

Off Highway Wiper Direct Drive Multi-Voltage

WDD2 MV 2019

AGENDA

No.	
	Project Leader
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P4	Wiper arm type
P5	Wiper blade type
P6	Wiper arm/blade connection
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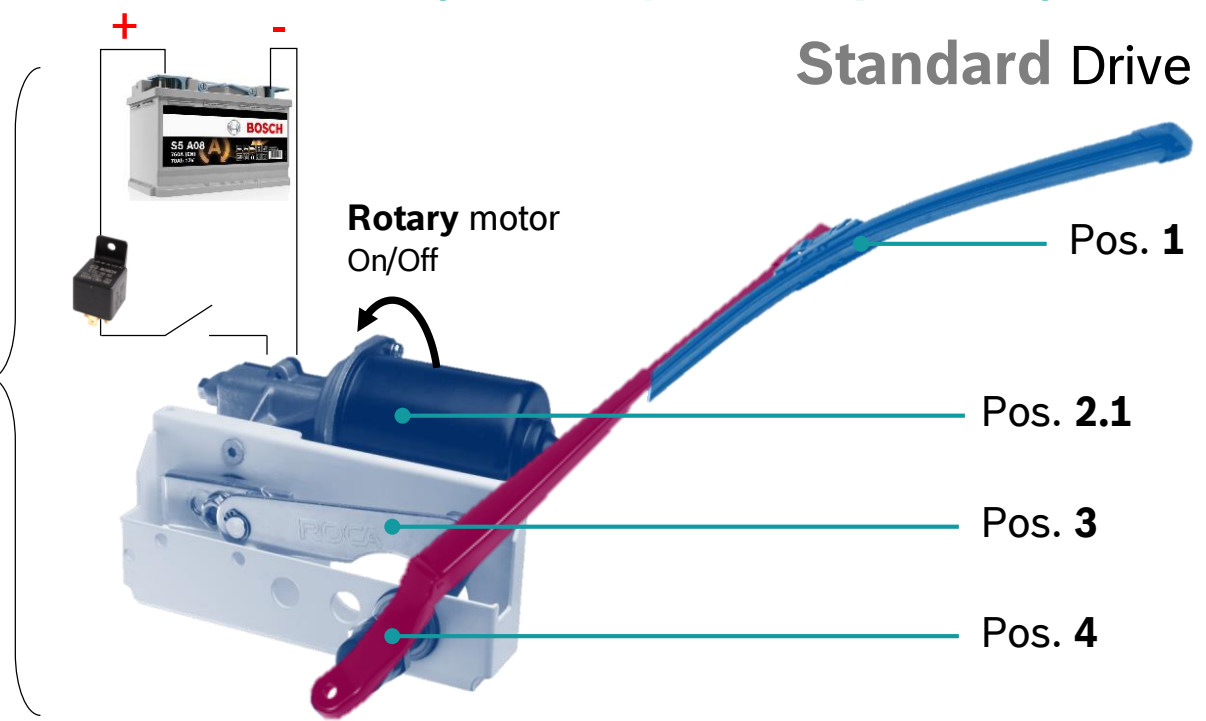
PROJECT LEADER

WiperDirectDrive2 OHW "WDDMultiV"

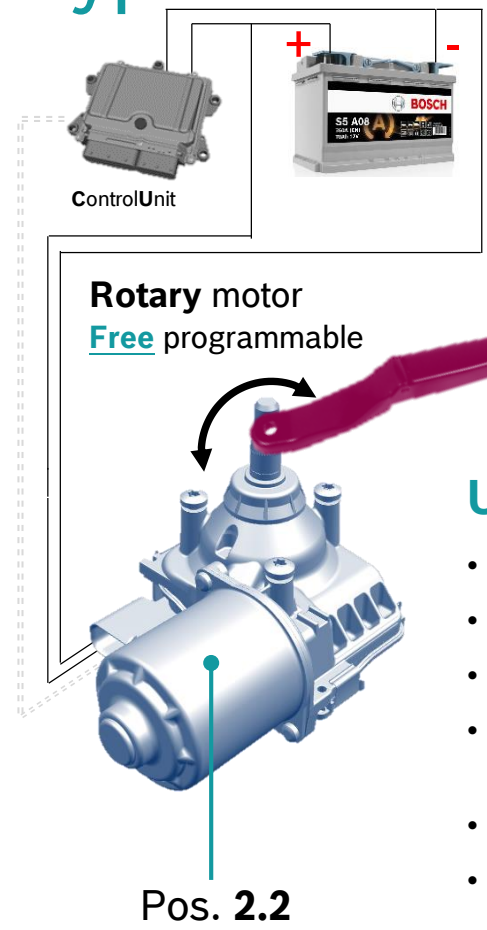
P1 - Delivery Scope Wiper system type

Source:
Pos. 1: www.lott.de
Pos. 2.1: www.watski.de
Pos. 3: www.lott.de

Wiper "SYSTEM"



Position	Description	Product focus	General BOSCH position
1	Wiper blade	YES	System competency @BOSCH System supply via external TIER 1 supplier
2.1	Analog wiper motor	YES	
2.2	"Smart" Wiper direct drive	YES	
3	Metal kinematic	NO	
4	Wiper arm	NO (YES)*	



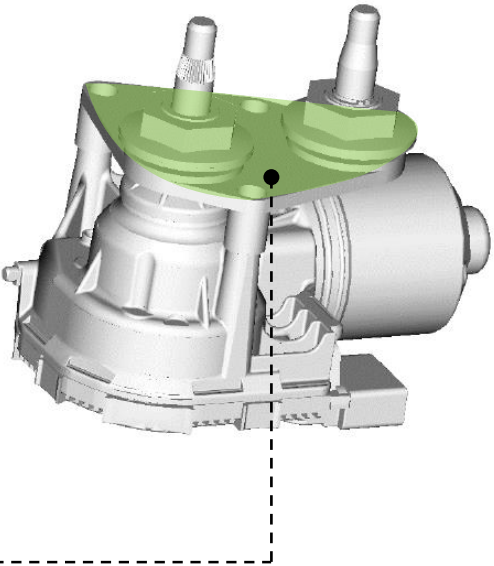
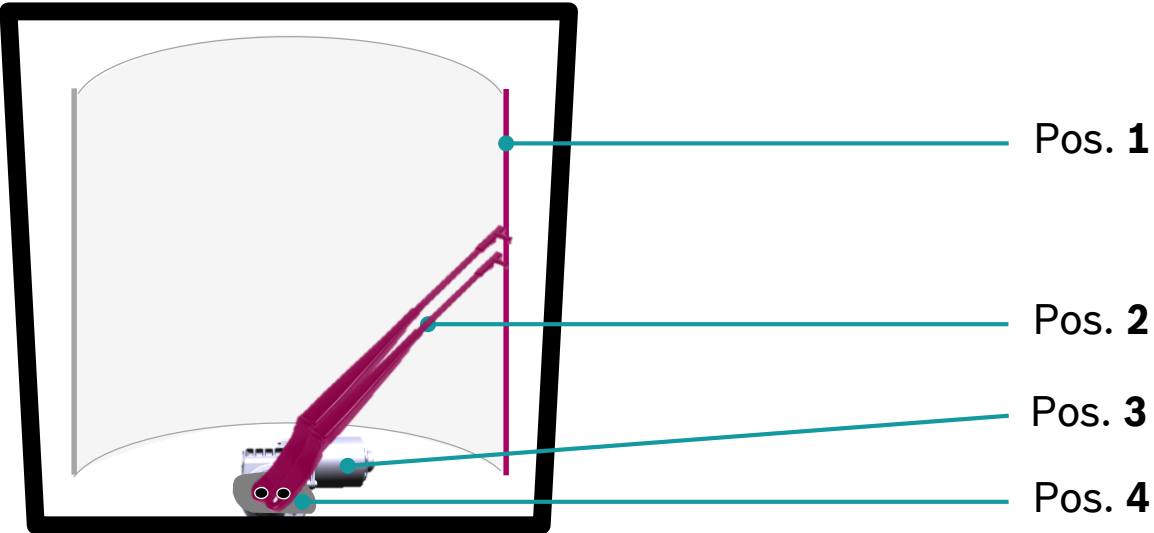
USP's:

- LIN / CAN (2.0) / Analog communication possible
- One part number for all applications and projects
- Parameter customization
- Increased wiper blade life + additional software functions
- Reduced engineering effort for different cabins
- Easy services and spare part management
- 12V + 24V applications covered
- Less components (no relay necessary)
- Reduced installation space (no kinematic)

*: Depending on volumes, in general not in focus

WiperDirectDrive2 OHW "WDDMultiV"

P2 - Wiper system type (Pantograph operation)



INFO's

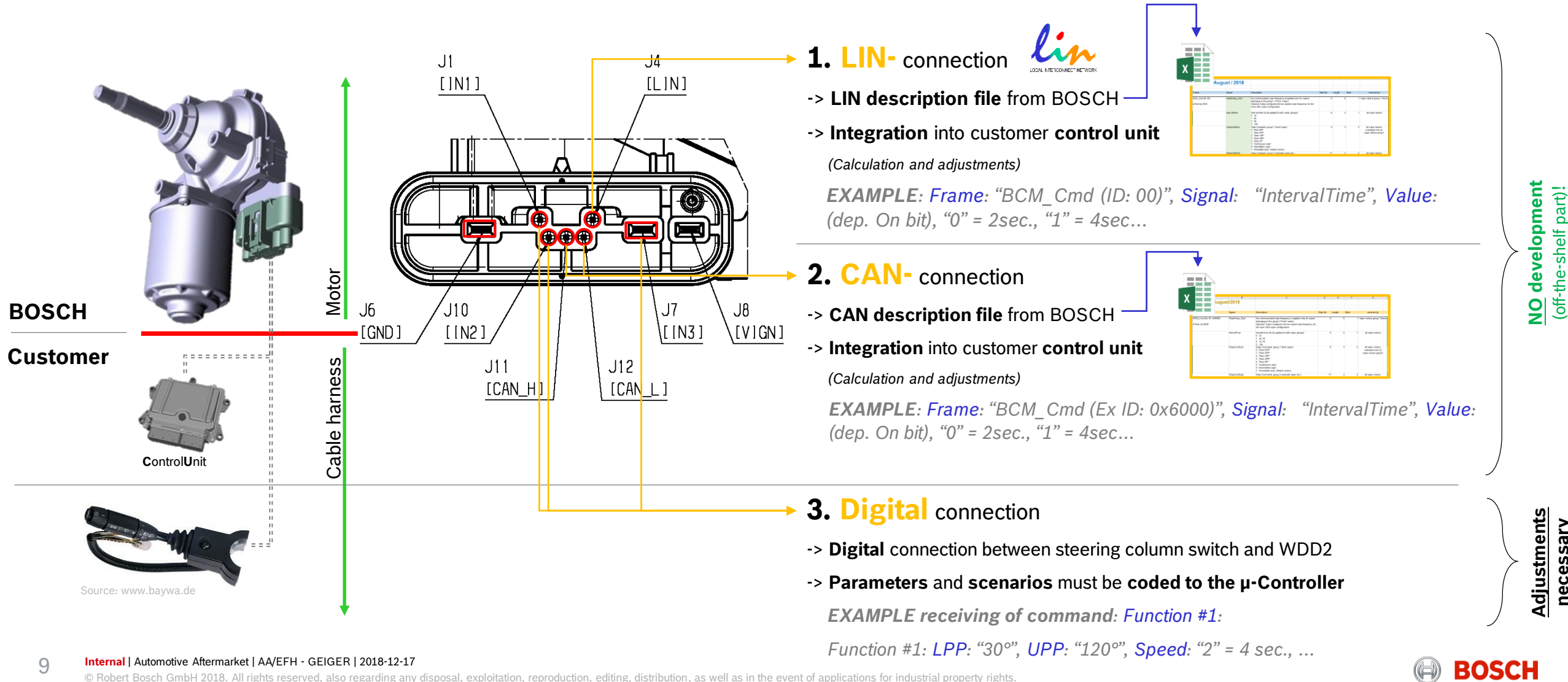
- With additional motor **bracket** **
- Production drawing can be shared
- **Engineering support** via BOSCH available *

Position	Description	Available via BOSCH?	General BOSCH position
1	Wiper blade	YES	System competency @BOSCH System supply via external TIER 1 supplier
2	Wiper pantograph arm	NO (YES)*	
3	Wiper direct drive	YES	
4	Motor bracket **	NO (YES)*	

*: Depending on volumes, in general not in focus
**: Production drawing and example available, can be shared after discussion

WiperDirectDrive2 OHW "WDDMultiV"

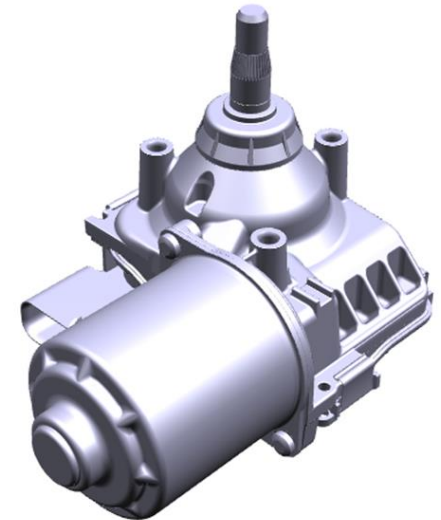
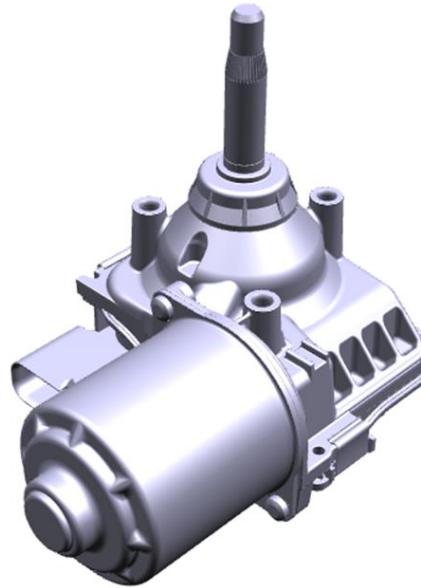
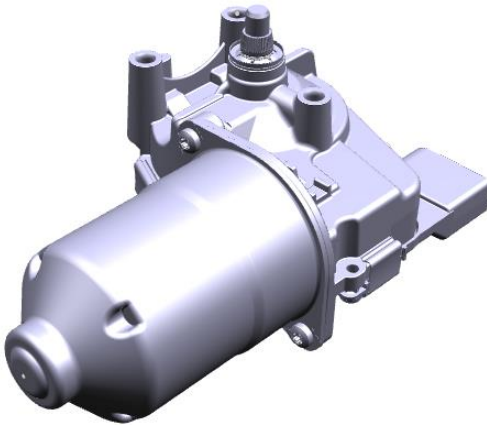
P2 - Wiper system type



2019

P3 - Wiper drive type

- ▶ Reversing direct drive Multi voltage High Tech
- ▶ Reversing direct drive 12V Base Tech
- ▶ Analog drive 12V (4-Pin Motor) 0390243611

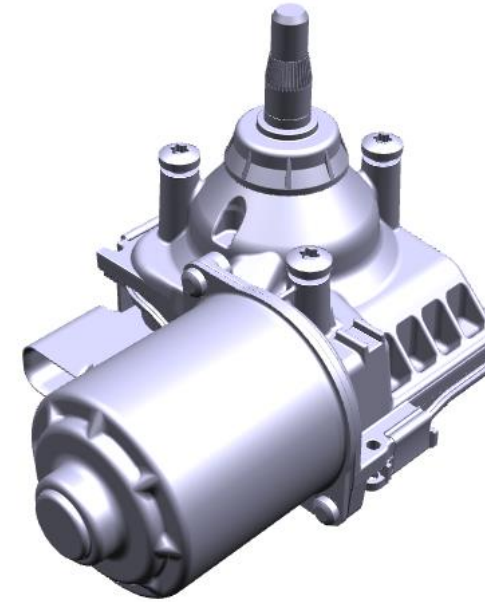


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P3 – General product description

Features:

- Smart reversing wiper direct drive DC brushed motor in:
 - Base-tech: LIN/ digital and 12V
 - High-tech: LIN / CAN / digital and multivoltage 12V & 24V
- shaft length 85mm base tech
- shaft length 105mm high tech
- IP 6K7
- Variable wipe angle up to 360°

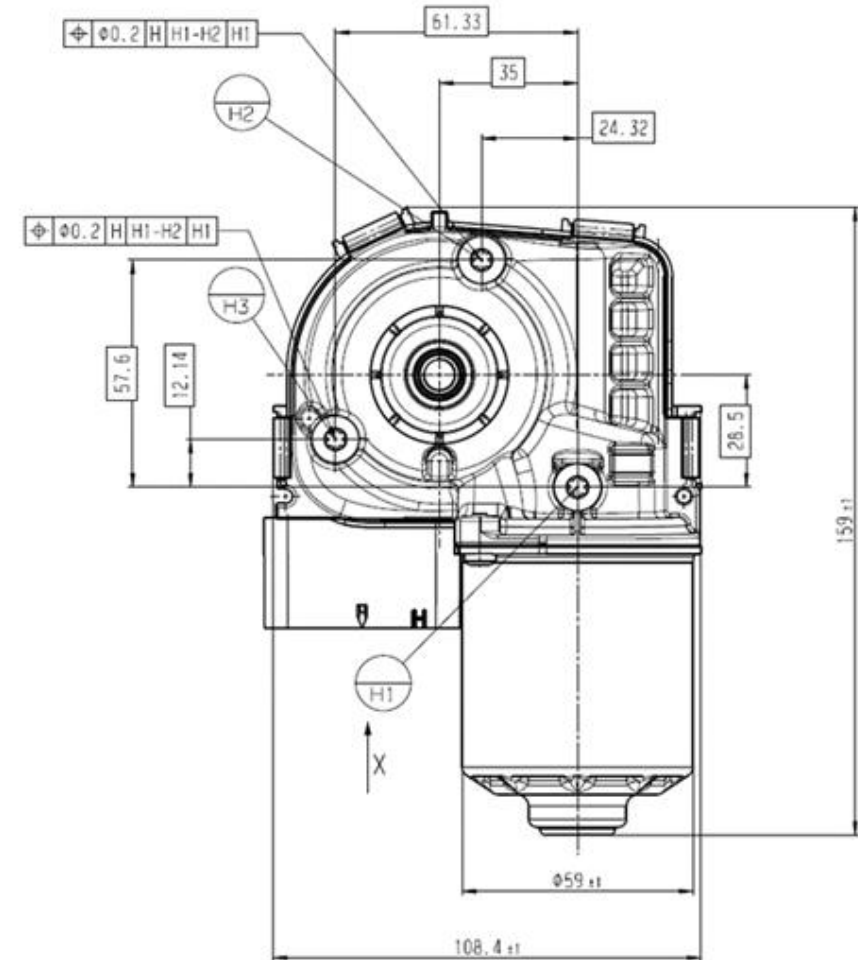


2019

P3 – General product description

Customer Benefits:

- Compact reversing wiper direct drive multivoltage 12V / 24V
- Large wipe area and variable wipe zones up to 360°
- LIN / CAN and digital communication possible
- One part number for all applications and projects
- parameter customization
- Longer wiper blade life and additional software functions
- teach-in to eliminate tolerances during vehicle assembly
- reduced engineering effort for different cabins
- Easy services and spare part management
- DC-Motor (brushed motor) with aluminum housing, Worm gear (85mm/ 105mm)
- ECU (wiper control unit) consisting of plastic cover with an integrated connector (8-PIN Molex connector) and PCB with a motor control electronics and software
- Up to 8 motors with IDs possible



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P3 – General product description

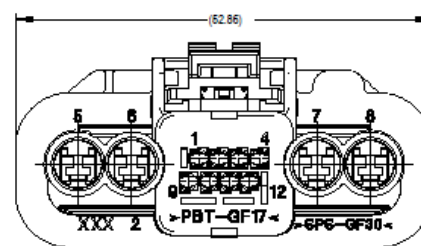
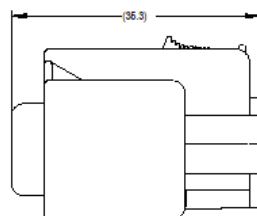
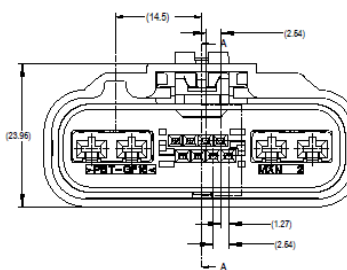
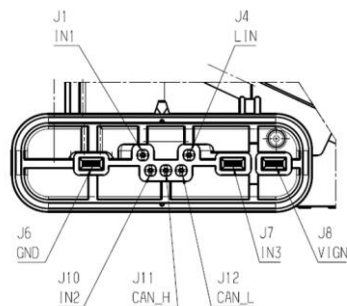
Technical Data	
Motor size	WDD2 MultiV
Nominal voltage	12V/ 24V
Test voltage	13,5V
Operation voltage range	9 ... 32V
holding torque drive / system (power-off)	approx. 2,6Nm / 4 Nm
Thermomanagement	Reduction of number of wipe speed based on windscreen conditions (dry windscreen) down to intermittent
Gear location	left
Connector variants	Connector
Basic dimensions (height x width x length)	116,3 x 111 x 160mm
Lifetime	1.5 mio cycles, according to SAE J903C
Operating Time	~ 660 hours
Breakaway torque at 5rpm	Ca. 34Nm breakaway torque can be adjusted separately for each gear location and turning direction by software parameters to compensate efficiency effects
Vehicle system communication	LIN 2.1/ CAN / Digital input
Drive weight	~ 1kg
Mounting to vehicle body	Via Bracket/ Grommets
Vehicle body integration	Mechanical end Stopps (i.e on the windshield) are madatory

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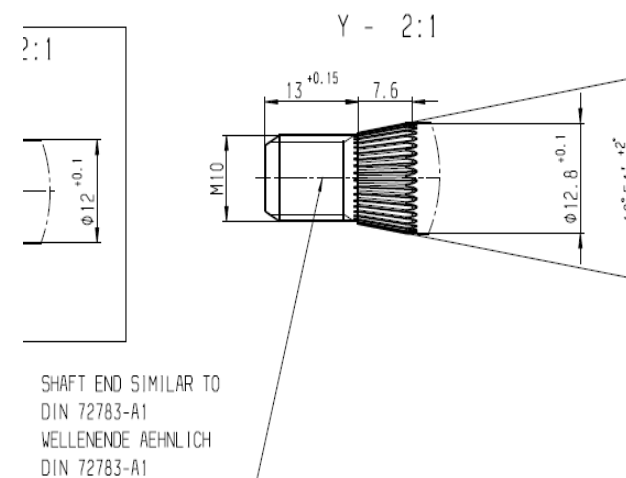
P3 – General product description

Electrical Interfaces and 8-PIN connector

- Pin UBAT(VIGN)
- Pin GND:
- The electronic system is supplied with voltage via a power module.
- Pin LIN: Communication interface to the LIN bus. Configuration of reversing point and speeds for digital mode.
- Pins CanH CanL: Communication interface via CAN bus. Automatic configuration of CAN Baudrate [125, 250, 500kbits]
- Pins IN1, IN2, IN3: for HW coding 1, 2, 3, 4. This interface is used for the CAN identifier configuration and digital mode functions.
- Mating connector according molex drawing: SD-31034-001, variant 31034-5016



Mechanical Interface



2019

P3 – General product description

Drive system environment:

The wiper system can be mounted under different conditions up to +85°C (example: in cabin applications, on glass applications, roof top applications)

Wiper drive system type:

The wiper direct drive multivoltage for Off-Highway is a part of the wash-wipe-system which consists of following components:

- Wiper blade (WBA) with optional attachable nozzles
- Wiper arms (WAA)
- Wiper motor bracket (with a mechanical hard stop for the Teach-in function and system calibration, noise decoupling elements, optional with blind shaft for Pantograph arm)
- One or multiple wipe drives (WDD2 multiV)

Hardware Monitoring:

- WDD2multiV monitors its hardware components such as Position sensor, Non Volatile Memory(NVM), RAM, P-Flash , H-Bridge, Temperature sensor

Modes Definition: Internal Mode, Normal Mode, Teach-in mode, Limp Home mode.

Wiping Functions:

Wiper Feedback (Wiper states, error messages),

Parking Strategy, Alternative Park Position (APP, for longer blade life), Continuous Wiping (Low and High Speed Wiping), Intermittent Wiping,

Torque limitation. Synchron wiping, interval and wipe speed dependent on wipe angle. 2 wiper groups with different wipe speeds for each group. Support BCM for Front Wash, Jet wiper, After wash, Automatic Wiping (Splash Wipe, RainSensor Mask Area) , Mist Wiping.

Customer parameters:

wipe frequency, wipe angles (upper and lower reversing position), service position, alternative park position (APP), wipe direction (upwipe direction: counterwise or counterclockwise), Torque limitation, wipe movement mode, wipe angle correction.

BOSCH

P5&6 WIPER BLADES

CONVENTIONAL BLADES | RFP JD

BOSCH Wiper blades | PC-program

Overview



400	400	3 397 001 741	3 391 250 246	8x3, 9x3, 9x4
400	450 S	3 397 001 742	3 391 250 246	8x3, 9x3, 9x4
420	420	3 397 001 743	3 391 250 246	8x3, 9x3, 9x4
450	450	3 397 001 744	3 391 250 246	8x3, 9x3, 9x4
450	450 S	3 397 001 745	3 391 250 246	8x3, 9x3, 9x4
475	480	3 397 001 746	3 391 250 246	8x3, 9x3, 9x4
475	480 S	3 397 001 747	3 391 250 246	8x3, 9x3, 9x4
500	500	3 397 001 748	3 391 250 246	8x3, 9x3, 9x4
500	500 S	3 397 001 749	3 391 250 246	8x3, 9x3, 9x4
530	530	3 397 001 750	3 391 250 246	8x3, 9x3, 9x4
530	530 S	3 397 001 751	3 391 250 246	8x3, 9x3, 9x4
550	550	3 397 001 752	3 391 250 246	8x3, 9x3, 9x4
550	550 S	3 397 001 753	3 391 250 246	8x3, 9x3, 9x4
600	600	3 397 001 754	3 391 250 209	9x3
600	601	3 397 010 266	3 391 250 215	12x4
600	602	3 397 011 552	3 391 250 246	8x3, 9x3, 9x4
650	650	3 397 010 267	3 391 250 289	9x3, 9x4
650	652	3 397 011 553	3 391 250 246	8x3, 9x3, 9x4
700	701	3 397 010 014	3 391 250 246	8x3, 9x3, 9x4

Benefits

Twin Workshop Packaging

- ▶ Easy installation
- ▶ Best wipe performance due to special coating
- ▶ Long service life due to robust design
- ▶ Coverage of main arm interfaces (hook, saddle, bayonet)
- ▶ Full length range from 400 – 700mm
- ▶ Special length available 800, 900 & 1000mm
- ▶ Competitive price due to simple neutral packaging

→ **WS-packaging, 10pcs.**

CONVENTIONAL BLADES | TRUCK PROGRAM

BOSCH Wiper blades | HD-program

Overview (1/2)

Short Code	P/N	Index	Special Parts	Length [mm]	Adapter name	Wiper arm
N 56	3 397 018 962	HGP		550	230 (H12)	12x4
N 63	3 397 018 966	HGP		600	12x4	12x4
N 65	3 397 018 963	HGP		650	230 (H12)	12x4
N 67	3 397 011 937	HGP		650	H 15	9x4
N 70	3 397 018 170	HGP		700	230 (H12)	12x4
N 71	3 397 011 238	HGP	Incl. spray nozzle	700	230 (H12)	12x4
N 72	3 397 002 918	HGP		700	U15L	16,2 (L)
N 73	3 397 018 173	HGP		700	T8	9x4 (L)
N 75	3 397 011 822	HGP	Incl. spray nozzle	700	230 (H12)	12x4

BOSCH Wiper blades | HD-program

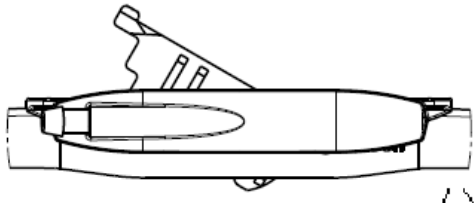
Overview (2/2)

Short Code	P/N	Special Parts	Length [mm]	Adapter name	Wiper arm
N 80	3 397 018 180		800	...482/ ...278	Saddle
N 82	3 397 011 425		800	101-104A	Saddle
N 90	3 397 018 190		900	...482	Saddle
N 91	3 397 018 191		900		Underhook 16x6
N 92	3 397 011 426		900	105/107/108 A	Saddle
N 100	3 397 018 199		1000	277/482/278/476	Saddle
N 101	3 397 018 198		1000	16x6	Underhook
N 102	3 397 011 427		1000	105 / 106 / 107 / 108 /109 A	Saddle

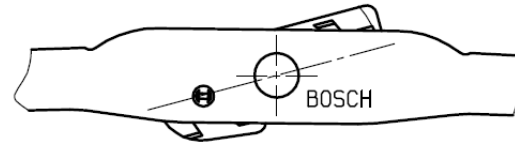
BOSCH Wiper blades | HD-program

Adapters (1/2)

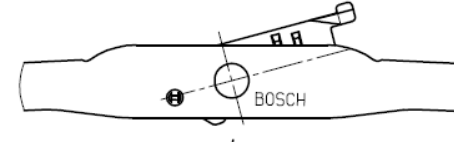
230 (H 12)



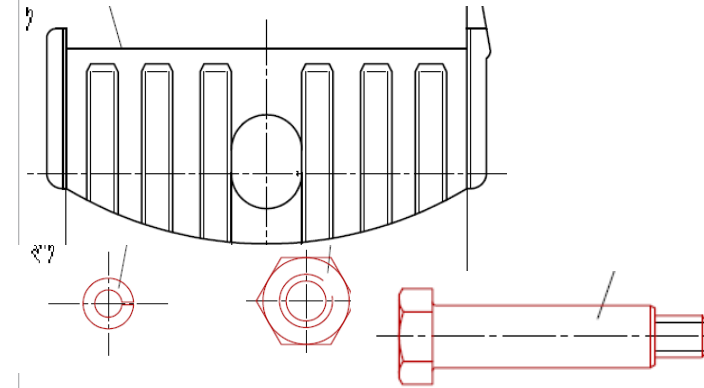
12 x 4



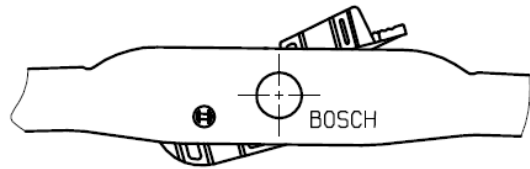
H 15



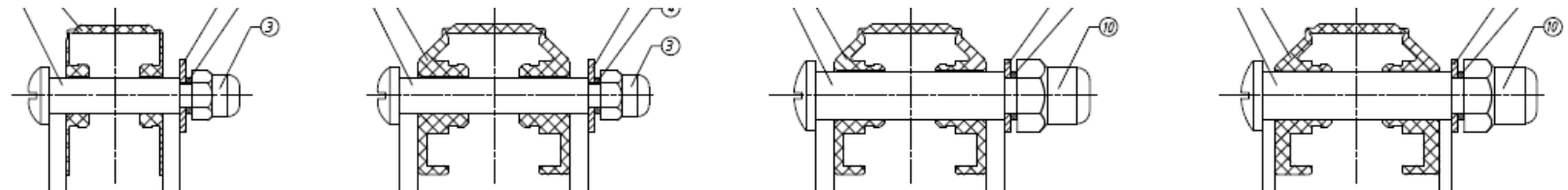
U15L



T8

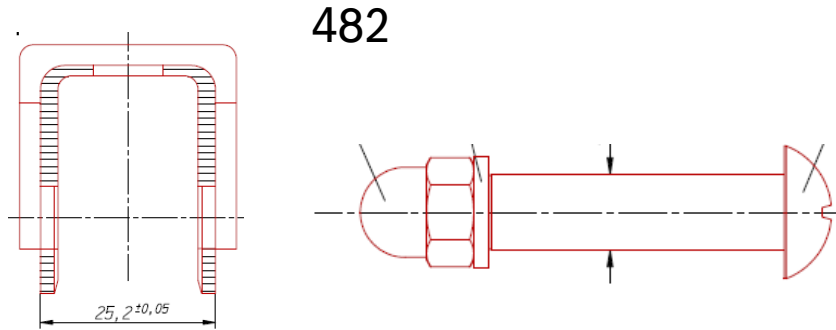


101 – 104a

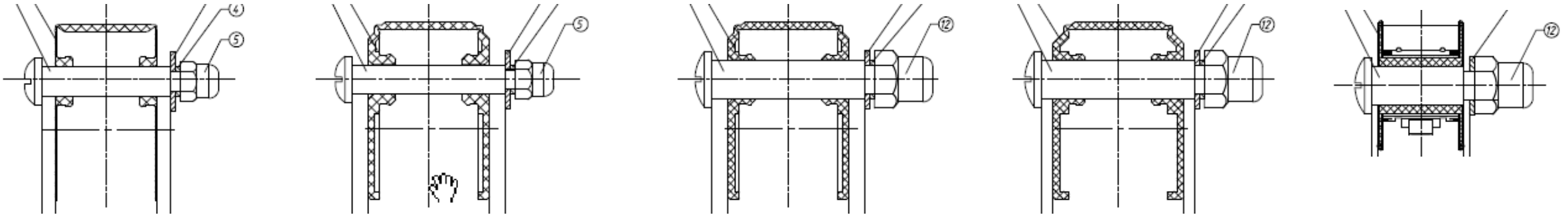


BOSCH Wiper blades | HD-program

Adapters (2/2)



105 / 106 / 107 / 108 / 109 A



BOSCH Wiper blades | HD-program

Advantages at a glance

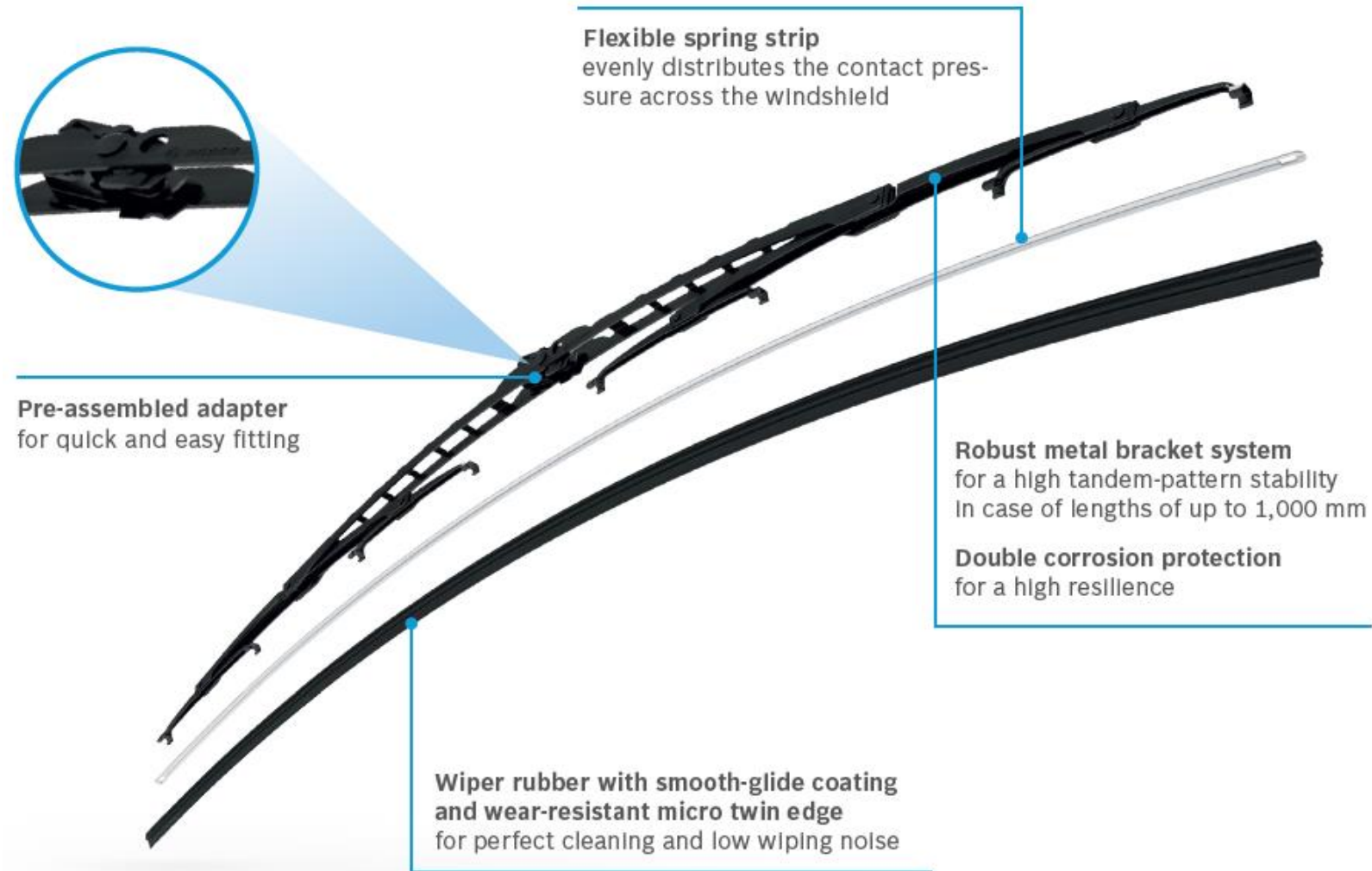
Robust conventional metal-bracket wiper blade with pre-assembled adapter for commercial vehicles, buses, vans and LCVs – wiper rubber with wear-resistant micro twin edge and resilient metal bracket system with double corrosion protection lastingly ensure high wiping comfort and safety



- ▶ **Perfect cleaning and low wiping noise – even with partially dry windshields:** wiper rubber with smooth-glide coating for increased wiping comfort under any weather conditions
- ▶ **Quick and easy fitting:** pre-assembled adapter for quick and easy wiper-blade replacement
- ▶ **Particularly robust and durable:** wiper rubber with wear-resistant micro twin edge and a resilient metal bracket system with double corrosion protection result in high resilience
- ▶ **Tandem-pattern stability:** robust metal design for wiper blades with lengths between 400 and 1,000 mm prevents lifting and fluttering – even if subject to strong winds
- ▶ **Perfectly fitting and safe:** comprehensive and vehicle-specific quality and functional tests complying with the same standards as those applied for OE parts; coverage of up to 98 % of all commercial vehicles, buses and special vehicles

BOSCH Wiper blades | HD-program

Twin standard commercial-vehicle wiper blade



FLAT BLADES

BOSCH Wiper blades | HD-program

Overview

Short Code	P/N	Special Parts	Length [mm]	Adapter name	Wiper arm
AR 50 N	3 397 008 841		500	M2	9x3, 9x4
AR 55 N	3 397 008 842		550	M2	9x3, 9x4
AR 60 N	3 397 008 843		600	M5	9x3, 9x4, 12x4
AR 61 N	3 397 008 847	Spray nozzle	600	M2	9x3, 9x4
AR 65 N	3 397 008 844		650	M5	9x3, 9x4, 12x4
AR 66 N	3 397 008 848	Spray nozzle	650	M1	9x3, 9x4
AR 70 N	3 397 008 845		700	M5	9x3, 9x4, 12x4
AR 71 N	3 397 008 849	Spray nozzle	700	M5	9x3, 9x4, 12x4

BOSCH Wiper blades | HD-program

Advantage at a glance

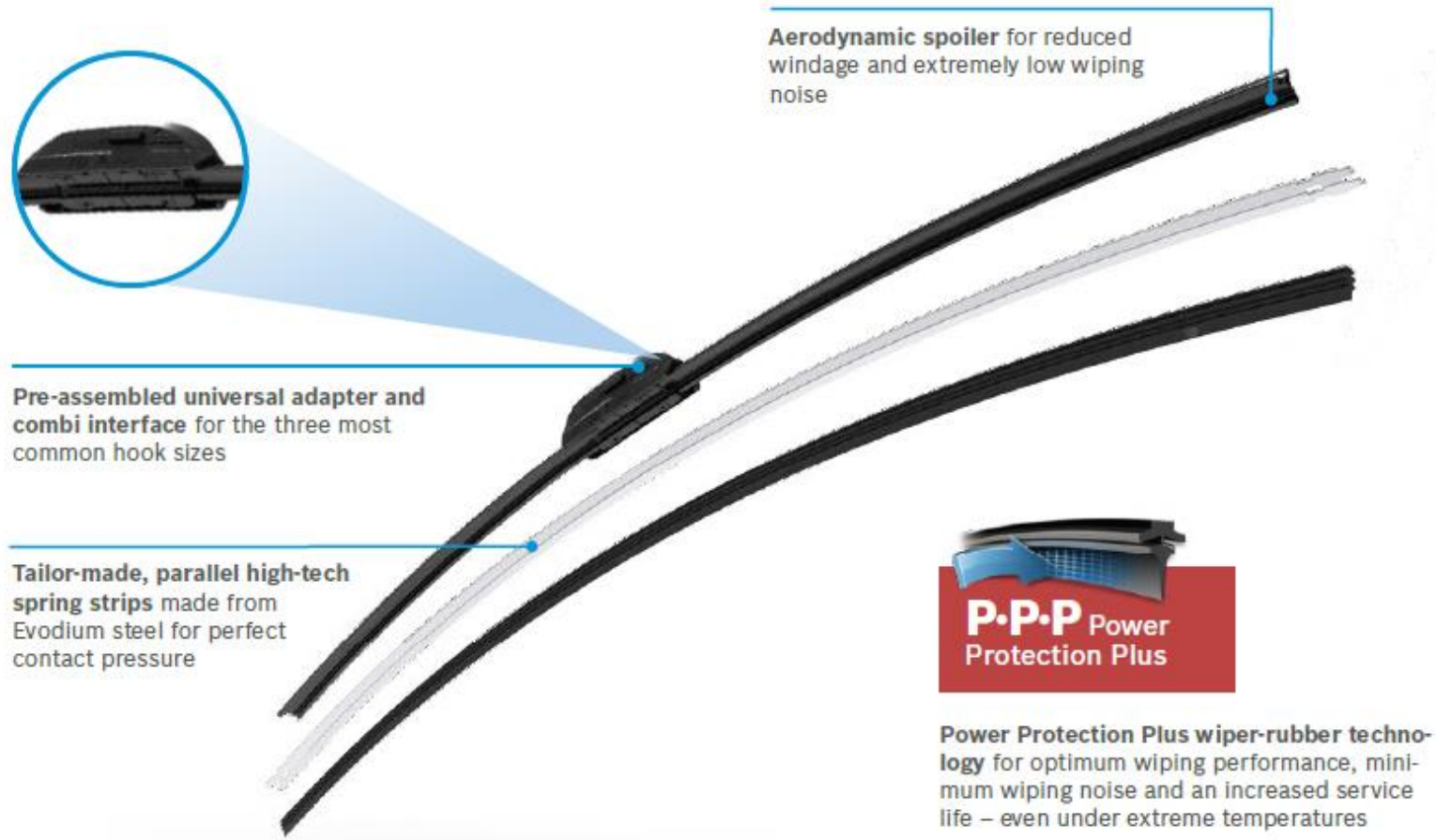
High-performance flat wiper blade with pre-assembled adapter for commercial vehicles, buses, vans and LCVs – aerodynamic design and patented Power Protection Plus wiper rubber for optimum visibility under any weather conditions



- ▶ **Perfect wiper performance under any weather conditions, increased service life and gentle wiper action:** wiper rubber with patented Power Protection Plus coating
- ▶ **Quick and easy fitting:** pre-assembled universal adapter and combi interface for the three most common hook sizes
- ▶ **A clear view and the ideal solution for large windshields:** lengths between 500 and 800 mm; tailor-made high-tech spring strips ensure optimum contact pressure for the wiper blade to fully and optimally clean the windshield
- ▶ **Extremely low wiping noise:** aerodynamic design for reduced windage
- ▶ **Perfectly fitting and safe:** comprehensive and vehicle-specific quality and functional tests complying with the same standards as those ones applied for OE parts; high coverage of all common wiper-arm types

BOSCH Wiper blades | HD-program

Aerotwin commercial vehicle wiper-blade



2019

P7 - Use in vehicle type(s) / variant(s)

► Off-Highway (OHW)



2019

P8 - Applicable laws

- ▶ FMVSS 104 (US LAW)
- ▶ FMVSS 107 (US LAW)
- ▶ SAE J198_201210 (US Standard)
- ▶ SAE J903a-1966 (US Standard)
- ▶ 2008/2/EC
- ▶ ECE1008/2010
- ▶ 94/68/EG
- ▶ 2000/2/EG and 75/322/EWG Pkt. 6.5, 6.6, 8.7
- ▶ StVZO
- ▶ ISO/DIS 25119-2 2017-01
- ▶ ISO26262 11-2011

2019

P10 - Safety Case Report

- ▶ ASIL QM according ISO26262
- ▶ AgPLr QM
- ▶ AgPLr “a” according ISO25119-2 2017-01

TESTING / VALIDATION TEAM

2019

P20 - Customer Requirement Specification Annotation

► [20180723_Deviation List RFP.xlsx](#)

Please review the following check list and provide feed back the list of tests for your product offering
Test may not be required based on tailoring for specific applications
Test level may change based on tailoring for specific applications

Standard	Test Method	Test ID	Test Levels	Read Y/N	Lot	#pcs	12V LIN Wiper Motor	12/24V LIN Wiper Motor																	
Mechanical Loads	Dust and Particle Impact																								
	Inorganic Dust	A1	L2	Y	B	3	Req: IP6x TCD: IP6Kx (dust tight)	Req: IP6x TCD: IP6Kx (dust tight)																	
	Fluids & Gases																								
	Salt Environment	B1	L3	Y	B	3	Req: 48h @ 35°C + 168hr waiting period. The DUT shall be fully functional after the test; some visual corrosion is acceptable. TCD: 144hr	Req: 48h @ 35°C + 168hr waiting period. The DUT shall be fully functional after the test; some visual corrosion is acceptable. TCD: 144hr																	
	Cold Water Splash	B3	L3	Y	B	3	Req: IPx5 (Cold water splash / indirect spray) TCD: IPx7 (short term immersion) ... not the same	Req: IPx5 (Cold water splash / indirect spray) TCD: IPx7 (short term immersion) ... not the same																	
	Chemical Resistance	B4	L3	Y	F	3	Req: Brush application 168hr RB proposal: - Urea Nitrogen - NPK Fertilizer*9 (7.5% each N P & K)	Req: Brush application 168hr RB proposal: - Urea Nitrogen - NPK Fertilizer*9 (7.5% each N P & K)																	
	Vibration																								
	Random Vibration	D3	L3	Y	G	3	Req: 0.5G²/Hz @ 5Hz 0.7G²/Hz @ 10Hz TCD: DIN EN 60068-2-64 8hr / axis <table><tr><th>Frequency in Hz</th><th>Power-density spectrum in (m/s²)²/Hz</th></tr><tr><td>5</td><td>0,884</td></tr><tr><td>10</td><td>20</td></tr><tr><td>55</td><td>6,5</td></tr><tr><td>180</td><td>0,25</td></tr><tr><td>300</td><td>0,25</td></tr><tr><td>360</td><td>0,14</td></tr><tr><td>1000</td><td>0,14</td></tr><tr><td>2000</td><td>0,14</td></tr></table>	Frequency in Hz	Power-density spectrum in (m/s²)²/Hz	5	0,884	10	20	55	6,5	180	0,25	300	0,25	360	0,14	1000	0,14	2000	0,14
Frequency in Hz	Power-density spectrum in (m/s²)²/Hz																								
5	0,884																								
10	20																								
55	6,5																								
180	0,25																								
300	0,25																								
360	0,14																								
1000	0,14																								
2000	0,14																								

2019
P21 - Test Matrix No.

► 20180720_WDD2_MultiVoltage_Testplan

[illegible]

2019

P23 - EMC Test Plan No.

► [18T2022_EMC_Testplan_Platform_WDDmultiV_V1.0_signed.pdf](#)

 BOSCH AE/EMC2	EMC Test Plan Platform WDDmultiV	
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Project name
Platform WDDmultiV (12 / 24 V) - Only for Bosch internal use -

Product	Customer
WDDmultiV Wiper Motor System	Platform
Test plan number	Pages
18T2022	36 pages
Revision number	Date of last revision
1.0	04. October 2018

Test plan approval

Supplier	Customer
EMC Engineering (AE/EMC2):	Approved by Robert Bosch (AA-TR/PAC)
pk1, BOSCH, DE, G, E Gersom Zotzmann +49(173)7589414 Gersom.Zotzmann@de.bosch.com Digital unterschrieben von pk1, BOSCH, DE, G, E Gersom Zotzmann Datum: 2018.10.04 12:36:26 +0200'	pk1, BOSCH, DE, H, E Herbert Lutterodt +49(721)942-2754 Herbert.Lutterodt2@de.bosch.com Digitaly signed by pk1, BOSCH, DE, H, E, Herbert Lutterodt2 Date: 2018.10.04 16:37:36 +0200'

ELECTRONICS / SOFTWARE TEAM

WDDmultiV LIN / CAN Manual

P30 - Bus specification

LIN (High & Base Tech version)

- According LIN spec. 2.2 and 12V
- 19200 Baud
- For frames & signal spec. see respective *.xlsx & *.ldf file
- Frame Scheduling: An example and further annotations are given within the above *.xlsx file

CAN (High Tech version only)

- High speed CAN, 29 bit identifiers
- Available Baudrates: 125k, 250k, 500k, 1000k
- Auto baudrate detection at every startup, the result is stored permanently to shorten the following startups
- For frames & signal spec. see respective *.xlsx & *.dbc file
(frames & signals are kept identical to LIN except the IDs, future extension for CAN reserved)
- BCM send frames cycle time: **BCM_Cmd** ≤ 100ms, **BCM_PAR_Mx** ≤ 500ms

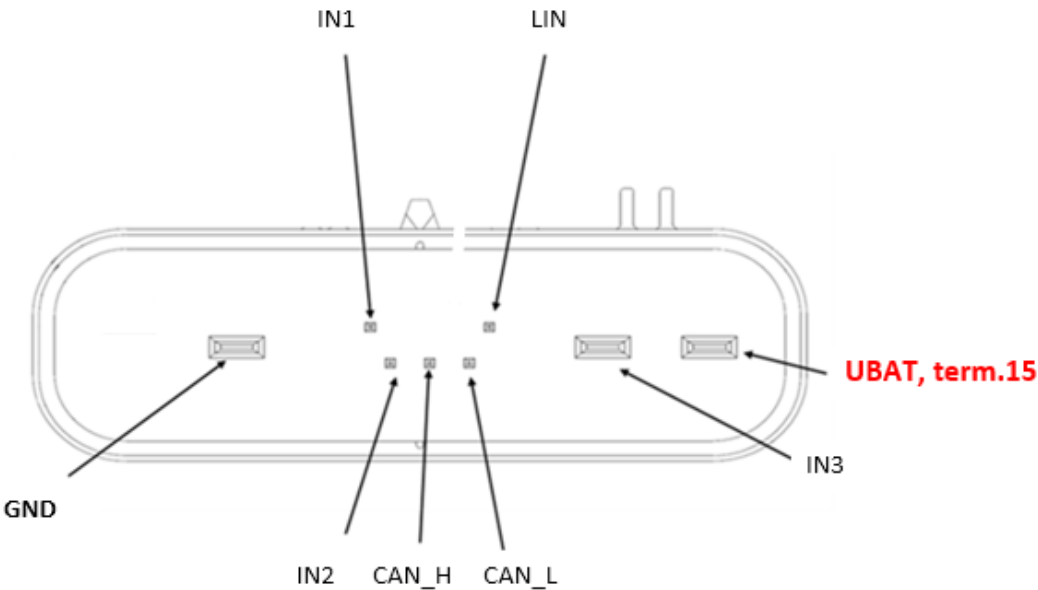


WDDmultiV LIN / CAN Manual

P30 - Motor Nr. & frame IDs by IN1, IN2, IN3 connector signals

IN3	IN2	IN1	NAD	LIN-PID BCM_PAR_Mx	LIN-PID WSM_STAT_Mx	Motor Nr	remark
0	0	0	0x0B	11d	21d	1	
0	0	1	0x0C	12d	22d	2	
0	1	0	0x0D	13d	23d	3	
0	1	1	0x0E	14d	24d	4	
1	0	0	0x0F	15d	25d	5	
1	0	1	0x00	tbd	tbd	-	for future configuration
1	1	0	0x00	tbd	tbd	-	for future configuration
1	1	1	0x00	tbd	tbd	-	for future configuration

IN3	IN2	IN1		CAN-ID (hex) BCM_PAR_Mx	CAN-ID (hex) WSM_STAT_Mx	Motor Nr	remark
0	0	0		0x6006	0x6001	1	
0	0	1		0x6007	0x6002	2	
0	1	0		0x6008	0x6003	3	
0	1	1		0x6009	0x6004	4	
1	0	0		0x600A	0x6005	5	
1	0	1		tbd	tbd	-	for future configuration
1	1	0		tbd	tbd	-	for future configuration
1	1	1		tbd	tbd	-	for future configuration



- Note:**
- The LIN/CAN frame ID setup is done once at every ECU startup, a later change at IN1..3 have no impact. The result is **not** stored permanently. There is a 200ms LIN/ CAN communication pause.
 - IN1..3 are active high inputs to be connected to UBAT permanently for a „1“, otherwise do not connect them.

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P30 - BCM_Cmd frame

General annotations

- 1) This frame is holding the wipe command signals for all wipers. Note: For safety reason the wiper is not starting to operate automatically after ECU startup regardless of the [WipeCmdGrp1/...2](#) signal. A change of the signal value is required therefore, e.g. by actuating the wiper steering switch. (Exception: Adjusting EPP/APP within $< \pm 2,5^\circ$)
- 2) Some of them are common for all motors, others (those having the [_Grp1](#) or [_Grp2](#) postfix) are dedicated to the front or rear wiper group. Every motor can be assigned to front or rear group by the [WiperGrp_Mx](#) signal (BCM_PAR_Mx frame) for independent front and rear wiper operation.
- 3) The LIN signals having the [Config_](#) prefix are reserved to configure the motor to “directly wired wiper switch operation mode” via LIN. They are not regarded for normal wipe operation via LIN.

WipeCmdGrp1/...Grp2 signals

Value	Wipe functionality
0	Park in EPP (<u>e</u> xtended <u>p</u> ark <u>p</u> osition), wiper is driven into the lowest PP. The motor holds the EPP actively against an external torque
1	Park in APP (<u>a</u> lternate <u>p</u> ark <u>p</u> osition), wiper is driven first into EPP and then into a higher park position e.g. to flip over the rubber or etc. The motor holds the APP actively against an external torque
2	Go to LRP, wiper is driven into the <u>l</u> ower <u>r</u> eversing <u>p</u> osition
3	Go to URP, wiper is driven into the <u>u</u> pper <u>r</u> eversing <u>p</u> osition
4	Go to SP, wiper is driven into the <u>s</u> ervice <u>p</u> osition, e.g. for replacement of wiper blades. The motor does <u>not</u> hold the SP actively (also LRP&URP)
5	Continuous wipe, normal wipe operation
6	Intermittent wipe, interval wipe operation
7	Immediate Stop, wiper stops immediately, e.g. during engine start

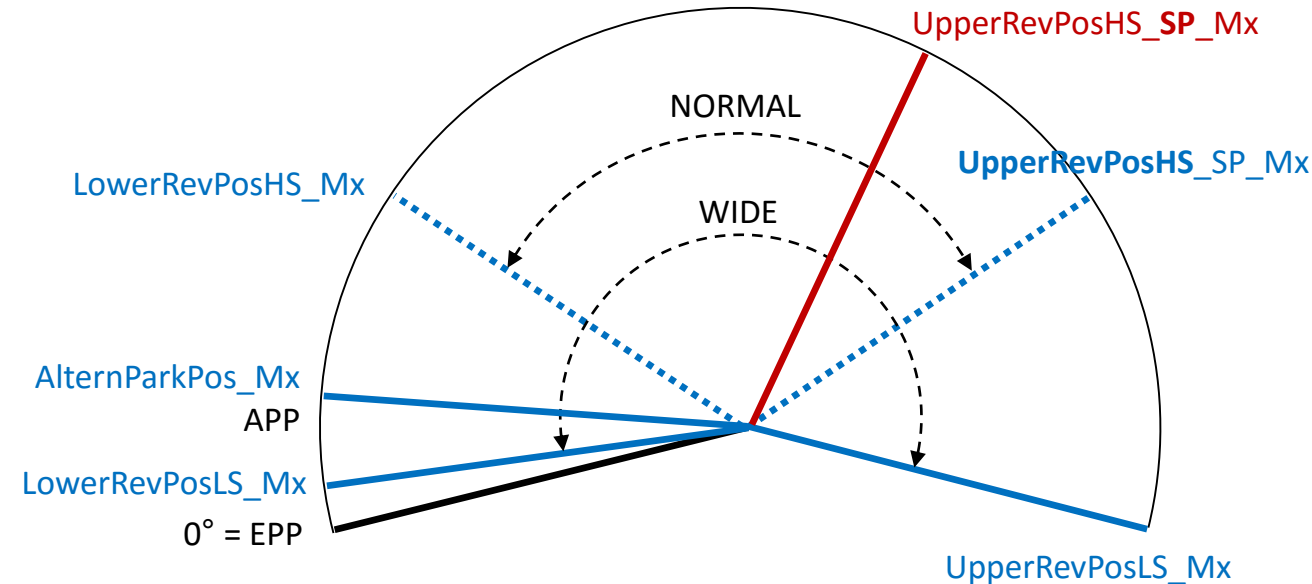
WDDmultiV LIN / CAN Manual

P30 - BCM_PAR_Mx frames

General annotations

- 1) The signals of these frames specify the wipe angle sectors, rotational sense and further wipe mode details for the motor Mx. "x" is the motor number set up acc. To the frame ID table. The signal values are overtaken once after every ECU startup, later changes have no impact. They are **not** stored permanently.
- 2) The wiper starts to operate not before the [ParamValid_Mx](#) signal is „1“. This shall be set by the BCM if all other signals are valid & ready to be sent. Keep [ParamValid_Mx](#) at 1 thereafter.
- 3) 2 different angle sectors can be set up for LS (low speed) and HS (high speed) wipe by the respective LIN/CAN signals. The HS sector is selected automatically if the wipe frequency, set by [WipeFrequ_Grp1/..2](#), is $\geq 45/\text{min}$. Range: 24...63/min.
- 4) 2 different wipe angle sector ranges are defined: NORMAL ($< 120^\circ$) & WIDE ($\geq 120^\circ$). For the WIDE range $\frac{1}{2}$ of the wipe frequency set by [WipeFrequ_Grp1/..2](#) is performed. This provides the ability of synchronous movement also for multi motor operation between NORMAL & WIDE range.

Example



- 5) The signal [UpperRevPosHS_SP_Mx](#) has a double use: It indicates the upper reverse position for HS wipe and the service position requested by [WipeFrequ_Grp1 = 7](#). In that case the BCM has to send the service position value within the [UpperRevPosHS_SP_Mx](#) signal (For SP this is done exceptionally not only at startup).

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P30 - WSM_STAT_Mx frames

General annotations

- 1) These frames hold the wiper status signals to be sent to the BCM. This includes the internal status and the signals required for multi motor synchronization.
- 2) Signal **ConfigStat_Mx** indicates whether the wipe parameters within the **BCM_PAR_Mx** frames have been received and the signals are valid. Wiper operation is only released if both conditions are met.
- 3) Signal **TeachInStatus_Mx** indicates whether the Teach-In procedure has been performed and whether it has been successful. This information is stored permanently after it has been generated. The Teach-In procedure is optional.
- 4) **MotSynchTime_Mx** is required for the multi motor synchronization. The BCM does not have to regard this signal.

WiperState_Mx signals

Value	Wipe functionality
0	Wiper is parked in EPP (extended/normal park position)
1	Wiper is parked in APP (alternate park position)
2	Wiper is parked in IPP "Intermittent Park Pos." (for interval synch)
3	Wiper is moving down
4	Wiper is moving up
5	Wiper is moving through reverse pos. or adjusting static reverse pos.
6	Motor is deactivated by <u>immediate stop cmd</u> or <u>not yet released</u> (no change in wipe cmd after startup) or <u>in a static URP/LRP/SP</u> or <u>wipe parameters are unconfigured/invalid</u> or wiper has <u>under/overvoltage</u> or is <u>blocked</u> or has an <u>internal error</u>
7	Wiper is adjusting service position

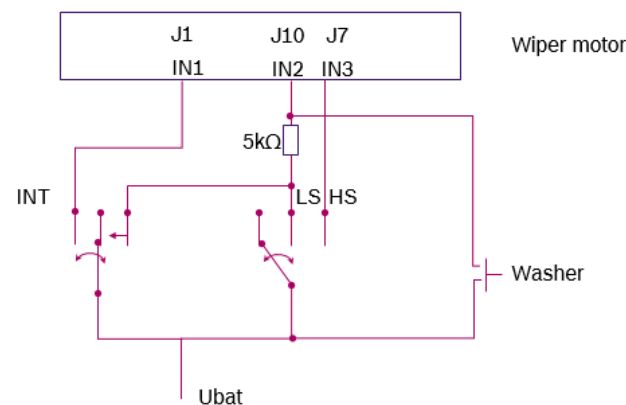
WDDmultiV LIN / CAN Manual

P30 - Digital wiper switch input : Digital MODE 1

General annotations

- 1) Direct wiper switch (3 pins communication) communication is first active after receiving of LIN BCM_Cmd -> [Config_1](#).
- 2) Bit 0, used in order to activate digital switch configuration or LIN mode
 - 0 = switch to LIN mode (Deactivate direct switch configuration)
 - 1 = switch to direct switch configuration mode
- Bit 1, used in order to select between mode 1 or 2
 - 0 = direct switch **mode 1** pin configuration
 - 1 = direct switch mode 2 specific pin configuration
- 3) With the BCM_Cmd -> [Config_TakeOver](#) the parameter defined by wiper_config_1&2 and parameter list is saved in the wiper memory
- 4) A 10101010 signal pattern has to be sent in order to save the configuration into the wiper NVM to prevent this feature from being triggered unintentionally

Function	IN1	IN2	IN3	
Park	0	0	0	Off, extended park position
INT	1	0	0	Interval mode
LS	1	1 + (5kΩ)	0	Low Speed
INT	1	1	0	Low speed + washer
HS	1	0	1	High speed
HS	1	1	1	High speed + washer
LS	0	1 + (5kΩ)	0	Low speed continues or Low speed single wipe ^{*)}
N.A	0	1 + (5kΩ)	1	High Speed ^{*)}
Washer	0	1	0	Washer + LS
HS	0	1	1	High speed + washer
HS	0	0	1	High speed



LS = Low Speed
 HS = High Speed
 INT = Interval mode
 IN1..3 = Input 1..3

WDDmultiV LIN / CAN Manual

P30 - Digital wiper switch input : Digital MODE 2

General annotations

- 1) Direct wiper switch (3 pins communication)
communication is first active after receiving of LIN
BCM_Cmd -> [Config_1](#).
- 2) Bit 0, used in order to activate digital switch
configuration or LIN mode
 - 0 = switch to LIN mode (Deactivate direct switch
configuration)
 - 1 = switch to direct switch configuration modeBit 1, used in order to select between mode 1 or 2
 - 0 = direct switch mode 1 pin configuration
 - 1 = direct switch **mode 2** specific pin configuration
- 3) With the BCM_Cmd -> [Config_TakeOver](#) the
parameter defined by wiper_config_1&2 and
parameter list is saved in the wiper memory
- 4) A 10101010 signal pattern has to be sent in order to
save the configuration into the wiper NVM to prevent
this feature from being triggered unintentionally

Function Active Front Wiper	Pin 1	Pin 2	Pin 3
Off	0	0	0
Slow (220°)	1	0	0
	1	0	1
Fast (110°)	0	1	0
	0	1	1
Intermittent (220°) – 6 [s]	1	1	0
Mist & Washer	0	0	1
All active	1	1	1

Wiring Pin 1 = IN1
Pin 2 = IN2
Pin 3 = IN3

Slow or Fast may be detected temporarily if the switches Pin1&2 are not switching simultaneously when moving from **Off to Intermittent** or **back** as shown in the table below. A software **delay filter** is required therefore to suppress this misbehavior.

Pin 1	Pin 2	Result at delay between actuations	Misbehavior
0→1	0→1 del.	wipe slow → intermittent	no
0→1 del.	0→1	wipe fast → intermittent	yes
1→0	1→0 del.	1 unexpected fast wipe cycle	yes
1→0 del.	1→0	1 unexpected slow wipe cycle	yes

2019

P31 - CAN Data Base File

► [WDDMultiV_CAN_V2_312.dbc](#) (16.07.2018)

Frame	Signal	Description	Start bit	Length	Byte	received by	cycle time
BCM_Cmd (Ex ID: 0x6000) # Sent by BCM	WipeFrequ_Grp1	the communicated wipe frequency is applied only for wipers belonging to the group1 ("Front" wiper). Optional: It also configures the low speed wipe frequency for the none UDS wiper configuration.	0	6	1	wiper motors group 1 (front)	70ms
	IntervalTime	Intervall time (to be applied to both wiper groups) 0 2s 1 4s //6 2 7s //9 3 12s	6	2	1	all wiper motors	
	WipeCmdGrp1	Wipe Command, group 1 (front wiper) 0, "Park EPP" 1, "Park APP" 2, "Goto LRP" 3, "Goto URP" 4, "Goto SP" 5, "Continuous wipe" 6, "Intermittent wipe" 7, "Immediate stop" (Starter active)	8	3	2	all wiper motors, evaluated only by wiper motors group1	

2019

P31 - LIN Description File

► [WDDmultiV_LIN_V2_312.ldf](#) (19.06.2018)

Frame	Signal	Description	Start bit	Length	Byte	received by	schedule proposal
BCM_Cmd (ID: 00) # Sent by BCM	WipeFrequ_Grp1	the communicated wipe frequency is applied only for wipers belonging to the group1 ("Front" wiper). Optional: It also configures the low speed wipe frequency for the none UDS wiper configuration.	0	6	1	wiper motors group 1 (front)	10ms, min 6,12ms
	IntervalTime	Intervall time (to be applied to both wiper groups) 0 3s 1 6s 2 9s 3 12s	6	2	1	all wiper motors	
	WipeCmdGrp1	Wipe Command, group 1 (front wiper) 0, "Park EPP" 1, "Park APP" 2, "Goto LRP" 3, "Goto URP" 4, "Goto SP" 5, "Continuous wipe" 6, "Intermittent wipe" 7, "Immediate stop" (Starter active)	8	3	2	all wiper motors, evaluated only by wiper motors group1	

2019

P31 - LIN Description File UDS

► [WDDmultiV_LIN_V2_312.ldf](#) (19.06.2018)

UDS Diagnostics

UDS (unified diagnostic services), ISO 14229-1, to be implemented for LIN & CAN

The following services are required:

\$11: ECU reset

\$22: Read Data By Identifier

Read Product-IDs, Configuration items, parameters, error memory (DTC), measurement values etc.

\$2E: Write Data By Identifier

Write Configuration items, parameters, erase error memory (DTC), start test sequences, etc.

\$3E: Tester present

Sub ID	UDS- WriteById (0x2E) and UDS-ReadById (0x22)	Remark
F194	applicationSoftwareIdentificationDataIdentifier format: ASCII (15 Byte)	Data saved in Wiper and communicated to diagnostic host
F187	vehicleManufacturerSparePartNumberDataIdentifier format: ASCII (15 Byte)	Data communicated from Diagnostic host to Wiper @ customer end of line and saved in wiper memory
F188	vehicleManufacturerECUSoftwareNumberDataIdentifier format: ASCII (15 Byte)	Data communicated from Diagnostic host to Wiper @ customer end of line and saved in wiper memory
F189	vehicleManufacturerECUSoftwareVersionNumberDataIdentifier format: ASCII (15 Byte)	Data communicated from Diagnostic host to Wiper @ customer end of line and saved in wiper memory

APPLICATION TEAM

2019

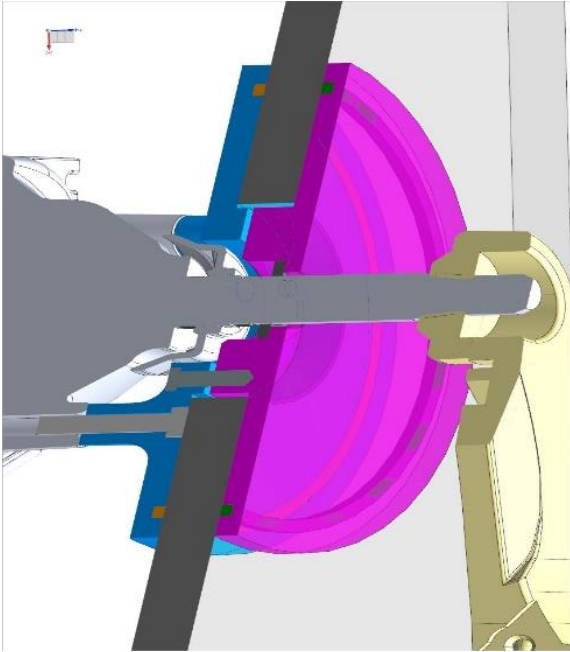
P40 - Offer drawing wiper drive

- ▶ [0390A00365-AGZ-001-01-1-DE.pdf](#) - Base Tech
- ▶ [0390A00374-AGZ-001-01-1-DE.pdf](#) - High Tech

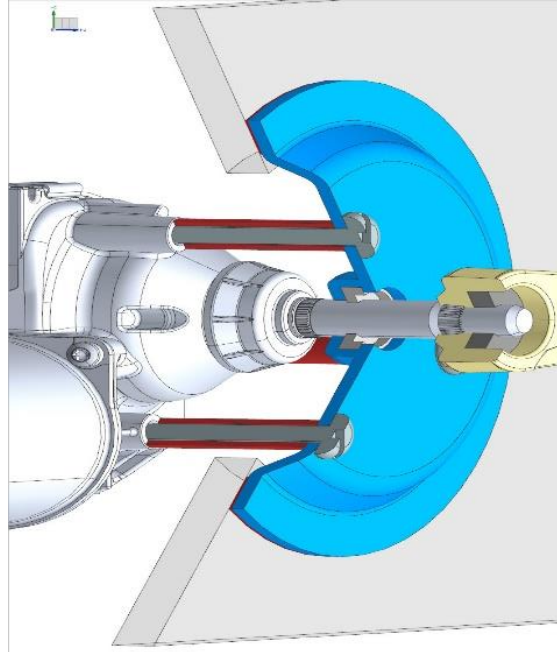
2019

P43 - Assembly instructions wiper system

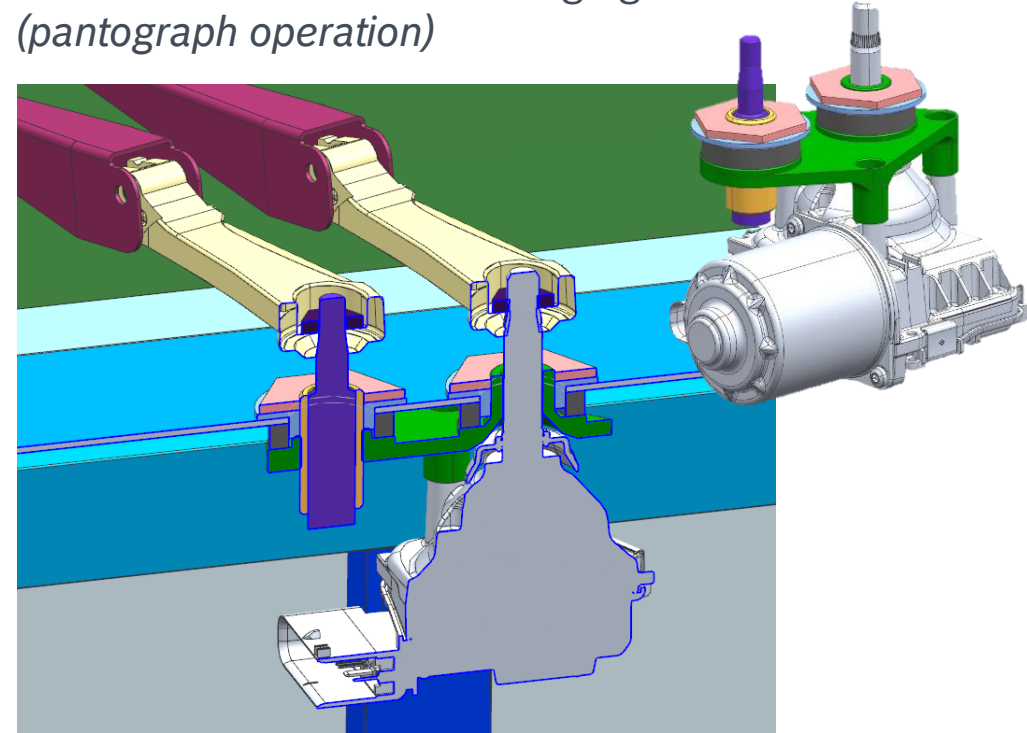
#1 Clamping of glass



#2 Gluing of metal part onto glass



#3 Bracket installation through glass (pantograph operation)



2019

P43 - Assembly instructions wiper system

Option 1: Defined mounting position

1. In order to mount the wiper arms, the wiper system first has to be referenced in a parking position.
2. The wiper blade must furthermore be connected to the wiper arm according to the installation instructions.
3. The wiper arm must then be mounted on the windscreen using a gauge or marks on the windscreen. For this purpose, a maximum tolerance of ± 3 mm on the wiper blade outer circle must be ensured.
4. The fixation of the wiper arms on the wiper shafts must be performed with the tightening torque according to chapter 2, point P46 and the customer-specific nut.

Option 2: Undefined mounting position (Teach in)

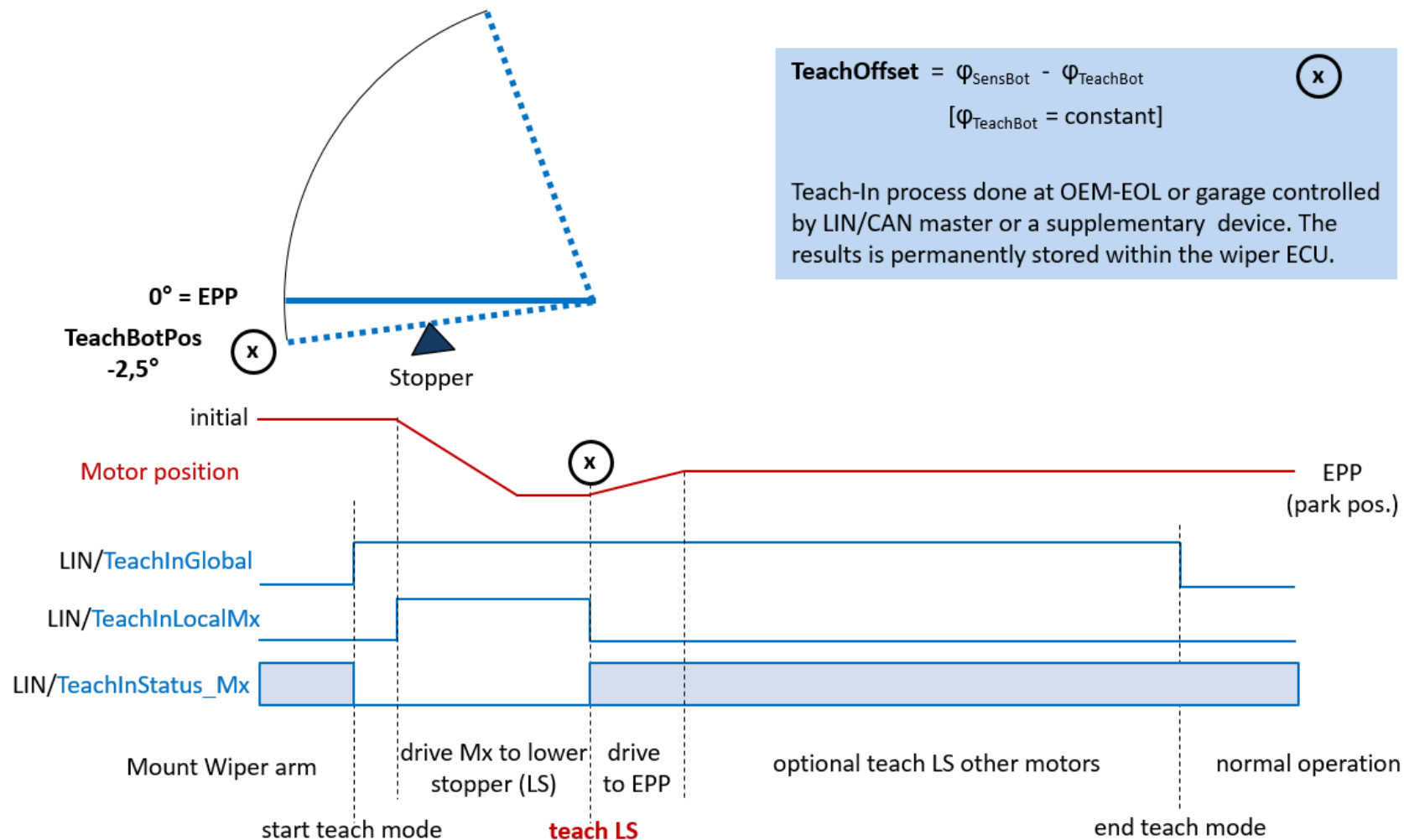
It enables to mount the wiper arm in an undefined position

2019

P43 - Teach-In 0° angle position

General annotations

- 1) The Teach-In is an **optional** procedure to adjust the motor internal angle sensor value to the position of the mounted wiper arm. It enables to mount the wiper arm in an undefined position.
- 2) A fixed or temporarily present mechanical stopper is required at the -2,5° below EPP position, able to stop the wiper arm (reduced torque & speed).
- 3) The procedure is controlled individually for every motor via LIN/CAN signals according to the chart beside. The motor movement is then done automatically as shown in the chart.
- 4) The initial moving direction is “downwards” the rotational sense is given by **RotateSense_Mx**.



2019

P45 - Vehicle attachment points tightening torque

- ▶ Screws (8...9)

P46 - Wiper arm connection tightening torque

- ▶ ~30Nm

P47 - Vehicle speed max.

- ▶ 80Km/h

P48 - Vehicle high speed for wipe quality requirement

- ▶ 80Km/h

P49 - Specified vehicle wiring harness resistance

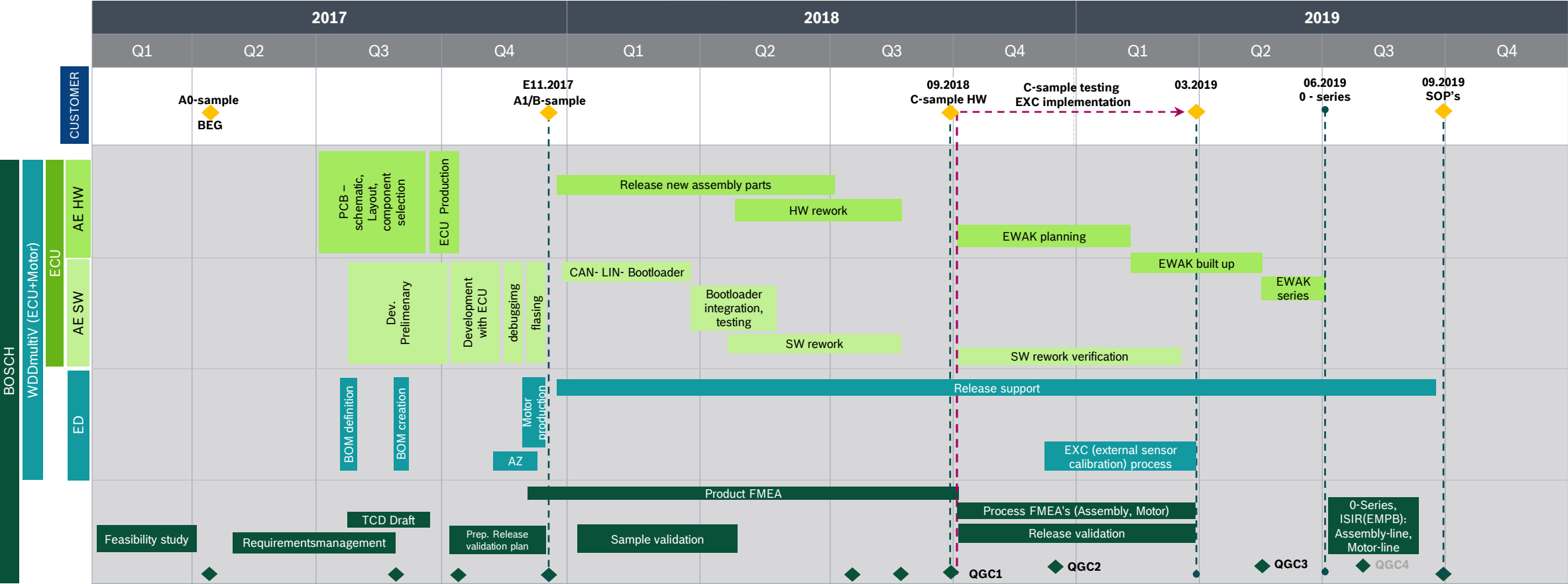
- ▶ 0.05 Ohm

OTHERS

WiperDirectDrive2 OHW "WDDMultiV"

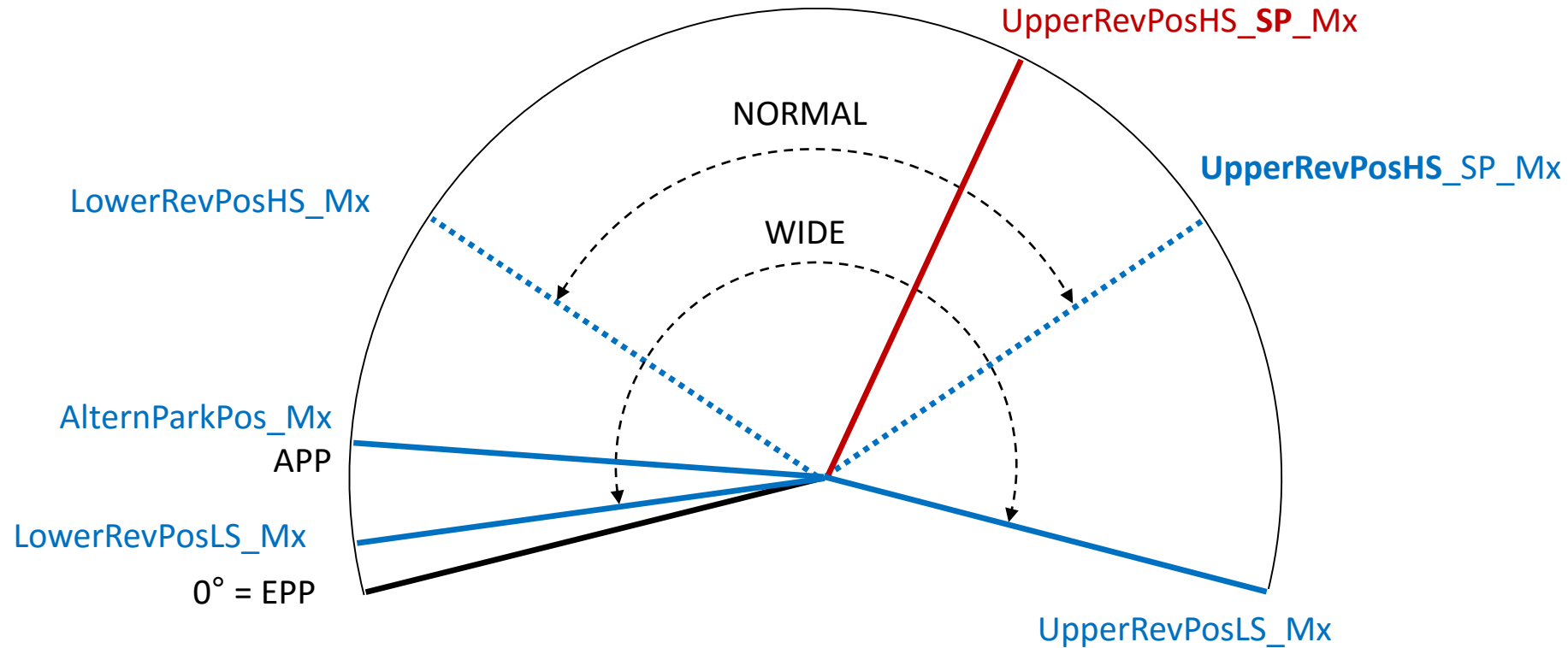
Current project situation

Sample situation 02.2019: C-samples available 



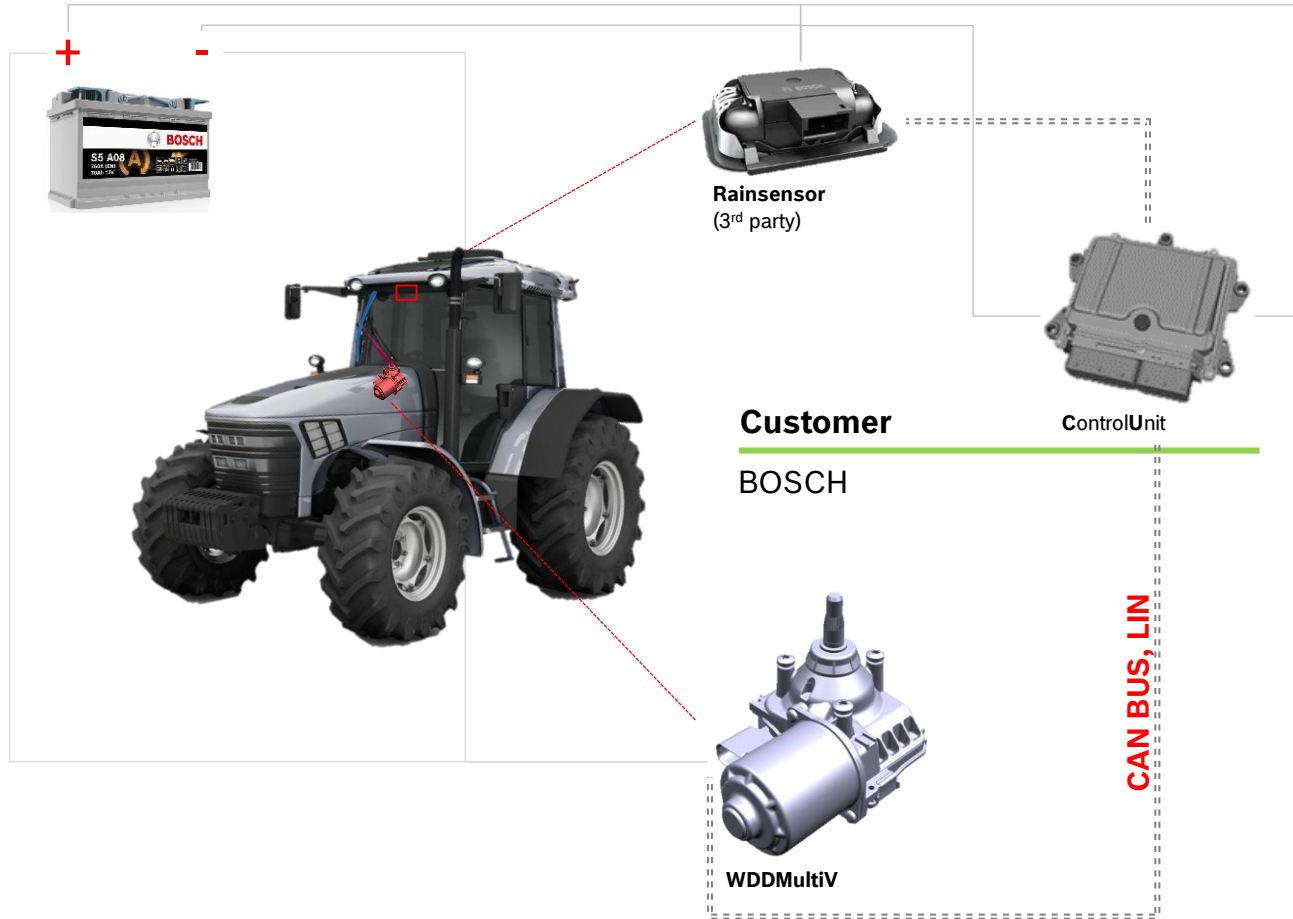
WDDmultiV LIN / CAN Manual

Wiper positions



WiperDirectDrive2 OHW "WDDMultiV"

Ready for future...rain sensor



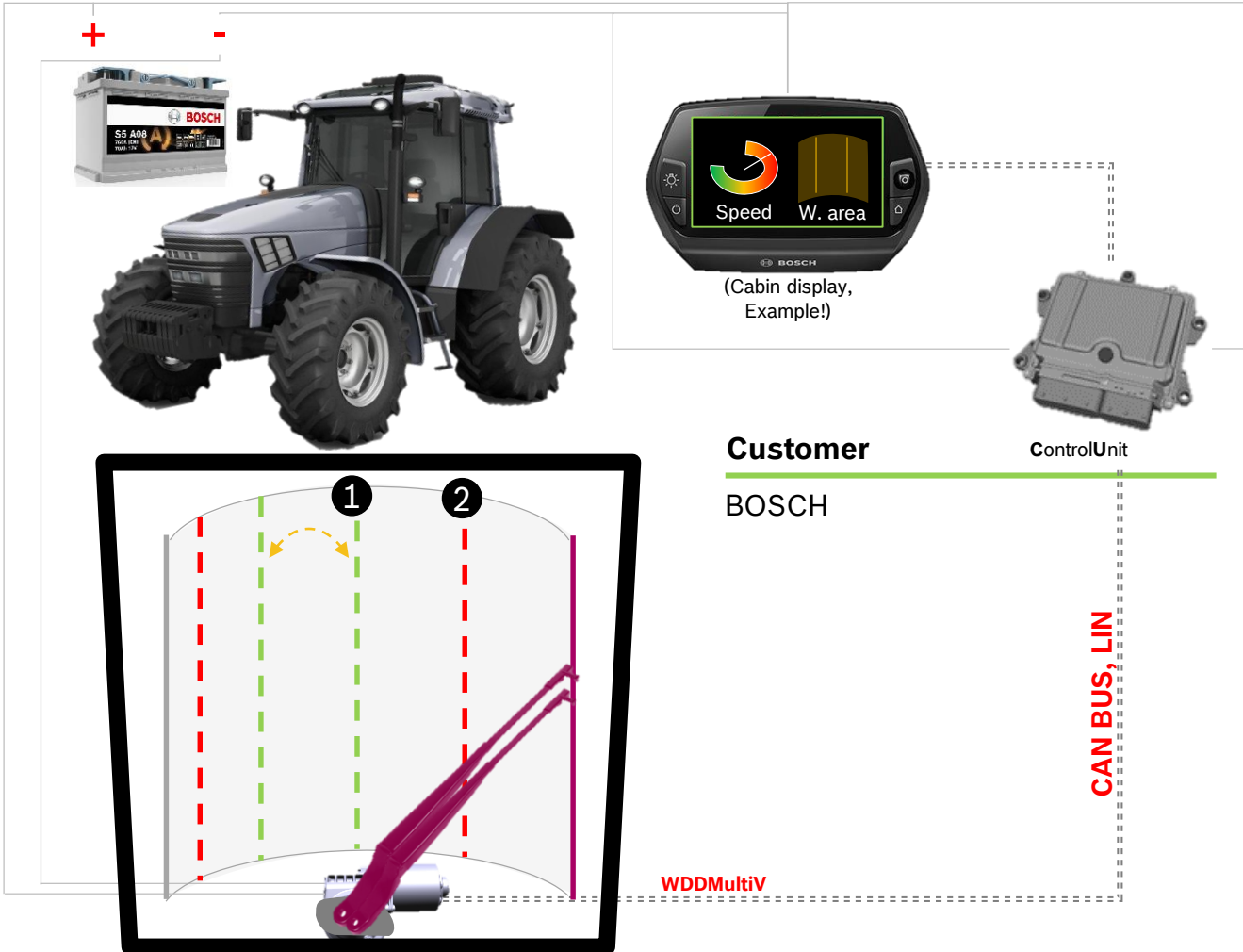
Rain sensor as USP

Integration of non BOSCH rain sensor

- Integration via **LIN / CAN (2.0)** communication
- Customer control unit (CU) logic can **developed independently**
- **Free adjustable and customizable wiping angles, frequency, field of wiping**

WiperDirectDrive2 OHW "WDDMultiV"

Ready for future...customization of parameters



...**imagine**, if the end customer would be able to adjust the settings of his wiper in accordance to HIS requirements...

- Integration via **LIN / CAN (2.0)** communication
- Customer control unit (CU) logic can **developed independently**
- **Customization** of wiping angles, frequency, field of wiping
- **Examples:**
 - ① Wiping with speed #1, inside green frames
 - ② Wiping with speed #2, inside red frames