

MODEL 212**Function requirements, general**

- Circuit 15R ON

i The electronic ignition lock control unit (N73) sends the status of circuit 15R over the interior CAN (CAN B) to the front SAM control unit with fuse and relay module (N10/1).

Wiping windshield, general

The windshield wiping function keeps the windshield free of water or snow, for example.

The windshield wiper function is comprised of the following subfunctions:

- **Intermittent wipe function sequence**

Intermittent wipe function sequence

The intermittent wipe function is activated by turning the combination switch (S4) to switch position "1" (rain/light sensor (B38/2) low sensitivity) or switch position "2" (rain/light sensor high sensitivity).

i When changing the switch position of the combination switch from switch position "0" to "1" or "2" or when changing from switch position "1" to "2", a wipe cycle ("reaction wipe") is activated.

The steering column tube module control unit (N80) reads in the switch position of the combination switch directly and sends this via chassis CAN (CAN E) (up to 28.02.2013) or chassis CAN 1 (CAN E1) (as of 01.03.2013) to the front SAM control unit. The front SAM control unit sends the switch position of the combination switch via the wiper/inside rear-view mirror LIN (LIN 2) to the rain/light sensor. The rain/light sensor then calculates the required wipe frequency on the basis of the amount of windshield wetness and sends the relevant request via the wiper/inside rear-view mirror LIN to the front SAM control unit. The front SAM control unit actuates the wiper motor (M6/1) via the wiper/inside rear-view mirror LIN.

The intermittent wipe function is interrupted under the following conditions:

- Activation of wipe stop function (with CODE 551 (Anti-theft alarm system (ATA [EDW])))
- Activating wash function

Single wipe function sequence

The single wipe function can only be activated if the combination switch is set to switch position "0", "1" or "2". If the windshield wiper is not located in the rest position, the request of the combination switch is ignored.

Wipe once:

To wipe once, briefly push the combination switch axially to the detent point.

Repeated wiping:

If the combination switch is pressed for longer, wiping takes place in accordance with the duration for which it is pressed, but only for a maximum of $t = 30$ s.

The steering column tube module control unit reads in the switch position of the combination switch directly and sends this via chassis CAN (up to 28.02.2013) or chassis CAN 1 (as of 01.03.2013) to the front SAM control unit. The front SAM control unit actuates the wiper motor via the wiper/inside rear-view mirror LIN accordingly.

Function sequence of wiping at specified speed

The wipe function with predefined speed is activated by turning the combination switch to switch position "3" (continuous wipe at slow speed) or switch position "4" (continuous wipe at fast speed). The steering column tube module control unit reads in the switch position of the combination switch directly and sends this via chassis CAN (up to 28.02.2013) or chassis CAN 1 (as of 01.03.2013) to the front SAM control unit. The front SAM control unit then actuates the wiper motor over the wiper/inside rear-view mirror LIN accordingly.

The wash function with predefined speed is interrupted under the following conditions:

- Activation of wipe stop function (with CODE 551 (Anti-theft alarm system (ATA [EDW])))
- Activating wash function

- **Single wipe function sequence**
- **Function sequence of wiping at specified speed**
- **Function sequence for interrupting wiping during engine start**
- **Wiper start suppression function sequence**
- **Function sequence for wiper stop (with CODE 551 (Anti-theft alarm system (ATA [EDW])))**
- **Function sequence for automatic speed reduction (except CODE 494 (USA version))**

- Activating single wipe function
- Activation of afterwipe function
- Activating wiper start suppression function
- Turning combination switch to position "0", "3" or "4"
- Blocking wiper motor

i If errors are present in the data from the rain/light sensor, the intermittent wipe function is also interrupted. The wiper motor is then actuated at the defined time intervals.

i If the combination switch is held in switch position "0" for longer than $t = 30$ s, a "stuck combination switch" is assumed and the single wipe function is interrupted despite the current request.

The speed at which the windshield wipers are moved corresponds to the wiping speed in switch position "3" (continuous wipe at low speed).

The single wipe function is interrupted under the following conditions:

- Activating wash function
- Activation of afterwipe function
- Activating wipe interruption during engine start function
- Blocking wiper motor

- Activation of afterwipe function
- Activation of speed reduction function (except CODE 494 (USA version))
- Turning the combination switch to position "0", "1", or "2"
- Blocking wiper motor

i The data from the rain/light sensor is not taken into consideration when the wipe function with predefined set speed is active.

Function sequence for interrupting wiping during engine start

During engine start, the front SAM control inhibits the actuation of the wiper motor. Any wiping procedure already started is terminated. The engine start is recognized by the transmission of the status of circuit 50. The electronic ignition lock control unit transmits the status of circuit 50 to the front SAM control unit via the interior CAN.

Additional function requirements for wiper start suppression

- Vehicle speed $v < 3$ km/h
- Combination switch in position "1" or "2"

Wiper start suppression function sequence

The wiper start suppression is intended to prevent the driver or front passenger from being sprayed with water from the windshield when getting in or out of the vehicle as the result of an initiated wipe operation. The windshield wipers remain in the park position despite a wipe request triggered manually or automatically. If a door is opened during wiping, the front SAM control unit interrupts the actuation of the wiper motor. The instrument cluster (A1) sends the vehicle speed to the front SAM control unit over the interior CAN. The steering column tube module control unit reads in the switch position of the combination switch directly and sends this via chassis CAN (up to 28.02.2013) or chassis CAN 1 (as of 01.03.2013) to the front SAM control unit. The opening of the left front door is recognized by the status of the left front door rotary tumbler switch (A85s1) in the left front door lock (A85). The left front door control unit (N69/1) reads in the status of the left front door rotary tumbler switch directly and sends it to the front SAM control unit via interior CAN. The opening of the right front door is recognized by the status of the right front door rotary tumbler switch (A85/1s1) in the right front door lock (A85/1). The right front door control unit (N69/2) reads in the status of the right front door rotary tumbler switch directly and sends this via interior CAN to the front SAM control unit.

The front SAM control unit reads in all relevant information, evaluates it and interrupts actuation of the wiper motor. A wiping procedure that has already started is not interrupted immediately. The wipers continue to move to the park position.

The wiper start suppression is deactivated under the following conditions:

- Vehicle speed $v \geq 3$ km/h

Additional function requirements for wiper stop (with CODE 551 (Antitheft alarm system (ATA [EDW])))

- Wipe or wash function activated

Additional function requirements for automatic speed reduction (except CODE 494 (USA version))

- Vehicle speed reduction from $v > 6$ km/h to $v < 3$ km/h
- Combination switch in position "3" or "4"

Function sequence for automatic speed reduction (except CODE 494 (USA version))

It is assumed that the windshield does not become as wet at slow speeds. For this reason, the front SAM control unit reduces the wiper speed as soon as vehicle deceleration from $v > 6$ km/h to $v < 3$ km/h is detected. The instrument cluster sends the vehicle speed to the front SAM control unit over the interior CAN. The steering column tube module control unit reads in the switch position of the combination switch directly and sends this via chassis CAN (up to 28.02.2013) or chassis CAN 1 (as of 01.03.2013) to the front SAM control unit. The front SAM control unit reads in all relevant information, evaluates it and switches the wiper speed of the wiper motor back by one stage via the wiper/inside rear-view mirror LIN.

- Combination switch in switch position "3" or "4"
- Single wipe or wash function activated
- Driver and passenger door closed
- Selector lever in position "D" or "R" (transmission 722, 724.2, 725)
- Clutch operated (transmission 711, 716)
- Change from circuit 15C to circuit 15R

i With circuit 15R ON, no information is available about the current selector lever position or gear range. The electronic selector lever module control unit (N15/5) (transmission 722.6) or the fully integrated transmission control unit (Y3/8n4) (transmission 722.9, 724.2, 725) constantly sends "selector lever position or gear range N" over the drive train CAN (CAN C), CDI control unit (N3/9) (diesel engine) or ME-SFI [ME] control unit (N3/10) (gasoline engine) and chassis CAN (up to 28.02.2013) or chassis CAN 1 (as of 01.03.2013) to the front SAM control unit.

The current selector lever position or gear range is only available at circuit 15 ON. The wiper start suppression is not canceled by circuit 15R On. The "Clutch operated" status (transmission 711, 716) is detected by the clutch pedal switch (S40/3). The CDI control unit or the ME-SFI [ME] control unit reads in the status of the clutch pedal switch directly and transmits this over the chassis CAN (up to 28.02.2013) or chassis CAN 1 (as of 01.03.2013) to the front SAM control unit.

Function sequence for wiper stop (with CODE 551 (Antitheft alarm system (ATA [EDW])))

The wipe stop function prevents the wiper motor from being actuated by the front SAM control unit when the engine hood is open and thus causing damage to the vehicle. If the engine hood is opened at a speed of $v < 3$ km/h, the front SAM control unit immediately stops the wiper motor actuation. At a speed of $v > 6$ km/h, the wiper stop function is deactivated, i.e. the wiper motor is actuated again from this speed onwards. The instrument cluster sends the vehicle speed to the front SAM control unit over the interior CAN. The steering column tube module control unit reads in the switch position of the combination switch directly and sends this via chassis CAN (up to 28.02.2013) or chassis CAN 1 (as of 01.03.2013) to the front SAM control unit. An opened engine hood is detected by the pedestrian protection + ATA [EDW] engine hood switch Hall sensor (A38/1) (with CODE U60 Pedestrian protection) or by the left engine hood contact switch (S62/43) (except CODE U60 (Pedestrian protection)). The rear SAM control unit with fuse and relay module (N10/2) reads in the status directly and sends this over the interior CAN to the front SAM control unit. The front SAM control unit reads in all the relevant information, evaluates it and then interrupts actuation of the wiper motor via the wiper/inside rear-view mirror LIN.

The speed reduction is canceled under the following conditions:

- Vehicle speed $v > 6$ km/h
- Changing wiper speed
- Activating single wipe function
- Activating wash function

	Electrical function schematic for windshield wiper		PE82.30-P-2051-97DAA
--	--	--	----------------------

