

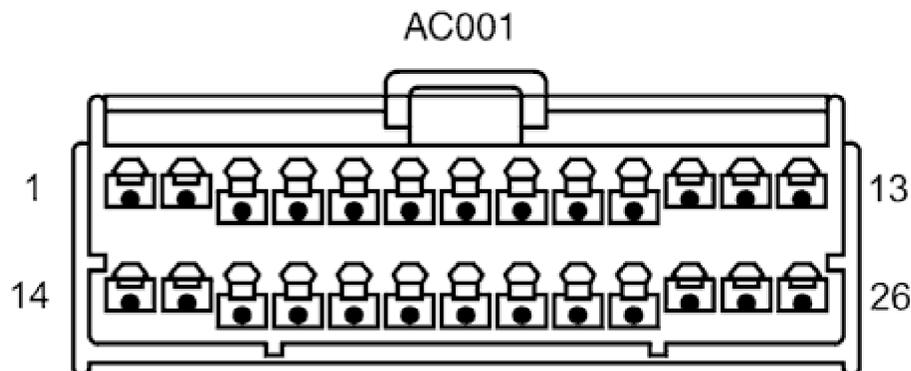
1998 XK RANGE - Control Components - 412-04

This procedure is from Steve at www.thejagwrangler.com

Control Components

Connector Pins Identification

Connector Pin Identity Chart for AC001



E34303

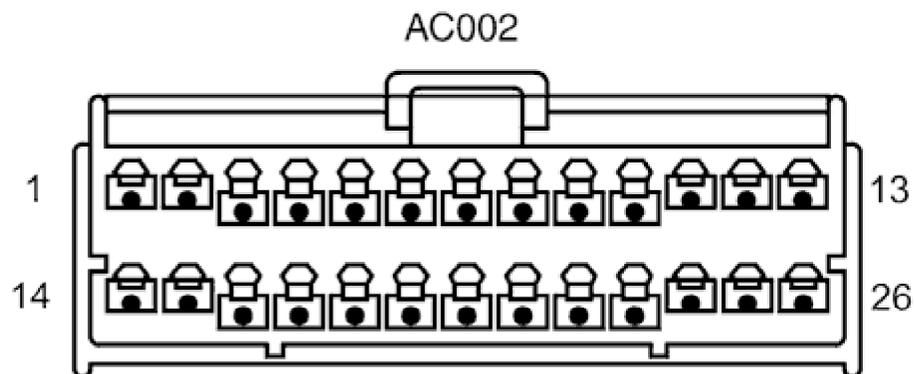
Pin Number	Circuit	Circuit Function
001		Compressor ON signal
002		Coolant valve
003		RH Blower motor relay
004		Heated windshield relays (where fitted)
005		Heated door mirror relay
006		Defrost servomotor (positive)
007		Center vent servomotor (positive)
008		LH air intake servomotor fresh / recirculation (positive)
009		RH air intake servomotor fresh / recirculation (positive)
010		Not used
011		Not used
012		Foot servomotor (positive)
013		Cool air bypass servomotor (positive)
014		Not used
015		Not used
016		LH Blower motor relay
017		Coolant pump motor relay
018		Heated backlight relay
019		Defrost servomotor (negative)

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020		Center vent servomotor (negative)
021		LH air intake servomotor fresh / recirculation (negative)
022		RH air intake servomotor fresh / recirculation (negative)
023		Not used
024		Not used
025		Foot servomotor (negative)
026		Cool air bypass servomotor (negative)

Connector Pin Identity Chart for AC002



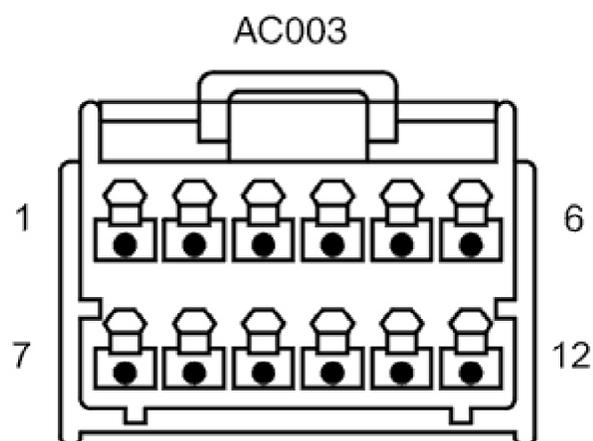
E34304

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This procedure is from Steve at www.thejagwangler.com

Pin Number	Circuit	Circuit Function
001		Solar sensor
002		Center vent servomotor feedback potentiometer
003		RH air intake servomotor feedback potentiometer fresh / recirculation
004		Not used
005		Cool air bypass servomotor feedback potentiometer
006		Coolant temperature signal
007		RH blower motor voltage feedback
008		RH blower motor drive signal
009		Differential potentiometer
010		Defrost servomotor feedback potentiometer
011		LH air intake servomotor feedback potentiometer fresh / recirculation
012		Not used
013		Foot servomotor feedback potentiometer
014		Not used
015		LH blower motor voltage feedback
016		LH blower motor drive signal

Connector Pin Identity Chart for AC003



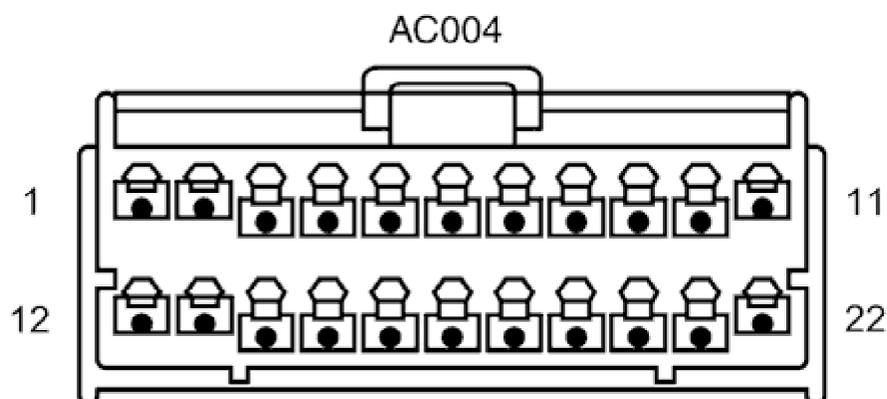
E34305

1998 XK RANGE - Control Components - 412-04

This procedure is from Steve at www.thejagwangler.com

Pin Number	Circuit	Circuit Function
001		Screen request to ECM
002		CLOCK signal to control panel
003		DATA OUT signal to control panel
004		Compressor lock signal
005		Exterior air temperature sensor
006		Heater matrix temperature sensor
007		DATA IN signal from control panel
008		START signal to control panel
009		Not used
010		Compressor lock select
011		In-car temperature sensor
012		Evaporator temperature sensor

Connector Pin Identity Chart for AC004



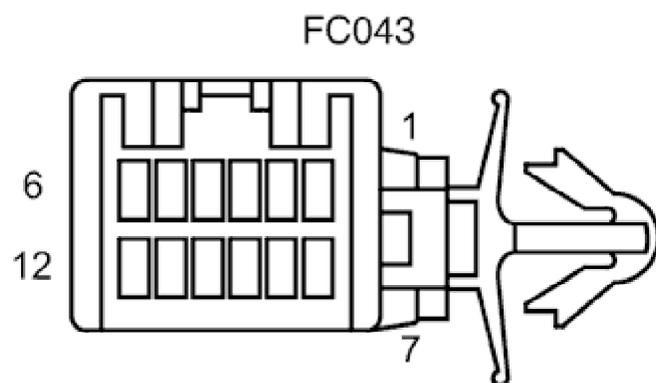
E34306

1998 XK RANGE - Control Components - 412-04

This procedure is from Steve at www.thejagwrangler.com

Pin Number	Circuit	Circuit Function
001		Ignition positive supply
002		Battery isolate supply
003		Auxiliary ground
004		Auxiliary ground to control panel
005		Battery supply
006		Engine speed input
007		Electrical load drive inhibit
008		+5V sensors
009		Clutch request to ECM
010		Diagnostic L-line
011		Not used
012		Ignition (positive) to control panel
013		System ground
014		Ground to control panel
015		Air conditioning isolation relay
016		Vehicle speed
017		Pressure switch
018		Aspirator motor (In-car sensor)
019		Sensor ground
020		Logic ground for diagnostic lines
021		Diagnostic K-line
022		Not used

Connector Pin Identity Chart for FC043



E34307

1998 XK RANGE - Control Components - 412-04

This procedure is from Steve at www.thejagwrangler.com

Pin Number	Circuit	Circuit Function
1		Input CLOCK
2		Input START
3		Input DATA IN
4		Output DATA OUT
5		Input ignition (positive)
6		Input auxiliary (negative)
7		Ground
8		Dimmer
9		Dimmer override
10		Not used
11		Not used
12		Not used

Control Panel Communication

The control panel provides operator interface with the climate control system.

Control panel operation is described in detail in the D section.

Control Panel Inputs / Outputs

Pin #	Description	Cable color
1	Output clock	Slate
2	Output start	Slate / Red
3	Input data in	Slate / Yellow
4	Output data out	Slate / Green
5	Output ignition positive	White / Red
6	Output auxiliary positive	White / Blue
7	Output ground	Black
8	Dimmer	Red
9	Dimmer override	Red / Green
10	Not used	n/a
11	Not used	n/a
12	Not used	n/a

A/CCM Connections

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Pin #	Input / Output	Function	Specification
1 (22-way)	Input	Ignition positive supply	With ign ON
2 (22-way)	Input	Battery isolate supply	Activated when IGN ON and for 30 seconds after IGN OFF
3 (22-way)	Input	Auxiliary ground	Auxiliary switch closed to ground
4 (22-way)	Output	Auxiliary ground	Direct line to pin #3
5 (22-way)	Input	B+	
6 (22-way)	Input	Engine speed input	Open collector, 3 pulses per rev.
7 (22-way)	Input	Electrical load drive inhibit	Active low signal from EMS
8 (22-way)	Output	Sensor +5V	
9 (22-way)	Output	Clutch request	Open collector R = 1KOHM, connected to IGN, activated high
10 (22-way)	Input	Diagnostic L line	
11 (22-way)	n/a	Not used	n/a
12 (22-way)	Output	Ignition (+VE) to control panel	
13 (22-way)		System ground	
14 (22-way)	Output	Ground to control panel	
15 (22-way)	Output	Isolation relay	Activated when IGN ON and for 30 seconds after IGN OFF
16 (22-way)	Input	Vehicle speed input	
17 (22-way)	Input	Pressure switch	Ground for normal pressure. IGN+ for abnormal pressure
18 (22-way)	Output	Aspirator motor (Motorized In-car Aspirator)	0.05A at 12V, activated high during ON mode only
19 (22-way)	Input	Sensor ground	
20 (22-way)		Logic ground for diagnostic lines	
21 (22-way)	Output	Diagnostic K line	
22 (22-way)	Output	Water pump ground	Sensing cct current signal
23 (12-way)	Output	Screen request to ECM	Open collector R = 57OHM, connected to IGN, activated low
24 (12-way)	Output	CLOCK signal to control panel	Open collector R = 1KOHM, connected to IGN, activated high
25 (12-way)	Output	DATA OUT signal to control panel	Open collector R = 1KOHM, connected to IGN, activated high
26 (12-way)	Input	Compressor lock signal	

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27 (12-way)	Input	Ambient air temperature sensor	Voltage / temperature values
28 (12-way)	Input	Heater matrix temperature sensor	Voltage / temperature values
29 (12-way)	Input	DATA IN signal from control panel	
30 (12-way)	Output	START signal to control panel	Open collector R = 1KOHM, connected to IGN, activated high
31 (12-way)	Not used		
32 (12-way)	Input	Compressor lock select	Ign. voltage
33 (12-way)	Input	In-car temperature sensor (Motorized In-car Aspirator)	Voltage / temperature values
34 (12-way)	Input	Evaporator temperature sensor	Voltage / temperature values
35 (16-way)	Input	Solar sensor	Voltage / temperature values
36 (16-way)	Input	Centre vent servo motor feedback potentiometer	Resistance 6KOHM +/-10% 0% closed - 1V, 100% open - 4V
37 (16-way)	Input	RH air intake servo motor feedback potentiometer	Resistance 6KOHM +/-10% 0% closed - 1V, 100% open - 4V
38 (16-way)	Not used		
39 (16-way)	Input	Cool air bypass servo motor feedback potentiometer	Resistance 6KOHM +/-10% 0% closed - 1V, 100% open - 4V
40 (16-way)	Input	Coolant temperature signal	PWM signal
41 (16-way)	Input	RH blower motor voltage feedback	
42 (16-way)	Output	RH blower motor drive signal	0V to 3V max.
43 (16-way)	Input	Differential potentiometer	Resistance 10KOHM +/-10%. Min. 1V, Max. 4V
44 (16-way)	Input	Defrost servo motor feedback potentiometer	Resistance 6KOHM. +/-10%. 0% closed - 1V, 100% open - 4V
45 (16-way)	Input	LH air intake servo motor feedback potentiometer	Resistance 6KOHM +/-10%. 0% closed - 1V, 100% open - 4V
46 (16-way)	Not used		
47 (16-way)	Input	Foot servo motor feedback potentiometer	Resistance 6KOHM +/-10%. 0% closed - 1V, 100% open - 4V

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48 (16-way)	Not used		
49 (16-way)	Input	LH blower motor voltage feedback	
50 (16-way)	Output	LH blower motor drive signal	0V to 3V max.
51 (26-way)	Input	Compressor ON signal	B+ @ compressor ON
52 (26-way)	Output	Water valve	1amp at 12 volts
53 (26-way)	Output	RH Blower motor relay	Load 105OHM at 12V IGN, activated low
54 (26-way)	Output	Heated windshield relays	Load 36OHM at 12V IGN, activated low
55 (26-way)	Output	Heated door mirror relay	Load 105OHM at 12V IGN, activated low
56 (26-way)	Output	Defrost servo motor (+VE)	B+ when operated
57 (26-way)	Output	Centre vent servo motor (+VE)	B+ when operated
58 (26-way)	Output	LH air intake servo motor (+VE)	B+ when operated
59 (26-way)	Output	RH air intake servo motor (+VE)	B+ when operated
60 (26-way)	Not used		
61 (26-way)	Not used		
62 (26-way)	Output	Foot servo motor (+VE)	B+ when operated
63 (26-way)	Output	Cool air bypass servo motor (+VE)	B+ when operated
64 (26-way)	Output	RH High speed relay	Load 105OHM at 12V IGN, activated low
65 (26-way)	Output	LH High speed relay	Load 105OHM at 12V IGN, activated low
66 (26-way)	Output	LH Blower motor relay	Load 105OHM at 12V IGN, activated low
67 (26-way)	Output	Water pump motor relay	Load 105OHM at 12V IGN, activated low
68 (26-way)	Output	Heated backlight relay	Load 72OHM at 12V IGN, activated low
69 (26-way)	Output	Defrost servo motor (-VE)	B+ when operated

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70 (26-way)	Output	Centre vent servo motor (-VE)	B+ when operated
71 (26-way)	Output	LH air intake servo motor (-VE)	B+ when operated
72 (26-way)	Output	RH air intake servo motor (-VE)	B+ when operated
73 (26-way)	Not used		
74 (26-way)	Not used		
75 (26-way)	Output	Foot servo motor (-VE)	B+ when operated
76 (26-way)	Output	Cool air bypass servo motor (-VE)	B+ when operated

System Self-test**Control Panel Interrogation Procedure**

The control panel has a self-diagnosis feature, and is capable of displaying and clearing stored fault codes.

Climate control is an integrated system, therefore it is recommended that the PDU is used for fault diagnosis. The fault codes displayed with the control panel self-diagnosis feature are not as comprehensive as those of the PDU. The PDU will display the relevant fault code, fault code description and information of the system peripherals at the time the fault occurred.

Fault Code Extraction and Deletion Procedure

Error information is stored in the A/CCM up to a maximum of 5 faults. Should a sensor fault occur there will be an audible beep and the message Er will be displayed on the control panel display for 5 seconds after ignition on. Please note that this will happen only once in any ignition switch cycle. The error source may be accessed by the following procedure

This procedure must be completed through one complete cycle, 1 through 6

Step	Result
#1 Simultaneously hold AUTO and RECIRC - Switch ignition to ON	Display element check
#2 Press AUTO	Display of stored fault (NUMERIC) code. If ZERO appears, there are no stored codes
#3 Press FACE	Scroll through stored faults (maximum of 5)
#4 Simultaneously press FACE and R	Clear stored fault codes (may need to be repeated for each fault)
#5 Press RECIRC (Press FAN to skip actuator check)	Initiate actuator check (Actuator codes 20 through 27 *)
#6 Press FAN	Exit error check mode

NOTE:

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This procedure is from Steve at www.thejagwrangler.com

* Actuator codes do NOT equate to system fault codes.

NOTE:

Only codes 11, 15 and 21 (see Fault Code Listing) will cause audible beep and 'Er' display.

NOTE:

If '0' is displayed, there are no stored fault codes, wait 30 seconds to allow system self-test.

- The control panel display will flash repeatedly indicating a list of two digit numbers (see table for code analysis).
- Should a code be displayed accompanied by an audible beep, the fault is current and therefore still present within the system. A code displayed without an accompanying 'beep' indicates a fault had previously occurred but is not present within the system.

NOTE:

It is advisable to check all areas indicated with cleared fault codes. Such faults may re-occur if intermittent problems are present in the system.

- To delete stored and cleared fault codes press 'R' and 'FACE' buttons simultaneously.
- After investigating and correcting all stored faults, press the 'Push Off' button to restore normal operation with default panel settings, ie AUTO at 24°C.

Control Panel Fault Code Listing

Condition(s):NOTE:

Reference fault code #23*: In ambient temperatures below 0°C, this code may be logged because the low ambient causes a temporary low gas pressure.

NOTE:

Where the ambient temperature rises above 40°C, with the engine close to overheating, electrical feed to the compressor clutch may be cut and code #23 registered.

0 Normal operation no fault codes present

Possible Source(s):

- None

Action(s) to take:

- Wait 30 seconds for system self-check.

11 Motorized in-car aspirator malfunction

Possible Source(s):

- Harness / connector fault
- Sensor open / short circuit

Action(s) to take:

- Panel fault codes are not stored for motorized in-car aspirator motor failure.

12 Ambient temperature sensor malfunction

Possible Source(s):

- Harness / connector fault
- Sensor open / short circuit

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This procedure is from Steve at www.thejagwrangler.com

Action(s) to take:

- After rectification, disconnect the vehicle battery for 10 seconds to reset the system.

13 Evaporator temperature sensor malfunction

Possible Source(s):

- Harness / connector fault
- Sensor open / short circuit

Action(s) to take:

- Refer to PDU

14 Water temperature input malfunction

Possible Source(s):

- Instrument cluster output

Action(s) to take:

- Refer to PDU

15 Heater matrix temperature sensor malfunction

Possible Source(s):

- Harness / connector fault
- Sensor open / short circuit

Action(s) to take:

- Refer to PDU

21 Solar sensor

Possible Source(s):

- Sensor open /short circuit

Action(s) to take:

- Refer to PDU

22 Compressor lock signal fault

Possible Source(s):

- Low refrigerant charge, low compressor oil level, loose drive belt
- Harness / connector fault

Action(s) to take:

- Adjust items as required

23 Refrigerant pressure switch malfunction

Possible Source(s):

- Harness / connector fault
- Switch open / short circuit

Action(s) to take:

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This procedure is from Steve at www.thejagwrangler.com

- Refer to PDU

23 Refrigerant pressure low refrigerant charge *

Possible Source(s):

- Leak from damaged pipe or joint

Action(s) to take:

- Rectify as required and recharge system

24 Face vent demand potentiometer fault

Possible Source(s):

- Potentiometer open / short circuit
- Harness / connector fault

Action(s) to take:

- Refer to PDU

31 LH fresh / recirc. potentiometer fault

Possible Source(s):

- Harness / connector fault
- In certain circumstances the servo motor may over-travel and cause further logged faults. This may be cured, following fault rectification, by cycling the ignition ON-OFF-ON 3 times

Action(s) to take:

- Refer to PDU

32 RH fresh / recirc. potentiometer fault

Possible Source(s):

- Harness / connector fault
- In certain circumstances the servo motor may over-travel and cause further logged faults. This may be cured, following fault rectification, by cycling the ignition ON-OFF-ON 3 times

Action(s) to take:

- Refer to PDU

33 Cool air by-pass potentiometer fault

Possible Source(s):

- Harness / connector fault
- In certain circumstances the servo motor may over-travel and cause further logged faults. This may be cured, following fault rectification, by cycling the ignition ON-OFF-ON 3 times

Action(s) to take:

- Refer to PDU

34 Defrost vent potentiometer fault

Possible Source(s):

- Harness / connector fault

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This procedure is from Steve at www.thejagwrangler.com

- In certain circumstances the servo motor may over-travel and cause further logged faults. This may be cured, following fault rectification, by cycling the ignition ON-OFF-ON 3 times

Action(s) to take:

- Refer to PDU

35 Centre vent potentiometer fault

Possible Source(s):

- Harness / connector fault
- In certain circumstances the servo motor may over-travel and cause further logged faults. This may be cured, following fault rectification, by cycling the ignition ON-OFF-ON 3 times

Action(s) to take:

- Refer to PDU

36 Foot vent potentiometer fault

Possible Source(s):

- Harness / connector fault
- In certain circumstances the servo motor may over-travel and cause further logged faults. This may be cured, following fault rectification, by cycling the ignition ON-OFF-ON 3 times

Action(s) to take:

- Refer to PDU

41 LH fresh / recirc. motor fault

Possible Source(s):

- Harness / connector fault
- Servo motor seized or sticking
- Flap seized or sticking

Action(s) to take:

- Refer to PDU

42 RH fresh / recirc. motor fault

Possible Source(s):

- Harness / connector fault
- Servo motor seized or sticking
- Flap seized or sticking

Action(s) to take:

- Refer to PDU

43 Cool air by-pass motor fault

Possible Source(s):

- Harness / connector fault
- Servo motor seized or sticking

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This procedure is from Steve at www.thejagwrangler.com

- Flap seized or sticking

Action(s) to take:

- Refer to PDU

43 Cool Air by-pass motor fault

Possible Source(s):

- Harness / connector fault
- Servo motor seized or sticking
- Flap seized or sticking

Action(s) to take:

- Refer to PDU

44 Defrost vent motor fault

Possible Source(s):

- Harness / connector fault
- Servo motor seized or sticking
- Flap seized or sticking

Action(s) to take:

- Refer to PDU

45 Centre vent motor fault

Possible Source(s):

- Harness / connector fault
- Servo motor seized or sticking
- Flap seized or sticking

Action(s) to take:

- Refer to PDU

46 Foot vent motor fault

Possible Source(s):

- Harness / connector fault
- Servo motor seized or sticking
- Flap seized or sticking

Action(s) to take:

- Refer to PDU

Associated Faults

Other conditions which may exist but will NOT log fault codes:

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This procedure is from Steve at www.thejagwrangler.com

Condition(s):**No heat****Possible Source(s):**

- Airlock in system.

Action(s) to take:

- Refer section 303-03 for fill / bleed procedure

Possible Source(s):

- Heater water pump inoperative
- Coolant flow valve stuck closed

Action(s) to take:

- Check operation and circuit

Possible Source(s):

- Faulty engine coolant thermostat

Action(s) to take:

- Renew as required

One vent failing to open / close**Possible Source(s):**

- Broken linkage.

Action(s) to take:

- Renew as required

Poor airflow**Possible Source(s):**

- Blower motors - incorrect operation

Action(s) to take:

- Check operation and circuit

Panel Communication Check

The panel communication check verifies the inputs and outputs from the control panel to the A/CCM.

Step	Result
#1 Simultaneously hold FACE and FAN - Switch ignition to ON	Panel communication with FACE, Bi-LEVEL, FOOT, DEMIST, DEFROST and RECIRC lines checked - State lamps will illuminate if all is OK. Unlit state lamp indicates a continuity fault for that specific link
#2 Press ON	Exit check mode

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This procedure is from Steve at www.thejagwrangler.com

Item	Check LED	Condition
Ignition	Defrost	IGN input at 12V, check LED is illuminated
Auxiliary	Face	AUX input at 12V, check LED is illuminated
Clock	Feet / face	Clock input normal, check LED is illuminated
Start input	Foot	Start input normal, check LED is illuminated
Data out	Screen / foot	Data out input normal, check LED is illuminated
Dimmer override	Recirc.	Dimmer override input ON, check LED is illuminated

Actuator Check Procedure

The system self test procedure drives all the actuator motors, to check their operation. If an actuator is operating incorrectly or operating outside of its limits then a fault code will be present.

Before commencing with the actuator check procedure, ensure the car is operating under normal conditions.

1. Switch ignition OFF.
2. Press and hold the RECIRC and AUTO buttons simultaneously, switch ignition ON and run the engine.
3. All the control panel LEDs and all LCD segments will flash on and off. Any function LED indicator which does not flash on / off suggests a fault condition within that area of the panel or, with the LED.
 - Any LCD element which fails to flash on / off indicates a fault within the display element or panel.
4. Press AUTO
5. Press RECIRC button to instigate actuator check mode.
6. Press FACE to cycle through the actuator mode conditions 20 to 27.
7. Press the FAN button to restore normal operation with default panel settings, ie AUTO @ 24°C.

Actuator Fault Codes**NOTE:**

* The water valve operates on a 6 second pulse, ie 3 seconds ON, 3 seconds OFF.

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		Outlet						
Code	Blower Level	Centre vent	Foot	Defrost	Cool air by-pass	Fresh / Recirc.	Compressor	Water valve
20	0	open	closed	closed	closed	fresh	OFF	closed
21	1	open	closed	closed	closed	fresh	OFF	closed
22	10	open	closed	closed	open	half open	A/C ON	closed
23	17	bleed	half open	closed	half open	half open	A/C ON	6s pulse *
24	17	bleed	half open	closed	closed	recirc.	A/C ON	6s pulse *
25	23	closed	open	bleed	closed	recirc.	A/C ON	open
26	23	closed	half open	half open	closed	recirc.	A/C ON	open
27	31	closed	closed	open	closed	open	A/C ON	open