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D-IPS[®] Manual for the power supply

1AC: D-IPS[®] 250C/500C
3AC: D-IPS[®] 350/3C - D-IPS[®] 500/3C
- Controllable Version -



Important Note: *Only qualified personnel is allowed to use the device for specified application.
Read the instruction manual carefully and pay attention to the safety instructions and manufacturer's requirements in any case!*

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Device features:

- **Innovative power supply for professional OEM application**
- **Mounting on TS35-rail (screw fastener via adapter accessory available)**
- **High efficiency**
- **Standby-power (< 1,5 W)**
- **LC-Display to display the control data and device configuration**
- **LED power indicator and error messages**
- **Digital control of the primary and secondary side**
- **Supply depending on model 1-phase / 3-phase**
- **Active PFC**
- **High transient stability**
- **No inrush current**
- **Adjustable load parameter characteristic**
- **Programmable input parameters according to customer specification**
- **Application specific output characteristics and sequences programmable**
Optionally ex works
- **Various signal-/data interfaces and others analogue (0-10V, 4-20mV), digital, relay contacts**
- **Connections for passive/active sensors and optional supply through separate AUX output**
- **Compact mounting form**

1) GENERAL SAFETY NOTES

- The D-IPS® power supplies are rack mounting power supplies for the use in industrial applications.
For correct installation pay attention to the relevant DIN/VDE/EN standards.
- When electrical devices are activated, certain parts are under dangerous voltage inevitably.
- Improper handling of these devices can cause fatal injuries and substantial material damages.
- Only qualified personnel is allowed to work on these devices.
- The device may not be opened, otherwise the test-certificate as well as the warranty expires. All necessary connections and adjustment elements for operation are accessible from the outside.
- The device must be installed in accordance with the standards of EN60950.
- A separator for activating the power supply must be provided.
- Before installation or work at the device, turn off the main switch and secure against unauthorized switching.
- Never work on applied voltage!
- To avoid overheating of the power supply through insufficient convection, a minimum distance to the other modules must be maintained:
10cm in vertical direction and 2cm in horizontal direction.

IMPORTANT SAFETY INSTRUCTIONS

1. Store these instructions

The manual contains important safety and operating instructions.

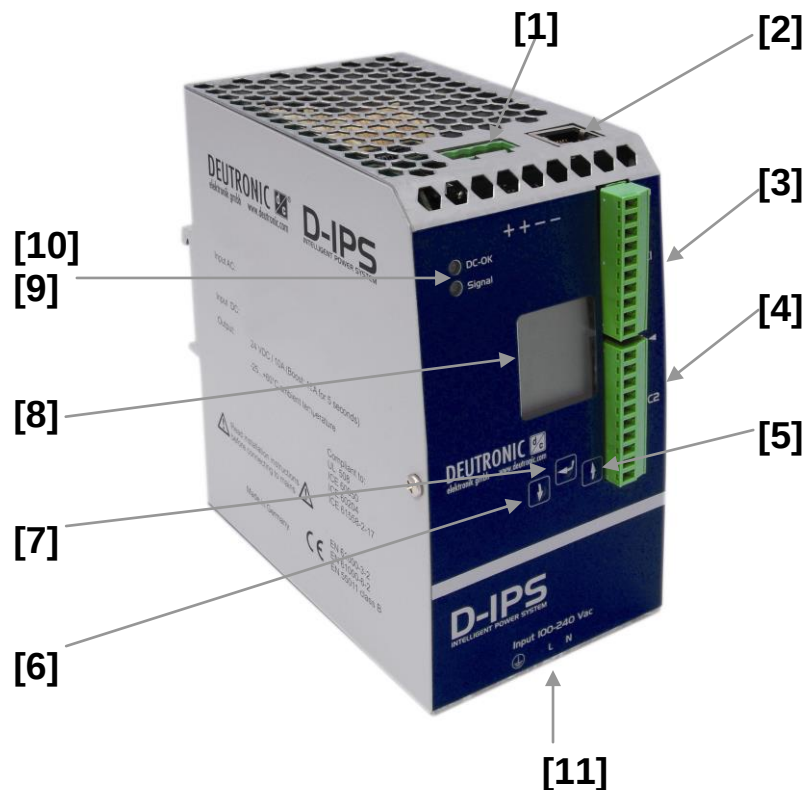
2. Only suspend the Power supply to the temperature ranges specified in the datasheet.
3. The use of accessories which is not recommended or sold by the manufacturer can result in a risk of electric shock or personal injury.
4. Do not use the power supply furthermore, when there was a hard blow, a fall damage or was damaged in any other way. In this case send the unit to a Deutronic service station.
5. The power supply may not be opened. If a service or a repair is needed, the device must be sent to a official Deutronic service center. Incorrect installation can result in electric shock or fire
6. To reduce the risk of electric shock, the device must be disconnected from mains before every maintenance or cleaning. The device`s switch-off only does not reduce the risk.

2) Technical data



For detailed technical data such as input voltage, needed input fuse / required circuit breaker etc. please refer to the data sheet. This data sheet you can find at the internet under www.deutronic.com or on request anytime available at Deutronic directly.

3) Connections and controls



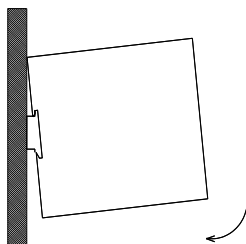
- | | |
|--|--|
| [1] DC output | [8] User menu (LC-display) |
| [2] Communication-Interface | [9] Signal LED |
| [3] C1 Interface | [10] „DC OK” LED |
| [4] C2 Interface | [11] mains connection
(depending on the device version 1AC / 3AC) |
| [5] UP - button (select parameters) | |
| [6] DOWN - button (select parameters) | |
| [7] ENTER - button
(edit / accept parameters)) | |

4) Installation

DIN-rail mounting:

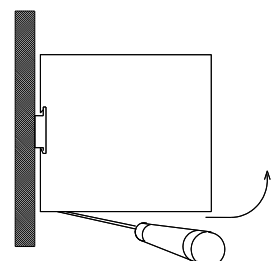
Mounting:

Hang up the device with the DIN-rail guide into the top edge of the DIN-rail and press down to snap in.



Dismounting:

Unlock the snap mechanism with a screwdriver. Lift up the device.



Mains connection:

The mains connection of N, L, PE (1-phase) or L1, L2, L3, PE (3-phase) exclusively occurs via the connections of the plug-in mains clamp. The connection sequence is printed on the front side of the casing.

1AC-types are suitable for connection to IT networks.

3AC-types are not suitable for connection to IT- or Delta-networks.

Warning:

The ground conductor supply ensues over the plug-in clamp.

Never loose or open any housing screws.

Only operate at the connectors when the unit is free of energy

Make sure before starting:

- The mains connection must be carried out professionally and the protection against electric shock must be secured.
- In accordance with the standards of EN 60950 the device must be switchable in volt-free mode outside the power supply (eg, by a breaker or the primary-side cable protection)
- The ground conductor has to be connected.
Recommended minimum cross section of 1,5mm² or AWG16 for North America.
- The mains cords must be dimensioned and secured sufficient.
- The output lines must be dimensioned or secured separately according to the device's output current.
- A sufficient convection in the correct mounting position must be guaranteed.

Output and control lines

DC-output: 2x +Uout , 2x GND

Additional 2 interface plugs (10-pin) are mounted for the external control as well as a programming interface.

User information for applications with control lines in areas of radio interference class B (EN55011):

When using interface cables and signal lines each must be drawn through RF ferrite with two windings.

Connecting cable:

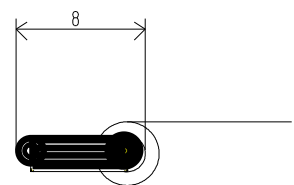
Cable cross-sections of 0,2mm² to 2,5mm² flexible or rigid can be used.

Pay attention for a sufficient cord diameter.

Remove insulation of the cable ends to 8mm approximately.

It is recommended to secure the cable ends through ferrules against unraveling / splice out.

Ensure that all single wires are located at the connection area.



5) Initial operation - configuration, controls and displays

The power supply has a standby-power of < 1,5W , so a mains switch was renounced.

Important note for initial operation:

Warning – before initial operation all loads must be clamped off!

Please have a look to the specifications at the type label, before you connect the unit to the mains.

When the mains voltage applies to the input, the actual voltage- and current values will be shown with the associated unit (V or. A) at the display.

The green DC-OK LED lights.

The device configuration like data source (interface), nominal values for output voltage and output current must be checked for the selected application and set if necessary!

After a successful parameterization the device can be disconnected from mains. Afterwards the output must be connected with the load correctly and if necessary restore mains supply.

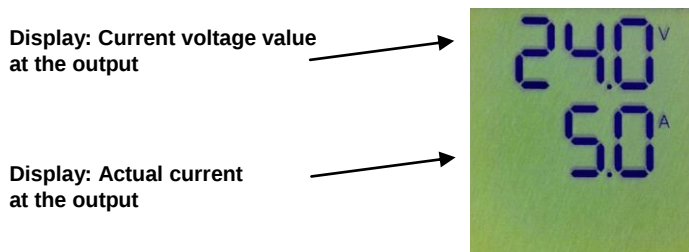
Configuration:

The controllable power supplies of the D-IPS®-C series have following configuration possibilities:

- Configuration at the device directly (via buttons control).
- Configuration of the device via communication protocol (RS 232, Ethernet etc.).
- Optional: Special customer settings preconfigured possible ex works.

User interface / display:

At the top of the startdialogue the values for voltage and current as well as the selected source (internal, analog, digital) are displayed.



Description of the display:

In the basic variant the device has following reference values –default options (data sources)
- for each of the output variables (current and voltage)

Src	Source	
Int	Internal	Values can be entered on the front panel by the buttons
Anl010	Analog	Value is transmitted in analog kind (0...10VDC)
Anl420	Analog	Value is transmitted in analog kind (4...20mA)
di	Digital	Data communication via the RS232 interface (or other optional interface - e.g. ETH / USB etc.)

Note:

The source for the reference value input must be set, so that each input will be activated. By internal input (buttons) the entered values will be taken at the source input firstly. The source can be selected via communication protocol as well. The values of the digital interface (RS-232/ETH etc.) take precedence over the internal or analog source.

Description of the LED-display:

Green LED:

- Voltage lead : LED lights
- Current lead : LED blinks (frequency 1)
- Power lead: LED blinks (frequency 2)

Red LED:

- Error: LED blinks
- Option: customer specific programming of the red LED
- Normally the LC-display shows the actual values of voltage and current and in set mode each level or function.

6) Configuration of the source for output voltage and current

The output voltage and the output current can be adjusted by the following sources:

- Internal input Buttons on the unit
- Analog input 0...10V / 4...20mA
- Digital input RS232 (option: Ethernet etc.)

6. a) Source input for the voltage by buttons

Press „ENTER“

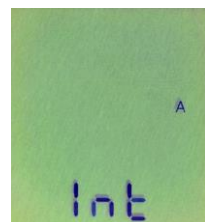
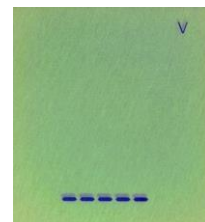
Select with the buttons „↑“ or „↓“ „Src„ (V)

(in this menu item the data source for the target value of the output voltage will be selected)

Press „ENTER“

There are three menu items to choose from:

Each source can be selected with the buttons „↓“ or „↑“



1. Selection „Internal Source“ for the voltage target value



2. Source selection „Digital Input“ (like RS232, Ethernet etc.)



3. Selection „Analog Input 0...10V“ for the voltage target value

After selecting the desired source it will take over when „ENTER“-button is pressed.

After a successful takeover of the source the display shows „Ok“.

When the display shows „no“ the source was not taken over and the selection must be done once again.

Exit from this menu level with any button „Src“ (V).

Press the buttons „↓“ and „↑“ at the same time to get out of the menu level, without overtaking the source. Press the buttons „↓“ and „↑“ simultaneous once again to get out of the menu, then it shows the current values for current and voltage.

6. b) Source input for the current by buttons

Press „ENTER“

Select with the buttons „↑“ or „↓“ „Src“ (A)

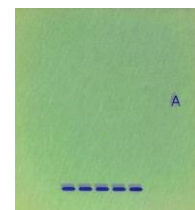
(in this menu item the data source for the target value of the output current will be selected)

Press „ENTER“

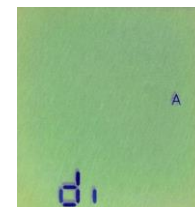
There are three menu items to choose from:

Each source can be selected with the buttons „↓“ or „↑“

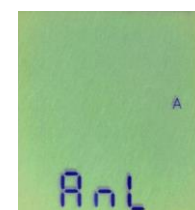
1. Selection „Internal Source“ for the current target value



2. Source selection „Digital Input“ (like RS232, Ethernet etc.)



3. Selection „Analog Input 0...10V“ for the current target value



After selecting the desired source it will take over when „ENTER“-button is pressed.

After a successful takeover of the source the display shows „Ok“.

When the display shows „no“ the source was not taken over and the selection must be done once again.

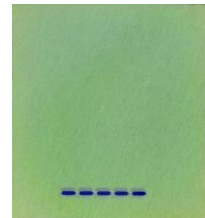
Exit from this menu level with any button „Src“ (A).

Press the buttons „↓“ and „↑“ at the same time to get out of the menu level, without taking over the source. Press the buttons „↓“ and „↑“ simultaneous once again to get out of the menu, then it shows the current values for current and voltage

6. c) Buttons input of the reference values of the output sizes at internal source

Following example shows the configuration of the reference values for the output voltage. (Reference values for the output current will be adjusted in the same way).

Press button „ENTER“ for the first menu level.
The display shows the start symbol of the menu.



Choose with the buttons „↓“ or „↑“ the voltage target value „Int“ (V) in this menu item.



Press „ENTER“ for the input of the voltage target value.

The changeable digit is marked with an underscore.
By pressing the button „↑“ or „↓“ the position can be changed.
With the button „ENTER“ the next digit is selected and so on.



After the desired target value has been set, it can be taken over.
This happens through simultaneous pressing of buttons „↓“ and „↑“ at visible "OK" indicator
Exit with any button from this menu subitem to „Int“ (V).
At simultaneous pressing of buttons „↓“ and „↑“ while appears **no „Ok“** symbol, the in the meantime set parameter is not accepted.
In this case, all input steps must be repeated.



So the voltage reference value of the internal input is set.
The output voltage will be active to this value with the input of the source „Int“ (V) firstly.

To exit from this menu press „↓“ and „↑“ to the same time.

7) Programming options (for OEM customers)

The following described device features and –functions can be programmed at Deutronic in according to customer specification optionally and supplied as a customer specific variant

7. a) INPUT

Programmable input variables (OEM)

- maximum input current
- minimum activation voltage
- control of power consumption
- Inhibit/start release at phase loss (3AC only)
- Min./max. start release temperature
- Min./max. operating temperature

7. b) OUTPUT

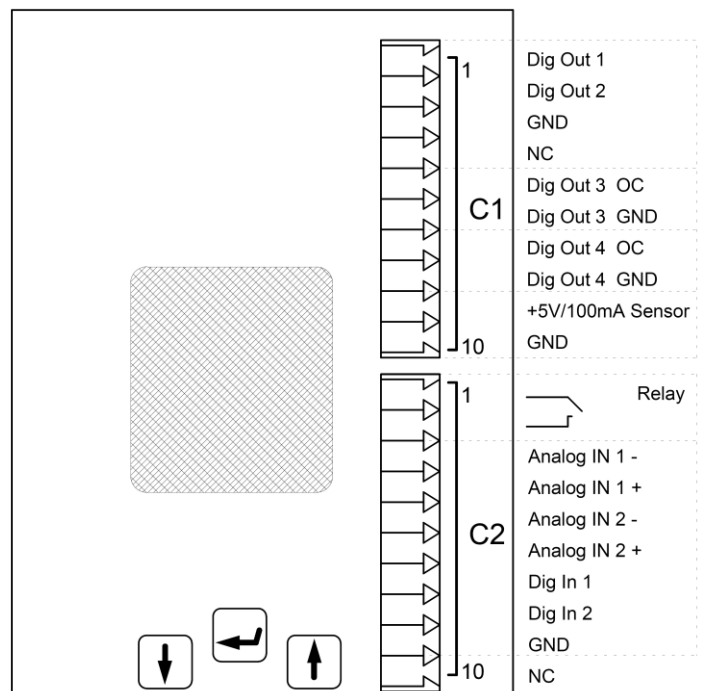
Programmable output variables (OEM)

- Current limit / overload behavior
- Output characteristics- I-const., P-const., Hiccup, Fuse-Mode
- Overload behaviour
- Power reserve by time
- Operation control programmable (time–raster-control)
- Data recording
- Signalling freely programmable
- Exceeding of tolerance windows (U) with selectable delay time
- Early alert signal level:
 - Early warning
 - Temperature – early shutdown signal
 - too low Uin for required memory time
- Network Analysis
- Analog and digital inputs and outputs

The programming of the above described features can be realized in according to customer specifications in our company.

8) Input/Output-Interface

Digitally controlled secondary / Output



Connector C1:

Status

PIN	Configuration	Function and level
1	DIGITAL-OUT-1	High, max. 20mA
2	DIGITAL-OUT-2	High, max. 20mA
3	GND	
4	NC	
5	DIGITAL-OUT-3	OC*, max. 50mA
6	DIGITAL-OUT-3	GND
7	DIGITAL-OUT-4	OC*, max. 50mA
8	DIGITAL-OUT-4	GND
9	+5VDC / 100mA	Auxiliary voltage, floating (for active sensors)
10	GND (AUX)	

Connector C2:

Control / Sensing

PIN	Configuration	Function and level
1	Relay1	1-2 Make contact
2	Relay1	
3	-ANALOG-IN-1 Spannung/Voltage	
4	+ANALOG-IN-1 Spannung/Voltage	0..10VDC Control voltage
5	-ANALOG-IN-2 Strom/Current	
6	+ANALOG-IN-2 Strom/Current	0..10VDC Control voltage
7	DIGITAL-IN-1	0 / 5VDC Level
8	DIGITAL-IN-2	0 / 5VDC Level
9	GND	
10	NC	

*OC = Open Collector

9) Communication via RS-232 or Ethernet

9. a) The RS232-interface:

Pin No.	Control-PC	AC/DC-Source
1	DCD	not used
2	RxD ←	TxD
3	TxD →	RxD
4	DTR	not used
5	GND	GND
6	DSR	not used
7	RTS	not used
8	CTS	not used
9	RI	Not used

RS-232 Interface parameters:

Baudrate: 57600 baud
Datenbits: 8
Parity: none
Stopbit: 1
Handshake: none
Protokoll: <STX>/<ETX> (further details are described below)

9. b) The Ethernet-Interface (order option):

The Ethernet-Interface is used to connect the controllable power supply of D-IPS® -C series to a 10/100Mbit Ethernet (TCP/IP or UDP).

Network-connection RJ45

Transmission standard Ethernet, IEEE 802.3

Protocols (supported) TCP/IP, UDP

Data rate max. 10 / 100 Mbps (Auto-Sensing)

For further information about Ethernet communication with the D-IPS® controllable power supplies please contact our sales department.

10) Command structure – description of communication:

With various commands the D-IPS® -C can be controlled remotely and configured via the interface. Furthermore measured values can be requested in this way. The commands themselves consist of printable ASCII-characters. Also some non-printable control characters are used for the control of data transmission.

Control characters	Value
Start character <STX>	0x02
End character <ETX>	0x03

Command mode	Extension	Example
Read Command (R)	?	OUT:UOUTS? request voltage reference value
Write Command (W)	,parameter	OUT:UOUTS,10.0 set voltage reference value to 10,0V

Example: <STX>OUT:UOUTS?<ETX>

Used shortcuts :

<STX>	„ Start of Text “ (ASCII-Code 2) will sent before start of a command
<ETX>	„ End of Text “ (ASCII-Code 3) will sent after the end of a command
<ACK>	„ Acknowledge “ (ASCII-Code 6) Response, when control command has been processed successfully
<NAK>	„ Negative Acknowledge “ (ASCII-Code 21) Response, when control command can not be performed
<ERR>	Error (ASCII-Code 7) Response, when control command is unknown
<Z>	Zahl / Number with decimal point and a decimal place e.g. 12.3 or 012.3

Command structure:

Control commands and replies are transferred in the form of ASCII-character chains. It is used as start character the **<STX>** - as last character **<ETX>**

A distinction is made between uppercase and lowercase.

The control commands are processed in the order, in which they were received.

Each command consists of a main group command and one or two sub-group command, these are connected with „ : “. Then the marking of the type of the command follows.

The possible commands are divided into three types. READ, WRITE, EXECUTE. The differentiation is made by the appropriate sign after the main command.

READ	→	?
WRITE	→	,
EXECUTE	→	no sign

At the WRITE-commands for the input of voltage, current and power a number input with one decimal place must be done after the WRITE-character „ , “. The decimal places in decimal numbers are separated with „ . “.

Example for control commands:

<STX>OUT:UOUTS?<ETX>

This command is a READ-command. The output voltage is requested.

<STX>OUT:UOUTS,24.0<ETX>

This command is a WRITE-command. The output voltage is set to 24,0V.

<STX>PER:DIG1:ON<ETX>

This command is a EXECUTE-command. The digital output 1 is set to HI-level.

Commands are answered either with **<ACK>**, **<NAK>** or with **<ERR>**.

Running system commands:**DEV:GO**

Description: Power module will be activated
Return value: <ACK>

DEV:STOP

Description: Power module will be switched off
Return value: <ACK>

Output control:**OUT:UOUT?**

Description: Measurement of current voltage at the output
Return value: <Z>

OUT:UOUTS?

Description: Measurement of nominal voltage for output
Return value: <Z>

OUT:IOUT?

Description: Measurement of actual current at the output
Return value: <Z>

OUT:IOUTS?

Description: Measurement of nominal current for output
Return value: <Z>

OUT:UOUTS,x

Description: Setting of nominal value for output voltage
Parameter: **x** = 0.0 to max. value e.g. 24.0 [V] (system-specific)
Return value: <ACK> / <NAK>
Basic setting: 0.0

OUT:IOUTS,x

Description: Setting of nominal value for output current
Parameter: **x** = 0.0 to max. value e.g. 20.0 [A] (system-specific)
Return value: <ACK> / <NAK>
Basic setting: 0.0

Source changes of nominal value for voltage and current:

Voltage source:

SORV:INT

Description: Switching to the internal input of nominal value for voltage
(entered value by buttons on the display)

Return value: <ACK>

SORV:DIG

Description: Switching to the digital input of nominal value for voltage
(RS232 interface)

Return value: <ACK>

SORV:ANL

Description: Switching to the analog input of nominal value for voltage
(analog input 0...10V)

Return value: <ACK>

Current source:

SORA:INT

Description: Switching to the internal input of nominal value for current
(entered value by buttons on the display)

Return value: <ACK>

SORA:DIG

Description: Switching to the digital input of nominal value for current
(RS232 interface)

Return value: <ACK>

SORA:ANL

Description: Switching to the analog input of nominal value for current
(analog input 0...10V)

Return value: <ACK>

Periphery control:

PER:DIN1?

Description: State of digital input 1
Return value: „SET“ / „CLEAR“

PER:DIN2?

Description: State of digital input 2
Return value: „SET“ / „CLEAR“

PER:DIG1:ON

Description: State of digital output 1
Subcommand: „ON“ / „OFF“
Return value: <ACK>
Basic setting: „OFF“

PER:DIG2:ON

Description: State of digital output 2
Subcommand: „ON“ / „OFF“
Return value: <ACK>
Basic setting: „OFF“

PER:DIG3:ON

Description: State of digital output 3
Subcommand: „ON“ / „OFF“
Return value: <ACK>
Basic setting: „OFF“

PER:DIG4:ON

Description: State of digital output 4
Subcommand: „ON“ / „OFF“
Return value: <ACK>
Basic setting: „OFF“

PER:REL1:ON

Description: State of relay output 1
Subcommand: „ON“ / „OFF“
Return value: <ACK>
Basic setting: „OFF“

11) Notes

12) Annex - accessories

Software, mounting bracket, output clamps, RS232 adapter etc. can be found on our webpage www.deutronic.com.

13) Service Center / Repair

Do not open this device!

All needed connections and setting elements for operation are accessible from outside.

Please pay attention to following instructions:

To ensure a fast and smooth processing it is absolutely important that every device sent to Deutronic for repair has a full filled out return service scripture in which for every device all relevant data (e.g. address, name contact person, phone number etc.) as well as a detailed fault description is included.

The needed return service scripture as well as the world wide service partner addresses you will find on our webpage **www.deutronic.com** in the menu item '*service worldwide*'.

Disclaimer:

The customer is responsible for the use of the device according to the specifications. Regardless of the type, Deutronic is not liable for damage incurred through the use of the device.

Contact:

Deutronic Elektronik GmbH
Deutronicstrasse 5
84166 Adlkofen / Germany

Tel.: +49 8707 920-0
Fax: +49 8707 1004
E-Mail: sales@deutronic.com
<http://www.deutronic.com>

All data at nominal input, full load and 25°C ambient temperature, if not marked otherwise.

Technical modifications and mistakes reserved.

Products are described by information contained in catalogs and data-sheets. It is not be considered as assured qualities. Stresses listed under „Maximum Rating“ (one at a time) may be applied to devices without resulting in permanent damage. The operation of the equipment for extended periods may affect device reliability.

Limiting value tolerance are subject to usual fluctuation.