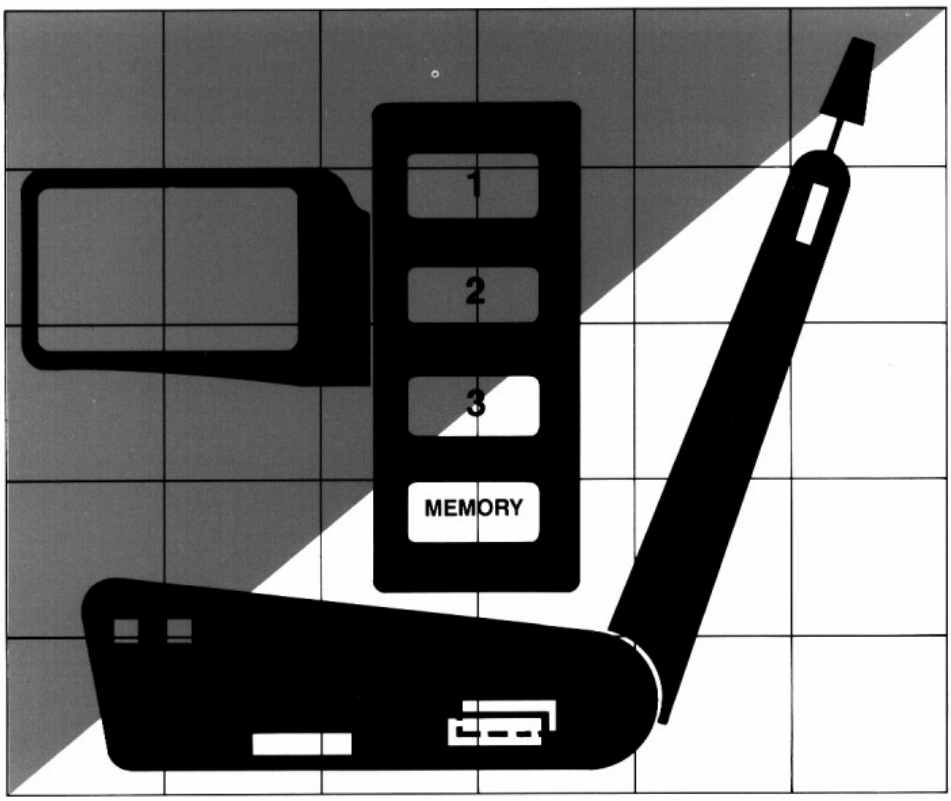
Seat and Mirror Memory

Training
Reference
Book



BMW of North America, Inc.
Service Training Department

DISCLAIMER

This training reference book is not intended to be a complete and all-inclusive source for repair and maintenance data. It is only part of a training information system designed to assure that uniform procedures and information are presented to all participants at the BMW Service Training Center.

The technician must always refer to and adhere to the following official factory service publications:

1. Service Information
2. Repair Manuals
3. Specifications Microfiche
4. Technical Reference Information
5. Video Bulletins

Note: The information contained in the training course materials is solely intended for participants in this training course conducted by the BMW Service Training Center.

Information status January 1989.

For changes/additions to the technical data, please refer to the current information issued by the "Service Division".

TABLE OF CONTENTS

INTRODUCTION

The seat/mirror memory (SM/SPM) allows three pre-adjusted positions of the seat and both outside mirrors to be stored in memory. Recalling and storing of these positions is accomplised with the memory switch located on the seat. The control unit contains an EEPROM, which stores the seat/mirror positions. Disconnecting the battery will not erase the memory positions stored in the control unit.

*EEPROM – permanent memory which can be erased and programmed again electronically.

SEAT ADJUSTING SWITCH

This seat adjusting switch is mounted on the left side of the driver's seat. Five adjusting planes can be operated with the seat adjusting switch: position (fwd/back), headrest, backrest, height and inclination.

Buttons return automatically to the original positions after all functions.

Motor sequencing is designed so that a maximum of two motors will run simultaneously each time a position is called. The order is sequence is:

1. *Seat position and backrest inclination,*
2. *seat inclination and height,*
3. *and finally headrest and thigh support.*

The same sequence of priority is applicable for manual operation and simultaneous selection of several functions.

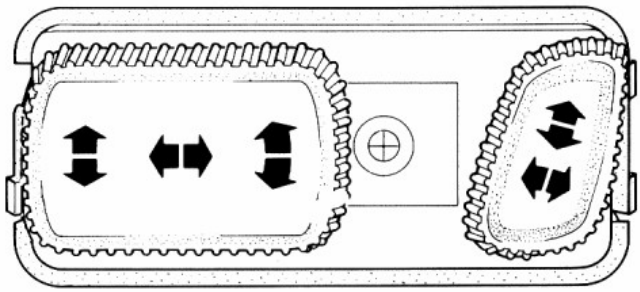
The actual position of motors is fed back to the control unit with potentiometers which are integrated in the motors.

Ground is supplied to the control unit (SM/SPM) via the seat adjusting switch depending on the switch position.

Switches for "seat adjustment" without memory and "seat memory" are different and must not be mixed up.

The control unit will interrupt power flow when the manual adjusting switch is held pushed in longer than 30 seconds and the motors are already in final position, i.e. against stops.

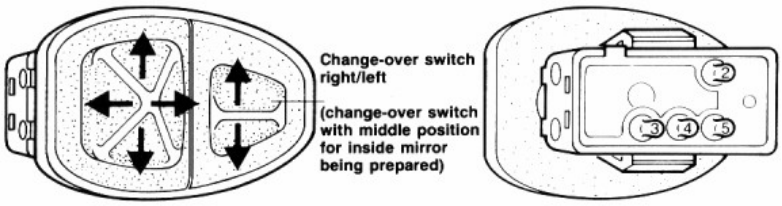
This is controlled internally by a bi-metallic operated circuit breaker.



MIRROR ADJUSTING SWITCH

The mirror adjusting switch is a four position switch, with a change over switch for left/right mirror adjustments. Three positions of mirror adjustment are programmable with the seat/mirror memory switch.

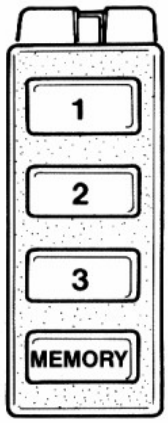
Incorporated in the mirror circuit is a function that allows the right outside mirror to tilt down when the transmission is shifted into reverse. This aids the driver in viewing the right side of the car while backing up. This function will only operate when the change over switch is in the left mirror adjusting position, which allows the driver the option of cancelling this function.

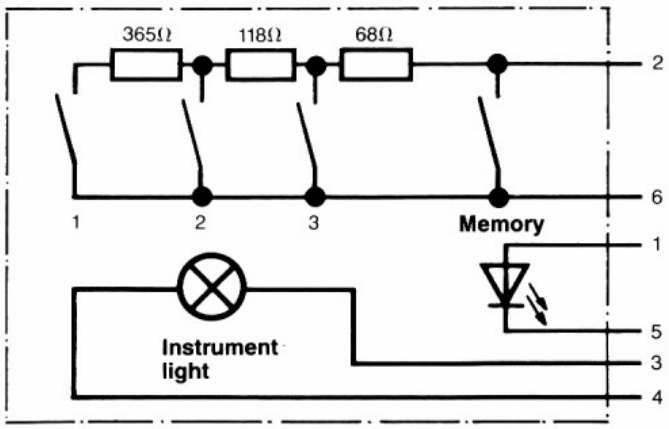


MEMORY SWITCH:

The memory switch sends different voltage values to the control unit in recalling or programming depending on which botton is pressed. SM and SPM can be programmed as long as the LED is on.

The memory button connects pins 2 & 6. The control unit then activates the light diode (LED) for approx. 10 seconds.





Different resistance values will be input to the control unit via the switch (series connection), when the three programmed seat positions are called.

1. = 551 .
2. = 186 .
3. = 68 .

PROGRAMMING SEQUENCE

Description of Operations:

1. Adjustment of seat and mirrors is possible at any time, with the seat and mirror adjusting switches. Mirror motor speed is reduced with manual mirror adjustment, so that the mirror can be adjusted more accurately.

   (10°/sec to 2.5°/sec). The cycling is changed automatically with low battery voltage.

2. **Programming**

The storing of seat and mirror positions in the memory is only possible with the iginition key in "R" or "ON."

a) Press memory button. LED comes on to show readiness for storing (max. time is 10 seconds).

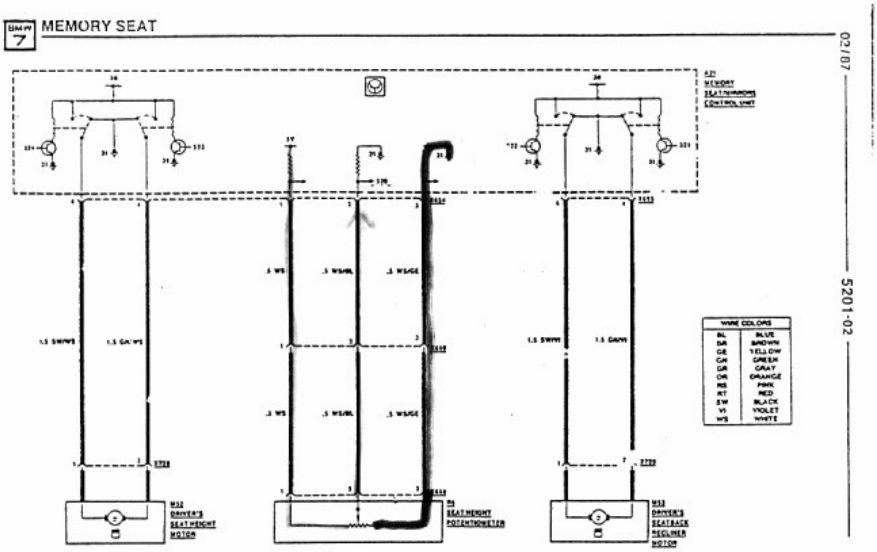
b) Press call buttons (1, 2 or 3). The seat/mirror positions will be stored in memory.

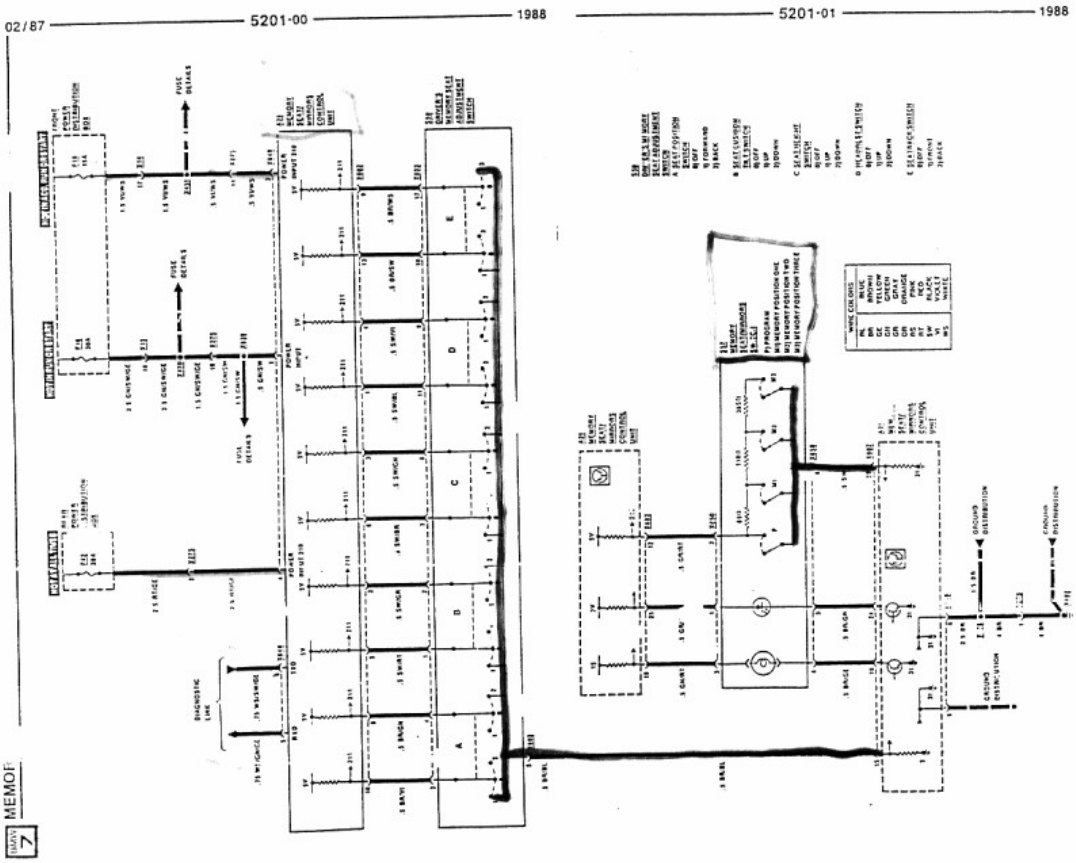
c) LED goes out after storage in the memory.

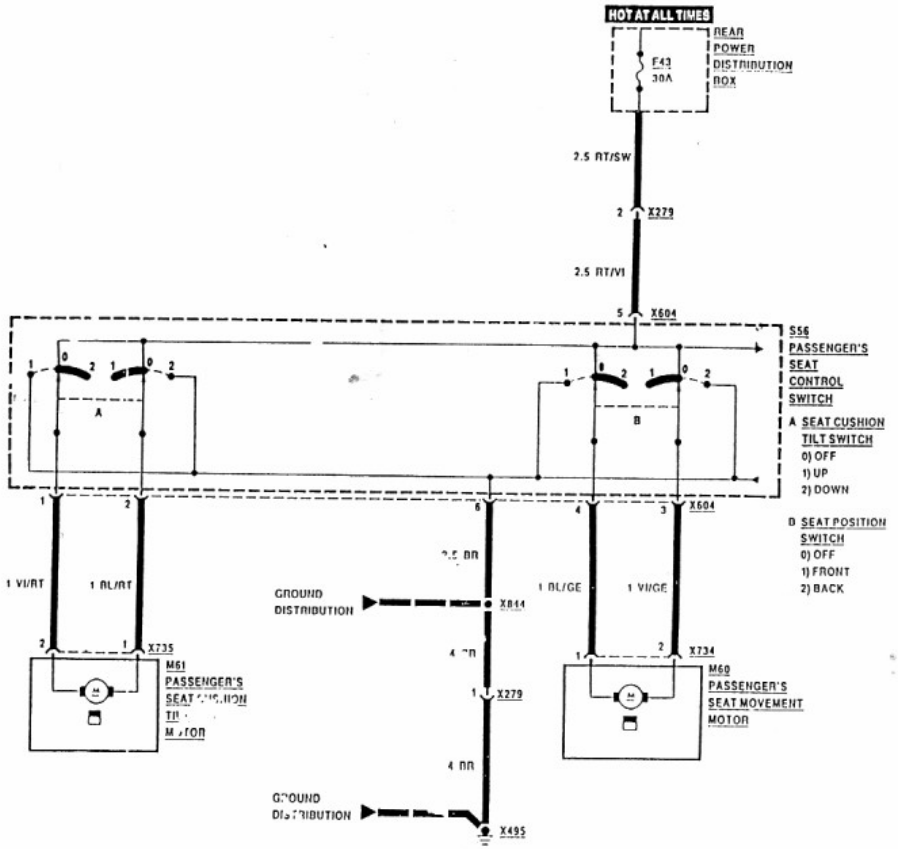
3. **Calling Memory**

a) With the ignition key "OFF" and the door open or inside light delayed action activated or in "R": pressing the program buttons (1, 2 or 3) will recall the programmed seat/mirror position.

b) With the ignition key "ON" or "OFF" and door not opened or inside light delayed action not activated:
   - Program button must be pressed until the selected position is reached.
   - Releasing the button will stop movement immediately.
   - The program will continue when pressing and holding the same button again
   - Pressing a different button will call off a new position without finishing the previously called position.





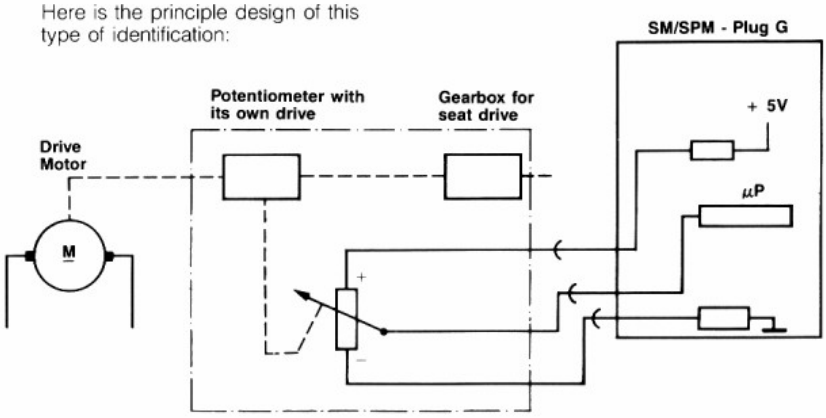


WIRE COLORS	
BL	BLUE
BR	BROWN
GE	YELLOW
GN	GREEN
GR	GRAY
OR	ORANGE
RS	PINK
RT	RED
SW	BLACK
VI	VIOLET
WS	WHITE

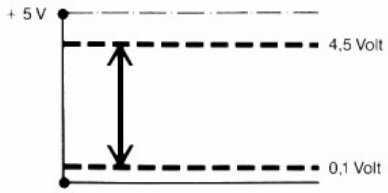
RESTORING POTENTIOMETERS:

The seat and mirror positions (actual position of motors) are each recognized by a restoring potentiometer. The control unit uses the voltage drop of the potentiometer as a reference of seat position.

Here is the principle design of this type of identification:



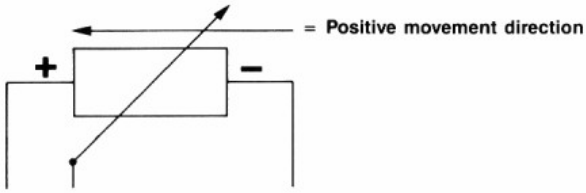
The working ranges of the potentiometer paths are between "H" approx. 4.5 volts and "L" approx. 0.1 volt, and are all identical.



The gearboxes of potentiometers are adapted to the adjusting travel in order to utilize the maximum potentiometer ranges (= improved precision for memory calling). Potentiometer gear boxes must have different ratios for the identical potentiometer travel, since the adjusting travel of a headrest is different than the adjusting travel for axial seat movement. This difference in gearbox ratio is marked on the plug/motor with different colors of paint. All restoring potentiometer paths have a fixed resistance of 4.7 k-ohms.

Connection of Restoring Potentiometers

It is important that the potentiometer power supply is connected on the correct poles, in order to have perfect operation of the SM/SPM control unit.



The potentiometer voltage must rise in the case of positive moving direction fo the seat adjusting plane.

Positive Adjustment:

— Seat height up
— Backrest forward
— Inclination front up
— Position forward
— Headrest up

The following is applicable to mirror drive.

Positive Adjustment:

— Vertical upward
— Horizontal to the right

The following "labels" are used on the potentiometer housings for identification of the different ratios.

	Color Code of Plug	Potentiometer Gearbox Ratio
Headrest	(red)	255
Seat height	(red)	255
Backrest	(green)	731
Forward/ backward	(brown)	1125
Inclination	(black)	146.6