

C1, F/G650GS/X BMS/ECU Information

The information here has been assembled from the RealOEM on-line Fiche & information on various owner sites and enthusiast forums. See the notes at the end of the document regarding understanding of the way dealers refer to firmware revisions on the new diagnostics systems.

Revision 11

BMS/ECU Information

BMS-C	Initial units were supplied programmed, later they were supplied un programmed. RealOEM Note on these is below Note data revision no. in BMS-C control unit - ONLY FOR REPAIR AT THE DEALER'S Control unit, BMS-C 13617659372 \$555.15 +core +core = plus core charge (possibility of a return of the old part)	
	Part 13617659372 (Control unit, BMS-C) is used on the following models:	
	C1N: C1 (0191) C1 200 (0192)	R13: F650GS 00 (0172,0182) F650GS Dakar 00 (0173,0183)
	K14: F650CS 02 (0174,0184)	
BMSC II	Part 13627714905 (Control unit, BMS-CII) is used on the following models:	
	K14: F650CS 04 (0177,0187)	K15: G650 Xchallenge (0165,0195) G650 Xcountry 07 (0164,0194) G650 Xcountry 08 (0141,0151) G650 Xmoto (0167,0197)
	R13: F650GS 04 (0175,0185) F650GS Dakar 04 (0176,0186)	R131: G650GS 09 (0178,0179) G650GS 11 (0188,0189)
BMSE	Part 13618535856 (Control unit, BMSE) is used on the following models:	
	R134: G650GS (0188,0189)	K18: C 600 Sport (02/2011 - 04/2015)
	R134: G650GS Sertao 2014 (0136,0146)	K19: C 650 GT (01/2011 - 04/2015)
	Note. Part No 13618535856 supersedes part numbers 13618533726 and 13618523514 used on the initial K18/19, it is not clear why the change in part numbers, it may be early units were supplied programmed or that there has been a hardware update.	

Notes from TSB's

Disconnecting the battery of the BMS-C control unit does not cause any data to be deleted.
All data, adaptation values, and contents of the fault memory remain intact. (TSB13 003 03 051)

Turning the throttle-valve potentiometer does not have any influence on the engine's operating characteristics. After a very short time, the BMS-C control unit recalibrates itself to recognize the new baseline position. (TSB13 003 03 051)

The BMS C1 & C2 units used on the C1, CS & GS models any BMS can be re flashed to suit any of the models. (The software tools needed are unclear)

BMS-C Programming Versions (Single Spark)										
Model	TSN	Type Test No	Variant	BMS Part No	Program Release	Data Release	Injector	Octane Rating		
	VIN 4&7	On Controller Label		By Moditec in “Read Control Unit Identification”						
C1	0191	7655542	C1 125	7655299	4000	1651		95		
C1	0191	7655543	C1 80			1652		95		
C1	0191	7655542	C1 125			1661		95		
C1	0191	7655543	C1 80			1662		95		
C1	0191	7655542	C1 125			1671		95		
C1	0191	7655543	C1 80			1672		95		
C1	0191	7655542	C1 125	7664624	7000	1611		95		
C1	0191	7655543	C1 80			1612		95		
C1 200	0192	7658450	C1 200			2601		95		
C1	0191	7655542	C1 125	7668133	8000	1611		85		
C1	0191	7655543	C1 80			1612		95		
C1 200	0192	7658450	C1 200			2611		95		
F650GS	0172	7655699	R13 ECE	7658860	5000	3611	156026	95		
				7655705	6000	3601	156026	95		
						3611	156026	95		
				7664624	7000	3601	155788	95		
3606	155788					91				
F650GS Dakar	0173			7664624	7000	3608	156026	95		
						3601	155788	95		
				7668133	8000	3606	155788	91		
						3608	156026	95		
F650CS	0174			7655702	K14 ECE	7668133	8000	4606	155788	91
F650GS	0182	7655700	R13 US	7655705	6000	3604	156026	95		
				7664624	7000	3614	156026	95		
						3604	155788	95		
				7664624	7000	3607	155788	91		
F650GS Dakar	0183					7664624	7000	3609	156026	95
				7668133	8000			3604	155788	95
						3607	155788	91		
				3609	156026	95				
F650 CS	0184			7655703	K14 US	7668133	8000	4607	155788	91
BMS C (Single Spark) Notes										
1/ The boot blocks are common to F650GS, CS and C1										
2/ Program data / Map / Adaption Map is a separate data block										
3/ The old injector is compatible with the new software versions but only with RON 95 fuel										
4/ The transition from closed loop to open loop is 2000 rpm on early firmware & 4500 on later.										
5/ A further update to the data block was released in 2003 (0360A & 0460A)										

Software and Injector Compatibility - F650GS Single Spark									
Injector	CC/Min	BAR	Bosch Part No	BMW Part No	EU		Octane	US	
					Program	Data		Program	Data
Old	302.7	3	0 280 156 026	13 54 7 652 159	5000	3611	95		
					6000	3601	95	6000	3604
					6000	3611	95	6000	3614
					7000	3608	95	7000	3609
					8000	3608	95	8000	3609
New	325.8	3	0 280 155 788	13 71 1 342 366	7000	3601	95	7000	3604
					7000	3606	91	7000	3607
					8000	3601	95	8000	3604
					8000	3606	91	8000	3607
Injector/Firmware Notes									
Program versions 6000/7000 with old Injector are the surging & stalling versions									
The program/data maps worth using are :-				8000 3606 ECE with new injector RON 91					
5000 3611 ECE with old injector				8000 3604 US with new injector RON 95					
8000 3601 ECE with new injector RON 95				8000 3607 US with new injector RON 91					

BMS - A9500 (Single Spark) Connector Pinout Connector Viewed from open end (x) = Pin No							
Pin	Description	Signal	Color	Pin	Description	Signal	Color
1	T9010 - Coil & P9002 - Tacho	Z1	Sw	15	R9570 - Throttle Pos Pot (1)	DKP-	Ws/Rt
2	M9140 - Cooling Fan (via Fuse 3)	FAN	Ws/Ge	16	B9690 - Lambda Sensor (3)	LSS-	Ge
3	B9562 - Coolant Temp Sensor (4)	TFK-	Br/Rt	17	B9690 - Lambda Sensor (4)	LSS+	Sw
4	B9562 - Coolant Temp Sensor (3)	TFKS	Br/Gn	18	B9545 - Inductive Sensor (1)	RPM+	Ge/Rt
5	M9576 - Throttle Valve Actuator (4)	D	Vi/Sw	19	H9190 - Coolant Lamp (10)	KT	Vi
6	M9576 - Throttle Valve Actuator (1)	A	Vi/Gn	20	Y9601 - Fuel Injector (2)	EV	Ge/Bl
7	X9590 - Diagnostic Socket (1)	DIAG	Br/Sw	21	P9210 - Speedo & Option Skt	TAA	Bl/Ge
8	B9545 - Inductive Sensor (2)	RPM-	Ge/Br	22	Y9572 - Tank Vent Valve	TEV	Gr/Rt
9	X9402 - Common Ground	31	Br/Or	23	B9550 - Air Temp Sensor (1)	TFLS	Br/Ge
10	B9690 - Lambda Sensor (1)	LSH+	Gr/Sw	24	R9570 - Throttle Pos Pot (2)	DKPS	Ws/Sw
11	M9576 - Throttle Valve Actuator (3)	C	Vi/Ws	25	X9431 - From F1 +12v 31	30F4	Rt/Ws
12	S9084 - RHS Switch - Starter (3)	50	Sw/Ge	26	R9570 - Throttle Pos Pot (3)	DKP+	Ws/Gr
13	M9576 - Throttle Valve Actuator (2)	B	Vi/Ge	27	M9100 - Fuel Pump (15)	EKP	Gn/Br
14	B9550 - Air Temp Sensor (1)	TFL-	Br/Bl	28	K9110 - Motronic Relay V+	15g	Gn/Bl
Color Code	Ws = White Sw = Black	Bl = Blue Br = Brown	Ge = Yellow Rt = Red	Gn = Green Or = Orange	Gr = Grey Vi = Violet	Rs=Pink Tr=Clear	
Notes Main power is supplied to pin 28 from Motronic relay, power to pin 25 is the secondary power input. Wiring diagrams have errors on fan & fuse wire colors & only early production machines have Fuse 3							

F650GS Dual Spark Information

Software and Injector Information – F650GS/CS/G650GS/650X Dual Spark									
Injector Specification			Date	Model	Octane (RON)	Program	Data		
cc/Min	BAR	Part No					EU2	EU3	US
329.6	3 5	13 64 7 685 373	19/6/06	K15HE/SM	91	A200E	N60B		N607
			1/11/06	K15HE/SM	91	A200E	?	N61B	N617
			8/5/08	K15HE	91	A210E	N60C		N604
			19/6/06	K15SCR	91	A200E	O60B		O607
			1/11/06	K15SCR	91	A200E	?	O61B	O617
			8/5/08	K15SCR	91	A210E	O60C		O604
		BMW	29/9/03	K14/02	91	A170E	E606		E607
			24/2/04	K14/02	91	A180E	E606		E607
			8/12/05	K14/02	91	A190E	E606		E607
			25/7/06	K14/02	91	A200E	E606		E607
			7/11/06	K14/02	91	A200E	?	E616	E617
			8/5/08	K14/02	91	A210E	E606		E607
		Bosch	29/9/03	R13MU	91	A170E	D606		D607
			22/2/04	R13MU	91	A180E	D606		D607
			8/12/05	R13MU	91	A190E	D606		D607
			28/6/06	R13MU	91	A200E	D606	D60B	D607
			1/11/06	R13MU	91	A200E	D616	D61B	D617
			8/5/08	R13MU	91	A210E	D606	D60B	D607
			3/3/10	R13MU	91	A210E	?	D620	D630
0-280-158-058									

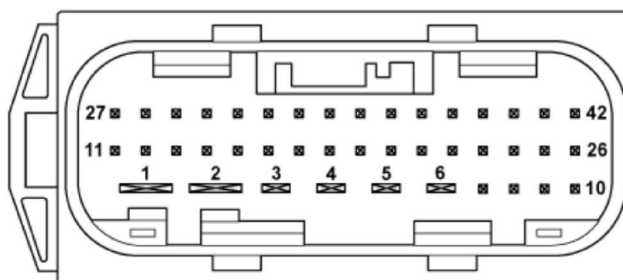
BMSCII (Dual Spark) Notes

- 01/ The boot block / program is common to F, G , CS and X Series models
- 02/ The data/mapping block is different on each model CS / GS / X. (F & G GS data is the same)
- 03/ There are 2 different data / map data versions for the X Series
- 04/ The early firmware (A170E) had cold starting problems
- 05/ Fuel injectors are common across the 650 single dual spark variants (GS/X, F and G series)
- 06/ The 2006 190E firmware is coupled with a decompression lever & spring replacement
Decompression Lever - 11 31 7 699 386, Spring - 11 31 2 343 097
- 07/ Firmware 200E adds EU3 compliance for emissions (Data D60B) EU2 data is D606
- 08/ EU3 machines have a modified exhaust pipe, different lambda and modified catalytic converter
- 09/ G650X HE is the Xchallenge & SuperMoto, SCR is the 07 & 08 Xcountry (same firmware on both)
- 10/ G650X owners are using Bosch Injector 0280 155 892 for improved performance (374 cc/min)

Note The 2012 G650GS has A210E D630 Firmware

**BMS A9500
(Dual Spark)
Connector Pinout**

(x) = Pin No



Pin	Description	Signal	Color	Pin	Description	Signal	Color
1	F9200–Fuse F1 12v Power V+	15	Gn/Rt	26	H9001–Coolant Temp Lamp (10)	KT	Vi
2	G9230–Battery V- Earth V-	31	Br	27	X9230–Bat+ Unswitched	30	Rt
3	T9520–Ignition Coil 2 (1)	Z2	Sw/Vi	28	R9570–Throttle Valve Sensor (3)	DKP+	Ws/Gr
4	T9510–Ignition Coil 1 (1)	Z1	Sw/Gn	29	B9690–Lambda O2 Sensor (4)	LBDA	Sw
5	M9140–Coolant Fan (1)	Luefter	Ws/Bl	30	R9570–Throttle Valve Sensor (2)	DKPS	Ws/Sw
6	M9100–Fuel Pump (2)	EKP	Gn/Br	31	B9562–Coolant Temp Sensor (4)	TMOT+	Br/Gn
7				32	B9550–Intake Air Sensor (2)	TANS+	Br/Ge
8	B9690–Lambda O2 Sensor (1)	15V	Gr/Sw	33	B9326–Crankshaft Sensor (2)	RPM-	Ge/Br
9				34	B9326–Crankshaft Sensor (1)	RPM+	Ge/Rt
10				35	X9590–Diagnostics Skt (1)	DIAG	Br/Sw
11				36	P9210–Tacho (6)	TAA	Bl/Ge
12				37			
13				38			
14				39	M9575–Idle Actuator (2)	B	Vi/Ge
15	R8570–Throttle Valve Sensor (1)	DKP-	Ws/Rt	40	Y9572–Tank Vent Valve (2)	TEV	Gr/Rt
16	B9550–Intake Air Sensor (1)	TANS-	Br/Bl	41	M9575–Idle Actuator (1)	A	Vi/Gn
17	B9562–Coolant Sensor (3)	TMOT-	Br/Rt	42			
18	B9690–Lambda O2 Sensor (3)	31LBDA	Ge	43			
19				44			
20				45			
21				46			
22	S9080–RHS Switch Starter (3)	50	Sw/Ge	47			
23	M9575–Idle Actuator (4)	D	Vi/Sw	48			
24	Y9601–Injection Valve 1 (2)	EV	Ge/Bl	49			
25	M9575–Idle Actuator (3)	C	Vi/Ws	50			

Color Code Ws = White Bl = Blue Ge = Yellow Gn = Green Gr = Grey Rs=pink
 Sw = Black Br = Brown Rt = Red Or = Orange Vi = Violet Tr=Clear

BMSCII (G Series) Note

There is a hot start problem with all K15, R13/31, R13/40 models prior to engine No 61712400
The cause is the decompression lever rather than firmware, it is covered by US TSB 1100312-015

General Notes.

Main power is supplied from pins 1 & 2, adaptation memory power is from pins 2 & 27
 The F650GS, G650GS and G650X pin out and color codes are the same

G650GS & Sertao 2013+ BMSE Information

The BMSC has been replaced by the BMS-E as of some time in the 3rd quarter of 2013, the earliest VIN identified is September 2013. The BMS-E is manufactured by Magneti Marelli and is used on a number of other models. The models include the C600 and C650GT Scooters, the Husqvarna Terra, and a few others. Internally it has CAN BUS, allows for 2 cylinders and additional sensors.

The firmware is no longer separated into program and data components, it is now combined into one programmable firmware set.

The firmware determines which components internally are active. The G650GS and Sertao do not utilise the CAN BUS elements.

The BMS-E has two numbers in the BMW system. An un programmed Hardware OE No and a Part No. The Part No is the programmed unit.

The firmware revision is shown as Part No in the GS911 readouts on the BMS-E.

Software and Injector Information – 2013+ G650GS and Sertao								
Injector Specification			Date	Model	Octane (RON)	Firmware		
cc/Min	BAR	Part No				ECE	US	Brazil
329.6	3 5	BMW 13 64 7 685 373	6/6/12	GS/Sertao	91	8538091	8538092	8538093
			27/11/12	GS/Sertao	91	8537911	8537912	8537913
			29/4/13	GS/Sertao	91	8548402	8548403	8548404
		Bosch 0-280-158-058	25/11/13	GS/Sertao	91	8537811	8537812	8537813
			1/10/15	GS/Sertao	91	8561542	8561543	8561844
			4/11/16	GS/Sertao	91	8388468	8388469	8393716

Notes

GS911 read outs from more machines are needed to confirm the information above

Some machines are reported as stalling on over run, the firmware revision has not been identified but has to be the first 2 or 3 versions.

The 25/11/13 update is believed to be the hot start release

The BMS-E equipped Sertao's were subject to recall in Oct 2015 and again Nov 2016 for a “stalling” issue.

The BMS-E can also lose track of the Idle Actuator position when the ignition is turned off.

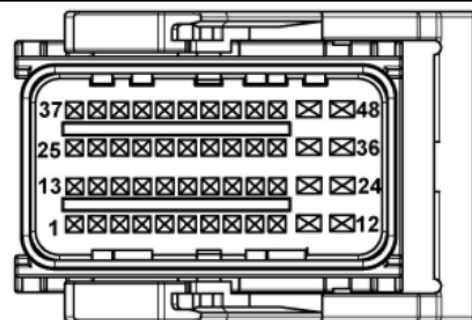
Australia - ACCC	USA - NHTSA	Canada - Recall	UK - VOSA
1st November 2010 to 3rd August 2015 Recall Numbers 2015/14903 & 2016/15811	manufactured March 8, 2013, to March 2, 2015 Recall Numbers 15v537 & 16v689	2013 models listed Recall Numbers 2015378 & 2016478	Build Start Date 08/11/12 Build End Date 22/07/15 Recall Numbers RM/2015/029

BMS-E Socket and Pin out

The pin out below has been checked against the wiring diagrams and should be correct but needs to be checked against the wiring on a machine. E & OE until it can be cross checked.

BMS A9500 (2014 R134 BMS-E) Connector Pinout

(x) = Pin No



Pin	Description	Signal	Color	Pin	Description	Signal	Color
1	Not Used	CAN-L		25	Start Switch S9084 (3)	START	SwGe
2	Not Used	CAN-H		26	Air Temp Sensor B9550 (2)	TFLS	BrGe
3	Crankshaft Sensor+ B9326 (2)	KWGS	BlGe	27			
4	Crankshaft Sensor- B9326 (1)	KWG-	Ge	28			
5				29			
6	Fuel Pump Relay K9100 - (1)	EKP	BrGe	30			
7	Lambda Sensor Heatr B9690 (2)	LSH-	Br	31	Idle Actuator M9575 (2)	LS1B2	ViGe
8	Diagnostics K-Line X9590 (1)	Diag	BrSw	32	Idle Actuator M9575 (4)	LS1A2	ViSw
9	Y9601-Injection Valve 1 (2)	V1	Ge/Bl	33			
10	Water Temp Lamp X9001 (8)	KT	Vi	34	Looped to pin 42	BRUE	Br
11	Battery + From Fuse 1	30F1	RtSw	35	Ground Battery - X9231	31	Br
12				36	Ignition Coil 2 - T9520 (1)	ZS2	SwVi
13	Coolant Temp Sensor B9562 (3)	TFKS	BrGn	37	Lambda Sensor B9690 (4)	LSS+	Sw
14	Throttle Pos S Signal R9570 (2)	DKPS	WsSw	38	Lambda Sensor B9690 (3)	LSS-	Ge
15	Not Used - Sidestand Switch I/P			39	ABS On/Off Switch S9556 (1)	NIV-OEL	BlBr
16	Throttle Pos Sense R9570 (2)	DKP+	WsGr	40			
17				41	Dash - Tacho A9001 (11)	TAA	BlGe
18	Tank Vent Valve (US) Y9572 (2)	TEV	GrRt	42	Looped to pin 34	BRUE	Br
19	Idle Actuator Valve M9575 (3)	LS1B1	ViWs	43			
20	Idle Actuator Valve M9575 (1)	LS1A1	ViGn	44			
21	Radiator Fan Relay K9140 (8)	LUEF	BlGe	45			
22	Power from Ign/Kill Sw S9080	15	GnBl	46	Throttle Pos Sw R9570 (1)	DKP-	WsRt
23	Fuel Pump Relay K9100 (2)	EKP	GnSw	47	Air/Water Temp B9562 B9550	31	BrBl
24	Not Used			48	Ignition Coil 1 - T9510 (1)	ZS	SwGn
Color Code	Ws = White Sw = Black	Bl = Blue Br = Brown	Ge = Yellow Rt = Red	Gn = Green Or = Orange	Gr = Grey Vi = Violet	Rs=pink Tr=Clear	

Notes

There is a weakness in the earth connection in the BMS-E socket which has resulted in BMS-E failures, it is recommended to put an earth strap on the case of the BMS-E

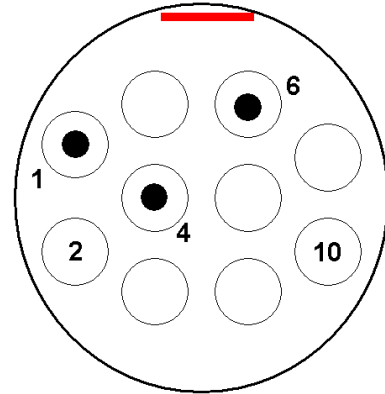
Diagnostic Socket Notes

F650GS Socket Pinout (Viewed from front)

Pin 1 – K-Line
Pin 4 – Earth V-
Pin 6 - 12v V+

Pin 2 – ABS on other models
Pin 10 – Ignition on other models

Pin removal tool is BMW 0518



Rear of a Diagnostic Plug Cap showing pins 1 & 4 looped. (K-Line & Earth)

The open pin positions are 5 & 8

This is the Diagnostic Socket Cap supplied on some machines manufactured up to at least 2002

An early electrical diagram suggests wiring on pins 4 (Eth) & 5 (Pwr)

GS911 Plug

Pins 1, 2, 4, 6 and 10 fitted to enable communications with all K-Line models 1999 to 2012



650 CS / GS / X Fuel Injector Specifications					
Parameter		F60GS	F650GS	650GS/M / X	
		Old	New	All Dual Spark	
Bosch No		0-280-156-026	0-280-155-788	0-280-158-058	
Lbs/Hr		28.8	31	31.4	
Cc/Min		302.7	325.8	329.6	
Grams/Min		217.7	234.4	237	
PSI		43.5	43.5	43.5	
BAR		3	3	3	
Spray Type		E	C	C	
Pattern (Degrees)		20	25	20	
Type		EV6	EV6	EV14	
Plug		Jetronic	Jetronic	Jetronic	
Resistance		14.5	15.95	12	
O-Ring Spacing		48	48	48	
Length		61	61	78	
Note – The F650GS Old injector was used only with 5000 series BMS-C programming					

Dealer Diagnostics Notes

The early Moditec and GT1 Dealer diagnostics systems expressed firmware versions in the manner they are presented in this document. The new MOSS diagnostics system is a Motorrad version of the car diagnostics system and has adopted the concept of Integration Level from the car system.

The integration level is expressed as a number representing the month and data revision of the diagnostics system. It is not very explanatory.

An example is	Integration Level Plant	KH24-12-08-500	Factory Level
	Integration Level Old	KH24-13-02-500	Level before update
	Integration Level New	KH24-13-02-500	Level after update

The integration level refers to the overall vehicle so above we have 8th Month 2012 followed by 2nd month of 2013 status on data. The individual module details are presented as a “Part No” which changes according to the firmware revision fitted.

It should be noted that it appears up until 2015 the group in BMW handling the G Series has not been correctly updating the iLevel and so all revisions of firmware show 08-08-500.

The GS911 expresses the firmware revision of ECU's as per the earlier Moditec and GT1 as these firmware numbers are still recorded in the same traditional way internal to the ECU's.