nexofox

AMETEK®

Software

Edge

Member
OPEN INDUSTRY 4.0
ALLIANCE

NEW!

Let´s IIoT

Modular

REST API

PROFINET

BGE by nexofox

"

IIoT
meets
motor
control

AMETEK® / dunkermotoren / MAE® / EGS AUTOMATION / nexofox

›› BGE – Makes every motor a smart motor

With the nexofox BGE series, Dunkermotoren provides suitable controllers for your DC and BLDC motor application. With the available electronics, motor outputs from 10 to 1500 W can be covered. Module and harsh versions are available on request.

By using the nexofox controllers, you will also have access to all nexofox features such as MotionCode, system integration, and cloud monitoring.

«BGE 5510»

«BGE 8060»

Smart Diagnostics

Remote Control

MotionCode

Predictive Maintenance

ON THE CONTROLLER

BEYOND CONTROLLER (EDGE / CLOUD)

Motion Configuration

Digital Twin

111
101
011
001

Simply integrate the motor into your digital ecosystem and use nexofox services on demand

Configure the controller without programming experience

Manage configurations, firmware and MotionCode without being on site

Program the controller according to your requirements

Be informed when the controller needs your attention

Get forecasts about the mechanical wear of the drive train

View all information about the controller quickly and easily

Smartphone App
A great tool for the analysis of the motors and systems

Service
We will assist you as competent service provider from the very first concept throughout the whole life cycle of your application.

≫ Smart functions supporting your application

dMove and dPro functions

All *dMove* and *dPro* devices support the following functions
(some may be limited by hardware):

» Quick-Start command
» Profile position mode, profile velocity mode
» Current mode (without current profile)
» Velocity profile with linear ramps (trapezoidal velocity profile)
» Homing methods: 17, 18, 19, 21, 35, homing on blockage
» CiA 402 operation modes: profile position, profile velocity,
  velocity, torque, homing
» Digital Inputs and Outputs, analogue Input
» Over and under voltage monitoring
» Static current limit, I*t current limit, I²t current limit
» Communication parameters 1000s (CiA 301)
» Brake Management, Ballast Circuit, Voltage Controlled
  Deceleration
» Over temperature monitor
» Configuration of the rotation direction
» Parameter management (storing in non volatile memory)
» Digital input function assignment digital output function
  assignment
» MotionCode

IO-Modus

» Stand-alone operation (Motor needs no bus connection
  to operate)
» Motor parameters can be adapted to application via
  Drive Assistant 5
» Operating hours counter
» Speed-, positioning- and current modes can be combined
» Functions can be assigned to digital inputs
» Digital outputs can be configured
  (Replaces SI, most PI and some MI motors)
» Default settings for all IO motors (*dMove*/ *dPro*):
  Two fixed speeds (200 rpm / 2500 rpm)
  or analog input (0…10 V » 0…4096 1/ min)
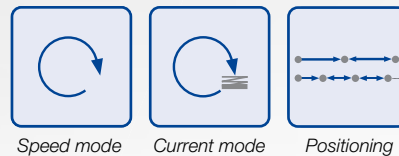
Speed mode   Current mode   Positioning

≫ Integration in your apllication is our key

Industrial Ethernet EtherCAT (EC)

» Quickstart Commands
» CANopen over EtherCAT (CoE)
» Operation as NC axis
» Supports "distributed clocks" (synchronous operation)
» Parameterization and service via Drive Assistant 5 possible
» Extensive object dictionary and commissioning help documents

EtherCAT.

PROFINET (PN)

» Dunker Quickstart commands
» PROFIdrive, application classes 1 + 4
  (synchronous operation)
» Certified PROFINET and PROFIdrive » trouble-free
  commissioning and operation
» Extensive object dictionary and commissioning help document
» Parameterization and service via Drive Assistant 5 possible
» Also available from Dunkermotoren A very wide range of
  brushless DC motors for SIMATIC MICRO-DRIVE with and
  without gears

PI CERTIFIED
PROFIBUS · PROFINET

Ethernet/IP (EI)

» Generic slave device for Rockwell PLC
» Ethernet/IP certified
» Further packages planned, contact us if required:
  » Usabiltiy package (Add On Instructions)
  » CIP Sync (hard realtime communication)
  » IO-Scanner (master functionality)
  » CIP Safety (safety over ethernet)

EtherNet/IP

Integrierte Funktionale Sicherheitsfunktion STO

» Safety levels according to the following standards:
  » • IEC 61508-1:2010, IEC61508-2:2010;
    usable until SIL 2
  » • ISO 13849-1:2015, 13849-2:2012;
    usable until PL d (Category 3)
  » • IEC 61800-5-2:2016; einsetzbar bis SIL 2
  » • IEC 62061:2005
» Fully integrated in motor or external controller,
  motor or controller size remain the same
» Possible for all *dPro* motors
» Motor logic stays powered in STO state » no lost position
» Considerably lower cost, space consumption and cabling
  than previous solutions
» Ask for availability in your desired product

TÜV NORD
Safety Approved

CANopen (CO)

» Compatible according to CiA 402 and CiA 301
» Large selection of Dunker's own Quickstart
  commands for a quick start-up
» More than 20 years of experience and more than 600.000
  devices with CANopen interface sold
» Extensive object dictionary and commissioning help documents
» Parameterization via Drive Assistant 5
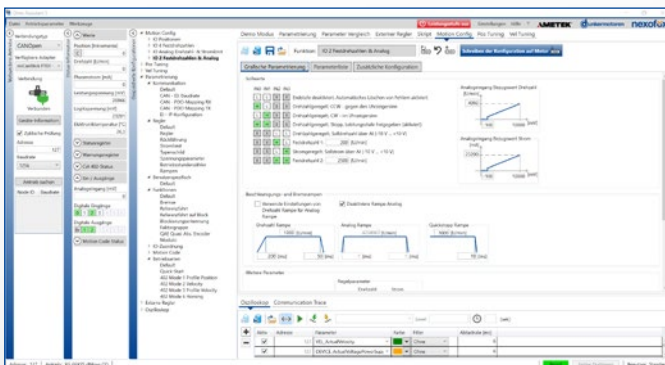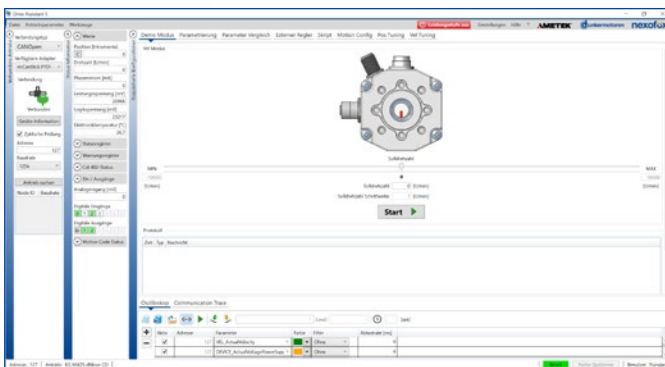
CANopen

WE MAKE EVERY MOTOR A SMART MOTOR!

>> Easy and comfortable commissioning via…

Drive Assistant 5

Commissioning and configuration tool for dPro and dMove motors and external controllers in IO mode, with EtherCAT, PROFINET or CANopen interface, for devices with MotionCode and for monitoring the CAN bus

» Motors are parametrised and can then be used stand-alone.
» Up to 14 different speeds, positions, ramps, currents can be assigned to digital inputs
» Direct parameter access possible
» Status of all relevant motor parameters can be displayed

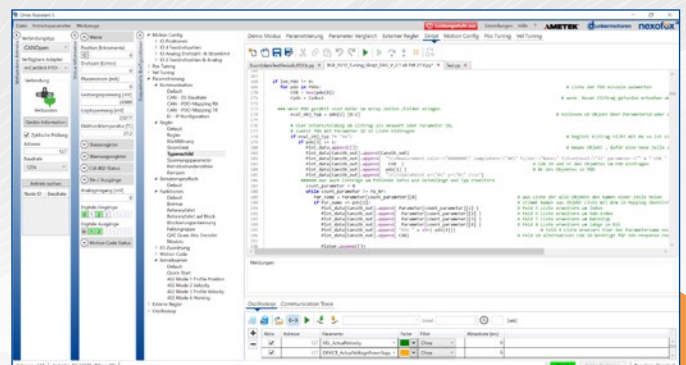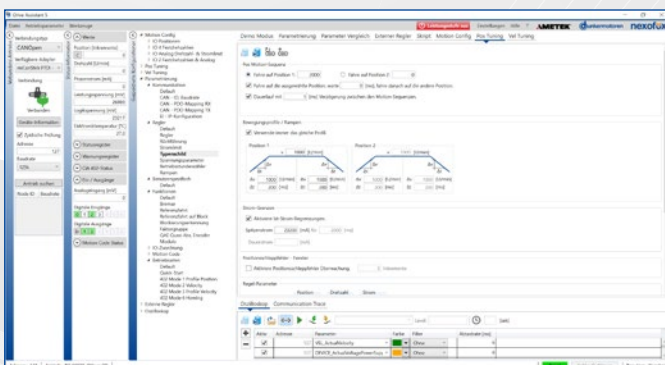» Wide range of tuning options
» For all dMove and dPro motors and external controllers
» Extensive oscilloscope function
» Commissioning and service also for EtherCAT and PROFINET motors (*dPro* EC and *dPro* PN), directly via Ethernet
» Python scripting function
» CAN Monitor
» Automatic device search, detection of CANopen, EtherCAT and PROFINET devices

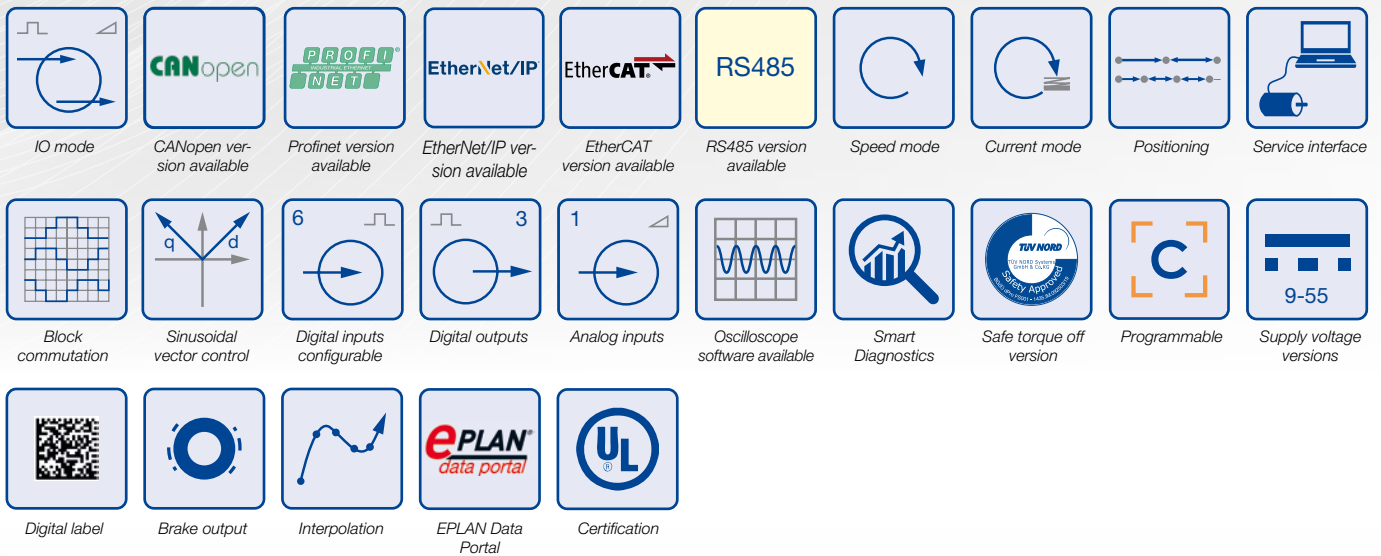CI/CO Drive Assistant

CI/CO Drive Assistant - Parameter

CI/CO Drive Assistant - Tuning

CI/CO Drive Assistant - Scripts
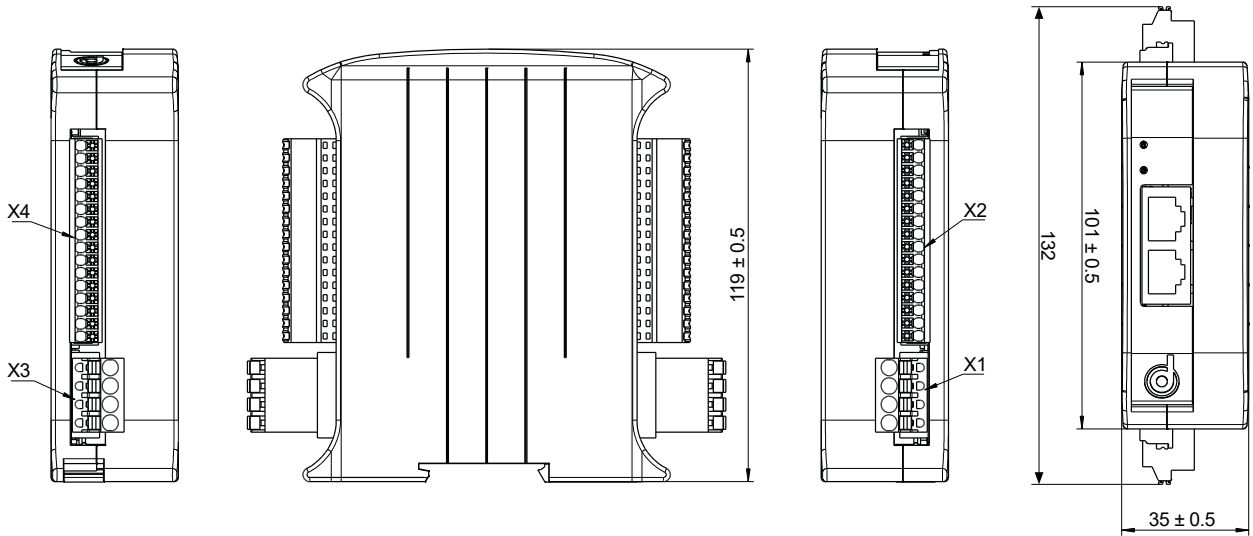
►► BGE 5510 *dPro* IO/CO/PN/EC/EI

» Compact 4-quadrant controller for control of brushless and brushed DC motors up to 250 W continuous output power
» Free programmability (C)
» Safety function Safe Torque Off (does not work with brushed DC motors)
» Connection option for additional encoder and brake

» IO (stand-alone variant): Control in stand-alone operation via digital and alaog inputs
» CO (CANopen variant): CiA 301 and drive profile CiA 402
» PN (PROFINET variant): PROFIdrive certified, application classes 1 and 4, IRT capable
» EC (EtherCAT variant): CoE (CAN over EtherCAT), distributed clocks for real-time operation
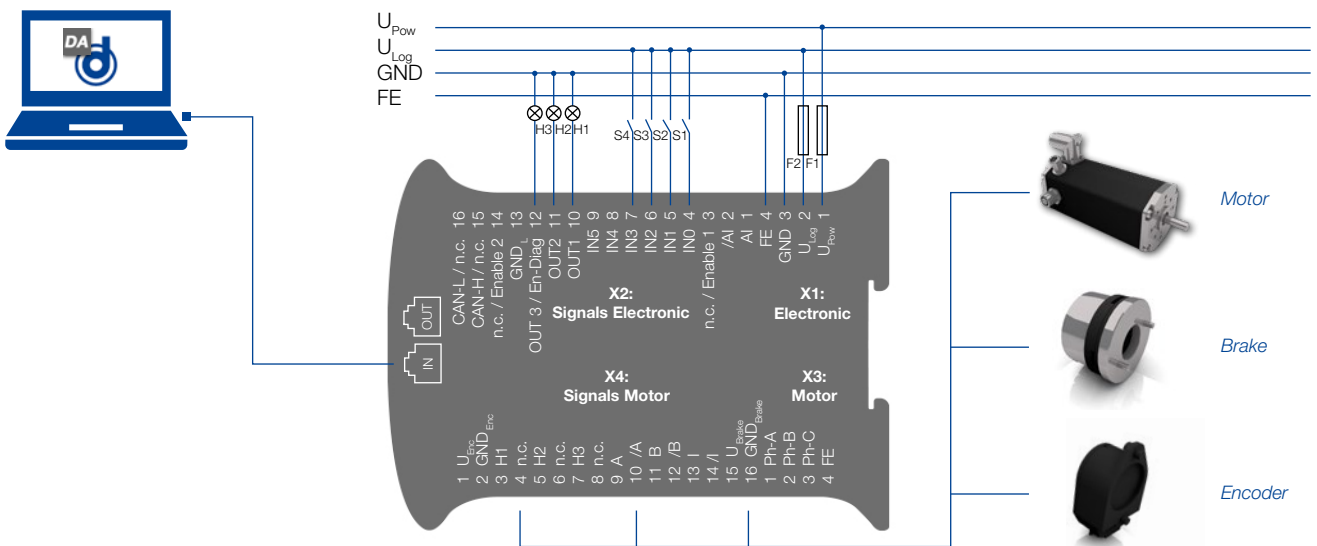» EI (Ethernet/IP variant): Integration in ControlLogix Studio, CIP Synch on request

IO mode	CANopen version available	Profinet version available	EtherNet/IP version available
EtherCAT version available	RS485 version available	Speed mode	Current mode
Positioning	Service interface		

Block commutation	Sinusoidal vector control	Digital inputs configurable	Digital outputs
Analog inputs	Oscilloscope software available	Smart Diagnostics	Safe torque off version
Programmable	Supply voltage versions		

Digital label	Brake output	Interpolation	EPLAN Data Portal
Certification			

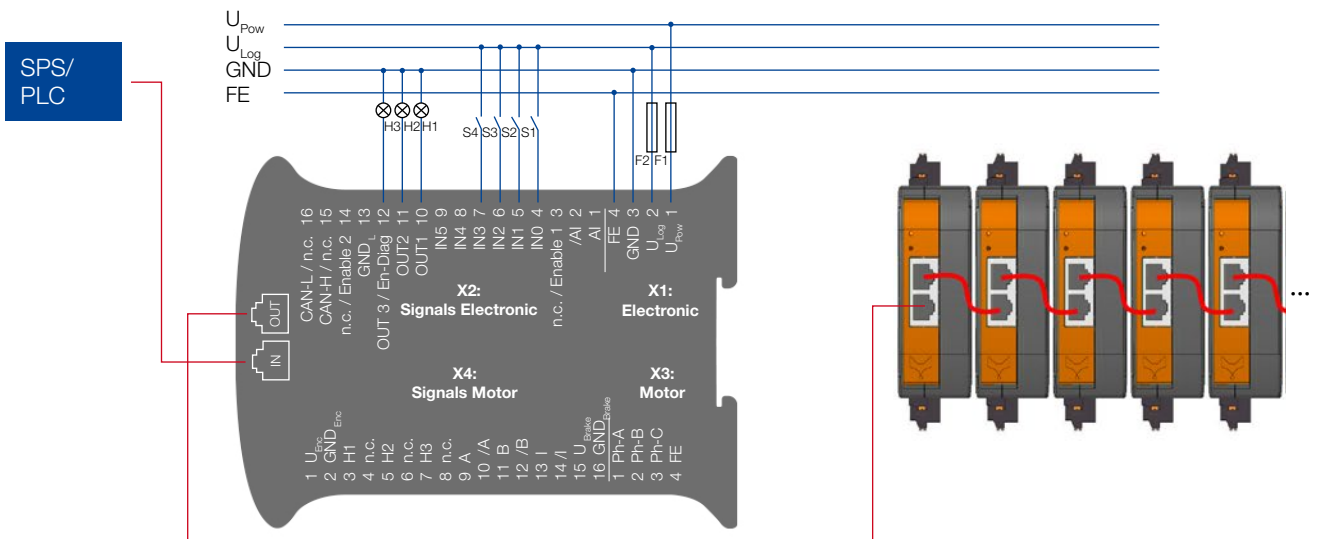| Technical Data/ Technische Daten		BGE 5510 *dPro* IO/CO/PN/EC/EI
Nominal voltage electronic supply/ Versorgungsspannung Elektronik	VDC	9-30
Nominal voltage power supply/ Versorgungsspannung Leistung	VDC	9-55
Peak output current/ Maximaler Ausgangsstrom	A_{pk}	30
Continuous output current/ Zulässiger Dauerausgangsstrom	A	10@24VDC 6@48VDC
Continuous consumption electronic/ Stromaufnahme Elektronik	mA	~70
Operation modes/ Betriebsarten	-	Stand-alone (IO) Slave (CO/PN/EC/EI)
Safety functions/ Sicherheitsfunktion	-	STO
Safety indicators/ Sicherheitskennzahlen	-	EN 61508/62061: SIL 2 EN ISO 13849: PL d
Motor feedback inputs/ Motorencoder Eingänge	-	Hall, Incremental
Digital input/ Digitale Eingänge	-	6
Digital output/ Digitale Ausgänge	-	3
Analog input (-10V to +10V)/ Analogeingang (-10V bis +10V)	-	1
Dimension (LxWxH)/ Abmessung (LxBxH)	mm	100x35x120
Weight/ Gewicht	kg	0,17

119 ± 0.5
132
101 ± 0.5
35 ± 0.5

X4
X3
X2
X1

Example: Configuration over Drive Assistant 5/
Beispiel: Konfiguration über den Drive Assistant 5

U_Pow
U_Log
GND
FE

H3 H2 H1
S4 S3 S2 S1
F2 F1

X2:
Signals Electronic

CAN-L / n.c. 16
CAN-H / n.c. 15
n.c. / Enable 2 14
GND_L 13
OUT 3 / En-Diag 12
OUT2 11
OUT1 10
IN5 9
IN4 8
IN3 7
IN2 6
IN1 5
IN0 4
n.c. / Enable 1 3

X1:
Electronic

/AI 2
AI 1
FE 4
GND 3
U_Log 2
U_Pow 1

X4:
Signals Motor

1 U_Enc
2 GND_Enc
3 H1
4 n.c.
5 H2
6 n.c.
7 H3
8 n.c.
9 A
10 /A
11 B
12 /B
13 I
14 /I
15 U_Brake
16 GND_Brake

X3:
Motor

1 Ph-A
2 Ph-B
3 Ph-C
4 FE

Motor

Brake

Encoder

OUT
IN

Example: Slave Mode over Master PLC/
Beispiel: Slave-Modus über Master-SPS

SPS/
PLC

U_Pow
U_Log
GND
FE

H3 H2 H1
S4 S3 S2 S1
F2 F1

X2:
Signals Electronic

CAN-L / n.c. 16
CAN-H / n.c. 15
n.c. / Enable 2 14
GND_L 13
OUT 3 / En-Diag 12
OUT2 11
OUT1 10
IN5 9
IN4 8
IN3 7
IN2 6
IN1 5
IN0 4
n.c. / Enable 1 3

X1:
Electronic

/AI 2
AI 1
FE 4
GND 3
U_Log 2
U_Pow 1

X4:
Signals Motor

1 U_Enc
2 GND_Enc
3 H1
4 n.c.
5 H2
6 n.c.
7 H3
8 n.c.
9 A
10 /A
11 B
12 /B
13 I
14 /I
15 U_Brake
16 GND_Brake

X3:
Motor

1 Ph-A
2 Ph-B
3 Ph-C
4 FE

OUT
IN

...

⟩⟩ BGE 8060 *dPro* IO/CO/PN/EC/EI

» Compact 4-quadrant controller for control of brushless and brushed DC motors up to 1500 W continuous output power
» Free programmability (C)
» Safety function Safe Torque Off (does not work with brushed DC motors)
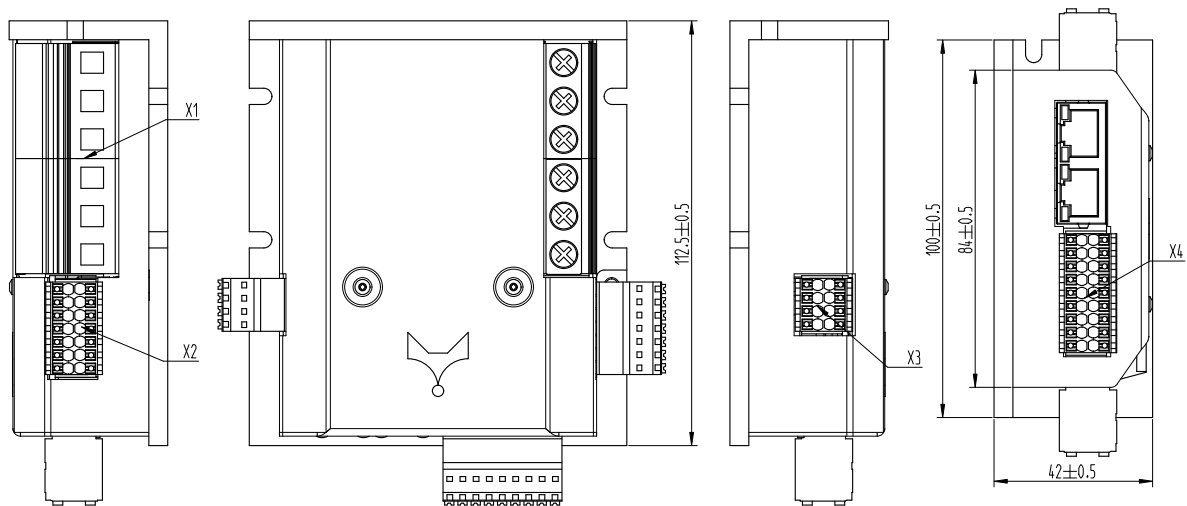» Connection option for additional encoder and brake

» IO (stand-alone variant): Control in stand-alone operation via digital and alaog inputs
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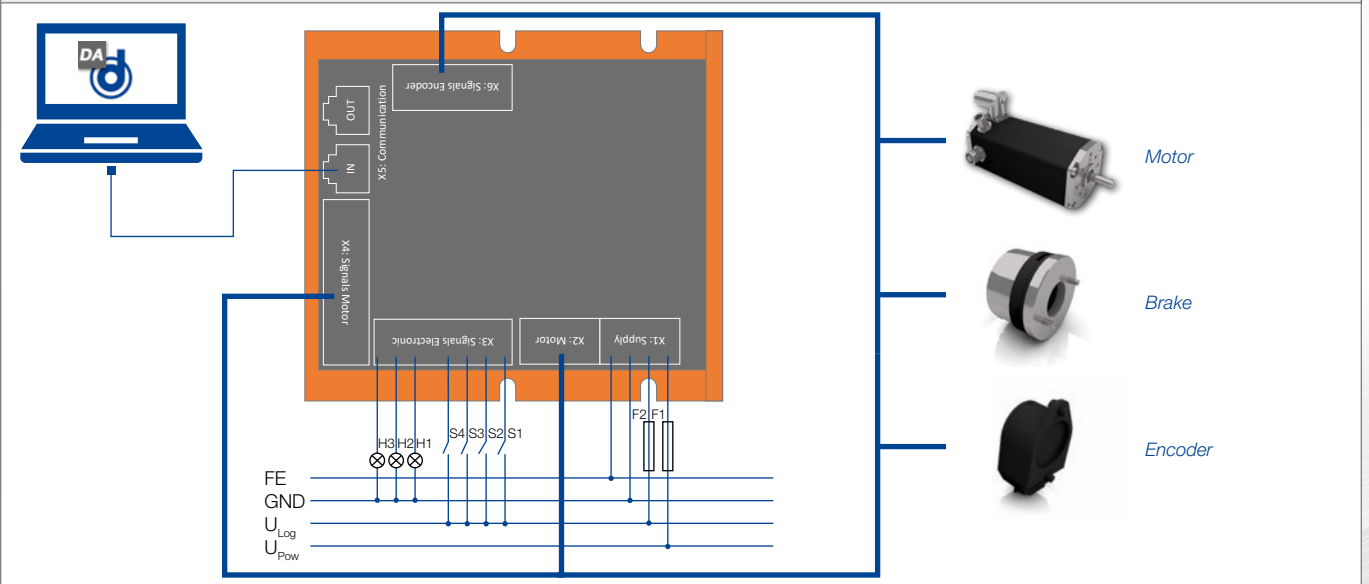» EI (Ethernet/IP variant): Integration in ControlLogix Studio, CIP Synch on request

IO mode	CANopen version available	Profinet version available	EtherNet/IP version available	EtherCAT version available	Speed mode	Current mode	Positioning	Service interface	Block commutation

Sinusoidal vector control	Digital inputs configurable	Digital outputs	Analog inputs	Oscilloscope software available	Smart Diagnostics	Safe torque off version	Programmable	Supply voltage versions	Digital label

Brake output	Interpolation	EPLAN Data Portal	Certification	SSI version available
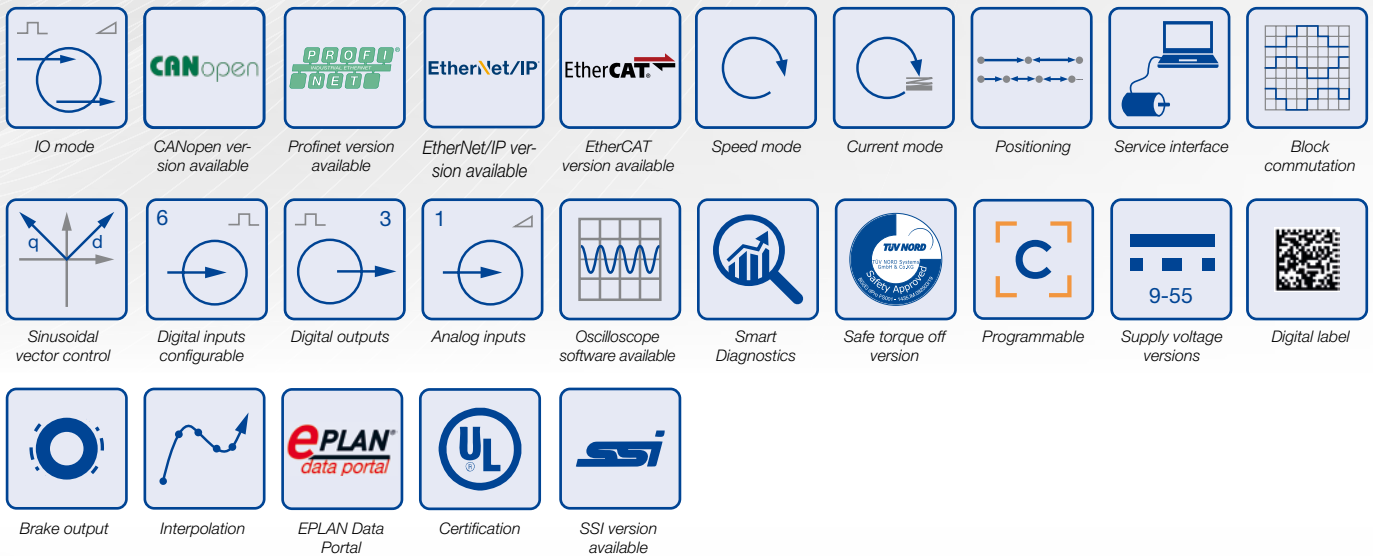
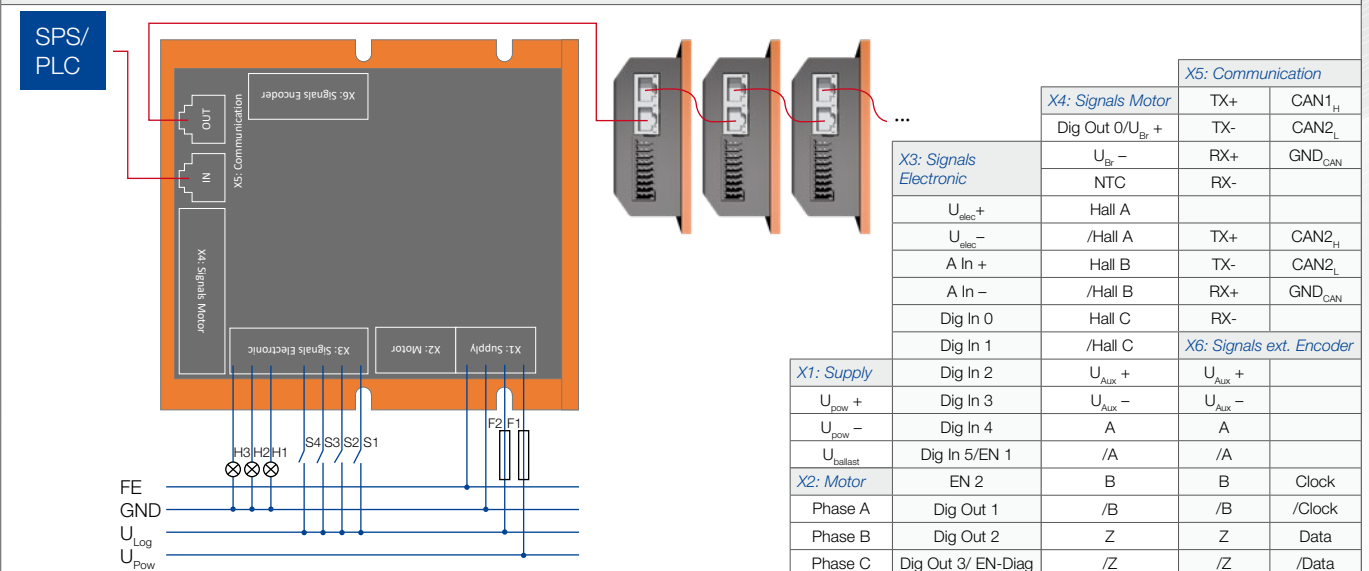| *Preliminary Technical Data*/ Vorläufige Technische Daten		BGE 8060 *dPro* IO/CO/PN/EC/EI
Nominal voltage electronic supply/ Versorgungsspannung Elektronik	VDC	9-30
Nominal voltage power supply/ Versorgungsspannung Leistung	VDC	9-80
Peak output current/ Maximaler Ausgangsstrom	A_{pk}	tbd.
Continuous output current/ Zulässiger Dauerausgangsstrom	A	~35@48VDC
Continuous consumption electronic/ Stromaufnahme Elektronik	mA	~70
Operation modes/ Betriebsarten	-	Stand-alone (IO) Slave (CO/PN/EC/EI)
Safety functions/ Sicherheitsfunktion	-	STO
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Motor feedback inputs/ Motorencoder Eingänge	-	Hall, Incremental, SSI
Digital input/ Digitale Eingänge	-	6
Digital output/ Digitale Ausgänge	-	3
Analog input (-10V to +10V)/ Analogeingang (-10V bis +10V)	-	1
Dimension (LxWxH)/ Abmessung (LxBxH)	mm	100x42x112,5
Weight/ Gewicht	kg	0,6

Motor

Brake

Encoder

			X5: Communication	
	X4: Signals Motor	TX+	$CAN1_H$	
	Dig Out 0/U_{Br} +	TX-	$CAN2_L$	
X3: Signals Electronic	U_{Br} –	RX+	GND_{CAN}	
	NTC	RX-		
U_{elec}+	Hall A			
U_{elec} –	/Hall A	TX+	$CAN2_H$	
A In +	Hall B	TX-	$CAN2_L$	
A In –	/Hall B	RX+	GND_{CAN}	
Dig In 0	Hall C	RX-		
Dig In 1	/Hall C	X6: Signals ext. Encoder		
X1: Supply	Dig In 2	U_{Aux} +	U_{Aux} +	
U_{pow} +	Dig In 3	U_{Aux} –	U_{Aux} –	
U_{pow} –	Dig In 4	A	A	
$U_{ballast}$	Dig In 5/EN 1	/A	/A	
X2: Motor	EN 2	B	B	Clock
Phase A	Dig Out 1	/B	/B	/Clock
Phase B	Dig Out 2	Z	Z	Data
Phase C	Dig Out 3/ EN-Diag	/Z	/Z	/Data

≫ BGE - Features

3 Benefits of the BGE dPro from nexofox

Wide range of supported brushed and brushless motors

Easy integration in several ecosystems based on many supported interfaces

All nexofox software products are ready to use

EASILY CONFIGURABLE WITH DRIVE ASSISTANT 5

IIOT READY FOR ALL NEXOFOX SERVICES

IO VERSION FOR STAND ALONE APPLICATIONS

PROGRAMMABLE WITH MOTIONCODE

VECTOR CONTROL FOR MOTORS

LISTED IN EPLAN DATA PORTAL

You don't need a housing and want to integrate the controller board into your design? No problem, module versions are available on request

You operate the controller under difficult conditions? No problem. If required, we offer versions for use in harsh environments

On request, we can commission any motor for you on our controller and create a suitable controller setting ex works

⟫ Decentralized modular control topologies

3 Benefits of MotionCode

More scalable and flexible

Lower cost by eliminating the need of PLC

Save time

AVAILABLE FOR MOTORS & EXTERNAL CONTROLLERS

PRE-DEFINED FUNCTIONS AND TEMPLATES

ACCESS TO ALL DEVICE RESOURCES

C

ECLIPSE-BASED DEVELOPMENT ENVIRONMENT

INDEPENDENT FROM THE FIRMWARE

» Easy programming in C directly on the motor(s) or controller(s)
» Realization of decentral or modular automation topologies
   - without PLC
» Motors can be combined into modules
» Modules can easily be configured and programmed
   into systems (simple distribution and reusable logic)
» Motors are connected to all required sensors and have
   the necessary logic
» Available monitoring functions of the motor can be used as
   support for other controllers
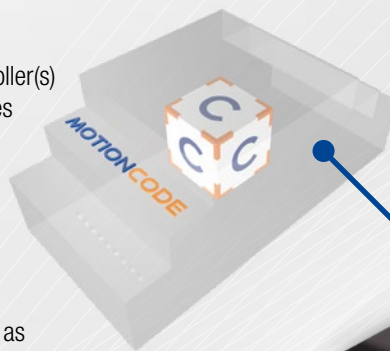
ZeroPLC
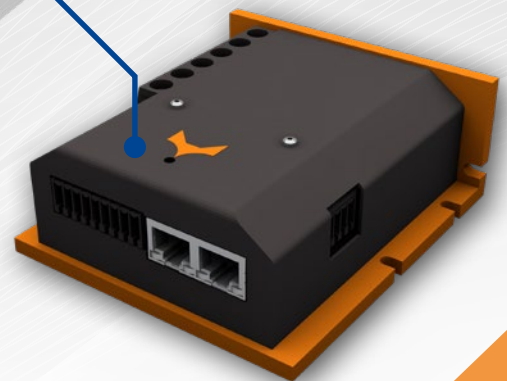
›› The DNA of modularity is transferred to the IIoT world

Find out what really lasts on your motor solutions and what keeps them busy

» Full integration into your IIoT ecosystem (possible)

» 100% customizable to your needs
  - Thanks to open interfaces

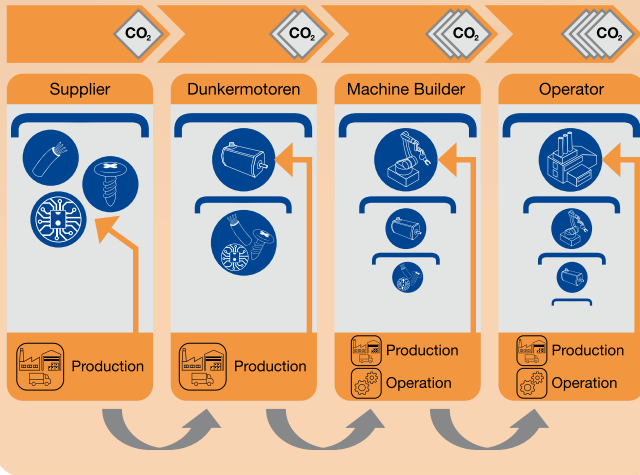» Support of latest communication protocols
  such as MQTT or OPC UA

CUSTOMER INTERFACE

NEXOLINK

DIGITAL TWIN

REMOTE CONTROL

PREDICTIVE MAINTENANCE
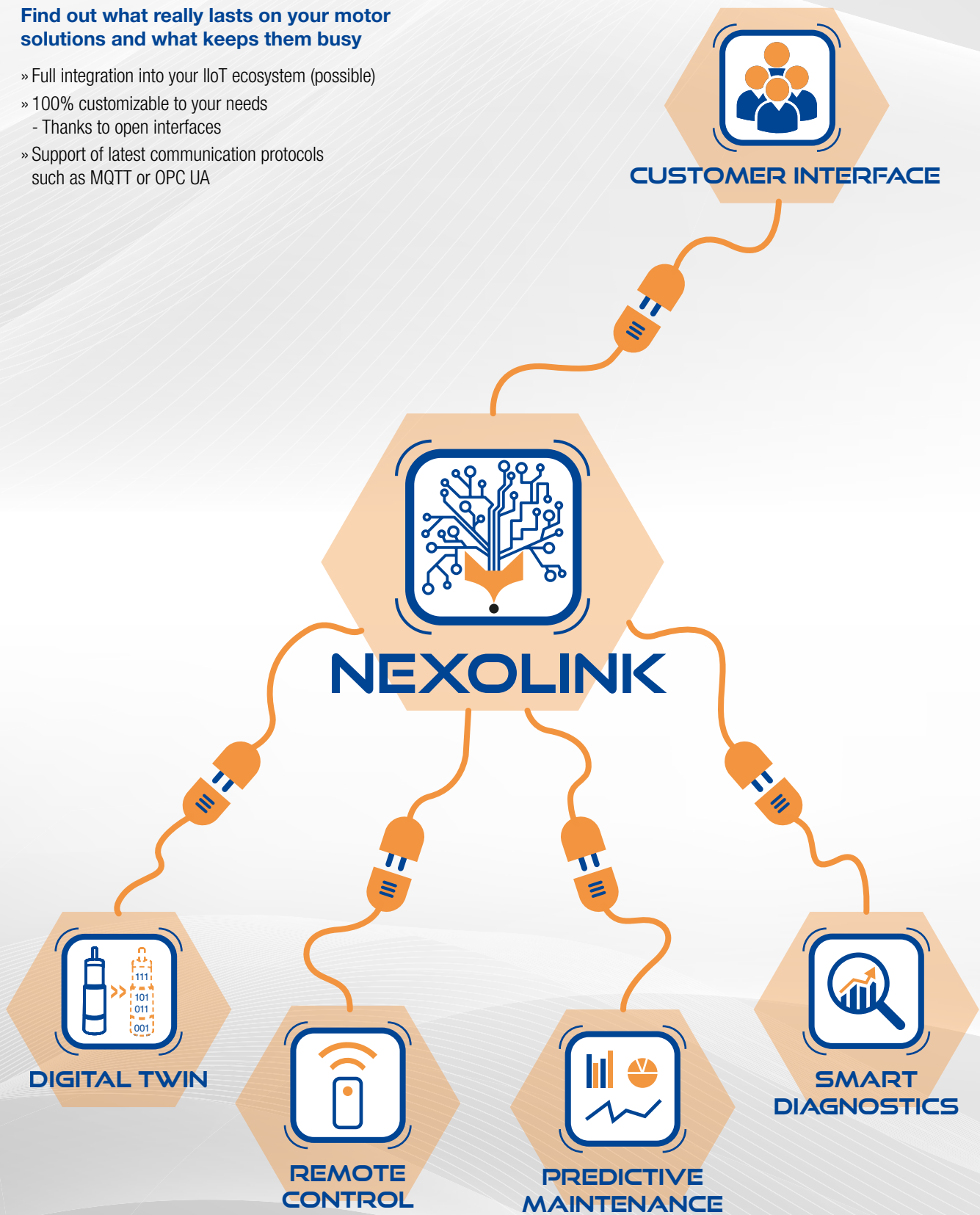
SMART DIAGNOSTICS

DIGITAL TWIN

Expand your industrial IoT solution with the digital twin of your Dunkermotoren motor solution.

» Exchange of product data via AAS
» Cross-manufacturer data provision

CO₂	CO₂	CO₂	CO₂
Supplier	Dunkermotoren	Machine Builder	Operator
Production	Production	Production / Operation	Production / Operation

SMART DIAGNOSTICS

Cloud-based solution with intuitive dashboards for visualizing the most important drive parameters. Gain insights without internal effort

» Configurable gateway
» Alarms & warning messages
» No motor-specific IIoT knowledge required
» Updates & extensions

Starter Package	Enterprise
» 2 connected motors » Including 2 motors for rent » EDGE Gateway on request » Unlimited data for 3-month trial	» Contact our sales team to get an indiviual offer for your indiviual Smart Diagnostic Package

S	M	L
» Up to 50 connected motors » 150 MB high frequency data » EDGE Gateway on request » Yearly subscription	» Up to 100 connected motors » 250 MB high frequency data » EDGE Gateway on request » Yearly subscription	» Up to 500 connected motors » 750 MB high frequency data » EDGE Gateway on request » Yearly subscription

NEXOLINK

NexoLink is the basis for getting your Dunkermotoren motor solution ready for industrial IoT.

» Fully integrated into your industrial IoT ecosystem
» Expandable at any time
» MQTT and OPC UA capable

PREDICTIVE MAINTENANCE

The health of your Dunkermotoren motor solution is as important to you as it is to us?
Predictive Maintenance by nexofox offers a comprehensive insight

» Sensorless determination of gearbox wear
» Cloud-based optimization of algorithms (temporary data connection required)
» Analysis of data directly on the EDGE

CUSTOMER IIOT-ECOSYSTEM

All nexofox IIoT solutions are / can be integrated into your industrial IoT ecosystem.

» ERP
» MES

>> **We are at your Side throughout the entire Product Life Cycle**

PROJECT IDEA	CONCEPT DEVELOPMENT	PROJECT REALIZATION
Design Workshop	Drive Design	Programming
Advice	Concept-creation (System & Software)	Individual Development
System Analysis		Lifetime Analysis
	Design to Cost	System Integration
		Qualification & Validation

Your Benefit

» Draw on our expertise and experience in drive technology throughout the entire product life cycle.

» Our motors are used in a wide variety of applications from a simple rotary device to sophisticated programming to digital services offered through nexofox

» Relieve your engineers and leave the selection, dimensioning and programming of the motors to the team Dunkermotoren and nexofox

Rely on us as your partner throughout your entire project and beyond!

nexofox
AMETEK®

COMMISSIONING → **SUPPORT & MONITORING**

Commissioning Support
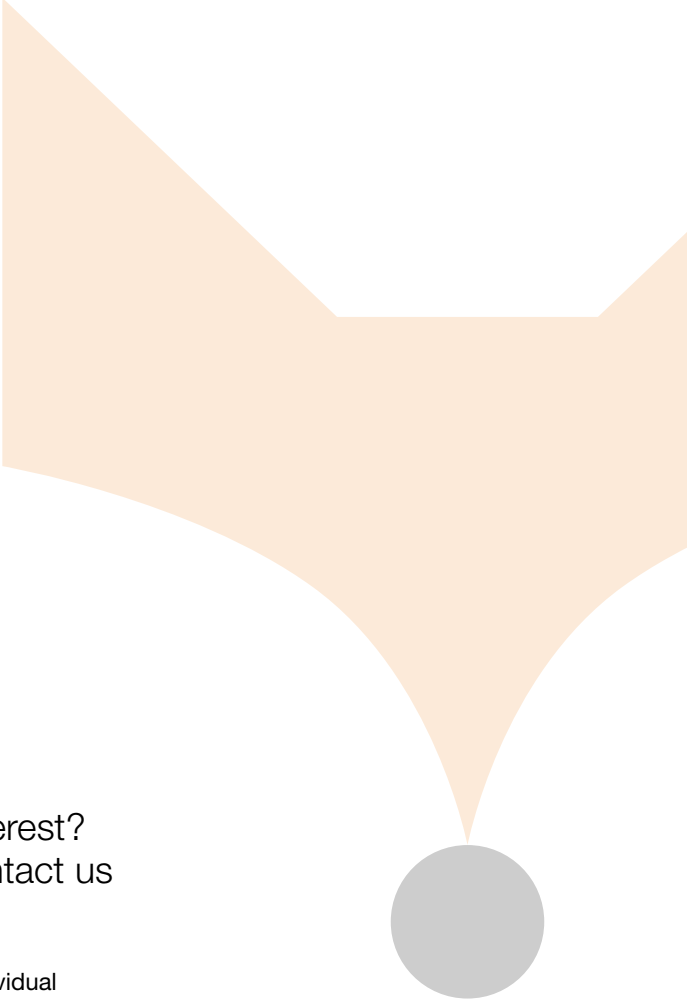
Specific Controller-setting

Digital Services (Device Cloud & Applications)

Support (Remote & On site)

Trainings & Courses

We have always stood by our customers as a competent project partner and are continuously expanding this with new services.

" Have we piqued your interest?
Then please feel free to contact us
with your requirements.

Together we will find the perfect and individual
individual solution for you.

nexofox

AMETEK®