GTEC
Transfer switch
Open transition

Description

GTEC transfer switches combine reliability and flexibility in a small, economical package for transferring loads between a utility and a generator set, or between two generators.

The microprocessor control monitors utility and emergency standby generator power. When utility power fails or is unsatisfactory, the control starts the generator, then transfers the load from the utility to the generator. When stable utility power returns, the switch automatically transfers the load back to the utility.

For genset-to-genset applications, the generator set that is connected to the utility side of the control is the lead genset. If the lead generator set goes down or is taken offline, the transfer switch starts the second generator set and transfers the load. The control can be programmed to alternate between the two generator set at a set interval up to 300 hours.

The fully integrated controller is designed for practical functionality, with LED indicators and digital push-buttons for ease of operator use.

Features

Microprocessor control: Easy-to-use, standard control. LED displays indicate transfer switch status. Pushbuttons allow operator to activate test, exercise timing and transfer mode.

Programmed transition: Open transition timing can be adjusted to completely disconnect the load from both sources for a programmed time period. Recommended for inductive loads to prevent nuisance tripping.

Advanced transfer switch mechanism: True transfer switch mechanism with break-before-make action.

Manual operation: Standard removable handle can be used to manually operate the switch after the power source has been completely disconnected.

Multi-voltage rating: The multiple selectable voltage setting is field adjustable, and allows GTEC to be applied to voltage ranging from 110V to 277V without using external transformers.

Positive interlocking: Mechanical and electrical interlocking prevent source-to-source connection through the power or control wiring.

Main contacts: Silver alloy contacts with multi-leaf arc chutes are rated for 100% load interruption. They require no routine contact maintenance and provide 100% continuous current ratings.

Easy to service: Single-plug harness connection and compatible terminal markings simplify servicing. Access space is ample. Door-mounted controls are field-programmable; no tool is required.

Complete product line: Cummins Power Generation offers a wide range of equipment, accessories and services to suit virtually any backup power application.

Warranty and service: Products are backed by a comprehensive warranty and a worldwide network of distributors with factory-trained service technicians.

Specifications sheet
40 - 2000 amp

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Transfer switch mechanism

- A powerful, economical AC solenoid operates GTEC transfer switches.
- Independent break-before-make action is used for 2-pole, 3-pole and 4-pole switches. On 4-pole/switched neutral switches, this action prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping designs.
- A mechanical interlock prevents simultaneous closing of normal and emergency contacts.
- Electrical interlocks prevent simultaneous closing signals to normal and emergency contacts and interconnection of normal and emergency sources through the control wiring.
- High-pressure silver alloy contacts resist burning and pitting. Separate arcing surfaces further protect the main contacts. Contacts are mechanically held in both normal and emergency positions for reliable, quiet operation.
- Contact wear is reduced by multiple leaf arc chutes that cool and quench the arcs. Barriers separate the phases to prevent interphase flashover. Protective covers for lugs are available.

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating</td>
<td>Up to 480VAC, 50 or 60 Hz</td>
</tr>
<tr>
<td>Arc interruption</td>
<td>Multiple leaf arc chutes provide dependable arc interruption.</td>
</tr>
<tr>
<td>Neutral bar</td>
<td>A full current-rated neutral bar is Standard on enclosed 3-pole transfer switches.</td>
</tr>
<tr>
<td>Auxiliary contacts</td>
<td>Two isolated contacts (one for each source) indicating switch position are provided for customer use. Contacts are normally open, and close to indicate connection to the source. Wired to terminal block for easy access. Rated at 5 amps continuous at 100VAC or 2.5 amps continuous at 200VAC.</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-30° C (-22° F) to 60° C (140° F)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40° C (-40° F) to 60° C (140° F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>Up to 95% at 20° C</td>
</tr>
<tr>
<td>Altitude</td>
<td>Up to 2,000 m (6,561 ft) without derating</td>
</tr>
<tr>
<td>Total transfer time (source-to-source)</td>
<td>Will not exceed 100 msec with normal voltage applied to the actuator and without programmed transition enabled.</td>
</tr>
<tr>
<td>Manual operating handle</td>
<td>Transfer switches are equipped with a removable operating handle which allows operation during servicing to facilitate troubleshooting with sources of power disconnected.</td>
</tr>
</tbody>
</table>
Microprocessor control

- Simple, easy-to-use control provides transfer switch information and operator controls
- LED lamps for source availability and source connected indication, exercise mode, and test mode. LED status lamps also provided for control set-up and configuration
- Pushbutton controls for initiating test, overriding time delays and setting exercise time
- Field-configurable for open or programmed transition
- Integral exerciser clock
- Control is prototype-tested to withstand voltage surges per EN 60947-6-1
- Gold-flashed generator start contacts

Control functions

**Under-voltage sensing:** All phases on the normal source, and single phase on generator source.
  - **Normal source pickup:** adjustable 80-95%
  - **Dropout:** adjustable 70-90% of nominal voltage
  - **Generator source pickup:** 90%
  - **Dropout:** 75% of nominal voltage
**Over-voltage sensing:** All phases on the normal source.
  - **Source pickup:** 120%
  - **Dropout:** 125%
**Under-frequency sensing:** Default setting is OFF.
  - **Generator source pickup:** 90% of nominal frequency
  - **Dropout:** 85% of nominal frequency
  - **Normal source pickup:** 80%
  - **Dropout:** 70%
**Over-frequency sensing:** Default setting is OFF
  - **Normal source pickup:** 130%
  - **Dropout:** 140%

**Genset-to-genset sensing:** Same functions as above, for lead and secondary generators.

**Exercise mode:** The control exerciser clock can be set to operate on a 7, 14, 21 or 28-day cycle with a fixed exercise period duration of 20 minutes. A convenient 12-hour offset feature offsets the exercise time by 12 hours, without having to reprogram the timer. The control can be programmed to exercise the generator with or without load.

**Test mode:** When manually or remotely activated from the control panel, the control will start the generator and run until stopped. Can be configured to test with or without load.

Transition modes

**Open transition/programmed:** Controls the time required for the device to switch from source to source, so load-generated voltages decay to a safe level before connecting to an energized source. Recommended method of dealing with significantly inductive loads to prevent nuisance tripping. Adjustable 0-10 seconds, default 0 seconds.

**Open transition/in-phase:** Initiates open transition transfer when in-phase monitor senses both sources are in phase. Operates in a break-before-make sequence. Includes ability to enable programmed transition as a back-up. If sources are not in phase within 120 seconds, the system will transfer using programmed transition.

Time-delay functions

**Engine start:** Prevents nuisance genset starts due to momentary power variation or loss. Adjustable 0-10 seconds, default 3 seconds.

**Transfer normal to emergency:** Allows genset to stabilize before application of load. Prevents power interruption if normal source variation or loss is momentary. Allows staggered transfer of loads in multiple transfer switch systems. For genset-to-genset applications, delays transfer of load from lead to secondary generator. Adjustable 0-300 seconds, default 5 seconds.

**Re-transfer emergency to normal:** Allows the utility to stabilize before re-transfer of load. Prevents needless power interruption if return of normal source is momentary. Allows staggered transfer of loads in multiple transfer switch systems. For genset-to-genset applications, delays re-transfer of load from secondary back to lead generator. Adjustable 0-30 minutes, default 10 minutes.

**Engine stop:** Maintains availability of the genset for immediate reconnection if the normal source fails shortly after transfer. Allows gradual genset cool down by running unloaded. Adjustable 0-30 minutes, default 10 minutes.

**Elevator signal relay:** Requires optional elevator signal relay (M032). Delays transfer for specified interval to prevent a power interruption during elevator operation.

Options

**Elevator signal relay (M032):** Provides relay output contacts for sending a load-disconnect warning signal to the elevator control. Transfer/re-transfer delay time is selectable for 0, 1, 2, 3, 5, 30, 120 or 300 seconds.

**Programmable exerciser clock (J030):** Provides a fully-programmable 7-day clock to provide greater flexibility in scheduling exercise periods than standard integral exerciser. Peaking function feature allows for generator operation during periods of high utility rates.

**Manual restore (S006):** Provides a key switch on the front door to allow the operator to control when the switch transfers to the available normal source.
### Electrical performance

The transfer switches listed below must be protected by either circuit breakers or fuses. The following WCR ratings are available when protecting the transfer switch with a circuit breaker or fuse. Short circuit ratings are stated in symmetrical RMS ampere.

### Fuse protection

<table>
<thead>
<tr>
<th>Transfer switch amperes</th>
<th>Overload current (make-break test)</th>
<th>Endurance cycles at current (operational performance capability)</th>
<th>WCR at 480V max with current limiting fuse</th>
<th>Max fuse, size and type</th>
</tr>
</thead>
<tbody>
<tr>
<td>40, 63</td>
<td>95 amps</td>
<td>6000 at 63 amps</td>
<td>26,000 amps</td>
<td>RT16NT-00 63 amp IEC NH Fuse type</td>
</tr>
<tr>
<td>100, 125</td>
<td>188 amps</td>
<td>6000 at 125 amps</td>
<td>26,000 amps</td>
<td>RT16NT-00 125 amp IEC NH Fuse type</td>
</tr>
<tr>
<td>160, 200, 225, 250</td>
<td>375 amps</td>
<td>6000 at 125 amps</td>
<td>38,000 amps</td>
<td>RT16NT-2 250 amp IEC NH Fuse type</td>
</tr>
<tr>
<td>350, 400, 500</td>
<td>750 amps</td>
<td>1000 at 0 amps 2000 at 500 amps</td>
<td>50,000 amps</td>
<td>RT16NT-3 500 amp IEC NH Fuse type</td>
</tr>
<tr>
<td>630, 800</td>
<td>1200 amps</td>
<td>1000 at 0 amps 2000 at 800 amps</td>
<td>55,000 amps</td>
<td>RT16NT-4 800 amp IEC NH Fuse type</td>
</tr>
<tr>
<td>1000, 1250</td>
<td>1875 amps</td>
<td>1500 at 0 amps 1500 at 1250 amps</td>
<td>65,000 amps</td>
<td>RT16NT-4 1250 amp IEC NH Fuse type</td>
</tr>
<tr>
<td>1600, 2000</td>
<td>3000 amps</td>
<td>1500 at 0 amps 500 at 2000 amps</td>
<td>120,000 amps</td>
<td>KRP-C 3000 amp Class L Fuse type</td>
</tr>
</tbody>
</table>

### Circuit breaker protection

<table>
<thead>
<tr>
<th>Transfer switch amperes</th>
<th>Max breaker rating</th>
<th>Specified Circuit breaker protection manufacturer, model and type</th>
</tr>
</thead>
</table>
| 40, 63                  | 63A                | Schneider: NSX160FTM, EZD100, NSD100F, NSD100K  
Siemens: 3VU, 3RV1, 3VT1  
ABB: Isomax S1, S2X80, Sim100 |
| 100, 125                | 125A               | Schneider: NSX160FTM, NSD160K  
Siemens: 3VL, 3VT1  
ABB: Isomax S2, Isomax S3, S3X, Sim250 |
| 160, 200, 225, 250      | 250A               | Schneider: NSX250NTM, NSD250K  
Siemens: 3VL, 3VT2  
ABB: Isomax S3, S4X, Sim250 |
| 350, 400, 500           | 500A               | Schneider: NSX630NTM, NSD630K  
Siemens: 3VL, 3VT3  
ABB: Isomax S4, S6X, Sim500 |
| 630, 800                | 800A               | Schneider: MT08, MT10, NW08  
Siemens: 3VL, 3WT, 3VT4  
ABB: Isomax S6, E1B, E1N, E1S |
| 1000, 1250              | 1250A              | Schneider: MT12, NW16  
Siemens: 3VL, 3WT, 3VT5  
ABB: Isomax S7, E2B, E2L |
| 1600, 2000              | 2000A              | Schneider: MT20, MT25, NW20, NW25  
Siemens: 3WT  
ABB: E1N, E2N, E2S, E3S |

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**Enclosures**

The transfer switch and control are mounted in a key-operated locked enclosure. Enclosures meet IEC 60947-6-1 standard. 40-500 amp switches are front-connected. 630-2000 amps are rear-connected. Standard enclosure is grey. Green is available as an option (P152).

Cable tie bars are available to relieve stress on lugs for switches smaller than 500 amps.

### Dimensions: IP32

| Amp rating | Height | Width | Door closed | Door open | Weight | Outline drawing |
|------------|--------|-------|-------------|-----------|--------|----------------|---|
|            | in | mm | in | mm | in | mm | lb | kg |
| 40, 63     | 31.4 | 800 | 23.6 | 600 | 8.8 | 226 | 31.4 | 800 | 101.4 | 46 | 0500-6004 |
| 100, 125   | 31.4 | 800 | 23.6 | 600 | 8.8 | 226 | 31.4 | 800 | 105.8 | 48 | 0500-6004 |
| 160, 200, 225, 250 | 39.3 | 1000 | 31.4 | 800 | 8.8 | 226 | 39.3 | 1000 | 125.6 | 57 | 0500-6005 |
| 350, 400, 500 | 39.3 | 1000 | 31.4 | 800 | 8.8 | 226 | 39.3 | 1000 | 143.3 | 65 | 0500-6005 |
| 630, 800   | 53.9 | 1370 | 29.2 | 742 | 24.8 | 631 | 53.0 | 1348 | 385.8 | 175 | 0500-6006 |
| 1000, 1250 | 53.9 | 1370 | 29.2 | 742 | 24.8 | 631 | 53.0 | 1348 | 405.6 | 184 | 0500-6006 |
| 1600, 2000 | 78.7 | 2000 | 39.4 | 1000 | 44.3 | 1126 | 83.7 | 2126 | 888.9 | 400 | A0281839 |

### Dimensions: IP54

<table>
<thead>
<tr>
<th>Amp rating</th>
<th>Height</th>
<th>Width</th>
<th>Door closed</th>
<th>Door open</th>
<th>Weight</th>
<th>Outline drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in</td>
<td>mm</td>
<td>in</td>
<td>mm</td>
<td>in</td>
<td>mm</td>
</tr>
<tr>
<td>40, 63</td>
<td>34.0</td>
<td>864</td>
<td>23.5</td>
<td>598</td>
<td>11.6</td>
<td>296</td>
</tr>
<tr>
<td>100, 125</td>
<td>34.0</td>
<td>864</td>
<td>23.5</td>
<td>598</td>
<td>11.6</td>
<td>296</td>
</tr>
<tr>
<td>160, 200, 225, 250</td>
<td>41.9</td>
<td>1064</td>
<td>31.6</td>
<td>804</td>
<td>11.6</td>
<td>296</td>
</tr>
<tr>
<td>350, 400, 500</td>
<td>41.9</td>
<td>1064</td>
<td>31.6</td>
<td>804</td>
<td>11.6</td>
<td>296</td>
</tr>
<tr>
<td>630, 800</td>
<td>53.9</td>
<td>1370</td>
<td>29.5</td>
<td>750</td>
<td>26.6</td>
<td>676</td>
</tr>
<tr>
<td>1000, 1250</td>
<td>53.9</td>
<td>1370</td>
<td>29.5</td>
<td>750</td>
<td>26.6</td>
<td>676</td>
</tr>
<tr>
<td>1600, 2000</td>
<td>78.9</td>
<td>2004</td>
<td>39.2</td>
<td>996</td>
<td>45.3</td>
<td>1150</td>
</tr>
</tbody>
</table>
Submittal detail: options

## Current ratings
- 40
- 63
- 100
- 125
- 160
- 200
- 225
- 250
- 350
- 400
- 500
- 630
- 800
- 1000
- 1250
- 1600
- 2000

## Voltage ratings
- R060 110 to 139
- R061 220 to 240
- R062 255 to 277
- R063 110 to 277

## Pole configuration
- A027 Poles - 2 (solid neutral)
- A028 Poles - 3 (solid neutral)
- A029 Poles - 4 (switched neutral)

## Frequency
- A044 60 Hertz
- A045 50 Hertz

## Application
- A035 Utility-to-genset
- A037 Genset-to-genset

## System Options
- A041 Single phase, 2-wire or 3-wire
- A042 Three phase, 3-wire or 4-wire

## Enclosure
- B004 Open construction: no enclosure - includes automatic transfer switch and controls (1600—2000 amp open construction not available)
- B901 IP32 general purpose indoor
- B014 IP54 general purpose outdoor
- P152 Optional paint colour: Onan green
- M048 Protective shield

## Control voltage
- M033 12V, Genset starting voltage
- M034 24V, Genset starting voltage

## Control options
- J030 Add-on programmable exercisor clock
- M032 Relay signal module
- S006 Manual restore switch

## Battery chargers
- K001 2 amps, 12/24 volts

## Auxilary relays
- Relays are factory installed. All relays provide two sets of form C (DPDT) contacts rated 5 amps at 250VAC. Relay terminals accept one 0.75 mm to two 4 mm wires per terminal.
- L101 24 VDC coil: installed, not wired (for customer use).
- L102 24 VDC coil: emergency position - relay energized when GTEC in Source 2 (emergency) position.
- L103 24 VDC coil: normal position - relay energized when GTEC in Source 1 (normal) position
- L201 12 VDC coil: installed, not wired (for customer use)
- L202 12 VDC coil: emergency position - relay energized when GTEC in Source 2 (emergency) position
- L203 12 VDC coil: normal position - relay energized when GTEC in Source 1 (normal) position

## Warranty
- Warranty: 12 months from commissioning to a maximum 18 months after date of sale.

## Accessories
- AC-176 Specification sheet