

Bühler  
Motor



Drive Solutions  
**DNA** in side  
6th Generation



**Mobility**  
**in Transition.**

»» Passion in Motion



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# Facts and Figures

## General:

Family owned and self-financed

**1.450+** Employees

**9%**

Sales Growth  
(healthy and sustainable sales growth)

**11** Locations

**20+**

Mio units  
(per year Bühler Motor worldwide)

**6** Countries

**500+**

Mio units  
in the field within the last 20 years

**300+** Mio Euro  
in net sales

**360°**

Customer Care

# Facts and Figures

## Engineering services:

Global project  
realization local to local

## Test capabilities:

**80+** Test benches  
globally

**450+** Active patents

**200+** Engineers

## Your benefits:

Speed-to-market

Design flexibility

Global footprint

**-/+ 4** Mio volume range  
(low to high)

# Fast Forward Automotive Solutions

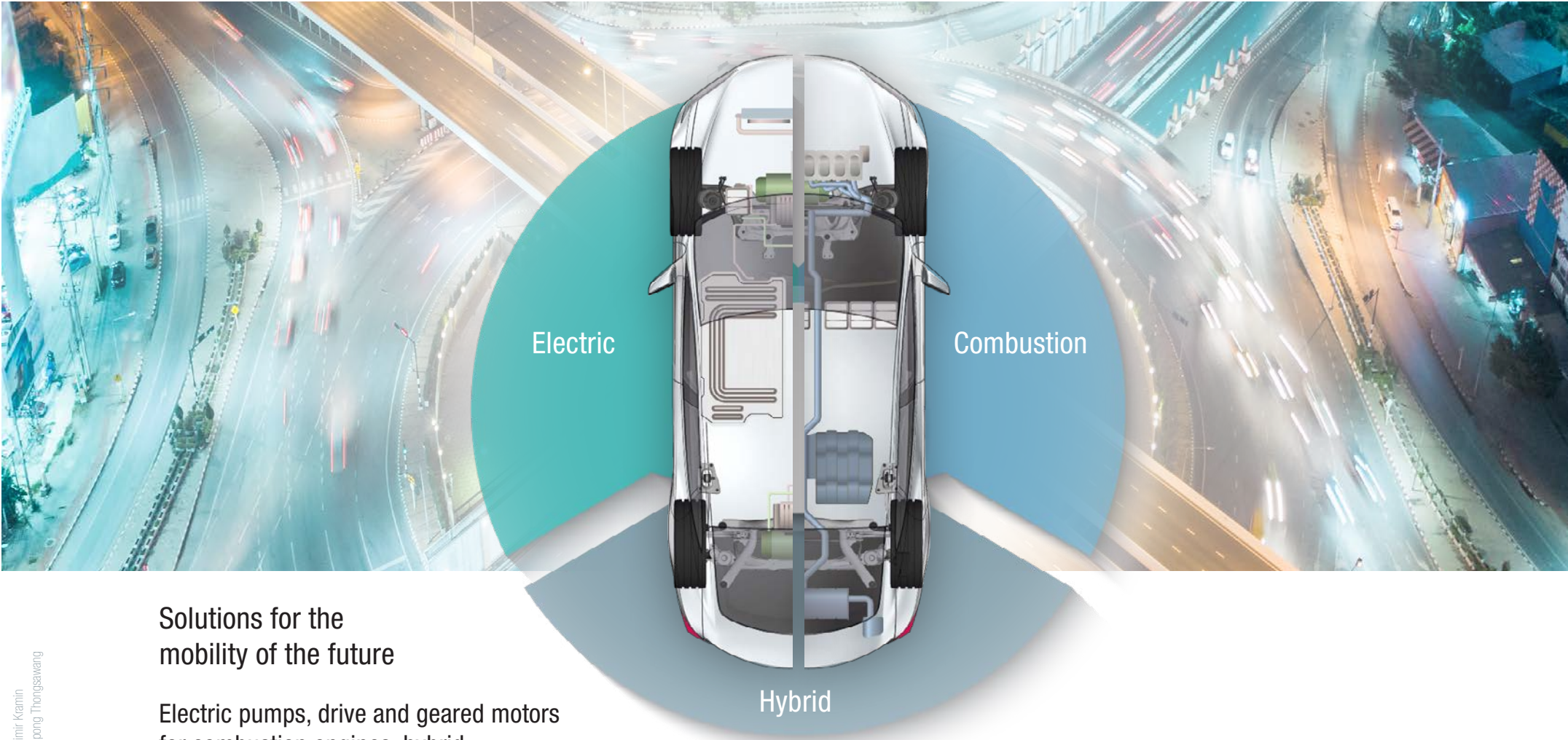


## Fast Forward Automotive Solutions

Electric motors and pumps for the mobility of the future.

We move the future. With intelligent drive solutions that improve performance through their innovative power and dynamics. Here, Bühler Motor is on hand as a system supplier for individual solutions in the automobile industry. Tuned to its customers' needs and quickly integrated into production.

# Solutions for the mobility of the future



Solutions for the mobility of the future

Electric pumps, drive and geared motors for combustion engines, hybrid and electric vehicles.

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# Automotive Segments



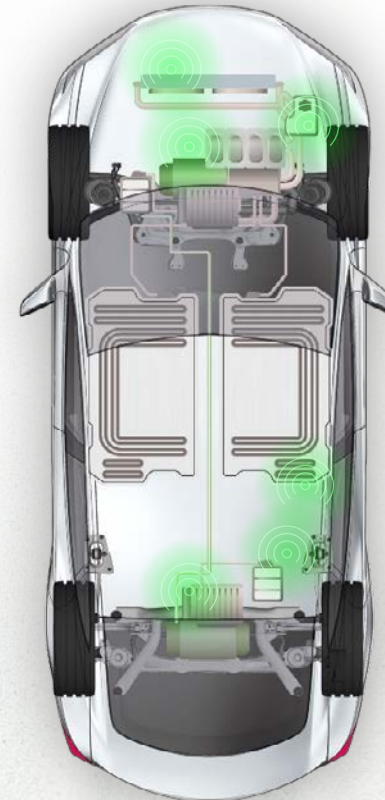
## | Clean Air

Technologies for emission control.



## | Drivetrain

Electric transmission oil pumps and actuators for the demands of today and tomorrow.



## | Thermal Management

Electric pump and drive technologies for energy-efficient temperature control.



# Clean Air Solutions

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iStock © Lukas Bischoff



## I Clean Air Solutions

Bühler Motor for  
the mobility of the future.

Drive concepts and holistic system solutions for emission optimization of internal combustion engines. As the preferred technology partner of the automotive industry, Bühler Motor has already today a portfolio that provides answers to the mobility of the future.



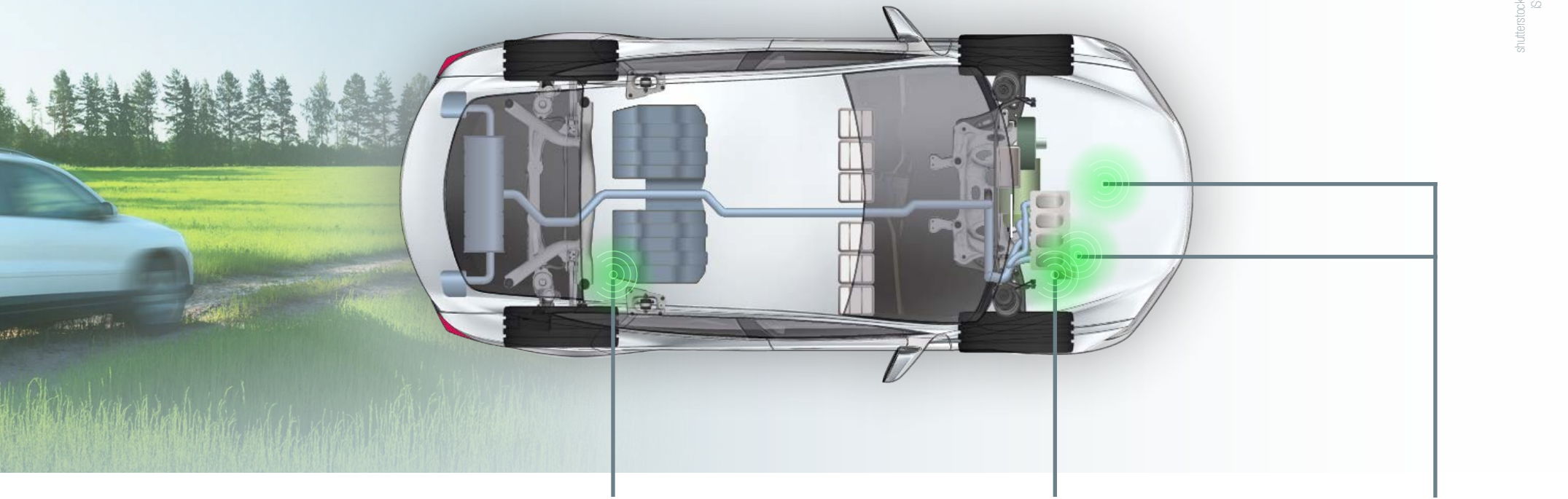
I Drivetrain

I Thermal  
Management



# Clean Air Solutions

## Clean Air Solutions



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AdBlue®/DEF pumps/  
SCR pumps



eOMS  
(electrical oilmist separator)



Electrical  
Vacuum pumps

# Electric pumps for exhaust gas after-treatment (SCR)



## Electric pumps for exhaust gas after-treatment (SCR)

Compact AdBlue®/DEF pump with split case design for conveying reduction liquid to the SCR injector.

Product examples:



SCR pump premium



SCR pump compact

## Applications:

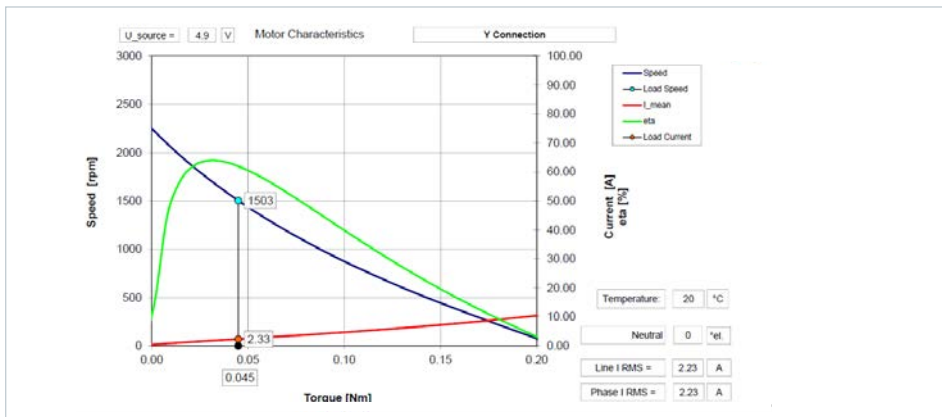
AdBlue®/DEF pumps in SCR systems

# SCR Pump premium



## Technical data:

Operating voltage:	12 V
Current:	IN A 2,3 @4,9 V
Max. delivery:	5 bar
Max. flow rate:	9 l/h (0,15 l/min)
Ambient temperature range:	-40 °C – +90 °C
Length (nominal):	~ 77,5 mm
Diameter (nominal):	~ 78 mm
Weight:	550 g
Controlling:	PWM



Subject to change without notice

## Features:

- Bidirectional, filling/feeding and draining with a pump
- Motor: three-phase BLDC, sensorless, internal rotor
- Waterproof
- Rare-earth magnets
- Special materials for the aggressive medium AdBlue®

# SCR Pump compact

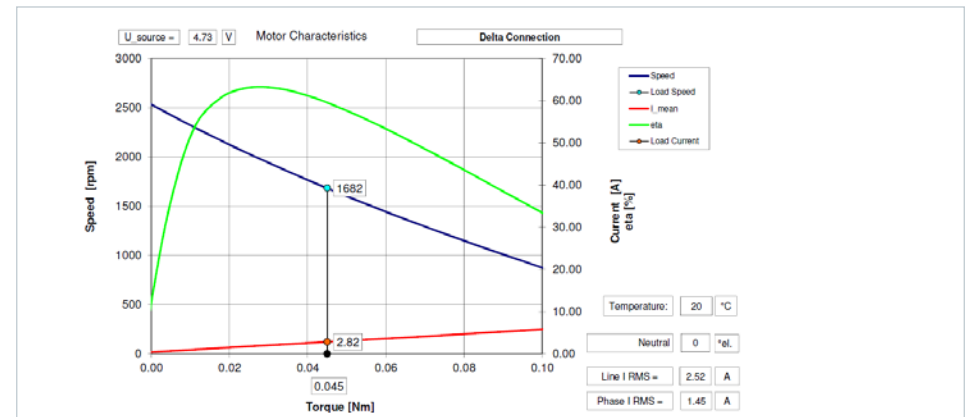
## Technical data:

Operating voltage:	12 V
Current:	IN A 2,7 @4,38 V
Max. delivery:	7 bar
Max. flow rate:	1,7 l/h (0,03 l/min)
Ambient temperature range:	-40 °C – +90 °C
Length (nominal):	~ 88,2 mm
Diameter (nominal):	~ 60 mm
Weight:	437 g
Controlling:	PWM



## Features:

- Pump: External gears, self-priming, stainless steel housing
- Integrated media bypass with 2,5 l/h
- Motor: three-phase BLDC, sensorless, internal rotor
- Pumped medium: AdBlue®
- Other media available on request
- Special materials for the aggressive medium AdBlue®



Subject to change without notice

# bDrive 55 electrical oilmist separator

Product example:



bDrive 55 eOMS  
(electrical oilmist separator)

## Electrical oilmist separator

BLDC Motor for electrical oilmist separators (eOMS)

### Applications:

Active high-performance filters in petrol and diesel engines for the growing demands on crankcase ventilation in passenger cars.



AglobeStock © Denis Fozimovsky

# bDrive 55 electrical oilmist separator

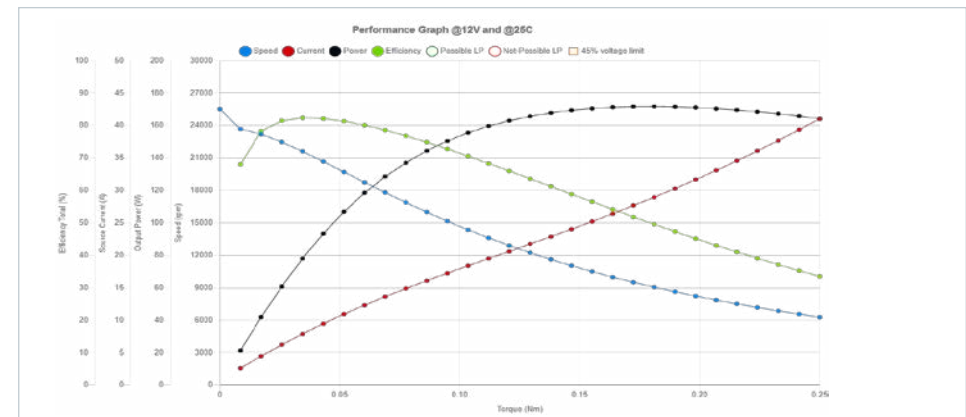
## Technical data:

Operating voltage:	12 V
Operating voltage range:	9 – 16 V
Nominal speed:	2.000 – 16.000 rpm
Nominal torque	0,01 – 0,03 Nm
Nominal current :	0,3 – 7,0 A
Acceleration:	up to 4.000 rpm/s
Temperature range:	-40 °C – +130 °C
Length (nominal):	~ 50 mm
Diameter (nominal):	~ 85 mm
Weight:	~ 330 g
Communication interface :	LIN



## Features:

- Motor: three-phase BLDC, sensorless, internal rotor
- With control electronics, (including interference suppression, inverse-polarity protection, diagnostic functions)
- Motor in split pot design for media separation



# Electric vacuum pump

Product example:



Vacuum pump

## Electric vacuum pumps

Low-noise DC pump drive for electric vacuum pumps.

Application:

Brake booster





# Vacuum pump

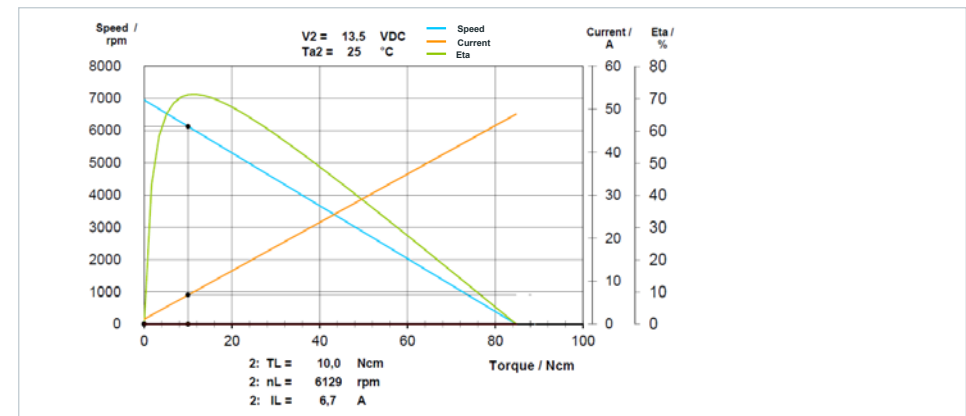
## Technical data:

Power consumption:	80 W – 130 W
Length (w/o) connector:	~ 100 mm (~ 3.94 inch)
Diameter (motor):	~ 51 mm (~ 2.01 inch)
Controlling:	PWM / On-Off / LIN
Working life:	450.000 cycles
Protection:	IP6K9K
EMV CISPR25:	Level 5



## Features:

- Highly integrated design for vane pump
- Very tight tolerances
- Can be installed horizontally or vertically



# Drivetrain Solutions

## | Drivetrain Solutions

Solutions with maximum flexibility and scalability.

Actuators for x-by-wire:  
Our actuators take care of exact switching operations, clutch actuation and inserting the parking lock.



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| Clean Air

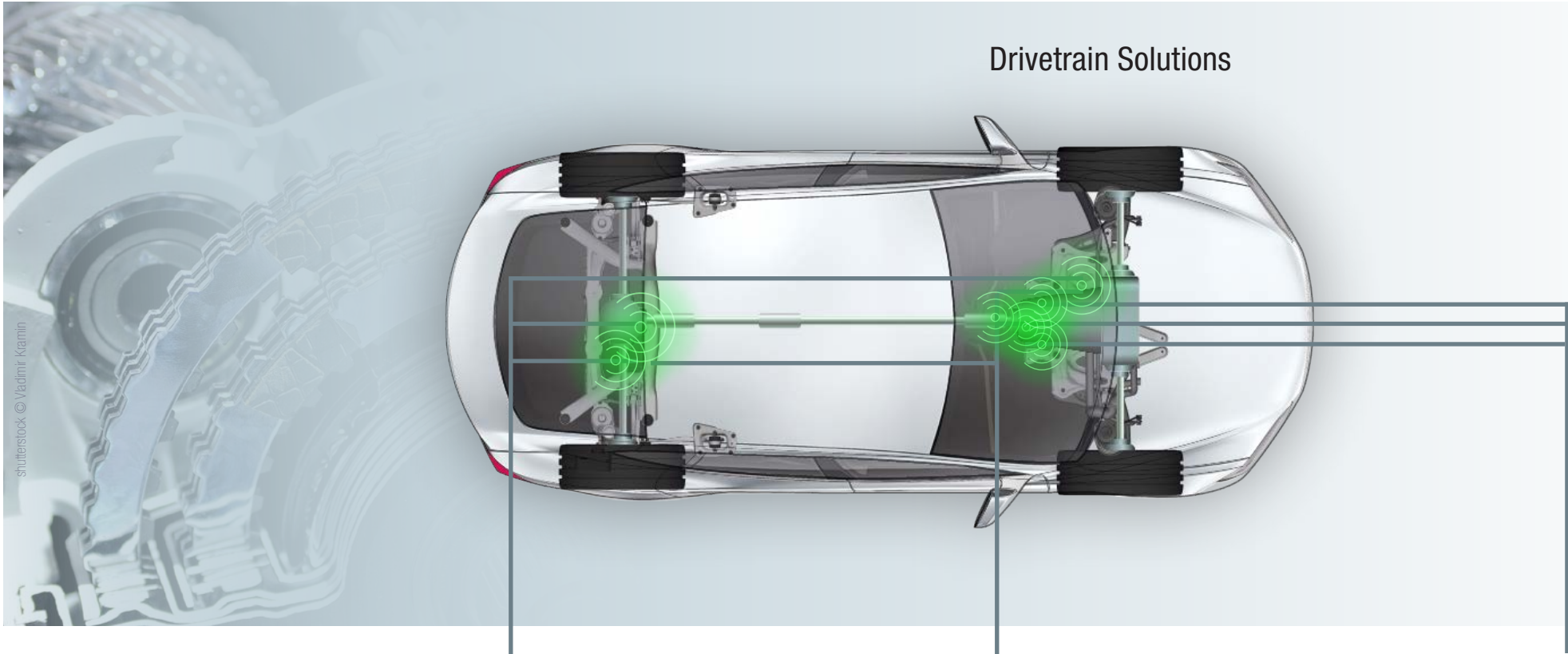


| Thermal Management



# Drivetrain Solutions

## Drivetrain Solutions



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Electrohydraulic  
and electromechanical drives  
for torque management

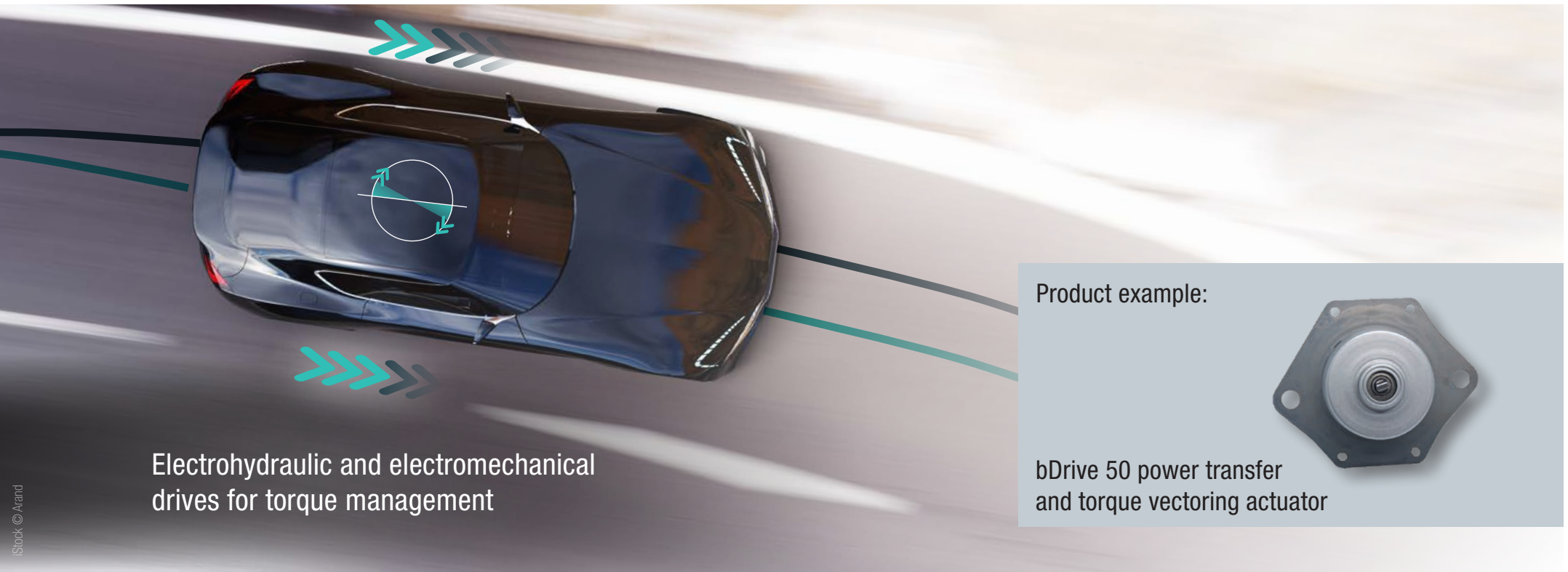


Electric pumps  
and pump drives  
for all-wheel drive



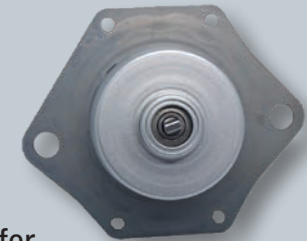
Electric  
oil pump drives  
bDrive

# bDrive 50 power transfer and torque vectoring actuator



Electrohydraulic and electromechanical drives for torque management

Product example:



bDrive 50 power transfer and torque vectoring actuator

## Applications:

- Torque vectoring
- Increases the performance by distribution of the drive torque between the right and left wheel
- Increase in vehicle stability in critical driving conditions

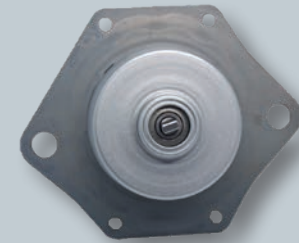
# bDrive 50 power transfer and torque vectoring actuator



## Technical data:

Power consumption:	100 W @ 12 V, room temperature
Product platform:	bDrive
Application:	Actuator
Voltage:	9 – 16 V
External dimensions:	Ø 50 mm
Ambient temperature range:	-40 – +140 °C
Temperature range of medium:	-40 – +140 °C
Controlling:	PWM / On-Off
Working life:	8000 hrs

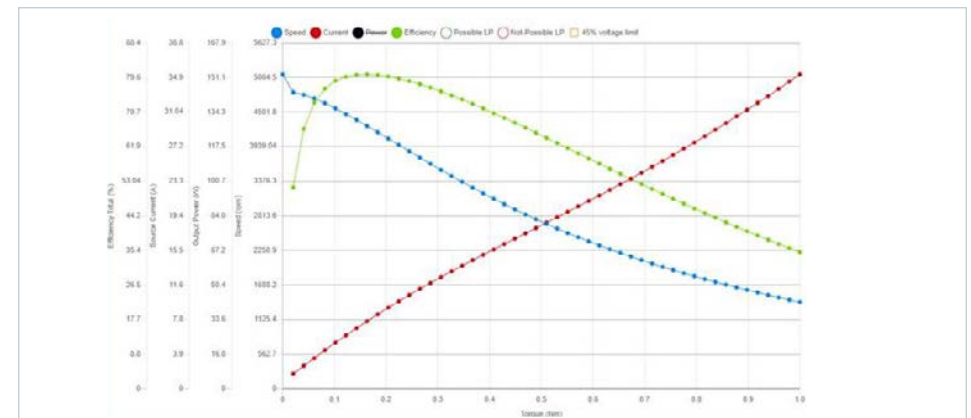
## Product example:



bDrive 50 power transfer and torque vectoring actuator

## Features:

- Actuator for clutch actuation in a torque vectoring system
- Cartridge installation
- CCW and CW run for coupling and decoupling of clutches
- High dynamic actuation 0 – 4600 rpm in 2 – 8 ms.
- High corrosion resistance > 720 hrs.



Subject to change without notice

# bDrive 50 with integrated pump housing

## Electric pumps and pump drives for all-wheel drive

Pumps and pump drives with very good synchronization allow the all-wheel clutch to be controlled directly. Using optional sensors, very precise, fast regulation of rotation speed across the entire working range.

Product example:



bDrive 50 with integrated pump housing

## Applications:

- Electro-hydraulic all-wheel clutch systems
- Transfer cases
- Locking differentials

# bDrive 50 with integrated pump housing

## Technical data:

<b>Power consumption:</b>	170 W @ 12 V, room temperature
<b>Product platform:</b>	bDrive 50
<b>Application:</b>	Oil pump drive for activation of all-wheel drive
<b>Voltage:</b>	9 – 16 V
<b>External dimensions:</b>	approximately $\varnothing$ 51 × 100 mm (w/ECO)
<b>Ambient temperature range:</b>	-40 – +125 °C
<b>Temperature range of medium:</b>	-40 – +115 °C
<b>Controlling:</b>	PWM / On-Off
<b>Working life:</b>	150 hrs
<b>Protection:</b>	IP6K9K

## Product example:



bDrive 50  
with integrated pump housing

## Features:

- Flexible interfaces for axial piston, gear wheel and gerotor pumps
- Optional hall-effect incremental sensors, GMR sensors
- Robust design for all all-wheel applications
- DC technology

# Electric oil pumps and oil pump drives

## Electric oil pumps and oil pump drives – bFlow O and bDrive

Our family of electric gear oil pumps offers new functions in gears and enables efficiency to be dramatically increased, thus cutting CO<sub>2</sub> emissions. They provide special solutions for start/stop, coasting and electric driving, for specific lubrication and cooling, dry sump solutions and additional functions such as actuation of parking locks.

Product examples:



bFlow O100



bFlow O300



bFlow O600

## Application:

DCT, AT, CVT, AMT,  
BEV/hybrid transmissions (DHT)



bDrive 50  
oil pump housing  
with micro-controller



bDrive 60  
oil pump drive  
for 7DCT



bDrive 60  
oil pump drive  
for transmission



bDrive 70  
oil pump drive  
for hybrid vehicles



# bFlow 0100

## Technical data:

Power consumption:	80 W – 150 W
Max. delivery:	15 bar (1500 kPa)
Max. flow rate:	15 l/min
Ambient temperature range:	-40 °C – +140 °C
Temperature range of medium:	-40 °C – +140 °C
Length (w/o connector):	80 – 140 mm
Diameter (motor):	~ 50 mm
Controlling:	PWM / LIN / CAN
Working life:	10.000 hrs
Protection:	IP6K9K / within transmission
Applications:	Start-/stop-boosting



## Features:

- Can be fully or partly integrated in the transmission
- Alternative: Installation externally on transmission
- Materials and sealing systems in accordance with the conditions of use and the oils used
- Depending on hydraulic requirements, as flow or positive displacement pumps (impeller, gerotor or vanes)
- Customer-specific communication (PWM / LIN / CAN- interface)
- Suitable for hybrid and all-electric applications

Subject to change without notice

# bFlow 0300



## Technical data:

<b>Power consumption:</b>	300 W
<b>Max. delivery:</b>	2 bar
<b>Max. flow rate:</b>	18 l/min
<b>Ambient temperature range:</b>	-40 °C – +140 °C
<b>Temperature range of medium:</b>	-40 °C – +125 °C
<b>Length (w/o) connector:</b>	80 – 140 mm
<b>Diameter (motor):</b>	~ 60 mm
<b>Working life:</b>	12.600 hrs
<b>Protection:</b>	IP6K9K
<b>Applications:</b>	Cooling and lubrication of the clutch system (7DCT)

## Features:

- Installation externally on transmission
- Materials and sealing systems in accordance with the conditions of use and the oils used
- Hydraulic requirement: use as gerotor
- Customer-specific communication (PWM)
- Suitable for hybrid and all-electric applications

# bFlow 0600

## Technical data:

<b>Power consumption:</b>	400 W – 600 W
<b>Max. delivery:</b>	up to 37 bar
<b>Max. flow rate:</b>	up to 13 l/min
<b>Ambient temperature range:</b>	10 °C – +130 °C
<b>Temperature range of medium:</b>	-40 °C – +125 °C
<b>Length (w/o) connector:</b>	110 – 145 mm
<b>Diameter (motor):</b>	~ 66 mm
<b>Controlling:</b>	CAN / PWM / internal controller
<b>Working life:</b>	10.000 hrs
<b>Protection:</b>	IP6K9K / IP68
<b>Applications:</b>	Hybrid and all-electric applications

## Features:

- Can be fully or partly integrated in the transmission
- Alternative: Installation externally on transmission
- Materials and sealing systems in accordance with the conditions of use and the oils used
- Depending on hydraulic requirements, as flow or positive displacement pumps (impeller, gerotor or vanes)
- Customer-specific communication (PWM / LIN / CAN interface)
- Suitable for hybrid and all-electric applications

Subject to change without notice



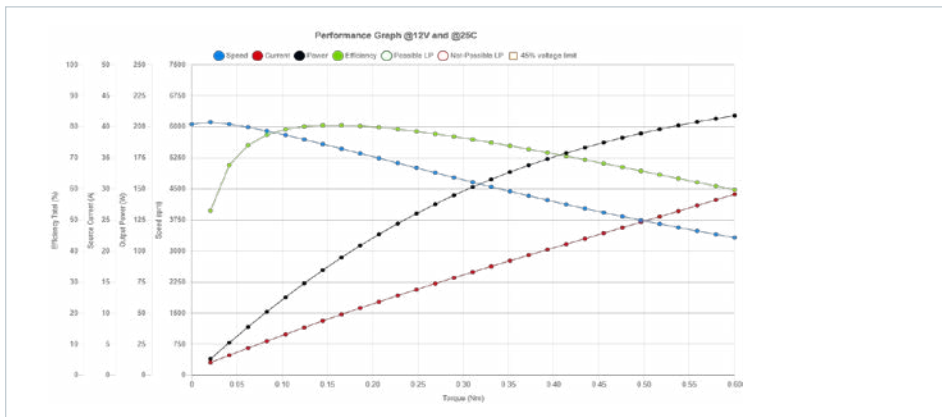
# bDrive 50 oil pump housing with micro-controller

bDrive 50  
oil pump housing  
with micro-controller



## Technical data:

Power consumption:	200 W @ 12 V, room temperature
Product platform:	bDrive 50
Application:	Oil pump drive
Voltage:	9 – 16 V
External dimensions:	approximately Ø 50 – 60 mm × 80 mm (w/ECO)
Ambient temperature range:	-40 – +125 °C
Temperature range of medium:	-25 – +125 °C
Controlling:	CAN
Working life:	7000 hrs
Protection:	IPX9K



## Features:

- Can be fully or partly integrated in the transmission
- Alternative: Installation externally on transmission
- Materials and sealing systems in accordance with the conditions of use and the oils used
- Depending on hydraulic requirements, as flow or positive displacement pumps (impeller, gerotor or vanes)
- Customer-specific communication (PWM / LIN / CAN interface)
- Suitable for hybrid and all-electric applications

Subject to change without notice

# bDrive 60 oil pump drive for 7DCT

## Technical data:

<b>Power consumption:</b>	150 W @ 12 V, room temperature
<b>Product platform:</b>	bDrive 60
<b>Application:</b>	Oil pump drive
<b>Voltage:</b>	9 – 16 V
<b>External dimensions:</b>	approximately Ø 60 mm × 80 mm
<b>Ambient temperature range:</b>	-40 – +140 °C
<b>Temperature range of medium:</b>	-40 – +140 °C
<b>Working life:</b>	4000 hrs

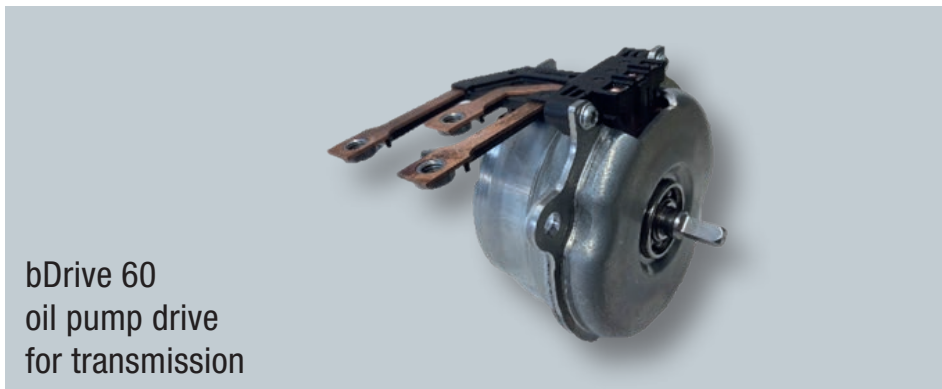


## Features:

- Can be fully or partly integrated in the transmission
- Materials and sealing systems in accordance with the conditions of use and the oils used
- Depending on hydraulic requirements, as flow or positive displacement pumps (impeller, gerotor or vanes)
- Customer-specific communication (PWM)
- Suitable for hybrid and all-electric applications

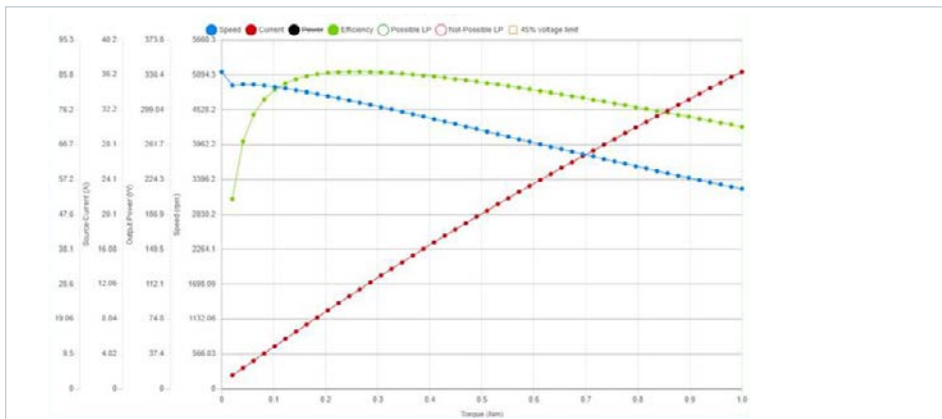
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# bDrive 60 oil pump drive for transmission



## Technical data:

Power consumption:	400 W @ 12 V, room temperature
Product platform:	bDrive 60
Application:	Oil pump drive
Voltage:	9 – 16 V
External dimensions:	Ø 60 mm
Ambient temperature range:	-40 – +140 °C
Temperature range of medium:	-40 – +140 °C
Working life:	7000 hrs



## Features:

- Oil pump drive for automatic transmission in hybrid vehicles
- Support of main transmission oil pump
- Fully integrated in the transmission (submerged under oil)
- Materials and sealing systems in accordance with the conditions of use and the oils used
- Depending on hydraulic requirements, as flow or positive displacement pumps (impeller, gerotor or vanes)

# bDrive 70 oil pump drive for hybrid vehicles

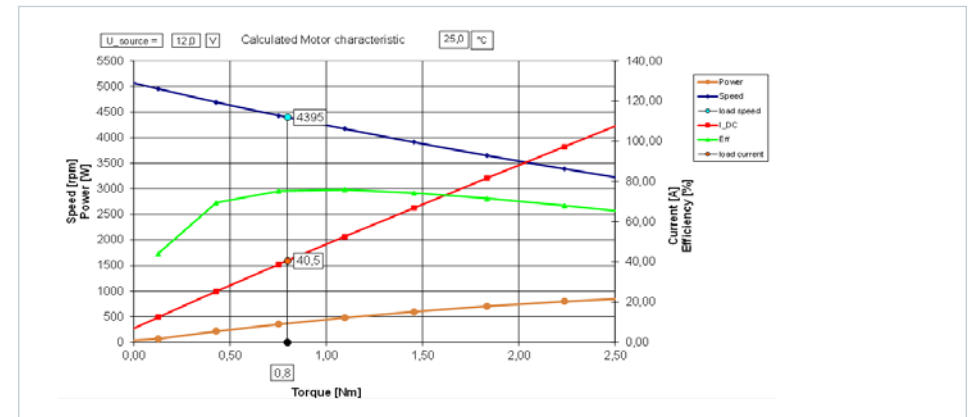
## Technical data:

Power consumption:	600 W @ 12 V, room temperature
Product platform:	bDrive 70
Application:	Oil pump drive
Voltage:	9 – 16 V
External dimensions:	approximately Ø 67 mm × 110 mm
Ambient temperature range:	-40 – +140 °C
Temperature range of medium:	-40 – +140 °C
Working life:	4.000 hrs



## Features:

- Oil pump drive for automatic transmission in hybrid vehicles
- Fully integrated in the transmission
- Materials and sealing systems in accordance with the conditions of use and the oils used
- Depending on hydraulic requirements, as flow or positive displacement pumps (impeller, gerotor or vanes)
- Customer-specific communication (PWM)
- Suitable for hybrid and all-electric applications



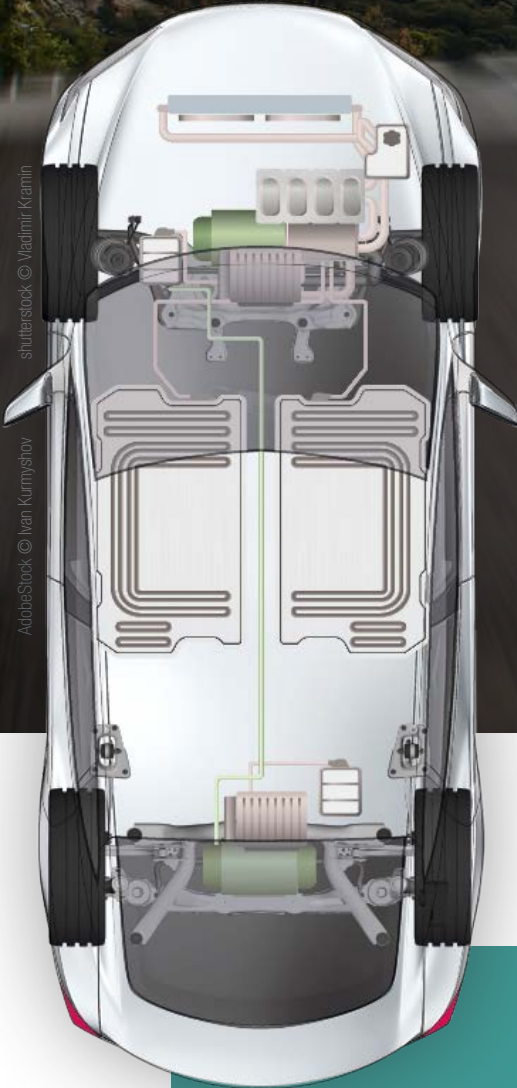
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# Thermal Management

## I Thermal Management

Energy-efficient in practice,  
precise temperature control.

Improved energy efficiency, less CO<sub>2</sub>, lower NO<sub>x</sub> values, yet at the same time more comfort, safety and driving pleasure: With its innovative drive solutions precisely tailored to any requirements, Bühler Motor provides effective support here – and offers outstanding system expertise.



I Clean Air

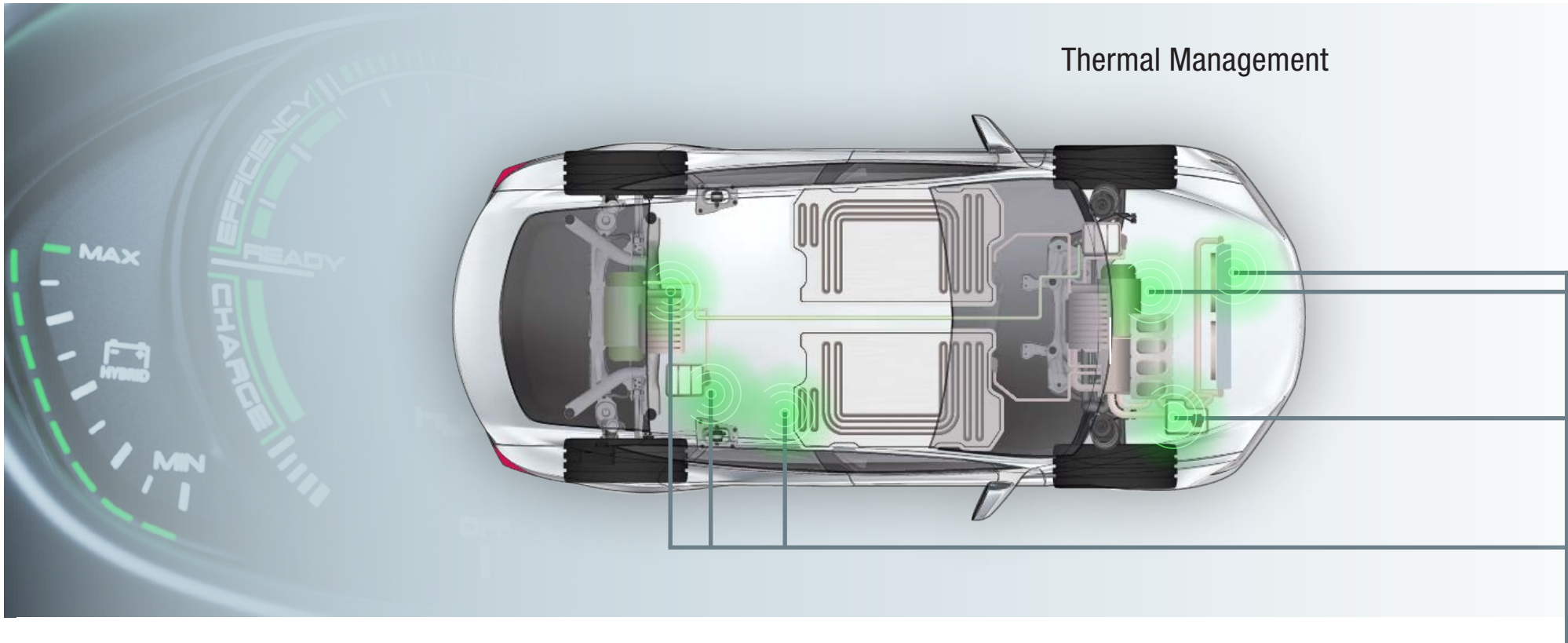


I Drivetrain





# bFlow C for hybrid and electric vehicles



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## bFlow C for hybrid and electric vehicles

For cooling the battery or precise temperature control of power electronics: Our auxiliary water pumps ensure that individual components are kept in an optimum operating range independently of each other.

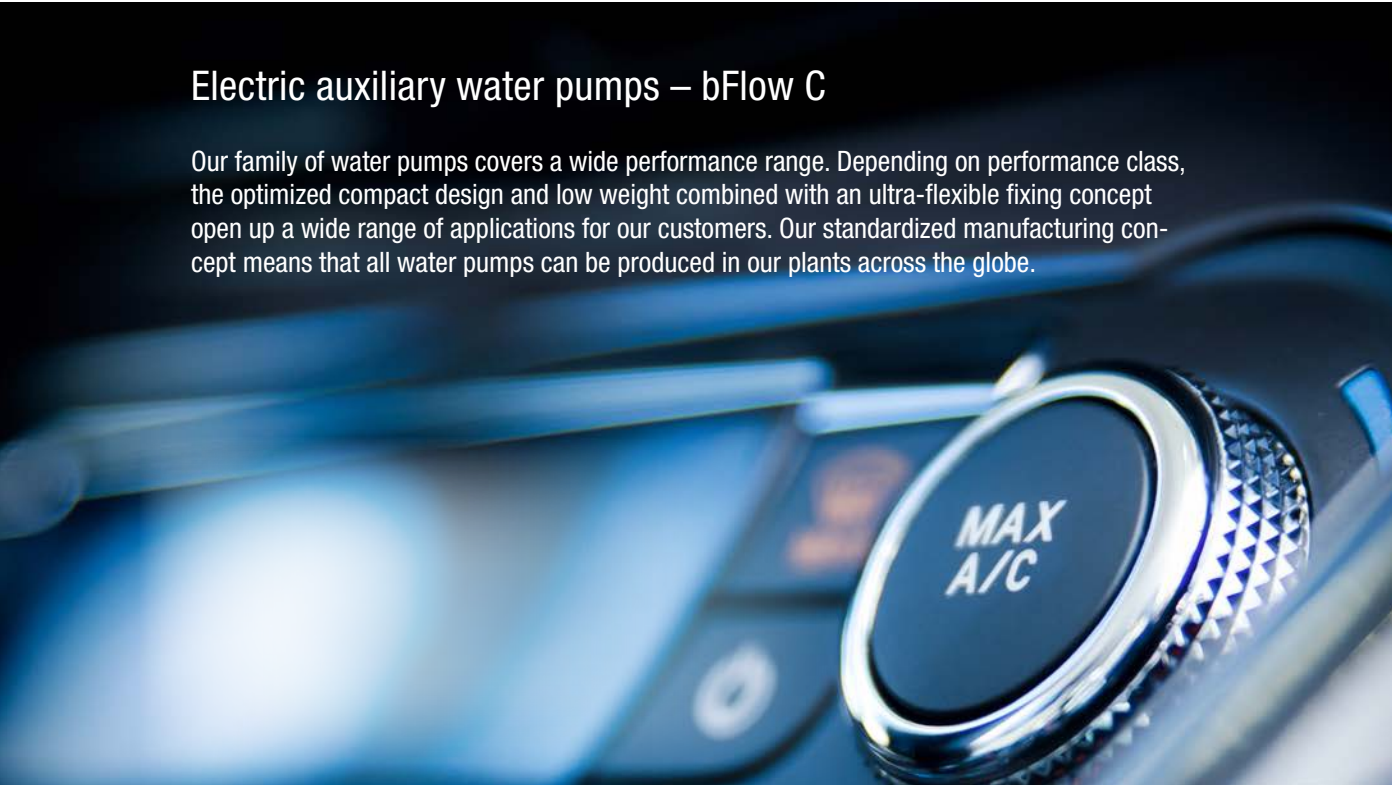


auxiliary water pumps – bFlow C

# Electric auxiliary water pumps – bFlow C

## Electric auxiliary water pumps – bFlow C

Our family of water pumps covers a wide performance range. Depending on performance class, the optimized compact design and low weight combined with an ultra-flexible fixing concept open up a wide range of applications for our customers. Our standardized manufacturing concept means that all water pumps can be produced in our plants across the globe.



bFlow C1D-20



bFlow C3B-30



bFlow C3A-50



bFlow C5A-60



bFlow C5B-80-150



bFlow C7A-150-300

### Applications:

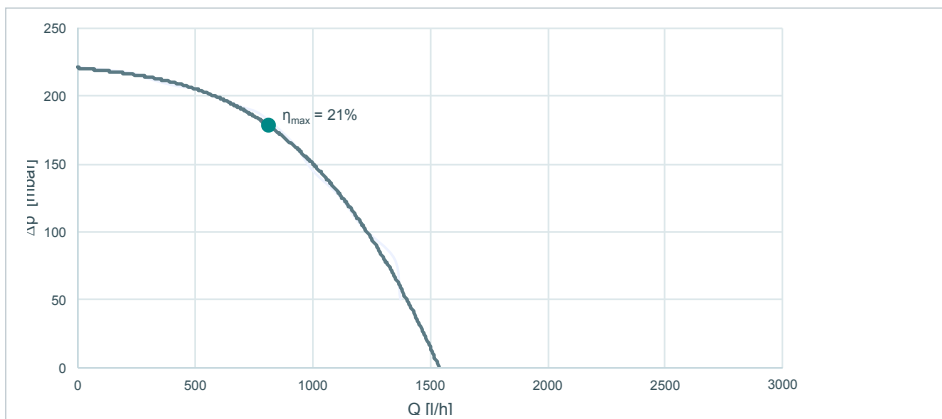
- Auxiliary heating systems
- Internal heating
- Post shutdown cooling
- AGR and turbocharger cooling
- Battery and performance electronics cooling in hybrid applications
- Electric vehicles

# bFlow C1D-20



## Technical data:

Power consumption:	~ 20 W
Max. delivery:	0,22 bar (22 kPa)
Max. flow rate:	1550 l/h (25,8 l/min)
Ambient temperature range:	-40 °C – +135 °C (-40 °F – 275 °F)
Temperature range of medium:	-40 °C – +135 °C (-40 °F – 275 °F)
Length (w/o) connector:	~ 56 mm (~ 2.20 inch)
Diameter (motor):	~ 53 mm (~ 2.20 inch)
Controlling:	PWM / On-Off / LIN
Working life:	up to 35.000 hrs (depending on application)
Protection:	IP6K6K / IPX9K
EMV CISPR25:	Level 5



exemplary performance curve

## Features:

- Motor mounting possible
- Customized connection design (hydraulic, electric)
- Performance-specific hydraulic concept
- Wet-running motor concept with static sealing concept
- Suitable for ICE, hybrid and fully electric applications
- Customer specific software for optimal efficiency
- Application examples: AGR, internal heating and post shutdown cooling

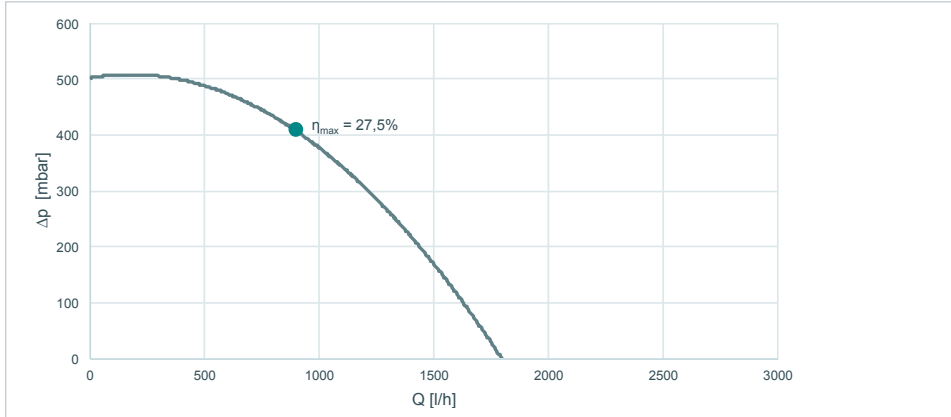
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# bFlow C3B-30



### Technical data:

Power consumption:	~ 30 W
Max. delivery:	0,5 bar (50 kPa)
Max. flow rate:	1800 l/h (30,0 l/min)
Ambient temperature range:	-40 °C – +135 °C (-40 °F – 275 °F)
Temperature range of medium:	-40 °C – +135 °C (-40 °F – 275 °F)
Length (w/o) connector:	~ 74 mm (~ 2.91 inch)
Diameter (motor):	~ 59 mm (~ 2.28 inch)
Controlling:	PWM / On-Off / LIN
Working life:	up to 35.000 hrs (depending on application)
Protection:	IP6K6K / IPX9K
EMV CISPR25:	Level 5



exemplary performance curve

### Features:

- Motor mounting possible
- Customized connection design (hydraulic, electric)
- Performance-specific hydraulic concept
- Wet-running motor concept with static sealing concept
- Suitable for ICE, hybrid and fully electric applications
- Customer specific software for optimal efficiency
- Application examples: charge air cooling, cooling for ancillary units

Subject to change without notice

# bFlow C3A-50

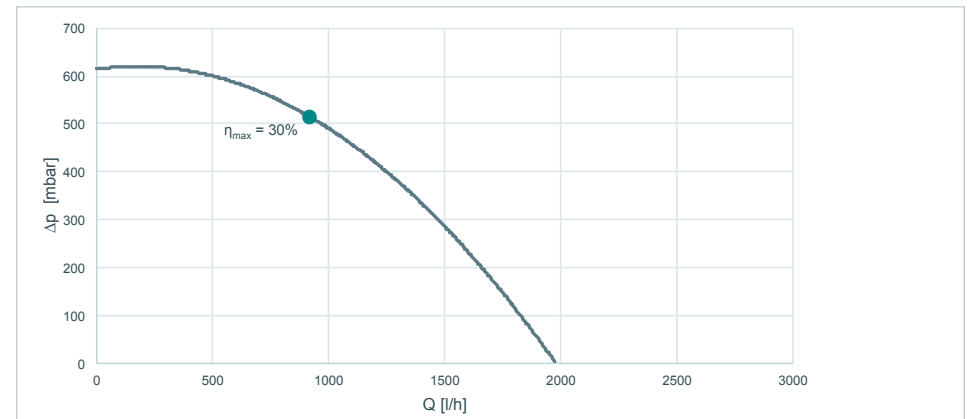
## Technical data:

Power consumption:	~ 50 W
Max. delivery:	0,62 bar (62 kPa)
Max. flow rate:	1950 l/h (32,5 l/min)
Ambient temperature range:	-40 °C – +135 °C (-40 °F – 275 °F)
Temperature range of medium:	-40 °C – +135 °C (-40 °F – 275 °F)
Length (w/o connector):	~ 74 mm (~ 3.22 inch)
Diameter (motor):	~ 59 mm (~ 2.28 inch)
Controlling:	PWM / On-Off / LIN
Working life:	up to 35.000 hrs (depending on application)
Protection:	IP6K6K / IPX9K

## Features:

- Motor mounting possible
- Customized connection design (hydraulic, electric)
- Performance-specific hydraulic concept
- Wet-running motor concept with static sealing concept
- Suitable for ICE, hybrid and fully electric applications
- Customer specific software for optimal efficiency
- Application examples: Cooling for power electronics, temperature control for BEV and HEV

Subject to change without notice

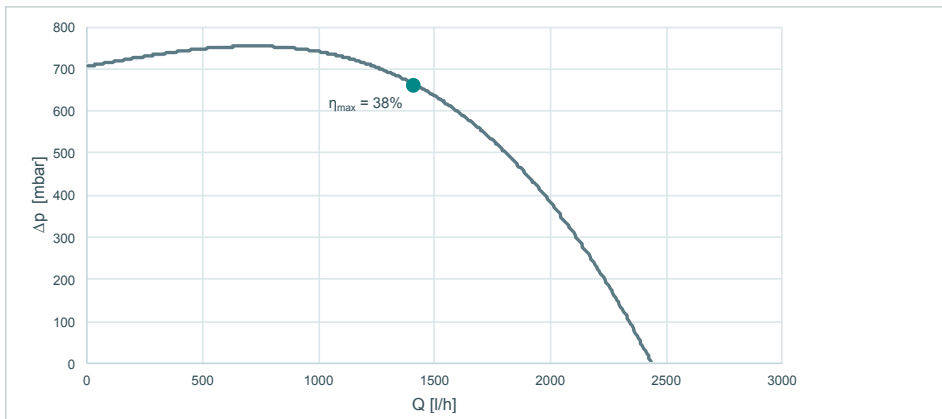


exemplary performance curve

# bFlow C5A-60



bFlow C5A-60



exemplary performance curve

## Technical data:

Power consumption:	~ 60 W
Max. delivery:	0,76 bar (76 kPa)
Max. flow rate:	2450 l/h (40,8 l/min)
Ambient temperature range:	-40 °C – +135 °C (-40 °F – 275 °F)
Temperature range of medium:	-40 °C – +135 °C (-40 °F – 275 °F)
Length (w/o) connector:	~ 138 mm (~ 5.43 inch)
Diameter (motor):	~ 70 mm (~ 2.76 inch)
Controlling:	PWM / On-Off / LIN
Working life:	up to 35.000 hrs (depending on application)
Protection:	IP6K6K / IPX9K

## Features:

- Motor mounting possible
- Customized connection design (hydraulic, electric)
- Performance-specific hydraulic concept
- Wet-running motor concept with static sealing concept
- Suitable for ICE, hybrid and fully electric applications
- Customer specific software for optimal efficiency
- Application examples: Battery cooling und cooling for power electronics

Subject to change without notice

# bFlow C5B-120

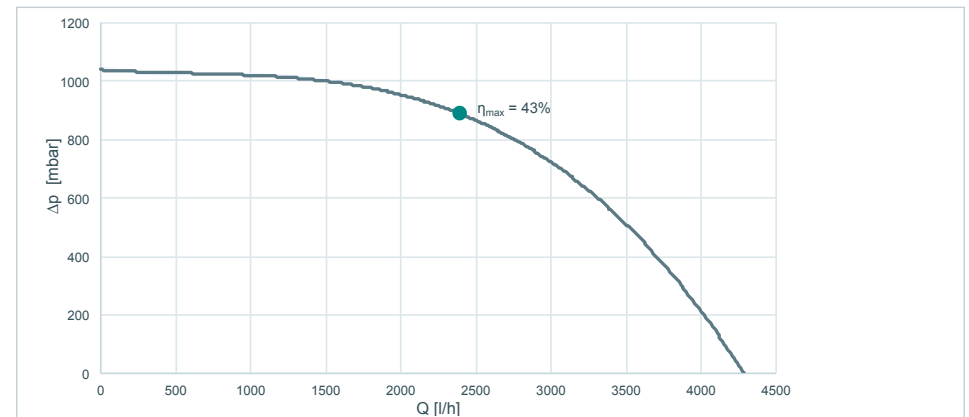
## Technical data:

Power consumption:	~ 120 W
Max. delivery:	1,1 bar (110 kPa)
Max. flow rate:	4300 l/h (71,6 l/min)
Ambient temperature range:	-40 °C – +120 °C (-40 °F – 248 °F)
Temperature range of medium:	-40 °C – +90 °C (-40 °F – 194 °F)
Length (w/o connector):	~ 140 mm (~ 5.51 inch)
Diameter (motor):	~ 80 mm (~ 3.15 inch)
Controlling:	PWM / On-Off / LIN
Working life:	up to 35.000 hrs (depending on application)
Protection:	IP6K6K / IPX9K

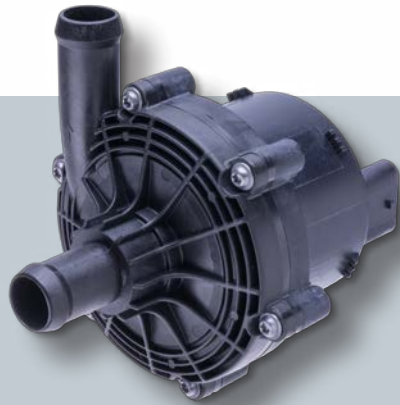


## Features:

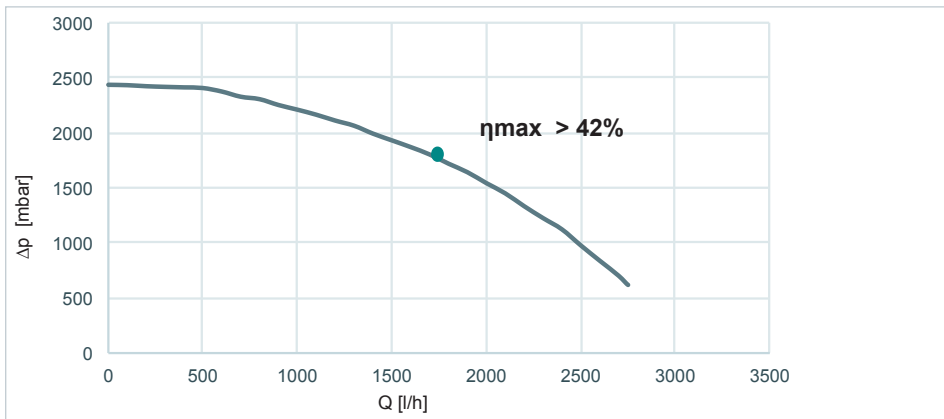
- Motor mounting possible
- Customized connection design (hydraulic, electric)
- Performance-specific hydraulic concept
- Wet-running motor concept with static sealing concept
- Suitable for ICE, hybrid and fully electric applications
- Customer specific software for optimal efficiency
- Application examples: Cooling for AC-DC converter and cooling for electric motor



# bFlow C7A-200



bFlow C7A-200



exemplary performance curve

## Technical data:

Power consumption:	~ 200 W
Max. delivery:	2.4 bar (240 kPa)
Max. flow rate:	3000 l/h (50 l/min)
Ambient temperature range:	-40 °C – +120 °C (-40 °F – 248 °F)
Temperature range of medium:	-40 °C – +90 °C (-40 °F – 194 °F)
Length (w/o connector):	~ 160 mm (~ 6.3 inch)
Diameter (motor):	~ 74 mm (~ 2.9 inch)
Controlling:	PWM / On-Off / LIN
Working life:	up to 35.000 hrs (depending on application)
Protection:	IP6K6K / IPX9K

## Features:

- Motor mounting possible
- Customized connection design (hydraulic, electric)
- Performance-specific hydraulic concept
- Wet-running motor concept with static sealing concept
- Suitable for ICE, hybrid and fully electric applications
- Customer specific software for optimal efficiency
- Application examples: Cooling for AC-DC converter and cooling for electric motor
- Optional with heating function (pump head integrated heating ring)

Subject to change without notice



# bFlow C7A-300

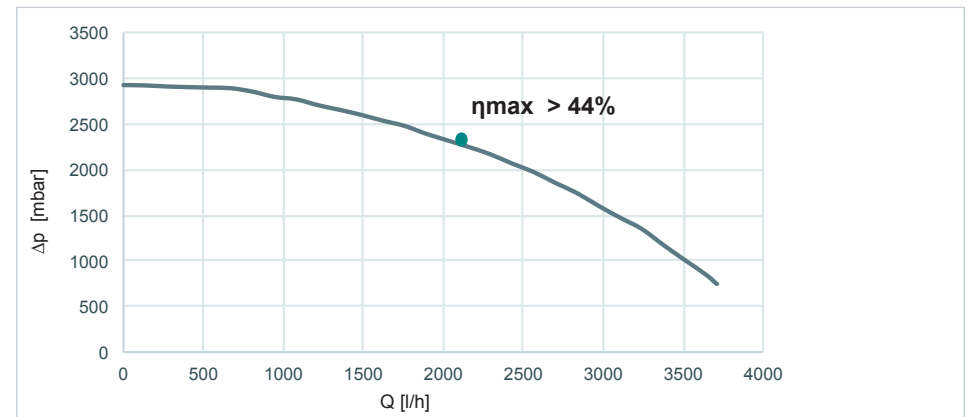
## Technical data:

Power consumption:	~ 300 W
Max. delivery:	2.8 bar (280 kPa)
Max. flow rate:	4200 l/h (70 l/min)
Ambient temperature range:	-40 °C – +120 °C (-40 °F – 248 °F)
Temperature range of medium:	-40 °C – +90 °C (-40 °F – 194 °F)
Length (w/o) connector:	~ 175 mm (~ 6.9 inch)
Diameter (motor):	~ 74 mm (~ 2.9 inch)
Controlling:	PWM / On-Off / LIN
Working life:	up to 40.000 hrs (depending on application)
Protection:	IP6K6K / IPX9K

## Features:

- Motor mounting possible
- Customized connection design (hydraulic, electric)
- Performance-specific hydraulic concept
- Wet-running motor concept with static sealing concept
- Suitable for ICE, hybrid and fully electric applications
- Customer specific software for optimal efficiency
- Application examples: Cooling for AC-DC converter and cooling for electric motor
- Possibility of full integration (integrated pump head)

Subject to change without notice



exemplary performance curve

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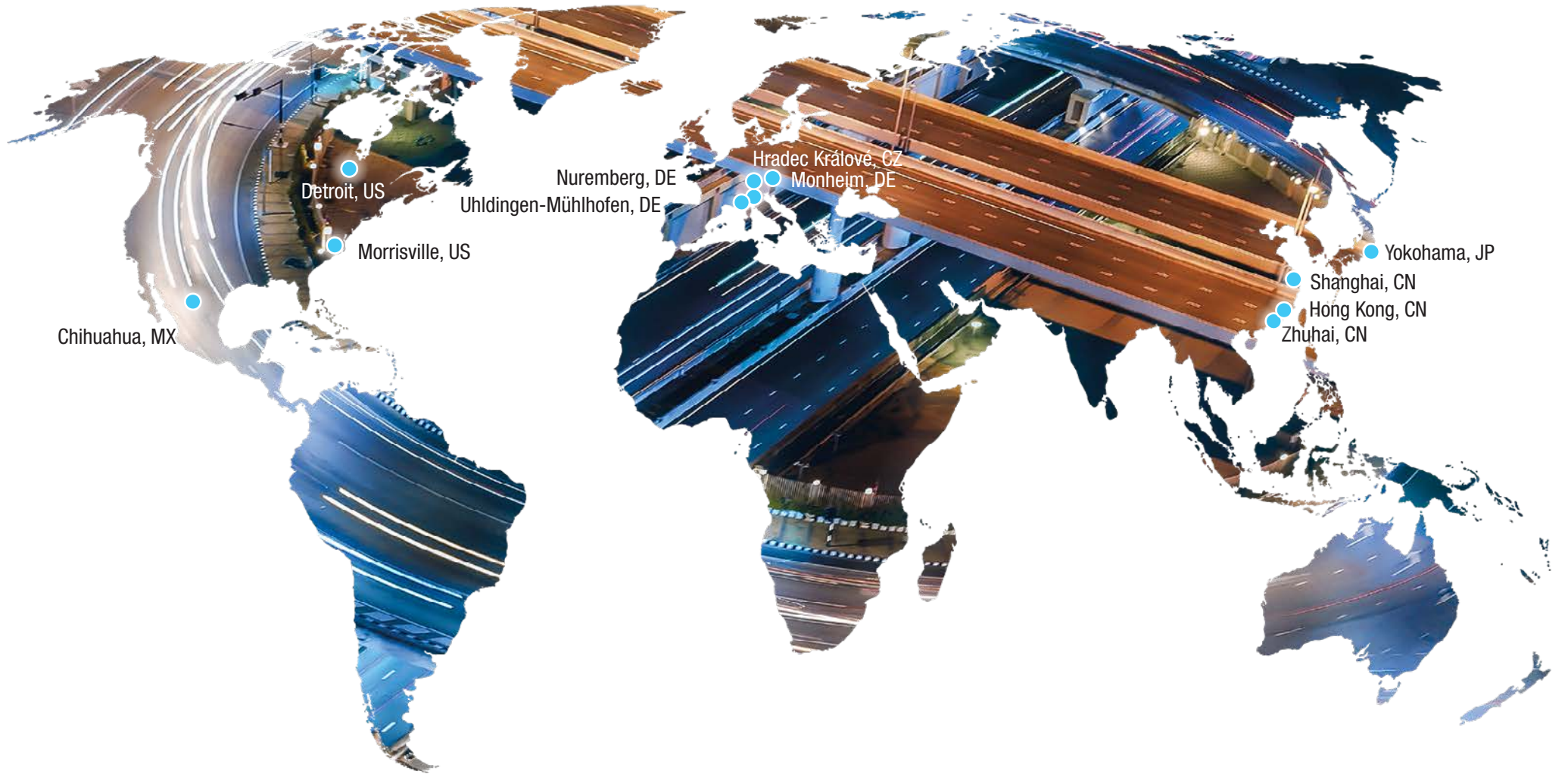
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