TDK·Lambda

Technical Specification

DDSM240-0555-R0

Digitaly controlled DC-DC converter
1..10A / 5..55VDC

Industries & Applications

Automation | Industrial | Semi-Fab | Renewable | Comms | Test

ePLAN data portal

Features & Benefits

- **Wide input & output range** with 120W and 240W for various applications
- **Compact & durable design** for cost effective use of cabinet space
- **Efficient system management** and diagnostics from any location
- **Advanced connectivity** features Modbus over USB and PowerCMC software
- **User friendly operation** with a clear digital front display and push buttons
- **Push-in terminals** for durable connection quality and vibration resistance
- **High efficiency and low stand-by losses** contribute to an eco-friendly energy footprint
- **DC-OK signaling** for professional integration into applications control architecture

Technical data abstract[1]

Output voltage	*nom.*	5..55VDC
Output voltage range	*max.*	4.7..57VDC
Output current	*nom.*	1..10A
Input voltage	*nom.*	12..48VDC
Input voltage range	*max.*	10.8..52.8VDC
Input current	*max.*	12A
Output power	*max.*	240W
Conversion efficiency[2]	*max.*	93%
Power losses[2]	*max.*	10.9W
No load consumption[3]	*max.*	5W
Ambient operating temp	*max.*	-25..+70°C (-13..+158°F)
Service life MTBF[4]	*min.*	1 173 000hrs
Early life MTBF[4]	*min.*	638 000 hrs
Communication interface		Mini USB
Width		40.0mm (1.57in)
Height		115.0mm (4.53in)
Depth		116.6mm (4.59in)
Weight		500g (1.10lb)

[1] All values refer to STC unless otherwise stated | [2] 48VDC, 100% P_{out_nom}, normal operation | [3] 48VDC, 0% P_{out_nom}, normal operation | [4] 25°C_{amb}, 100% P_{out_nom}

Certifications & Approvals

IECEE CB SCHEME
IEC EN 61010-1
IEC EN 61010-2-201
IEC EN 62368-1 (Ed.3)

c UL us LISTED
UL CSA 61010-1
UL CSA 61010-2-201
E356563

c UL us
UL CSA 62368-1 (Ed.3)
E511889

Compliance & Registration

CE
EU Low Voltage Dir. 2014/35/EU
EU EMC Dir. 2014/30/EU
EU RoHS Dir. 2011/65/EU

UK CA
Safety and EMC Reg. 2016
Hazard. Substances Reg. 2012

China Electronic Industry Standard
SJ/T 11364-2014 (China RoHS2)

Commercial information

Order codes	DDSM240-0555-R0
HS code	8504409590
Life-cycle status	Launch
Product revision	D03
Single package	
Width	166mm (6.54in)
Height	182mm (7.17in)
Depth	57mm (2.24in)
Gross weight	619g (1.36lb)
Bulk package	
Width	310mm (12.20in)
Height	210mm (8.27in)
Depth	343mm (13.50in)
Quantity	10 units
Pallet	
Width	1000mm (39.37in)
Height (fully packed)	1080mm (42.52in)
Length	1200mm (47.24in)
Quantity	240
Manufacturer warranty	3 years

Model selector

Model name	Output Power	Output Voltage	Feature
DDSM120-0555-R0	120W	5..55V_{DC}	7 segment display, Mini USB
DDSM240-0555-R0	240W	5..55V_{DC}	7 segment display, Mini USB

Add-ons and accessories

D1SE power supplies
Essential power supplies without compromises.

D1SE120-24-XX
Power supply, input 100 – 240VAC, output 24VDC/5A, push-in terminals. Optional DC-OK and conformal coating.

D1SE240-24-XX
Power supply, input 100 – 240VAC, output 24VDC/10A, push-in terminals. Optional DC-OK and conformal coating.

D1SE480-24-XX
Power supply, input 100 – 240VAC, output 24VDC/20A, push-in terminals. Optional DC-OK and conformal coating.

www.emea.lambda.tdk.com/de/landing/d1se

DRB 3 phase power supplies
Three-phase power supplies with compact dimensions and energy saving efficiencies.

DRB120-12-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 12VDC/10A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

DRB120-24-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 24VDC/5A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

DRB240-24-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 24VDC/10A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

DRB240-48-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 48VDC/5A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

DRB480-24-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 24VDC/20A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

DRB480-48-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 48VDC/10A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

DRB960-24-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 24VDC/40A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

DRB960-48-3-XX
Power supply, input 3x380 .. 500VAC | 530 .. 675VDC, output 48VDC/20A, DC-OK, INHIBIT, screw or push-in terminals. Optional conformal coating.

www.emea.lambda.tdk.com/de-en/landing/drb-3-phase

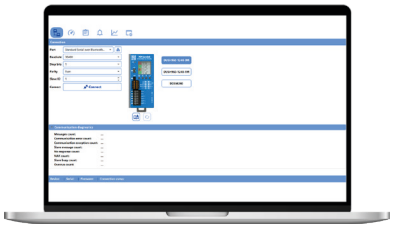
DUSH DC-UPS
In mission critical applications, the DUSH serves as a backup solution to deliver power from a battery.

DUSH960-1248-0M
20A input/output/battery, 12..48V programmable, buck-boost converter, battery interface, Modbus/RTU, LCD, 5A AUX output, push-in terminals

DUSH960-1248-1M
20A input/output/battery, 12..48V programmable, buck-boost converter, battery interface, Modbus/RTU, LED indication, push-in terminals

www.emea.lambda.tdk.com/uk/products/dush

PowerCMC



Control and monitoring center software via Modbus/RTU and USB.

www.emea.lambda.tdk.com/uk/technical-centre/software-tools

Index

List of abbreviations

avg.	*average*	The arithmetic average calculated from a row of values.
CC		Constant output current
chap.		Chapter
Dir.		Directive
eCap		Electrolytic capacitor
EMC		Electromagnetic Compatibility
Iout		DC output current under a particular operating condition
Iout_boost		Available current reserve beyond Iout_nom (w/o a drop in Uset) that can be delivered for a limited time.
Iout_nom		Continuous nominal DC output current under STC.
Iout_ol		Max. intermittent DC output current in an overload situation and a shortfall of Uset.
Iout_sc		Max. short circuit DC output current and Uout close to zero.
max.	*maximum*	The maximum value which a parameter can assume, or which must not be exceeded.
MCB		Miniature circuit breaker
min.	*minimum*	The minimum value which a parameter can assume, or must not be fallen below.
MTBF		Mean Time Between Failure
nom.	*nominal*	The ideal or reference value of a technical parameter which is guaranteed under STC. All nominal values in this document refer to each other and represent the general specification of the device.
OCP		Overcurrent protection
OTP		Overtemperature protection
OVP		Overvoltage protection
PELV		Protective Extra Low Voltage
Pout		Output power under a particular operating condition with reference to Pout_nom
Pout_boost		Available power reserve beyond Pout_nom that can be delivered for a limited time.
Pout_nom		Nominal output power
UPS		Uninterruptible power supply
Reg.		Regulation
SELV		Safety Extra Low Voltage
STC		Standard test conditions (see „1. General“ on page 5)
typ.	*typical*	The typical value of a parameter is not guaranteed but can be assumed under STC. The min. or max. value must be determined during the engineering process of the end application.
Uout		DC output voltage under a particular operating condition
Uout_nom		Nominal DC output voltage
Uset		Manually set output voltage via voltage potentiometer
UVP		Undervoltage protection
/		Separator between two values. The conditions to which the values refer can be found in the last column of the table.
..		Specifies a range of values.
<		The parameter is less than or equal to the specified value
>		The parameter is greater than or equal to the specified value

Table data structure

X. Technical category			
Technical parameter	Characteristic (optional)	Values	Condition (optional)

1. General

1.1 Proper handling of the product
The faultless and safe operation of the products requires proper transport, proper storage, set-up, assembly, installation, commissioning, operation and maintenance. The permissible ambient conditions must be observed. Instructions in the associated documentation must be observed.

1.2 Protection enclosure required
The device must be installed in a protective housing or control cabinet to which only qualified personnel have access.

1.3 Humid environments
Do not operate the device in a damp environment or in an environment where condensation is likely to occur.

1.4 Wiring protection
It is essential to ensure that a suitably sized DC type circuit breaker is installed on the input and output.

1.5 Observe country-specific regulations
In addition to the product documentation, the relevant country-specific regulations for the installation of the device must be observed.

1.6 Prohibited electrical/mechanical modifications
The product must not be modified in any way electrically or mechanically. Modifications can result in fatal injuries and damage to property.

1.7 Expiry of the manufacturer's warranty
The power supply is maintenance-free. Repairs can only be carried out by the manufacturer. Opening the housing voids the manufacturer's warranty.

1.8 Use of third-party products
If third-party products and components are used for power or voltage increase, buffering (AC or DC side), EMC filtering, redundancies or for DC side load protection, it must be in accordance with the TDK-Lambda product specification.

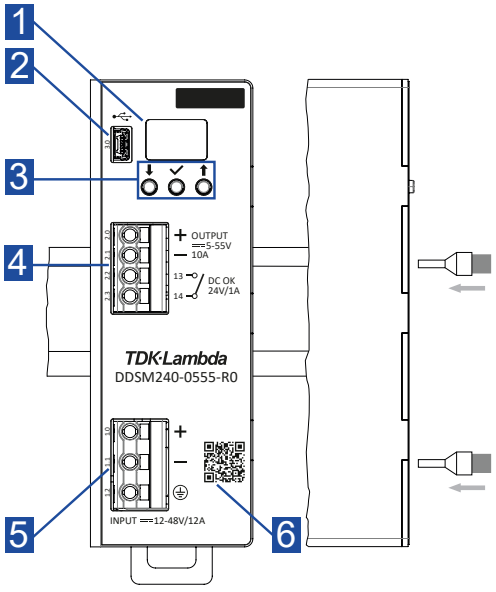
1.9 Standard test conditions
Unless otherwise stated, all values are specified at nominal input and output voltages, normal mounting position, at full load, 25°C (77°F) ambient temperature and a run-in time of 5 minutes.

1.10 Selection of an appropriate power supply
Use an appropriately sized power supply, which can deliver the additional required internal current consumption of the DC-DC converter.

1.11 Cyber security
Due to cyber security reasons only use the DDSM DC-DC converter in your internal network. Do not connect the DDSM to the internet

1.12 User manual
For further information on updating, setting up, installing and operating the unit, please read our detailed user manual.

1.13 Description of user elements



1. 7-segment / 2 digit display
2. MODBUS over USB
3. Navigation keys
4. Push-in terminal, DC output
5. Push-in terminal, DC input
6. Web link to further documentation

For more detailed information on the input/ouput wiring and the connection of the signalling contacts, please refer to „Wiring & Connection“ on page 14.

Fig. 1: Description of user elements

2. Electrical output

Output voltage [Uout_nom]	*nom.*	5 .. 55V_{DC}	
Output voltage range [Uset]	*max.*	4.7 .. 57V_{DC}	
Voltage adjustment steps	*max.*	0.01V_{DC}	
Output current [Iout_nom]	*nom.*	1 .. 10A	
Boost current	*max.*	11A / continous	
Current adjustment steps		0.1A	
Overload behaviour		Constant current + Intermittent mode (Hiccup)	see diagram
Short circuit proof		Yes, with auto recovery	
Start-up delay	*max.*	3.8s	
Rise time	*typ.*	1400ms	100% P_{out}, depending on output voltage
Fall time	*typ.*	0.3ms	depending on output voltage
Hold-up time	*typ.*	3.3 .. 5.0ms	12V_{DC} Input, 100% Pout, depending on output voltage
	typ.	5.8 .. 9.6ms	24V_{DC} Input, 100% Pout, depending on output voltage
	typ.	19.2 .. 34.2ms	48V_{DC} Input, 100% Pout, depending on output voltage
Voltage drop I-O	*max.*	6.5mV	
Output capacitance	*max.*	690µF	
Capacitive load start-up	*max.*	10000µF	
Feedback voltage	*max.*	62V_{DC}	

*only DUSH960-1248-0M

In order to guarantee the optimal functionality of the DDSM, it is essential to configure the system parameters through one of the following methods: PowerCMC or directly on the device. Otherwise, the DDSM may enter an error state.

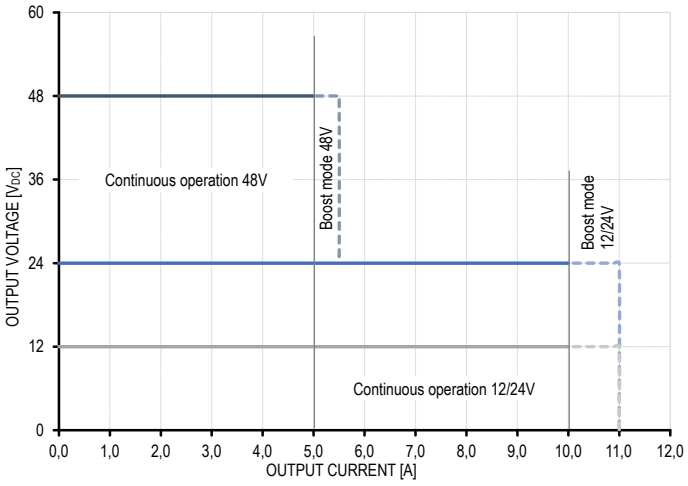


Fig. 2: Boost current capability up to 55°Camb

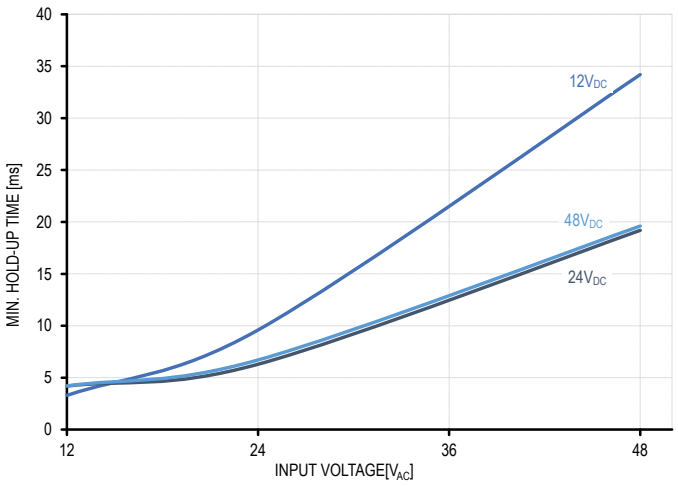


Fig. 3: Hold-up times under different output voltages in dependence of the input voltage

3. Electrical input

Input voltage [Uin_nom]	*nom.*	12 .. 48VDC
Input voltage range	*max.*	10.8 .. 52.8VDC
Turn-ON voltage	*min.*	11VDC
Turn-OFF voltage	*max.*	11VDC
Input current	*max.*	12A
Input capacitance	*max.*	1160µF

Consider machinery directive EN 60204-1, for temparatures >40°C current-carrying capacities of the respective cables must be observed.

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4. Performance

Output power	*nom.*	120W	12VDC
	nom.	240W	24VDC
	nom.	240W	48VDC
Boost power	*max.*	132W / continuous	12VDC
	max.	264W / continuous	24VDC
	max.	264W / continuous	48VDC
Conversion efficiency			
100% P_{out_nom}	*max.*	85.2%	12VDC
	max.	90.1%	24VDC
	max.	93.0%	48VDC
25 .. 100% P_{out_nom}	*avg.*	83.2%	12VDC
	avg.	89.4%	24VDC
	avg.	91.6%	48VDC
Power losses			
100% $P_{out\_nom.}$	*max.*	10.8W	12VDC
	max.	13.3W	24VDC
	max.	10.9W	48VDC
25 .. 100% $P_{out\_nom.}$	*avg.*	15.4W	12VDC
	avg.	18.4W	24VDC
	avg.	20.4W	48VDC
No load consumption	*max.*	4.8W	12VDC, 0% Pout_nom.
	max.	5.5W	24VDC, 0% Pout_nom.
	max.	5.0W	48VDC, 0% Pout_nom.

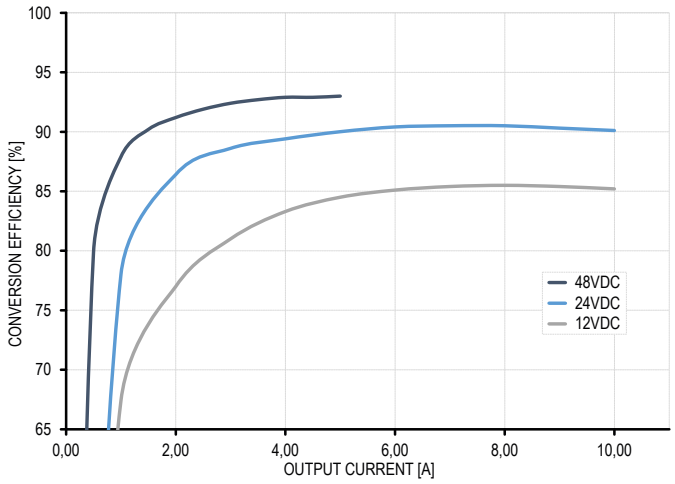

Fig. 4: Conversion efficiencies for different output voltages in dependence of the output current

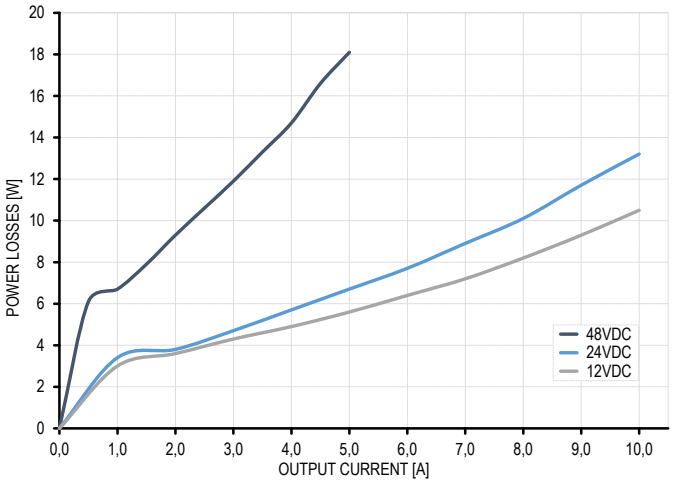

Fig. 5: Power losses for different output voltages in dependence of the output current

5. Ambient conditions

Ambient storage temperature	*max.*	-40 .. +85°C$_{amb}$ (-40 .. +185°F$_{amb}$)	
Ambient operating temperature	*max.* *nom.*	-25 .. +70°C$_{amb}$ (-13 .. +158°F$_{amb}$) -25 .. +55°C$_{amb}$ (-13 .. +131°F$_{amb}$)	 normal mounting position
Power derating*	*min.* *max.*	1.6W/°C$_{amb}$ (0.89W/°F$_{amb}$) 8.0W/°C$_{amb}$ (4.44W/°F$_{amb}$)	12V$_{DC}$ output, > 55°C$_{amb}$, normal mounting position > 55°C$_{amb}$, all mounting positions
Cooling concept		Natural convection	
Relative storage humidity IEC 60068-2-30	*max.*	95%	non-condensing
Relative operation humidity IEC 60068-2-30	*max.*	95%	non-condensing
Operating altitude	*nom.* *max.*	3000mASL (9842ftASL) 6000mASL (19685ftASL)	 not UL approved, reduced OVC
Percental power derating	*min.*	5% per 1000m (5% per 3281ft)	48V$_{DC}$, >3000mASL (>9842ftASL)
Temperature derating	*min.*	5K per 1000m (9K per 3281ft)	48V$_{DC}$, >3000mASL (>9842ftASL)
Atmospheric pressure	*nom.* *max.*	689hPa 469 .. 1070hPa	
Pollution degree		2	
Vibration sinusoidal IEC 60068-2-6		2g / 10 .. 500Hz, 2hour/direction X,Y,Z	mounted on DIN rail
Shock test sinosoidal halfwave IEC 60068-2-27		30g / 11ms ±5ms, 2 bumps/direction, 9 bumps total	mounted on DIN rail
Audible noise		Some audible noises may be heard during no load, overload or short circuit.	

* Not actively controlled

ⓘ For altitudes above 3000mASL (9842ftASL) the next lower OVC must be considered.

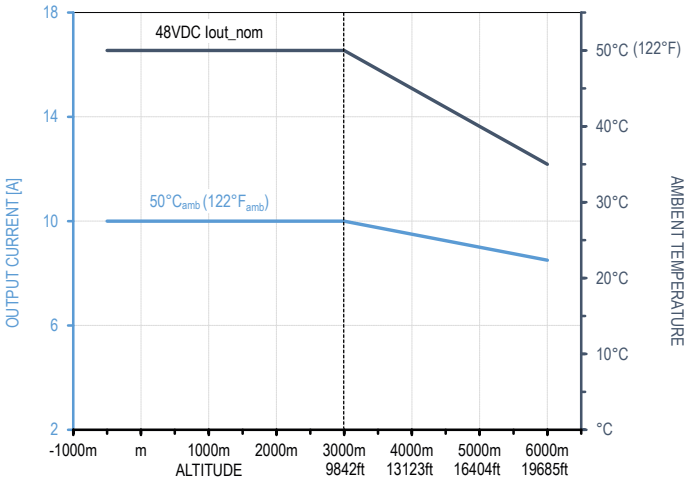

Fig. 6: Output current and ambient temperature derating at increasing altitudes

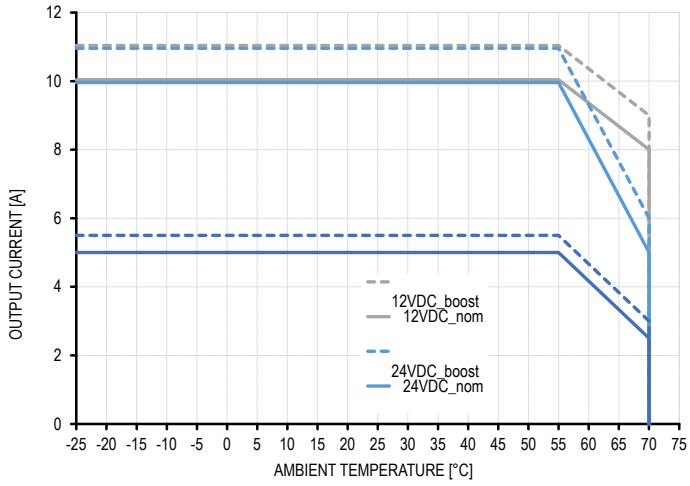

Fig. 7: Permitted output current in dependence of the ambient temperature for normal mounting position

6. Reliability and Service lifetime

Service lifetime	*min.*	71 383hrs	24V_{DC}, Iout_nom, 25°C_{amb}, 24/7
	min.	34 088hrs	24V_{DC}, Iout_nom, 40°C_{amb}, 24/7
Service life MTBF Telcordia SR-332 Issue 4	*min.*	5.88 / 3.79 / 0.86M hrs	25 / 40 / 70°C_{amb}, 50% Iout_nom
	min.	1.17 / 0,88/ 0,35M hrs	25 / 40 / 70°C_{amb}, Iout_nom
Early life MTBF Telcordia SR-332 Issue 4	*min.*	5.88 / 0,95 / 0,48M hrs	25 / 40 / 70°C_{amb}, 50% Iout_nom
	min.	0,64 / 0,53 / 0,27M hrs	25 / 40 / 70°C_{amb}, Iout_nom

The maximum service lifetime guaranteed by the eCap manufacturer is 131400hrs (15 years). All values above are theoretically calculated.

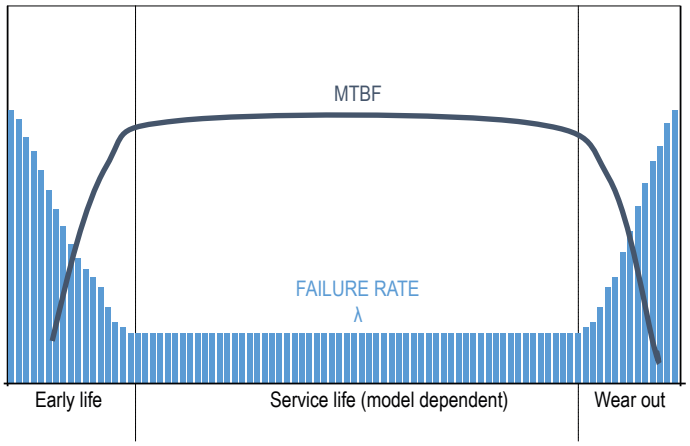

Fig. 8: Generic diagram visualising failure rate and MTBF values during the products life-cycle

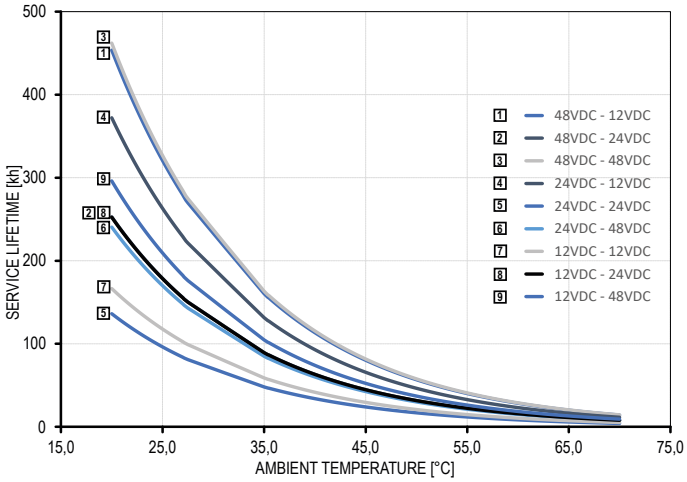

Fig. 9: Expected service lifetime in dependence of ambient temperature

7. Dimensions & Mechanical data

Enclosure material		Aluminum	
Front label material		LEXAN 8010 or equivalent	
Inflammability class UL94		V0	front labels and terminals
Width		40.0mm (1.57in)	
Height		115.0mm (4.53in)	
Depth		116.6mm (4.59in)	w/o DIN-rail, incl. buttons
Weight		500g (1.10lb)	
Lever arm	*max.*	48mm (1.89in)	
Torsional moment on DIN-Rail	*max.*	0.24Nm (2.08lb in)	
Enclosure openings	*max.*	7,0mm (0.28in)	
DIN-Rail types IEC/EN 60715		TH 35-7,5, TH 35-15	

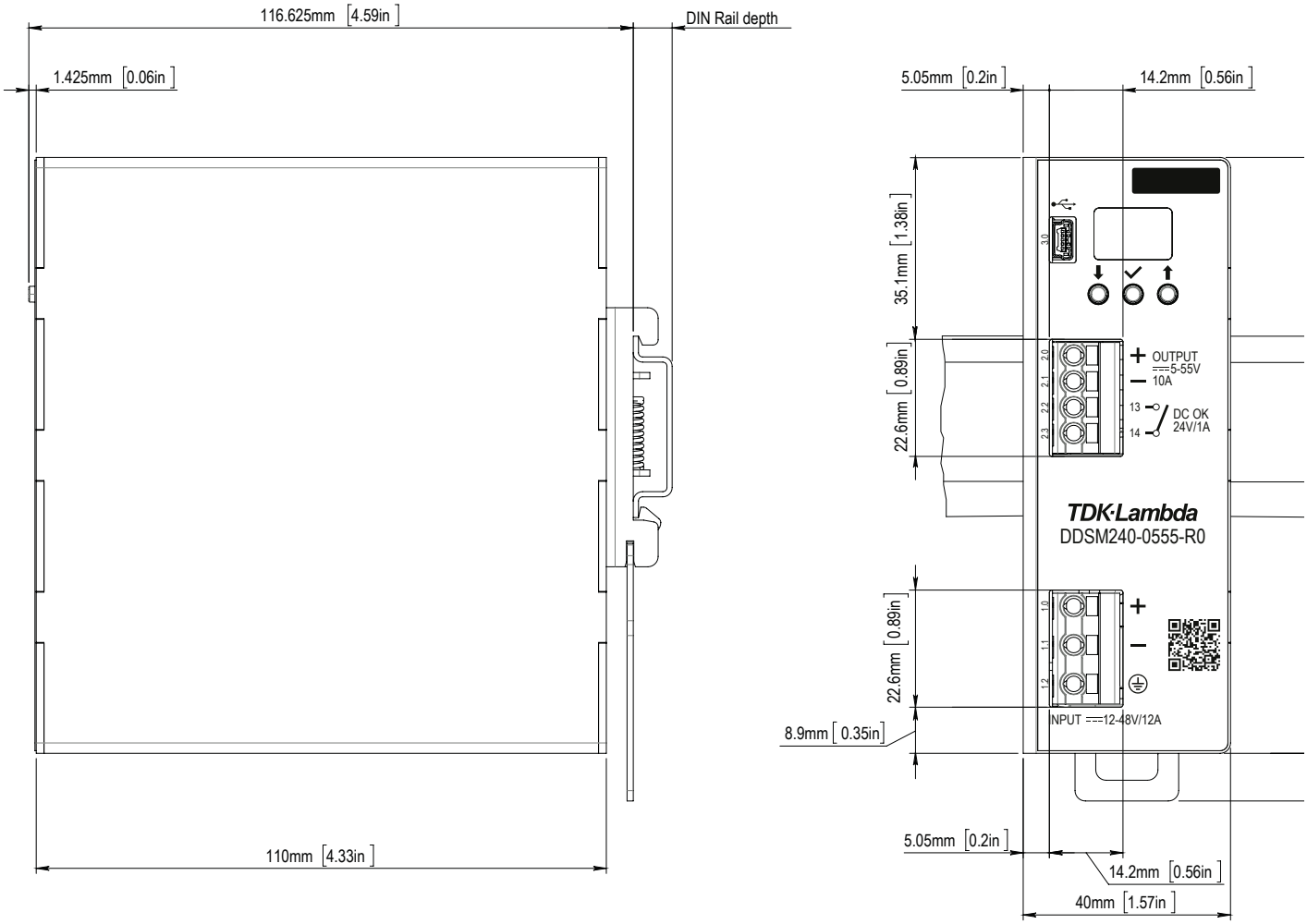

Fig. 10: DDSM120-0555-R0 dimensions

Unless otherwise stated, all values are specified in normal mounting position, at full load, nominal input and output voltages, 25°C (77°F) ambient temperature and a run-in time of 5 minutes.

8. Communication interfaces

Local HMI	
Display	7 segment, 2 digit display
Indication	Status, Settings, Alarms
Control	3 push buttons
Features	Device settings, system alarms, status information
Remote HMI	
Physical interface	USB 2.0
Protocol	Modbus over USB
Connectivity	Mini USB
Software tool	PowerCMC
Read functions	Device settings, system alarms, status information
Write functions	Device settings
Electrical isolation	No

In order to guarantee the optimal functionality of the DDSM, it is essential to configure the system parameters through one of the following methods: PowerCMC or directly on the device. Otherwise, the DDSM may enter an error state.

9. Installation clearances

Vertically (Z axis)				
Top side	1	*min.*	40mm (1.57in)	
Bottom side	2	*min.*	20mm (0.79in)	installation above heat sources not permitted
Horizontally (X axis)				
Left side / Right side	3a 4a	*min.*	15mm (0.59in)	to heat sources (same power rating)
Left side / Right side	3b 4b	*min.*	5mm (0.19in)	to passive components

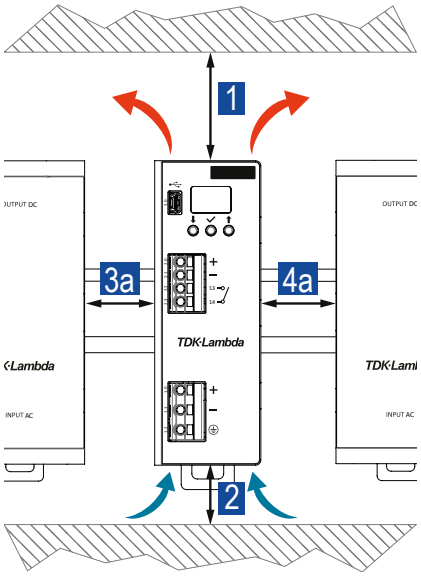

Fig. 11: Installation clearances to heat sources

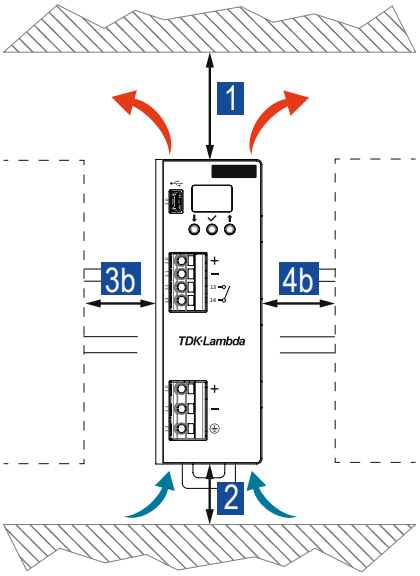

Fig. 12: Installation clearances to passive components

10. Wiring & Connection

	Terminal 1.x	Terminal 2.x	Connector 3.0
Connected functions	Input	Output, DC-OK	PowerCMC
Terminal type	Push-in (3 pole)	Push-in (4 pole)	Mini USB
Recommended screw driver	SL 0.5x3.0mm (SL1/64x1/8in)	SL 0.5x3.0mm (SL1/64x1/8in)	
Solid wire	0.2 .. 4.0mm² (26 .. 12AWG)	0.2 .. 4.0mm² (26 .. 12AWG)	
Flexible wire	0.2 .. 2.5mm² (26 .. 12AWG)	0.2 .. 2.5mm² (26 .. 12AWG)	
Isulated ferrules*	0.25 .. 1.5mm²	0.25 .. 1.5mm²	
Uninsulated ferrules*	0.25 .. 2.5mm²	0.25 .. 2.5mm²	
Twin ferrules*	0.75 .. 1.0mm²	0.75 .. 1.0mm²	
Stripping length	9 .. 10mm (0.35 .. 0.39in)	9 .. 10mm (0.35 .. 0.39in)	

*The ferrules must be selected to match the stripping length.

In compliance to IEC/EN/UL 62368-1 ferrules are required if flexible wires are used. In compliance with IEC/EN/UL 61010-1, 61010-2-201 appropriate copper wires must be used that withstand operating temperatures of at least 75°C (167°F) in ambients NOT exceeding 40°C (104°F), and 90°C (194°F) in ambients exceeding 40°C (104°F).

Take into account the current carrying capacity of the cabling according to EN 60204-1 (Safety of machinery - Electrical equipment of machines). To use the full current capacity of the device use either a 4mm² solid wire or a 2.5mm² flexible wire with an adequate temperature rating.

11. Signaling & Control

DC-OK

Type		Relay contacts	
Characteristic		N/O	
Resistive load	*nom.*	1A	24V$_{DC}$
	max.	5A	30V$_{DC}$
Closing		Uout > 90% Uset	duration max. 800ms
Opening		Uout > 80% Uset	duration max. 200ms

In order to guarantee the optimal functionality of the DDSM, it is essential to configure the system parameters through one of the following methods: PowerCMC or directly on the device. Otherwise, the DDSM may enter an error state.

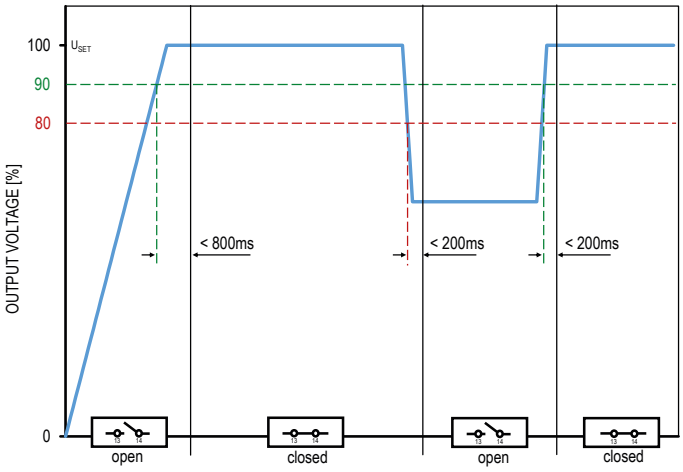

Fig. 13: DC-OK relay status in dependence of output voltage

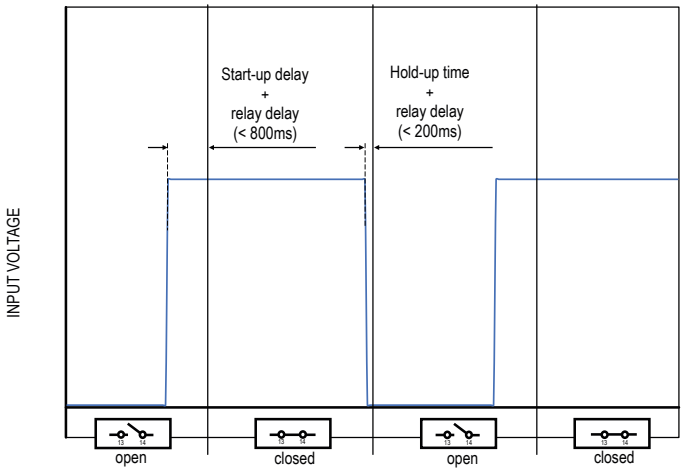

Fig. 14: DC-OK relay status in dependence of input voltage

12. Block diagram

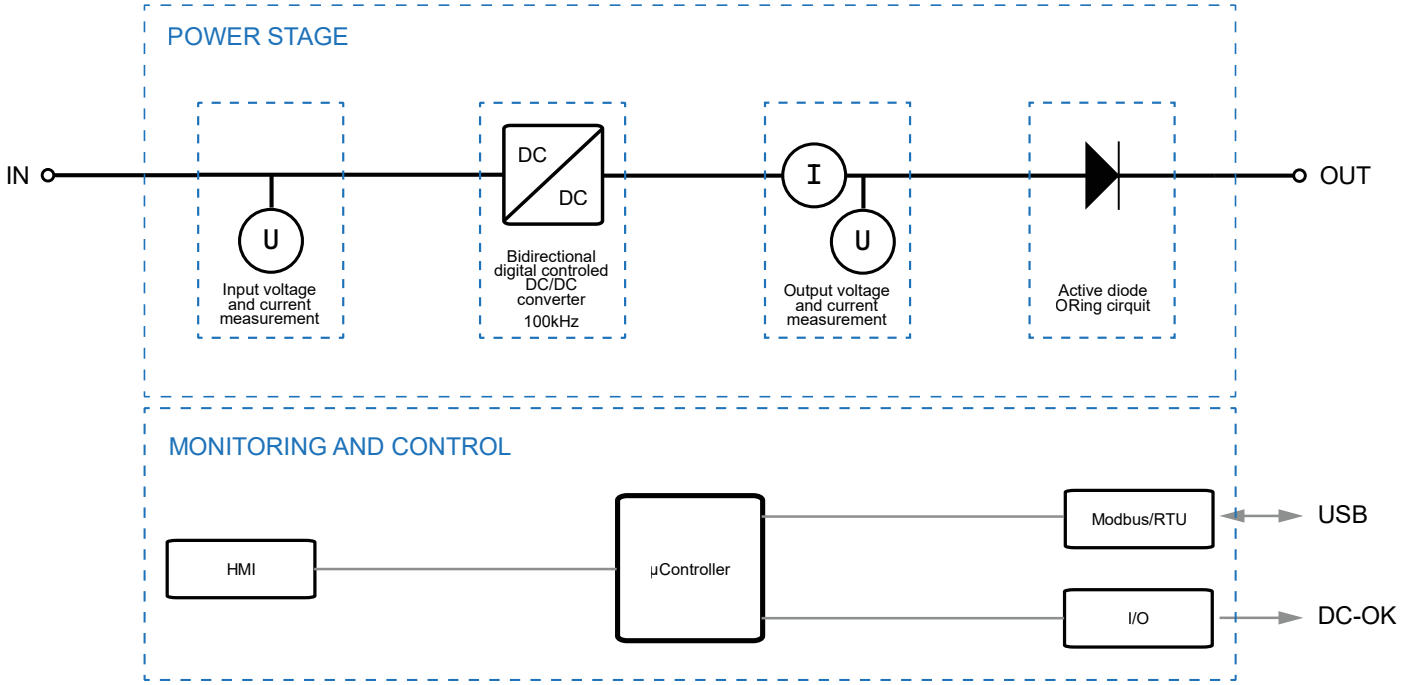

Fig. 15: Block diagram of DDSM models

13. Device protection

Ingress protection degree IEC 60529		IP 20	
NEMA classification NEMA 250-2018		NEMA 1	
Overtemperature protection (OTP)		Yes, auto recovery	
Output overvoltage protection (OVP)	*max.*	62V_{DC}	
Output overcurrent protection (OCP)	*max.*	15A Hiccup / 11A CC	Depends on the selected mode ('Hiccup' or 'CC mode')
Internal fuse		20A	not user replaceable
Recommended MCB types		DC-type	Current rating depending on cable length and cross section

It is essential to ensure that a suitably sized DC type circuit breaker is installed on the input, output.

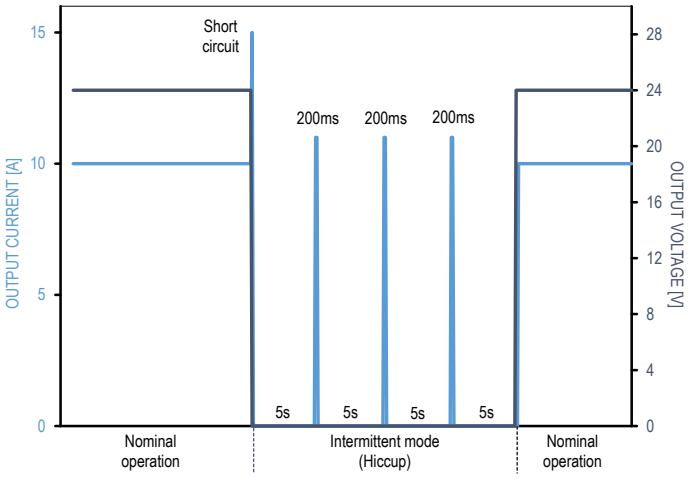

Fig. 16: Output current and timing during short-circuit (I_{out} >150%) and intermittent mode (Hiccup)

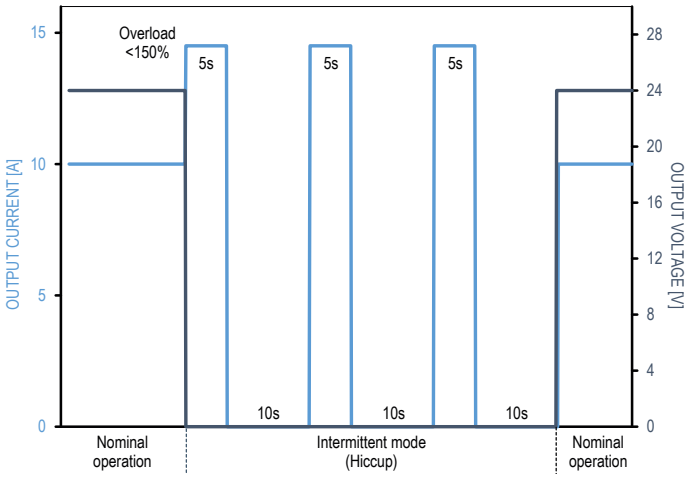

Fig. 17: Output current and timing during overload (I_{out} 110-150%) and intermittent mode (Hiccup)

Unless otherwise stated, all values are specified in normal mounting position, at full load, nominal input and output voltages, 25°C (77°F) ambient temperature and a run-in time of 5 minutes.

14. Electrical Safety

Class of protection IEC 61010-1, IEC 62368-1 (Ed.3)	I	
Electrical energy source classification IEC 62368-1 (Ed.3)	ES1	
Safety Extra Low Voltage IEC 61010-2-201	SELV	
Protective Extra Low Voltage IEC 61010-2-201	PELV	
Overvoltage category* IEC 61010-1, IEC 62368-1 (Ed.3)	II	<3000mASL (<9842ftASL)

* Not applicable along with IEC 61204-7

14.1 Insulation strength

		Type test (60s) IEC 62368-1, IEC 61010-1	Routine test (60s) IEC 61010-1	Field test (5s)
Input / PE	A	2200V_{DC}, 1555V_{AC} / 60s	2200V_{DC} / 5s	2200V_{DC} / 5s
Input / Output	B	2200V_{DC}, 1555V_{AC} / 60s	2200V_{DC} / 5s	2200V_{DC} / 5s
Input / DC-OK	C	2200V_{DC}, 1555V_{AC} / 60s		
Output / PE	D		750V_{DC} / 5s	750V_{DC} / 5s
Output / DC-OK	E	1216V_{DC}, 860V_{AC} / 60s		

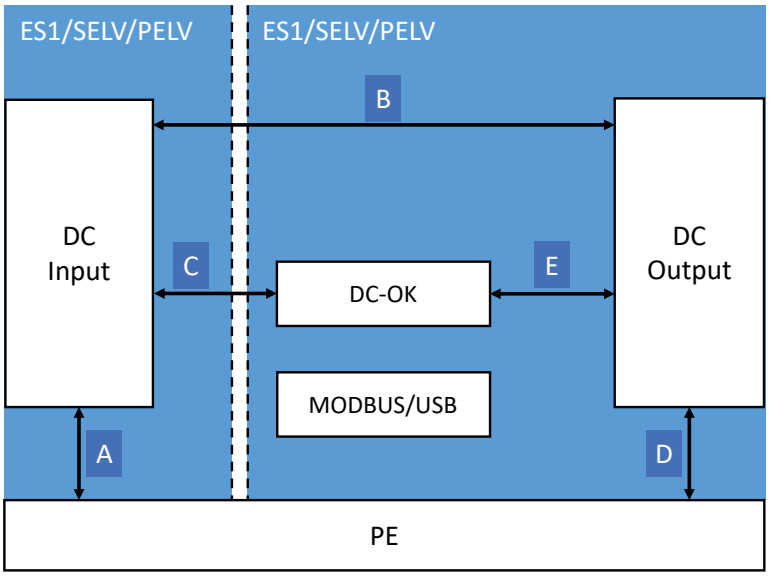

Fig. 18: Schematic of the insulation paths

14.2 HIPOT test

Apart from routine test, the end user might need to check the insulation strength during the final inspection and testing to guarantee the electrical safety of the end application. Therefore, a high-voltage test (HIPOT test) can be performed in the field. The following conditions must be observed:

- As every HIPOT test causes stress on the power supplies safety insulation, avoid frequent HIPOT testing or excessive test voltages.
- The test voltages and durations, as indicated under “Insulation strength” on page 16, must not be exceeded.
- The test voltages rise and fall time should be between 2 and 4 seconds.

According to EN 60204-1 (Safety of machinery - Electrical equipment of machines), an individual HIPOT test of the power supply isn‘t required. During the HIPOT test of the end application, the power supply can be disconnected and only installed once the test has been completed.

15. Electromagnetic immunity

Investigated under generic standards IEC 61000-6-2:2016 / EN IEC 61000-6-2:2019 / IEC 61000-6-3:2020 / EN IEC 61000-6-3:2021 - Immunity standard for industrial environments and emission standard equipment in residential environments.

Electrostatic contact discharge	4kV	Criterion A	330Ω/150pF
Electrostatic air discharge	8kV	Criterion A	330Ω/150pF
Electromagnetic RF field	10V/m 3V/m	Criterion A Criterion A	80MHz .. 1GHz 1.4GHz .. 2GHz
Fast transients (burst)			
Input	1kV	Criterion A	5kHz
Output	1kV	Criterion A	5kHz
Signal contact	1kV	Criterion A	5kHz
Power frequency magnetic field	30A/m	Criterion A	50Hz, 60s each axis (x, y, z)

Performance level definitions:

Criterion A:
The device continues operation as intended during and after the test. The specified performance level accepts a change of ±10% on nominal output voltage and current. There is neither a violation of the performance level, nor a loss of function if the device is used as intended.

Criterion B:
The device continues operation as intended after the test. The specified performance level accepts a change of ±10% on nominal output voltage and current. There is neither a violation of the performance level, nor a loss of function if the device is used as intended. During the test a violation of the performance level is allowed.

Criterion C:
A temporary loss of function is allowed, provided the function is auto-recoverable, or can be restored by the operation of the controls.

16. Electromagnetic emission

Investigated under generic standards IEC 61000-6-2:2016 / EN IEC 61000-6-2:2019 / IEC 61000-6-3:2020 / EN IEC 61000-6-3:2021 - Immunity standard for industrial environments and emission standard equipment in residential environments.

Conducted noise emission input EN 55016-2-1, CISPR 16-2-1	Class B	150kHz .. 30MHz
Radiated noise emission input EN 55016-2-1, CISPR 16-2-1	Class B	30MHz .. 1GHz

17. Certifications & Approvals

c UL us LISTED	UL 61010-1 CAN/CSA-C22.2 No. 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
	UL 61010-2-201 CAN/CSA-C22.2 No. 61010-2-201	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-201: Particular requirements for control equipment UL file: E356563
IECEE CB SCHEME	IEC EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
	IEC EN 61010-2-201	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-201: Particular requirements for control equipment
	IEC EN 62368-1 (Ed.3)	Audio/video, information and communication technology equipment - Part 1: Safety requirements
c UL us	UL 62368-1 (Ed.3)	Audio/video, information and communication technology equipment - Part 1: Safety requirements UL file: E511889

Unless otherwise stated, all values are specified in normal mounting position, at full load, nominal input and output voltages, 25°C (77°F) ambient temperature and a run-in time of 5 minutes.

18. Designed to meet

The safety design of the product complies additionally with the following harmonised standards.

IEC/UL 60950-1	Information technology equipment - Safety - Part 1: General requirements
IEC 62477-1	Safety requirements for power electronic converter systems and equipment - Part 1: General
EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
UL 508	Standard for industrial control equipment

19. Compliance & Registration

CE	Conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA).
UKCA	UKCA (UK Conformity Assessed) is the product marking that is used for certain goods being placed on the United Kingdom market.
	The Waste Electrical and Electronic Equipment Directive (WEEE Directive) is the European Community Directive 2012/19/EU on collection, recycling and recovery targets for all types of electrical goods.
RoHS COMPLIANT	The Restriction of Hazardous Substances Directive 2011/65/EU (RoHS 2) regulates the use of certain hazardous substances in electrical and electronic equipment.
ALL COMPONENTS REACH COMPLIANT	Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is a European Union regulation that addresses the production and use of chemical substances, and their potential impacts on both human health and the environment.

20. Application notes

20.1 Parallel operation

Multiple devices can be connected in parallel to increase the output power capabilities and/or for redundancy purposes.
When operating in this mode operating mode must be set to “Parallel (PA)”.

- For proper operation between the units the cable length connecting the various DDSM to the load must have the same length and cross-section.
- For optimal current sharing it may be necessary to slightly adjust some of the devices output voltage until the same current is delivered by all the units.
- For precise set-up of a parallel system a good precision current meter is suggested.
- It is recommended to limit the load power to 80% of the sum of the individual output power of the paralleled units.

When “Parallel (PA)” mode is selected the current limitation method is automatically fixed to “Constant Current (CC)” model.

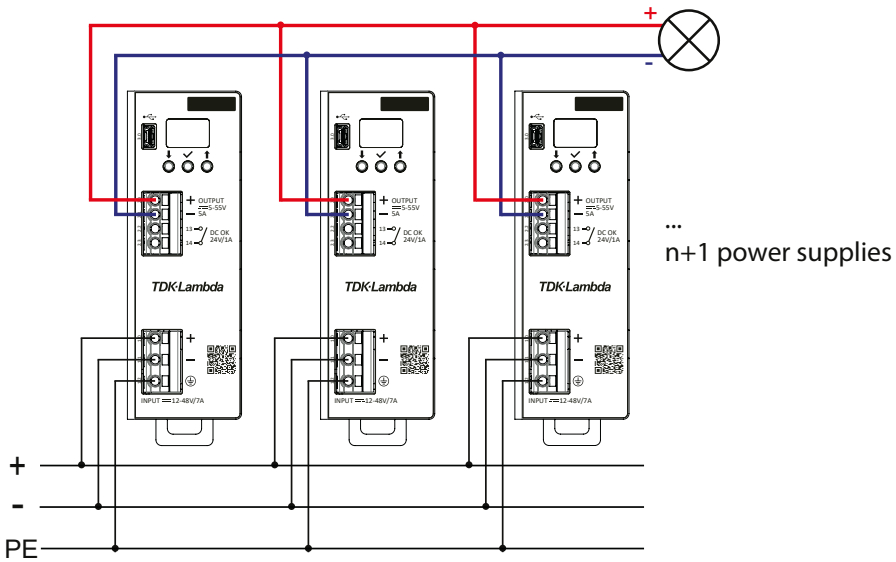

Fig. 19: Connection scheme of n+1 power supplies paralleled for the purpose of power increase

20.2 Series operation

It is not permitted to connect the DDSM on the output side in series.

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