

**BARTH<sup>®</sup> Engine Controller  
STG-125 12V Kubota<sup>®</sup>  
Art. No. 0850-0125**

**MANUAL**



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## 1 SAFETY INSTRUCTIONS

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and the connected equipment. These notices are highlighted in the manual by a warning symbol and are marked as follows according to the level of danger:



**Only qualified personnel should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground and to tag circuits, equipment and systems in accordance with established safety practices and standards.**



**Turn off the battery power supply before performing any wiring operations! Short circuits can be harmful, critical and can cause explosions and serious burns!**



**Please read this manual carefully and observe all safety instructions! Also take care to meet the engine manufacturer's warnings and instructions!**

## 2 DESTINATED USE

The Motor Controller STG-125 is designed to control KUBOTA<sup>®</sup> Super-Mini, 03-M- and 05-Engines. It must not be used for life critical, medical or fail safe applications.

## 3 DISCLAIMER

BARTH Elektronik GmbH assumes no liability for usage and functionality of the STG-125 in case of disregarding this manual. The strict accordance of this manual is important since the installation methods, peripheral connections, usage and maintenance can not be controlled by BARTH Elektronik GmbH. Therefore BARTH Elektronik GmbH assumes no liability for any claim.

## 4 PRODUCT DESCRIPTION



### 4.1 Features

- Engine START/STOP by one Push Button
- Automatic dynamical Preheating Control
- Self-acting Starter Motor Control
- Ignition Mode provides low-battery Cut-Off
- Generator Control and Starter Inhibition
- Oil Pressure Control & Cable Break Detection
- Cooling Water Temperature Control
- Automatic Failure Emergency Stop
- Entirely splashproof Housing IP 65
- Suitable for Outdoor Use in harsh Environment
- Fully protected against Sand, Ice and Rain
- Compact panel mount Housing
- Wide Operating Voltage Range 7 to 16 VDC
- Operating Temperature from -30 to +60°C
- Wiring Harness for KUBOTA<sup>®</sup> Super-Mini, 03-M- and 05-Engine Series available

### 4.2 Applications

- Construction Machines
- Agriculture Machines
- Exavators and Diggers
- Diesel Generator Sets

### 4.3 Delivery content

- BARTH<sup>®</sup> Engine Controller STG-125

#### 4.4 General description

The BARTH® STG-125 is an innovative and comfortable Diesel Engine Controller with outstanding monitoring functions suitable for all KUBOTA® Diesel Engines out of the Super-Mini, 03-M- and 05-Series.

Thanks to the high integration grade the STG-125 replaces vintage ignition switches and panel-mounted indicator lights by one powerful and reliable unit.

As a result you save precious space and wiring effort and won't get affected by broken or corroded mechanical ignition switches.

The controlled preheating and engine start procedures ensure in combination with the automatic failure engine stop functions the longest possible engine life.

In addition BARTH® offers the wiring harness KB-900 and KB-901 suitable for the STG-125 Engine Controller providing direct connection to all KUBOTA® Diesel Engines out of the 03-M- and 05-Series. The wiring harness KB-901 also supports the KUBOTA® Super-Mini Series featuring a ETS control circuit (energize to stop valve).

For bulk buyer BARTH® supplies the STG-125 also as OEM product in customer-tailored versions.

#### 4.5 Functions and operation



##### START/STOP BUTTON

Activating this button for a short time (<1s), switches the ignition relay output which powers up all ignition loads without starting the engine. This mode features a battery monitor which cuts-off all ignition load in case of battery under-voltage. Activating the button for longer than 1 second, the engine start procedure will be initiated. First of all the STG-125 checks whether or not preheating will be necessarily. In the second step the starter motors get powered up until the engine's idle speed is reached. Any malfunction during the engine starting procedure will time-limit each starter motor runtime to 5 seconds to get a secure protection against starter overheating. Activating the STG-125's button a second time the engine will be immediately being stopped.

##### **ON IGNITION / ENGINE ON**

This green indicator LED shows the main status of the STG-125 Motor Controller.

##### **BATTERY / GENERATOR**

The STG-125 controls and monitors generator voltage and frequency. Malfunction will be indicated by the red LED.

##### **ENGINE FAILURE**

Failed engine starting procedures, a broken sensor or cable break will be indicated by the yellow LED.

##### **OIL PRESSURE INDICATOR**

Low oil pressure leads to an immediate engine stop. The STG-125 also checks proper cable connection to the oil pressure sensor before start-up. Any malfunction inhibits the engine start procedure and lights up the red LED.

##### **TEMPERATURE INDICATOR**

An overheated engine is indicated by the red LED and also initiates an immediate engine stop.

					State
■ ■ ■	OFF	OFF	OFF	OFF	Controller in standby mode, engine is ready to start
—	—	OFF	OFF	OFF	Ignition ON and under-voltage-shutdown is activated, engine OFF
—	OFF	OFF	OFF	OFF	Engine runs without any issues
■ ■ ■ ■	—	OFF	OFF	OFF	Engine start procedure is enabled, green LED flashes during preheating
OFF	OFF	—	OFF	OFF	Engine malfunction due to failed start procedure
OFF	OFF	—	—	OFF	Engine malfunction due to low oil pressure
OFF	OFF	—	OFF	—	Engine malfunction due to overtemperature

## 5 INSTALLATION

### 5.1 Mounting



**The STG-125 must be installed and wired by a trained technician who knows and complies with both the universally applicable engineering rules and the regulations and standards that apply in specific cases.**

To mount the STG-125 you need a hole diameter of 51 to 52mm in your front panel. Fastening the STG-125 follows from the backside using the M50 nut.

**Take care to meet the environmental conditions of the STG-125.**

### 5.2 Wiring

The STG-125 must only be used in 12V DC systems. To connect the STG-125 the BARTH<sup>®</sup> wiring harness KB-900 or KB-901 is mandatory. BARTH<sup>®</sup> supplies a M12 connection cable to wire the STG-125 to any other customer-specific wiring harness.



**Turn off the power supply before performing any wiring operations!**



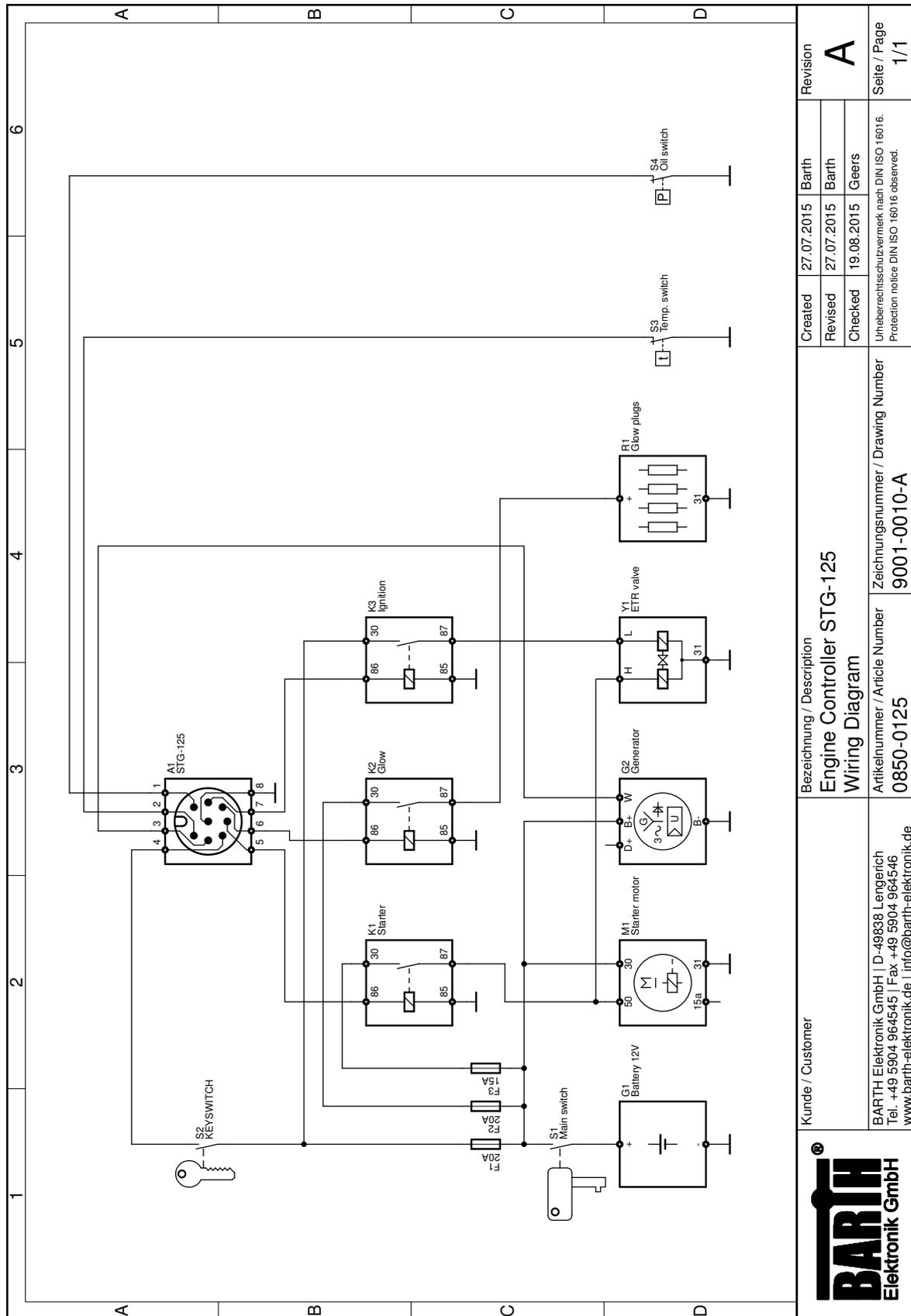
**False electrical connection, voltage reversal or disregarding the electrical specifications may cause irreversible damage of the STG-125!**

**Ensure correct power supply voltage range and polarisation!**

**External fusing is mandatory!**

For detailed information please refer to the following wiring diagram to connect the STG-125 to the diesel engine.

**5.3 Wiring Diagram**



## 6 APPENDIX

### 6.1 Specifications

#### 6.1.1 General

<b>Hardware design</b>	BARTH® rugged, fully sealed, splashproof panel mount housing
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#### 6.1.2 Power supply

<b>Operating voltage</b>	7 to 16 VDC
<b>Current consumption</b>	< 5 mA at 16 VDC STG-125 in stand-by mode
<b>Fusing</b>	5 A max. (external) mandatory for voltage reversal protection
<b>Voltage reversal protection</b>	yes (combined with external fuse)
<b>ESD/TVS protection</b>	yes
<b>Heat dissipation (at full load)</b>	normally < 1 W

#### 6.1.3 Inputs

<b>Temperature switch</b>	Digital, low-active, fully ESD/TVS Protection
<b>Oil Pressure switch</b>	Digital, low-active, Cable break Detection, fully ESD/TVS Protection
<b>Generator ‚W‘</b>	Analog, 0 to 16 VDC frequency counter

#### 6.1.4 Outputs

<b>Ignition Preheating Starter motor</b>	Output type: solid state, direct relay control  $I_{OUT} \leq 1,5 \text{ A}$ (resistive load) $U_{OUT} \geq U_{IN} - 0,45 \text{ V}$  Maximal allowable load inductance for a single switch off (one output): $V_{DD} = 12\text{VDC}$ , $I_L = 1,5\text{A}$ , $Z_L \leq 70\text{mH}$ $V_{DD} = 12\text{VDC}$ , $I_L = 1\text{A}$ , $Z_L \leq 200\text{mH}$  On-state resistance $V_{DD}$ to OUT: $R_{ON} \leq 180\text{mOhm}$  Turn-on time: $t_{ON} \leq 250\mu\text{s}$ Turn-off time: $t_{OFF} \leq 270\mu\text{s}$
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#### 6.1.5 Electrical connection

<b>Main connector</b>	Type: M12, 8-pole Manufacturer: BINDER Art. No. 79-3480-32-08
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#### 6.1.6 Electromagnetic compatibility (EMC)

<b>Electrostatic discharge (ESD) on any input</b>	20 kV air discharge 30 kV contact discharge (IEC/EN 61 000-4-2, level 3)
<b>Electrostatic discharge (ESD) on any output</b>	8 kV (human body model) (MIL-STD883D)
<b>Electromagnetic fields</b>	Field strength 10 V/m (IEC/EN 61000-4-3)

#### 6.1.7 Security features

<b>Security features</b>	Push button control Cable break detection Undervoltage shutdown Starter motor inhibit Emergency stop (oil pressure, high temperature)
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#### 6.1.8 Environmental conditions

<b>Operation temperature</b>	-30..+60 °C (IEC 60068-2-1/2)
<b>Storage temperature</b>	-30..+70 °C (IEC 60068-2-1/2)
<b>Relative humidity</b>	5 to 100%, condensing (IEC 60068-2-30)
<b>Air pressure (in operation)</b>	500 to 1500 hPa
<b>Shock resistance</b>	min. 100 m/s <sup>2</sup> (IEC 60068-2-27)
<b>Vibration resistance</b>	min. 50 m/s <sup>2</sup> @ 10..150 Hz (IEC 60068-2-6)
<b>Degree of protection</b>	IP 65 (IEC 60529)
<b>Drop</b>	Drop height: 250mm (IEC 60068-2-31)
<b>Free fall (packaged)</b>	1000 mm (IEC 60068-2-32)

#### 6.1.9 Weight and dimensions

<b>Weight</b>	200 g
<b>Dimensions</b>	56 x 47 mm (DxT)
<b>Panel Mount Diameter</b>	51 to 52 mm (D)

#### 6.1.10 Ordering information

<b>Ordering information</b>	Engine Controller STG-125 Art. No. 0850-0125
	For Kubota® 03-M and 05: Wiring Harness KB-900 Art. No. 0125-0900
	For Kubota® Super-Mini: Wiring Harness KB-901 Art. No. 0125-0901

## 6.2 Disposal



**If you wish to finally dispose of the product, ask your local recycling centre or dealer for details about how to do this in accordance with the applicable disposal regulations.**

## 6.3 Conformity declaration

For the following designated product it is hereby confirmed, that the construction in that technical design brought by us in traffic corresponds to the standards specified below. In the event of any alternation which has not been approved by us being made to any device as designated below, this statement shall thereby be made invalid.

<b>Description</b>	Engine Controller
<b>Type</b>	STG-125
<b>Art. No.</b>	0850-0125
<b>Directive 2004/108/EG relating to electromagnetic compatibility (EMC)</b>  <b>CE</b>	Applied norms: EN55022:2006+A1:2007 EN55024:1998+A1:2001 +A2:2003 EN61000-3-2:2006 +A1:2009+A2:2009 EN61000-3-3:2008 EN61000-6-2:2005
<b>RoHS Directive 2011/65EU</b>	We hereby declare that our product is compliant to the RoHS Directive on restriction of the use of certain hazardous substances in electrical and electronic appliances.

BARTH® Elektronik GmbH

Lengerich, 10.10.2013



Dipl.-Ing. (FH) D. Barth  
 Managing Director

## 6.4 Documents, videos and software

Detailed information, additional documents, application notes and videos relating to this product are downloadable from [www.barth-elektronik.de](http://www.barth-elektronik.de)