PRODUCT DESCRIPTION

The MLY02.100 is a simple redundancy module, which can be used to build 1+1 and N+1 redundant systems. It is equipped with two input channels, which can be connected to power supplies with up to 5A output current and one output, which can carry nominal currents up to 10A. The module is suitable for power supplies with constant current overload behavior as well as any kind of “Hiccup” overload behavior.

Unique quick-connect spring-clamp terminals allow a safe and fast installation and a large international approval package for a variety of applications makes this unit suitable for nearly every situation.

SHORT-FORM DATA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input voltage</strong></td>
<td>DC 12-48V ±25% w/o restrictions</td>
</tr>
<tr>
<td><strong>Input voltage range</strong></td>
<td>DC 12-120V ±25% w/o restrictions</td>
</tr>
<tr>
<td><strong>Input current</strong></td>
<td>2x 0-5A</td>
</tr>
<tr>
<td><strong>Input current input</strong></td>
<td>1x 5A</td>
</tr>
<tr>
<td><strong>Input current input</strong></td>
<td>2x 5A</td>
</tr>
<tr>
<td><strong>Output current</strong></td>
<td>0-10A continuous</td>
</tr>
<tr>
<td><strong>Output current</strong></td>
<td>10-16A for 5 seconds</td>
</tr>
<tr>
<td><strong>Output current</strong></td>
<td>&lt;16A at cont. overload/short circuit</td>
</tr>
<tr>
<td><strong>Input to output voltage drop</strong></td>
<td>typ. 0.8V</td>
</tr>
<tr>
<td><strong>Input to output voltage drop</strong></td>
<td>typ. 0.9V</td>
</tr>
<tr>
<td><strong>Input to output voltage drop</strong></td>
<td>typ. 0.9V</td>
</tr>
<tr>
<td><strong>Power losses</strong></td>
<td>typ. 0W at no load</td>
</tr>
<tr>
<td><strong>Power losses</strong></td>
<td>typ. 4.0W input: 1x5A</td>
</tr>
<tr>
<td><strong>Power losses</strong></td>
<td>typ. 4.5W input: 2x2.5A</td>
</tr>
<tr>
<td><strong>Power losses</strong></td>
<td>typ. 9.0W input: 2x5A</td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>-40°C to +70°C operational, +60 to +70°C</td>
</tr>
<tr>
<td><strong>Derating</strong></td>
<td>0.25A/°C</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>45x75x91mm WxHxD</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>140g / 0.31lb</td>
</tr>
</tbody>
</table>

ORDER NUMBERS

Redundancy Module

MLY02.100

MAIN APPROVALS

For details and the complete approval list, see chapter 13.

UL 508

UL 60950-1

ATEX

IECEx

DNV

ABS

Marine

Marine

Jul. 2021 / Rev. 1.5 DS-MLY02.100-EN
All parameters are specified at 24V, 10A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.
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TERMINOLOGY AND ABBREVIATIONS

PE and symbol PE is the abbreviation for Protective Earth and has the same meaning as the symbol ⚪. Earth, Ground This document uses the term "earth" which is the same as the U.S. term "ground".
t.b.d. To be defined, value or description will follow later.
DC 24V A figure displayed with the AC or DC before the value represents a nominal voltage with standard tolerances (usually ±15%) included. E.g.: DC 12V describes a 12V battery disregarding whether it is full (13.7V) or flat (10V)
24Vdc A figure with the unit (Vdc) at the end is a momentary figure without any additional tolerances included.
may A key word indicate flexibility of choice with no implied preference
shall A key word indicate a mandatory requirement
should A key word indicate flexibility of choice with a strongly preferred implementation

1+1 Redundancy Use of two identical power supplies in parallel to provide continued operation following most failures in a single power supply. The two power supply outputs should be isolated from each other by utilizing diodes or other switching arrangements.
E.g.: two 2.5A power supplies are needed to achieve a 2.5A redundant system.

N+1 Redundancy Use of three or more identical power supplies in parallel to provide continued operation following most failures in a single power supply. All power supply outputs should be isolated from each other by utilizing diodes or other switching arrangements. E.g.: To achieve a 10A redundant system, five 2.5A power supplies are needed in a N+1 redundant system.
1. INTENDED USE

This device is designed for installation in an enclosure and is intended for commercial use, such as in industrial control, process control, monitoring and measurement equipment or the like. Do not use this device in equipment where malfunction may cause severe personal injury or threaten human life.

The redundancy module can be used with any type of power supply as long as the maximum output current ratings are not exceeded. It is suitable for power supplies with continuous overload current as well as any kind of intermittent (Hiccup) overload behavior.

If this device is used in a manner outside of its specification, the protection provided by the device may be impaired.

2. INSTALLATION INSTRUCTIONS

**WARNING** Risk of electrical shock, fire, personal injury or death.

- Turn power off before working on the device and protect against inadvertent re-powering.
- Do not open, modify or repair the device.
- Use caution to prevent any foreign objects from entering into the housing.
- Do not use in wet locations or in areas where moisture or condensation can be expected.
- Do not touch during power-on, and immediately after power-off. Hot surface may cause burns.

**Obey the following installation instructions:**

This device may only be installed and put into operation by qualified personnel.

This device does not contain serviceable parts. The tripping of an internal fuse is caused by an internal defect.

If damage or malfunction should occur during installation or operation, immediately turn power off and send unit to the factory for inspection.

Install the device in an enclosure providing protection against electrical, mechanical and fire hazards.

Do not ground or earth the positive output pole which could prevent redundancy in case of a ground failure. Ground the negative output pole, when needed.

Use only power supplies with a negligible output ripple voltage in the low frequency range between 50Hz and 10kHz when used in marine applications according to the GL regulations.

Install the device onto a DIN rail according to EN 60715 with the input terminals on the top of the device. Other mounting orientations require a reduction in output current.

Make sure that the wiring is correct by following all local and national codes. Use appropriate copper cables that are designed for a minimum operating temperature of 60°C for ambient temperatures up to +45°C, 75°C for ambient temperatures up to +60°C and 90°C for ambient temperatures up to +70°C. Ensure that all strands of a stranded wire enter the terminal connection.

The device is designed for pollution degree 2 areas in controlled environments. No condensation or frost is allowed.

The enclosure of the device provides a degree of protection of IP20. The enclosure does not provide protection against spilled liquids.

The input must be powered from a PELV or SELV source or an “Isolated Secondary Circuit” in order to maintain a SELV or PELV output.

Check correct input polarity. The device will not operate when input voltage is reversed.

The device is designed as “Class of Protection III” equipment according to IEC 61140.

The device is designed for convection cooling and does not require an external fan. Do not obstruct airflow and do not cover ventilation grid!

The device is designed for altitudes up to 5000m (16400ft). Above 2000m (6560ft) a reduction in output current is required.
Keep the following minimum installation clearances: 40mm on top, 20mm on the bottom, 5mm left and right side. Increase the 5mm to 15mm in case the adjacent device is a heat source. When the device is permanently loaded with less than 50%, the 5mm can be reduced to zero.

The maximum surrounding air temperature is +70°C (+158°F). The operational temperature is the same as the ambient or surrounding air temperature and is defined 2cm below the device.

The device is designed to operate in areas between 5% and 95% relative humidity.

**Installation Instructions for Hazardous Location Areas**

The device is suitable for use in Class I Division 2 Groups A, B, C, D locations and for use in Group II Category 3 (Zone 2) environments.

Hazardous Location classification: ATEX: EPS 11 ATEX 1 312 X, II 3G EX ec IIIC T4 Gc

![WARNING] EXPLOSION HAZARDS!

Substitution of components may impair suitability for this environment.

Do not disconnect the device unless power has been switched off or the area is known to be non-hazardous.

A suitable enclosure must be provided for the end product which has a minimum protection of IP54 and fulfils the requirements of the EN 60079-0.
## 3. Input and Output Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>2</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>1</td>
</tr>
<tr>
<td>Input voltage</td>
<td>nom. DC 12-48V ±25%</td>
</tr>
<tr>
<td>Input voltage range</td>
<td>9–60Vdc</td>
</tr>
<tr>
<td>Input voltage with restrictions</td>
<td>nom. DC 12-120V ±25%</td>
</tr>
<tr>
<td>Input voltage range with restrictions</td>
<td>9-150Vdc</td>
</tr>
<tr>
<td>Voltage drop, input to output</td>
<td>typ. 0.8V at 2x2.5A, see Fig. 3-2</td>
</tr>
<tr>
<td></td>
<td>typ. 0.9V at 1x5A, see Fig. 3-3</td>
</tr>
<tr>
<td></td>
<td>typ. 0.9V at 2x5A, see Fig. 3-2</td>
</tr>
<tr>
<td>Input current</td>
<td>nom. 2x 0-5A continuous</td>
</tr>
<tr>
<td></td>
<td>nom. 1x 0-10A continuous</td>
</tr>
<tr>
<td></td>
<td>nom. 2x 5-8A for 5 seconds</td>
</tr>
<tr>
<td>Peak input current</td>
<td>max. 125A for maximal 10ms per input</td>
</tr>
<tr>
<td>Output current</td>
<td>nom. 10A continuous</td>
</tr>
<tr>
<td></td>
<td>nom. 10-16A for 5 seconds</td>
</tr>
<tr>
<td></td>
<td>max. 16A at continuous overload or short circuit, see note 2</td>
</tr>
<tr>
<td>Reverse current</td>
<td>max. 0.6mA per input, -40°C to +60°C</td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>max. 200Vdc voltage applied to the output, continuously allowed</td>
</tr>
</tbody>
</table>

**Note 1:** Each input can be loaded up to 10A. At currents above 10A, the other input should not be loaded. It is preferable to parallel the two inputs in order to minimize the power loss in such cases.

**Note 2:** Ensure that the continuous output current does not exceed 16A. Check the short-circuit current of the power sources and if the power source can deliver more than 16A together, use an appropriate fuse on the output.

**Note 3:** The redundancy module can be used with input voltages up to 150Vdc with the constraint, that it can be used only as a single input module at voltages above 60Vdc. Both inputs need to be connected together as shown in Fig. 3-1. Ensure proper means to protect against touching this voltage.

---

**Fig. 3-1** Restrictions for utilizing voltages between 60 and 150Vdc (See also Note 3)

---

[Diagram showing restrictions for utilizing voltages between 60 and 150Vdc]
Fig. 3-2  Input to output voltage drop when both inputs draw current
(typical 1+1 redundant case, when the output voltages of the two units are equal or set into "parallel use" mode)

Fig. 3-3  Input to output voltage drop when only one input draws current

4. POWER LOSSES

**DC 24V**

<table>
<thead>
<tr>
<th>Power losses</th>
<th>typ. 4.0W</th>
<th>input: 2x2.5A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby power losses</td>
<td>typ. 9.0W</td>
<td>input: 2x5A</td>
</tr>
</tbody>
</table>

**Fig. 4-1  Power losses**
5. **LIFETIME EXPECTANCY AND MTBF**

The redundancy module has two input channels which are completely independent from each other. Each control circuit, auxiliary voltage source, or other circuitry in the module are designed separately for each input. The dual input redundancy module can be considered as two single redundancy modules combined together in one housing. The only common point is the circuit trace that ties the two separate circuits together at the output.

The MTBF figures below are for the entire dual input module. If the MTBF number of only one path is needed, simply double the value from the table.

The redundancy module does not have electrolytic capacitors included. Therefore, the lifetime expectancy is extremely high.

<table>
<thead>
<tr>
<th>Input / output current conditions</th>
<th>Input: 2x5A</th>
<th>Output: 10A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifetime expectancy</strong> *)</td>
<td>min.</td>
<td>25 years</td>
</tr>
<tr>
<td></td>
<td>min.</td>
<td>25 years</td>
</tr>
<tr>
<td><strong>MTBF</strong>)  SN 29500, IEC 61709</td>
<td>84 868 000h</td>
<td>at 24V 40°C</td>
</tr>
<tr>
<td></td>
<td>125 266 000h</td>
<td>at 24V 25°C</td>
</tr>
<tr>
<td>**MTBF **)  MIL HDBK 217F</td>
<td>71 454 000h</td>
<td>at 24V and 40°C (Ground Benign GB40)</td>
</tr>
<tr>
<td></td>
<td>81 453 000h</td>
<td>at 24V and 25°C (Ground Benign GB25)</td>
</tr>
</tbody>
</table>

*) The *Lifetime expectancy* shown in the table indicates the minimum operating hours (service life).

**) MTBF stands for **Mean Time Between Failure**, which is calculated according to statistical device failures, and indicates reliability of a device. It is the statistical representation of the likelihood of a unit to fail and does not necessarily represent the life of a product.

The MTBF figure is a statistical representation of the likelihood of a device to fail. A MTBF figure of e.g. 1 000 000h means that statistically one unit will fail every 100 hours if 10 000 units are installed in the field. However, it can not be determined if the failed unit has been running for 50 000h or only for 100h.
6. TERMINALS AND WIRING

Input and output

<table>
<thead>
<tr>
<th>Type</th>
<th>Bi-stable, quick-connect spring clamp terminals. IP20 Finger safe construction. Suitable for field- and factory installation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid wire</td>
<td>0.3-4mm²</td>
</tr>
<tr>
<td>Stranded wire</td>
<td>0.3-2.5mm²</td>
</tr>
<tr>
<td>American Wire Gauge</td>
<td>26-12 AWG</td>
</tr>
<tr>
<td>Max. wire diameter</td>
<td>2.8mm (including ferrule)</td>
</tr>
<tr>
<td>Wire stripping length</td>
<td>6mm / 0.25inch</td>
</tr>
<tr>
<td>Pull-out force</td>
<td>10AWG:80N, 12AWG:60N, 14AWG:50N, 16AWG:40N (according to UL486E)</td>
</tr>
</tbody>
</table>

Instructions:

a) Use appropriate copper cables that are designed for minimum operating temperatures of:
   - 60°C for ambient up to 45°C and
   - 75°C for ambient up to 60°C and
   - 90°C for ambient up to 70°C minimum.

b) Follow national installation codes and installation regulations!

c) Ensure that all strands of a stranded wire enter the terminal connection!

d) Ferrules are allowed, but not required.

e) Do not connect or disconnect the wires from the terminals below -25°C (-13°F).
7. **FUNCTIONAL DIAGRAM**

![Functional Diagram](image)

8. **FRONT SIDE AND USER ELEMENTS**

![Front Side](image)

- **A** Output terminal
- **B** Input terminals for input 1
- **C** Input terminals for input 2
9. EMC

The redundancy module is suitable for applications in industrial environment as well as in residential, commercial and light industry environment without any restrictions. A detailed EMC report is available on request.

**EMC Immunity**

According generic standards: EN 61000-6-1 and EN 61000-6-2

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Standard</th>
<th>Voltage</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge</td>
<td>EN 61000-4-2</td>
<td>8kV</td>
<td>Criterion A</td>
</tr>
<tr>
<td>Contact discharge</td>
<td></td>
<td>15kV</td>
<td>Criterion A</td>
</tr>
<tr>
<td>Air discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electromagnetic RF field</td>
<td>EN 61000-4-3</td>
<td>80MHz-2.7GHz</td>
<td>10V/m</td>
</tr>
<tr>
<td>Fast transients (Burst)</td>
<td>EN 61000-4-4</td>
<td>Input lines</td>
<td>2kV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Output lines</td>
<td>2kV</td>
</tr>
<tr>
<td>Surge voltage on input lines</td>
<td>EN 61000-4-5</td>
<td>+ / – → DIN rail</td>
<td>1kV</td>
</tr>
<tr>
<td>Surge voltage on output line</td>
<td>EN 61000-4-5</td>
<td>+ / – → DIN rail</td>
<td>1kV</td>
</tr>
<tr>
<td>Conducted disturbance</td>
<td>EN 61000-4-6</td>
<td>0.15-80MHz</td>
<td>10V</td>
</tr>
<tr>
<td>Power-frequency magnetic field</td>
<td>EN 61000-4-8</td>
<td>50Hz</td>
<td>30A/m</td>
</tr>
</tbody>
</table>

**Criterions:**

A: Redundancy module shows normal operation behavior within the defined limits.

**Notes:**

*) A test is not applicable according to EN 61000-6-2, since the device does not contain components susceptible to magnetic fields, e.g. hall elements, electrodynamic microphones, etc.

**EMC Emission**

According generic standards: EN 61000-6-3 and EN 61000-6-4

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Standard</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted emission</td>
<td>IEC/CISPR 16-1-2, IEC/CISPR 16-2-1</td>
<td>B, input lines *)</td>
</tr>
<tr>
<td>Conducted emission</td>
<td>IEC/CISPR 16-1-2, IEC/CISPR 16-2-1</td>
<td>B, output lines *)</td>
</tr>
<tr>
<td>Radiated emission</td>
<td>EN 55011, EN 55032</td>
<td>B</td>
</tr>
</tbody>
</table>

This device complies with FCC Part 15 rules.

Operation is subjected to following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

*) Provided, that power sources connected on the inputs fulfill the class B requirements too.
10. ENVIRONMENT

Operational temperature *) -40°C to +70°C (-40°F to 158°F)  Reduce output power above +60°C
Output derating 0.25A/°C 60-70°C (140°F to 158°F), see
Storage temperature -40 to +85°C (-40°F to 185°F) for storage and transportation
Humidity **) 5 to 95% r.H.  IEC 60068-2-30

Vibration sinusoidal (***) 2-17.8Hz: ±1.6mm  17.8-500Hz: 2g  2 hours / axis
Shock (***) 15g 6ms, 10g 11ms  3 bumps / direction  18 bumps in total  IEC 60068-2-6

Altitude 0 to 2000m (0 to 6560ft) without any restrictions
Altitude derating 0.7A/1000m or 5°C/1000m > 2000m (6500ft), see Fig. 10-2

Over-voltage category not applicable The concept of the overvoltage category is
used for equipment energized directly from the low voltage mains (IEC 60664-1 §4.3.3.2.1).

Degree of pollution 2 IEC 62103, EN 50178, not conductive

*) Operational temperature is the same as the ambient temperature and is defined as the air temperature 2cm below the unit.
**) Do not energize while condensation is present
***) Tested in combination with DIN rails according to EN 60715 with a height of 15mm and a thickness of 1.3mm and standard mounting orientation.

Fig. 10-1  Output current vs. ambient temp.

Fig. 10-2  Output current vs. altitude

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All parameters are specified at 24V, 10A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted
11. PROTECTION FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output over-current protection</td>
<td>not included</td>
<td></td>
</tr>
<tr>
<td>Reverse input polarity protection</td>
<td>included</td>
<td>unit does not start when input voltage is reversed</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
<td>EN/IEC 60529</td>
</tr>
<tr>
<td>Penetration protection</td>
<td>&gt; 2.5mm</td>
<td>e.g. screws, small parts</td>
</tr>
<tr>
<td>Over-temperature protection</td>
<td>not included</td>
<td></td>
</tr>
<tr>
<td>Input transient protection</td>
<td>not included</td>
<td></td>
</tr>
<tr>
<td>Output transient protection</td>
<td>not included</td>
<td></td>
</tr>
<tr>
<td>Internal input fuse</td>
<td>not included</td>
<td></td>
</tr>
</tbody>
</table>

12. SAFETY FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input / output separation</td>
<td>no galvanic separation 200V epitaxial diode between input and output</td>
</tr>
<tr>
<td>Safety level of output voltage</td>
<td>The output voltage is regarded to be SELV (EN 60950-1) or PELV (EN 60204-1, EN 50178, IEC 60364-4-41) if the input voltage fulfills the requirements for a SELV source or PELV source.</td>
</tr>
<tr>
<td>Class of protection</td>
<td>III plastic housing, PE connection not required</td>
</tr>
</tbody>
</table>
13. **Approved, Fulfilled or Tested Standards**

**UL 508**
- UL Certificate
  - Listed equipment for category NMTR - Industrial Control Equipment
  - Applicable for US and Canada
  - E-File: E198865

**IEC 60950-1**
- CB Scheme Certificate
  - General safety requirements for Information Technology Equipment (ITE)

**UL 60950-1**
- UL Certificate
  - Recognized component for category QGQ - Information Technology Equipment (ITE)
  - Applicable for US and Canada
  - E-File: E137006

**ATEX**
- Agency Certificate (Bureau Veritas)
  - EN 60079-0 Explosive atmospheres - General requirements
  - EN 60079-7 Equipment protection by type of protection "e"
  - Certificate: EPS 11 ATEX 1 312 X
  - Temperature Code: T4
  - Type of Protection: ec

**IECEx**
- IECEx Certificate
  - IEC 60079-0 Explosive atmospheres - General requirements
  - IEC 60079-7 Equipment protection by type of protection "e"
  - Certificate: IECEx EPS 12.0032X
  - Temperature Code: T4
  - Type of Protection: ec

**Class I Div 2**
- CSA Certificate
  - Power Supplies for Hazardous Location
  - Applicable for Canada and US
  - CSA Class: 5318-01 (Canada), 5318-81 (USA)
  - Temperature Code: T4
  - Groups: A, B, C and D

**Marine (DNV)**
- DNV Certificate
  - DNV Type approved product
  - Certificate: TAA00002JT
  - Temperature: Class B
  - Humidity: Class B
  - Vibration: Class C
  - EMC: Class A
  - Enclosure: Class A

**Marine (ABS)**
- ABS Design Assessment Certificate
  - ABS (American Bureau of Shipment) assessed product
  - Certificate: 17-HG1599236-PDA

**IEC 60068-2-60**
- Manufacturer's Declaration (Online Document)
  - Environmental Tests, Flowing Mixed Gas Corrosion Test
  - Test Ke - Method 4
  - H2S: 10ppb
  - NO2: 200ppb
  - Cl2: 10ppb
  - SO2: 200ppb
  - Test Duration: 3 weeks, which simulates a service life of 10 years.

---

All parameters are specified at 24V, 10A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.
## 14. Regulatory Product Compliance

| EU Declaration of Conformity | The CE mark indicates conformance with the - EMC directive  
- ATEX directive  
- RoHS directive |
|-----------------------------|-------------------------------------------------|
| REACH Directive             | Manufacturer’s Statement  
EU-Directive regarding the Registration, Evaluation, Authorization and Restriction of Chemicals |
| WEEE Directive              | Manufacturer’s Statement  
EU-Regulation on Waste Electrical and Electronic Equipment  
Registered in Germany as business to business (B2B) products. |
| EAC TR Registration         | EAC Certificate  
EAC EurAsian Conformity - Registration Russia, Kazakhstan and Belarus  
8504408200, 8504409000 |
15. PHYSICAL DIMENSIONS AND WEIGHT

<table>
<thead>
<tr>
<th>Weight</th>
<th>140g / 0.31lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN rail</td>
<td>Use 35mm DIN rails according to EN 60715 or EN 50022 with a height of 7.5 or 15mm. The DIN rail depth must be added to the unit depth (91mm) to calculate the total required installation depth.</td>
</tr>
<tr>
<td>Installation clearances</td>
<td>See chapter 2</td>
</tr>
</tbody>
</table>

16. ACCESSORIES

**DIN rail bracket for wall or panel mount:**
A suitable DIN rail bracket is available on request.
17. APPLICATION NOTES

17.1. RECOMMENDATIONS FOR REDUNDANCY

Recommendations for the configuration of redundant power systems:
- Use separate input fuses for each power supply.
- Use three-phase power supplies to gain functional safety if one phase fails.
- When single-phase power supplies are utilized connect them to different phases or mains circuits if possible.
- Set the power supply in “Parallel-Use” mode if this feature is available.
- It is desirable to set the output voltages of all power supplies to the same value.

17.2. INDUCTIVE AND CAPACITIVE LOADS

The unit is designed to supply any kind of loads, including unlimited capacitive and inductive loads.

17.3. EXAMPLE: 1+1 REDUNDANCY

1+1 Redundancy up to 2.1A requires two ML50.100 power supplies (each 2.1A output current) and one MLY02.100 redundancy module.

Note: Use separate mains systems for each power supply whenever it is possible.
17.4. **EXAMPLE: N+1 REDUNDANCY**

N+1 Redundancy up to 6.3A requires four ML50.100 power supplies (each 2.1A output current) and two MLY02.100 redundancy modules.

Fig. 17-2  *Wiring diagram, N+1 Redundancy, 6.3A output current*

**Note:** Use separate mains systems for each power supply whenever it is possible.

17.5. **EXAMPLE: BATTERY BACK-UP**

A battery back-up requires one power supply and one MLY02.100 redundancy module.

**Please note:**
Set output voltage of power supply to 26.5Vdc minimum to ensure, that the load current is delivered from the power supply and not from charger (battery). Use a fuse between battery and MLY02.100!

Fig. 17-3  *Wiring diagram, 10A Battery back-up*
17.6. MOUNTING ORIENTATIONS

Mounting orientations other than input terminals on the bottom and output on the top require a reduction in continuous output power or a limitation in the maximum allowed ambient temperature.

Fig. 17-4
Mounting Orientation A (Standard orientation)

Fig. 17-5
Mounting Orientation B (Upside down)

Fig. 17-6
Mounting Orientation C (Table-top mounting)

Fig. 17-7
Mounting Orientation D (Horizontal cw)

Fig. 17-8
Mounting Orientation E (Horizontal ccw)

All parameters are specified at 24V, 10A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.