Circuit protection with monitoring function for the 24 V secondary circuit

Electronic 24 V DC circuit breakers

Modular and selective protection in plant and machinery

Reliable circuit protection allows reduction of wire cross-sections

Fast replacement using innovative connection technology

Detection of triggering cause (via IO-Link)

Current and voltage measurement in each channel (via IO-Link)

Safety on the 24 V side
As opposed to the 230 V primary side, the circuit protection in the secondary circuit is often neglected. Another issue is that in the event of a failure of the 24 V DC voltage supply standard mechanical circuit breakers often do not trigger. This may happen with long cables, for example. The electronic circuit breakers from ifm monitor the circuit ideally and, if required, disconnect reliably. Individual branch circuits can be selectively disconnected. This allows a reduction of wire cross-sections in the load circuit of the switched-mode power supplies. On the new adjustable protection modules, the tripping current can be set, allowing for optimum adaptation of the plant’s circuits to the machinery. The IO-Link version also allows evaluation of important diagnostic data.
Modular installation
The system has a modular structure and consists of a supply module to feed max. 40 A. The protection modules can be mounted side by side. This is done via a simple clip mechanism, completely without any bridges, jumpers or the like.
Easy mounting and minimised wiring complexity save cost and time. With the standard version the user can connect up to 10 and with the IO-Link version up to 8 safety modules to the head module.

Versions
In addition to the triggering mechanism, the modules feature an LED for signalling if the module has triggered, if it is active and to what extent it is utilised. By means of a pushbutton each channel can be activated, deactivated or set.
The feed module has an additional collective output to provide a warning signal if a module has triggered.

More transparency with IO-Link
The IO-Link version has the same function; there is, however, additional information about each channel:
- effective nominal current (1 byte cyclical)
- output voltage (acyclical)
- triggering counter (acyclical)
- current unit status (1 byte cyclical):
  - short circuit
  - overload
  - undervoltage
  - limit reached (80 % Iₙ)
- activation/deactivation
- reset with triggering
- reset triggering counter

Extended functions DF2101 IO-Link supply module:
- min. / max. value generation of the measured current and voltage value for each channel over any period of time
- averaging of the measured current and voltage value for each channel over any period of time
- permanent switching on of individual channels in order to ignore the cyclic data exchange (e.g. to guarantee the voltage supply of important devices during the initialisation phase). The safety function remains active.
The protection modules are available in the fixed sizes 2 A, 4 A, 6 A, 8 A and 10 A and also as adjustable version 1...10 A. The fixed current values prevent subsequent misuse by changing the max. current value. The adjustable modules enable flexible set-up.

<table>
<thead>
<tr>
<th>Inputs [V DC]</th>
<th>Nominal current [A]</th>
<th>Interface</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply module, standard</strong></td>
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<td></td>
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<tr>
<td>24, 40 A</td>
<td>–</td>
<td>–</td>
<td>DF1100</td>
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<td><strong>Protection module, standard</strong></td>
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<tr>
<td>–</td>
<td>2 x 2</td>
<td>–</td>
<td>DF1212</td>
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<tr>
<td>–</td>
<td>2 x 4</td>
<td>–</td>
<td>DF1214</td>
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<tr>
<td>–</td>
<td>2 x 6</td>
<td>–</td>
<td>DF1216</td>
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<tr>
<td>–</td>
<td>1 x 8</td>
<td>–</td>
<td>DF1208</td>
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<tr>
<td>–</td>
<td>1 x 10</td>
<td>–</td>
<td>DF1210</td>
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<tr>
<td>–</td>
<td>2 x 1...10</td>
<td>–</td>
<td>DF1220</td>
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<tr>
<td><strong>Supply module, IO-Link</strong></td>
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<tr>
<td>24, 40 A</td>
<td>–</td>
<td>IO-Link</td>
<td>DF2101</td>
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<tr>
<td>–</td>
<td>2 x 2</td>
<td>IO-Link in combination with head module</td>
<td>DF2212</td>
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<tr>
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<td>IO-Link in combination with head module</td>
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<td>1 x 8</td>
<td>IO-Link in combination with head module</td>
<td>DF2208</td>
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<tr>
<td>–</td>
<td>1 x 10</td>
<td>IO-Link in combination with head module</td>
<td>DF2210</td>
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<tr>
<td>–</td>
<td>2 x 1...10</td>
<td>IO-Link in combination with head module</td>
<td>DF2220</td>
</tr>
</tbody>
</table>

Further technical data
- Operating voltage [V DC] 24 (18...30)
- Switch-off characteristics time-current characteristics
- Fail-safe element = nominal current (e.g. 4 A = 4 A)
- Switching status indication LED multi-colour, signal contact via feeding module
- Temperature range [°C] -25...60
- Approvals UL508 listed, NEC Class2 (for DF1212 / DF1214 DF2212 / DF2224)

Accessories
- Description | Order no. |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>IO-Link connection cable, 0.5 m, M12 connector</td>
<td>E12613</td>
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<tr>
<td>IO-Link connection cable, 2 m, open end</td>
<td>E12614</td>
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</tbody>
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For further technical details please visit: ifm.com