

MOTORTECH NO_x Monitoring

For Monitoring Emissions and Proving the Effective Operation of Gas-Otto lean-burn Engines



Benefits & Features

NO_x Monitoring: MOTORTECH EasyNO_x

The European Medium Combustion Plant Directive (MCP) is the guideline for regulating emissions in combustion engines from 1 MW energy input. The German Mechanical Engineering Industry (VDMA) provides a guideline for qualitative measuring of emissions.

For this purpose the EasyNO_x generates daily average values from the currently measured NO_x value and documented in the generous on-board data memory. The normal operation of the engine is decisive and starting and stopping processes of the lean-burn gas engine are excluded from the monitoring. Additionally, exhaust gas temperatures are recorded and monitored.

The EasyNO_x is available as **BASIC** package or **EXTENDED** package (communication option with master control system such as the ALL-IN-ONE system).

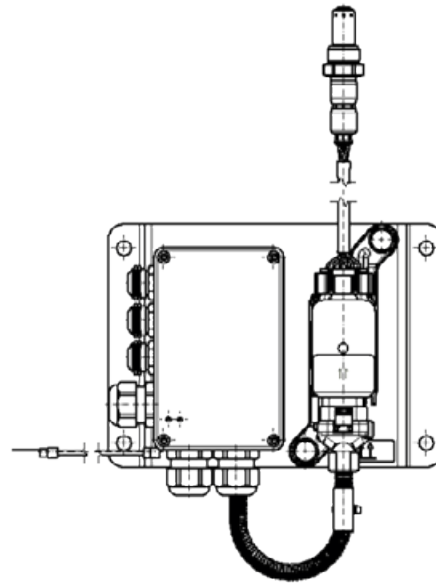
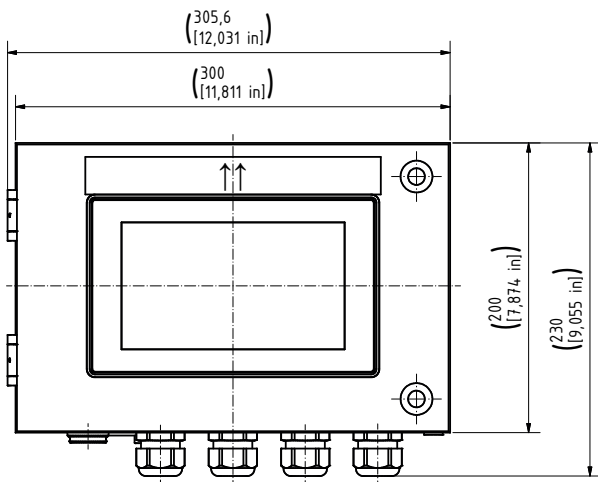


✓ Benefits

- ✓ Manipulation-safe data storage
- ✓ Generous on-board data storage
- ✓ Suitable for all Gas-Otto lean-burn engines
- ✓ Meets the requirements of VDMA 6299
- ✓ MOTORTECH NO_x sensor with **CE certificate**
- ✓ Simple reporting via USB interface
- ✓ No additional annual flat rate
- ✓ EasyNO_x prepared for later visualization of MOTORTECH ignition and knock detection
- ✓ Multi-modularity: monitoring of two engines simultaneously
- ✓ Each engine is equipped with NO_x sensors and temperature monitoring

Features

- NO_x and temperature detection in exhaust gas via separate sensors
- Daily averaging of NO_x values, monitoring and parameterization of the relevant exhaust gas values and alarm thresholds
- Data storage on on-board 16 GB SD card
- Visualization and operation via 7" touch panel in screwed metal housing
- Accumulation of operating hours and normal operating hours
- Warning messages and parameterization
- User management with password access
- Exhaust gas temperature monitoring
- Summation of days exceeding the NO_x limit
- Specification of absence hours and days in percent for easy evaluation
- Manipulation-safe data storage by means of private key procedure
- "Quick-Report" creation as PDF document with collected emission data via the USB interface
- **BASIC:** Normal operation detection via 4-20 mA MAP (boost pressure) input signal
- **EXTENDED:** Normal operation detection from data of the master control (load) via CANopen® communication or 4-20 mA input signal
- **EXTENDED:** CANopen® interface
- **EXTENDED:** Additional I/O module to accommodate 1 analog input, collective fault and emission status output as binary signals and 1 analog output for the NO_x signal



Technical Data

EasyNO_x [1]

- 7" capacitive multi-touch display with glass surface
- Resolution 800 pixels x 460 pixels
- Screwed metal housing with swing door
- Dimensions 300 mm x 200 mm x 80 mm (L x W x H)
- Protection class IP66
- Powder-coated
- 4x PG cable gland for input and output cabling at the bottom of the device
- USB 2.0 type A interface on the bottom
- CAN Bus interfaces (1x CANopen® (ISO/DIS 11898), (1x SAE J1939 (ISO/DIS 11898), galvanically isolated)
- Operating conditions 0 °C to 50 °C
- Power supply 24 V DC
- Power consumption max. 67 W*
- Current consumption max. 4.2 A*

CAN Bus/NO_x sensor module [2]

- Evaluation unit of the NO_x sensor and CAN bus module on mounting plate
- Pre-assembled and pre-wired
- Dimensions 206.5 x 150 x 82 mm (L x W x H)
- Protection class IP66
- Permissible ambient temperature -40 °C to +85 °C

CAN Bus module [2a]

- 16 bit resolution
- 2 inputs for thermocouples (type K)
- 2 analog inputs (0-22 mA)

NO_x Sensor [2b]

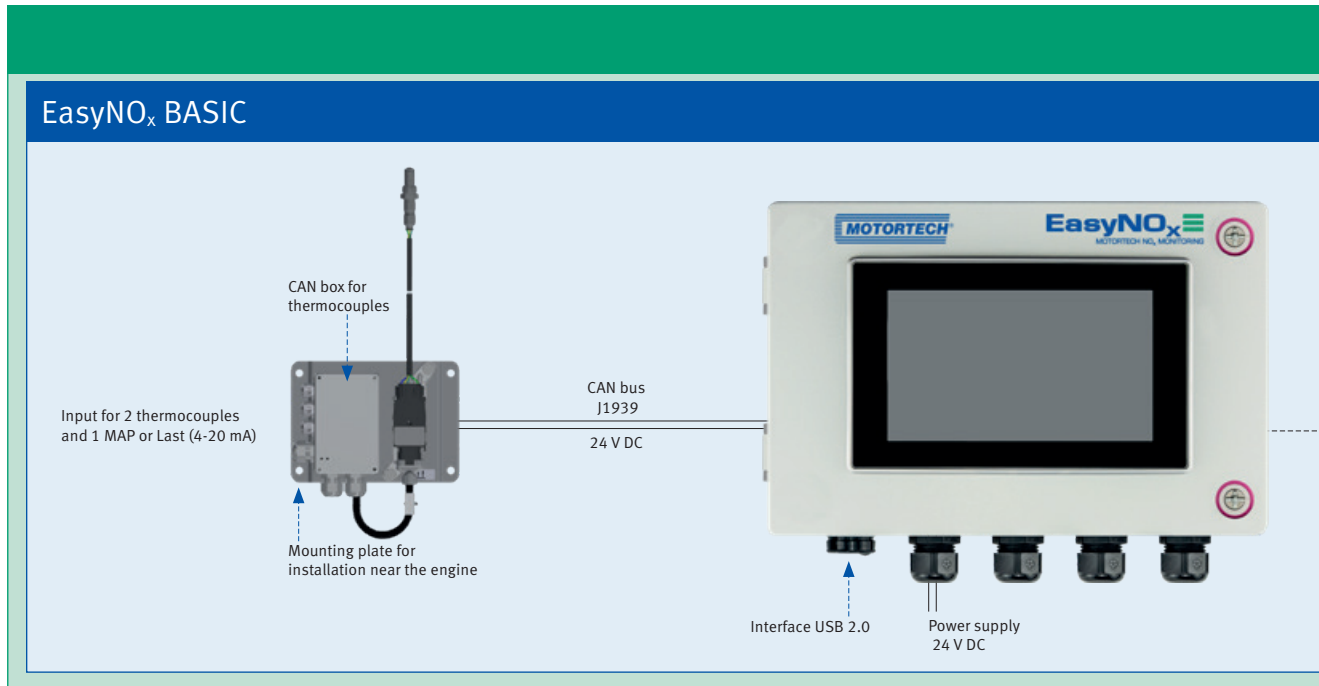
- Probe length 25.4 mm
- Length sensor element 96.9 mm
- Length of connecting cable 900 mm
- Protection class IP6K9K
- Exhaust gas temperature: -40 °C to 800 °C
- Operating temperature Hexagon nut: -40 °C to +620 °C
- Operating temperature Sensor sleeve/connecting cable harness: -40 °C to +200 °C
- Operating pressure range: 800 mbar to 1,600 mbar abs
- Power supply 24 V DC
- Power consumption max. 20 W
- Current consumption max. 6.2 A
- CAN SAE J1939
- CE certificate (EMC Directive, RoHS Directive)

I/O communication module (EXTENDED) [3]

- Communication with the higher-level CHP control
- For installation in the control cabinet by the customer
- 3x binary outputs (collective fault, emission level OK, start/stop)
- 1x binary input (start/stop)
- 1x analog input (load)
- 1x analog output (NO_x signal)

* With up to 2 connected CAN bus/NO_x sensor modules
Data preliminary, subject to technical changes.

System Overview BASIC



Scope of delivery – EasyNO_x BASIC

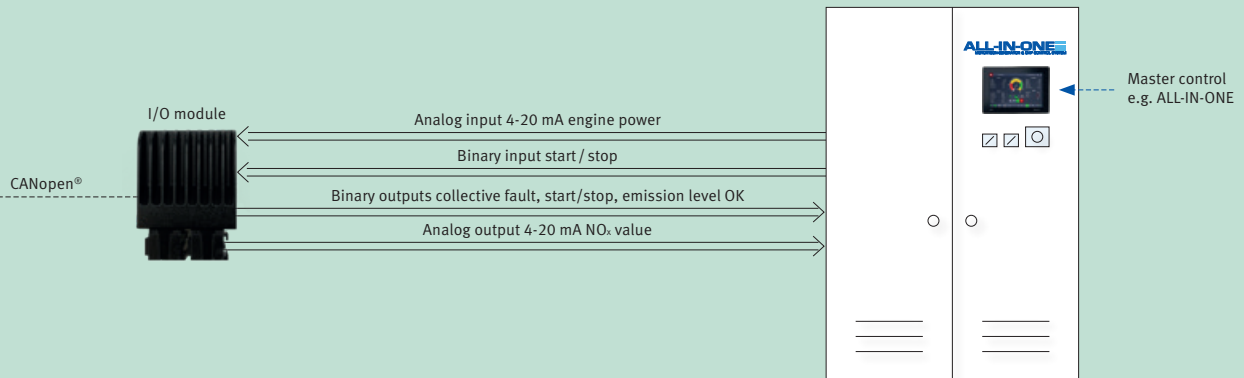
Package	Consists of
EasyNO _x BASIC package for 1 engine	<ul style="list-style-type: none"> ■ 1 EasyNO_x [1] ■ 7" capacitive LED touchpanel in metal housing (300 mm x 200 mm x 80 mm) with USB interface ■ EasyNO_x software for NO_x monitoring for 1 engine ■ 16 GB SDHC memory card ■ 4 cable fittings with seal inserts ■ Pre-assembled and pre-wired ■ 1 CAN Bus/NO_x sensor module [2] ■ 1 NO_x sensor (24 V) ■ 1 welding boss for NO_x sensor ■ 1 CAN bus module¹⁾ for temperature detection and to implement 2 thermocouples²⁾ (type K) and the CAN bus connection of the NO_x sensor. Evaluation unit of the NO_x sensor and temperature detection module pre-assembled and pre-wired on mounting plate.
EasyNO _x BASIC package for 2 engines within close range or engine room	<ul style="list-style-type: none"> ■ 1 EasyNO_x [1] ■ 7" capacitive LED touchpanel in metal housing (300 mm x 200 mm x 80 mm) with USB interface ■ EasyNO_x software for NO_x monitoring for 2 engines ■ 16 GB SDHC memory card ■ 4 cable fittings with seal inserts ■ Pre-assembled and pre-wired ■ 2 CAN Bus/NO_x sensor modules [2] ■ 1 NO_x sensor each (24 V) ■ 1 welding boss each for NO_x sensor ■ 1 CAN bus module¹⁾ each for temperature detection and to implement 2 thermocouples²⁾ (type K) and the CAN bus connection of the NO_x sensor. Evaluation unit of the NO_x sensor and temperature detection module pre-assembled and pre-wired on mounting plate.
EasyNO _x BASIC extension package for 2nd engine within close range or engine room	<ul style="list-style-type: none"> ■ 1 EasyNO_x software dongle [1] ■ EasyNO_x software for NO_x monitoring for 1 additional engine and its value acquisition via the existing EasyNO_x touch panel ■ 1 CAN Bus/NO_x sensor module [2] ■ 1 NO_x sensor (24 V) ■ 1 welding boss for NO_x sensor ■ 1 CAN bus module¹⁾ for temperature detection and to implement 2 thermocouples²⁾ (type K) and the CAN bus connection of the NO_x sensor. Evaluation unit of the NO_x sensor and temperature detection module pre-assembled and pre-wired on mounting plate.

¹⁾ CAN bus wiring to EasyNO_x as well as power supply (24 V DC) must be provided by the customer.

²⁾ Thermocouples must be offered and ordered separately.

System Overview EXTENDED

EasyNO_x EXTENDED



Scope of delivery – EasyNO_x EXTENDED

Package	Consists of
EasyNO _x EXTENDED package for 1 engine	<ul style="list-style-type: none"> 1 EasyNO_x [1] <ul style="list-style-type: none"> 7" capacitive LED touchpanel in metal housing (300 mm x 200 mm x 80 mm) with USB interface EasyNO_x software for NO_x monitoring for 1 engine 16 GB SDHC memory card 4 cable fittings with seal inserts Pre-assembled and pre-wired 1 CAN Bus/NO_x sensor module [2] <ul style="list-style-type: none"> 1 NO_x sensor (24 V) 1 welding boss for NO_x sensor 1 CAN bus module¹⁾ for temperature detection and to implement 2 thermocouples²⁾ (type K) and the CAN bus connection of the NO_x sensor. Evaluation unit of the NO_x sensor and temperature detection module pre-assembled and pre-wired on mounting plate. 1 I/O communication module [3] <ul style="list-style-type: none"> For communication with the CHP master control (ECU or PLC) and for installation in the control cabinet
EasyNO _x EXTENDED package for 2 engines within close range or engine room	<ul style="list-style-type: none"> 1 EasyNO_x [1] <ul style="list-style-type: none"> 7" capacitive LED touchpanel in metal housing (300 mm x 200 mm x 80 mm) with USB interface EasyNO_x software for NO_x monitoring for 2 engines 16 GB SDHC memory card 4 cable fittings with seal inserts Pre-assembled and pre-wired 2 CAN Bus/NO_x sensor modules [2] <ul style="list-style-type: none"> 1 NO_x sensor each (24 V) 1 welding boss each for NO_x sensor 1 CAN bus module¹⁾ each for temperature detection and to implement 2 thermocouples²⁾ (type K) and the CAN bus connection of the NO_x sensor. Evaluation unit of the NO_x sensor and temperature detection module pre-assembled and pre-wired on mounting plate. 2 I/O communication modules [3] <ul style="list-style-type: none"> For communication with the CHP master control (ECU or PLC) and for installation in the respective control cabinet
EasyNO _x EXTENDED extension package for 2nd engine within close range or engine room	<ul style="list-style-type: none"> 1 EasyNO_x software dongle [1] <ul style="list-style-type: none"> EasyNO_x software for NO_x monitoring for 1 additional engine and its value acquisition via the existing EasyNO_x touch panel 1 CAN Bus/NO_x sensor module [2] <ul style="list-style-type: none"> 1 NO_x sensor (24 V) 1 welding boss for NO_x sensor 1 CAN bus module¹⁾ for temperature detection and to implement 2 thermocouples²⁾ (type K) and the CAN bus connection of the NO_x sensor. Evaluation unit of the NO_x sensor and temperature detection module pre-assembled and pre-wired on mounting plate. 1 I/O communication module [3] <ul style="list-style-type: none"> For communication with the CHP master control (ECU or PLC) and for installation in the control cabinet

¹⁾ CAN bus wiring to EasyNO_x as well as power supply (24 V DC) must be provided by the customer.

²⁾ Thermocouples must be offered and ordered separately.

Important Note: The operator is obliged to keep the device up to date with future updates provided by MOTORTECH to ensure secure data storage and functionality.

Data preliminary, subject to technical changes.

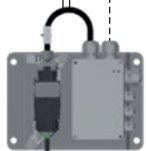
Wiring Diagram BASIC

BASIC 1. Engine

EasyNO_x
MOTORTECH NO_x MONITORING



CAN J1939
24V DC

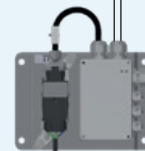


2x thermocouple input
1x analog input MAP or Last



BASIC 2. Engine (Expansion package)

120 Ω switchable / CAN J1939



2x thermocouple input
1x analog input MAP or Last

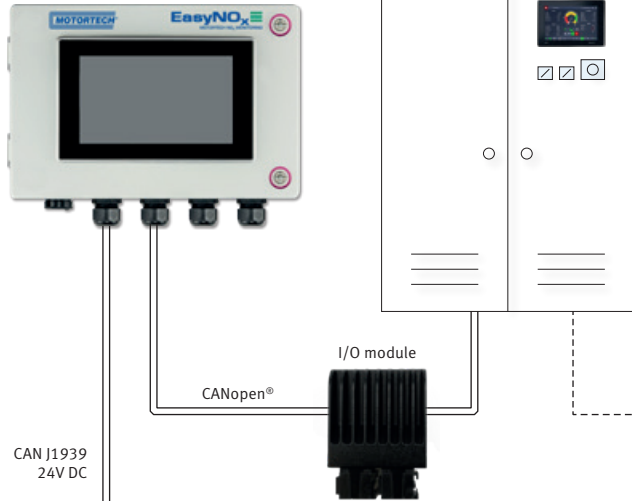


Wiring Diagram EXTENDED

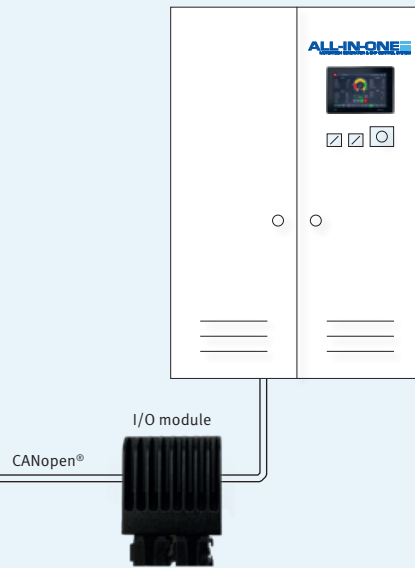


EXTENDED 1. Engine

EasyNO_x
MOTORTECH NO_x MONITORING



EXTENDED 2. Engine (Expansion package)



CAN J1939
24V DC

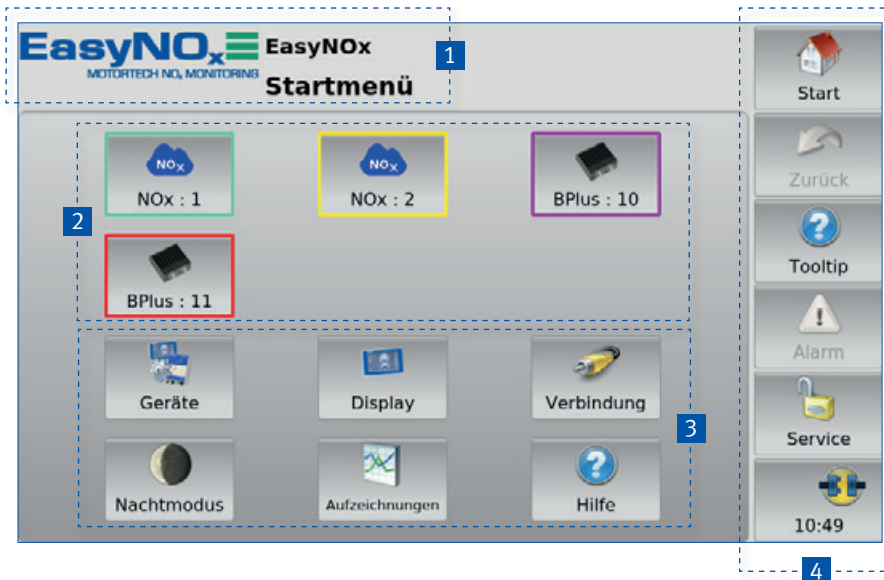
120 Ω switchable / CAN J1939

2x thermocouple input
1x analog input MAP or Last

2x thermocouple input
1x analog input MAP or Last

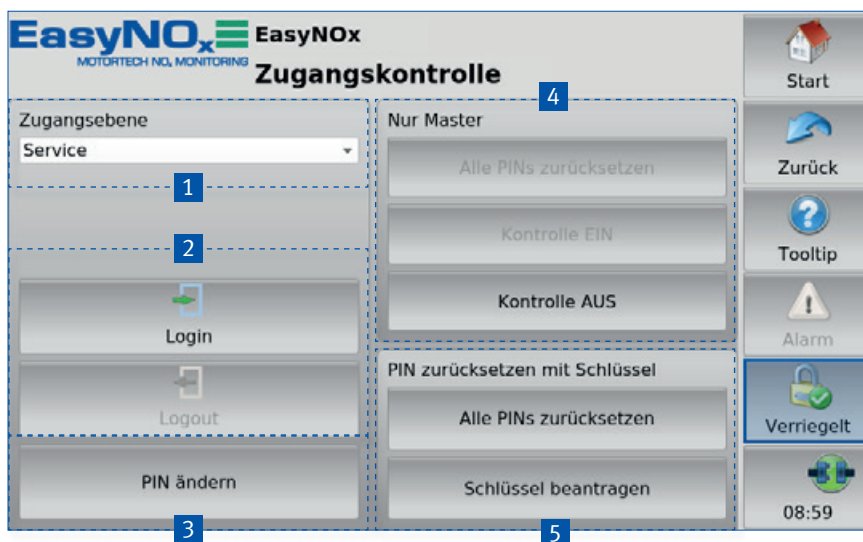
Screenshots Software

Evolution of the PowerView3 – Proven Software Base



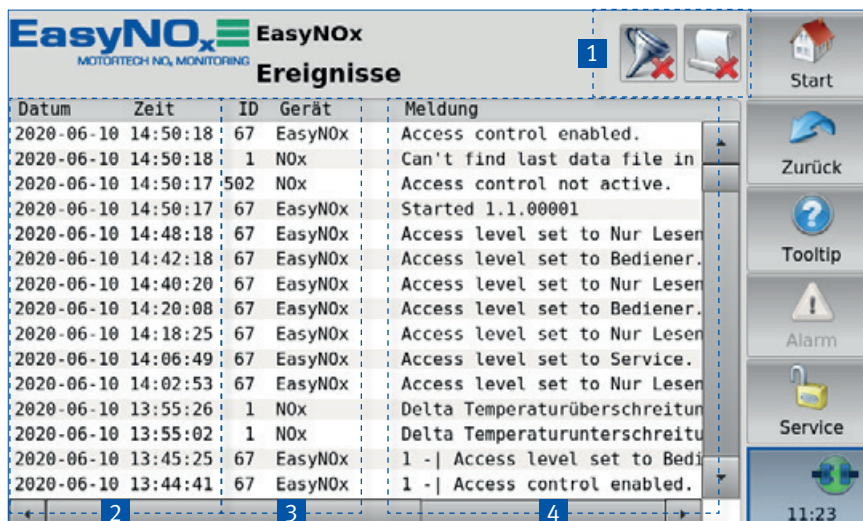
- 1 Title bar
- 2 Devices
- 3 Standard functions
- 4 Fixed button bar

Start menu: Device management, operating concept, trending, data recording, alarms & history, PDF reports, voice selection, help system, integration of other MOTORTECH devices, firmware update



- 1 Master Service Operator Read only
- 2 Login/logout
- 3 Change PIN
- 4 Administration
- 5 Emergency: PIN loss

Access control



- 1 Filter
- 2 Timestamp (sorting: newest first)
- 3 ID & device type
- 4 Message texts

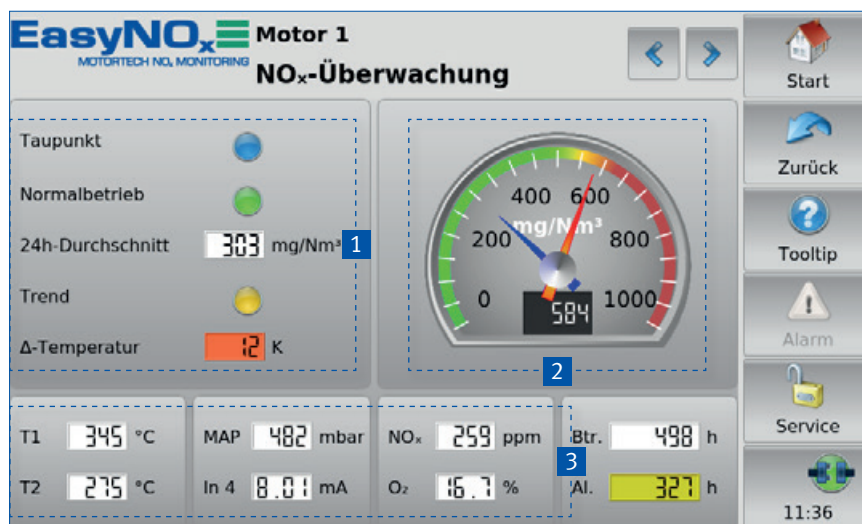
Events: Message list

User interface EasyNO_x



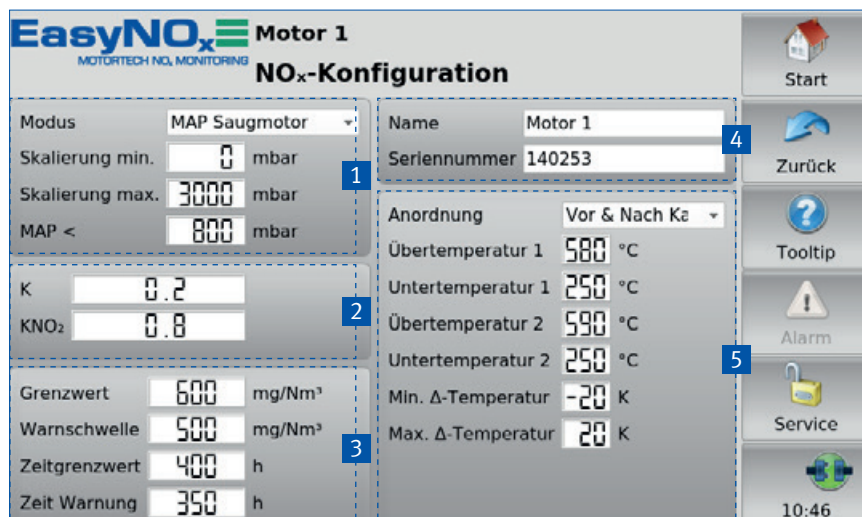
- 1 Live values
- 2 Data export
- 3 Configuration
- 4 Help

NO_x Main Menu



- 1 Status
- 2 NO_x – Current value & daily average value
- 3 Current measured values

Engine 1:
NO_x Monitoring (DEMO MODE)



- 1 Standard operation
- 2 NO_x measurement
- 3 Limit values
- 4 Name & measuring period
- 5 Oxi-Kat monitoring

Engine 1:
Setting NO_x thresholds

Ordering Information

Ordering Information EasyNO_x Packages

Packages	P/N	Description
EasyNO _x BASIC ¹⁾	63.05.001-01	EasyNO_x BASIC package for 1 engine consists of: <ul style="list-style-type: none"> ■ 1 EasyNO_x ■ 1 CAN Bus/NO_x sensor module ^{2) 3)}
	63.05.001-02	EasyNO_x BASIC package for 2 engines within close range or engine room consists of: <ul style="list-style-type: none"> ■ 1 EasyNO_x ■ 2 CAN Bus/NO_x sensor modules ^{2) 3)}
	63.05.001-03	EasyNO_x BASIC extension package for 2nd engine within close range or engine room consists of: <ul style="list-style-type: none"> ■ 1 EasyNO_x software dongle ■ 1 CAN Bus/NO_x sensor module ^{2) 3)}
EasyNO _x EXTENDED	63.05.002-01	EasyNO_x EXTENDED package for 1 engine consists of: <ul style="list-style-type: none"> ■ 1 EasyNO_x ■ 1 CAN Bus/NO_x sensor module ^{2) 3)} ■ 1 I/O communication module
	63.05.002-02	EasyNO_x EXTENDED package for 2 engines within close range or engine room consists of: <ul style="list-style-type: none"> ■ 1 EasyNO_x ■ 2 CAN Bus/NO_x sensor modules ^{2) 3)} ■ 2 I/O communication modules
	63.05.002-03	EasyNO_x EXTENDED extension package for 2nd engine within close range or engine room consists of: <ul style="list-style-type: none"> ■ 1 EasyNO_x software dongle ■ 1 CAN Bus/NO_x sensor module ^{2) 3)} ■ 1 I/O communication module

¹⁾ A MAP signal (4-20 mA) must be provided by the customer for normal operation detection.

²⁾ CAN bus wiring to EasyNO_x as well as power supply (24 V DC) must be provided by the customer.

³⁾ Thermocouples must be offered and ordered separately.

Ordering Information Accessories and Spare Parts

Accessories	P/N	Description
Thermocouple	56.01.185-15000	Thermocouple <ul style="list-style-type: none"> ■ NiCr-Ni, type K, according to DIN EN 60584, class 1 ■ Probe diameter: 4.5 mm ■ Probe length: 100 mm ■ Connection cable 15.000 mm ■ Flexible thermo cable, 2 x 0.22 mm², individually and together with Teflon® (FEP) insulated ■ Kink protection spring
	56.01.186-15000	Thermocouple <ul style="list-style-type: none"> ■ NiCr-Ni, type K, according to DIN EN 60584, class 1 ■ Probe diameter: 4.5 mm ■ Probe length: 200 mm ■ Connection cable 15.000 mm ■ Flexible thermo cable, 2 x 0.22 mm², individually and together with Teflon® (FEP) insulated ■ Kink protection spring

Important Note: The operator is obliged to keep the device up to date with future updates provided by MOTORTECH to ensure secure data storage and functionality. Data preliminary, subject to technical changes.

Ordering Information Accessories and Spare Parts

Accessories	P/N	Description
Fittings for Thermocouples	64.40.041	Screw-in fitting <ul style="list-style-type: none"> Thread M12 x 1 Width across flat 14 mm Bore 4.6 mm Stainless steel (1.4571)
	64.40.042	Screw-in fitting <ul style="list-style-type: none"> Thread G 1/2" Width across flat 24 mm Bore 4.6 mm Stainless steel (1.4571)
	64.40.043	Screw-in fitting <ul style="list-style-type: none"> Thread 1/2" NPT Width across flat 22 mm Bore 4.6 mm Stainless steel (1.4571)
	64.40.044	Weld-in fitting <ul style="list-style-type: none"> Welding collar 14 x 5 mm Width across flat 14 mm Bore 4.6 mm Stainless steel (1.4571)
CAN Bus Hybrid Cable	06.05.093-25	CAN bus hybrid cable <ul style="list-style-type: none"> For connecting EasyNO_x to the CAN Bus/NO_x sensor module and its power supply (24 V DC) 2 x 1.5 mm², 2 x 0.5 mm², 1 x 0.5 mm² 25 m spool
	06.05.093-50	CAN bus hybrid cable <ul style="list-style-type: none"> For connecting EasyNO_x to the CAN Bus/NO_x sensor module and its power supply (24 V DC) 2 x 1.5 mm², 2 x 0.5 mm², 1 x 0.5 mm² 50 m spool
MAP Sensors	56.01.002	MAP sensor <ul style="list-style-type: none"> Measuring range 0 bar to 6 bar Output 4-20 mA, 2-wire Thread G 1/4" (DIN EN 837), stainless steel Sealing FPM
	56.02.017	MAP sensor <ul style="list-style-type: none"> Measuring range 0 bar to 3 bar Output 4-20 mA, 2-wire Thread G 1/4" (DIN EN 3852), stainless steel Sealing FKM
NO _x Sensor	56.03.003	NO_x sensor (included in scope of supply of CAN Bus/NO_x sensor module) <ul style="list-style-type: none"> Power supply 24 V DC CAN SAE J1939 interface CE certificate
I/O Communication module	63.05.014-01	I/O communication module for 1. engine (retrofit to existing BASIC)
	63.05.014-02	I/O communication module for 2. engine (retrofit to existing BASIC)

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GAS ENGINE TECHNOLOGY

Ignition Systems	Red
Spark Plugs & Accessories	Orange
Gas Engine Control Systems	Light Blue
Sensor Systems	Yellow
Air/Fuel Ration Control Systems	Green
Exhaust Gas Aftertreatment	Green
Gas Engine Accessories	Grey

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