

OWNER'S MANUAL

IDC 360 SERIES DC-DC ISOLATED CONVERTERS

The Samlex America IDC Series is a complete line of isolated DC-DC converters suitable for applications requiring galvanic isolation between the input and the output. They are distinguished by high efficiency (~ 85%), absolute safety, reliability and compact design. The converters are based on high performance, fixed frequency switching regulator. The line covers nominal input voltages of 12, 24, 48 and 72 VDC and nominal output voltages of 12 / 24 VDC. The units are EMI /EMC compliant and conform to the European standards EN50081-1 / EN61000-6-3 (for emission) and EN50082-1 / EN61000-6-1 (for immunity). Versions with 12 V / 24 V inputs also conform to the European Automotive Directive 95/54/CE.

The input to output isolation can provide either an isolated output power source, or generate different voltage rails and / or dual polarity rails. These configurations are most often found in instrumentation, data processing and other noise sensitive circuits where it is necessary to isolate the load and noise presented to the local power supply rails from that of the entire system. The isolated positive output can be connected to the input ground rail to generate a negative supply rail, if required.

Galvanic isolation of the output allows multiple converters to be connected in series. In this way, non-standard voltage rails can be generated. For series connection, additional filtering is strongly recommended as the converters' switching circuits will not be synchronized and will result in summation of the ripple voltages. The output could also produce relatively large beat frequencies. A capacitor across the output will help, as will a series inductor.

All models are covered by Samlex America's two year warranty and offer an MTBF of approx 500000 hours. Applications include DC to DC conversion requirements for tractor trailers, forklifts, heavy machinery, locomotive/ railroad, bus conversions, consumer aviation and marine craft.

INSTALLATION & OPERATION

General Installation Requirements

- This unit is cooled by two temperature controlled fans. Install the unit in a cool, dry & well ventilated space. Do not block the vent openings on the sides.
- Do not install the unit inside the engine compartment.
- Do not connect / disconnect input and output connections when live voltages are present.

WARNING! This unit is not a Battery Charger. Please do not use it to charge a battery.

Fusing on the input & output sides

The input side of the unit will be connected to the battery. A battery has the capacity to supply very large currents. In case there is a short circuit between the input side wiring, very heavy current will flow and will burn / melt the wiring and may be a fire hazard. To prevent this, use a suitable fast blow fuse in line with the positive input wire within 18 in from the battery positive terminal.

The output side should be connected through a suitable fuse in line with the "Output +" terminal. Details of input/output side fuses are shown in "Specifications".

WARNING! The warranty will be voided if proper fuses are not used as recommended.

Switching on and switching off arrangement on the input side

There is no on / off switch on the input side of the unit. An external on / off switch may be used in series with the positive input wire, if required.

Sizing of input and output wiring

In order to prevent excessive voltage drop and consequent loss of current capacity and efficiency, use proper size of input and output wires. Please note that as the current / length of wiring are increased, the thickness of the wiring will also be required to be increased. The thickness of wires and cables is normally expressed in AWG (American Wire Gauge). Also, note that a lower AWG number denotes a thicker wire. Use multi-stranded copper insulated wiring rated for at least 90° C. Please refer to details of input/output wire sizes under "Specifications".

Type of input and output connections

The unit has a terminal block with 4 male, quick connect flat blade type terminals (6.3 mm / ¼ in.) for quick connection / disconnection. Two blades are for input (Marked "Input +" and "Input -") and two are for output (Marked "Output +" and "Output -"). The wiring for connection to the terminals should be terminated with the corresponding female quick connect terminals meant for the above male 6.3 mm / ¼" flat blade type terminal.

Making input & output connections & operation

CAUTION! Please ensure that the polarity of the input connection is not reversed. Connect the positive of the battery to the positive terminal and the negative of the battery to the negative. In case the input polarity is reversed, the unit will be damaged and will not be covered under warranty.

- Input and output connections should not be made when live voltages are present.
- Switch off the load that is required to be powered from the converter.
- Connect the output wires to the load and then to the output side of the unit through the external fuse. Observe correct polarity.
- Switch off the external inline input side switch (if used) and also remove the external inline fuse in the positive input wire.
- Connect the input side wires to the converter's input side first. **OBSERVE CORRECT POLARITY.**
- Connect the input wires to the battery.
- Insert the external inline input side fuse in the positive input wire. **NOTE:** If an on / off switch is not used in series with the positive input wire or if a switch has been used and has not been switched off, a spark may be observed when inserting the fuse due to the initial inrush current to charge the input side capacitors inside the converter.
- Switch on the input power to the unit (if an external switch has been used). Output voltage will now be available on the output side of the unit.
- Switch on the load.

Input Connection for IDC-360C & IDC-360D (versions prior to "Revision R5")

When the converter is used in a fork lift that operates on 30V or higher (versions IDC-360C or IDC-360D), use an isolation diode in series with the "Input +" terminal. IDC-360C & IDC-360D come with this diode. This diode prevents reverse flow of high current into the input battery if the battery voltage dips. This diode has a female quick connect on the cathode side and a male quick connect on the anode side. Connect the cathode side to the "Input +" terminal of the converter and the anode side to the battery. For versions "Revision R5" and onwards, this diode is incorporated inside the unit.

Protections

Overload/Short circuit: Overloading beyond the maximum output current value (30A for IDC-360x-12 & 15A for IDC-360x-24) will produce voltage drop on the output side. The output will recover automatically once the overload condition is removed.

Under short circuit conditions on the output side, the voltage will drop to near 0 volts. There is automatic reset once the short circuit condition is removed.

Over voltage on the output side: In case of over voltage, a zener diode across the output will conduct and simulate short circuit protection (see above).

Over voltage / transients on the input side: A Metal Oxide Varistor (MOV) across the input terminals provides protection against high voltage transients by blowing the input side fuse(s).

Reversal of polarity on the input side connection: In case of reversal on input side polarity, a diode connected across the input terminals will conduct and will blow the input side fuse(s).

Over temperature: In case of over heating, the output voltage will drop. It will reset automatically once the temperature drops to normal.

IDC-360 SERIES SPECIFICATIONS



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Model Name	Input Voltage Range (VDC)	Output Voltage (VDC)	Output Current (A) *
IDC-360A-12	9 - 18	12.5	30
IDC-360B-12	20 - 35	12.5	30
IDC-360C-12	30 - 60	12.5	30
IDC-360D-12	60 - 120	12.5	30
IDC-360A-24	9 - 18	24.5	15
IDC-360B-24	20 - 35	24.5	15
IDC-360C-24	30 - 60	24.5	15
IDC-360D-24	60 - 120	24.5	15

* The output current indicated is the maximum current at the maximum input voltage

Input to output isolation	Yes. > 400 V RMS
Output ripple & noise	< 50 mV RMS
Peak efficiency	85%
Cooling	By two temperature controlled fans
Operating temperature	-20° to +30° C, (De-rate linearly to zero at 70° C)
Humidity, non condensing	Max 95%
Protections	Overload / short circuit on the output side; Over voltage on the output side; Over voltage / transients on the input side; Reverse polarity on the input side; Over heating

External Input Side Fuse & Wiring (Inline with "Input +" Terminal)

Model Name	Fuse Specs	Wire Size (up to 6 ft)
IDC-360A-12 / IDC-360A-24	32V 50A	AWG # 4
IDC-360B-12 / IDC-360B-24	32V 25A	AWG # 10
IDC-360C-12 / IDC-360C-24	80V 15A	AWG # 12
IDC-360D-12 / IDC-360D-24	125V 7.5A	AWG # 14

External Output Side Fuse & Wiring (Inline with "Output +" Terminal)

Model Name	Fuse Specs	Wire Size (up to 10 ft)
IDC-360A-12	32V 30A	AWG # 4
IDC-360B-12	32V 30A	AWG # 4
IDC-360C-12	32V 30A	AWG # 4
IDC-360D-12	32V 30A	AWG # 4
IDC-360A-24	32V 15A	AWG # 10
IDC-360B-24	32V 15A	AWG # 10
IDC-360C-24	32V 15A	AWG # 10
IDC-360D-24	32V 15A	AWG # 10

Safety & EMC

- Emission	EN50081-1 / EN61000-6-3
- Immunity	EN50082-1 / EN61000-6-1
- Automotive	95/54/EC (IDC-360A & IDC-360B Series Only)
Input/ Output Connections	Quick Connect male 6.3mm / 1/4" flat blade
Dimensions (W x D x H)	162 x 150 x 63 mm / 6.4" x 5.9" x 2.5"
Weight	1.4 Kg / 3.2 lbs



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