**GENERAL DESCRIPTION**

The YR2.DIODE is a 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 10A output current and one output, which can carry nominal currents up to 20A. The module is suitable for power supplies with constant current overload behavior as well as any kind of “Hiccup” overload behavior.

The YR2.DIODE is the perfect solution to use in a redundant system, if the power supply itself is equipped with a DC-OK signal (e.g.: DIMENSION Q-Series). In addition to the YR2.DIODE is the YRM2.DIODE which has a monitoring circuitry included. LEDs and relay contacts signal when one of the two DC-input voltages is not in range due to a non-functioning power supply.

Another interesting application for this redundancy module is to separate sensitive loads from non-sensitive loads. This avoids the distortion of the power quality for the sensitive loads which can cause controller failures.

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>Input voltage</td>
<td>DC 12 - 48V ±25%</td>
</tr>
<tr>
<td>Input voltage range</td>
<td>9 - 60Vdc</td>
</tr>
<tr>
<td>Input current</td>
<td>2x 0 - 10A Continuous</td>
</tr>
<tr>
<td></td>
<td>2x 10 - 16A Up to 5 seconds</td>
</tr>
<tr>
<td>Output current</td>
<td>20A Continuous, &lt;60°C</td>
</tr>
<tr>
<td></td>
<td>15A Continuous, &lt;70°C</td>
</tr>
<tr>
<td></td>
<td>32A Up to 5s, &lt;70°C</td>
</tr>
<tr>
<td></td>
<td>max. 25A In overload or short circuit mode</td>
</tr>
<tr>
<td>Input to output voltage drop</td>
<td>typ. 780mV At 2x5A input</td>
</tr>
<tr>
<td></td>
<td>typ. 850mV At 2x10A input</td>
</tr>
<tr>
<td>Power losses</td>
<td>typ. 0W At no load</td>
</tr>
<tr>
<td></td>
<td>typ. 7.8W At 2x5A input</td>
</tr>
<tr>
<td></td>
<td>typ. 17W At 2x10A input</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40°C to +70°C</td>
</tr>
<tr>
<td>Size (WxHxD)</td>
<td>32x124x102mm Without DIN rail</td>
</tr>
<tr>
<td>Weight</td>
<td>290g / 0.64lb</td>
</tr>
</tbody>
</table>

1) R.M.S. currents at voltages below 6Vdc.

**ORDER NUMBERS**

- **Redundancy Module**  
  - YR2.DIODE DC 12-48V

- **Accessory**  
  - ZM1.WALL Wall/panel mount bracket
  - ZM11.SIDE Side mount bracket

**MARKINGS**

- UL 508
- UL 60950-1
- IEC 60950-1
- ATEX Class I Div 2
- Marine

Mar. 2021 / Rev. 1.5 DS-YR2.DIODE-EN
All parameters are specified at 24V, 20A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.
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The information given in this document is correct to the best of our knowledge and experience at the time of publication. If not expressly agreed otherwise, this information does not represent a warranty in the legal sense of the word. As the state of our knowledge and experience is constantly changing, the information in this data sheet is subject to revision. We therefore kindly ask you to always use the latest issue of this document (available under www.pulspower.com). No part of this document may be reproduced or utilized in any form without our prior permission in writing.

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.

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 10A power supplies are needed to achieve a 10A 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 40A redundant system, five 10A 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.

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 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 surfaces 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 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.

A PE (ground) connection is not required. However, connecting the chassis ground terminal to ground can be beneficial to gain a high EMI immunity.

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 6000m (19685ft). See additional requirements in the product datasheet for use above 2000m (6560ft).

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.

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All parameters are specified at 24V, 20A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.
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 IIC 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>Nominal</th>
<th>Voltage Drop, Input to Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>2</td>
<td>Voltage drop, input to output</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>1</td>
<td>typ. 0.78V at 2x5A, see Fig. 3-1</td>
</tr>
<tr>
<td>Input voltage</td>
<td>DC 12-48V ±25%</td>
<td>typ. 0.85V at 1x10A, see Fig. 3-2</td>
</tr>
<tr>
<td>Input voltage range</td>
<td>9-60Vdc</td>
<td>typ. 0.85V at 2x10A, see Fig. 3-1</td>
</tr>
<tr>
<td>Voltage drop, input to output</td>
<td>typ. 0.78V</td>
<td>at 2x5A, see Fig. 3-1</td>
</tr>
<tr>
<td>Input current</td>
<td>nom. 2x 0-10A</td>
<td>continuous, see note 1</td>
</tr>
<tr>
<td>Input current</td>
<td>nom. 1x 0-20A</td>
<td>continuous, see note 1</td>
</tr>
<tr>
<td>Input current</td>
<td>nom. 2x 10-16A</td>
<td>up to 5 seconds</td>
</tr>
<tr>
<td>Peak input current</td>
<td>max. 150A</td>
<td>for maximum 10ms per input</td>
</tr>
<tr>
<td>Output current</td>
<td>nom. 20A</td>
<td>continuous</td>
</tr>
<tr>
<td>Output current</td>
<td>nom. 20-32A</td>
<td>up to 5 seconds</td>
</tr>
<tr>
<td>Output current</td>
<td>max. 25A</td>
<td>at continuous overload or short circuit, see note 2</td>
</tr>
<tr>
<td>Reverse current</td>
<td>max. 2mA</td>
<td>per input, -40°C to +60°C</td>
</tr>
<tr>
<td>Reverse current</td>
<td>max. 200Vdc</td>
<td>voltage applied to the output, continuously allowed</td>
</tr>
</tbody>
</table>

Note 1: Each input can be loaded up to 20A. 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 25A. Check the short-circuit current of the power sources and if the power source can deliver more than 25A together, use an appropriate fuse on the output.
Fig. 3-1  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. 3-2  Input to output voltage drop when only one input draws current

4. POWER LOSSES

| DC 24V | Power losses | typ. | 7.8W | input: 2x5A |
|        |              | typ. | 8.5W | input: 1x10A |
|        |              | typ. | 17.0W| input: 2x10A |

Standby power losses

|       | typ. | 0W | at no output current |

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: 2x10A</th>
<th>Output: 20A</th>
<th>Input: 2x5A</th>
<th>Output: 10A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime expectancy *)</td>
<td>min. 25 years</td>
<td>25 years</td>
<td>min. 25 years</td>
<td>25 years</td>
</tr>
<tr>
<td>MTBF **) SN 29500, IEC 61709</td>
<td>46 500 000h at 24V and 40°C</td>
<td>55 700 000h at 24V 40°C</td>
<td>70 000 000h at 24V and 25°C</td>
<td>84 000 000h at 24V 25°C</td>
</tr>
<tr>
<td>MTBF **) MIL HDBK 217F</td>
<td>36 200 000h at 24V and 40°C (Ground Benign GB40)</td>
<td>43 500 000h at 24V 40°C (Ground Benign GB40)</td>
<td>41 100 000h at 24V and 25°C (Ground Benign GB25)</td>
<td>49 300 000h at 24V 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

<table>
<thead>
<tr>
<th>Input and output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Quick-connect spring clamp terminals.</td>
</tr>
<tr>
<td>IP20 Finger safe construction.</td>
</tr>
<tr>
<td>Suitable for field- and factory installation.</td>
</tr>
<tr>
<td>Shipped in open position.</td>
</tr>
<tr>
<td>Solid wire</td>
</tr>
<tr>
<td>Stranded wire</td>
</tr>
<tr>
<td>American Wire Gauge</td>
</tr>
<tr>
<td>Wire diameter</td>
</tr>
<tr>
<td>Wire stripping length</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.

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

1. Insert the wire
2. Snap the lever

To disconnect wire: same procedure vice versa
7. **FUNCTIONAL DIAGRAM**

![Functional diagram](image)

8. **FRONT SIDE AND USER ELEMENTS**

![Front side](image)

- **A** Output terminal
- **B** Chassis ground terminal
  - Connection of the chassis to ground is optional and not required since the unit fulfills the requirements according to protection class III.
- **C** Input terminals for input 1
- **D** 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.

<table>
<thead>
<tr>
<th>EMC Immunity</th>
<th>According generic standards: EN 61000-6-1 and EN 61000-6-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge</td>
<td>EN 61000-4-2 Contact discharge Air discharge</td>
</tr>
<tr>
<td>Electromagnetic RF field</td>
<td>EN 61000-4-3 80MHz-2.7GHz</td>
</tr>
<tr>
<td>Fast transients (Burst)</td>
<td>EN 61000-4-4 Input lines Output lines</td>
</tr>
<tr>
<td>Surge voltage on input lines</td>
<td>EN 61000-4-5 +/- Chassis ground</td>
</tr>
<tr>
<td>Surge voltage on output lines</td>
<td>EN 61000-4-5 +/- Chassis ground</td>
</tr>
<tr>
<td>Conducted disturbance</td>
<td>EN 61000-4-6 0.15-80MHz</td>
</tr>
<tr>
<td>Power-frequency magnetic field</td>
<td>EN 61000-4-8 50Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria:</th>
<th>criterion A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:</td>
<td>Redundancy module shows normal operation behavior within the defined limits.</td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
</tr>
<tr>
<td>*)</td>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMC Emission</th>
<th>According generic standards: EN 61000-6-3 and EN 61000-6-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted emission</td>
<td>IEC/CISPR 16-1-2, IEC/CISPR 16-2-1 Class B, input lines *)</td>
</tr>
<tr>
<td>Radiated emission</td>
<td>EN 55011, EN 55032 Class 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 de-rating 0.5A/°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: g 2 hours / axis IEC 60068-2-6
Shock ***) 30g 6ms, 20g 11ms 3 bumps / direction IEC 60068-2-27
18 bumps in total
Altitude 0 to 2000m (0 to 6560ft) without any restrictions
2000 to 6000m (6560 to 20000ft) reduce output power or ambient temperature, see Fig. 10-2
Altitude de-rating 1.25A/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
11. PROTECTION FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output over-current protection</td>
<td>not included</td>
</tr>
<tr>
<td>Reverse input polarity protection</td>
<td>included, unit does not start when input voltage is reversed</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20, EN/IEC 60529</td>
</tr>
<tr>
<td>Penetration protection</td>
<td>&gt; 3.6mm, e.g. screws, small parts</td>
</tr>
<tr>
<td>Over-temperature protection</td>
<td>not included</td>
</tr>
<tr>
<td>Input transient protection</td>
<td>not included</td>
</tr>
<tr>
<td>Output transient protection</td>
<td>included, see EMC section</td>
</tr>
<tr>
<td>Internal input fuse</td>
<td>not included</td>
</tr>
</tbody>
</table>

12. SAFETY FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input / output separation</td>
<td>Functional isolation, no galvanic separation</td>
</tr>
<tr>
<td></td>
<td>200V epitaxial diode between input and output</td>
</tr>
<tr>
<td>Input, output to chassis ground</td>
<td>Basic isolation</td>
</tr>
<tr>
<td>separation</td>
<td></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, IEC 60364-4-41) if the input voltage fulfils the requirements for a SELV source or PELV source.</td>
</tr>
<tr>
<td>Class of protection</td>
<td>III, PE (Protective Earth) or chassis connection not required</td>
</tr>
<tr>
<td>PE resistance</td>
<td>&lt; 0.1Ohm, between housing and chassis-ground terminal</td>
</tr>
</tbody>
</table>

13. DIELECTRIC STRENGTH

The input and output voltages have the same reference, are floating and have no ohmic connection to ground.

Type and factory tests are conducted by the manufacturer. Field tests may be conducted in the field using the appropriate test equipment which applies the voltage with a slow ramp (2s up and 2s down). Connect input/output terminals together before conducting the test.

When testing, set the cut-off current settings to the value in the table below.

<table>
<thead>
<tr>
<th>Type test</th>
<th>60s</th>
<th>500Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory test</td>
<td>5s</td>
<td>500Vdc</td>
</tr>
<tr>
<td>Field test</td>
<td>5s</td>
<td>500Vdc</td>
</tr>
<tr>
<td>Cut-off current setting</td>
<td>&gt; 2mA</td>
<td></td>
</tr>
</tbody>
</table>
## 14. Approvals and Fulfilled Standard

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

### IEC 60950-1
- **IECEE 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

### 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

### ATEX
- **Agency Certificate (Bureau Veritas)**
  - EN 60079-0 Explosive atmospheres - General requirements
  - EN 60079-7, EN 60079-15 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, IEC 60079-15 Equipment protection by type of protection "e"
  - Certificate: IECEx EPS 12.0032 X
  - Temperature Code: T4
  - Type of Protection: ec

### Marine (DNV GL)
- **DNV-GL Certificate**
  - DNV-GL Type approved product
  - Certificate: TAA00002JT
  - Temperature: Class D
  - 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-PD

### IEC 60068-2-60
- **Manufacturer’s Declaration (Online Document)**
  - Environmental Tests, Flowing Mixed Gas Corrosion Test
  - Test Ke - Method 4
  - H2S: 10ppb
  - NO2: 200ppb
  - CI2: 10ppb
  - SO2: 200ppb
  - Test Duration: 3 weeks, which simulates a service life of at least 10 years.
YR2.DIODE

Y-Series
DC12-48V, 20A, Dual Redundancy Module

Mar. 2021 / Rev. 1.5 DS-YR2.DIODE-EN
All parameters are specified at 24V, 20A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted

15. REGULATORY COMPLIANCE

EU Declaration of Conformity
The CE mark indicates conformance with the
- EMC directive
- RoHS directive
- ATEX 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

Manufacturer’s Declaration (Online Document)
Airborne Contaminants Corrosion Test
Severity Level: G3 Harsh
H2S: 100ppb
NOx: 1250ppb
Cl2: 20ppb
SO2: 300ppb
Test Duration: 3 weeks, which simulates a service life of at least 10 years

VDMA 24364
Paint Wetting Impairment Substances Test (or LABS-Test)
Tested for Zone 2 and test class C1 according to VDMA 24364-C1-L/W
for solvents and water-based paints

Manufacturer’s Declaration (Online Document)
Airborne Contaminants Corrosion Test
Severity Level: G3 Harsh
H2S: 100ppb
NOx: 1250ppb
Cl2: 20ppb
SO2: 300ppb
Test Duration: 3 weeks, which simulates a service life of at least 10 years

ISA-71.04-1985
Corrosion
G3-ISA-71.04

VDMA 24364
LABS
VDMA 24364-C1-L/W

15/22
16. Physical Dimensions and Weight

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>32mm 1.26”</td>
</tr>
<tr>
<td>Height</td>
<td>124mm 4.88”</td>
</tr>
<tr>
<td>Depth</td>
<td>102mm 4.02”</td>
</tr>
</tbody>
</table>

The DIN-rail height must be added to the unit depth to calculate the total required installation depth.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>290g / 0.64lb</td>
</tr>
</tbody>
</table>

DIN-Rail

Use 35mm DIN-rails according to EN 60715 or EN 50022 with a height of 7.5 or 15mm.

Housing material

- Body: Aluminium alloy
- Cover: zinc-plated steel

Installation clearances

See chapter 2

Fig. 16-1 Front view

Fig. 16-2 Side view

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All parameters are specified at 24V, 20A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted
17. ACCESSORIES

**ZM1.WALL  Wall mounting bracket**
This standard bracket is used to mount the YR40 redundancy module onto a flat surface without utilizing a DIN-Rail.

**ZM11.SIDE  Side mounting bracket**
This bracket is used to mount the YR80 redundancy module sideways with or without utilizing a DIN-Rail. The two aluminum brackets and the black plastic slider of the unit have to be detached, so that the steel brackets can be mounted. For sideway DIN-rail mounting, the removed aluminum brackets and the black plastic slider need to be mounted on the steel bracket.
18. APPLICATION NOTES

18.1. 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 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.

18.2. INDUCTIVE AND CAPACITIVE LOADS

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

18.3. EXAMPLE: 1+1 REDUNDANCY UP TO 10A

1+1 Redundancy up to 10A requires two 10A power supplies and one YR2.DIODE redundancy module.

Fig. 18-1 Wiring diagram, 1+1 Redundancy, 10A output current

Note: Use separate mains systems for each power supply whenever it is possible.
18.4. EXAMPLE: N+1 REDUNDANCY UP TO 30A

N+1 Redundancy up to 30A requires four 10A power supplies and two YR2.DIODE redundancy modules.

Fig. 18-2  Wiring diagram, n+1 Redundancy, 30A output current

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

18.5. EXAMPLE: BATTERY BACK-UP

A battery back-up with 10A requires one 10A power supply and one YR2.DIODE 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 YR2.DIODE!
18.6. Example: Redundancy for Controls

The example shows a cost-effective solution to get redundant power for a PLC or controller system. In many cases, two power supplies are used: one for the demanding loads and another one for the controls and sensitive loads. The power supply for the demanding loads can be used as a redundant source to supply the controls.

Traditional approach:

- PS1 → Load
- PS2 → PLC

Improved approach:

- PS1 → Load
- PS2 → YR2 → PLC

Fig. 18-4  Wiring diagram, redundancy for sensitive loads

Note: Use separate mains systems for each power supply whenever it is possible.
18.7. **Example: Decoupling of Branches**

Buffer energy supplied from a DC-UPS or buffer module is not wasted in “power branches”.

**Please note:**
Set output voltage of the power supply to a level that the buffer unit or DC-UPS will not start unexpected. Take the voltage drop of the YR2.DIODE into account.

![Fig. 18-5 Wiring diagram, decoupling of buffered branches](image)

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

18.8. **Use in a Tightly Sealed Enclosure**

When the redundancy module is installed in a tightly sealed enclosure, the temperature inside the enclosure will be higher than outside. The inside temperature defines the ambient temperature for the redundancy module.

Results from such an installation:

- Power supply is placed in the middle of the box, no other heat producer inside the box
- Enclosure: Rittal Typ IP66 Box PK 9516 100, plastic, 110x180x165mm
- Load: 24V, 16A; (=80%) load is placed outside the box
- Input: 24Vdc
- Temperature inside enclosure: 57.8°C (in the middle of the right side of the power supply with a distance of 2cm)
- Temperature outside enclosure: 24.6°C
- Temperature rise: 33.2K
18.9. **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. 18-6**
Mounting Orientation A (Standard orientation)

**Fig. 18-7**
Mounting Orientation B (Upside down)

**Fig. 18-8**
Mounting Orientation C (Table-top mounting)

**Fig. 18-9**
Mounting Orientation D (Horizontal cw)

**Fig. 18-10**
Mounting Orientation E (Horizontal ccw)