intreXis®

Power Supplies with the X

Datasheet

intreXis Boardnet Converter Platform
IC383_3, 500 W Single-Output
230 VAC input

- Xtra high efficiency: > 93 % @ 230 VACin, 500 W
- Xtra high extra power for overload: 750 W for 100 ms
- Xtra high peak short circuit current: trips reliably circuit breakers:
  13 A characteristic B, 8 A characteristic C
- Xtra high peak startup-current: Can source up to twice the nominal output current during startup: satisfies high peak current absorption of demanding loads during startup.
  Startup-current: 40 A typ

This datasheet covers the details of the IC383_3 power supply with single output voltage and output power of 500 W. This DC/DC converter is designed according to EN 50155:2021 and IEC 60571:2012 for railway applications and is ideal for other demanding environments which require the highest performance and reliability.

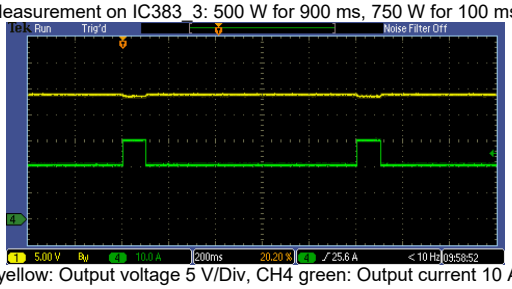
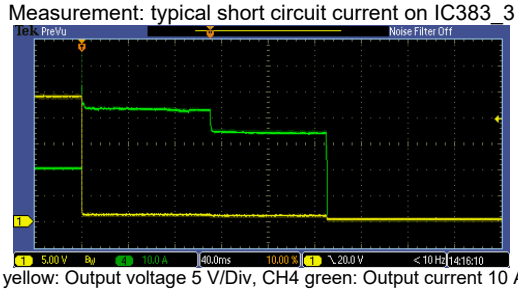
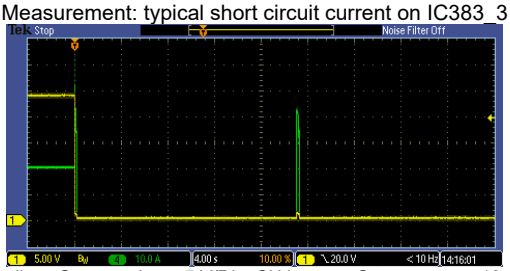
Output voltage: 24 V. Other voltages on request.
Ordering code: IC383_3

INPUT CHARACTERISTICS

Continuous Input Voltage Range	230 VAC, ±10 % 50 – 60 Hz		
Input Undervoltage Lockout	Vin_OFF = 161 VDC ±3.5 % Vin_ON = 184 VDC ±3.5 %		
Inrush Current	A passive inrush limitation circuit limits the input inrush current at switch-on of the input voltage. Inrush Current Integral: I_{inrush}^2t < 1.5 A^2s @ Vin = 230 VAC, ±10 %		
Input Capacitance	3 µF		
Input Current typ. @ full Load	**207 VAC**	**230 VAC**	**253 VAC**
	2.7 A	2.4 A	2.2 A
Input Power typ. @ no Load, Vin = 230 VAC	2.05 W		
Internal Input Fuse	Fuse included, therefore no external fuse or circuit breaker required. I^2t-fuse = 171 A^2s If you, nevertheless, install an external circuit breaker for any other reason, please select it according to the recommendation below.		
External Circuit Breaker recommendation Important: Circuit Breaker must be rated for the maximum AC-input voltage	4 A, type B		
Interruptions of Input Voltage Supply (Hold-up time)	Class S2 (10 ms) according to EN 50155:2021 The converter continues to operate as intended during and after the interruption, with no degradation of performance or loss of function over the entire input voltage range (Performance criterion A).		
Startup time (Time input voltage ON to output voltage ON)	< 2 s for all input voltages		

OUTPUT CHARACTERISTICS

Output Voltage Nominal	+24.4 VDC @ 0 % load +24.0 VDC @ 50 % load +23.6 VDC @ 100 % load Falling output-voltage-characteristic ensures current-sharing
Max. Continuous Output Power @ Vin = 230 VAC, ±10 % (no derating over the entire temperature range)	500 W
Max. Peak Output Power @ Vin = 230 VAC, ±10 %	750 W for 100 ms
Minimum Load	No minimum load required
Setpoint Accuracy	< 1.0 %
Load Regulation @ off-load to full load over the entire temperature range	< 3.6 %
Line Regulation @ full load over the entire temperature range	< 0.1 %
Output Ripple & Noise @ 20 MHz bandwidth, including spikes	< 50 mVpp @ 25 °C < 350 mVpp @ -50 – -25 °C

Overload and Short-Circuit	The converter is continuous overload and short-circuit proof. **Output overloaded:** Short overloads up to 750 W for 100 ms: no limitation, output voltage remains stable: Measurement on IC383_3: 500 W for 900 ms, 750 W for 100 ms:  CH1 yellow: Output voltage 5 V/Div, CH4 green: Output current 10 A/Div, Timebase: 200 ms/Div **High peak startup current:** Sources up to twice the nominal output current during startup: satisfies high peak current absorption of demanding loads during startup: 40 A for 110 ms, then 30 A for 90 ms typ. **Output short-circuited:** When the output is shorted, the converter delivers 40 A for 110 ms, then 30 A for 90 ms typ. Measurement: typical short circuit current on IC383_3  CH1 yellow: Output voltage 5 V/Div, CH4 green: Output current 10 A/Div, Timebase: 40 ms/Div Then it switches off and tries periodically to switch on again, every 20 seconds for 150 ms typ.: Measurement: typical short circuit current on IC383_3  CH1 yellow: Output voltage 5 V/Div, CH4 green: Output current 10 A/Div, Timebase: 4 s/Div If the short-circuit is still present, the converter switches off again and tries again periodically. If the short-circuit is removed, the converter switches on at the next switch-on attempt (hiccup). **Longer/Higher overloads:** >100 ms or >750 W: converter switches off and retries (hiccup)

Current Limit (varies due to component tolerances)	21.8 – 25.8 A
Short-Circuit current	40 A for 110 ms followed by 30 A for 90 ms, every 20 sec < 10 Arms trips reliably following circuit breakers: characteristic B: up to 10 A characteristic C: up to 6 A
Overvoltage Protection (OVP) (output voltage is limited, if main regulation loop fails)	< 30 VDC
Paralleling of Outputs	Paralleling up to 3 units. Falling output-voltage-characteristic ensures current-sharing. Lead lines to load with equal length and cross section ensure accurate current-sharing between units. If one or more units fail, the other units continue delivering power without limitations.
Active Decoupling Diode for redundant Systems	A FET on the output, acting as a decoupling diode, is included for redundant systems with two or more power supply sources driving a load.
Maximum load-capacitance	40 mF

EFFICIENCY

Conditions	**207 VACin**	**230 VACin**	**253 VACin**
Efficiency typ. @ 100 % Load	93.5 %	93.5 %	93.4 %
Efficiency typ. @ 66 % Load	93.6 %	93.6 %	93.4 %
Efficiency typ. @ 33 % Load	92.0 %	91.8 %	91.7 %

SIGNALS AND INTERFACES

DC-OK Signal	Optically isolated solid-state relay (between connector X30/pin 1-2)
DC-OK solid-state relay & LED switch on threshold	Vout > 23.0 VDC ±2 %
DC-OK solid-state relay & LED switch off threshold	Vout < 22.5 VDC ±2 %
DC-OK max. solid-state relay current, when on	50 mA max.
DC-OK max. solid-state relay voltage-drop, when on	< 1.7 VDC @ 50 mA (between connector X30/pin 1-2)
DC-OK max. transistor voltage, when off (max voltage which can be applied externally)	±154 VDC (between connector X30/pin 1-2)
LED	Green LED on output side indicates that output voltage is ok

ELECTROMAGNETIC COMPATIBILITY (EMC)

Test	Standard	Test severity levels	Performance Criteria
Surges	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	1.2/50 µs 42 Ω, 0.5 µF DC power supply port ±2 kV line to ground ±1 kV line to line	Criterion B required, but compliant with more strict criterion A
Electrostatic discharge	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	±6 kV contact discharge ±8 kV air discharge	Criterion B required, but compliant with more strict criterion A
Fast transients	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	±2 kV 5/50 ns tr/th 5 kHz repetition frequency	Criterion A
Radio-frequency common mode	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	150 kHz – 80 MHz 10 Vrms (carrier voltage) 80 % AM, 1 kHz Source impedance 150 Ω	Criterion A
Radio-frequency electromagnetic field	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	80 MHz – 1000 MHz 20 Vrms/m 80 % AM, 1 kHz unmodulated carrier 1400 MHz – 2000 MHz 10 Vrms/m 80 % AM, 1 kHz unmodulated carrier 2000 MHz – 2700 MHz 5 Vrms/m 80 % AM, 1 kHz unmodulated carrier 5100 MHz – 6000 MHz 3 Vrms/m 80 % AM, 1 kHz unmodulated carrier	Criterion A
Conducted emissions	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	150 kHz – 500 kHz: 99 dBµV quasi-peak 500 kHz – 30 MHz: 93 dBµV quasi-peak	
Radiated emissions	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	30 MHz – 230 MHz: 40 dBµV/m quasi-peak at 10 m 230 MHz – 1000 MHz: 47 dBµV/m quasi-peak at 10 m	

ENVIRONMENTAL CHARACTERISTICS

Operating Temperature	-50 °C – +85 °C Class OT4: -40 – +70 °C and class ST1,ST2: +15 °C according to EN 50155:2021 extended down to -50 °C
Cooling	Natural convection
Storage Temperature Range	-50 °C – +100 °C
Altitude Class	Class Ax (>1400 m) according to EN 50125-1:2014: 5000 m above sea level max.
Pollution Degree	PD2 according to EN 50124-1:2017
Shock and Vibration	According to EN 61373:2010/AC:2017-09 category 1, class B
Rapid Temperature Variation	Class H2 according to EN 50155:2021: -25 °C to +15 °C / 95 %RH, ±3 K/s +10 °C to +40 °C / 60 %RH, ±3 K/s
Protective Coating	Class PC2 according to EN 50155:2021 The board is protected on both sides with a protective transparent fluorescent-pigment coating to prevent deterioration or damage due to moisture and atmospheric contaminants. The coating is compliant with class 2, according to IPC-A-610H
Prohibited Substances	For detailed information about RoHs, REACH, UNIFE (RISL), Dodd-Frank Act's Section 1502 on Conflict Minerals refer to the intreXis environmental policy document on www.intrexis.ch
Fire behaviour	EN 45545-2:2020+A1:2023 compliant with all Hazard Levels HL1-HL3 NFPA 130: 2023

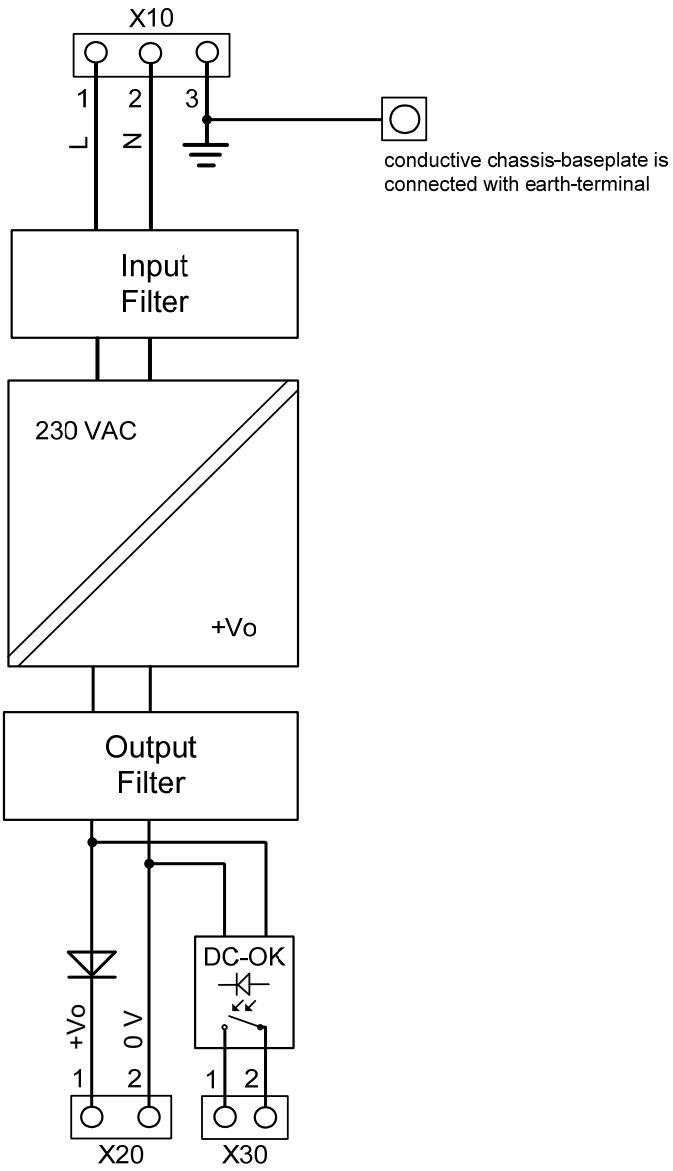
GENERAL CHARACTERISTICS

General Standard	EN 50155:2021 Railway applications - Rolling stock - Electronic equipment IEC 60571:2012 Railway applications - Electronic equipment used on rolling stock			
Useful Life Class	Class L4 (20 years) according to EN 50155:2021			
MTBF Calculation method: MIL-HDBK-217-F2 Using demonstrated Failure Rates of components	**Ground Benign (GB), +25 °C**	**Ground Benign (GB), +40 °C**	**Ground Fixed (GF), +40°C**	**Ground Mobile (GM), +40 °C**
	6 637 000 h	4 821 000 h	949 000 h	480 000 h
Marking	Label with following information: - part number, input voltage range, input frequency, input current, output voltage, output power - unique serial number for identification and traceability (printed in text format and as barcode) - revision index			
Connector identification	Printings on chassis to identify connectors and pin-functions			

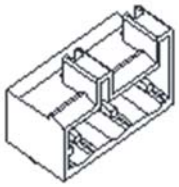
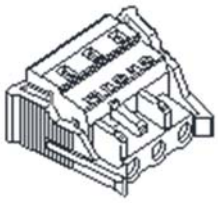
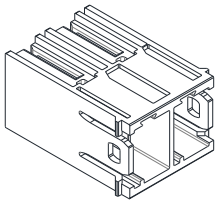
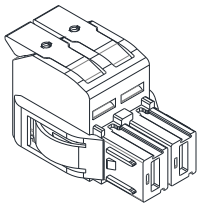
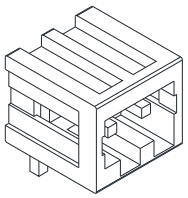
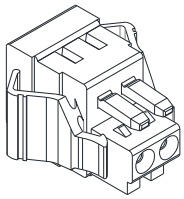
SAFETY AND INSULATION

Safety Standards	IEC 60950-1:2005+A1:2009+A2:2013 CSV EN 62368-1:2020+A11:2020 IEC 62368-1:2023
Insulation Coordination	According to EN 50124-1:2017
Input, Output, Chassis	The input is galvanically isolated to the output. Input, output and DC-OK signal are galvanically isolated to the chassis. The DC-OK Signal is isolated to the output and input
Input to Output	Isolation Voltage: 4000 Vrms at 2000 m altitude, 60 s 3000 Vrms at 5000 m altitude, 60 s Clearance: 7.3 mm Creepage: 7.3 mm For the type test, the Y-capacitors must be removed according to EN 61287-1:2014. Please refer to the intreXis whitepaper “Insulation Test” for detailed information. For the routine test according to EN 50124-1:2017 of Input to Output and Input to Chassis, intreXis AG recommends the following procedure: connect Output to Chassis, apply a test-voltage of 2125 VDC or 1500 VAC with trigger threshold ≥30 mA, 10 s between Input and Chassis. For this test, the Y-capacitors must not be removed. Please refer to the intreXis whitepaper “Insulation Test” for detailed information.
Input to Chassis	Isolation Voltage: 2000 Vrms, 60 s Clearance: 2.5 mm Creepage: 2.5 mm For the routine test, see above.
Output to Chassis	Isolation Voltage: 2000 Vrms, 60 s Clearance: 2.5 mm Creepage: 2.5 mm
DC-OK Signal to Input DC-OK Signal to Output DC-OK Signal to Chassis	Isolation Voltage: 2000 Vrms, 60 s Clearance: 2.5 mm Creepage: 2.5 mm
Insulation Resistance	Input – Chassis: > 550 MΩ Input – Output: > 550 MΩ Output – Chassis: > 550 MΩ DC-OK Signal to Input: > 550 MΩ DC-OK Signal to Output: > 550 MΩ DC-OK Signal to Chassis: > 550 MΩ Test-voltage: 500 VDC

BLOCK DIAGRAM



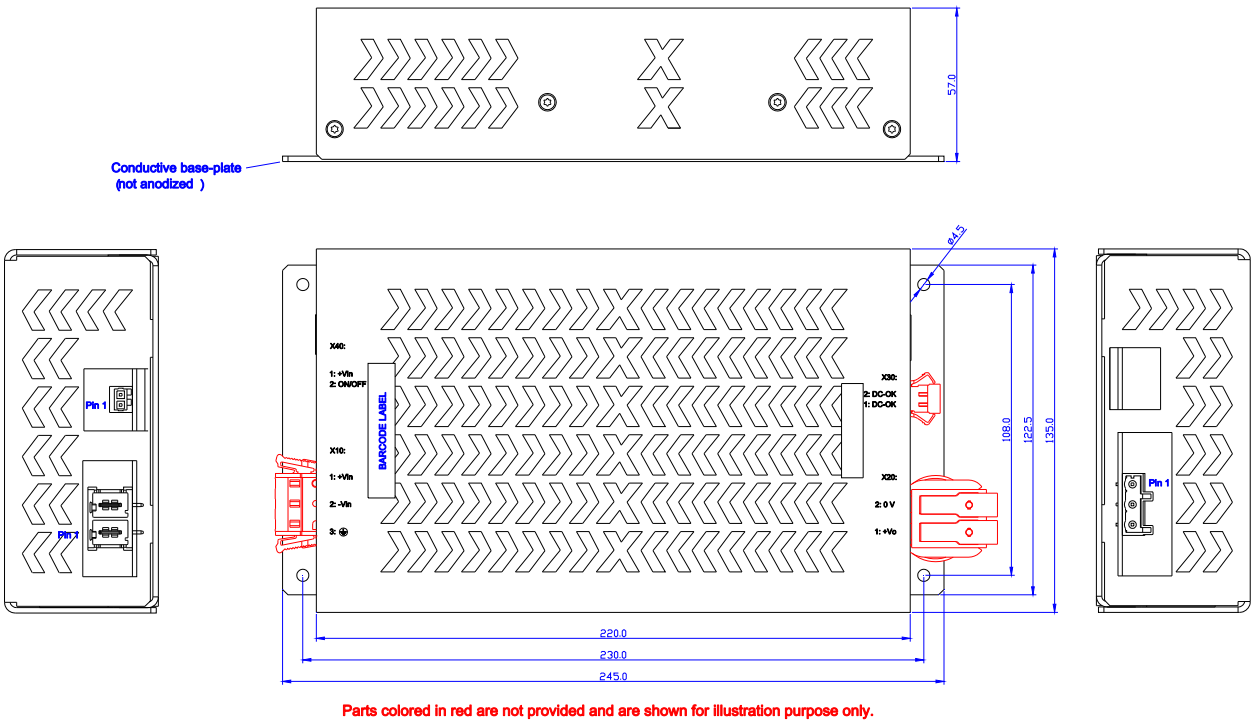
CONNECTOR TYPES

Input connector X10	Wago 721-833/001-000 Pitch: 7.5 mm Number of pins: 3 	Mating part: Wago 721-203/037-000 
Output connector X20	Wago 832-3622 Pitch: 10.16 mm Number of pins: 2 	Mating part: Wago 832-1102/037-000 
Signal connectors X30	Wago 734-262 Pitch: 3.81 mm Number of pins: 2 	Mating part: Wago 734-202/037-000 

MECHANICAL CHARACTERISTICS

Chassis	Aluminium: EN AW 5052 - AL5052 - AlMg2.5 or EN AW 5754 - AL5754 - AlMg3 Baseplate: blank Cover: black anodized
Overall dimensions	According to the drawing (millimeters, unless otherwise specified)
Weight	1190 g
IP code	IP20 Except for input-connector side
Mounting	Mounting in any position is allowed

Mechanical drawings:



Parts colored in red are not provided and are shown for illustration purpose only.

Output connector X20:
1. +Vo
2. 0 V

Signal Connector X30:
1. DC-OK
2. DC-OK

Input connector X10:
1. 230 VAC-Line
2. 230 VAC-Neutral
3. EARTH

The unit must be secured using four M4 screws or bolts (not supplied) in the mounting holes.

TEST COMPLIANCE SUMMARY (CERTIFICATE OF CONFORMITY)

Performed Test	Standard	Test conditions	Performance level	Reference document
Visual inspection	EN 50155:2021 IEC60571:2012	Aspect, dimensions, weight, markings	According to design specification	Testreport_IC383_3
Performance test	EN 50155:2021 IEC60571:2012	Ambient temperature. Nominal supply voltage: 230 VAC Supply voltage range: 230 VAC, ±10 % (static)	Criterion A	Testreport_IC383_3
AC Power supply test	EN 50155:2021 according to Annex I	Supply voltage: 230 VAC, ±10 %	Criterion A	Testreport_IC383_3
Insulation test	EN 50155:2021 IEC60571:2012	Input – Chassis 500 VDC Input – Output 500 VDC Output – Chassis 500 VDC DC-OK Signal – Output DC-OK Signal – Input DC-OK Signal – Chassis Repeated after Voltage withstand test Voltage withstand test: Input – Chassis 2000 Vrms 60 s Input – Output 4000 Vrms 60 s Output – Chassis 2000 Vrms 60 s DC-OK Signal – Output 2000 Vrms 60 s DC-OK Signal – Input 4000 Vrms 60 s DC-OK Signal – Chassis 2000 Vrms 60 s	Resistance > 20 MΩ (measured >550 MΩ, exceeding the requirement) No disruptive discharge	Testreport_IC383_3
Low temperature test Cold start test	EN 50155:2021 IEC60571:2012	T = -50 °C	Criterion A (exceeds the requirements, extended range down to -50 °C for extremely cold environments)	Testreport_IC383_3
Dry heat test	EN 50155:2021 IEC60571:2012	T = +70 °C (cycle A) T = +85 °C (cycles B and C)	Criterion A	Testreport_IC383_3
Low temperature storage test	EN 50155:2021 IEC60571:2012	T = -50 °C	Criterion A after recovery period	Testreport_IC383_3
Cyclic damp heat test	EN 50155:2021 IEC60571:2012	T = +55 °C and +25 °C (2 cycles)	Criterion A	Testreport_IC383_3
Electromagnetic compatibility test	EN 50155:2021 EN 50121-3-2:2016/ A1:2019 IEC60571:2012 IEC 62236-3-2:2018	See section 'Electromagnetic Compatibility (EMC)'		Compliant
Shock and vibration test	EN 50155:2021 IEC60571:2012	EN 61373:2010/AC:2017-09 Category 1, class B		Compliant

Additional tests:

Performed Test	Standard	Test conditions	Performance level	Reference document
Fire behaviour	EN 45545-2:2020	PCB: R25 (EN 60695-2-11, T16: No ignition at T=850 °C)	PASSED (HL1-HL2-HL3)	Fire_Certificate_IC383

Furthermore, the product is compliant with the requirements of:

- EC 1907/2006 (December, 18th 2006) REACH regulation: Registration, Evaluation, Authorisation and Restriction of Chemicals.

- UNIFE Railway Industry Substance List

Neuhausen am Rheinfall, 19.08.2025

Thomas Schiegg
intreXis AG

EU DECLARATION OF CONFORMITY (DoC)

CE

Product Models	IC383_3	
Name and address of the manufacturer	intreXis AG Tobelraastrasse 4 CH-8212 Neuhausen am Rheinfall Switzerland	
This declaration of conformity is issued under the sole responsibility of the manufacturer.		
IC383_3 		
The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:	Low Voltage Directive: RoHS Directive: EMC Directive:	2014/35/EU 2011/65/EU, (EU) 2015/863 2014/30/EU
References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:	Low Voltage Directive: RoHS Directive: EMC Directive: Railway Applications:	EN 62368-1:2020/A11:2020 IEC 63000:2016+AMD1:2022 CSV EN 50121-3-2:2016/ A1:2019 EN 50155:2021
Signed for and on behalf of:	intreXis AG Tobelraastrasse 4 CH-8212 Neuhausen am Rheinfall Switzerland	
Place, Date of issue	Neuhausen am Rheinfall, 19.08.2025	
Name, Function, Signature	Thomas Schiegg, Managing Director:	

UK DECLARATION OF CONFORMITY (DoC)

Product Models	IC383_3	
Name and address of the manufacturer	intreXis AG Tobelraastrasse 4 CH-8212 Neuhausen am Rheinfall Switzerland	
This declaration of conformity is issued under the sole responsibility of the manufacturer.		
IC383_3 		
The object of the declaration described above is in conformity with the relevant UK legislation:	UK SI 2016 No. 1101: UK SI 2012 No. 3032: UK SI 2016 No. 1091:	Electrical Equipment (Safety) Regulations 2016 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 Electromagnetic Compatibility Regulations 2016
References to the relevant standards used or references to the other technical specifications in relation to which conformity is declared:	Low Voltage Directive: RoHS Directive: EMC Directive: Railway Applications:	BS EN 62368-1:2020/A11:2020 BS EN IEC 63000:2018 BS EN 50121-3-2:2016/A1:2019 BS EN 50155:2021
Signed for and on behalf of:	intreXis AG Tobelraastrasse 4 CH-8212 Neuhausen am Rheinfall Switzerland	
Place, Date of issue	Neuhausen am Rheinfall, 19.08.2025	
Name, Function, Signature	Thomas Schiegg, Managing Director: 	

INSTALLATION AND OPERATION

Safety	 Warning / Caution! The power supplies should be installed and put into operation only by qualified personnel. Before installing or removing the unit, disconnect the power from the system. The main protective earthing terminal is provided on the connector X10/pin 3. In addition to the main protective earthing terminal (X10/pin 3), a separate protective earthing terminal must be connected permanently. This can be achieved by screwing the unit onto a conductive, earthed plate.
Servicing	In case of failures, malfunctions or defects, the converter must be returned to intreXis for analysis and repair. In particular, the converter should be sent to intreXis for analysis if any damage has occurred to the unit (e.g. the unit dropped). Any attempts to open and repair the unit could void the warranty and could expose the operator to hazardous voltages.
Spare Parts	List and drawings of spare parts are not provided, since the failed units have to be returned to intreXis for analysis and repair.
Disposal	Disused units must be collected separately and disposed at a suitable recycling facility.
Connecting the Cables	Ensure that proper wires are used according to the input current specifications. Prepare the cables according to the specifications of the particular connector used.
Operation of the Unit	Once the input power is applied, the output voltage is enabled.