

## User manual

# DC UPS for lead-based batteries in industrial applications

## D-TOP150IB (Deutronic-Art.No. 101912)



Please read the manual carefully before starting operation with the UPS module. Only handle the device in accordance with the given instructions.

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## 1. General indications for use and safety

The DC-UPS management module D-TOP150IB is intended as a rack mounting device designed for use with 35 mm rail.

Optional available:

- Battery pack DBAT-24-7Ah (Deutronic-Art.No. 101795)  
(two 12V/7Ah-lead accumulators in series, typ YUASA with 25A-fuse)  
incl. connection line: UPS – battery pack; 1,5m
- Battery pack DBAT-24-14Ah (Deutronic-Art.No. 101796)  
(four 12V/7Ah-lead accumulators in series, typ YUASA with two 25A-fuses)  
incl. connection line: UPS – battery pack; 1,5m

The device is mainly intended for industrial applications

**It is only allowed to use lead-based batteries with the D-TOP150IB module . Only special trained and qualified staff is allowed to install the device and put it into operation!**

To ensure safe and proper operation, appropriate transportation as well as professional storage, assembly and installation is presupposed!

Only the manufacturer or the manufacturers customer service is allowed to open the device.

Before operation is started please following these notes:

- Operating instructions D-TOP150IB
- All security warnings on the used components

**Improper use of the DC-UPS module and its attached components, may cause considerable damages.**

**Deutronic assumes no liability at any improper operation.**

## 2. Application and operation

### Application field

- In conjunction with a maintenance-free 24VDC battery as energy storage, buffering of the 24VDC output voltage is without repercussion on overload and mains failures.

### 2.1 Construction

- Installation equipment for the assembly on 35 mm rail mounting in accordance to EN60715
- Mains connection via separate pluggable screw terminals (installation position on the front side)
- Connection of the signal and control lines via pluggable screw terminals (PINs sorted according to functional groups, installation position on the front side)
- Signalling of the operating mode via three LEDs on the front side
- Signalling of the operating mode via three potential-free relay change-over contacts
- Signalling of the operating mode with a RS232 compatible interface (TTL compatible, interface converter as accessories available, Art.No. 101849)
- Battery circle has bidirectional current monitor (uninterruptible also at short circuit of the battery; fuse in the battery container is required)
- Battery charging voltage is temperature controlled
- Protection against reverse polarity connection of the battery and/or power supply

### 2.2 Operation

(Connections and contacts see 5. Schematic , page 6)

Operation mode	State	Signals
Mains operation, supply > 21,5V±1,5%	- Load attached to the power supply - Battery offline, charge or tickle mode - Battery test every 10 s (monitoring at the sync pin, low active)	- Green LED shines continuously → tickle mode (battery full) - LED flashes (T <sub>off</sub> 300ms, T <sub>on</sub> 900ms) → Charge mode - Contact DC_ok closed
Battery operation, supply < 21V±1,5%	- Load attached to the battery - Internal load converter off_line - No battery test - Switch off the battery by when reaching the deep discharge protection voltage < 18,5V±1,5% - Automatic battery cut-off at mains operation	- Green LED flashes (T <sub>off</sub> 900ms T <sub>on</sub> 300ms) - Contact DC_ok open (1 sec signal delay for short interrupts of mains supply)
Overload	- Output current of the DC-UPS > Output current of the power supply - Battery and power supply are switched in parallel - Battery cut-off when reaching the overload current limit	
Battery start	- Press BAT_START button longer than 0.5 seconds (during mains operation BAT_START is deactivated)	

### 2.3 Temperature sensor

- Used for temperature control of the battery charging voltage
- The sensor is fastened to the battery module and connected to the UPS module (signal plug)
- Type Siemens K164 (4,7 kOhm) ; length of the connecting leads 1,5 m

### 2.4 Battery pack DBAT-24-7Ah

- The module contains two maintenance-free lead accumulators
- Per accumulator 12V / 7Ah, for example typ YUASA NP7-12L (with 6.3mm connector)
- Both batteries are switched in series with a FK2-fuse 25 A

**!!! Only assemble the fuse when setting the device into operation !!!**

### Note:

**If another battery might be used, please take care that this battery pack has suitable fuses!**

**Connection lines UPS / battery module:**

- in each delivery of the battery module D-BAT a red and a black connection line is preconverted
- cable length: about 1,5m
- customized converted cable looms on request

**2.5 Mounting of components**

- DC-UPS module:
- Mount device to the 35mm rail
  - Keep at least 10 mm free space on the left and right side from the UPS module
  - Keep at least 40 mm free space on the top and bottom side from the UPS module
- Battery module (optional):
- If possible install battery pack at the bottom of the rack
  - Vertical assemble of the module (fuse needs to be entered on front side)
  - Fasten with 4 screws M5x8

**!!!Attention!!!**

**Remove the fuse out of the fastener from the battery container first, before doing an wiring!**

**2.6 Wiring**

(see the enclosed connection plan for D-TOP150IB)

**Connect D-TOP150IB with load:**

- \* red cable to positive pole (connection + U<sub>a</sub>)
- \* black line to negative pole (connection -U<sub>a</sub>)

**Connect D-TOP150IB with the lead-based (Pb) battery module:**

- \* connect pole (+) of the battery to connector +U<sub>a</sub> (red battery line to plus pole)
- \* connect pole (-) of the battery to connector -U<sub>BAT</sub> (black battery line to minus pole)

- Connect temperature sensor and mount next to the battery
- If other cables should be used, please take care of sufficient cable diameter
- The lines have to be provided with wire-end sleeves
- Max. cable length from D-TOP150IB to battery module: 2,5m
- Connect signal lines to "Alarm" or "BAT/OK " clamps if necessary
- (PIN assignment see page 6)

### 3. First operation

**!!! Only allowed for special qualified personnel !!!**

- Make sure that the **fuse** is **removed** from the fastener at the battery container
- Switch DC power supply on
- For about 0.5 sec all LEDs shine and all relays work (self-test)
- Mount fuse into the battery container
- After a time of about 20 sec the yellow BAT-LED has to expire, if a full charged battery is connected

**The device is ready for operation**

**!!! Attention !!!**

If **no LED** at the UPS module is **shining**, switch off mains immediately!

- Reverse polarity connection of the **DC power supply**
- Check wiring!

Note:

On battery connections with reverse polarity, no high currents run internally.  
The battery connection is separated with a high impedance.

### 4. Technical Data

Input with active PFC circuit

Mounting to TS35 rail (acc. to EN60715)

(UL1950 recognized, cUL508 listed) on request

EN60950, EN50178, VDE160, EN55011-B, EN61000-3-2, EN61000-3-3, EN61000-6-2

Safety class IP20 acc. to DIN VDE0470, 11.92

Connectable in parallel

Short circuit protection / no load protection

Over voltage protection

Output adjustable

High storage time >40msec

#### 4.1 Power supply input

Input voltage	100-240VAC wide range (tolerance: 85-265VAC), 47-63Hz
Inrush current	<15A, cold start, NTC
Over voltage protection at Input	Varistor
Internal fuse	T4A/250V (additional external fuse is not necessary)
Hold up time	>40msec, independent from input voltage
Power factor	app. 0,95
Current consumption D-TOP150IB	230VAC: 0,8A typ. 120VAC: 1,6A typ.

#### 4.2 Environment

Storage temperature:	Battery:	-20°C .. +50°C
	UPS:	-40°C .. +85°C
Operating temperature:	Battery:	+5°C... +40°C
	UPS:	-0°C... +60°C
Cooling:	Air convection	

#### 4.3 UPS input

Mains operation:	$U_{DC}$	=	24V (21,5V ... 29,5V $\pm$ 1,5%)
	$I_{DC}$	=	6A (incl. load current)
Battery operation:	$U_{bat}$	=	24V (27,9V ... 18,5V)
	$I_{bat}$	=	6A

#### 4.4 Power supply output

Output voltage	24VDC, tolerance $\pm 3\%$
Adjustment range	21-29,5V
Output current	6A
Current limit	$I = \text{typ. } 1,2 * I_{Nenn}$
Startup delay time	<100ms
Start of capacitive loads	unlimited, I-const characteristic
Control deviation $U_{out}$	
Load regulation stat. (10-90%):	0,5%
dyn, (10-90%):	1%
Line regulation (85-265V)	0,5%
Ripple & noise	<50mVss
Spikes	<200mVss
Efficiency	app. 88%
Overvoltage protection (output)	Active OVP circuit max. 33V

#### 4.5 UPS output

Mains operation:	$U_{Load} =$	$U_{DC}$ (voltage on load)	
Charger:	$U_{ch} =$	27,9V nom. (26,0V ... 29,0V	temperature tracking
		see page 8)	
	$I_{ch} =$	0,6A	
Test cycle:	$t_{test} =$	10s typ. ( $\pm 2s$ )	
		(Charger will be switched off for 0,2s)	
Battery operation:	$U_{Load} =$	$U_{bat}$	
	$I_{Load} =$	$I_{bat}$	

#### 4.6 Current limitation

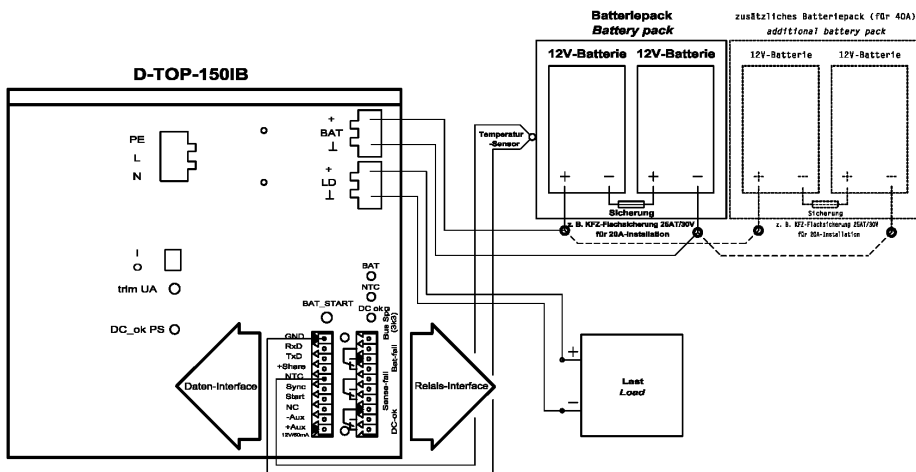
Mains operation:	via DC supply
Battery operation:	
	UPS module: via power switch
	Battery module: via 25A fuse
Buffer time:	app. 5min (till 20,5V; assumed full loaded battery; $I_L = 20A$ )

Output signal (floating relay contact) - see 5. Schematic

#### Functional description

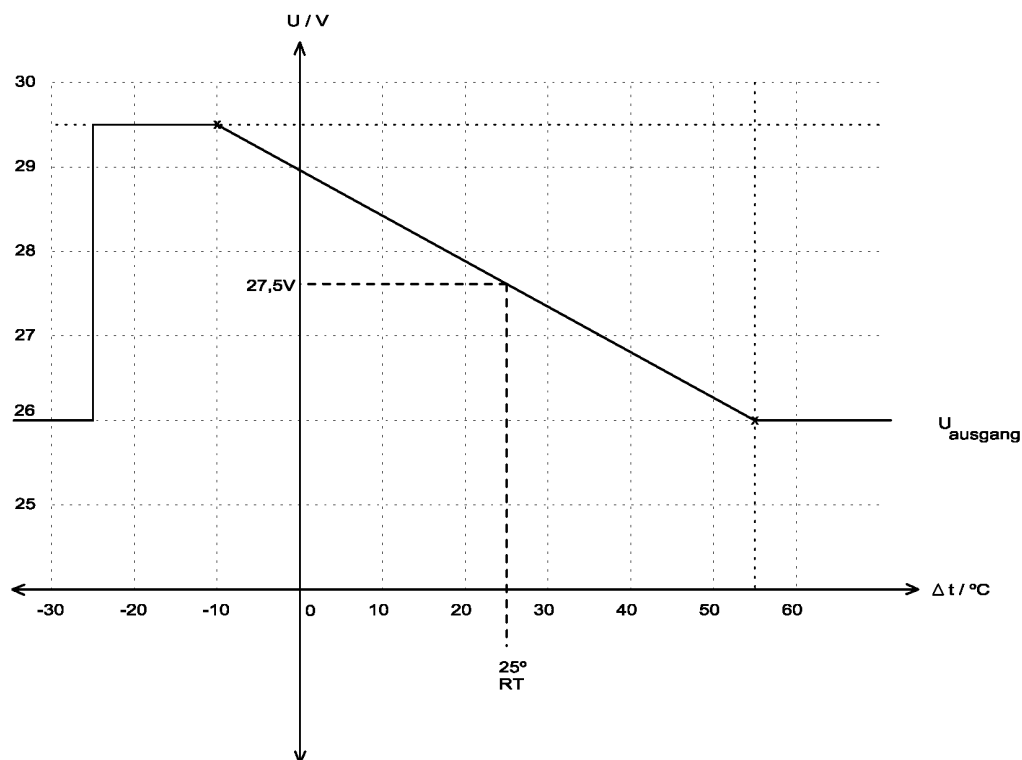
On mains connection to input (100-240 VAC) the device generates the preset load voltage on the battery output. When the UPS input lowers to 21VDC, the device is switching the battery uninterruptible on the load.

#### 5. Schematic





## 7. Temperature tracking



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