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# WATER VALVES

Temperature regulation on IHKA systems is accomplished by solenoid actuated water valve(s). The valve(s) are normally held open by spring pressure (failsafe), and are electrically closed by pulses from the IHKA control module to regulate the flow of hot coolant to the heater core(s).

The water valve(s) are pulsed according to the Y-factor, which is calculated from the following inputs:

- Desired temperature request (left and right if equipped)
- Interior temperature
- Heater core temperature(s)
- Ambient air temperature
- Blower speed request

When the desired temperature calls for maximum heat, the water valve(s) do not receive pulses and are mechanically sprung open.

Similarly, when maximum cooling is requested, the IHKA control module powers the water valve(s) completely closed.



NAME OF SIG	NAL OR F	UNCTION:		
Vehicle:	M.Y.:	System: _		DIS CD Version:
What type of out	put signal p	provides curre	ent to activat	te this circuit?
Switched Ground	Pulse Width M	Nodulated (PWM)	Linear Voltage	Linear Resistance Digital
How will the con	trol system	react if this s	signal becon	nes impaired or lost ?
Substitute Value	<b>?</b> Yes	No <b>If yes wh</b> a	at is it?	
Was a fault code	(s) present	with this defe	ctive signal/c	component? 🗌 Yes 🗌 No
If yes what is (ar	e) the spec	ific code(s)? _		
Does the DIS so	ftware prov	ide a Status I	Display for th	iis signal? 🗌 Yes 🗌 No
If "yes", what is	it?			
Is "component a	ctivation" p	ossible with	this signal/fu	Inction? 🗌 Yes 🗌 No
If yes what does	it do?			
Does this help y	ou with diag	gnosis? 🗌 Yes	No Wh	ıy?
Pin Numbers: W	hat is the c	ontrol module	pin number	for the signal?
Is there an asso	ciated grou	nd wire? 🗌 Ye	s 🗌 No <b>lf "</b>	yes", pin number?
Are there any ot	her signals/	systems shar	ing the wire	to consider? Ves No
If "yes" are there	e faults pres	sent in that sy	stem as wel	<b>!?</b> ] Yes ] No
What is (are) the	most suitat	<b>ble measurem</b> ance 🗌 Inductanc	ent(s) for this	s signal/component?
Signal Range?: _	No	ominal Value?:		
Notes:				

# **AUXILIARY COOLANT PUMP**

All models except E36/46 use an electrically powered auxiliary coolant pump to ensure that an adequate supply of hot coolant is always available to the heater core(s). The IHKA control module operates the pump directly (E31 uses a relay) by supplying the ground circuit.

Pump "ON" operating criteria (E38 shown as an example):

- Engine coolant temperature > 32°F (supplied via K-Bus on E38/39/46)
- Y-factor > 5%
- Maximum defrost mode selected
- Maximum heating requested
- "REST" function requested



NAME OF SIG	NAL OR F	UNCTION:		
Vehicle:	M.Y.:	System: _		DIS CD Version:
What type of out	put signal p	provides curre	ent to activat	te this circuit?
Switched Ground	Pulse Width M	Nodulated (PWM)	Linear Voltage	Linear Resistance Digital
How will the con	trol system	react if this s	signal becon	nes impaired or lost ?
Substitute Value	<b>?</b> Yes	No <b>If yes wh</b> a	at is it?	
Was a fault code	(s) present	with this defe	ctive signal/c	component? 🗌 Yes 🗌 No
If yes what is (ar	e) the spec	ific code(s)? _		
Does the DIS so	ftware prov	ide a Status I	Display for th	iis signal? 🗌 Yes 🗌 No
If "yes", what is	it?			
Is "component a	ctivation" p	ossible with	this signal/fu	Inction? 🗌 Yes 🗌 No
If yes what does	it do?			
Does this help y	ou with diag	gnosis? 🗌 Yes	No Wh	ıy?
Pin Numbers: W	hat is the c	ontrol module	pin number	for the signal?
Is there an asso	ciated grou	nd wire? 🗌 Ye	s 🗌 No <b>lf "</b>	yes", pin number?
Are there any ot	her signals/	systems shar	ing the wire	to consider? Ves No
If "yes" are there	e faults pres	sent in that sy	stem as wel	<b>!?</b> ] Yes ] No
What is (are) the	most suitat	<b>ble measurem</b> ance 🗌 Inductanc	ent(s) for this	s signal/component?
Signal Range?: _	No	ominal Value?:		
Notes:				

### **BLOWER SPEED SIGNAL**

The blower speed is controlled by the IHKA control module regulating (varying) the ground circuit through the use of transistors (final stage unit).

The IHKA control module determines the appropriate blower speed using these primary inputs:

- Blower control thumbwheel/rocker switch inputs
- The "Y-factor"

In the case of the E38 (shown), each of the blower speed requests are monitored by the IHKA control module. The control module always runs the blower at the **higher** selected speed to ensure adequate air flow through the interior. The outlet flap opening will be reduced on the side requesting less blower speed.

NOTE: Some models do not use a blower relay.



NAME OF SIGN	IAL OR F			
Vehicle:	M.Y.:	System:		DIS CD Version:
What type of outp	out signal	provides curre	nt to activat	te this circuit? Switched Power
Switched Ground	Pulse Width N	Nodulated (PWM)	Linear Voltage	Linear Resistance Digital
How will the cont	rol system	react if this s	ignal becon	nes impaired or lost ?
Substitute Value?	Yes	No If yes wha	t is it?	
Was a fault code(s	s) present	with this defec	tive signal/c	component? 🗌 Yes 🗌 No
If yes what is (are	) the spec	ific code(s)? _		
Does the DIS soft	ware prov	ide a Status D	isplay for th	iis signal? 🗌 Yes 🗌 No
If "yes", what is it	?			
Is "component ac	tivation" p	ossible with t	his signal/fu	Inction? Yes No
If yes what does i	t do?			
Does this help yo	u with dia	gnosis? 🗌 Yes	No Wh	ıy?
Pin Numbers: Wh	at is the c	ontrol module	pin number	for the signal?
Is there an associ	ated grou	nd wire? 🗌 Yes	s 🗌 No <b>lf "</b>	yes", pin number?
Are there any othe	er signals/	systems shari	ng the wire	to consider? 🗌 Yes 🗌 No
If "yes" are there	faults pres	sent in that sy	stem as wel	<b>I?</b> Yes No
What is (are) the n	nost suitat	ole measureme	ent(s) for this	s signal/component?
Voltage Resistanc	e 🗌 Capacit	ance 🗌 Inductance	e 🗌 Temperature	e Current Pressure Scope
Signal Range?:	No	ominal Value?:		
Notes:				

# **STEPPER MOTOR CONTROL**

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Stepper motors are installed in the system to provide infinitely variable operation of the air outlet flaps for automatic climate control. M-Bus (3 wire flat harness) controlled motors are used to operate all flaps, with the exception on some models of a dedicated fresh air motor and circuit.

Each of these motors features its own electronic circuitry and is electrically coded, indicating that installation is unique to a specific flap.

These type of stepper motors receive power and ground on two of the terminals, and coded operating instructions on the third. The instructions are digital signals (500 Hz) that control opening or closing of the flaps. The microprocessor inside the stepper motor receives the instructions and converts them into pulses to operate the permanent magnet rotor.



NAME OF SIG	NAL OR F	UNCTION:		
Vehicle:	M.Y.:	System: _		DIS CD Version:
What type of out	put signal p	provides curre	ent to activat	te this circuit?
Switched Ground	Pulse Width M	Nodulated (PWM)	Linear Voltage	Linear Resistance Digital
How will the con	trol system	react if this s	signal becon	nes impaired or lost ?
Substitute Value	<b>?</b> Yes	No <b>If yes wh</b> a	at is it?	
Was a fault code	(s) present	with this defe	ctive signal/c	component? 🗌 Yes 🗌 No
If yes what is (ar	e) the spec	ific code(s)? _		
Does the DIS so	ftware prov	ide a Status I	Display for th	iis signal? 🗌 Yes 🗌 No
If "yes", what is	it?			
Is "component a	ctivation" p	ossible with	this signal/fu	Inction? 🗌 Yes 🗌 No
If yes what does	it do?			
Does this help y	ou with diag	gnosis? 🗌 Yes	No Wh	ıy?
Pin Numbers: W	hat is the c	ontrol module	pin number	for the signal?
Is there an asso	ciated grou	nd wire? 🗌 Ye	s 🗌 No <b>lf "</b>	yes", pin number?
Are there any ot	her signals/	systems shar	ing the wire	to consider? Ves No
If "yes" are there	e faults pres	sent in that sy	stem as wel	<b>!?</b> ] Yes ] No
What is (are) the	most suitat	<b>ble measurem</b> ance 🗌 Inductanc	ent(s) for this	s signal/component?
Signal Range?: _	No	ominal Value?:		
Notes:				

# **COMPRESSOR CONTROL**

Using the E38 (99 MY) for this test, activation of the compressor clutch is an output control function of the IHKA module. Activation is carried out directly through a final stage (no relay required).

If the evaporator temperature is above 37°F (3°C), and the refrigerant pressure sensor indicates acceptable pressure, the control panel/module then signals the ECM that it is about to activate the compressor. The IHKA module will then activate the compressor if a cancellation signal is not received from the ECM.

Additional criteria:

- If the "snowflake" button is on at engine start-up, the control module delays compressor clutch activation until the engine speed exceeds 600 RPM for at least 5 seconds.
- If the "snowflake" is switched off while the engine is running, the control module continues to cycle the compressor (with increasingly longer off times) for up to 15 minutes.

Compressor deactivation:

- ECM detects full load signalling IHKA
- Evaporator temperature < 2°C
- Coolant temperature > 120°C
- Refrigerant pressure sensor indicates pressure is too low/high



NAME OF SIGN				
Vehicle:	M.Y.:	System:		DIS CD Version:
What type of outp	out signal p	rovides curre	nt to activat	te this circuit? Switched Power
Switched Ground	Pulse Width M	odulated (PWM)	Linear Voltage	Linear Resistance Digital
How will the cont	rol system	react if this s	ignal becon	nes impaired or lost ?
Substitute Value?	Yes N	lf yes wha	t is it?	
Was a fault code(s	s) present v	vith this defec	tive signal/c	component? 🗌 Yes 🗌 No
If yes what is (are	) the speci	fic code(s)? _		
Does the DIS soft	ware provi	de a Status D	isplay for th	iis signal? 🗌 Yes 🗌 No
If "yes", what is it	?			
Is "component ac	tivation" p	ossible with t	his signal/fu	Inction? 🗌 Yes 🗌 No
If yes what does i	t do?			
Does this help yo	u with diag	I <b>nosis?</b> 🗌 Yes	∏ No Wh	ıy?
Pin Numbers: Wh	at is the co	ontrol module	pin number	for the signal?
Is there an associ	ated grour	nd wire? 🗌 Yes	s 🗌 No <b>lf "</b>	yes", pin number?
Are there any othe	er signals/	systems shari	ng the wire	to consider? 🗌 Yes 🗌 No
If "yes" are there	faults pres	ent in that sy	stem as wel	<b>I?</b> Yes No
What is (are) the n	n <b>ost suitab</b> :e 🔲 Capacita	le measureme ance 🗌 Inductance	ent(s) for this	s signal/component?
Signal Range?:	<b>No</b> r	minal Value?:		
Notes:				

# **AUXILIARY FAN CONTROL**

Using a 99 MY vehicle (E38/39/46) for this test, the variable auxiliary fan is controlled by the ECM. The auxiliary fan request comes from the IHKA control module via the K-Bus. The fan speed request is based on the refrigerant pressure sensor input to the IHKA. Additional factors monitored by the ECM that influence fan operation are:

- Radiator outlet temperature sensor (exceeds the preset temperature)
- Vehicle speed
- Battery voltage level

The auxiliary fan motor incorporates an output final stage that activates the fan motor at variable speeds. The output stage receives an output signal (pulse width modulated 10-100 Hz) from the ECM which activates the motor.



NAME OF SIGN	NAL OR F	UNCTION:	
Vehicle:	_ M.Y.:	System:	DIS CD Version:
What type of outp	out signal p	provides curr	rent to activate this circuit?
Switched Ground	Pulse Width M	lodulated (PWM)	Linear Voltage Linear Resistance Digital
How will the cont	rol system	react if this	signal becomes impaired or lost ?
Substitute Value?	Yes N	No If yes wh	at is it?
Was a fault code(	s) present v	with this defe	ective signal/component? 🗌 Yes 🗌 No
If yes what is (are	e) the speci	fic code(s)?	
Does the DIS sof	tware provi	ide a Status	Display for this signal? 🗌 Yes 🗌 No
If "yes", what is it	t?		
Is "component ac	ctivation" p	ossible with	this signal/function? 🗌 Yes 🗌 No
If yes what does	it do?		
Does this help yo	u with diag	<b>ynosis? 🗌</b> Ye	s 🔲 No Why?
Pin Numbers: Wh	at is the co	ontrol modul	e pin number for the signal?
Is there an assoc	iated grour	nd wire? 🗌 Y	res 🗌 No lf "yes", pin number?
Are there any oth	er signals/	systems sha	ring the wire to consider? 🗌 Yes 🗌 No
If "yes" are there	faults pres	ent in that s	ystem as well? 🗌 Yes 🗌 No
What is (are) the r	<b>nost suitab</b> ce 🗌 Capacita	Ile measuren	ce Temperature Current Pressure Scope
Signal Range?:	No	minal Value?	:
Notes:			

## **REAR WINDOW DEFROSTER**

Using the E38 as an example for this test, the rear window defroster operating strategy depends upon ambient temperature.

- If ambient temperature is < 5°F (-15°C), pressing the rear window defroster but ton (ignition switch in "Run"), requests the control module to activate the defroster for 17 minutes, and then switch it off.
- If the ambient temperature is  $> 5^{\circ}F$  (-15°C), the control module acitvates the defroster for only 10 minutes before switching it off.
- Reactivating the defroster by pressing the button again will give an additional 5 minutes of defrosting, regardless of ambient temperature.
- If the ignition is switched "OFF" during defroster operation, the timer keeps operating and the defroster is deactivated. If the ignition is switched "ON" again with time remaining, the defroster is automatically reactivated until the timer runs out.
- If the battery voltage drops bellow 11.4 volts, the defroster automatically switched "OFF", and will resume operation when the voltage rises above 12.2 volts.



NAME OF SIGN	NAL OR F	UNCTION:	
Vehicle:	_ M.Y.:	System:	DIS CD Version:
What type of outp	out signal p	provides curr	rent to activate this circuit?
Switched Ground	Pulse Width M	lodulated (PWM)	Linear Voltage Linear Resistance Digital
How will the cont	rol system	react if this	signal becomes impaired or lost ?
Substitute Value?	Yes N	No If yes wh	at is it?
Was a fault code(	s) present v	with this defe	ective signal/component? 🗌 Yes 🗌 No
If yes what is (are	e) the speci	fic code(s)?	
Does the DIS sof	tware provi	ide a Status	Display for this signal? 🗌 Yes 🗌 No
If "yes", what is it	t?		
Is "component ac	ctivation" p	ossible with	this signal/function? 🗌 Yes 🗌 No
If yes what does	it do?		
Does this help yo	u with diag	<b>ynosis? 🗌</b> Ye	s 🔲 No Why?
Pin Numbers: Wh	at is the co	ontrol modul	e pin number for the signal?
Is there an assoc	iated grour	nd wire? 🗌 Y	res 🗌 No lf "yes", pin number?
Are there any oth	er signals/	systems sha	ring the wire to consider? 🗌 Yes 🗌 No
If "yes" are there	faults pres	ent in that s	ystem as well? 🗌 Yes 🗌 No
What is (are) the r	<b>nost suitab</b> ce 🗌 Capacita	Ile measuren	ce Temperature Current Pressure Scope
Signal Range?:	No	minal Value?	:
Notes:			

### WINDSHIELD BASE/ WASHER SPRAY JET HEATERS

Using the E38 as an example for this test, this circuit demonstrates that both heater systems are powered by the same relay.

- The lower portion of the windshield contains heating elements which when powered, prevent the wiper blades from freezing to the glass.
- The washer spray jet heaters are designed to prevent ice from forming on and obstructing the washer nozzles.

The control module monitors the signal from the ambient temperature sensor (K-Bus) and automatically activates the relay in this circuit when



NAME OF SIGN	IAL OR F	UNCTION:		
Vehicle:	M.Y.:	System:	I	DIS CD Version:
What type of outp	out signal p	provides curi	rent to activate	e this circuit? Switched Power
Switched Ground	Pulse Width M	odulated (PWM)	Linear Voltage	Linear Resistance Digital
How will the cont	rol system	react if this	signal becom	es impaired or lost ?
Substitute Value?	Yes N	√∘ If yes wh	nat is it?	
Was a fault code(s	s) present v	with this defe	ective signal/c	omponent? 🗌 Yes 🗌 No
If yes what is (are	) the speci	fic code(s)?		
Does the DIS soft	ware provi	de a Status	Display for thi	is signal? 🗌 Yes 🗌 No
If "yes", what is it	?			
Is "component ac	tivation" p	ossible with	this signal/fu	nction? 🗌 Yes 🗌 No
If yes what does i	t do?			
Does this help yo	u with diag	<b>jnosis? </b> Ye	s 🗌 No 🛛 Wh	y?
Pin Numbers: Wh	at is the co	ontrol modul	e pin number	for the signal?
Is there an associ	ated grour	nd wire? 🗌 🗎	∕es □No If"y	/es", pin number?
Are there any othe	er signals/	systems sha	ring the wire	to consider? 🗌 Yes 🗌 No
If "yes" are there	faults pres	ent in that s	ystem as well	? 🗌 Yes 🗌 No
What is (are) the n	n <b>ost suitab</b> :e 🔲 Capacita	Ile measuren	nent(s) for this	signal/component?
Signal Range?:	No	minal Value?	:	
Notes:				

# PARKED CAR VENTILATION

Parked car ventilation (if equipped), operates at pre-programmed times, the IHKA control module:

- Opens the fresh air flaps, face vent flaps, and
- Closes all other flaps, and
- Operates the blower motor at low speed for one-half hour

Using the E38 as an example:

- All switching is controlled directly by the IHKA control panel
- Desired ventilation "ON" times are programmed into the IKE On-Board Computer (BC) using the Multi-Information Display (MID)
- The BC in the IKE then communicates with the IHKA module over the I-Bus and the K-Bus



NAME OF SIGN	NAL OR F	UNCTION:	
Vehicle:	_ M.Y.:	System:	DIS CD Version:
What type of outp	out signal p	provides curr	rent to activate this circuit?
Switched Ground	Pulse Width M	lodulated (PWM)	Linear Voltage Linear Resistance Digital
How will the cont	rol system	react if this	signal becomes impaired or lost ?
Substitute Value?	Yes N	No If yes wh	at is it?
Was a fault code(	s) present v	with this defe	ective signal/component? 🗌 Yes 🗌 No
If yes what is (are	e) the speci	fic code(s)?	
Does the DIS sof	tware provi	ide a Status	Display for this signal? 🗌 Yes 🗌 No
If "yes", what is it	t?		
Is "component ac	ctivation" p	ossible with	this signal/function? 🗌 Yes 🗌 No
If yes what does	it do?		
Does this help yo	u with diag	<b>ynosis? 🗌</b> Ye	s 🔲 No Why?
Pin Numbers: Wh	at is the co	ontrol modul	e pin number for the signal?
Is there an assoc	iated grour	nd wire? 🗌 Y	res 🗌 No lf "yes", pin number?
Are there any oth	er signals/	systems sha	ring the wire to consider? 🗌 Yes 🗌 No
If "yes" are there	faults pres	ent in that s	ystem as well? 🗌 Yes 🗌 No
What is (are) the r	<b>nost suitab</b> ce 🗌 Capacita	Ile measuren	ce Temperature Current Pressure Scope
Signal Range?:	No	minal Value?	:
Notes:			

# **IHKA/ECM INTERFACES**

The IHKA signals the ECM when A/C is requested (KO signal), this alerts the ECM to stabilize idle speed (EML on 750iL) and compensate for the additional load. This signal is Pulse Width Modulated (5 Hz), which informs the ECM of the "get ready" request and the anticipated compressor load. On the 99 MY (E38/39/46), the A/C on signal is transmitted via the K-Bus/CAN-Bus.

On E38/39 models, the ECM sends a reply (KOREL) signal to the IHKA control module. If input conditions are correct, the IHKA will activate the A/C compressor. In addition this separate signal circuit is used to signal the IHKA to deactivate the compressor in the event that stand still full load conditions are present.

On E46/36 models, the A/C compressor relay is activated by the ECM.

	72.0°F     68.0°F     Image: Constrained by the state of the	
SWIT	A/C SYSTEM STATUS (Signal KO)	
COMPRESS ON POWER	OR COMPRESSOR CLUTCH SOLENOID	

IHKA CONTROL PANEL /MODULE

NAME OF SIGN	NAL OR F	UNCTION:	
Vehicle:	_ M.Y.:	System:	DIS CD Version:
What type of outp	out signal p	provides curr	rent to activate this circuit?
Switched Ground	Pulse Width M	lodulated (PWM)	Linear Voltage Linear Resistance Digital
How will the cont	rol system	react if this	signal becomes impaired or lost ?
Substitute Value?	Yes N	No If yes wh	at is it?
Was a fault code(	s) present v	with this defe	ective signal/component? 🗌 Yes 🗌 No
If yes what is (are	e) the speci	fic code(s)?	
Does the DIS sof	tware provi	ide a Status	Display for this signal? 🗌 Yes 🗌 No
If "yes", what is it	t?		
Is "component ac	ctivation" p	ossible with	this signal/function? 🗌 Yes 🗌 No
If yes what does	it do?		
Does this help yo	u with diag	<b>ynosis? 🗌</b> Ye	s 🔲 No Why?
Pin Numbers: Wh	at is the co	ontrol modul	e pin number for the signal?
Is there an assoc	iated grour	nd wire? 🗌 Y	res 🗌 No lf "yes", pin number?
Are there any oth	er signals/	systems sha	ring the wire to consider? 🗌 Yes 🗌 No
If "yes" are there	faults pres	ent in that s	ystem as well? 🗌 Yes 🗌 No
What is (are) the r	<b>nost suitab</b> ce 🗌 Capacita	Ile measuren	ce Temperature Current Pressure Scope
Signal Range?:	No	minal Value?	:
Notes:			

While connecting and setting up the DIS/MoDiC measurement system for signal/circuit validation, note the settings in the appropriate locations for future reference. Document your findings by entering the displayed values in the Multimeter or Counter Display. If the signal requires the use of the oscilloscope, note your set up selections and sketch the waveform.

Print Change End Services Help	Print End Services	Help
BMW Test system Multimeter	BMW Test system Counter	Hold screen
Minnun Maxmun		Minimum Maximum
10 0 10 System votage Measurement Votage Resistance Capacitance finductance Section speed	0 50 100 Test function Frequency Period Pulse Pulse Pulse Duse duty	System voltage
Function V (Com ) P (H ) C (Com )	Test connection	Rotation speed
Measurement MFC1 MFC2 dipronstroke Pressure Sanor	Test range	Remote start
Measurement And		Lonour
Measurement automatic Structure	Trigger edge	Stimulate
Multimeter Counter Oscilloscope Stimulation Preset	Multimeter Counter Stimulation Preset measurments	
Print Change End Services Help	Print Change End Services	Help
Print Change End Services Help BMW Test system Oscilloscope setting	Print Change End Services BMW Measuring system Oscilloscope display	Freeze Image
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     Channel B       Test Reonnection     MFK 1     MFK 2	Print     Change     End     Services       BMW Measuring system Oscilloscope display       A IVI     Cirser1     Kerney	Freeze Image Channel 8
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     MFK 1     MFK 2     Channel B       Tostic ennection     MFK 1     MFK 2     Channel B       Type ofitest     Image     Image     Image	Print Change End Services BMW Measuring system Oscilloscope display A (V) Cursor 1 Memory Cursor 2 S (V) V B 6 6 1 1 1 1 1 6 6 7 7 7 7 8 6 6 1 1 1 1 1 6 6 7 7 7 7 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Help Freeze Image Channel B Zoom
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting     Channel D     Import 1     Import 2       Tostic ennection     Import 2     KikeSensizz     Channel D     Import 2       Type editest     Import 2     Import 2     Import 2       Test connection     Import 2     Import 2     Import 2       Type editest     Import 2     Import 2     Import 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Currer1         Currer2         8 (M)         V           8         1         16         8         1         16         8         7           8         1         1         16         8         7         1         8         4         9         2         9	Help Freeze Image Channel B Zoom Amp Freeze Channel A
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel 6       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A [V]         Conor1         Remory         Conor2         8 [V]         V           8         1         1         16         8         T           6         1         1         12         6         1           2         1         1         4         2         9           0         0         0         r         4         2         9           0         1         1         1         4         2         9         1         1         4         2         9           0         1         1         1         1         4         2         9         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1	Freeze Image (Channel B) (Channel B) (Channel I) (Channel I) (Channel I) (Channel I) (Channel I)
Frint       Change       End       Services       Help         BMW Test system       Oscilloscope setting       Channel A       Channel A         Test connection       MFK 2       KvcSomor       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 1       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger       Trigger       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger	Print         Change         End         Services           BMW Measuring system Oscilloscope display         SIV         V           A_VV         Curser1         Verrory         Curser2         SIV         V           8         1         1         16         8         1         16         8         1           2         1         1         1         16         8         4         9         9         0         0         0         7         1         4         2         9         0         1         4         2         9         0         1         4         2         9         0         7         7         8         4         9         0         7         7         8         4         2         9         0         7         7         7         8         4         2         9         0         7         7         7         8         4         2         9         0         7         7         8         4         9         9         7         7         8         4         9         9         7         8         4         9         9         7         8 <td< th=""><th>Freeze Image Freeze Image Channel B Common Channel B Channel B Channel B Channel B</th></td<>	Freeze Image Freeze Image Channel B Common Channel B Channel B Channel B Channel B
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel A       Channel A       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex tensor       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex tensor       MFK 1       MFK 2       Trigger at the services       Triger at the services       Trigger at th	Print         Change         End         Services           BMW Measuring system Oscilloscope display         Service1         Service2         Service3           A [V]         Currer1         Merror7         Currer2         Service3         Service3           A [V]         Currer1         Merror7         Currer2         Service3         Service3         Service3           A [V]         Currer1         Merror7         Currer2         Service3         Service3	Freeze Image Channel D Channel D
Print Change   BMW Test system Oscilloscope setting   Paste enneed to:     MKX 1        Teste enneed to:     MKX 1     MKX 2     Teste enneed to:     MKX 1     MKX 2     MKX 1     MKX 2     Minimum     Minimum     Minimum     Tegerender     Tegerende	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Cursor1         Cursor2         B (W)         V           A (V)         Cursor1         Cursor2         Cursor2         Cursor2           A (V)         Cursor1         Cursor2         Cursor2         Cursor2         Cursor2           A (V)         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2           Cursor2         Cursor2         Cursor2         Cursor2	Freeze Image Channel B Channel B Channel A Channel A Channel A Channel A Channel B Channel B Channel B Channel B Channel B Channel B

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Print Change End Services Help	Print End Services	Help
BMW Test system Multimeter	BMW Test system Counter	Hold screen
Minnun Maxmun		Minimum Maximum
10 0 10 System votage Measurement Votage Resistance Capacitance finductance Section speed	0 50 100 Test function Frequency Period Pulse Pulse Pulse Duse duty	System voltage
Function V (Com ) P (H ) C (Com )	Test connection	Rotation speed
Messurement MFC1 MFC2 dipronstroke Pressure Interpreture Sensor Sensor	Test range	Remote start
Measurement And		Lonour
Measurement automatic Strm.late	Trigger edge	Stimulate
Multimeter Counter Osciloscope Stimulation Preset	Multimeter Counter Stimulation Preset measurments	
Print Change End Services Help	Print Change End Services	Help
Print Change End Services Help BMW Test system Oscilloscope setting	Print Change End Services BMW Measuring system Oscilloscope display	Freeze Image
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     Channel B       Test Reonnection     MFK 1     MFK 2	Print     Change     End     Services       BMW Measuring system Oscilloscope display       A IVI     Cirser1     Kerney	Freeze Image Channel 8
Print       Change       End       Services       Help         BMW Test system       Oscilloscope setting       Channel D       MFK 1       MFK 2       Channel D         Test connection       MFK 1       MFK 2       KWSemac       MFK 1       MFK 2       Channel D         Type of itest       Image       Image       Image       Image       Image       Image	Print Change End Services BMW Measuring system Oscilloscope display A (V) Cursor 1 Memory Cursor 2 S (V) V B 6 6 1 1 1 1 1 6 6 7 7 7 7 8 6 6 1 1 1 1 1 6 6 7 7 7 7 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Help Freeze Image Channel B Zoom
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting     Channel D     Import 1     Import 2       Tostic ennection     Import 2     KikeSensizz     Channel D     Import 2       Type editest     Import 2     Import 2     Import 2       Test connection     Import 2     Import 2     Import 2       Type editest     Import 2     Import 2     Import 2       Test connection     Import 2     Import 2     Import 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Currer1         Currer2         8 (V)         V           8         1         16         8         7           8         1         16         8         7           2         1         4         2         2	Help Freeze Image Channel B Zoom Amp Freeze Channel A
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel 6       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A [V]         Conor1         Remory         Conor2         8 [V]         V           8         1         1         16         8         T           6         1         1         12         6         1           2         1         1         4         2         9           0         0         0         r         4         2         9           0         1         1         1         4         2         9         1         1         4         2         9           0         1         1         1         1         4         2         9         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1	Freeze Image (Channel B) (Channel B) (Channel I) (Channel I) (Channel I) (Channel I) (Channel I)
Frint       Change       End       Services       Help         BMW Test system       Oscilloscope setting       Channel A       Channel A         Test connection       MFK 2       KvcSomor       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 1       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger       Trigger       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger	Print         Change         End         Services           BMW Measuring system Oscilloscope display         SIV         V           A_VV         Curser1         Verrory         Curser2         SIV         V           8         1         1         16         S         T         F         12         6         T         P         12         6         T         P         12         6         T         P         12         6         T         P         1         4         2         P         P         1         <	Freeze Image Freeze Image Channel B Common Channel B Channel B Channel B Channel B
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel A       Channel A       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         MFK	Print         Change         End         Services           BMW Measuring system Oscilloscope display         Service1         Service2         Service3           A [V]         Currer1         Merror         Currer2         Service3         Service3           A [V]         Currer1         Merror         Currer2         Service3         Service3         Service3           B [V]         Currer1         Merror         Currer2         Service3         Service3         Service3           Currer1         Merror         Currer2         Service3         Service3         Service3         Service3           Currer1         Merror         Currer2         Service3         Service3         Service3         Service3         Service3           Currer1         Merror         Currer2         Service3         Service3         Service3         Service3         Service3	Freeze Image Channel D Channel D
Print Change   BMW Test system Oscilloscope setting   Paste enneed to:     MKX 1        Teste enneed to:     MKX 1     Teste enneed to:     MKX 1     MKX 2     Teste enneed to:     MKX 1     MKX 1     Minimum     Minimum     Minimum     Tegerender     Tegerender <t< th=""><th>Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Cursor1         Cursor2         B (W)         V           A (V)         Cursor1         Cursor2         Cursor2         Cursor2           A (V)         Cursor1         Cursor2         Cursor2         Cursor2         Cursor2           A (V)         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2           Cursor2         Cursor2         Cursor2         Cursor2</th><th>Freeze Image Channel B Channel B Channel A Channel A Channel A Channel A Channel B Channel B Channel B Channel B Channel B Channel B</th></t<>	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Cursor1         Cursor2         B (W)         V           A (V)         Cursor1         Cursor2         Cursor2         Cursor2           A (V)         Cursor1         Cursor2         Cursor2         Cursor2         Cursor2           A (V)         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2           Cursor2         Cursor2         Cursor2         Cursor2	Freeze Image Channel B Channel B Channel A Channel A Channel A Channel A Channel B Channel B Channel B Channel B Channel B Channel B

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Print Change End Services Help	Print End Services	Help
BMW Test system Multimeter	BMW Test system Counter	Hold screen
Minnun Maxmun		Minimum Maximum
10 0 10 System votage Measurement Votage Resistance Capacitance finductance Section speed	0 50 100 Test function Frequency Period Pulse Pulse Pulse Duse duty	System voltage
Function V (Com ) P (H ) C (Com )	Test connection	Rotation speed
Messurement MFC1 MFC2 dipronstroke Pressure Interpreture Sensor Sensor	Test range	Remote start
Measurement And		Lonour
Measurement automatic Strm.late	Trigger edge	Stimulate
Multimeter Counter Oscilloscope Stimulation Preset	Multimeter Counter Stimulation Preset measurments	
Print Change End Services Help	Print Change End Services	Help
Print Change End Services Help BMW Test system Oscilloscope setting	Print Change End Services BMW Measuring system Oscilloscope display	Freeze Image
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     Channel B       Test Reonnection     MFK 1     MFK 2	Print     Change     End     Services       BMW Measuring system Oscilloscope display       A IVI     Cirser1     Kerney	Freeze Image Channel 8
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     MFK 1     MFK 2     Channel B       Tostic ennection     MFK 1     MFK 2     Channel B       Type ofitest     Image     Image     Image	Print Change End Services BMW Measuring system Oscilloscope display A (V) Cursor 1 Memory Cursor 2 S (V) V B 6 6 1 1 1 1 1 6 6 7 7 7 7 8 6 6 1 1 1 1 1 6 6 7 7 7 7 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Help Freeze Image Channel B Zoom
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting     Channel D     Import 1     Import 2       Tostic ennection     Import 2     KikeSensizz     Channel D     Import 2       Type editest     Import 2     Import 2     Import 2       Test connection     Import 2     Import 2     Import 2       Type editest     Import 2     Import 2     Import 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Currer1         Currer2         8 (V)         V           8         1         16         8         1         16         8         7           8         1         1         16         8         7         1         8         4         9         2         9	Help Freeze Image Channel B Zoom Amp Freeze Channel A
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel 6       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A [V]         Conor1         Remory         Conor2         8 [V]         V           8         1         1         16         8         T           6         1         1         12         6         1           2         1         1         4         2         9           0         0         0         r         4         2         9           0         1         1         1         4         2         9         1         1         4         2         9           0         1         1         1         1         4         2         9         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1	Freeze Image (Channel B) (Channel B) (Channel I) (Channel I) (Channel I) (Channel I) (Channel I)
Frint       Change       End       Services       Help         BMW Test system       Oscilloscope setting       Channel A       Channel A         Test connection       MFK 2       KvcSomor       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 1       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger       Trigger       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger	Print         Change         End         Services           BMW Measuring system Oscilloscope display         SIV         V           A_VV         Curser1         Verrory         Curser2         SIV         V           8         1         1         16         S         T         F         12         6         T         P         12         6         T         P         12         6         T         P         12         6         T         P         1         4         2         P         P         1         <	Freeze Image Freeze Image Channel B Common Channel B Channel B Channel B Channel B
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel A       Channel A       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         MFK	Print         Change         End         Services           BMW Measuring system Oscilloscope display         Selver         Sel	Freeze Image Channel D Channel D
Print Change   BMW Test system Oscilloscope setting   Paste enneed to:     MKX 1   MKX 2   Teste enneed to:     MKX 1     MKX 2     Teste enneed to:     MKX 1     MKX 2     MKX 1     MKX 2     Minimum     Minimum     Minimum     Tegerender	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display         Services           A (V)         Cursor1         Cursor2         Services         Services           A (V)         Cursor1         Cursor1         Services         Services           A (V)         Cursor1         Cursor2         Services         Services           A (V)         Cursor1         Cursor2         Services         Services           A (V)         Cursor1         Cursor1         Services         Services           A (V)         Cursor1	Freeze Image Channel B Channel B Channel A Channel A Channel A Channel A Channel B Channel B Channel B Channel B Channel B Channel B

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Print Change End Services Help	Print End Services	Help
BMW Test system Multimeter	BMW Test system Counter	Hold screen
Minnun Maxmun		Minimum Maximum
10 0 10 System votage Measurement Votage Resistance Capacitance finductance Section speed	0 50 100 Test function Frequency Period Pulse Pulse Pulse Duse duty	System voltage
Function V (Com ) P (H ) C (Com )	Test connection	Rotation speed
Messurement MFC1 MFC2 dipronstroke Pressure Interpreture Sensor Sensor	Test range	Remote start
Measurement And		Lonour
Measurement automatic Strm.late	Trigger edge	Stimulate
Multimeter Counter Oscilloscope Stimulation Preset	Multimeter Counter Stimulation Preset measurments	
Print Change End Services Help	Print Change End Services	Help
Print Change End Services Help BMW Test system Oscilloscope setting	Print Change End Services BMW Measuring system Oscilloscope display	Help Freeze Image
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     Channel B       Test Reonnection     MFK 1     MFK 2	Print     Change     End     Services       BMW Measuring system Oscilloscope display       A IVI     Cirser1     Kerney	Freeze Image Channel 8
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     MFK 1     MFK 2     Channel B       Tostic ennection     MFK 1     MFK 2     Channel B       Type ofitest     Image     Image     Image	Print Change End Services BMW Measuring system Oscilloscope display A (V) Cursor 1 Memory Cursor 2 S (V) V B 6 6 1 1 1 1 1 6 6 7 7 7 7 8 6 6 1 1 1 1 1 6 6 7 7 7 7 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Freeze Image Channel B Zoom
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting     Channel D     Import 1     Import 2       Tostic ennection     Import 2     KikeSensizz     Channel D     Import 2       Type editest     Import 2     Import 2     Import 2       Test connection     Import 2     Import 2     Import 2       Type editest     Import 2     Import 2     Import 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Currer1         Currer2         8 (V)         V           8         1         16         8         7           8         1         16         8         7           2         1         4         2         2	Help Freeze Image Channel B Zoom Amp Freeze Channel A
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel 6       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A [V]         Conor1         Remov         Conor2         8 [V]         V           8         1         1         16         8         T           6         1         1         12         6         1           2         1         1         4         2         9           0         0         0         r         4         2         9           0         1         1         1         4         2         9         1	Freeze Image (Channel B) (Channel B) (Channel I) (Channel I) (Channel I) (Channel I) (Channel I)
Frint       Change       End       Services       Help         BMW Test system       Oscilloscope setting       Channel A       Channel A         Test connection       MFK 2       KvcSomor       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 1       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger       Trigger       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger	Print         Change         End         Services           BMW Measuring system Oscilloscope display         SIV         V           A_VV         Curser1         Verrory         Curser2         SIV         V           8         1         1         16         S         T         F           8         1         1         16         S         T         F         G	Freeze Image Freeze Image Channel B Common Channel B Channel B Channel B Channel B
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel A       Channel A       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         MFK	Print         Change         End         Services           BMW Measuring system Oscilloscope display         Service1         Service2         Service3           A [V]         Currer1         Merror         Currer2         Service3         Service3           A [V]         Currer1         Merror         Currer2         Service3         Service3         Service3           B [V]         Currer1         Merror         Currer2         Service3         Service3         Service3           Currer1         Merror         Currer2         Service3         Service3         Service3         Service3           Currer1         Merror         Currer2         Service3         Service3         Service3         Service3         Service3           Currer1         Merror         Currer2         Service3         Service3         Service3         Service3         Service3	Freeze Image Channel D Channel D
Print Change   BMW Test system Oscilloscope setting   Paste enneed to:     MKX 1        Teste enneed to:     MKX 1     Teste enneed to:     MKX 1     MKX 2     Teste enneed to:     MKX 1     MKX 1     Minimum     Minimum     Minimum     Tegerender     Tegerender <t< th=""><th>Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Cursor1         Cursor2         B (W)         V           A (V)         Cursor1         Cursor2         Cursor2         Cursor2           A (V)         Cursor1         Cursor2         Cursor2         Cursor2         Cursor2           A (V)         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2           Cursor2         Cursor2         Cursor2         Cursor2</th><th>Freeze Image Channel B Channel B Channel A Channel A Channel A Channel A Channel B Channel B Channel B Channel B Channel B Channel B</th></t<>	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Cursor1         Cursor2         B (W)         V           A (V)         Cursor1         Cursor2         Cursor2         Cursor2           A (V)         Cursor1         Cursor2         Cursor2         Cursor2         Cursor2           A (V)         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2         Cursor2           Cursor2         Cursor2         Cursor2         Cursor2	Freeze Image Channel B Channel B Channel A Channel A Channel A Channel A Channel B Channel B Channel B Channel B Channel B Channel B

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Print Change End Services Help	Print End Services	Help
BMW Test system Multimeter	BMW Test system Counter	Hold screen
Minnun Maxmun		Minimum Maximum
10 0 10 System votage Measurement Votage Resistance Capacitance finductance Section speed	0 50 100 Test function Frequency Period Pulse Pulse Pulse Duse duty	System voltage
Function V (Com ) P (H ) C (Com )	Test connection	Rotation speed
Measurement MFC1 MFC2 dipronstroke Pressure Sanor	Test range	Remote start
Measurement And		Lonour
Measurement automatic Strm.late	Trigger edge	Stimulate
Multimeter Counter Osciloscope Stimulation Preset	Multimeter Counter Stimulation Preset measurments	
Print Change End Services Help	Print Change End Services	Help
Print Change End Services Help BMW Test system Oscilloscope setting	Print Change End Services BMW Measuring system Oscilloscope display	Freeze Image
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting       Channel A     Channel B       Test Reonnection     MFK 1     MFK 2	Print     Change     End     Services       BMW Measuring system Oscilloscope display       A IVI     Cirser1     Kerney	Freeze Image Channel 8
Print       Change       End       Services       Help         BMW Test system       Oscilloscope setting       Channel D       MFK 1       MFK 2       Channel D         Test connection       MFK 1       MFK 2       KWSemac       MFK 1       MFK 2       Channel D         Type of itest       Image       Image       Image       Image       Image       Image	Print Change End Services BMW Measuring system Oscilloscope display A (V) Cursor 1 Memory Cursor 2 S (V) V B 6 6 1 1 1 1 1 6 6 7 7 7 7 8 6 6 1 1 1 1 1 6 6 7 7 7 7 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Help Freeze Image Channel B Zoom
Print     Change     End     Services     Help       BMW Test system     Oscilloscope setting     Change 0     Change 0       Tost connection     MFK 1     MFK 2     Kiksenstr       Type of test     Image 0     Image 0     Image 0       Test connection     Image 0     Image 0     Image 0       Type of test     Image 0     Image 0     Image 0	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A (V)         Currer1         Currer2         8 (V)         V           8         1         16         8         7           8         1         16         8         7           2         1         4         2         2	Help Freeze Image Channel B Zoom Amp Freeze Channel A
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel 6       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       KwSener       MFK 2       Tigger 1         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2         Testic onnection       MFK 2       MFK 2       Channel 6       MFK 2	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display           A [V]         Conor1         Remory         Conor2         8 [V]         V           8         1         1         16         8         T           6         1         1         12         6         1           2         1         1         4         2         9           0         0         0         r         4         2         9           0         1         1         1         4         2         9         1         1         4         2         9           0         1         1         1         1         4         2         9         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1         1         4         2         1	Freeze Image (Channel B) (Channel B) (Channel I) (Channel I) (Channel I) (Channel I) (Channel I)
Frint       Change       End       Services       Help         BMW Test system       Oscilloscope setting       Channel A       Channel A         Test connection       MFK 2       KvcSomor       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 1       MFK 2       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger       Trigger       Trigger         Test connection       MFK 2       KvcSomor       MFK 2       Trigger	Print         Change         End         Services           BMW Measuring system Oscilloscope display         SIV         V           A_VV         Curser1         Verrory         Curser2         SIV         V           8         1         1         16         S         T         F           8         1         1         16         S         T         F         G	Freeze Image Freeze Image Channel B Common Channel B Channel B Channel B Channel B
Print       Change       End       Services       Help         BMW Test system Oscilloscope setting       Channel A       Channel A       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex then       MFK 1       MFK 2       KV-Sensizion       MFK 1       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         Tot te ennex to make       MFK 1       MFK 2       MFK 2       MFK 2       Trigger at the services         MFK	Print         Change         End         Services           BMW Measuring system Oscilloscope display         Service1         Service2         Service3           A [V]         Currer1         Merror7         Currer2         Service3         Service3           A [V]         Currer1         Merror7         Currer2         Service3         Service3         Service3           A [V]         Currer1         Merror7         Currer2         Service3         Service3	Freeze Image Channel D Channel D
Print Change   BMW Test system Oscilloscope setting   Paste enneed to:     MKX 1        Teste enneed to:     MKX 1     MKX 2     Teste enneed to:     MKX 1     MKX 2     MKX 1     MKX 2     Minimum     Minimum     Minimum     Tegerender     Tegerende	Print         Change         End         Services           BMW         Measuring system         Oscilloscope display         Services           A (V)         Cursor1         Cursor2         Services         Services           A (V)         Cursor1         Cursor1         Services         Services           A (V)         Cursor1         Cursor2         Services         Services           A (V)         Cursor1         Cursor2         Services         Services           A (V)         Cursor1         Cursor1         Services         Services           A (V)         Cursor1	Freeze Image Channel B Channel B Channel A Channel A Channel A Channel A Channel B Channel B Channel B Channel B Channel B Channel B

#### SUPPLEMENTAL ETM SCHEMATIC WORKSHEET: