SITOP power supply

SITOP PSE200U

Electronic protection of 24 V DC load circuits with fast fault detection
The SITOP PSE200U selectivity module distributes the load current across several 24 V DC load circuits and monitors them reliably for overload and short-circuit conditions. The electronics permit brief current peaks caused, for example, by high inrush currents, but isolate 24 V DC load circuits in the event of an extended overload. This is ensured even on high-resistance lines and in the case of "creeping" short-circuits. In such cases, miniature circuit breakers fail to trip, or trip too late, even if the power supply unit could deliver the required tripping current. The SITOP PSE200U continues to supply 24 V DC to the load circuits not affected by an overload – a feature which avoids a possible total system failure. The single-channel signaling version facilitates fast, channel-specific fault localization via just one digital input at the PLC.

**Miniature circuit breakers with high current consumption**

Miniature circuit breakers are often still used for the selective protection of 24 V DC load circuits. In many cases, however, when interacting with switched-mode power supply units, they do not offer reliable protection. They require several times the rated current in order to trip within a few milliseconds. Because stabilized power supplies limit their output current electronically when there is a critical overload, the tripping current is not always guaranteed. This can cause the 24-V supply to break in and the PLC to go to Stop. Even if the power supply unit could supply the current, immediate tripping is not necessarily assured, because with this high current requirement, the line resistance can no longer be neglected. It prevents the required tripping current from flowing. Therefore fast tripping is only possible up to certain cable lengths and starting from larger cable cross-sections. In addition to the line resistance, the overall circuit design (e.g. contact resistances at terminals) must be taken into consideration when configuring miniature circuit breakers.

**SITOP PSE200U - optimized for switched-mode power supply units**

The SITOP PSE200U is specially designed to protect 24 V DC individual load circuits supplied by switched-mode power supplies. Individual setting of the tripping current allows optimum adaptation to the respective load circuit. Engineering effort is minimal since the switch-off characteristic always guarantees reliable tripping – even with high line impedances that limit the short-circuit current. SITOP PSE200U reliably disconnects the faulty path as soon as the current exceeds the set value by a small amount.

**Immediate switch-off increases plant availability**

SITOP PSE200U also has another important function: The electronics continuously monitor the 24 V DC input voltage. As soon as the 24 V DC threatens to fail, the path with a higher current than the set current is disconnected immediately. All other circuits continue to be supplied without interruption. Even PLCs, which can only bridge power failures for a few milliseconds, continue to run without problems.

<table>
<thead>
<tr>
<th>Load current</th>
<th>Tripping time</th>
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<tbody>
<tr>
<td>0 %</td>
<td>0.0 sec</td>
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<tr>
<td>50 %</td>
<td>0.1 sec</td>
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<tr>
<td>100 %</td>
<td>5.0 sec</td>
</tr>
<tr>
<td>150 %</td>
<td>10.0 sec</td>
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Response with current requirements per output circuit...

- From 0 A up to set value (I/I\_threshold = 100 %)
  - no shutdown
- From set value up to 150 %
  - shutdown after approx. 5 s
- Above 150 % of set value
  - current limiting to approx. 150 % for typ. 100 ms, then shutdown
- Above set value with simultaneous collapse of supply voltage below 20 V DC
  - immediate shutdown

1) Versions with NEC Class 2: 110%
Your benefits at a glance

- Reliable tripping regardless of cable lengths or cross-sections
- Four 24 V DC load circuits per module, with adjustable output current range of 0.5 to 3 A or 3 to 10 A
- Versions with power limitation of the outputs to 100 VA according to NEC Class 2
- Easy configuration thanks to individual setting of maximum output current using potentiometers
- Two versions for remote diagnostics: common signaling contact or single-channel signaling
- Evaluation of individual channels via free of charge SIMATIC S7 or SIMOTION function blocks or LOGO! software
- Library for visualization in SIMATIC PCS 7
- Remote reset possible from a central location
- 3-color LEDs for fast on-site fault localization
- Simple commissioning thanks to manual switch on/off of load circuits using reset button
- Voltage measuring points for output currents (1 V = 1 A), disconnecting of load circuit is not required
- Sequential connection delay of individual 24 V DC load circuits reduces total inrush current
- Sealable transparent cover protects against maladjustment of tripping currents and sequential delay

As electronic monitor, the SITOP PSE200U selectivity module switches faulty 24 V DC load circuits off immediately, and continues to supply the other 24 V DC load circuits without any interruption.

SITOP PSE200U - all connections, functions and options at a glance

Outputs 1-4,
Versions
0.5...3 A/ 3...10 A/
0.5...3 A according to NEC Class 2

Common signaling contact or single-channel signaling
Remote reset (24-V signal)
Device identification label (not included in scope of delivery)
3-color status LED per output:
- green: connected
- orange: manually disconnected
- red: disconnected due to overload
Switch for setting the delay time to 0, 25, 100 ms or load-optimized
Sealable transparent cover

Power supply unit
Selectivity module
PLC
HMI
Actuators
Sensors
24 V DC
24-V DC supply
O-V supply
Labeling field per output
Potentiometer for setting the tripping current
Pushbutton for On/Off/Reset for each output
Current monitor:
Measuring points for output current by means of voltage measurement: 1 V = 1 A
Sequential switching on reduces burden on the power supply

By switching on the outputs sequentially, the inrush current that the power supply has to provide is considerably reduced. This avoids the danger of a voltage dip which could result in disturbances within the plant. A power supply with a lower rated output current can possibly also be used. The connection delay can be set to 0 ms (all outputs simultaneously), 25 ms or 100 ms, or on a load-optimized basis. The delay time between the outputs is identical. Only if the setting “load-optimized” is selected, does the next output not switch until the previous one is below the set value.

Simple output current measurement

The selectivity module has a measuring point (MP) for each output, via which the current value at any moment is output. Because one volt corresponds to one ampere, simple voltage measurement is possible for determining the current without having to disconnect the cable. The 24 V supply of the feeder is not interrupted and the system remains completely in operation.

Fast, channel-exact diagnostics

The SITOP PSE200U module with single-channel signaling requires only one digital input for signaling the switched-off output to the controller. Evaluation is carried out using a SIMATIC S7 or SIMOTION function block, or in the LOGO! software, enabling simple integration into the diagnostics and host control or HMI systems.

The SITOP PSE200U module with single-channel signaling outputs the status of the 4 outputs cyclically by means of a serial code which can be read in by a digital input, e.g. of a PLC. Function blocks for SIMATIC S7-1500/1200/300/400, ET200 SPIET200 S for STEP 7 Classic and TIA Portal as well as for SIMOTION SCOUT and SIMOTION CPUs are available free-of-charge for the evaluation. As an application example you will also find the integration in LOGO! logic modules. Further information and downloads:

LOGO!: http://www.siemens.com/logo-application-examples

Easy visualization in the SIMATIC PCS 7 process control system is made possible by the SITOP library which contains the function blocks and faceplates for individual channel and common signaling:

## Technical specifications

<table>
<thead>
<tr>
<th>New: NEC Class 2 version</th>
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<tbody>
<tr>
<td>SITOP PSE200U with common signaling contact</td>
<td>SITOP PSE200U with single-channel signaling</td>
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### Input

- **Rated voltage** $V_{\text{in \, rated}}$: 24 V DC
- **Voltage range**: 22 ... 30 V DC
- **Input current**: 40 A max.

### Output

- **Rated voltage** $V_{\text{out \, rated}}$: Typ. $U_{\text{in}} - 0.2$ V
- **Number of outputs**: 4
- **Rated current** $I_{\text{out \, rated}}$ up to $+60 \degree$C per output: 3 A, 10 A
- **Setting range per output**: 0.5 ... 3 A, 3 ... 10 A
- **Set time delay**: 0 ms, 25 ms or 100 ms (identical between outputs) or load-optimized (as soon as the previous output is less than the set rated value)
- **Efficiency at $V_{\text{out \, rated}}, I_{\text{out \, rated}}$**: Typ. 99%

### Protection and monitoring

- **Status displays**: Three-color LED per output: green for output connected, yellow for output manually disconnected, red for output disconnected due to overload/short-circuit
- **Signal output**: Common signaling contact, changeover contact, contact rating 24 V/0.5 A
- **Protection class**: Class III
- **Degree of protection (EN 60 529)**: IP20
- **Certifications**: UR (UL 2367), cURus (UL 508, CSA C22.2 No. 107.1) cCSAus (Class I Div 2), ATEX (EN 60079-0, -15), GL 1), ABS 1), 6EP1961-2BA51/6EP1961-2BA61: NEC Class 2

### Connections

- **Input $+24$ V (load and electronics supply)**: 2 screw-type terminals for 0.5 ... 10 mm²
- **Input 0 V (electronics supply)**: 2 screw-type terminals for 0.5 ... 4 mm²
- **Outputs 1 to 4**: 1 screw-type terminal per output for 0.5 ... 4 mm²
- **Signal output**: 3 screw-type terminals for 0.5 ... 4 mm²
- **Remote reset**: 1 screw-type terminal for 0.5 ... 4 mm²

### General data

- **Emitted interference**: EN 61000-6-3, EN 55022 Class B
- **Noise immunity**: EN 61000-6-2
- **Ambient temperature range**: 0 ... +60°C (-25 to +85°C transport/storage)
- **Mounting**: DIN rail EN 60715 35 x 7.5/15
- **Dimensions (width x height x depth) in mm**: 72 x 80 x 72
- **Weight**: Approx. 170 g
- **Accessories**: Device identification label 20 mm x 7 mm, 340 units. Article No. 3RT1900-15B20

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Get more information:

More on the SITOP PSE200U selectivity module:
www.siemens.com/sitop-select

Using the SITOP Selection Tool to select the appropriate power supply:
www.siemens.com/sitop-selection-tool

Using the TIA Selection Tool to select the appropriate power supply, including add-on module:
www.siemens.com/tia-selection-tool

Operating instructions for downloading:
www.siemens.com/sitop/manuals

CAx data (2D, 3D, circuit diagram macro) as download:
www.siemens.com/sitop-cax

Find your personal contact partners at:
www.siemens.com/automation-contact

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens’ products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens’ guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit http://www.siemens.com/industrialsecurity.

Siemens’ products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer’s exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under http://www.siemens.com/industrialsecurity.