

Operating Instructions

CANarmatur

from ehb5160H

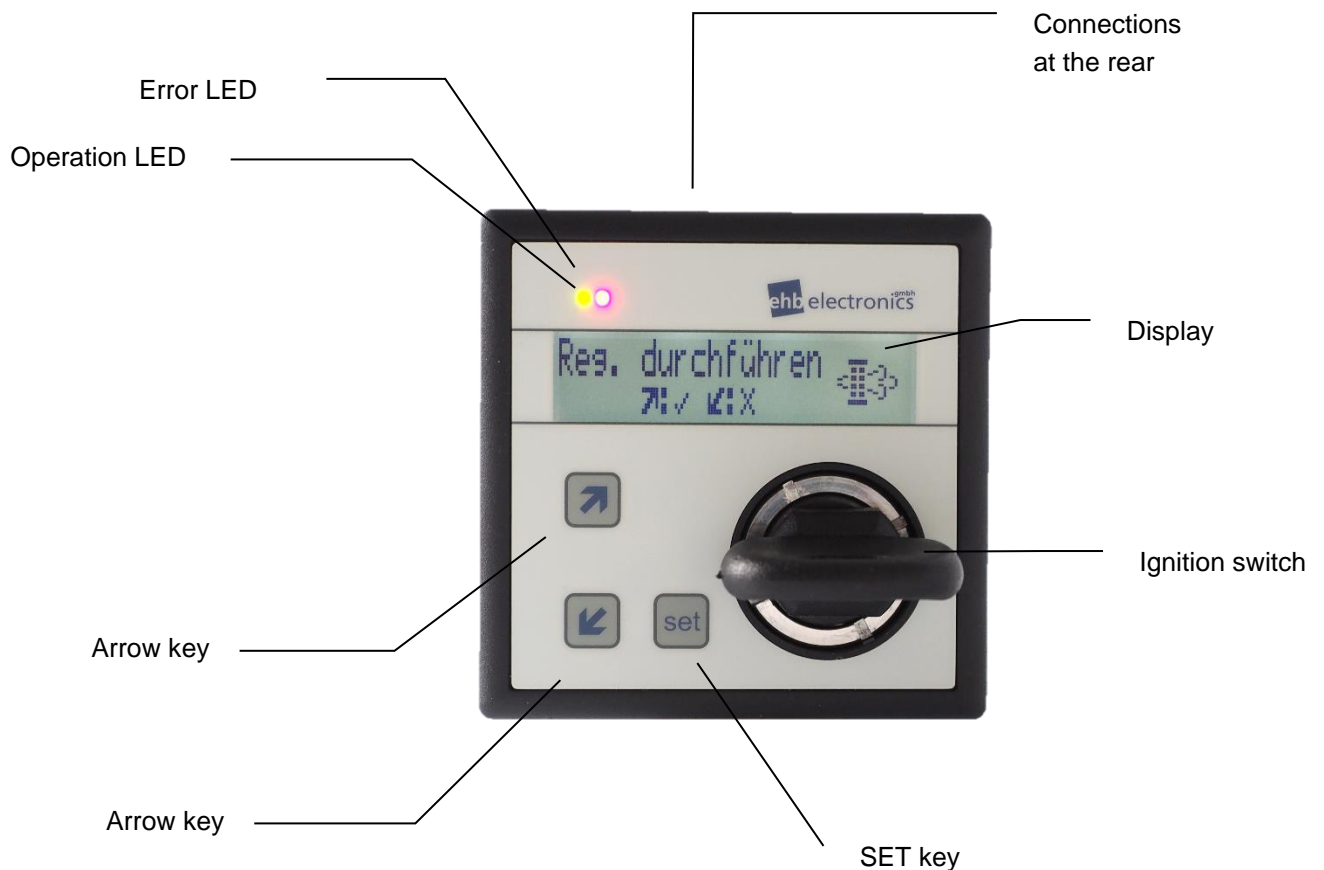


Information for service personnel

Version 2.64

1. Quick start guide

1.1 CANarmatur view



1.2 Function of the keys



Key	Meaning
set	Display of the selected operational values; error confirmation; entry and confirmation key for parametrisation.
	Arrow key (top key): Next display; increase value and number; speed increase (if parametrised)
	Arrow key (bottom key): Previous display; reduce value and number; speed reduction (if parameterised)
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Engine Torque 79 % </div>	Display of two lines with 16 characters each

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2. General information

2.1 Introduction

The CANarmatur is based on the CAN system (Controller Area Network). It is a communication protocol for exchanging short messages under real time conditions. The asynchronous, serial bus system was originally developed for the automotive industry to reduce the cable harnesses (up to 2 km for each vehicle) and therefore save weight and costs.

CANbus operates according to the CSMA procedure (Carrier Sense Multiple Access). The bus is either designed with copper lines or glass fibres. In the case of copper lines, CANbus operates with differential signals. It is normally designed with three lines. CAN_HIGH, CAN_LOW and CAN_GND (ground). CAN_LOW includes the complementary level of CAN_HIGH to ground. As a result, common-mode interference is suppressed as the difference remains the same.

The CANarmatur is a human/machine interface and is used by the operator of the machine or the unit to enable communication with the engine management system of an electronically controlled engine. The Engine Management Systems (EMS) of the individual engine manufacturers have an engine controller and also provide information about operational values on the CANbus (e.g. oil pressure, temperature, speed, operating hours and much more). The CANarmatur receives this engine data and displays them on the integrated LC display. It should be noted that not every engine manufacturer outputs the same data quantity via the CANbus.

Many engine manufacturer's work with an EMS according to SAE J1939. The CANarmatur can therefore receive, decode and represent all the information provided by the EMS if it is based on the SAE J1939 protocol. However a lot of this information is not of interest for daily operation so that the standard software supports the display of the following values:

- Operating hours
- Service hours
- Target speed
- Speed
- Engine oil pressure
- Engine oil temperature
- Engine oil level
- Coolant temperature
- Coolant level
- Fuel pressure
- Fuel Level
- Fuel Temp.
- Torque
- AUX Pressure
- AUX RPM
- AdBlue Level¹

Service times can be displayed; they are read in locally by the CANarmatur. As part of customer-specific modified software, the display of other values is possible.

Together with receiving and representing operational values, speed settings can also be sent to the EMS.

! Attention! Whether this function is supported depends of the respective MMS. Some MMS's do not allow any speed changes via the CANbus. Please also observe the MMS manual of your engine. The reason why some engine manufacturers do not support this function is because the CANbus is an asynchronous bus. This means that there is no guarantee that there is an immediate response (in this case a speed adjustment) to a command. For this reason, safety-relevant functions are often not allowed as bus functions.

The same also applies for switching off the engine in case of a fault. This is a basic function of all EMSs. Whether the engine is stopped and the type of events when this occurs must be defined via the configuration of the EMS. This is generally carried out by service technicians from the engine manufacturer.

¹ Only for software S05160-1x

2.2 Target group

This documentation is intended for service personnel who configure the CANarmatur. If your end customer carries out the programming himself, please note that he should receive the operating manual that was issued for the service personnel.

2.3 Important information on use

Test	Before delivering the installed CANarmatur to the end user, a functional test should be carried out in the peripheral equipment that is to be used.
Use	<p>This device is to be operated only in combination with the supplied accessories. Use only mild cleaning agents.</p> <p>Do not insert any objects into the device openings not intended for this purpose, since otherwise electronic faults can result.</p> <p>Protect the locking cylinder of the ignition starter switch from penetrating dirt and water.</p> <p>All switching inductors must be equipped with a free-wheeling diode.</p> <p>A battery master switch may only be opened in case of emergency or with the engine at a standstill and the device deactivated.</p> <p>The connection for the main power supply is realised directly at the battery terminals, whereby a line with sufficiently-large cross-sectional area and suitable fusing are used.</p>

When operating the device, comply with the applicable accident prevention regulations

Safety	Do not operate the CANarmatur within range of strong electromagnetic fields. Note and comply with the temperature information provided in chapter.
Installation	During the installation of the device follow the directions of the manufacturers of plugs and wire harnesses
Storage	A decommissioned CANarmatur must be stored under the conditions specified.
Shipping	<p>The unit is to be shipped either in its original packaging or in suitable sturdy alternative packaging.</p> <p>Improper packaging is regarded as <i>negligence</i> and results in any claims for repair under guarantee being forfeited.</p>
Maintenance	The CANarmatur requires no maintenance and no special upkeep over its entire service life.
Opening the CANarmatur	<p>The CANarmatur contains no parts that can be maintained, replaced or repaired by the customer or by third-party maintenance personnel.</p> <p>The CANarmatur has a protective seal to prevent it being opened without authorization. Please note that any unauthorized opening of the device will lead to it being irreparably damaged.</p>



ATTENTION!

Never use a high-pressure cleaner to clean the device. Instruct your service personnel that any high-pressure cleaning will cause damage and voids the warranty.

2.4 Repairing of devices

Should the device require repair work, please return it to:

ehb electronics gmbh
Hans-Böckler-Str. 20
30851 Langenhagen
GERMANY

Please make sure that you include a written fault description. This will facilitate the work of the ehb electronics gmbh service department and ensure faster return of your CANarmatur.

Alternatively you can use our online service for the returning of devices: www.ehbservice.de

NOTE!



ehb electronics GmbH assumes liability only for the proper execution of services and the correct characteristics of the materials used. Any further claims such as for loss of profit and for direct and indirect consequential damages such as loss of data are excluded.



ATTENTION!

Damages arising from improper packaging of the device for shipping and/or unauthorised intervention will invalidate the guarantee.

2.5 Disposal of devices

Product



Please dispose of the product at the end of its service life in accordance with the legal provisions.

Rechargeable batteries and other batteries



As the final consumer, you are legally obliged to return all used rechargeable batteries and other batteries (in accordance with the EU Batteries Directive). Disposal as household waste is not permitted.

Batteries containing hazardous substances are identified by the symbol shown here, this symbol indicating that disposal as household waste is not permitted. The chemical symbols for the hazardous heavy metals are:

Cd (cadmium)
Hg (mercury)
Pb (lead)

If a battery contains a hazardous heavy metal, the corresponding chemical symbol will appear on the battery, e.g. beneath the waste container symbol shown above. Dead batteries can at no cost be discarded at municipal waste collection points and also handed over to retail outlets where rechargeable batteries and other batteries are sold.

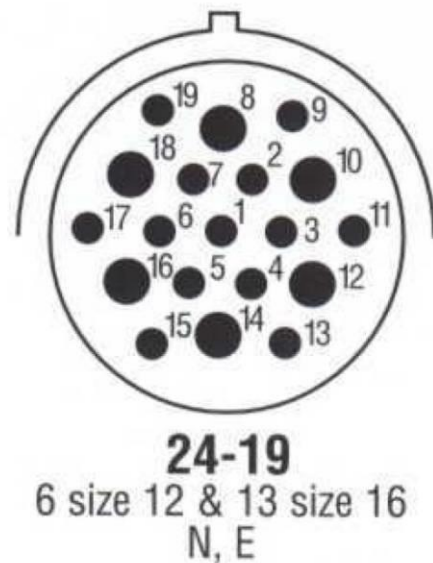
By acting in accordance with this disposal requirement, you will be fulfilling your legal obligations as well as contributing to the protection of the environment. Your compliance in this matter is appreciated.

3. Operation

3.1 Connection

The CANarmatur is attached using the supplied clamping brackets or three M6 threaded bushes in the housing bottom. The CANarmatur is electrically connected via a 19-pole D-plug. The standard wiring setup is indicated below.

Low-power contacts	
1	CAN-H
2	Input AUX 3 / term. "W"
3	CAN-L
4	Input OP 2
5	Terminal 31, GND (ground)
6	Input OP 3
7	Input AUX 1
9	Input AUX 2
11	Input OP 4
13	Input OP 1
15	Output AUX 2
17	NC
19	NC



High-power contacts	
8	50f to starter
10	Output OP 1
12	Output OP 2
14	"30" terminal, battery +
16	Output AUX 1
18	Output TERMINAL 15

Description

Plug for output
 Union nut for attachment

Manufacturer

DEUTSCH
 DEUTSCH

Order description

HDP24-24-19PE
 112263-90

3.1.1 Inputs

Inputs can be configured for the following signal types and functions (see section 4.5ff)

Input	Signal type						Function											
	switch to GND (<2.5V)	switch to + (UB)	sw. to GND (<1/4 UB)	Terminal " W" (0 to 0-1kOhm/0-180Ohm)	0-1kOhm		Switch alarm	Plus RPM	Minus RPM	to maximum RPM	to minimum RPM	to Operate RPM	Speed measurement	Diesel level measure-	Pressure measure-	Analogue gas position ²	Water in fuel ¹	Parking brake ¹
AUX 1	X				X		X	X		X				X		X		
AUX 2	X					X	X		X		X				X	X		
AUX 3		X		X			X					X	X				X	
OP 1			X				X	X		X								
OP 2			X				X		X		X							
OP 3			X				X					X						
OP 4			X				X											X

3.1.2 Outputs

The outputs are resistant to short-circuit and temperature.

An output is switched to active when the appropriately configured events occur. Several events can also occur in order to activate an output. These events are then linked to each other. This means that as long as one of the configured events is present, the output is still active.

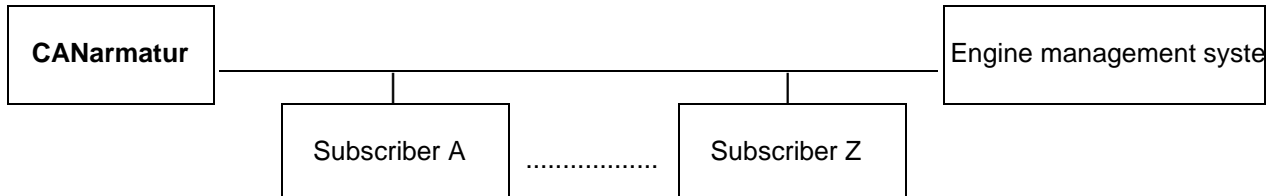
! Attention! Output OP 2 is an inversion of output OP 1.

Output	Signal type			Event									
	Not active: UB (switched, max. 2A) Active: 0V (output not switched)	Not active: 0V (output not switched) Active: UB (switched, max. 2A)	Delayed activation	Alarm of AUX 1 (switch or diesel level not reached)	Alarm of AUX 2 (switch or diesel level exceeded)	Alarm of AUX 3	If an error fault is displayed	Speed not reached/exceeded	Alarm of input OP 1	Alarm of input OP 2	Alarm of input OP 3	Alarm of input OP 4	
AUX 1	X		X	X	X	X	X	X					
AUX 2		X	X	X	X	X	X	X					
OP 1		X	X						X	X	X	X	
OP 2	X												

² Only for software S05160-1x

3.1.3 CANbus wiring

The CANbus wiring must have a linear design. This is automatically the case for a two-point connection between the CANarmatur and an engine management system. If there are other subscribers on the bus, they must be connected according to the following graphic:



Only the two external bus subscribers may be fitted with 120R terminating resistors. Please use the technical documentation to check whether and how you can fit or remove the resistors of the other bus subscribers as necessary.

For the wiring, we recommend a shielded or twisted 2-wire line with a cross-section of at least 0.5mm² (mechanical stability). Transfer rates of 250 kbit/s at a distance of up to 100m can then be realized without problem.

*For the shield to have an optimum effect,
it must only be connected to the earth on one side (see connection diagram)*

3.2 Activation and deactivation

Use the ignition starter switch (position 1) integrated in the controller with active terminal 30 to switch on the CANarmatur unit.

After the CANarmatur has been switched on, the following screen is displayed for a short time. It provides the installed software version.

CANarmaturV3
S05160-xx

After the version display has disappeared, the last operational value shown (when last switched off) is displayed again and the engine can be started (position 2).

Use the ignition key to switch off the engine and the CANarmatur unit.

With suitable parametrization and cabling, a follow-up time with minimum operating speed is possible, e.g. to protect a turbo charger. The CANarmatur then continues to run until the engine is stopped.

The device must be connected to steady plus (terminal 30) for the correct retention of settings.

3.3 Display of the operational values

After switching on the ignition starter switch, the CANarmatur is automatically in the operating mode, the operating LED lights up green. You can now call up the operational values in succession by pressing the SET key multiple times. The operational values can be displayed in two different ways. Firstly you can call up the next operational value by pressing the SET key. Or a scan time must be entered. This ensures that the operational values are displayed in succession at specified intervals. Which values are selected for display and the mode used to display them is defined by the customer service of the engine manufacturer.

3.4 Number entry

You must enter a number for the code as well as for some parameters. This is achieved using the **↗** - key; press it as often as needed until the number is reached, e.g. 2 times for "2", 4 times for "4". Reduce the value of the number with the **↘** - key. Each individual number entry must now be confirmed using the SET key.

3.5 SET key

The individual operational values are queried during operation using this key. With the aid of the SET key, you can also configure parameters. This is explained in detail in chapter 3. In addition the code for parametrization is entered by pressing the SET key and the **↗** - key simultaneously and also the confirmation of the number entry.

3.6 Arrow keys

Press the **↗ ↙** - keys to input the code after the display field has been called up by pressing the SET key and the **↗** - key simultaneously. The respective number entry is then confirmed using the SET key. The arrow keys are also used for menu guidance during parametrization (see chapter 3).

4. Changing settings

If you want to change the default settings, you must parametrize the CANarmatur device after the initial set-up. The default settings are generally changed by the engine customer service/intermediary.

Parameters should only be configured when the engine is at standstill.

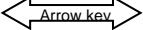
After switching on the ignition starter switch, the CANarmatur is in the operating mode that is displayed by the illuminated green LED. Access parametrization mode by pressing and holding the **↗** key and the **↙** - key simultaneously. The following appears:

Code
0000

Enter **↗** SET **↗↗** SET **↗↗↗** SET **↗↗↗↗** SET! (This corresponds to the code 1234.)

The parameter menu appears on the display. Use the arrow keys to navigate to the individual sub-menus and press the SET key to open the required menu. Various parameters can be configured in the submenu, e.g. the language, definition of the displayed CAN parameters or the capabilities of the inputs and outputs.

Menu structure of the parameter menu

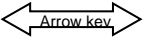
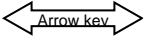
Submenu selection 		
System settings CAN and language	SET	CAN address, engine type and language.
System settings Unit/Scan Inter.	SET	Scan time, pressure unit and temperature unit.
System settings Displayed Values	SET	Setting of which operational values should appear on the display.
System settings Engine RPM	SET	TSC1 settings, permitted engine speed ranges, operating speed, ↗ ↙ - keys as activate speed adjustment, delay time for turbo protection.
System settings Standard IO's	SET	The AUX inputs and outputs can be configured here.
System settings Custom IO's	SET	The OP inputs and outputs can be configured here.
Exit UP Main menu	SET	Return to display of operational values (the modified settings are only saved when this menu item is selected!)

All settings are saved when the parameter menu is terminated by "**Exit UP main menu**". The settings are not applied if you terminate programming by shutting down the device with the ignition starter key.

4.1 CAN and language overview sketch

System Settings
Language/CAN Add

SET

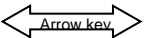
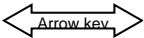
Parameter selection		Value selection / entry	Note
		 SET	

CAN address	SET	000-255 (↻)* SET (↻)* SET (↻)* SET	Number entry
Engine MFG	SET	Deutz EMR3, Deutz EMR4/5, Hatz TIC, Hatz TICD, Hatz andere, Iveco, Kubota, KDI Stage V, Yanmar, Andere (↻)* SET	Selection
Language	SET	German, English (↻)* SET	Selection
Exit UP System settings	SET	Back	

4.2 Scan and unit overview sketch

System Settings
Unit/Scan Inter.

SET

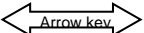
Parameter selection		Value selection / entry	Note
		 SET	

Scroll Interval	SET	00-60s (↻)* SET (↻)* SET	Number entry
Unit Pressure	SET	as bar, as psi (↻)* SET	Selection
Unit Temperature	SET	as C, as F (↻)* SET	Selection
Exit UP System Settings	SET	Back	

4.3 Operational values overview sketch

System Settings Displayed Values

SET

Parameter selection 		Value selection SET	Note
--	--	------------------------	------

Engine Hours		no, yes	(SET)* Switch over
Service Hours		no, yes	(SET)* Switch over
Target RPM		no, yes	(SET)* Switch over
Engine RPM		no, yes	(SET)* Switch over
Oil pressure		no, yes	(SET)* Switch over
Oil Temp		no, yes	(SET)* Switch over
Oil Level		no, yes	(SET)* Switch over
Coolant Temp.		no, yes	(SET)* Switch over
Coolant Level		no, yes	(SET)* Switch over
Fuel Pressure		no, yes	(SET)* Switch over
Fuel Level		no, yes	(SET)* Switch over
Fuel Temp.		no, yes	(SET)* Switch over
Engine Torque		no, yes	(SET)* Switch over
AUX Pressure		no, yes	(SET)* Switch over
AUX RPM		no, yes	(SET)* Switch over

AdBlue Tank ¹		no, yes	(SET)* Switch over
Exit UP System Settings	SET	Back	

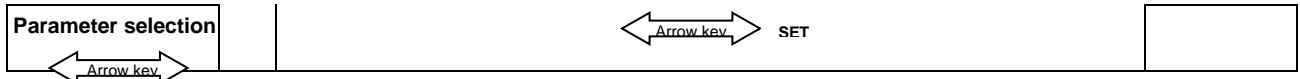
4.4 Engine speed overview sketch

System Settings Engine RPM

SET

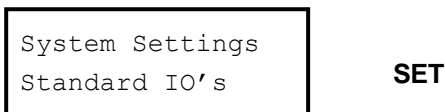
		Value selection / entry	Note
--	--	-------------------------	------

¹ Only for software S05160-1x




Send TSC1	SET	off, with priority X	(↵)* SET	Selection
TSC Repeat Time	SET	XXX ms	(↵)* SET (↵)* SET (↵)* SET	Number entry
max. RPM Limit	SET	XXXX RPM	(↵)* SET (↵)* SET (↵)* SET (↵)* SET	Number entry
min. Operate RPM	SET	XXXX RPM	(↵)* SET (↵)* SET (↵)* SET (↵)* SET	Number entry
max. RPM Limit	SET	XXXX RPM	(↵)* SET (↵)* SET (↵)* SET (↵)* SET	Number entry
max. Operate RPM	SET	XXXX RPM	(↵)* SET (↵)* SET (↵)* SET (↵)* SET	Number entry
Operate RPM	SET	XXXX RPM	(↵)* SET (↵)* SET (↵)* SET (↵)* SET	Number entry
TSC1 by Buttons	SET	off, on	(↵)* SET	Selection
Turbo timer	SET	XX s	(↵)* SET (↵)* SET	Number entry
Exit UP System Settings	SET	Back		

4.5 Standard IOs overview sketch



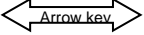
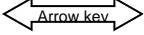
Menu structure of the Standard IOs menu


























Submenu selection			
Standard IO's Input AUX 1	SET	Configuration for input AUX 1.	
Standard IO's Input AUX 2	SET	Configuration for input AUX 2.	
Standard IO's Input AUX 3	SET	Configuration for input AUX 3.	
Standard IO's Output AUX 1	SET	Configuration for output AUX 1.	
Standard IO's Output AUX 2	SET	Configuration for output AUX 2.	
Exit UP System Settings	SET	Back	

4.6 Input AUX 1 overview sketch

Standard IO's Input AUX 1

SET

Parameter selection		Value selection / entry	Note
		 SET	

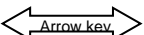
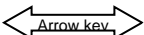
Input AUX 1	SET	Tank Sensor, Input Switch, as RPM(UP), as max RPM, Analog GasPosit.	()* SET	Selection
AUX 1 Tank 0%	SET	XXXX	()* SET ()* SET ()* SET ()* SET	Number entry
AUX 1 Tank 100%	SET	XXXX	()* SET ()* SET ()* SET ()* SET	Number entry
Low Fuel Alarm	SET	XXX %	()* SET ()* SET ()* SET	Number entry
Input AUX 1	SET	NC Alarm Switch, NO Alarm Switch	()* SET	Selection
max. Operate RPM	SET	XXXX RPM	()* SET ()* SET ()* SET ()* SET	Number entry
Value at 0% RPM¹	SET	XXXX	()* SET ()* SET ()* SET ()* SET	Number entry
Value at 100% RPM¹	SET	XXXX	()* SET ()* SET ()* SET ()* SET	Number entry
Exit UP Standard IO menu	SET	Back		



















Note: Depending on the selected function for the input, only parameters required for the configuration are displayed when selecting parameters.

4.7 Input AUX 2 overview sketch

Standard IO's Input AUX 2

SET

Parameter selection		Value selection / entry	Note
		 SET	

Input AUX 2	SET	Pressure Sensor, Input Switch, RPM(down), min RPM Analog Gas Posit. ¹	()* SET	Selection
Input AUX 2	SET	as 5 bar sensor, as 10bar sensor	()* SET	Selection
Pressure Alarm	SET	XX.X bar	()* SET ()* SET ()* SET	Number entry
Input AUX 2	SET	NC Alarm Switch, NO Alarm Switch	()* SET	Selection
min. Operate RPM	SET	XXXX RPM	()* SET ()* SET ()* SET ()* SET	Number entry
Value at 0% RPM¹	SET	XXXX	()* SET ()* SET ()* SET ()* SET	Number entry
Value at 100% RPM¹	SET	XXXX	()* SET ()* SET ()* SET ()* SET	Number entry

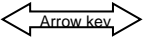
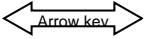
Exit UP Standard IO menu	SET	Back
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Note: Depending on the selected function for the input, only parameters required for the configuration are displayed when selecting parameters.

4.8 Input AUX 3 overview sketch

Standard IO's Input AUX 3

SET

Parameter selection		Value selection / entry	Note
		 SET	

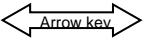
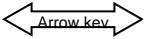
Input AUX 3	SET	RPM Sender, Input Switch, Operate RPM, Water in Fuel ¹	()* SET	Selection
Input AUX 3	SET	XXX.X IPU	()* SET ()* SET ()* SET ()* SET	Number entry
Input AUX 3	SET	NC Alarm Switch, NO Alarm Switch	()* SET	Selection
Operate RPM	SET	XXXX RPM	()* SET ()* SET ()* SET ()* SET	Number entry
speed Ramp	SET	XXXX RPM/s	()* SET ()* SET ()* SET ()* SET	Number entry
Exit UP Standard IO menu	SET	Back		





Note: Depending on the selected function for the input, only parameters required for the configuration are displayed when selecting parameters.

4.9 Output AUX 1 overview sketch

Standard IO's Output AUX 1

SET

Parameter selection		Value selection / entry	Note
		 SET	

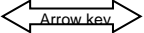
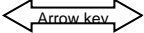
I-AUX 1 switch	SET	OFF, ON, not active	()* SET	Selection
I-AUX 2 switch	SET	OFF, ON, not active	()* SET	Selection
I-AUX 3 switch	SET	OFF, ON, not active	()* SET	Selection
ERROR	SET	OFF, ON	()* SET	Selection

¹ Only for software S05160-1x

RPM type	SET	CAN-BUS(SPN190), AUX3 (e.g. PickUp)	(↶↷)* SET	Selection
RPM Alarm	SET	OFF, ON	(↶↷)* SET	Selection
switch Speed	SET	XXXX RPM	(↶↷)* SET (↶↷)* SET (↶↷)* SET (↶↷)* SET	Number entry
Error when RPM	SET	Smaller limit, larger limit	(↶↷)* SET	Selection
as engine stop	SET	OFF, ON	(↶↷)* SET	Selection
Exit UP Standard IO menu	SET	Back		

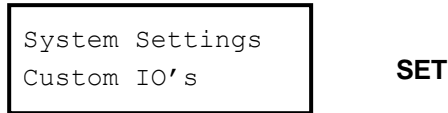
4.10 Output AUX 2 overview sketch

Standard IO's Output AUX 2	SET
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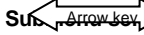
Parameter selection	Value selection / entry	Note
	 SET	

I-AUX 1 switch	SET	OFF, ON, not active	(↶↷)* SET	Selection
I-AUX 2 switch	SET	OFF, ON, not active	(↶↷)* SET	Selection
I-AUX 3 switch	SET	OFF, ON, not active	(↶↷)* SET	Selection
ERROR	SET	OFF, ON	(↶↷)* SET	Selection
RPM type	SET	CAN-BUS(SPN190), AUX3 (e.g. PickUp)	(↶↷)* SET	Selection
RPM Alarm	SET	OFF, ON	(↶↷)* SET	Selection
RPM Alarm Limit	SET	XXXX RPM	(↶↷)* SET (↶↷)* SET (↶↷)* SET (↶↷)* SET	Number entry
Error when RPM	SET	Smaller limit, larger limit	(↶↷)* SET	Selection
as engine stop	SET	OFF, ON	(↶↷)* SET	Selection
Exit UP Standard IO menu	SET	Back		

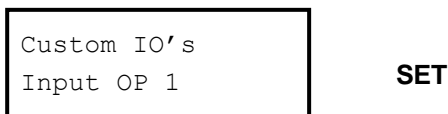
4.11 Custom IOs overview sketch

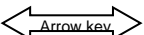
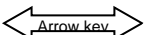








Menu structure of the Custom IOs menu

Sub-selection 		
Custom IO's Input OP 1	SET	Configuration for input OP 1.
Custom IO's Input OP 2	SET	Configuration for input OP 2.
Custom IO's Input OP 3	SET	Configuration for input OP 3.
Custom IO's Input OP 4	SET	Configuration for input OP 4.
Custom IO's Output	SET	Configuration for output OP 1 / OP 2 (OP 2 inversion of OP 1).
Exit UP System settings	SET	Back

4.12 Input OP 1 overview sketch

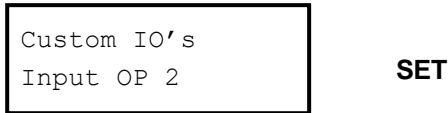


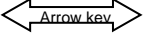
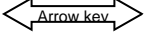
Parameter selection 		Value selection / entry  SET	Note
--	--	--	------







Input OP 1	SET	Input Switch, RPM(UP), RPM (MAX)	()* SET	Selection
Input OP 1	SET	NC Alarm Switch, NO Alarm Switch	()* SET	Selection
max. Operate RPM	SET	XXXX RPM	()* SET ()* SET ()* SET ()* SET	Number entry
Exit UP Custom IO menu	SET	Back		

Note: Depending on the selected function for the input, only parameters required for the configuration are displayed when selecting parameters.

4.13 Input OP 2 overview sketch

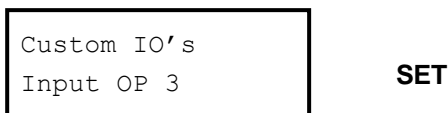


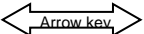
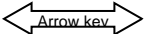
Parameter selection		Value selection / entry	Note
		 SET	











Input OP 2	SET	Input Switch, RPM (DOWN), RPM (MIN)	()* SET	Selection
Input OP 2	SET	NC Alarm Switch, NO Alarm Switch	()* SET	Selection
min. Operate RPM	SET	XXXX RPM	()* SET ()* SET ()* SET ()* SET	Number entry
Exit UP Custom IO menu	SET	Back		

Note: Depending on the selected function for the input, only parameters required for the configuration are displayed when selecting parameters.

4.14 Input OP 3 overview sketch

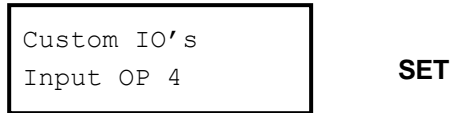


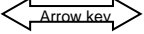
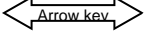
Parameter selection		Value selection / entry	Note
		 SET	



Input OP 3	SET	Input Switch, Operate RPM	()* SET	Selection
Input OP 3	SET	NC Alarm Switch, NO Alarm Switch	()* SET	Selection
Operate RPM	SET	XXXX RPM	()* SET ()* SET ()* SET ()* SET	Number entry
speed Ramp	SET	XXXX RPM/s	()* SET ()* SET ()* SET ()* SET	Number entry
Exit UP Custom IO menu	SET	Back		

Note: Depending on the selected function for the input, only parameters required for the configuration are displayed when selecting parameters.

4.15 Input OP 4 overview sketch

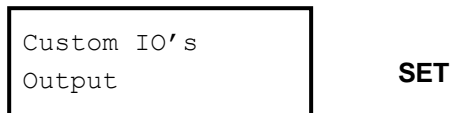


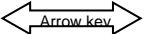
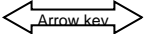
Parameter selection 	Value selection / entry  SET	Note
--	--	------

Input OP 4	SET	Input Switch, Parking Brake	 * SET	Selection
Input OP 4	SET	NC Alarm Switch, NO Alarm Switch	 * SET	Selection
Exit UP Custom IO menu	SET	Back		

Note: Depending on the selected function for the input, only parameters required for the configuration are displayed when selecting parameters.

4.16 Output OP 1 / OP 2 overview sketch



Parameter selection 	Value selection / entry  SET	Note
--	--	------

Op.In 1 Alarm	SET	OFF, ON, not active	 * SET	Selection
Op.In 2 Alarm	SET	OFF, ON, not active	 * SET	Selection
Op.In 3 Alarm	SET	OFF, ON, not active	 * SET	Selection
Op.In 4 Alarm	SET	OFF, ON	 * SET	Selection
as engine stop	SET	OFF, ON	 * SET	Selection
Exit UP Custom IO menu	SET	Back		

5. Explanations to the adjustable parameters

Parameter/Pin Explanations

5.1 CAN and language

CAN address You can configure the send address of the CANarmatur here.

Engine type Configure engine manufacturer.
 A special engine type must be entered if the engine manufacturer used requires special CAN functions.
 The following engine-specific functions are programmed:

Engine manufacturer	Function
Deutz EMR3	Send an additional engine protection CAN message
Deutz EMR4/5	DPF support, sending a specific TSC1 CAN message, sending an additional motor protection CAN message
Hatz TIC	Sending a specific TSC1 CAN message
Hatz TICD	DPF support, sending a specific TSC1 CAN message
IVECO	Send an additional TSC1 CAN message
KUBOTA	DPF support, sending an additional speed request
YANMAR	DPF support
KDI Stage V	DPF support

Language You can select between German and English (subject to change).

5.2 Scan and unit

Scan time Configure the time in which the displayed values are automatically changed over in the main menu. Configure with "0", (zero seconds) to switch off this function.

Pressure unit Select whether the pressures should be displayed in bar or PSI here.

Temperature unit Select whether the temperatures should be displayed in in Celsius "C" or Fahrenheit "F".

5.3 Operational values

You have the option to show a selection or all values from the following list on the display. The values are displayed when the "Yes value" has been selected. If an operational value has not yet been displayed, then it is set to "No" and must be changed with SET to "Yes": Now go to the next menu item using the arrow key. If you do not want to adjust a value, skip it using the arrow key.

Engine Hours CAN value, operating hours of the engine
 Service Hours determined by CANarmatur depending on the set service interval
 Target RPM Target RPM that is sent on the CAN bus of the CANarmatur
 Speed Engine speed received from the engine on the CAN bus.
 Oil pressure CAN value, engine oil pressure
 Oil Temp CAN value, engine oil temperature

Oil Level	CAN value, engine oil level
Coolant Temp.	CAN value, coolant temperature
Coolant Level	CAN value, coolant level
Fuel Pressure	CAN value, coolant pressure
Fuel Level	CAN value, fuel level
Fuel Temp.	CAN value, fuel Temp.
Engine output	CAN value, torque of the engine
AUX Pressure	Pressure value recorded via input AUX 2
AUX RPM	Speed recorded via input AUX 3
AdBlue Tank	CAN value, AdBlue level (from S05160-1f)

5.4 Engine speeds

Speed adjustment and priority of TSC1	If the value is not set to "OFF", the send of the speed target value CAN command TSC1 is switched on and sent with the priority set in the menu.
TSC1 repeat time	Setting of the repeat time for the CAN message TSC1 sent by the CANarmatur.
max. engine RPM	Programming of the maximum achievable speed of the engine. The setting of the parameter is important! It prevents an engine controller error message caused by exceeding the permitted engine speed.
min. engine RPM	Programming of the minimum achievable speed of the engine. The setting of the parameter is important! It prevents an engine controller error message caused by not reaching the permitted engine speed.
max. Operate RPM	Setting of the maximum operating speed of the system in which the engine is installed (e.g. pump). This parameter is important for the case when the maximum pump speed, for example, is not the same as the maximum engine speed.
min. Operate RPM	Configuration of the minimum operating speed of the system in which the engine is installed (e.g. pump). This parameter is important for the case when the maximum pump speed, for example, is not the same as the maximum engine speed.
Operate RPM	Programming of the operating speed of the engine (e.g. for the drive of a pump).
Set target value	The adjustment of the speed can be switched on or off using the ↗ ↘ - keys of the CANarmatur.
Parameter/Pin Turbo timer	Configuration of the delay time for the turbo protection. As immediately switching off the engine at full speed can cause damage to the turbo charger, it is only switched off when the minimum speed or idle run speed is reached. This turbo charger protective function brings on the follow-up time entered in seconds.

5.5 Inputs

Function	<p>Depending on the input, different functions are possible. The selections on offer for each input can be found in chapter 4.</p> <p>Possible functions:</p> <p>Switch: The input triggers an event (error message and possibly a response on an output) when it is activated.</p> <p>Tank level recording: The input triggers an event (error message and possibly a response on an output) if the configured level is not reached.</p> <p>Pressure recording: The input triggers an event (error message and possibly a response to an output) if the configured pressure is not reached.</p> <p>Frequency recording: A speed is calculated from the measured frequency. If a switch speed is not reached/exceeded, a response to an AUX output can occur.</p> <p>Speed adjustment: The options for how an adjustment can be made via the inputs are described in chapter 6.</p> <p>Analogue gas position: Enables speed adjustment via potentiometer For this purpose, connect a potentiometer (0-180Ω or 0-220Ω) to input AUX 1 or AUX 2 to ground. AUX 1 and also AUX 2 can be configured to gas position. In this case, a double potentiometer must be inversely connected. A redundancy check is then carried out and an error message generated if both potentiometer values indicate a large deviation.</p> <p>Attention: After changing the selection so that an input is activated as gas position, the 0% RPM and 100% RPM position of the potentiometers must be taught in!</p> <p>Water in Fuel¹: digital switch signal. If the input signal is active, an error message is generated when the engine is running.</p> <p>Parking brake¹: used to prevent stationary regeneration if input OP 4 is not connected to ground.</p>
AUX/OP x NC/NO	<p>Only for function of the input configured as “Switch”:</p> <p>Configuration of the input as NC (normally closed) or as NO (normally open)</p>
Tank at 0%	<p>Only for AUX 1 input with Tank level recording function:</p> <p>Displays the current digital value of the input for a 0% tank level. Activate the SET key to be able to change the value. Press SET again to save the value.</p>
Tank at 100% level	<p>Only for AUX 1 input with Tank level recording function:</p> <p>Displays the current digital value of the input for a 100% tank level. Activate the SET key to be able to change the value. Press SET again to save the value.</p>
Alarm level	<p>Only for AUX 1 input with Tank level recording function:</p> <p>Configuration of the alarm limit value for the tank level. The alarm is deactivated at 100%.</p>
Pressure sensor type	<p>Only for AUX 2 input with Pressure recording function:</p> <p>Setting of the sensor type. A 5bar or 10bar sensor can be connected.</p>
Pressure Alarm	<p>Only for AUX 2 input with Pressure recording function:</p> <p>Pressure alarm setting for which the input triggers an event if not reached. If the value is set to 0, the function is deactivated.</p>
Value at 0% RPM ¹	<p>Only for AUX 1 or AUX 2 input with Analogue gas position function: Displays the current digital value of the input for the minimum operating speed. Activate the SET key to be able to change the value. Press SET again to save the value.</p>

¹ Only for software S05160-1x

Value at 100%RPM ¹	Only for AUX 1 or AUX 2 input with Analogue gas position function: Displays the current digital value of the input for the maximum operating speed. Activate the SET key to be able to change the value. Press SET again to save the value.
IPU	Only for AUX 3 input with Frequency recording function: Configuration of the number of pulses per rotation for the measurement of the speed.
speed Ramp	Only for AUX 3 or OP 3 input with Speed adjustment "Operate RPM" function: Configuration increase (RPM/s) of the speed curve.

5.6 DPF Function

The DPF functions are only available for engine types with DPF (Deutz EMR4/5, Hatz TICD, Kubota, KDI Stage V, Yanmar).

5.6.1 Dynamic regeneration

Dynamic regeneration (also called active, assist or reset regeneration) is performed during normal operation and does not have a separate cycle during which a speed curve is run. The engine performs this function by itself if it is allowed.

The following message appears on the display and the red LED flashes at 1Hz.

Attention!
Reg. Hold load

5.6.2 Standstill regeneration

For a standstill regeneration (also called passive regeneration), a longer cycle with speed changes is run through.

Cycle with speed changes. This is only possible in a safe, no-load condition. If a standstill regeneration is requested by the ECU, the operator must therefore confirm the regeneration before it is started. When all preconditions are fulfilled, the engine speed is set back to idle.

The following message also appears on the display and the red LED flashes at 1Hz.

Reg. perform
↗:✓ ↙:✘

If an inhibit switch is set or the motor is not running, there is no display. The message is dropped as soon as the request is reported as not active.

When pressing ✘, the message is closed and is only displayed again after a nerve interval of 30 minutes. The operating speed must be restarted manually.

When you press ✓, additional conditions are checked for the Yanmar engine type.

- Coolant temperature > 60°C
- Motor at idle speed <= 1500 min-1

If a condition is not met, the (new) is displayed as follows.

Engine <=60 °C
Speed >1500

If the test is successful, the following message appears on the display until the ECU signals the start of regeneration. Regeneration starts and the red LED flashes at 1 Hz.

This can take several minutes.

Regeneration is started

If no active regeneration is reported from the EMS within 30 minutes, the following message.

Regeneration canceled

If an active regeneration is reported by the EMS, the following message appears.

Regeneration activ

If an inactive regeneration status is received afterwards, the following message appears on the display.

Regeneration finished

When this message is confirmed with "set", the message disappears and the operating screen is displayed. The operating speed must be restarted manually.

5.6.3 Service-Regeneration

The service regeneration (or recovery regeneration) normally means a service case.

If this regeneration is requested by the ECU, the following message appears

Regeneration canceled

As soon as an active service regeneration is reported by the ECU, the following message is displayed.

Regeneration activ 0%

If the service regeneration was not successful, the following message appears.

Regeneration failed

If the service regeneration was successful, the following message appears

Regeneration finished

5.6.4 Manual Regeneration

This type of regeneration does not exist for **Deutz engines**.

The manual regeneration offers the user the possibility to request a standstill regeneration, although it was not previously requested by the ECU. This can be useful, for example, if a standstill period is to be used for regeneration so that the machine is then ready for operation for a longer period. Since a regeneration cycle, if executed unnecessarily, may be detrimental to the exhaust system, a minimum filter level is (newly) assumed here.

Manual regeneration can be requested via the DPF menu (set + ↵).

5.6.5 Symbols

The filter symbol is displayed together with the regeneration messages. It flashes when the filter level is high.



Together with too high exhaust gas temperature, the temperature symbol is displayed.



5.7 Outputs

Under which conditions the output should be activated can be configured for the outputs. Depending on the output, there are different selection options possible. The outputs AUX 1 and AUX 2 have more options than output OP 1 or OP 2.



Attention!

The output AUX 1 switches OFF (0V and 0A current) if it is activated.

The output AUX 2 switches ON (12/24V, max. 2A) if it is activated.

The output OP 1 switches ON (12/24V, max. 2A) if it is activated.

The output OP 2 always behaves inversely to output OP 1 (OP 2 is "OFF" if OP 1 is "ON" and vice versa).

Engine stop (Turbo protection)	The engine stop event is switched "ON" or "OFF". If the event is switched ON and another event wants to activate the output, then the engine speed is first run at min. operating speed and the output is activated after a configurable time has elapsed.
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Only for **AUX 1** or **AUX 2** output:

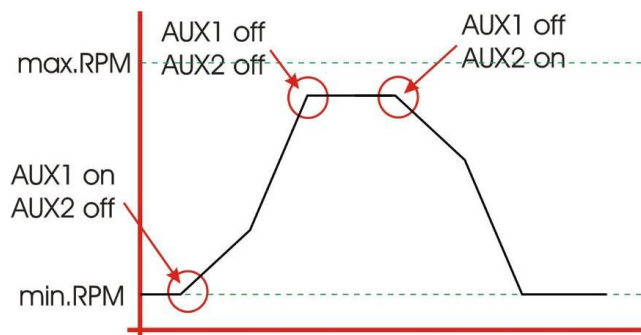
Event AUX 1	The event from input AUX 1 is switched "ON" or "OFF". An event could be due to the alarm switch being activated or the diesel level not being reached. If the parameter is then switched to "ON", this event triggers a response to the output.
Event AUX 2	The event from input AUX 2 is switched "ON" or "OFF".
Event AUX 3	The event from input AUX 3 is switched "ON" or "OFF".
ERROR	The ERROR event is switched "ON" or "OFF". If the parameter is set to "ON", the output is activated if an error message is shown on the display.
Speed source	Configuration of the source (CANbus or AUX 3) for a speed event.
RPM Alarm	The RPM Alarm event is switched "ON" or "OFF". If the parameter is set to "ON", then undershooting or exceeding the switch speed triggers an event that leads to the response of the output.
Switch speed	Configuration of the speed limit for the RPM Alarm event.

Smaller/larger speed	Configuration of whether the RPM Alarm event should be triggered if the speed is smaller or larger.
Engine stop (Turbo protection)	The engine stop event is switched "ON" or "OFF". If the event is switched ON and another event wants to activate the output, then the engine speed is first run at min. operating speed and the output is activated after a configurable time has elapsed.
Only for OP 1 or OP 2 output:	
Event OP 1	The event from input OP 1 is switched "ON" or "OFF".
Event OP 2	The event from input OP 2 is switched "ON" or "OFF".
Event OP 3	The event from input OP 3 is switched "ON" or "OFF".
Event OP 4	The event from input OP 4 is switched "ON" or "OFF".

6. Speed adjustment

6.1 Infinitely variable speed adjustment ("plus" / "minus")

If the input AUX 1 is programmed as "RPM (UP)" and input "ON" is switched (on terminal 31, ground), the engine speed is steadily increased up to the maximum operating speed. If the input AUX 2 is simultaneously programmed as "RPM (DOWN)", a speed adjustment in both directions is possible.



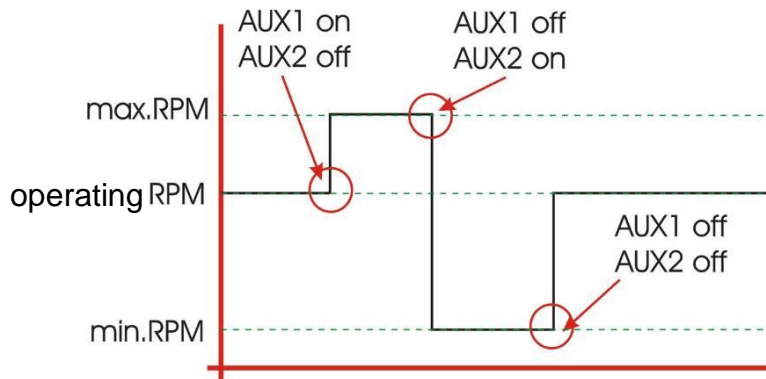
The curve starts with **AUX1 off** and **AUX2 off** in the diagram. Initially a flat line for min. RPM speed can therefore be seen. If AUX1 is now connected with ground (**AUX1 on**), the speed increase starts until AUX 1 is disconnected from ground again (**AUX1 off**). The speed is then maintained if both inputs are open. If AUX 2 is now connected with ground (**AUX2 on**), the speed decreases again. This function can be realized with OP 1 and OP 2 instead of AUX 1 and AUX 2.

6.2 3-stage speed adjustment (minimum RPM, operating RPM, maximum RPM)

If the input AUX 1 is programmed as "RPM (UP)" and input "ON" is switched (on terminal 31, ground), the CANarmatur sends the programmed **maximum operating speed** on the CANbus. The operating speed is sent again if the input is not switched.

If the input AUX 2 is programmed as "RPM (MIN)" and input "ON" is switched (on terminal 31, ground), the CANarmatur sends the programmed **minimum operating speed** on the CANbus. The operating speed is sent again if the input is not switched.

If both inputs are simultaneously set to "RPM (MAX)" or "RPM (MIN)", a 3-stage speed adjustment can be realized.



This function can be realized with OP 1 and OP 2 instead of AUX 1 and AUX 2.

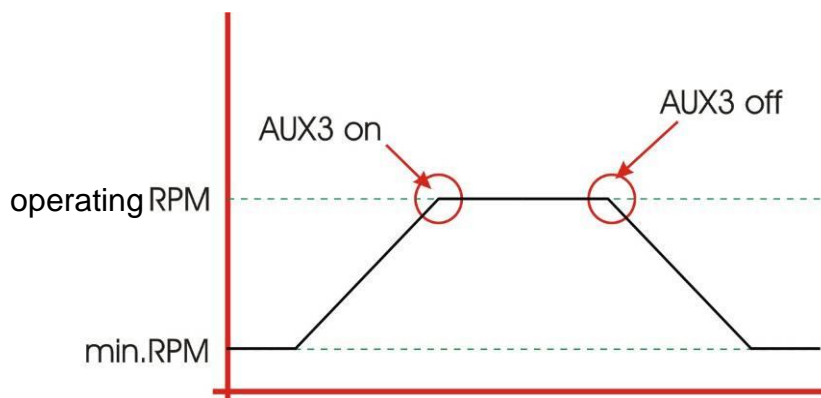
!! Attention!

Either the AUX or the OP inputs must be configured for this function .

Maxing or duplicated selection of these functions does not lead to a defined event.

6.3 Starting the operating speed via ramp

The input AUX 3 can be programmed so that when switching the input (to terminal 15), the programmed operating speed is started via a programmed speed ramp.



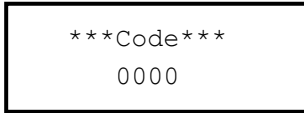
6.4 Speed adjustment using keys ↗ ↘

If “Set target value” is switched on in the configuration (see chapter 5.4), the speed can be increased or decreased using the ↗ or ↘ key. If the corresponding key is now briefly pressed, the speed is changed by a small step. If the key is held for a longer time, the speed is changed again. After a period of time, the speed of the adjustment is increased. The ramps for this are fixed in the CANarmatur and cannot be configured.

7. Service intervals

7.1 Input of service intervals

The various service intervals are maintained in the input menu that is opened via the **Code 4 3 2 1** (see section 3.6).



↔↔↔↔ SET ↔↔↔ SET ↔↔ SET ↔ SET

Parameter selection		Value selection / entry	Note
↔ Arrow key		↔ Arrow key	SET

Service Timer 1	SET	XXXX h	(↔)* SET (↔)* SET (↔)* SET (↔)* SET	Number entry
Service Hours 2	SET	XXXX h	(↔)* SET (↔)* SET (↔)* SET (↔)* SET	Number entry
Service Hours 3	SET	XXXX h	(↔)* SET (↔)* SET (↔)* SET (↔)* SET	Number entry
Service Hours 4	SET	XXXX h	(↔)* SET (↔)* SET (↔)* SET (↔)* SET	Number entry
Service interval	SET	XXXX h	(↔)* SET (↔)* SET (↔)* SET (↔)* SET	Number entry
Exit UP Custom IO menu	SET	Back		

Please note that the CANarmatur does not count the operating hours itself but that this is called up via the CANbus. The service times are to be matched according to the operating hours of the engine. If the CANarmatur is removed from the current engine and is used to monitor another engine, then please confirm the service (see below) and match the new service intervals with the operating hours of the new engine.

Four fixed times and one interval are available for selection. The first services for the engine can be set with the fixed times, for example. The default setting is as follows:

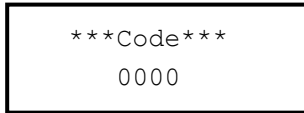
- Service 1: 500 op. hours.
- Service 2: 1000 op. hours.
- Service 3: 1500 op. hours.
- Service 4: 2000 op. hours.
- Interval: 500 op. hours.

7.2 Confirm service

Use the **Code entry 1 7 0 4** (see section 3.6) to confirm that the service was carried out and acknowledge the flashing service lamp.

8. IO-Test menu

Access the IO-Test menu by pressing and holding the SET key and the ↗ - key simultaneously until the **Code 0 0 0 1** is entered using the arrow keys.



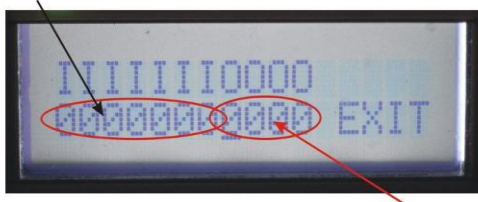
SET SET SET ↗ SET

The following screen is shown on the display



The individual characters have the following meaning:


Inputs AUX1-3 and OP1-4

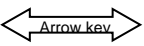
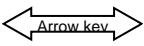




Outputs AUX1-2 and OP1-2

The display of the inputs shows a "1" if a signal is present at the relevant input and a "0" if no signal is present. If the relevant input is configured as a sensor input, an "X" is displayed instead of a "0" or "1". Use the arrow keys to select an output (the cursor moves to the left or right) and press the SET key to switch the relevant output ON (1) or OFF (0). If the cursor is on the "E" of EXIT and the SET key is then pressed, the menu is exited.

9. DPF menu

Access the DPF menu by pressing and holding the SET key and the  - key simultaneously. This menu can be used without a code entry.

Parameter selection		Value selection / entry	Note
		 SET	

Inhibit Reg.	SET	ON, OFF	 * SET	Selection
Force Reg.	SET	Now, later	 * SET	Selection
Soot Load		XX %	(SPN 3719)	Only display
Ash Load		XX %	(SPN 3720)	Only display
Time Last Reg.		XXXX h	(SPN 3721)	Only display
Parking brake		ACTIVE, NOT ACTIVE, NOT AVAILABLE	Current status of the input Input OP4 not configured as parking brake	Only display
Exit UP Main menu	SET	Back		

Note: for the soot and ash load status displays, as well as the time of the last regeneration, "--" is displayed if this information is not provided on the CANbus.

When selecting "ON" for ". Inhibit Reg.", the inhibiting of a DPF regeneration is switched to active. The "Now" selection for "Force Reg." sends the request of a DPF regeneration to the engine controller. Please note: The engine will only start regeneration if all conditions are met. Inhibit must be switched off, if configured, the parking brake must be applied (**OP 4** connected to ground). In addition, there are other conditions of the engine manufacturer, e.g. the engine must warm up, run with no load, a specified time since the last regeneration, etc. Please observe the engine operating manual.

10. Recurring DPF - information display

The following messages are displayed as recurring messages to be confirmed:

- Engine requests regeneration (here the ✓ / ✗ selection is possible)
- High temperature every minute
- The display for "High temperature" can also be output with the message "MAINTAIN LOAD". In this case, the operator should continue to operate the machine under load so that automatic regeneration is possible. Every 30 minutes
DPF active Regeneration Inhibit Status (SPN 3702 and SPN 3703) every 30 minutes
- If SCR is present, "Refuel AdBlue!" is output when the AdBlue level is <12%. Every minute

11. Error messages

The CANarmatur displays all errors sent by the EMS with SPN and FMI number. If the CANarmatur receives an error message that it knows, the red LED starts to flash and the relevant message appears as plain text on the LC display. The error should then be acknowledged using the SET key. The known errors (see table) are displayed in two lines. The English version of the display output is shown in brackets.

11.1 Error messages via the CANbus

Version S05160-7f or S05160-1f and later: On CAN errors, the red LED blinks until the error is no longer received. When error message is confirmed with SET key, the error will no longer be displayed. After turning off/on, the error will be displayed again if still present.

Type of error	Display line 1	Display line 2
Oil pressure error SPN 100	Fehler (Error)	Oeldruck (Oilpress)
Coolant error FMI 110	Fehler (Error)	KM.Temp. (CoolTemp.)
Speed error	Fehler (Error)	Drehzahl (Speed)
CANbus error	Fehler (Error)	CANbus (CANbus)
Error in power supply	Fehler (Error)	UB (UB)
Oil sensor error	Er.Oel (Er.Oil)	Sensor (Sensor)
Temp. sensor error	Er.Temp. (Er.Temp.)	Sensor (Sensor)
Charge sensor error	Er.LadeL (Er.CAPre)	Sensor (Sensor)
Charge temp. Error	Fehler (Error)	LadeTemp (ChartAT)
Charge temp. Sensor error	LadeTemp (ChartAT)	Sensor (Sensor)
Fuel Temp. Error	Fehler (Error)	KS-Temp. (FuelTemp)
Fuel Temp. Sensor error	KS-Temp. (FuelTemp)	Sensor (Sensor)
Input targ. val. 1 error	Target value 1 / ratedV.1	Sensor (Sensor)
Input targ. val. 1 error	Sollw.2 / ratedV.2	Sensor (Sensor)

11.2 Error messages via the input of the CANarmatur

Coolant level error	Fehler (Error)	Pegel (Level)
Air filter error	Fehler (Error)	L.Filter (AirFilte)
Tank level error	Fehler (Error)	Ks.Tank (FuelLevel)
Water in fuel ¹	Fehler (Error)	Fuel in water

Note:

If a coolant level error is determined via SPN and FMI, this comes via the CANbus. Unknown error messages are displayed with the error type in the following format:

E-type XXX (FMI)
 E-type XXXX (SPN)

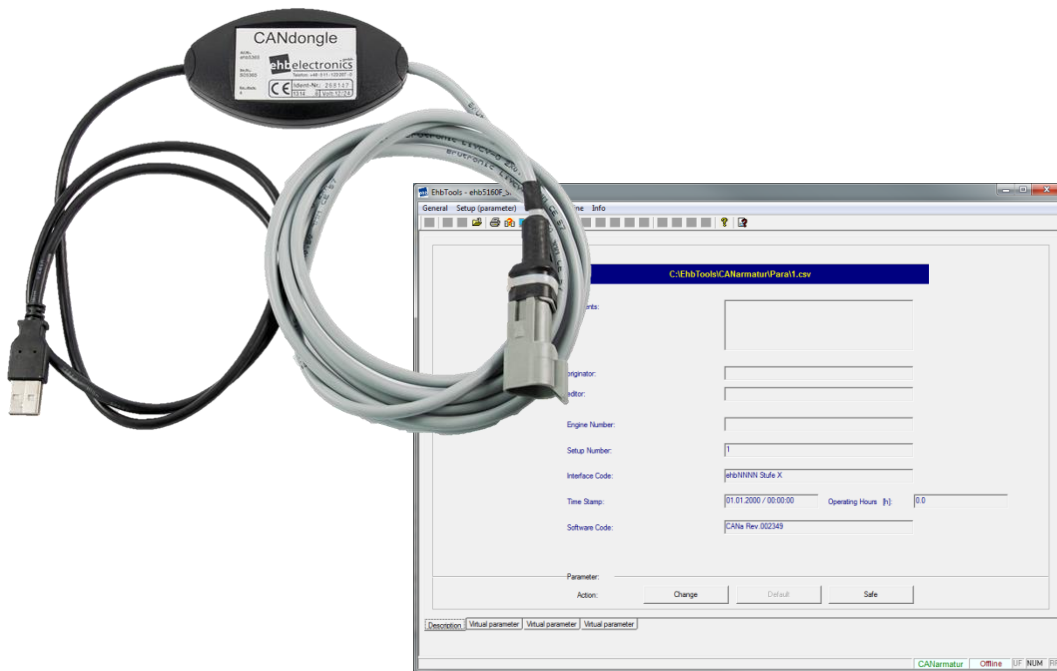
¹ Only for software S05160-1x

The meaning of these kinds of errors can be found in the manual of your Engine Management System (EMS) or Electronic Control Unit (ECU).

*Unknown error messages can also be displayed as plain text on the LC display as part of **customer-specific modified software**. Please send us your request.*

12. Communication with PC (optional)

Using the **CANdongle ehb5365** including **PC software ehbTools**, communication with **CANarmatur** is possible.



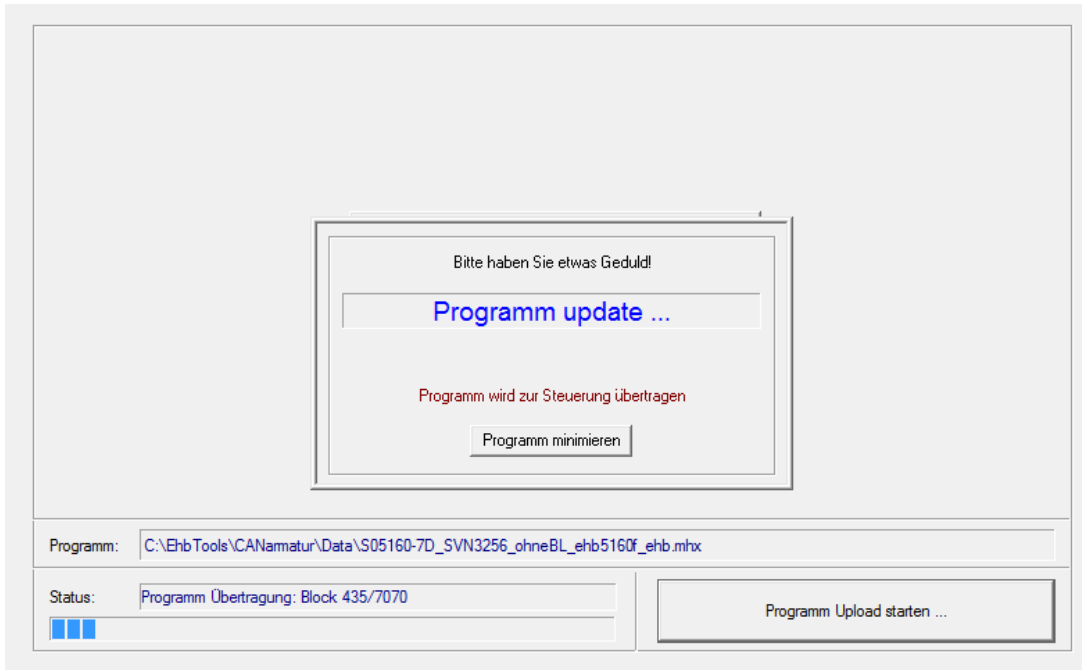
An online help program is integrated in the PC software ehbTools.

12.1 Software update

Using the above optional accessories, you can update the CANarmatur using the CANbus interface and the integrated CANbus boot loader.

To initiate the software update, first press “Program upload” from the “Online” menu of the menu bar to reach the “Program upload” tab. The software of the connected control unit can be updated here. To this end, the user must select the new software file after pressing the “Load program for upload” button, then start the upload procedure by pressing the “Start program upload” button and finally (and with as little delay as possible) activate the upload process by resetting the control unit (by interrupting the power supply, for example).

The current status is indicated accordingly.



Attention!

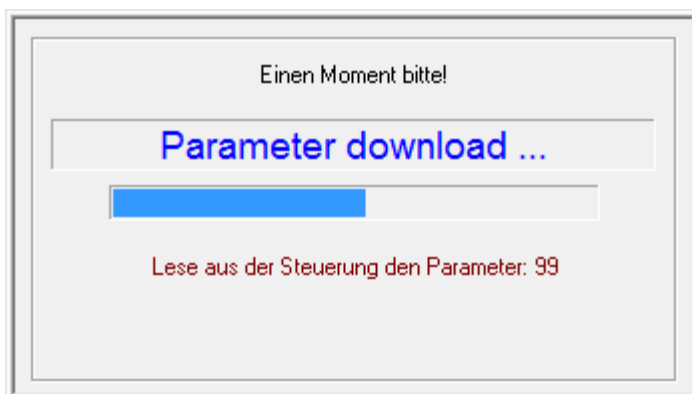
Ensure that the power supply is sufficient and remains uninterrupted for the entire duration of the update and the subsequent initialisation of the parameters.

The red LED on the CANarmatur flashes during the update. The power supply may only be switched off again when the red LED no longer flashes. Successful transfer is displayed with "OK" in the second line.

After successful completion of the software update, the connected control unit is to be restarted and, if necessary, provided with a corresponding parameter set via the program upload. A parameter download with subsequent check of the software version successfully completes this procedure.

12.2 Parameter Download / Upload

Use the above optional accessories to download and upload a parameter set from and to the CANarmatur. This parameter set can be saved to a PC and modified as required.



12.3 Parameter list with factory default settings

Using ehbTools you are able to set the parameters listed below. The parameters may also be changed from the menu, see chapter 4. The factory setting is shown in column „Default“. This is the setting at first delivery and may be generated with ehbTools by clicking the Default-button.

Par.	Name	Default	Comment
P001	CAN Address	3	
P002	Engine Type	1	<u>S05160-7x</u> und <u>S05160-1x</u> : 0=Deutz 1=IVECO 2=other <u>S05160-1x</u> : 3=Kubota 4=Yanmar 5=KDI Stage V
P003	Language	0	0=German 1=English 2=Spanish
P004	Scan time	0	0=deactivated, 1..60s
P005	Pressure Unit	0	0=bar, 1=psi
P006	Temperature Unit	0	0=°C, 1=°F
P010	Display Engine Hours	1	0=No, 1=Yes
P011	Display Service Hours	1	0=No, 1=Yes
P012	Display Target Speed	0	0=No, 1=Yes
P013	Display Engine RPM	1	0=No, 1=Yes
P014	Display Oil Pressure	1	0=No, 1=Yes
P015	Display Oil Temp.	0	0=No, 1=Yes
P016	Display Oil Level	0	0=No, 1=Yes
P017	Display Coolant Temp.	1	0=No, 1=Yes
P018	Display Coolant Level	0	0=No, 1=Yes
P019	Display Fuel Pressure	0	0=No, 1=Yes
P020	Display Fuel Level	0	0=No, 1=Yes
P021	Display Fuel Temp.	0	0=No, 1=Yes
P022	Display Enginge Torque	1	0=No, 1=Yes
P023	Display AUX Pressure	0	0=No, 1=Yes
P024	Display AUX RPM	0	0=No, 1=Yes
P050	TSC1 Priority	8	0..7=TSC1 Priority 8=Send target speed OFF
P051	TSC1 Repetition Time	10	[ms]
P052	max. Engine RPM	2800	[min ⁻¹]
P053	min. Engine RPM	750	[min ⁻¹]

P054	max. Operating RPM	2700	[min ⁻¹] Condition: P052 >= P054 >= P053, P054 >= P055
P055	min. Operating RPM	800	[min ⁻¹] Condition: P052 >= P055 >= P053, P055 <= P054
P056	Operating RPM	1800	[min ⁻¹] Condition: P054 >= P056 >= P055
P057	SET Target Value	0	0=OFF, 1=ON
P058	Turbo Timer	0	[s]
P059	Function Input AUX1	1	0=tank sensor, 1=input switch, 2=RPM(up), 3=RPM(max) <u>S05160-1x:</u> 4=Analog Gasposit.
P060	Tank at 0%	1	ADC-value corresponding empty tank
P061	Tank at 100%	1	ADC-value corresponding full tank
P062	Tank Alarm Level	100	0..99=Alarm limit in % 100=Alarm deactivated
P063	AUX1 NC/NO	1	0=NC (normally closed) 1=NO (normally open)
P064	Function Input AUX2	1	0= pressure sensor, 1=input switch, 2=RPM(down), 3=RPM(min) <u>S05160-1x:</u> 4=Analog Gasposit.
P065	Pressure Sensor Type	0	0=5bar sensor, 1=10bar sensor
P066	Pressure Limit	1.0	[bar] 0=deactivated
P067	AUX2 NC/NO	1	0=NC (normally closed) 1=NO (normally open)
P068	Function Input AUX3	1	0=frequency, 1=input switch, 2=oper- ate RPM <u>S05160-1x:</u> 3=water in fuel
P069	IPU	1.0	pulses per rotation
P070	AUX3 NC/NO	1	0=NC (normally closed) 1=NO (normally open)
P071	Speed Ramp	10	[min ⁻¹ /s]
P072	Output AUX1/Event AUX1	0	0=OFF, 1=ON
P073	Output AUX1/Event AUX2	0	0=OFF, 1=ON
P074	Output AUX1/Event AUX3	0	0=OFF, 1=ON
P075	Output AUX1/Error Alarm	0	0=OFF, 1=ON
P076	Output AUX1/Speed Source	0	0=CAN-Bus, 1=AUX3
P077	Output AUX1/Speed Alarm	0	0=OFF, 1=ON
P078	Output AUX1/Switching Speed	1000	[min ⁻¹]

P079	Output AUX1/Speed lower/higher	0	0=LOWER oder 1=HIGHER
P080	AUX1/Engine Stop	0	0=OFF, 1=ON
P081	Output AUX2/Event AUX1	0	0=OFF, 1=ON
P082	Output AUX2/Event AUX2	0	0=OFF, 1=ON
P083	Output AUX2/Event AUX3	0	0=OFF, 1=ON
P084	Output AUX2/Error Alarm	0	0=OFF, 1=ON
P085	Output AUX2/Speed Source	0	0=CAN-Bus, 1=AUX3
P086	Output AUX2/Speed Alarm	0	0=OFF, 1=ON
P087	Output AUX2/Switching Speed	1000	[min ⁻¹]
P088	Output AUX2/Speed lower/higher	0	0=LOWER oder 1=HIGHER
P089	AUX2/Engine Stop	0	0=OFF, 1=ON
P104	Engine Number	(leer)	max. 13 characters, Input with ehbTools for customer use.
P105	Setup Number	Default	max. 11 characters, this input will also be used in the file name to save the file with ehbTools.
P106	Software Version		Inquired by ehbTools when reading the device configuration. Readonly.
P108	Operating Hours		Inquired by ehbTools when reading the device configuration. Readonly. Only available if this information from the engine ECU is present.
P109	Interface Code		Internal use of ehbTools. Serial number of the dongle.
P110	Time Stamp		Internal use of ehbTools. Date and time of last parameter upload.
P120	Function Input OP1	0	0=input switch, 1=RPM(up), 2=RPM(max)
P121	OP1 NC/NO	1	0=NC (normally closed) 1=NO (normally open)
P122	Function Input OP2	0	0=input switch, 1=RPM(down), 2=RPM(min)
P123	OP2 NC/NO	1	0=NC, 1=NO
P124	Function Input OP3	0	0=input switch, 1=operate RPM
P125	OP3 NC/NO	1	0=NC, 1=NO
P126	OP4 NC/NO	1	0=NC, 1=NO
P127	Output OP/Event OP1	0	0=OFF, 1=ON
P128	Output OP/Event OP2	0	0=OFF, 1=ON
P129	Output OP/Event OP3	0	0=OFF, 1=ON
P130	Output OP/Event OP4	0	0=OFF, 1=ON
P131	Output OP/Engine Stop	0	0=OFF, 1=ON
P132	<u>S05160-7x</u> : New Parameter 132	0	Currently not in use.
	<u>S05160-1x</u> : Function Input OP4	0	0=input switch, 1=parking brake

P133	New Parameter 133	0	Currently not in use.
P134	New Parameter 134	0	Currently not in use.
P135	New Parameter 135	0	Currently not in use.
P136	New Parameter 136	0	Currently not in use.
P137	New Parameter 137	0	Currently not in use.
P138	New Parameter 138	0	Currently not in use.
P139	New Parameter 139	0	Currently not in use.
P140	New Parameter 140	0	Currently not in use.
P141	New Parameter 141	0	Currently not in use.
P142	New Parameter 142	0	Currently not in use.
P143	New Parameter 143	0	Currently not in use.
P144	New Parameter 144	0	Currently not in use.
P145	New Parameter 145	0	Currently not in use.
P146	New Parameter 146	0	Currently not in use.
P147	New Parameter 147	0	Currently not in use.
P148	New Parameter 148	0	Currently not in use.
P149	New Parameter 149	0	Currently not in use.
P150	New Parameter 150	0	Currently not in use.
P151	New Parameter 151	0	Currently not in use.
P152	New Parameter 152	0	Currently not in use.
P153	New Parameter 153	0	Currently not in use.
P154	New Parameter 154	0	Currently not in use.
P155	New Parameter 155	0	Currently not in use.
P156	New Parameter 156	0	Currently not in use.
P157	New Parameter 157	0	Currently not in use.
P158	New Parameter 158	0	Currently not in use.
P159	New Parameter 159	0	Currently not in use.
P160	New Parameter 160	0	Currently not in use.
P161	New Parameter 161	0	Currently not in use.
P162	New Parameter 162	0	Currently not in use.
P163	New Parameter 163	0	Currently not in use.
P164	New Parameter 164	0	Currently not in use.

13. Technical data

13.1 Hardware

Parameter/Pin	Conditions	Values/Feature			Comments
		Min.	Typ.	Max.	
Voltage range		8V	12...24V	32V	static
Interference voltage on UB	6V _{ss} , 50Hz	14V		28V	
Voltage peaks on UB	2ms		200V		
Current consumption 8 – 24V	14V	140mA	145mA	150mA	
	28V	95mA	100mA	110mA	
CANbus interface			250kbit/s		CAN 2.0B, SAE J1939
EPROM			64K		
RAM			2K		
EEPROM			0.5K		
Operating temperature		-20°C		+70°C	Temporary discolouration of the display > 50°C
Storage temperature	-40°C / +85°C	-30°C		+80°C	
Humidity (non-condensing)	48h		95%		according to SAE J1378
Vibration	6 h, 10-80 Hz		20g		according to SAE J1378
Shock	72x, 9-13ms	44g		55g	according to SAE J1378
LC display		128x32 Pixel			Dot Matrix LCD B/W display, transflective
Fastening		Clamp			
Degree of protection		IP67			

13.2 Reference to test standards

The product has been tested according to the following norms:

Emission. Measurement of radio radiation according to DIN EN 61000-6-4, DIN EN 61000-4-20

Robustness against electric static discharge (ESD) according to nach DIN EN 61000-4-2

Robustness against high frequency electro magnetic fields according to DIN EN 61000-4-3

Robustness against quick transient disturbance (burst) according to DIN EN 61000-4-4

Robustness against wire transmitted disturbance induced by high frequency fields according to DIN EN 61000-4-6

Vibration according to DIN EN 60068-2-6

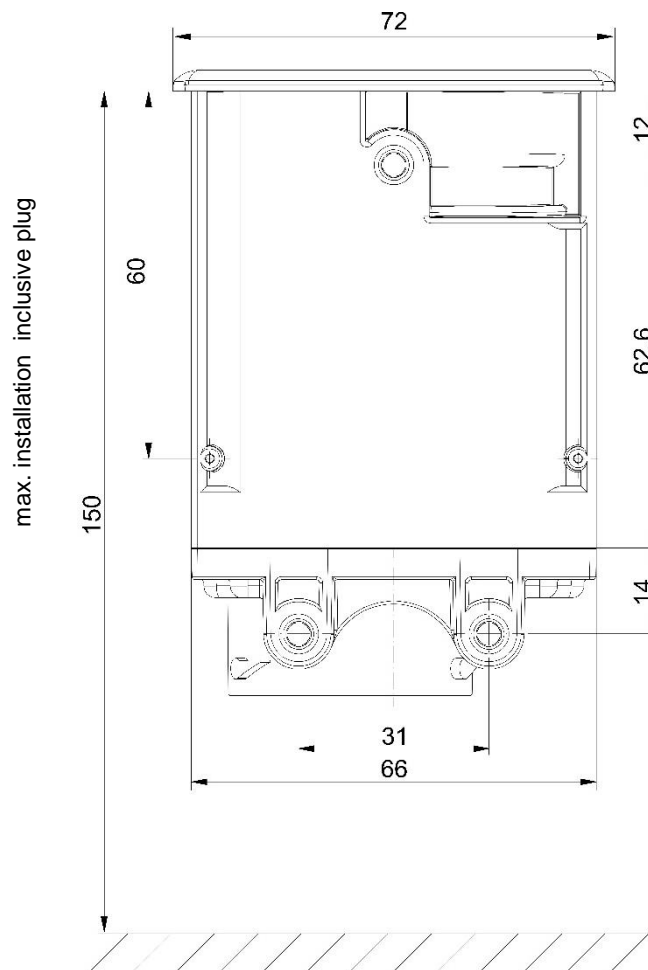
13.3 Software

After switching on, the **software version number** appears on the display for around 3 seconds. This documentation is valid for software versions S05160-7D and S05160-1B or higher. For newer

versions, the next letter of the alphabet is used as the last letter of the version number. Version S05160-1x has been extended with special functions.

If you have questions about the CANarmatur software status, please have this software version number at hand. When this note appears, internal data is being copied. None of the keys can be pressed. Afterwards either an operational value or an active error appears. The CANarmatur is now ready for operation.

13.4 Technical Drawing

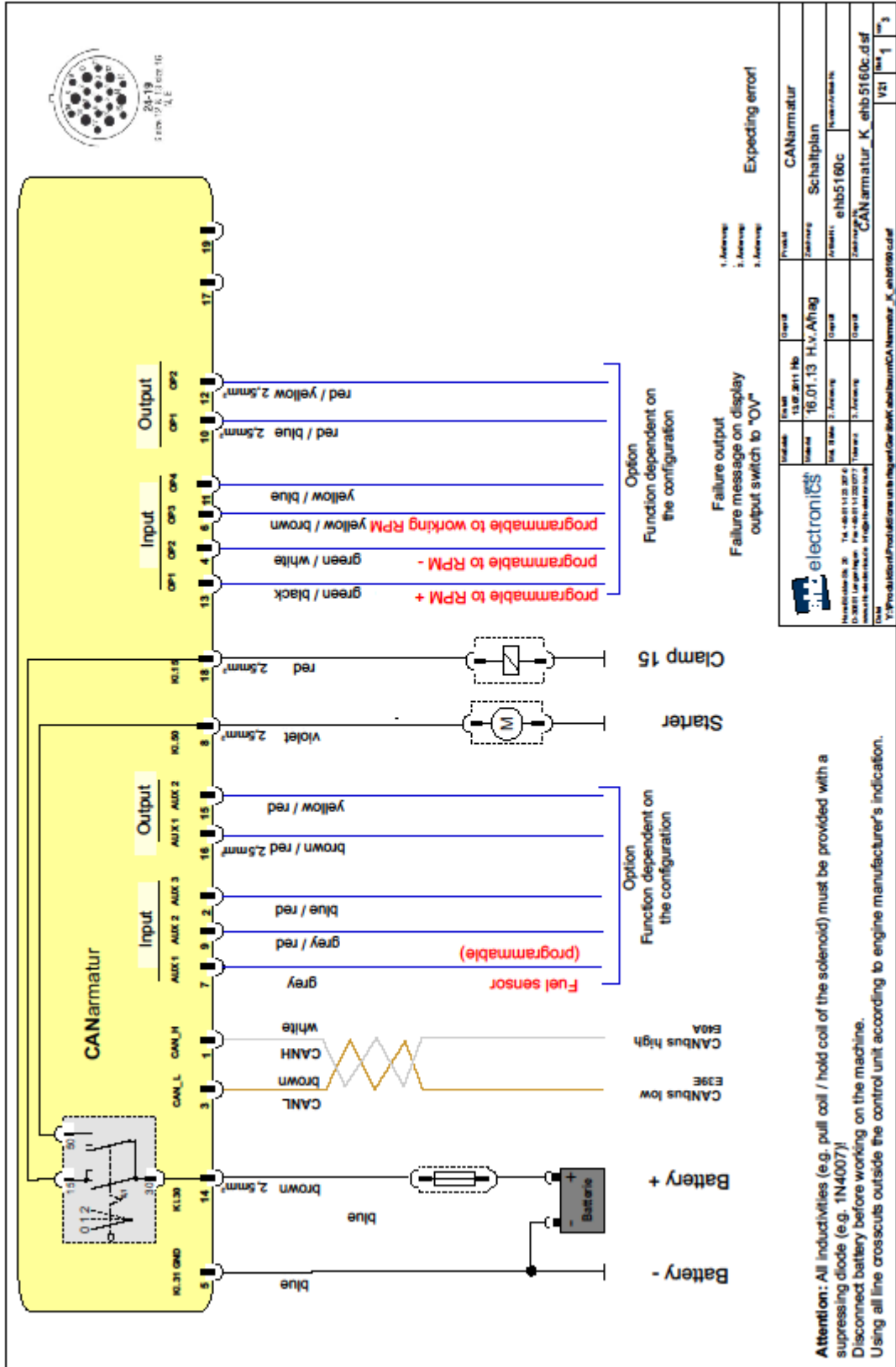


14. List of abbreviations

Abbrevia- tion	Explanation
AUX	Auxiliary
CAN	Controller Area Network
CSMA	Carrier Sense Multiple Access
DPF	Diesel particle filter
ECU	Electronic Control Unit
FI	Frequency Input
GND	Grounded (battery minus)
IO	Input/Output, I/O
IPU	Pulses per rotation
Terminal 31	Terminal 31, earth
LC display	Liquid Crystal Display
EMS	Engine management system
NC	normally closed
NO	normally open
OP	Option
SAE J1939	CAN standard
TSC	Torque Speed Control
RPM	Revolutions per minute
ZSS	Ignition switch

15. Example circuit diagram CANarmatur

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16. Document information, history

Project:	CANarmatur V3
Type of document:	Technical document
Version:	0.00
Prepared on:	14/09/2009
Prepared by:	ehb electronics gmbh, Langenhagen

Revisions:

Version:	Preparation/Revisions	Prep./Rev. date	Preparer/Reviser(s)
00.00	Preliminary version creation	14/09/2009	Mö
01.00	Amendments to preliminary version	22/01/2010	App
01.10	Amendments to preliminary version	25/03/2010	Mö
01.20	Amendments to preliminary version	17/04/2010	Mö
02.40	Formatting	31/10/2011	hag
02.50	Amendment	02/11/2011	Mö
02.50	Formatting	02/11/2011	hag
02.51	Amendments	08/11/2011	hal
02.52	Formatting	06/12/2011	hag
02.53	Wiring diagram	24/04/2012	How.
02.54	Adaptations of various diagrams	23/01/2013	Knä/hag
02.55	Adaptation page 2	26/02/2013	Jäk/hag
02.56	Adaptation of tech. data	14/10/2015	Kle/hag
02.57	Adaptation page 8 (connection), page 49 (connection diagram)	28/06/2016	Ak/hag
02.57	Formatting layout	09/08/2016	hag
2.58	Revision; Adaptation to hardware V3 and extension for software S05160-1x	20/03/2017	Mx
2.58	Formatting layout	21/03/2017 26/05/2017	Hag
02.59	Added parameter list with factory default settings Adaption testing standards and installation note, edited	14.11.2017 22.11.2017 05.11.2017	Mx Hag
2.60	Adaptation KDI Stage V for Software S05160-1e copyedit	14.08.2018 15.08.2018	Mx Hag
2.61	Adaptation Error LED copyedit	04.09.2018 05.09.2018	Mx Hag
2.61	Adaptation tables on page 9, copyedit	17.10.2018	Mx / Hag
2.62	Amendment AdBlue	19.10.2018	Mx / Hag
2.62	Adaption tables "Inputs" on page 9	10.09.2019	Hk/hag
2.63	DPF function and engine types copy edit	16.02.2021 03.03.2021	Hk Hag
2.64	change from G to H version	12.02.2024	Lut

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