

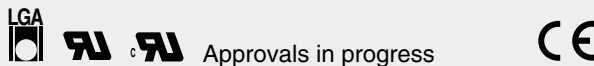
120/240 Watt AC-DC Front End with PFC

W Series Convert Select 120 Convert Select 240

Rugged 35 mm DIN-rail snap-fit design
3000 V AC input to output electric strength test
Single and double outputs for 24 or 48 V DC loads

- Universal AC-input with single stage conversion AC to DC with PFC
- Power factor >0.9, harmonics <IEC/EN 61000-3-2
- Immunity to IEC/EN 61000-4-2, -3, -4, -5, -6, -11
- Emissions below CISPR 20/EN 55022, level B
- Very high efficiency up to 88%
- Short-term output peak power capability
- Independently regulated outputs
- Outputs; no load, overload and short-circuit proof
- Ambient operating temperature -25...60°C
- Extremely small case size
- Very high reliability, MTBF >400'000 h (G_B, 40°C)

Safety in accordance to
 IEC/EN 60950, UL 1950, EN 50178 and VDE 0508



Summary

The "Convert Select" front end line represents a series of DIN-rail mountable AC-DC converters with power factor correction and has been designed according to the latest industry requirements and standards. The converters are ideal for use in demanding applications to power building controls, factory automation, industrial controls, PLCs, instrumentation, electromagnetic drives, fans and other DC loads.

The units are available with single and electrically isolated, independantly regulated double outputs allowing configuration of output voltages of 24 V, 48 V, ±24 V and 2 × 24 V DC. Key features of the "Convert Select" line include: power factor correction with low harmonic distortion, negligibly low inrush current, high immunity to transients and surges and very low electromagnetic emissions. Internal protection circuits such as input over- and undervoltage lock-out as well as output overvoltage protection by a second control loop ensure safe operation of the final system.

The outputs deliver an electrically isolated Safety Extra Low Voltage (SELV) with low output noise and are no load, overload and short-circuit proof. Electronically controlled short-term peak power capability of up to 150% of the rated output power enables the front end units to deliver addi-

tional power to start-up motors or to safely operate subsequent circuit breakers. Built-in large sized output capacitors absorb possible reverse energy which may be caused by quick decelerations of electromagnetic drives connected directly to the output.

A green LED at the front displays the status of the output(s). The "Convert Select" line is designed and built according to the international safety standards IEC/EN 60950, UL 1950, CAN/CSA C22.2 no. 950-95, EN 50178 and VDE 0508. LGA, UL and cUL approvals are in progress. Adequate clearance and creepage distances allow operation in pollution degree 3 environments.

The thermal concept allows operation at full load up to an ambient temperature of 60°C in free air without forced cooling.

A unique feature of the "Convert Select" line is the extremely small and compact design of the metallic case. A rugged DIN snap-fit device allows easy and reliable fixing onto the various 35 mm DIN rail types.

The units are fitted with cage clamp terminals easily accessible from the front. System connectors with screw terminals for use with preassembled harnesses and an input for external adjustment of the output voltage are available as options.

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Mechanical Data

Dimensions in mm. Tolerances ± 0.3 mm unless otherwise indicated.

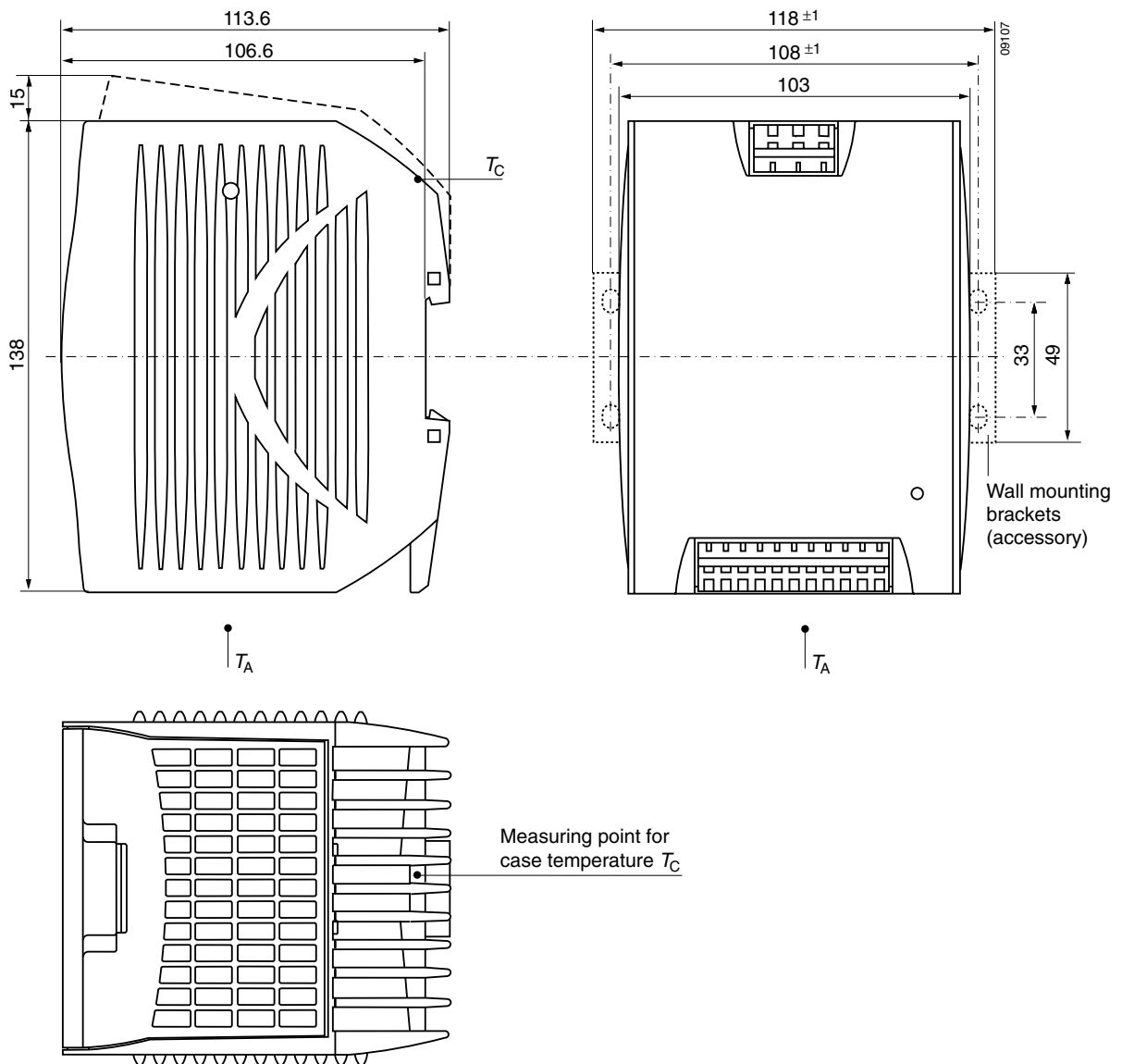
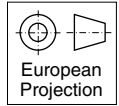


Fig. 1
 Case W01
 weight: approx. 1400 g
 Case designed by ATP, Munich.

Safety and Installation Instructions

Terminal Allocation

The terminal allocation tables define the electrical potentials of the AC-DC converters.

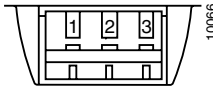


Fig. 2
View of the input terminals

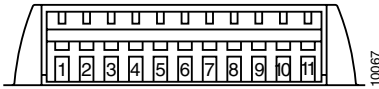


Fig. 3
View of the output terminals

Table 2: Terminal allocation input side

| Pin no. | Pin designation | Electrical determination |
|---------|-----------------|--------------------------|
| 1 | ⊕ | Protective earth |
| 2 | N~ | Input neutral |
| 3 | P~ | Input phase |

Table 3: Terminal allocation output side

| Pin no. | Pin des. | Single output | Double output |
|---------|----------|----------------------|----------------------|
| 1 | ⊕ | Earth to load | Earth to load |
| 2 | + | Output positive | Output 1 positive |
| 3 | + | Output positive | Output 1 positive |
| 4 | - | Output negative | Output 1 negative |
| 5 | - | Output negative | Output 1 negative |
| 6 | + | Output positive | Output 2 positive |
| 7 | + | Output positive | Output 2 positive |
| 8 | - | Output negative | Output 2 negative |
| 9 | - | Output negative | Output 2 negative |
| 10 | | Options ¹ | Options ¹ |
| 11 | ⊕ | Earth to load | Earth to load |

¹ E.g. option R.

Installation Instruction

The converters of the "Convert Select" series are components, intended exclusively for inclusion within other equipment by an industrial assembly operation or by professional installers. Installation must strictly follow the national safety regulations in compliance with the enclosure, mounting, creepage, clearance, casualty, markings and segregation requirements of the end-use application. See also: *Technical Information: Installation and Application*.

Mechanical fixing shall be made via the built-in snap-fit devices for DIN-rail mounting or via mounting brackets for wall mounting according to the following figures. Mounting brackets are available from Melcher under the designation: *Mounting Bracket UMB-W*, order no. HZZ00618.

The minimum space to the next device should be: top/bottom: 30 mm, left/right: 10 mm.

Install the converters vertically and make sure that there is sufficient air flow available for convection cooling.

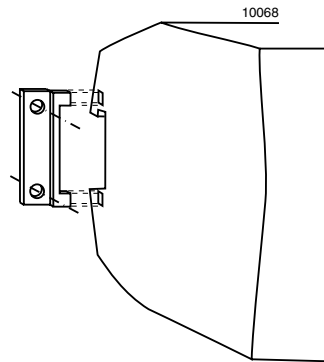


Fig. 4
Wall mounting with mounting bracket (accessory).

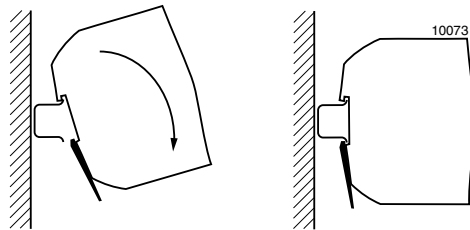


Fig. 5
Snap-fit mounting to DIN-rail.

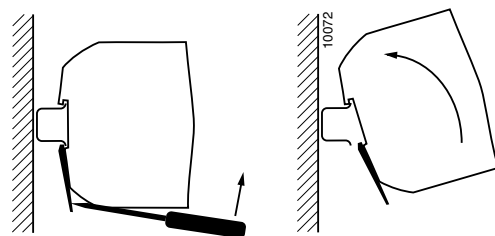


Fig. 6
Dismounting from DIN-rail. Use proper tool (min. 3 mm screwdriver) and adequate force.

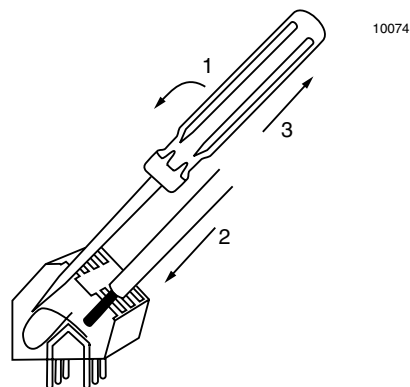


Fig. 7
Cage clamp terminal (standard). Use 0.08 to 2.5 mm² (AWG 28 to 12) solid wires or stranded wires, depending on local requirements.

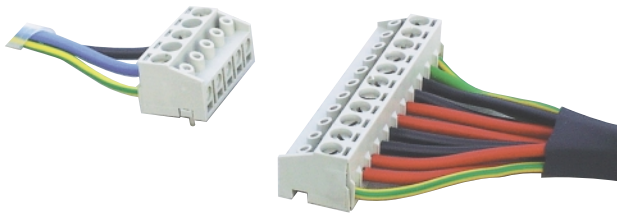


Fig. 8
System connector with screw terminals (option K).
Use 1.5 mm² solid wires or 1.0 mm² stranded wires with crimp termination.

Input terminal 1 (⊕) and output terminals 1 and 11 (⊖) of the AC-DC converters are reliably connected to the case. For safety reasons it is essential to connect input terminal 1 (⊕) to the protective earth of the supply system. Output terminals 1 and 11 can be used to connect the output voltage(s) or other equipment to earth.

The phase input (P~) is internally fused by a 6.3 A slow-blow type. It is not customer-accessible. This fuse is designed to protect the unit in case of overcurrent. External fuses in the wiring to one or both input pins (P~ and/or N~) may therefore be necessary to ensure compliance with local requirements. A built-in second fuse in the neutral path is available as an option (F).

A second fuse in the wiring to the neutral terminal N~ or option F is needed if:

- Local requirements demand an individual fuse in each source line
- Neutral and earth impedance is high or undefined
- Phase and neutral of the mains are not defined or cannot be assigned to the corresponding terminals (P~ to phase and N~ to neutral).

Caution:

- Improper installation and maintenance may result in failure, severe personal injury or substantial damage to property.
- Check for hazardous voltages before altering any connections.
- Hazardous voltages are present at the input and within the units if connected to the mains.
- Energy hazards by internal capacitors are present at the output terminals even if the unit has been disconnected from the mains. Wait a minimum of 3 minutes after disconnection before causing any short-circuit across the output terminals.

- Make sure that there is sufficient air flow available for convection cooling. This should be verified by measuring the case temperature when the unit is installed and operated in the end-use application. The maximum specified case temperature $T_{C\ max}$, measured at the: *Measuring point of case Temperature T_C* according to: *Mechanical data* shall not be exceeded.
- The installer must ensure that under all operating conditions T_C remains within the limits stated in the table: *Temperature specifications*.
- Do not open the modules.

Ensure that a unit failure (e.g. by an internal short-circuit) does not result in a hazardous condition. See also: *Safety of operator accessible output circuit*.

Standards and Approvals

All converters of the "Convert Select" series correspond to class I equipment.

They are UL recognized according to UL 1950, UL recognized for Canada to CAN/CSA C22.2 No. 950-95 and LGA approved to IEC/EN 60950 and EN 50178 standards and have been designed in accordance with these standards for:

- Building in
- Basic insulation between input and case, based on 250 V AC
- Double or reinforced insulation between input and output, based on 250 V AC
- Operational insulation between output(s) and case
- Operational insulation between the outputs
- The use in a pollution degree 3 environment.
- Connecting the input to a primary circuit with a maximum transient rating of 2500 V (overvoltage class III based on a 110 V primary circuit, overvoltage class II based on a 230 V primary circuit).

The AC-DC converters are subject to manufacturing surveillance in accordance with the above mentioned UL, CSA, EN and with ISO 9001 standards.

Protection Degree

The protection degree of the AC-DC converters is IP 20. In the vicinity of the terminals the protection degree depends on the installation. Protective covers are in preparation.

Cleaning Agents

In order to avoid possible damage, any penetration of cleaning fluids is to be prevented, since the power supplies are not hermetically sealed.

Table 4: Temperature specifications, valid for air pressure of 800...1200 hPa (800...1200 mbar)

| Temperature | | Conditions | Standard -6 | | Unit |
|-----------------|---------------------|-----------------|-------------|-----|------|
| Characteristics | | | min | max | |
| T_A | Ambient temperature | Operational | -25 | 60 | °C |
| T_C | Case temperature | | -25 | 90 | |
| T_S | Storage temperature | Non operational | -40 | 100 | |

Isolation

The electric strength test is performed as factory test in accordance with IEC/EN 60950 and UL 1950. Neither this test nor the insulation resistance measurement should be repeated in the field. Melcher will not honour any guarantee claims resulting from field tests with high voltages.

Table 5: Isolation

| Characteristic | | Input to case | Input to output | Output to case | Output to output | Unit |
|-----------------------------------|---|---------------|------------------|----------------|-------------------|-------------------|
| Electric strength test voltage | Required according to IEC/EN 60950 | 1.0 | 3.0 ¹ | 0.5 | – | kV _{rms} |
| | | 1.4 | 4.2 ¹ | 0.7 | – | kV DC |
| | Actual factory test 1 s | 2.8 | 4.2 ¹ | 1.4 | 0.3 | |
| | AC test voltage equivalent to actual factory test | 2.0 | 3.0 ¹ | 1.0 | 0.2 | kV _{rms} |
| Insulation resistance at 500 V DC | | >300 | >300 | >300 | >100 ² | MΩ |

¹ In accordance with IEC/EN 60950 only subassemblies are tested in the factory with this voltage.

² Tested at 100 V DC.

Important: Testing by applying AC voltages will result in high and dangerous leakage currents flowing through the Y-capacitors.

For creepage distances and clearances refer to: *Technical Information: Safety*.

Leakage Currents in AC-DC operation

Leakage currents flow due to internal leakage capacitance and RFI suppression Y-capacitors. The current values are proportional to the mains voltage and nearly proportional to the mains frequency. They are specified at maximum oper-

ating input voltage where phase, neutral and protective earth are correctly connected as required for class I equipment.

Table 6: Leakage currents

| Characteristic | | LW | Unit |
|------------------------|---------------------------------------|------------------|------|
| Earth leakage current | Permissible according to IEC/EN 60950 | 3.5 | mA |
| | Specified value at 255 V, 50 Hz (LW) | 1.7 ¹ | |
| | Specified value at 127 V, 60 Hz (LW) | 0.9 | |
| Output leakage current | Permissible according to IEC/EN 60950 | 0.25 | |
| | Specified value at 255 V, 50 Hz (LW) | <0.1 | |
| | Specified value at 127 V, 60 Hz (LW) | <0.1 | |

¹ In phase to phase configuration, leakage current is lower (200 V/60 Hz).

Safety of operator accessible output circuit

If the output circuit of an AC-DC converter is operator accessible, it shall be an SELV circuit according to IEC/EN 60950 related safety standards

The "Convert" series AC-DC converter are designed with SELV output circuits up to an output voltage of 57 V. However if the isolated outputs are connected to another volt-

age source or connected in series with a total of >57 V the output is hazardous.

However, it is the sole responsibility of the installer to assure the compliance with the relevant and applicable safety regulations. More information is given in: *Technical Information: Safety*.

Description of Options

K System Connectors

For installation into systems using preassembled harnesses the units are available with connectors fitted with screw terminals. The system connectors are UL-listed and approved for a temperature range –40...100°C and currents up to 10 A. Wire cross sections: Solid wires 1.5 mm²; stranded wires 1 mm².

F Built-in Second Fuse

A built-in second fuse in the neutral path provides safe phase to phase connection at low mains voltages (e.g. USA 120 V/208 V/60 Hz systems). The built-in second fuse furthermore enables safe connection to the mains where phase and neutral are not defined or cannot be identified, as e.g. in the case of plug and socket connection to the mains via Schuko-plugs, see also: *Safety and Installation Instructions*.

R U_o Adjustment

Adjustment of the output voltage in the range of approximately 5...110% of $U_{o\,nom}$ by an external voltage source (in the range of 0.125...2.75 V) connected between the R terminal and Vo–, or by an external resistor connected either between the R terminal and Vo– (5...100% of $U_{o\,nom}$) or the R terminal and Vo+ (100...110% of $U_{o\,nom}$).

With units with double outputs only the output connected to terminals 6, 7, 8 and 9 can be adjusted in the range of 5...110% of its nominal output voltage, see single output units. This allows a symmetric output voltage configurations. If the two outputs of double output units are connected in series the R-input affects only its related output and the adjustment range is limited to approx. 52 to 105% of the sum of the two nominal output voltages.