⚠ Always read the operating and installation instructions before start-up!

⚠ Work on automatic burner control systems may only be carried out by trained specialist personnel!

⚠ Never carry out work when a voltage is present!
This is also important when exchanging or installing low-voltage components such as servo motors, displays or communications components.

⚠ Check the functioning of the device if fuses are defective.

⚠ Only trained specialist personnel may set the operating parameters.

⚠ The communication connection may only be used in conjunction with the approved components.

⚠ The in-phase connection and the protective conductor connection shall be carried out in accordance with the wiring diagram and checked before start-up.

⚠ Tampering with the electronics or inappropriate storage renders the device warranty null and void.

⚠ The automatic burner control system is specified with the entries made here and no features are guaranteed.

⚠ If these instructions are not observed, damage to persons or property may occur.

Operating and installation instructions

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Combustion Controls

Power Converter DLU 02



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Description

Microprocessor-controlled power converter for adapting controllers or DDC systems with power or current interfaces (0-10 V, 4-20 mA) to eBUS-compatible automatic burner control systems of the MPA series.
The device converts analogue power control signals from an external controller or DDC system into standard eBUS messages and converts eBUS information sent by the automatic burner control systems into analogue power or current signals.

Accessories

AM02 display
eBUS connecting cable
(4-wire, 400 mm)

Order data

Type DLU 02

Order No.

230 878 DLU 02
231 582 AM 02 Display

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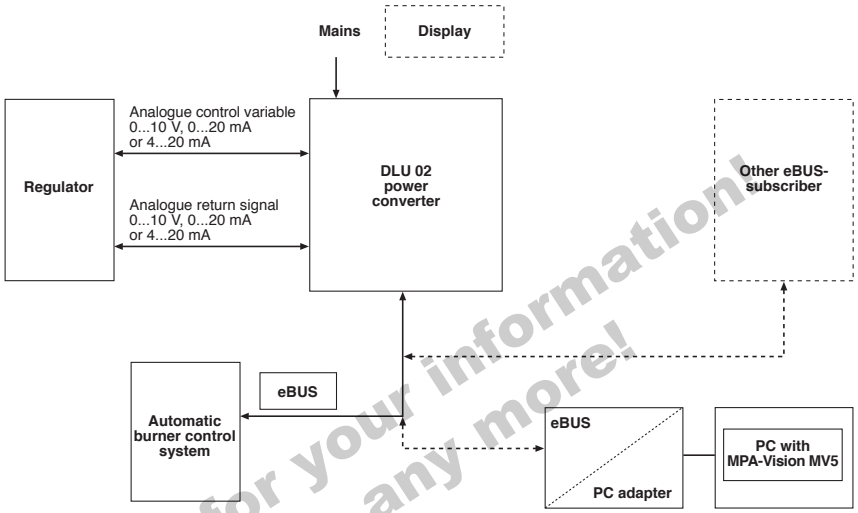
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DLU 02 Dungs power converter for coupling controllers and DDC systems with eBUS-compatible automatic burner control systems

The Dungs DLU 02 power converter has the following functions:

- Microprocessor-based electronics
- Installation in housing to IP20
- Connection system with RAST 5 and RAST 2.5 plug-in connectors
- 24 VDC/25 mA power supply for powering external current level converters
- Selectable input for power actuator signals either as voltage input of 0...10 V/2...10 V or as current input of 0...20 mA/4...20 mA.
- 0...10 V/2...10 V output
- 0...20 mA/4...20 mA output
- Integrated eBUS connection
- "Four-wire eBUS" connection (TTL level) for connecting automatic burner control systems without fully integrated eBUS connection
- Connection for external display unit for instrument parameterising

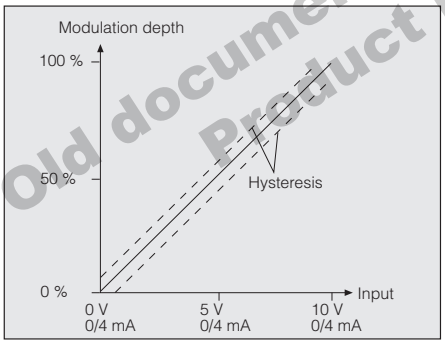
Schematic Diagram



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Voltage/current input

Input for controlling the modulation of a connected MPA series automatic burner control system using eBUS.



The voltage input converts the 0...10 V voltage to a modulation depth of 0...100 % and sends this via the eBUS to a connected automatic burner control system. The voltage input can be used as a current input by placing a jumper between terminals 8 and 9. This current input can be switched from 0..20 mA to 4...20 mA using a software switch. Negligible changes to the input parameter are not transmitted immediately. Changes which are smaller than the hysteresis
(+/- 5 % of the end value) are transmitted after one minute.

Voltage/current input

The DLU 02 supplies the modulation depth sent by the MPA as an analogue output variable. A modulation depth of 100 % (10 V) means 100 % power whereas a modulation depth of 0 % (0 V) indicates that burner is running at minimum power. The modulation depth can be measured as a current signal (0...20 mA) using the current output. This output can be adjusted to 4...20 mA using a software switch. As the output signals of the voltage and current outputs are internally linked, the voltage output also switches from 0...10 V to 2...10 V.

Power supply output

There is a power supply of 24 VDC for powering external modules (such as level converters). This supply has a load capacity of max. 25 mA.

eBUS interface

The DLU 02 has a fully-functional eBUS interface. An eBUS supply with a constant current of 20 mA and SYN character generator are integrated.

"Four-wire eBUS" connection

To connect the DLU 02 to automatic burner control systems which are only equipped with a "four-wire eBUS" interface (e.g. MPA22), the DLU 02 is also fitted with such an interface. Both devices can be interconnected using a special connecting cable without the need for a special MPA/eBUS adapter.

Connection for external display unit

The DLU 02 is parameterised using an external display unit which is not required for operation. The display unit is a special accessory.
Alternatively, you have the option of parameterising the DLU02 with MPA-Vision.

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Installation
You can install the device in any position.

Electrical connection
Always carry out connection and protective grounding in accordance with the local regulations and the wiring diagram.

Fuses
External fusing of the DLU02 with a 6.3A max. slow-blow fuse.

⚠ **If a fuse is faulty, check the functioning of the device!**

Start-up
The device must be de-energised before installation or maintenance work is carried out. Only trained specialist personnel may set the operating parameters. The communication connections and the connection to the display and operating unit may only be used in conjunction with the approved components. Always carry out the in-phase connection in accordance with the wiring diagram and check on start-up.

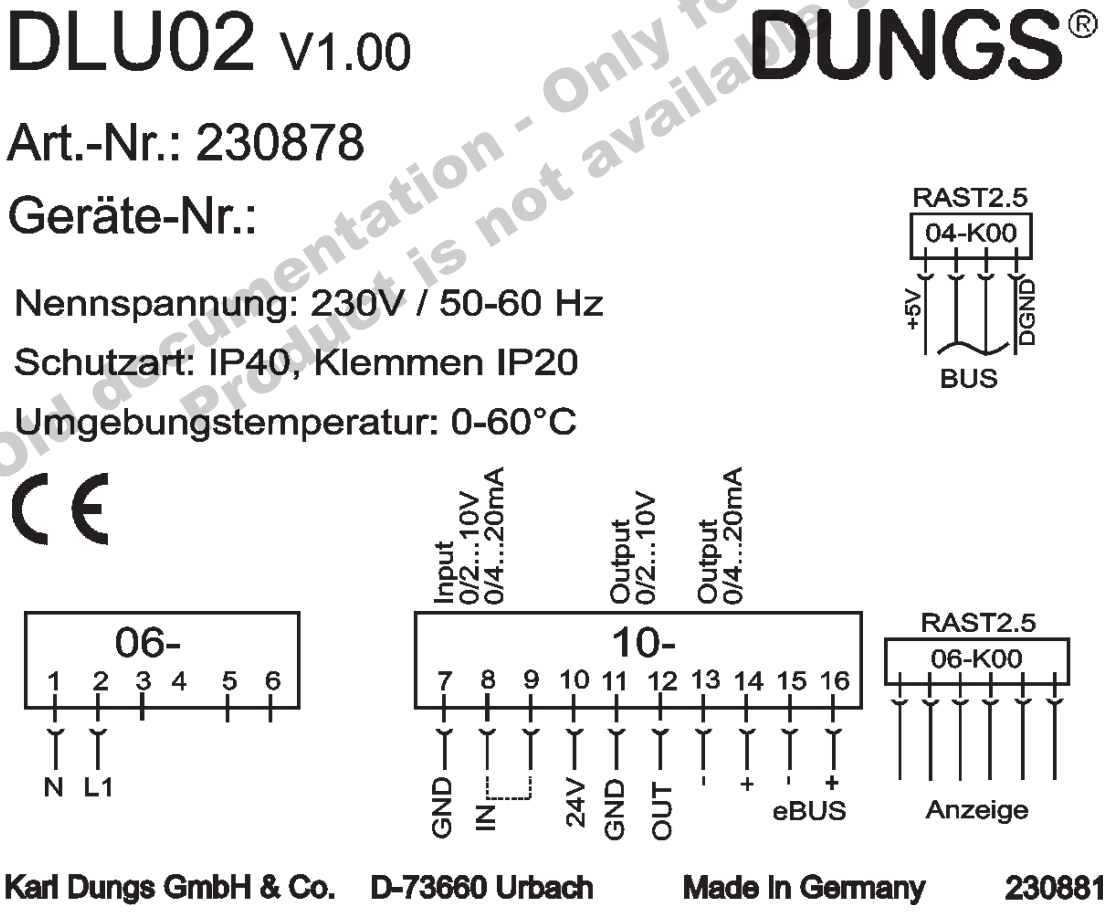
⚠ **Do not connect the current output with GND!**

Performance during faults
If there is a communication fault, measure the eBUS supply. The functionality of the eBUS system can be established using a simple eBUS tester or using a laptop and the MPA-Vision software.

⚠ **If these installation and operation instructions are not followed, damage to persons or property may occur. Therefore always comply with the instructions. Tampering with the electronics renders the warranty null and void.**

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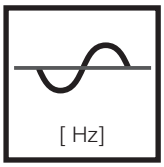
Wiring diagram



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Nominal voltage ~(AC) 230 V – 15 % … + 10 %



Frequency 50 Hz



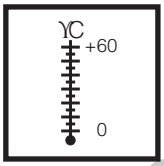
Performance rating ~ 8 VA



Fuses Back-up fuse, max. 6.3A, slow-blow



Protection type IP20, IP40 must be ensured by installation
IEC 529 (DIN 40 050)



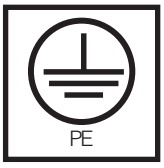
Ambient temperature 0 °C … + 60 °C



Humidity DIN 60730-1



Electrical connection Coded plug system RAST 5 and RAST 2.5
Wiring must be executed in accordance with local regulations and the wiring diagram. Extra-low voltage is isolated.



Protective ground-connection None



Weight 0,45 kg

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Voltages and currents

Voltage input	0/2...10 V Input resistance = 4.75 kΩ
Current input	0/4...2 mA Input resistance = 500 Ω
Voltage output	0/2...10 V Load <= 500 Ω Do not connect the output to GND!
eBUS	4-wire isolated 2-wire with 20 mA constant current sour-
ce	
	Cable length max. 2m
Output power	24 VDC, max. 25 mA

Communications

eBUS multi

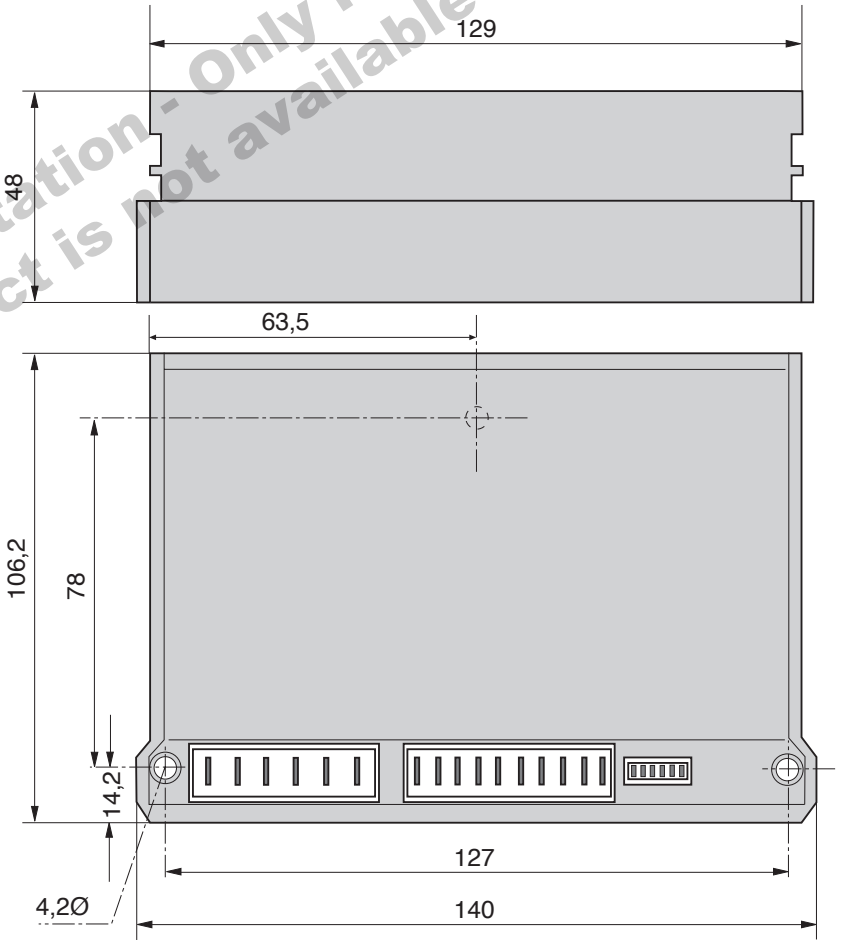
To eBUS specifications
Layer 1/2: V1.0
Layer 7: V1.2

PC service program

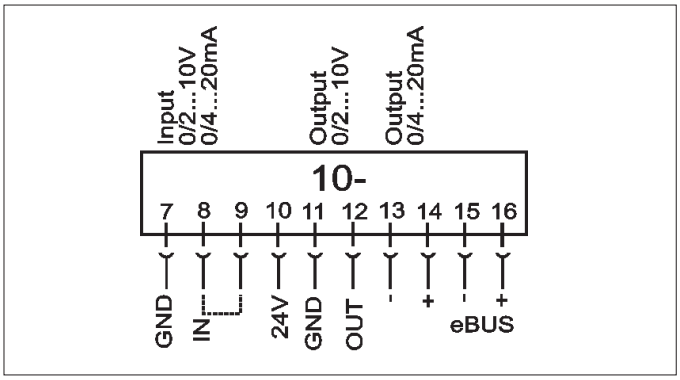
MPA-Vision for Windows 95
Connection using eBUS-PC interface

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Dimensions:



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Setting the voltage and current input

You can define whether the input is to be used as a voltage or current input using terminals 8 and 9. If the connections stay open, the input will function as a voltage input. If there is a jumper between them, the input functions as a current input. The use and the voltage or current range is selected using parameters nos. 3 & 4.

Parameter No. P03	Analogue input
OFF	Deactivated
ON	Activated

Parameter No. P04	Jumper	Input
OFF	No	0...10 V
ON	No	2...10 V
OFF	Yes	0...20 mA
ON	Yes	4...20 mA

Settings of the voltage and current input

The use and the voltage or current range of the two outputs is selected using parameters nos. 5 & 6.

Parameter No. P05	Analogue output
OFF	Deactivated
ON	Activated

Parameter No. P06	Voltage output	Current output
OFF	0...10 V	0...20 mA
ON	2..10 V	4...20 mA

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Setting the communications addresses

The DLU02 possesses two parameters for setting the eBUS addresses. Parameter no. 1 returns the eBUS address of the DLU, and is preconfigured to the address 10H. Parameter no. 2 is the eBUS address of the connected automatic burner control systems. The standard address for this is 03H.

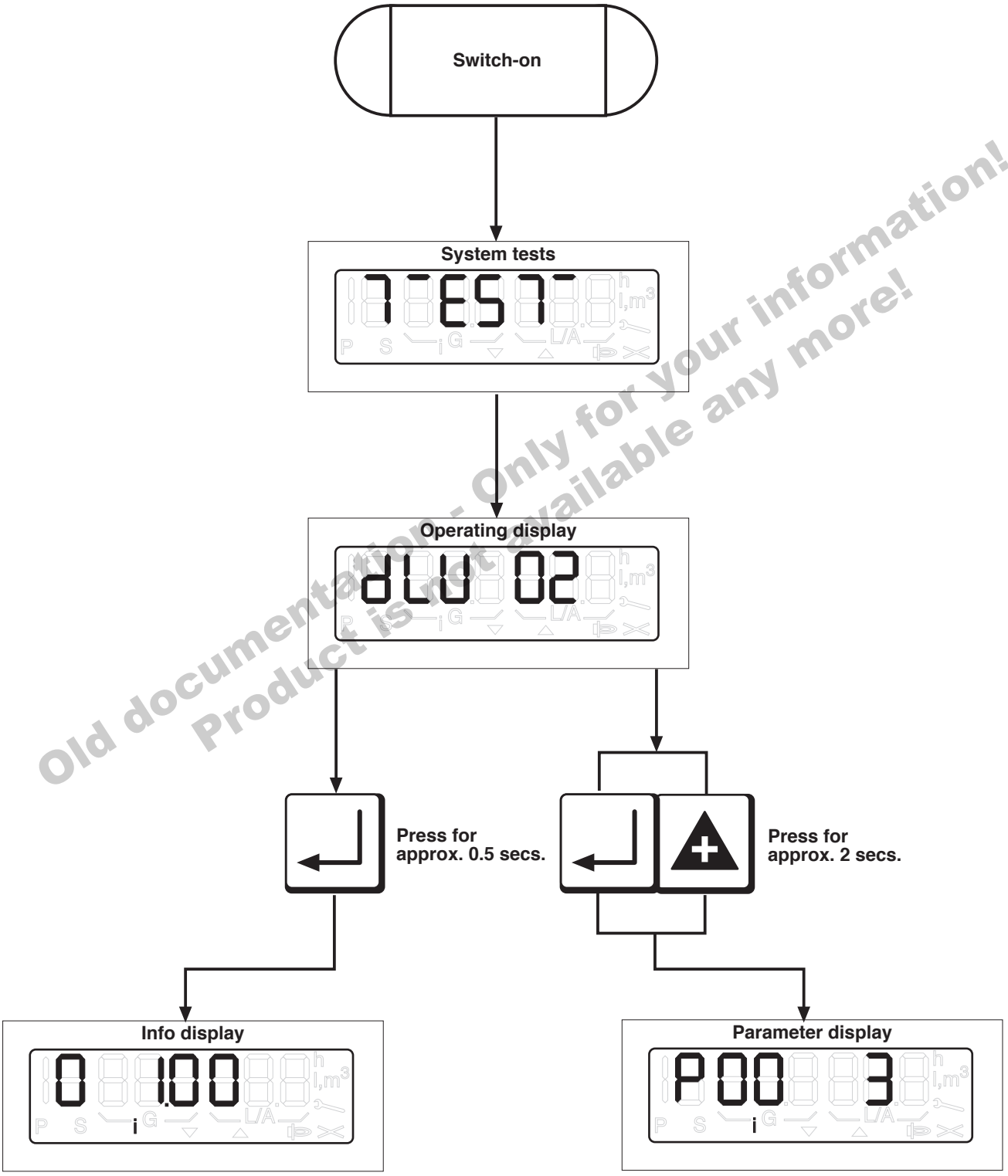
⚠ Important for use with the MPA 16.04 automatic burner control system

MPA 16.04 for the software versions up to V2.23 expects the eBUS address of 10H as the address of the DLU, which means that parameter 1 must be set to this value. Also, MPA 16.04 sends the current performance and not the modulation depth to the DLU because of the older eBUS specifications.

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Operating the display

The display and operating unit is principally only required for the parameterising of the DLU 02. If the display is connected, the device switches to operating display mode after switch-on and the execution of system tests. Only the text “DLU 02” is output. Using specific key combinations, you can switch the device to info display mode or parameter display mode. The individual modes are described below.



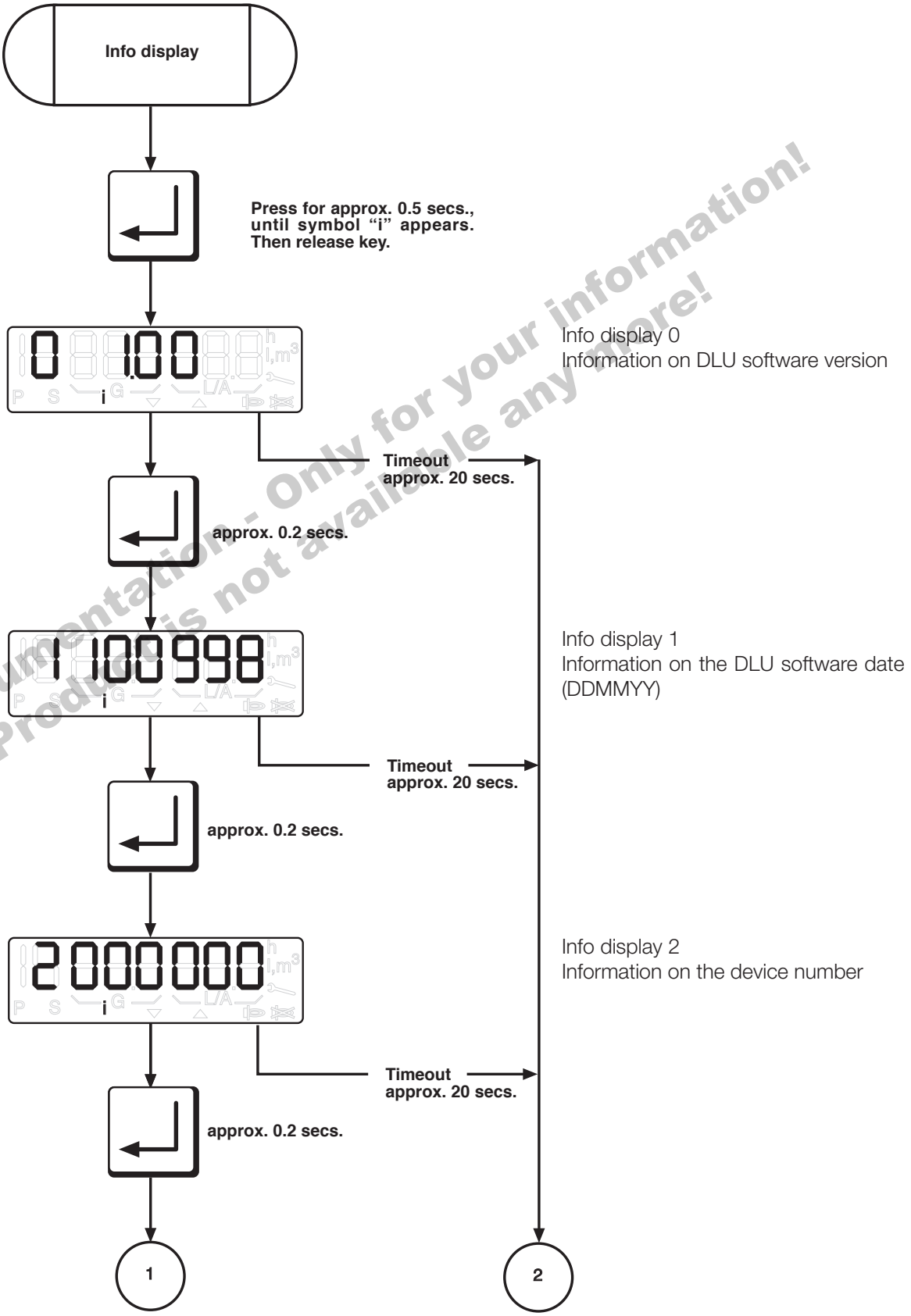
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Info display

The information display can only be reached via the operation display. It gives information on the software version, the software date, the device number, the production date, the DLU eBUS address, the MPA eBUS address, the analogue input status, the analogue input offset, the analogue output status, the analogue output offset and the cycle time for modulation depth request. After 20 seconds, the device exits this display and either times out or switches to the previous display.

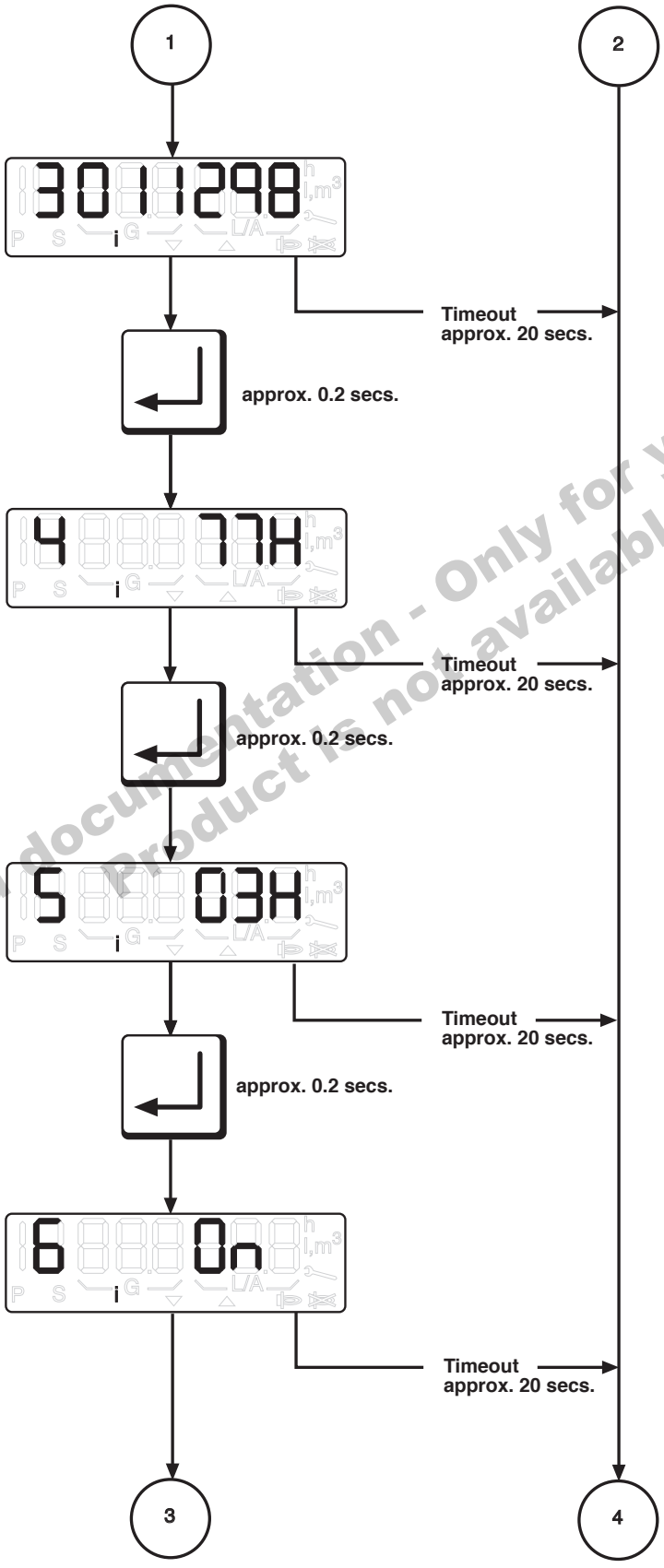


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Display and Operating Unit
Info display

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Info display 3
Information on the production date

Info display 4
Information on the DLU eBUS address in hexadecimal characters

Info display 5
Information on the MPA eBUS address in hexadecimal characters

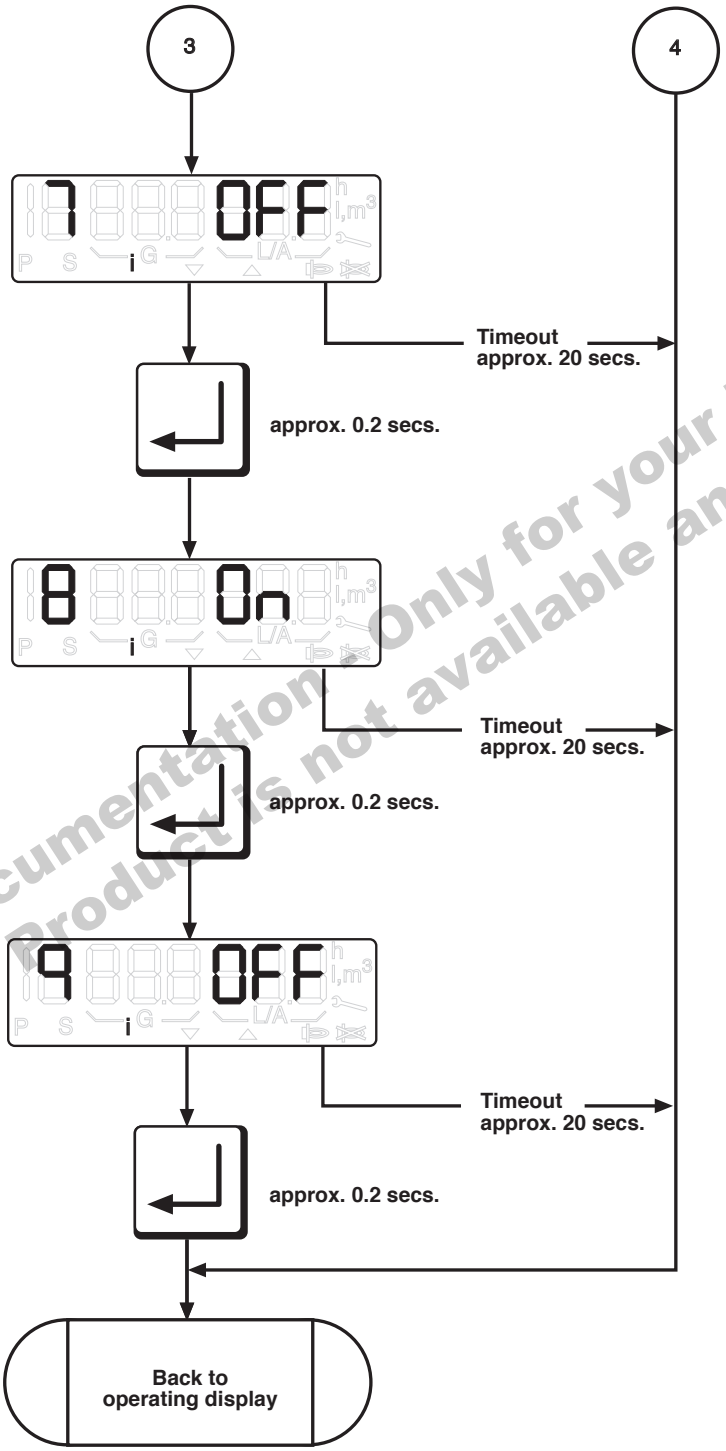
Info display 6
Analogue input status
OFF = Analogue input deactivated
ON = Analogue input active

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Display and Operating Unit
Info display

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Info display 7
Analogue input offset
OFF = 0...20 mA or 0...10 V
ON = 4...20 mA or 2...10 V

Info display 8
Analogue output status
OFF = Analogue output deactivated
ON = Analogue output active

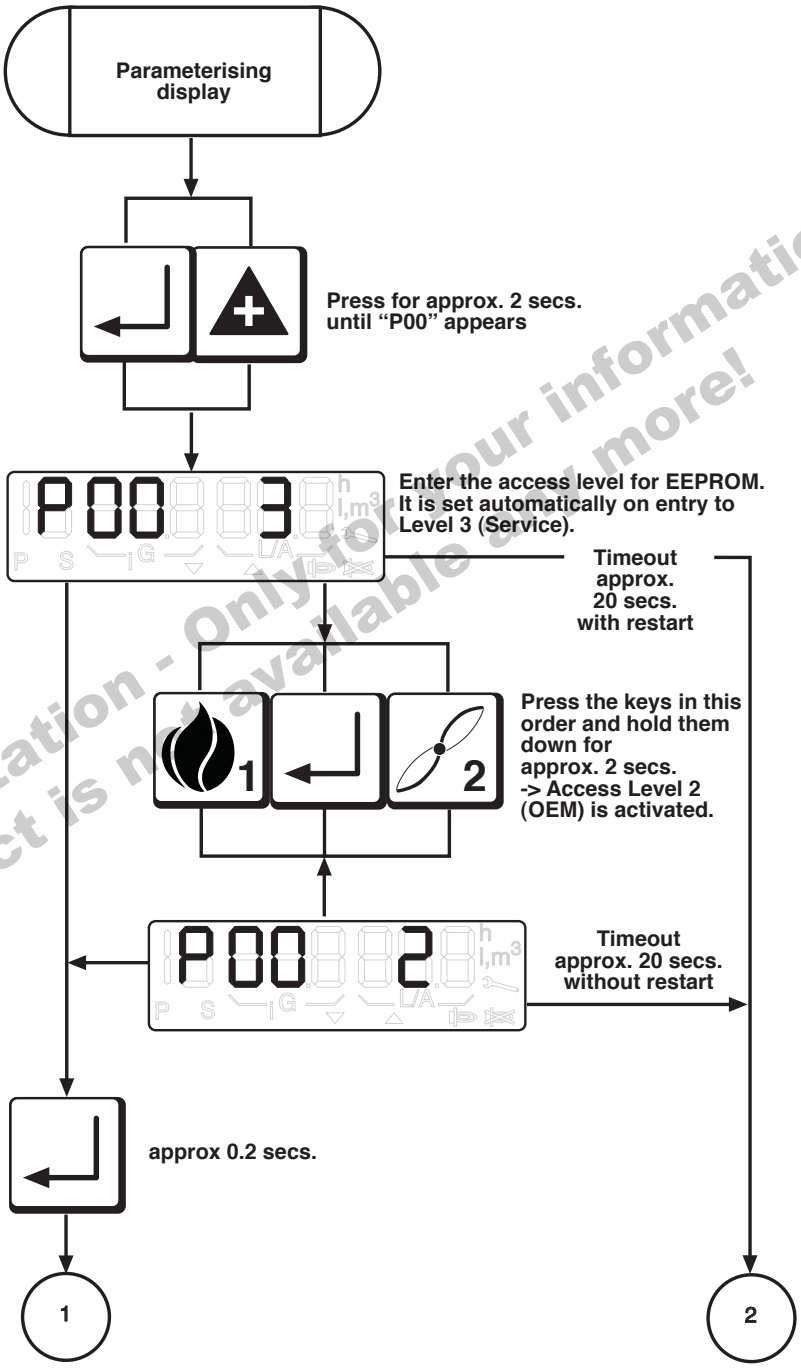
Info display 9
Analogue input offset
OFF = 0...20 mA or 0...10 V
ON = 4...20 mA or 2...10 V

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Parameterising mode

The Parameterising mode provides the facility of displaying important operating parameters and setting them with the keyboard. When adjusting the settings in Parameterising mode, set the access level to 3 (Service) so that all the parameters in the Service level can be set in MPA-Vision. After 20 seconds, the device exits this display and either times out or switches to the previous display. When you exit the parameter display, the device automatically restarts to update the changed parameters.

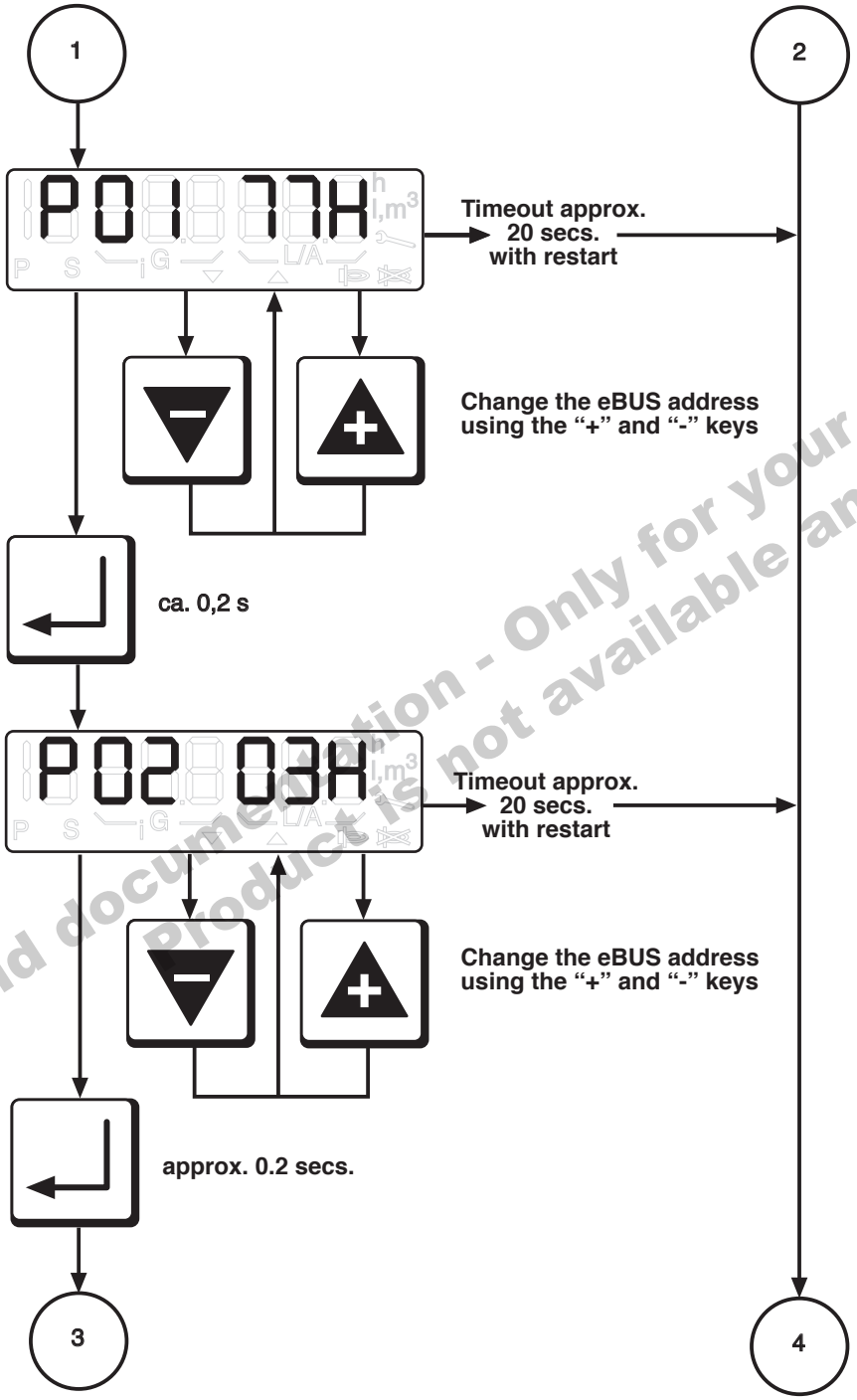


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Display and Operating Unit Parameterising mode

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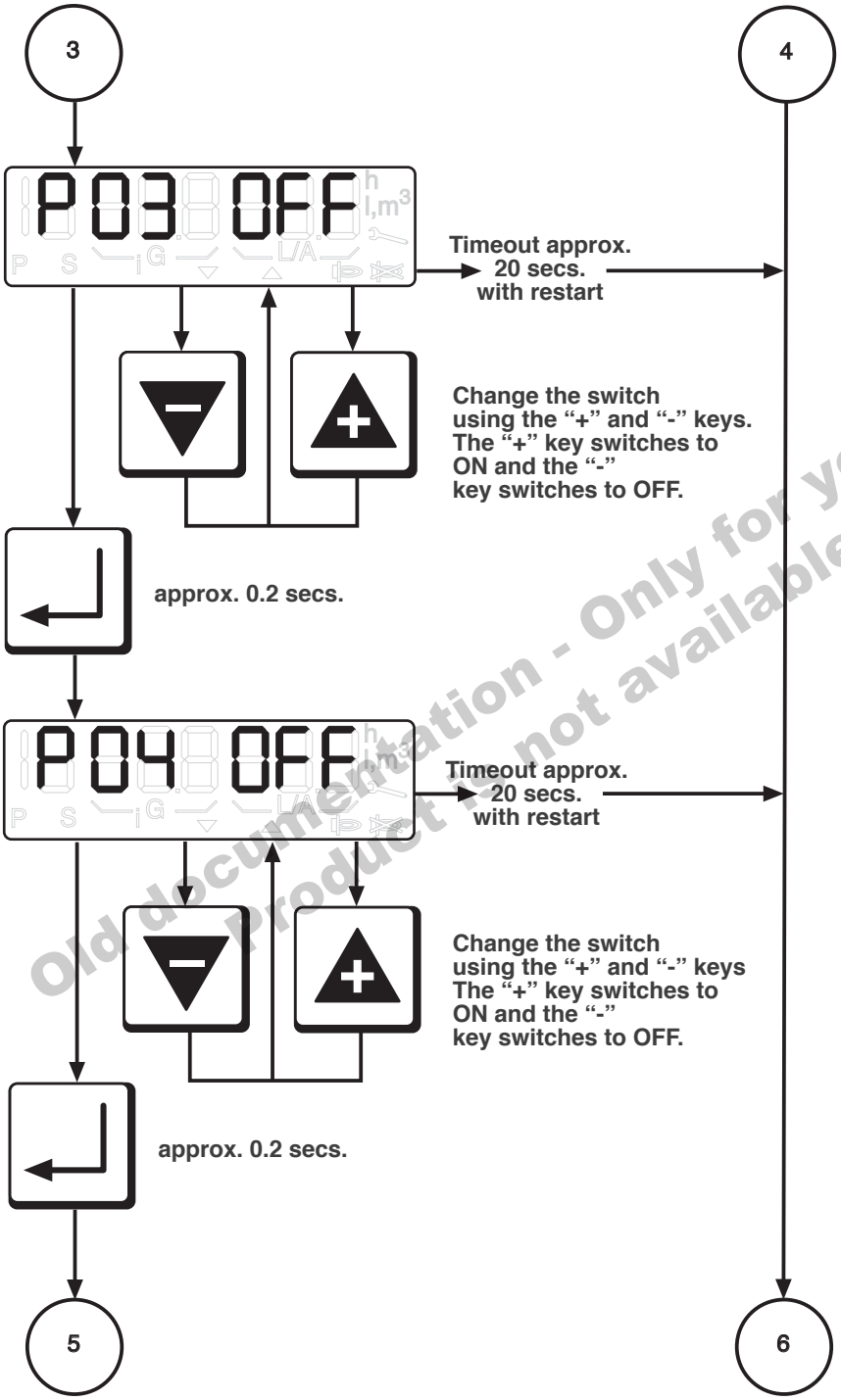


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Display and Operating Unit Parameterising mode

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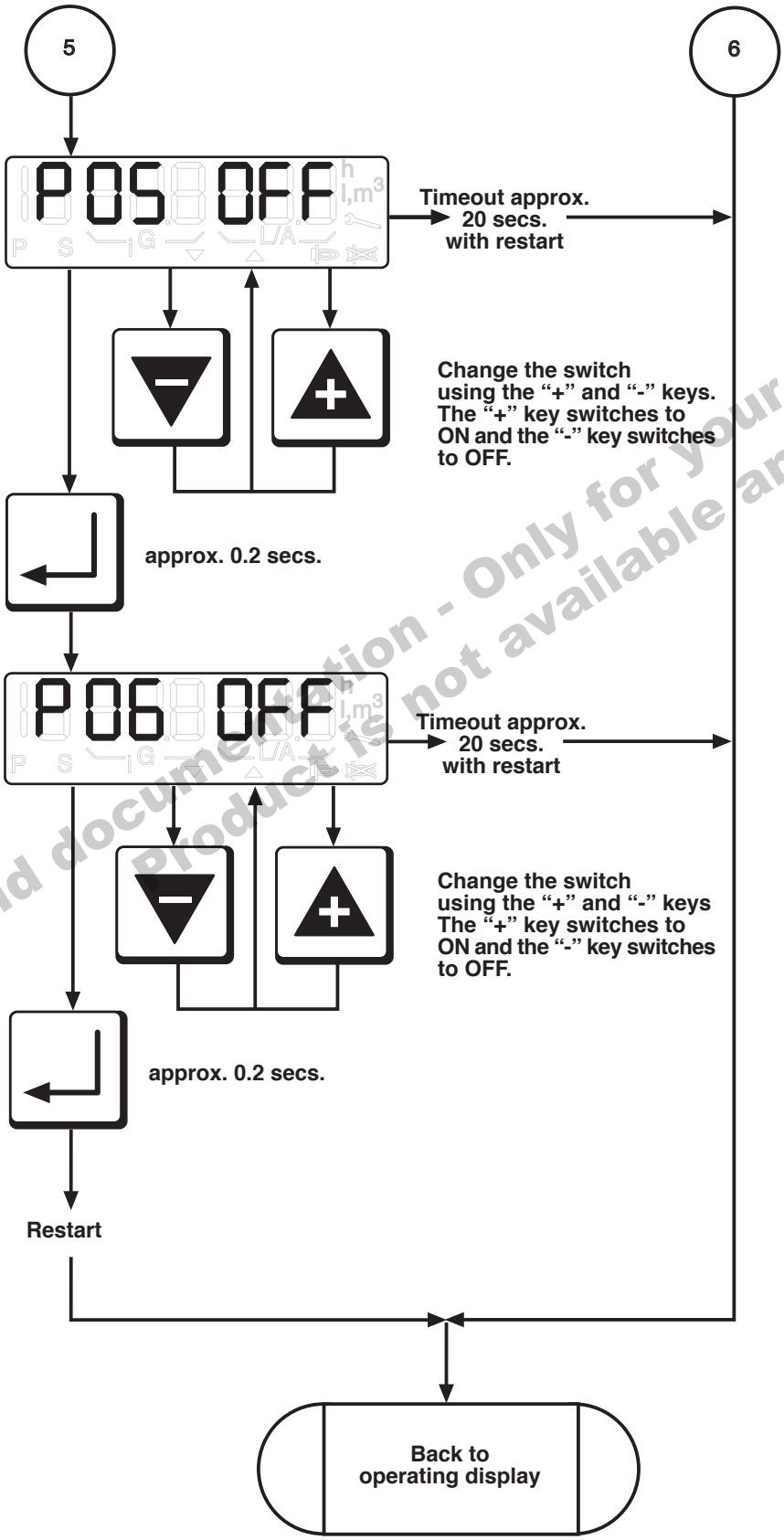


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Display and Operating Unit Parameterising mode

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