Install Electronic Cruise Control on a K75/K100

Note: This page in "under construction." I actually won't do this until early September 2013 but decided I'd do the write-up of it ahead of time while planning the install to keep notes for myself. Therefore, things like DIP switch settings are subject to change once I get it installed and have a chance experiment with it a bit. The usual disclaimers apply. Any text in red will be updated once I've actually done the install and have it working well.

Note: For K1s, K100RS4Vs and K1100s the wiring will be the same but you'll probably need to figure out a different way to hook it up to the throttle linkage since the throttle bodies are different than on a K75/K100.

WARNING: It's a good idea to disconnect the ground from your battery before performing any electrical work on your bike.

The Cruise Control Unit

In the past I've installed something like fifteen or so of the Audiovox CCS-100 vacuum cruise control units on various K bikes with excellent results. However, Audiovox stopped making them several years ago and there's still high demand so they usually sell for $175 or more on Fleabay these days. The site Murphs Kits sells exact replicas of them for $180. (plus shipping I think)

Since I've run out of "spare" CCS-100 units, I decided to have a go at installing an electronic cruise control. The one I'm installing goes by two

names. One name for it is GlobalCruise Electronic Cruise Control and the other is Rostra 250-1223 Universal Cruise Control. They also sell for about $175 plus shipping these days. However, several months ago I found a new one, without a control switch, on a $99.99 Buy-It-Now with free shipping so I snapped it up, knowing I'd probably need it someday. I just purchased a turbo K75 so now I have a bike to install it on.

Control Switch

On my first few CCS-100 installs, I used the control switch that came with it and mounted that above the choke lever. Like so:

Even though I'd filled the control switches with RTV to "waterproof" them, eventually one of them leaked, shorted and failed. Then I came up with the idea of using windscreen up/down switch from a K1100LT to control the cruise control. This has several advantages. First, it actually IS waterproof since it was designed for a motorcycle. Next, it's an OEM switch so it looks like it belongs there, unlike the aftermarket look of the Audiovox switch. Finally, it's ergonomically more convenient to use.

The up button of the windscreen switch functions as the Resume/Accel/"Tap-up" button and the down button functions as the Set/Coast/"Tap-down" button. "Tap-up" and "Tap-down" allow you to fine tune your cruising speed once the cruise control is engaged.

DIP Switches

As a "universal" cruise control, the 250-1223, like the Audiovox CCS-100, has a set of binary switches which allow you to configure the operation of the 1223 to your particular vehicle and type of installation. These are located under the rectangular rubber cap on the 1223. You probably want to do this ahead of time on the workbench. Up is on, down is off.

This table, from the installation manual, shows how the unit should be "programmed" by setting these switches.

Programming Functions	1	2	3	4	5	6	7	8	9	10	11	12
Gain (Sensitivity)												
Extra Low	OFF	OFF										
Low	ON	OFF										
Mid	OFF	ON										
High	ON	ON										
Pulses/Mile (Pulses/Kilometer) see *Page 18*												
2000 (1250)			OFF	OFF	OFF	OFF						
4000 (2500)			ON	OFF	OFF	OFF						
6000 (3700)			OFF	ON	OFF	OFF						
8000 (5000)			ON	ON	OFF	OFF						
10000 (6200)			OFF	OFF	ON	OFF						
12000 (7500)			ON	OFF	ON	OFF						
18000 (11200)			OFF	ON	ON	OFF						
24000 (15000)			ON	ON	ON	OFF						
3200 (2000)			OFF	OFF	OFF	ON						
6400 (4000)			ON	OFF	OFF	ON						
9650 (6000)			OFF	ON	OFF	ON						
12870 (8000)			ON	ON	OFF	ON						
16090 (10000)			OFF	OFF	ON	ON						
19300 (12000)			ON	OFF	ON	ON						
28960 (18000)			OFF	ON	ON	ON						
38600 (24000)			ON	ON	ON	ON						
Engine/SetUp Timer												
8 Cylinder/Low							OFF	OFF	OFF			
4 Cylinder/Low							ON	OFF	OFF			
6 Cylinder/Low							OFF	ON	OFF			
6 Cylinder/Extra High							ON	ON	OFF			
8 Cylinder/High							OFF	OFF	ON			
4 Cylinder/High							ON	OFF	ON			
6 Cylinder/High							OFF	ON	ON			
4 Cylinder/Extra High							ON	ON	ON			
VSS Source see *Page 18*												
Sine Wave Input**										OFF		
Square Wave Input*										ON		
Transmission												
Manual											OFF	
Automatic											ON	
Control Switch see *Page 22*												
Open Circuit												OFF
Closed Circuit												ON

Switches 1 & 2: These set the 1223's sensitivity to pulses from the speedometer sensor. Set them both to OFF. or ON-OFF?

Switches 3-6: These are to set the pulses/mile received from the speedometer sensor. A K bike speedometer sensor puts out roughly 5,200 pulses/mile so I set these to OFF-ON-OFF-OFF.

Switches 7-9: These switches determine how hard the control unit pulls on the throttle cable. If it pulls too hard then you will have a jerky ride. If it doesn't pull hard enough then the cruise won't be able to accelerate enough to maintain the set speed. When you're going up a steep hill for example. Low in the table refers to low weight to high horsepower ratio. I set these to (try OFF-OFF-OFF OFF-ON-OFF ON-OFF-OFF to see what works best)

Switches 10: The speedometer sensor on a K bike is an analog indcutive device that gererates a sine wav. Set this to OFF

Switches 11: Set this to OFF for a manual transmission vehicle.

Switch 12: Set this to OFF. (For either the windscreen switch or the switch that comes with it.)

Function:	Gain		Pulses/Mile				Pull			Sine	Man	Open
DIP Switch	1	2	3	4	5	6	7	8	9	10	11	12
Setting	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Gain Alternative	ON	OFF										
6 Cyl. Low							OFF	ON	OFF			
4 Cyl. Low							ON	OFF	OFF			

Wiring

Power supply: Since the 1223 uses electrical power to pull on the throttle it uses a fair amount of power compared to a vacuum cruise control so I added a switched fused relay to power it. Using standard Bosch terminal designations, here's how I wired the relay:

- 85: Ground
- 86: Tapped into the green/brown wire of the white four terminal alarm connector found in the relay box. (Switched power from #7 fuse.) This turns the cruise control on when the bike is turned on.
- 30: Power in. I connected this to the "always hot" terminal on the starter relay with a ring terminal. I put a 15 amp fuse in this circuit.
- 87: Red and brown wires of the 1223.

The wiring instructions in the installation manual that came with it are horrible so I did some poking around on The Internet to gain a better understand of the wiring.

Red Wire: According to the installation instructions you're supposed to hook this up to the "hot" brake switch wire (green/black on a K bike rear brake switch) but that wire is just switched power so I ran that to the relay output power above to keep things simple.

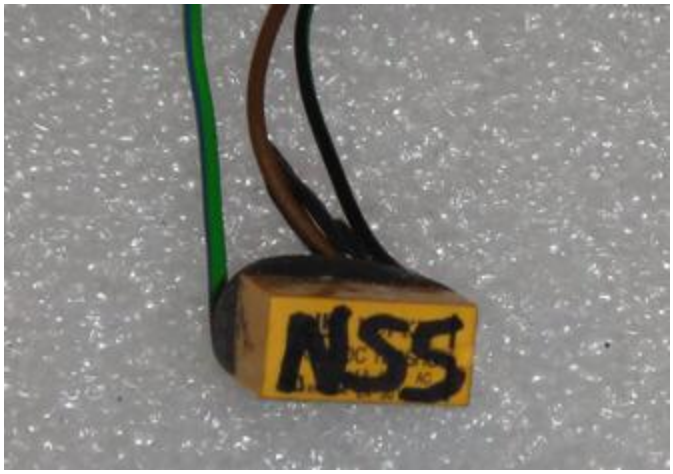
Brown Wire: This is the main 12V+ power to the 1223. That is hooked up to the relay output above.

Black Wire: This is the main ground for the 1223. I've read that the 1223 can be sensitive to poor grounding so I connected it to the negative terminal of the bike's battery using a ring terminal.

Violet Wire: When the brake light goes on, this wire senses 12V+ and disengages the 1223. You can tap this into the (gray/yellow) brake light wire. Since I'll probably convert the brake light to LED in the near future I added a normally closed PCB relay that grounds the violet wire when the brake light is not lit.

Light Gray Wire: This wire monitors the pulses from the speedometer sensor so the 1223 knows to speed up or slow down to keep you at your set speed. Tap that into the yellow speedometer sensor wire under the right side battery cover.

Light Green Wire: (Optional.) This is the Neutral Safety Switch wire that keeps the 1223 from over-revving if you pull in the clutch or the bike is in neutral. I looked up the installation instructions for this optional kit and from the wiring diagram deduced that when this wire gets a ground signal the 1223 will disengage. Since K bikes use the clutch switch and gear position indicator to put 12V+ to the start button when the clutch is pulled in, I used a normally open PCB relay to send a ground signal to the 1223 when the clutch is pulled in or the bike is in neutral. I tapped the positive trigger wire for the relay into one of the black/green wires (power to the start button) at the connector for the right combination switch.



Blue Wire: As a safety feature, this wire monitors the RPMs at the ignition coils to avoid the 1223 from going into run-away mode and over-revving the engine. However, since I'm using the clutch switch this wire does not need to be wired to the coils. Per the installation instructions that came with the 1223, I grounded this wire to the negative battery terminal with the main ground wire (black wire above) to avoid it introducing "trashy" signals into the system.

Dark Green Wire: This is the wire for the Set/Coast/"Tap-down" button. I wired that to the blue (down) wire of the windscreen switch.

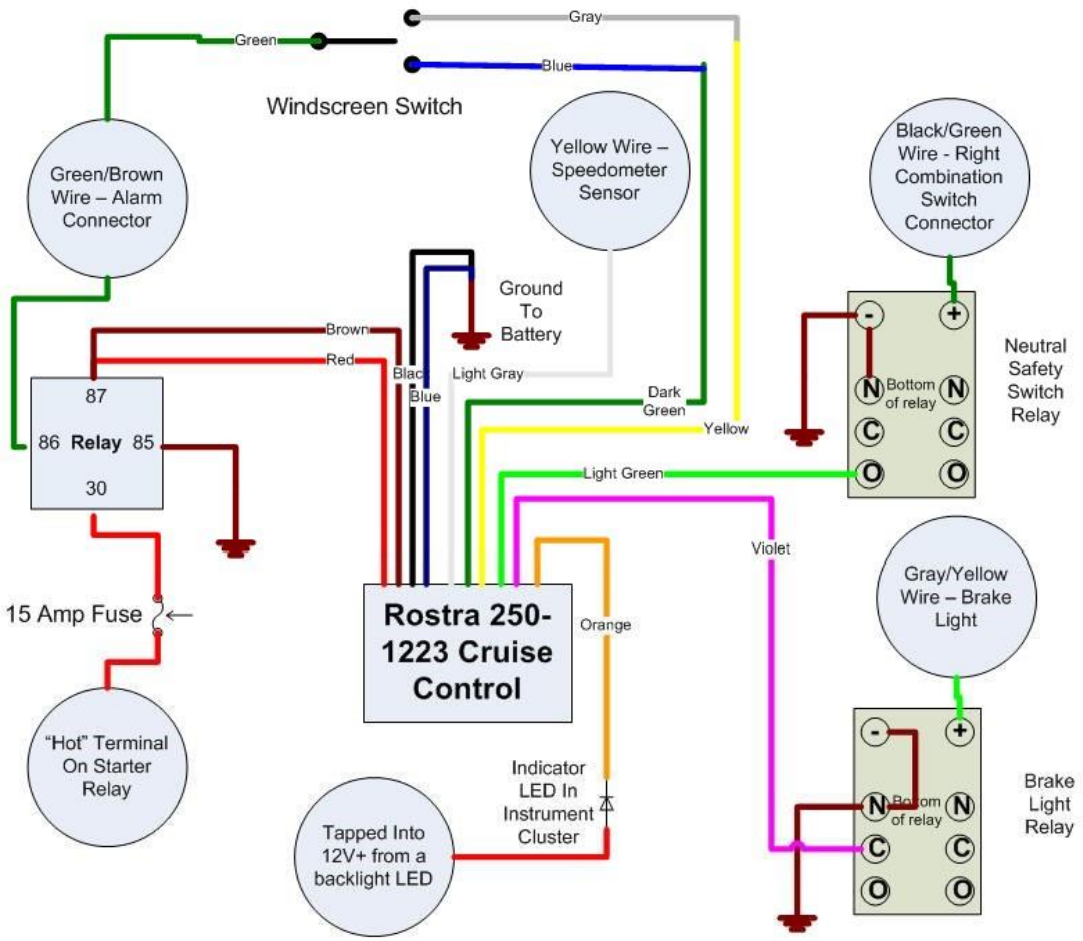
Yellow Wire: This is the wire for the Resume/Accel/"Tap-up" button. I wired that to the gray (up) wire of the windscreen switch.

Green Wire - Windscreen Switch: This provides switched 12V+ power to the windscreen switch. I tapped that into the green/brown wire of the alarm connector in the relay box.

Orange Wire: (Optional.) This wire puts out a ground signal when the cruise control is engaged. Since the bike is an 86+ non-ABS bike I wired that up to a green led I installed in the unused indicator next to the low fuel light in the instrument cluster.

Click on the wiring diagram below to have a larger version open in a new tab for printing:

Rostra 250-1223 Cruise Control – BMW K Bikes



K1100LT Windscreen Switch

The housing of the K1100LT left combination switch is the same as a K75/K100 so it will "bolt right up" to a K75/K100 choke perch. There's a Phillips screw at the bottom middle of the face of combination switch that holds the combination switch on. If that hasn't been removed since your bike left the factory then there can be some corrosion in the threads so be sure to use a good screwdriver and lots of pressure to avoid stripping the head of it.

The K1, K100RS4V and K1100 models use different combination switch wiring harness connectors than K75s/K100s. Therefore, you'll need to graft the connector from your old left combination switch to the K1100LT combination switch with a windscreen switch. However, both use the same wire colors so it's a straightforward task.

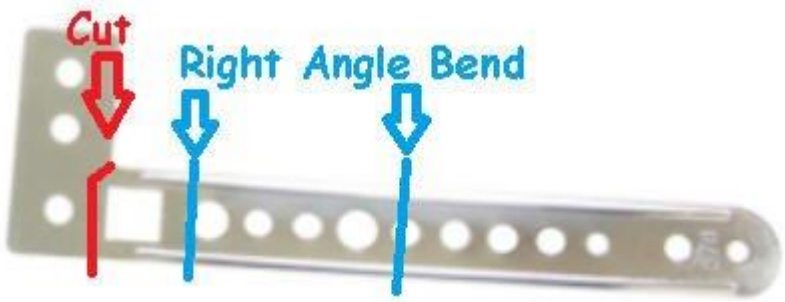
Hardware Installation

Cruise Control Body: I chose to install the 1223 in the tail cowl of my K75. I drilled a hole in the lower left hand corner of the tail cowl for the cable to pass through.

Picture here.

Then I ran the cable up the left frame rail to the throttle bodies.

Throttle Pull (a.k.a. Servo Cable): I modified the bracket that came with the 1223 as shown here:



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I snapped the black plastic cable holder into the square hole and mounted the modified bracket to the left frame rail with a stainless steel hose clamp above the throttle bodies:

Picture here.

I attached the hangman's noose connector to the bottom of the throttle bar as shown and used a small zip-tie to ensure that it stays in place:

Picture here.

Then I connected the hangman's noose to the cable from the servo with beads and bead connectors, leaving a small amount of slack when the throttle is at idle.

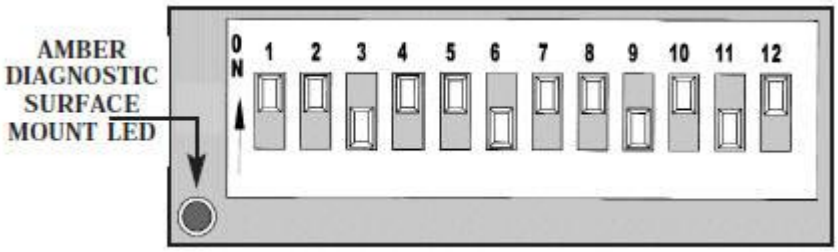
Picture here.

Test Ride

Although it is doubtful that anything will go wrong on your test ride, the red kill switch is your friend. It is important to note that on K bikes the kill switch cuts power to the brake light so if you're testing it with traffic behind you the vehicle behind you may not be aware that you are slowing when you apply the brakes.

Troubleshooting

There's a diagnostic LED under the rubber cap to the left of the DIP switches:



1. Turn the bike on while holding the up switch of the windscreen switch. The LED should be off and the 1223 should be in diagnostic mode.

2. Press the down switch of the windscreen switch. The LED should illuminate when the switch is pressed.

3. Press the up switch of the windscreen switch. The LED should illuminate when the switch is pressed. If neither of these illuminate, use a voltmeter to check that you are getting 12V at the windscreen switch's green wire.

4. The LED should illuminate when either brake is used. Check that you are getting power to the 1223 if none of the above actions illuminate the LED.

5. To test the speedometer sensor connection, with the bike in neutral and on the center stand, spin the rear wheel. The LED should flash.

6. To test the Neutral Safety Switch function.....

Footnote: The cruise control kit comes with several Scothlok connectors for tapping into existing wires. I've found these to be unreliable and sometimes they will cut the wire you're tapping into. I prefer to use Posi-Taps for tapping into wires.

Scotchlok

Posi-Tap
PTA2022