stored until the mode button is pushed and then all of the buttons are to be left unpushed for 3 seconds. At this point all adjustments will be stored and will take effect. Also at this point the display will revert back to DC monitor mode.

The following is a description of the menus available:

Foot brake override select:
Adjustable from 0% to 100%

The user can select what Duty Cycle to output to the DCCD whenever the foot brake is pushed. This is intended to tighten the rear/front split to all four wheels together during braking to minimize the tendency for any one wheel to lock up under braking. The yellow wire can be connected up through a switch allowing the user to enable and disable this function when desired.

Throttle position monitor:
No user adjustments in this menu

Allows the user to monitor the actual TPS level. The TPS may vary anywhere from 0 to 255.

Throttle override select:
Adjustable from 0% to 100%

Once the TPS has been pushed beyond the TTRG, the TOVR preset duty cycle will be output to the DCCD

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Throttle Override Trigger level:
Adjustable from 0 to 255

The user can select what level of TPS will trigger the throttle override mode. This is typically used to ensure the center differential is sufficiently locked under heavy acceleration. Setting this value to 255 will effectively disable this function.

Speed Override enable:
Speed override can be set to “ON” or “OFF”

This override is intended to unlock or open up the differential whenever the car is travelling at very low speeds such as in a parking lot or in a driveway. At low speeds, turning corners with a locked center differential makes steering difficult and also it puts unnecessary strain on the drive train.

If the SOVR is set to “ON” then whenever the car slows down to very low speeds the center differential opens up. When the car picks up speed the center differential resumes normal function.

If the SOVR is set to “OFF” the center differential will remain functional at very low speeds and even at a standstill. This may be useful if the cars is stuck in a snow bank and drive to all four wheels is desired regardless of speed.

Speed Delay:
Adjustable from 0.5 - 10 seconds

Control over how quickly the speed override engages. Variable in half second intervals from 0-4 seconds,
and above 4 seconds, the half second incremenents changes 1 second. The maximum delay is 10 seconds.

The HBK (Handbrake override) has no adjustments at all. If the user does not wish to use this override the blue wire should not be connected, or connected up through a switch to allow user to enable and disable this function anytime. The Handbrake override simply shuts off the DCCD whenever the handbrake is pulled. This is intended to disengage or open up the center differential allowing the handbrake to lock up the rear wheels but not affect the front wheels. This allows for handbrake turns to be similar to a two wheel drive car. Releasing the handbrake will revert center differential back to normal preset PDC-01 DCCD Controller parameters.

Wiring Connections

There are eight discreet wires and one 3 conductor cable which is connected to the Thumbwheel Switch. Each wire is described below:

Red	+12V The red wire must be connected to the cars 12V. It should be a fused 12 Volts, that is controlled by the igntion key. The Neetronics DCCD controller requires approximately 5 amps, so almost any 12V line will be sufficient.
	This 12 Volts must be switched on and off with the ignition key to prevent unnecessary battery load while the car is not running. Failure to follow this instruction, may result in damage to vehicle, DCCD controller, or a dead battery.
Orange	+12V The orange wire is the 12 Volt supply for the center differential clutch output. The red and orange wires can be connected together to 12V power supply.
Black	Ground The black wire is used as a ground. This must be connected to the cars ground, either by finding a ground wire somewhere in the car's wiring harness or, screwing the black wire to the car's chassis.
Purple	DCCD out The purple wire is to be connected to your vehicle's DCCD. The DCCD requires two wires to be connected in order to operate. The purple wire provides a switch to the ground side of the DCCD.
4' Red Wire	+12V The extra 4' red wire included with this kit is meant to be connected to the other side of the DCCD (opposite of the purple wire) to supply power.

WARNING

Do not connect purple wire to any 12 volt power supply. If purple wire is connected to any power, permanent damage will occur to PDC-01 unit.

White

TPS
The white wire is to be connected to the TPS (throttle position sensor) signal that goes into the car's ECU. The Neetronics DCCD controller monitors the TPS and provides a user adjustable override. The trigger point of this override is also user adjustable.

Yellow

Foot brake
The yellow wire is to be connected to the cars foot brake switch. The brake switch should have 2 terminals. 1 side connects to the 12v, and the other side connects to the Stop Lights and ECU. When the footbrake is depressed 12v should be sent to the stop lights and ECU. On some 2004 and older models they may not have a footbrake signal to the ECU, for those vechicles, just connect to stoplight wire.

Blue

Handbrake
The blue wire is to be connected to the handbrake switch. The handbrake switch should have 2 terminals, 1 terminal grounded, the other terminal connected to the parking brake/ brake fluid warning light. Cut the wire to the parking brake/ brake fluid warning light in the dashboard and connect it to the blue wire.

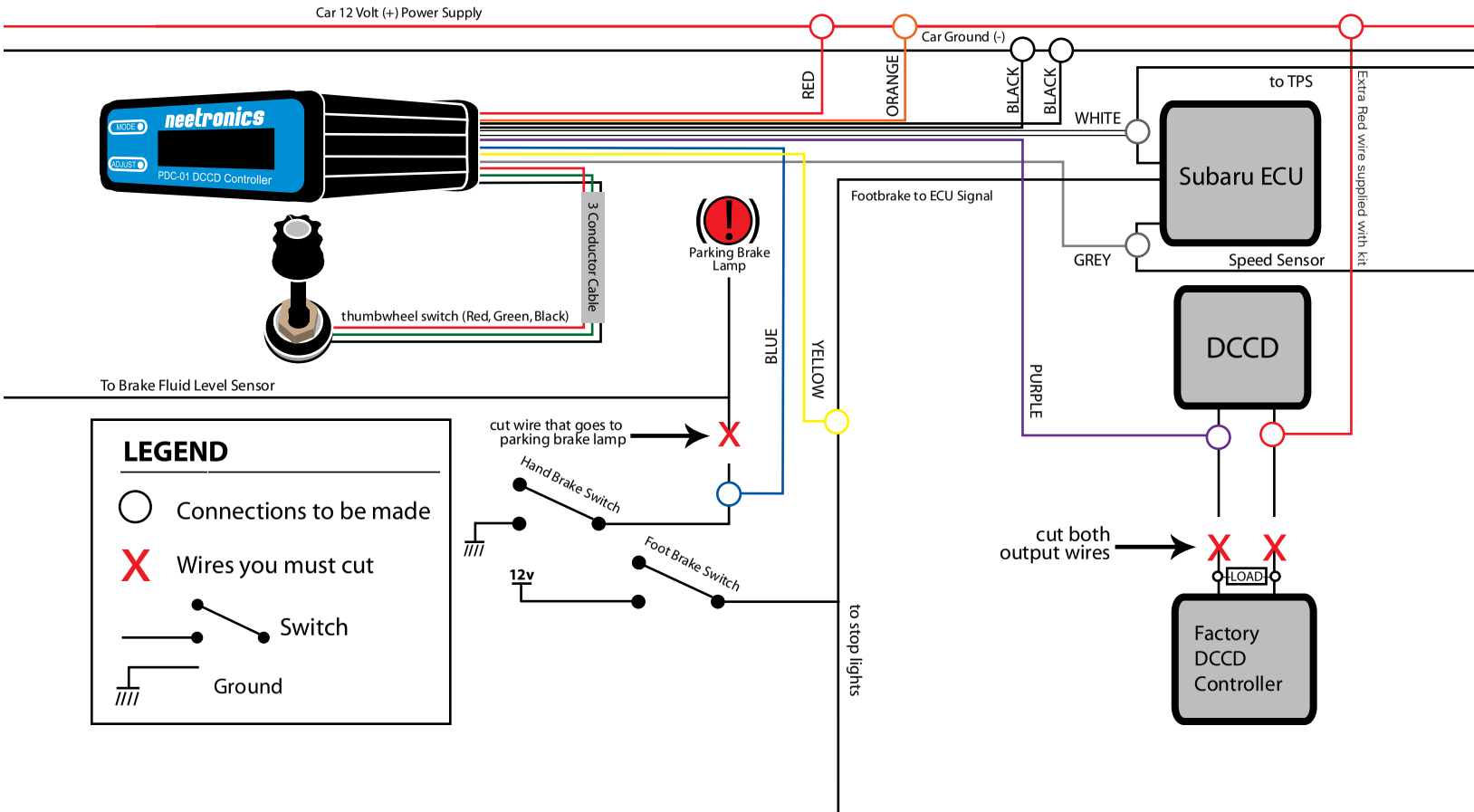
WARNING
It is recommended to disconnect the car's original handbrake wiring that goes to the dashboard lamp. This is recommended because the factory handbrake is wired in parallel with several other brake related components all of which can trigger the handbrake input to the Neetronics DCCD controller if left connected. To ensure reliable and predictable results, the handbrake switch must be the only switch seen by the Neetronics DCCD controller on this blue wire. Be aware that doing this will disable your parking brake warning lamp.

Grey

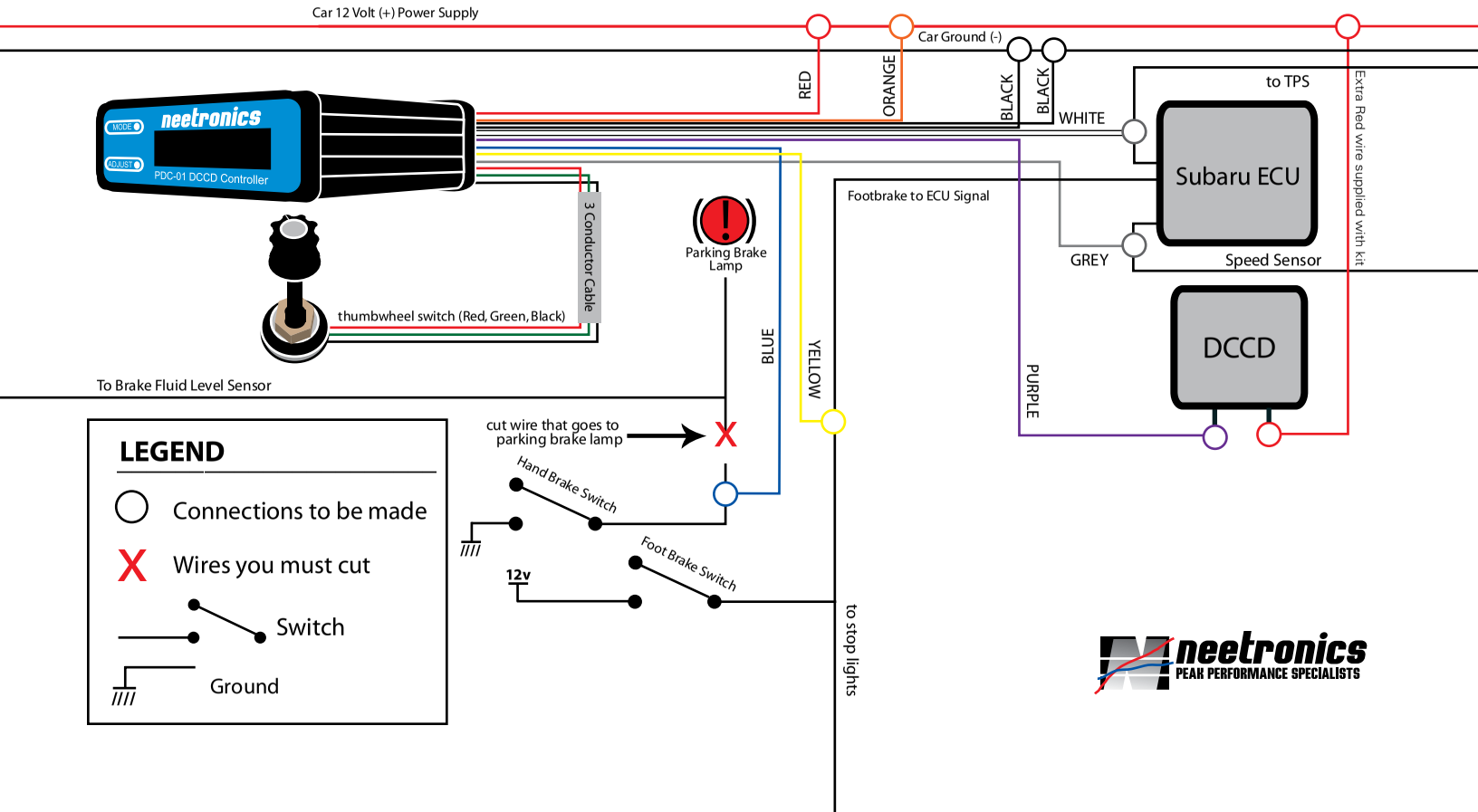
Speed
The grey wire is to be connected to the cars speed signal. From the factory, this signal comes from the transmission and is sent to the ECU. Simply tap into this wire. The Neetronics DCCD controller uses this input to shut off the DCCD output whenever the vehicle is moving at very low speeds. This will open up the differential to improve maneuvering in parking lots, driveways, etc. As soon as the car picks up speed the normal functions will resume. If desired, this function can be disabled and the delay adjustable by the user at anytime.

Connection Diagrams

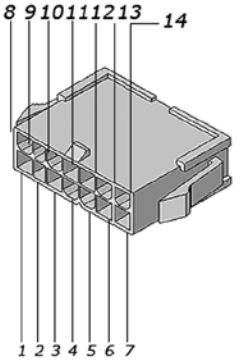
Vehicles originally equipped with a factory DCCD Controller



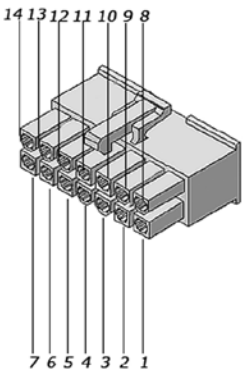
Vehicles not equipped with a factory DCCD Controller



DCCD UNIT SIDE

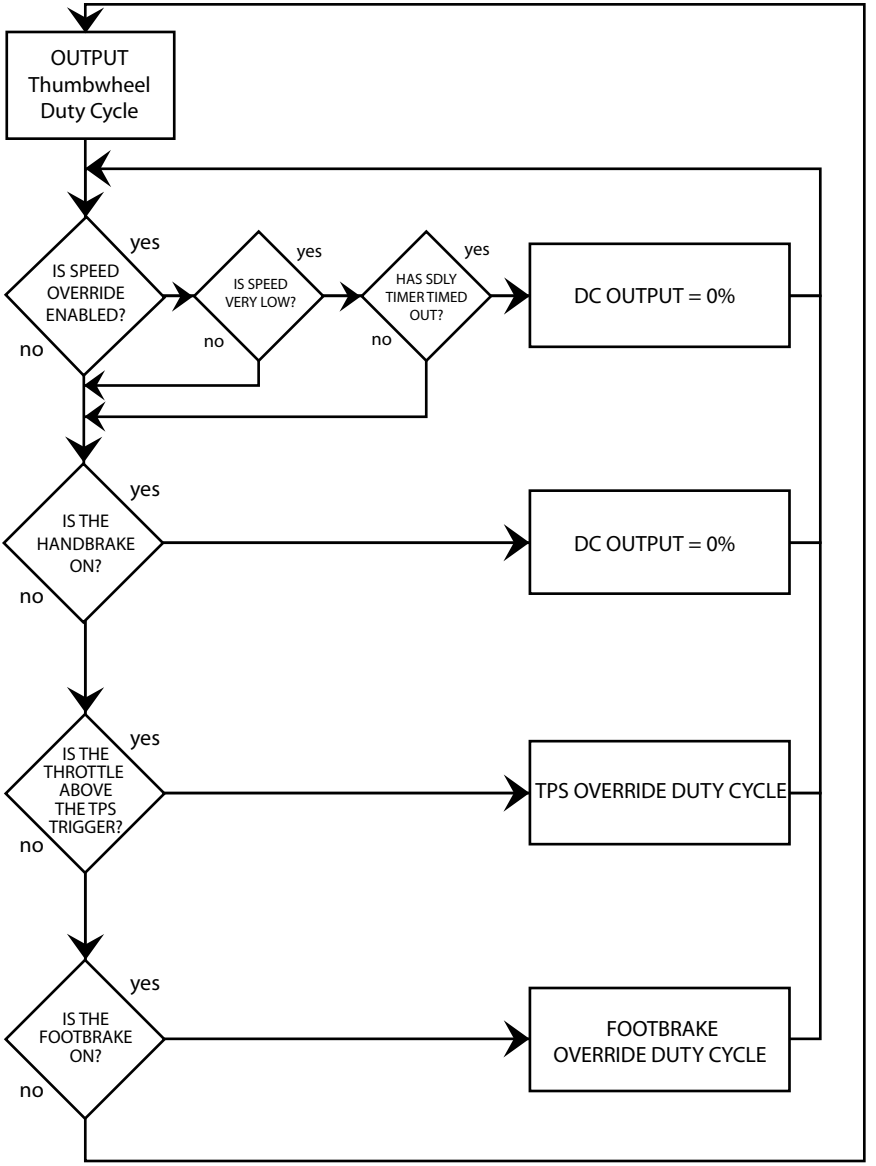


CAR SIDE



Pin #	Description	Wire Color
1	Speed Sensor	Grey
2	Hand Brake	Blue
3	Foot Brake	Yellow
4	DCCD Out	Purple
5	TPS	White
6	12V Power	Orange
7	DCCD Power	Red
8	Thumbwheel Power (5V)	Red
9	Thumbwheel Ground	Black
10	Thumbwheel Signal	Green
11		
12		
13	Ground	Black
14	Ground	Black

Function Chart



Setup Procedures

Following complete and correct installation, start by turning ignition key to "on" position. The display should be on and showing you the current Duty Cycle (DC) percentage. If not, check your installation and ensure that you have correctly installed the unit.

1) Make sure that the brake pedal, gas pedal are not depressed and the hand brake is not up.

2) Using the mode button, select TPS (throttle position monitor). With the gas pedal in the up position, it should relay a value on the screen. Depress gas pedal fully. This will allow you to see the range of your TPS. Record the minimum and maximum values. Each car will likely have different minimum and maximum values. If your minimum is 30 and your maximum is 212, half throttle should approximately be 121.

3) Using the mode button, select the TTRG Mode.

4) Using the Adjust button, set the TTRG to your desired value. Using the sample TPS values of minimum 30, maximum 121, if you want the throttle override to activate at half throttle, you would now enter 121.

5) Using the Mode button again, select TOVR mode.

6) Using the Adjust button, enter your desired throttle override duty cycle. Typically this is set 50% or higher.

7) Using the Mode button, select SOVR. This is the Speed Override Enable.

8) Push the adjust button to toggle between on and off to make your selection.

9) Use the mode button to select SDLY.

10) Push the adjust button to select your speed override delay. For dry pavement, you would likely have this value small, between 0 to 2 seconds, and on slippery surfaces like snow and ice, you may have to increase this value, between 1 to 6 seconds.

Warning
If all 4 wheels lock up under heavy braking, the speed sensor will now register 0km/h which will trigger the Speed Override. This delay will prevent the Speed override from triggering immediately and opening the differential while the car is skidding.

11) Using the mode button, select FBK.

12) Using the Adjust button, enter your desired footbrake override duty cycle. Typically this is set 50% or higher. For slippery surfaces, select a low setting to avoid traction loss due to 4 wheel lockup.

13) Allow the unit to sit for 3 seconds. The unit will now be displaying the actual Duty Cycle being output.

You may have to shut off the Speed Override to perform this next step.

14) Rotate the thumbwheel left and right, you are able to adjust from OFF to 100% in increments of 10%. It is recommended to leave his value below 50%, typically 20-30%. This is the duty cycle that will be constantly sent to the center differential, unless one or more of the overrides have been triggered.

This value is contstantly being sent to the differential.

Warning
If a high duty cycle is selected for prolonged periods of time, it may cause overheating of the DCCD.

15) Test drive the car and see that everything is working effectively and to your expectations.

These are recommended first time start up test settings. It is recommended that you experiment to determine your optimal settings for all modes

For tips on setting up your PDC-01 DCCD Controller visit: http://www.neetronics.com

Critical Notes

If installing the Neetronics PDC-01 DCCD Controller on any Subaru that was originally equipped with both a DCCD and ABS, there are some considerations.

The factory DCCD Lamp will flash when the factory DCCD Controller is no longer connected to the DCCD. If the factory DCCD controller is fully unplugged, the DCCD Lamp will flash but the ABS system will be off (disabled).

To eliminate the factory DCCD Lamp flashing without disabling the ABS, simply connect a load to the factory DCCD Controller ouput wires. (See Diagram)

For other Subarus that were not originally equipped with a DCCD this will not be a problem, since the ABS on those cars is not going to be electrically connnected to the DCCD.

1) HIGHEST PRIORITY (Speed Override)
Options: User can enable or disable
DC Output = 0%

2) HANDBRAKE OVERRIDE
Options: No user settings allowed.
When the hand brake is "ON" the output on the DCCD = 0%

3) THROTTLE POSITIONS OVERRIDE
Options: Two user settings, One user monitor
1 - Throttle trigger level (0 - 255), increases by 1 increment
2 - Throttle override Output level (0-100%)

4) FOOT BRAKE OVERRIDE
Options: One user setting
1 - DC Output level - 0-100%, increases by 1 increment
2 - Throttle override Output level (0-100%)

5) THUMB WHEEL
Options: No user settings allowed.
When the hand brake is "ON" the output on the DCCD = 0%

Setting TTRG too low may result in TPS OVERRIDE engaging and staying on, even when throttle is released.

RECOMMENDED MINIMUM TTRG SETTING
30 more than "closed" throttle value

Operating DCCD Controller at high duty cycle for a prolonged period of time can cause OVERHEATING of the center differential and possibly damage to associated components.

For Neetronics PDC-01 DCCD Controller tips, visit:
www.neetronics.com

About Neetronics

Paul Neethling is the mind behind the Neetronics line of electronics products and the tuner that you would go to for tuning your high perfromance vehicle. From Neetronics MAP sensors, tuning stand alone engine management systems, to your custom electronics needs, Neetronics is on the forefront of automotive tuning.

With an in-house 4 wheel drive capable dynamometer at the facilities, a multi-car service shop and a fully equipped electronics lab with knowledgeable engineers and designers, the team at Neetronics has the valuable knowledge and experience that translates to performance on the the tracks and rally stages of the world.

Neetronics is quickly taking on more challenges and further developing hi-tech performance products for performance driven automobiles.

As activists for responsible motoring and racing, we hope that you will choose to be safe about the conduct of your activities while enjoying your Neetronics products.

Look for upcoming products and further developments from Neetronics that will improve your car's performance. Visit us at www.Neetronics.com.

We support all our clients and relish in building relationships, so please get back to us and drop us a line.

We wish you all the best,

The Neetronics Team
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Limited Warranty

Neetronics warrants every product it sells to be free from defects in materials or workmanship for a period of 6 months from the date of manufacture. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs or alterations. We shall in no event be liable for death, injuries to persons or property or for incidental, contingent or consequential damages arising through the use of our products. Neetronics specifically disclaims the implied warranties of merchantability and fitness for a particular purpose, however some areas do not allow limitations on how long an implied warranty lasts, so the preceding exclusion may not apply to you.

This is Neetronics' sole written warranty, no other warranty is expressed or implied. In the event you should need warranty repair, Please see the Returns Procedure below. Neetronics reserves the right to repair or replace merchandise at its option. Neetronics reserves the right to make changes to any of its products or specifications without notice.

The PDC-01 kit is covered by a standard warranty for 6 months against manufacturer defects from the date of purchase.

Extended warranty of 12 months is available on the PDC-01 if installed by a "Neetronics" certified distributor / installer.

For the extended 12 months warranty to take effect, "Neetronics" must receive your completed "registration & installation form" within 30 days of the "PDC-01 Kit" original purchase date.

The Neetronics PDC-01 DCCD Controller is intended for off-road use only.

Returns Procedure

Call Neetronics at (905) 602-1949, or e-mail mailbox@neetronics.com.

Explain the nature of the problem to our service personnel and we will provide you with return directions. You will pay for shipping to us, and we will pay the return shipping to you as long as the warranty is accepted. Package the controller securely in original shipping box if at all possible. We are not responsible for damage in shipping.

Notes