

Automatic Transfer Switches

RTS-03 SERIES



Russelectric
POWER CONTROL PEOPLE YOU CAN RELY ON

RTS-03 Series Automatic Transfer Switches: Rugged

High-Performance Design

Russelectric automatic transfer switches are modern, high-speed switching devices designed to transfer electrical loads from a preferred power source to an alternate power source when voltage and/or frequency varies from preset limits, and to retransfer loads when preferred source is restored.

Russelectric RTS-03 Series automatic transfer switches utilize simple electrical operators to provide high-speed quick-break, quick-make, preloaded transfers. The operators are connected to the switch mechanism through precision self-aligning, ball joints and heavy-duty linkage rods which prevent misalignment.

The Industry's Highest 3-Cycle Closing and Withstand Ratings | A

Russelectric RTS-03 Series transfer switches have the highest 3-cycle closing and withstand ratings for 600 VAC or less of any switches available today.

All Russelectric RTS-03 Series automatic transfer switches have been fully tested for 3-cycle closing and withstand ratings under UL-1008.

3-Cycle Closing and Withstand Ratings	
RMS Symmetrical Amperes, 600 VAC or Less UL Tested, Listed, and Labeled Under UL-1008	
Switch Size amperes	Closing and Withstand Rating amperes
100-400	42,000
600-800	65,000
1000-1200	85,000
1600-4000	100,000

Before Underwriters' Laboratories, Inc. will allow a transfer switch to be listed with a short circuit rating, it requires that the switch be able to close in on the same amount of fault current that it can withstand. Consequently, in applications where extremely high short circuit current is available, fuse protection is mandatory.

When coordinated with current limiting fuses, Russelectric RTS-03 Series transfer switches have UL listed closing and withstand ratings of 200,000 amperes, at 480 VAC.

Built Rugged for Long Life, Minimum Maintenance, and Trouble-Free Service

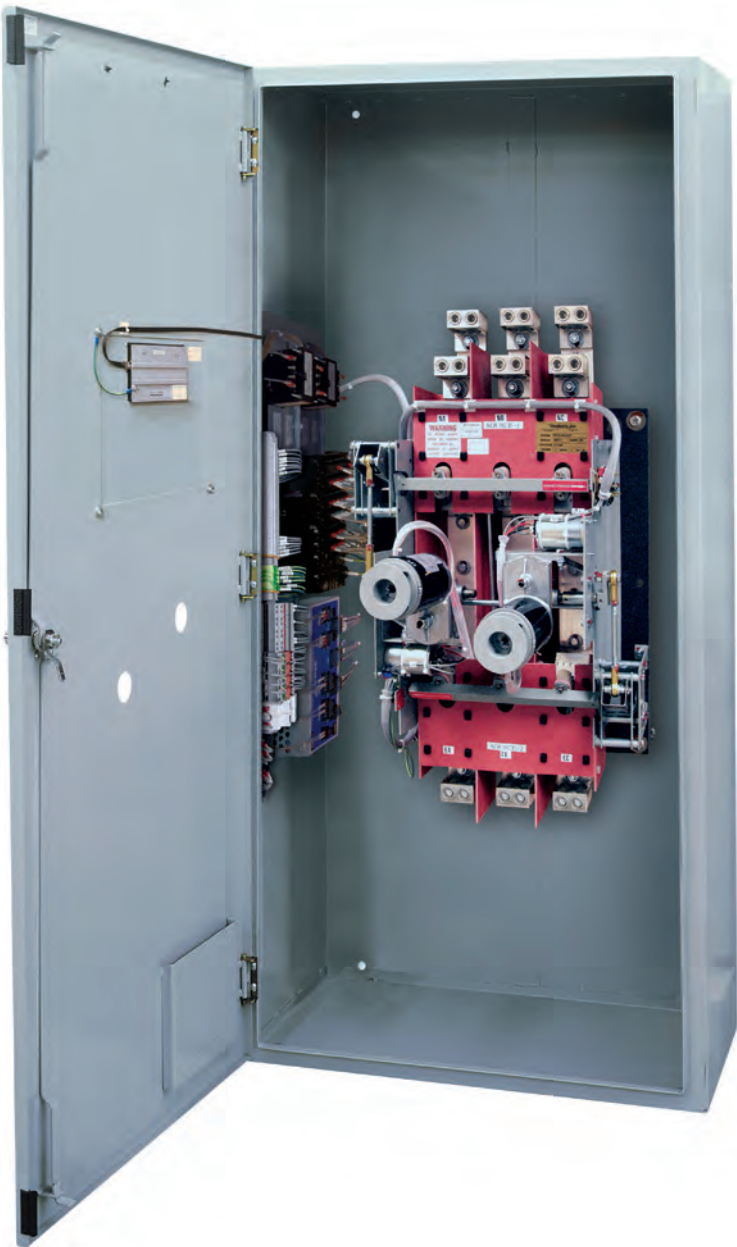
Russelectric builds all its transfer switches for years of reliable, trouble-free operation with a minimum of maintenance. In fact, many Russelectric switches have been in continuous service for over 40 years.

Russelectric transfer switch contacts are segmented and have tungsten arcing tips. All contacts are machined from solid copper — not cast, forged, or stamped. All mechanical assemblies, linkages, and connecting rods are purpose-built and precision-machined in-house. Mechanical linkages are sturdy anodized steel rods — machined, not stamped or riveted — with aircraft-style ball joint fittings.

Bus bar is solid copper, silver plated in accordance with UL and ANSI standards. All bus is formed, cut, and punched before being plated to guarantee the integrity of the silver plating and ensure maximum performance.

Enclosures are fabricated with code gauge steel to meet UL and other applicable standards. All enclosures feature arc-welded seams, extra bracing, and smooth, ground corners. Switches are seismic tested to International Building Code requirements for earthquake compliance.

All transfer switches are thoroughly inspected both mechanically and electrically under simulated operating conditions before shipment.



3-Cycle Closing and Withstand Rated Design

Quick-Break, Quick-Make, High-Speed, Preloaded Transfer | B

All Russelectric transfer switches feature preloaded springs and an electric operator-driven overcenter mechanism for opening and closing power contacts. During open-transition transfer, the contact mechanism is securely locked in place until the overcenter position is reached. The preloaded springs then instantaneously open the closed contacts (quick-break) and close the open contacts (quick-make) with a momentary break in between. The quick-break feature provides rapid full arc interruption, even under maximum voltage and amperage. This considerably reduces contact erosion and increases the switch's useful life.

Rapid and Reliable Arc Quenching | C

The Russelectric transfer switch current interrupting chamber consists of parallel steel plates partially surrounding the contacts and enclosed by an insulator. When contacts open, the induced magnetic field draws the arc into the plates, which split it into smaller arcs and extinguish it.

The plates also conduct heat away from the arc. (Photo shown with insulating barriers removed.)

Front Connected Control Components and Wiring | D

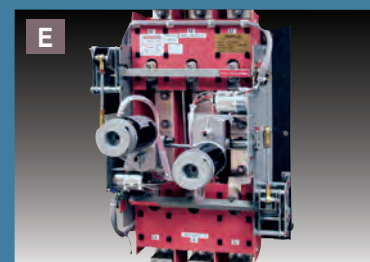
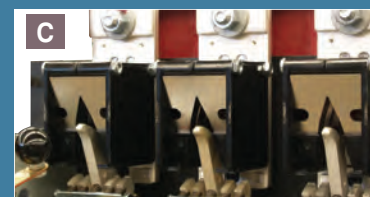
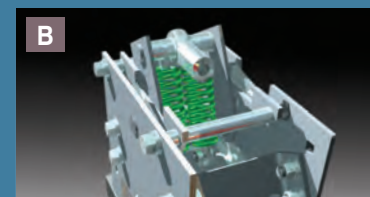
Control components and wiring can be replaced without removing the transfer switch from its enclosure.

Tracing of the electrical circuitry is simplified by the neatly arranged, front-connected, flame retardant, 600-volt SIS switchboard wiring. Heavy-duty control components and contacts are provided to handle switching requirements.

All wiring connections are labeled with sleeve-type markers, easily visible from the front of the cabinet.

Vertical-Type "VS" Switchboard Construction | E

Transfer switch bases and control panels are available in narrow widths for switchboard cubicles with front or rear terminals and/or bus tabs. Narrow widths to fit motor control center requirements (19" for capacities to 800 A 3-pole) and special arrangements are also available.



RPTCS ATS Control System

The Russelectric RPTCS microprocessor automatic transfer switch control system controls all operational functions of the ATS. Each RPTCS is programmed at the factory to control customer-specified options as well as standard switch features.

Setup, alarm acknowledgement, and review of actual data are easily accomplished using the controller's soft keys and color display. The intuitive, interactive menu guides the user through controller setup and the entering of configuration data, including communications and timing setpoints, adjustable control parameters (interlocks, alarms, and security), and event logging.

Real-time metering of voltage (phase-to-phase and phase-to-neutral) and frequency of both sources is standard, and

metering of current and power is available. The RPTCS can also monitor power quality with available waveform capture and historical trending. All metering can be accessed through the menu.

The controller senses Source 1 (usually the electric utility source) and Source 2 (usually the engine generator source) voltages and, by means of easy-to-see LEDs, indicates switch position and source availability. Through the menu, the user can also review operational data such as active time delays, transfer inhibits, metered values, fault and alarm reports, event records, and configuration settings. The controller also automatically displays the status of monitored conditions in color-coded banners at the top of the screen including faults and alarms, inhibits, and informational messages.

The RPTCS controller supports two communication interfaces: standard Modbus RTU or available Modbus TCP/IP via 10/100 Base-T Ethernet. An external communications port on the controller's faceplate allows fast, easy connection to a laptop. Controller design accommodates the addition of accessories.

Open-Transition Switches

Quick-break, quick-make,
high-speed transfer mechanism

Positive mechanical interlocking

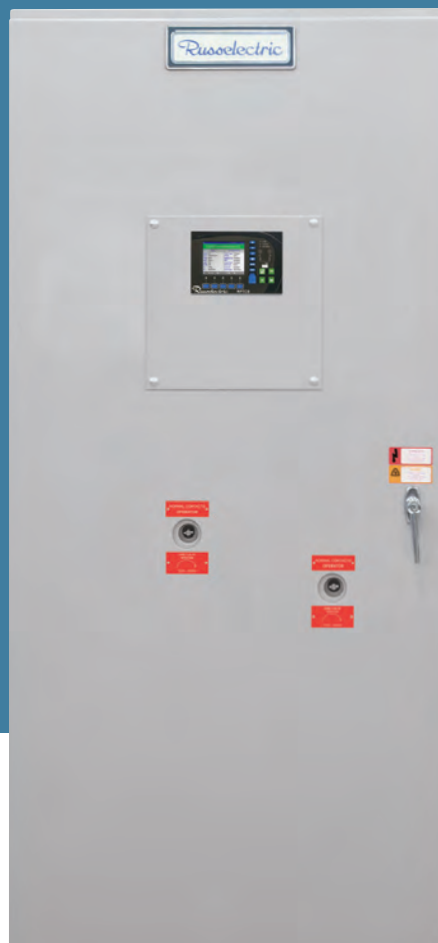
Simple electrical operators

Rapid arc quenching

Safe external manual operator
provides same quick-break,
quick-make operation as
electrical operator

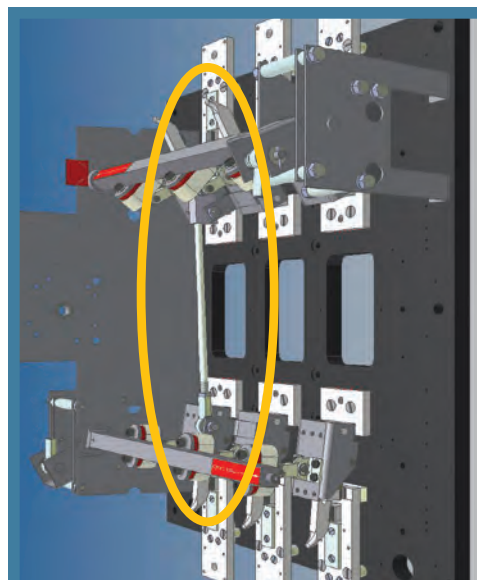
2-, 3- and 4-pole configurations

Front accessible wiring

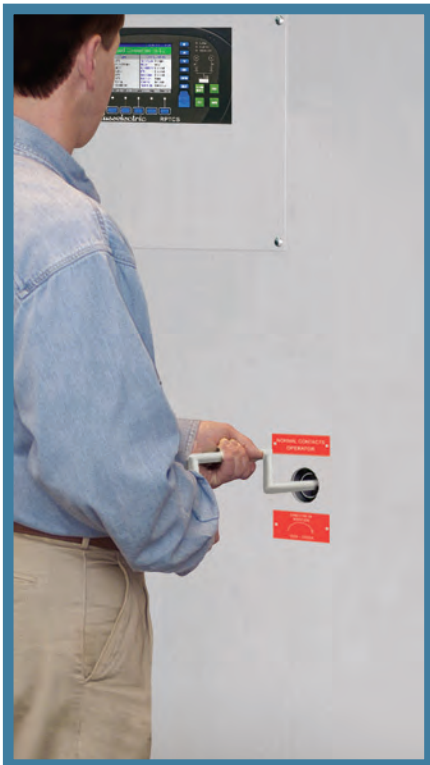


Positive Mechanical Interlocking

A rugged mechanical interlock positively prevents Source 1 and Source 2 contacts from being closed simultaneously.

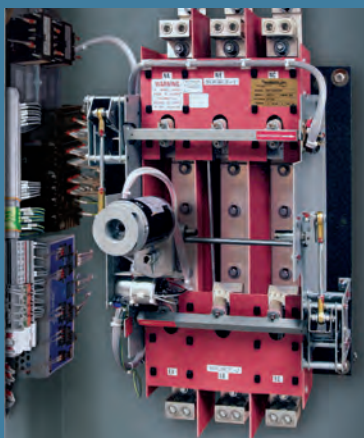


Simplified assembly



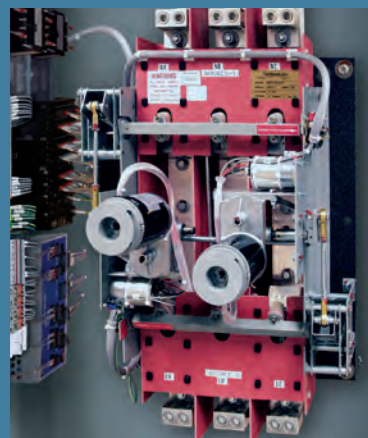
RTS-03 A: Single-Operator

For basic
transfer applications



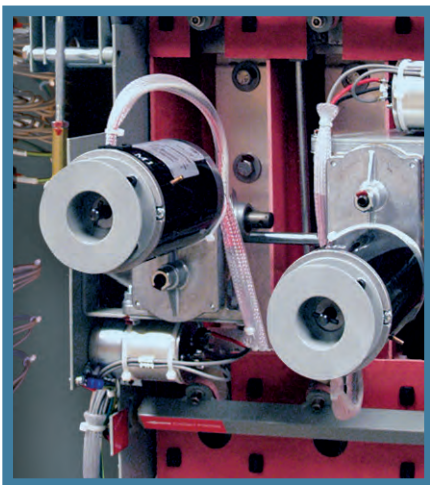
RTS-03 B: Dual-Operator

For high inductive load
transfer applications



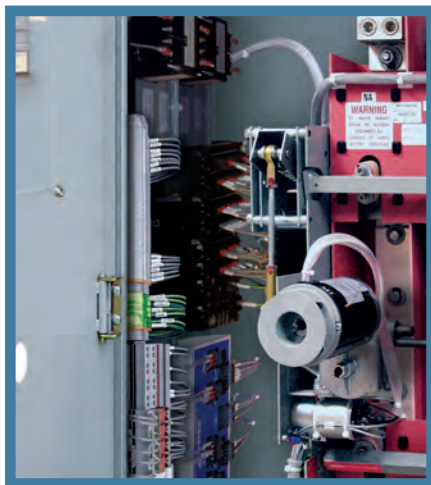
Safe External Manual Operator

In addition to automatic operation, these transfer switches can be operated manually. An external manual operator permits the full-speed manual transfer of loads (at the same contact speed as the electric operator) with the unit's door completely closed. This reduces the operator's exposure to the risk of possible arc flash injuries.



For Basic Power Transfer Applications

Single-operator RTS-03 A Series automatic transfer switches offer a dependable means of transferring power from one source to another and back again using open-transition transfer. These switches are ideal for resistive load applications where no time delay (to allow inductive load voltages to decay) is needed.



For Large Motor and High Inductive Load Transfer Applications

Dual-operator RTS-03 B Series automatic transfer switches allow inductive loads to be re-energized with normal inrush starting current after transfer. These inductive loads typically involve large 3-phase motors or transformers.

A time delay between the opening of the closed contacts and the closing of the open contacts allows large motor loads to demagnetize before transfer. This prevents the severe "bump" caused by switching a rotating motor (which momentarily acts as a generator) from one source to another source that is not in synchronism.

This transition time delay is approximately 400 milliseconds, but it may be increased through the switch's controller.

Ideal for Sophisticated Load Shed Control Applications

With their center-off position, Russelectric RTS-03 B Series dual-operator transfer switches are also ideal for sophisticated load shed control schemes. They are often used in generator paralleling systems.

RTS-03 Series Closed-Transition Transfer Switches

Closed-Transition Switches

High-speed quick-break, quick-make, open-transition transfer upon loss of preferred power source

Rapid closed-transition retransfer to preferred source and for testing with zero power interruption

Simple electrical operators

Rapid arc quenching

2-, 3-, and 4-pole configurations

Front accessible wiring

RTS-03 C: Closed Transition

For zero power interruption on testing and retransfer



Zero Power Interruption on Retransfer or Testing

RTS-03 Series closed-transition transfer switches offer the advantage of zero power interruption during both testing and automatic retransfer to Source 1. They are built to the same stringent standards as Russelectric's widely respected break-before-make switches. They are identical in size to open-transition switches.

High-Speed Operators Provide Transition in Less Than 100 Milliseconds

To provide the rapid transition necessary to achieve the absolute minimum time in which both Source 1 and Source 2 are simultaneously connected to the load, Russelectric uses special high-speed operators. Transfer occurs only when both sources are within an acceptable window of synchronization. Tests show that transition times are substantially less than 100 milliseconds.

Open-Transition Transfer, Closed-Transition Retransfer and Testing

1 | Transfer upon loss of Source 1

Upon reduction of Source 1 voltage below a preset value after a preset time delay, the Russelectric RTS-03 C signals the engine generator (Source 2) to start. When the engine generator has reached acceptable voltage and frequency, the transfer switch transfers to the engine generator source in open transition. The load is served by the engine generator until the ATS detects return of Source 1 to acceptable values. After a preset time delay to allow stabilization of Source 1, the ATS is ready to retransfer.

2 | Retransfer upon return of power to the preferred source

When the Russelectric RTS-03 C is ready to retransfer, a synch-check function initiates transfer once the engine generator is in synchronism with Source 1. After the open contacts (Source 1) have closed, the closed contacts (Source 2) open, providing closed-transition transfer.

The period of time in which both sets of contacts are closed is less than 100 milliseconds. A separate timer monitors the closed-transition period, and initiates a signal to reopen the set of contacts

that have just been closed, should the closed-transition time exceed the setting of the timer. In addition, a safety signal is provided for customer-connected alarm or remote breaker tripping should the closed-transition period exceed the timer's setting. Should Source 2 power fail at any time after Source 1 has returned, but before the stabilization time delay relay has timed out, the ATS will automatically open-transition retransfer to Source 1.

3 | Load test

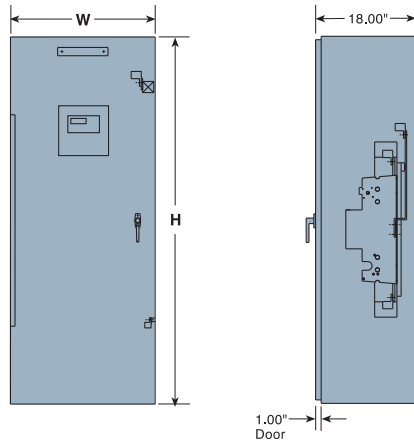
Upon initiation of load test, the ATS signals the engine generator (Source 2) to start. When the engine generator has reached acceptable voltage and frequency, a synch-check function initiates transfer to the engine generator in closed transition by closing the Source 2 contacts and then opening the utility (Source 1) contacts.

The closed-transition time is less than 100 milliseconds. After the load test period, retransfer to Source 1 is also closed-transition as previously described.

The timer monitoring excessive closed-transition transfer time is active during this operation. Failure of the generator source during load test will result in automatic open-transition retransfer to the utility source.

Specifications and Dimensions

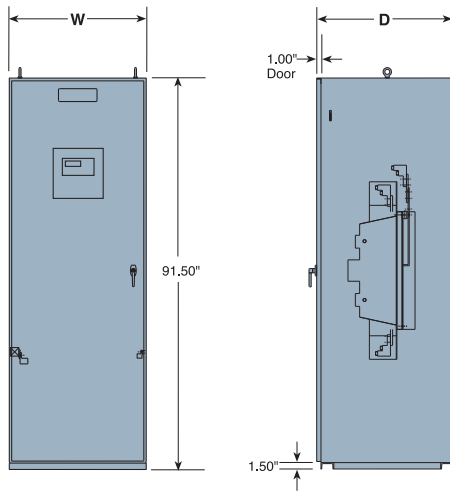
F



100-800 AMP ENCLOSED WALL-MOUNTED SWITCHES | F

Switch Rating amps	Switched Poles	Dimensions inches		Lug Size: Source 1, Source 2, and Load ¹ per phase and neutral	Approximate Shipping Weight ² pounds
		W	H		
100	$\frac{2 \text{ or } 3}{4}$	$\frac{26}{31}$	44	(1) #14—1/0	$\frac{490}{565}$
150	$\frac{2 \text{ or } 3}{4}$	$\frac{26}{31}$	44	(1) #6—250 MCM	$\frac{500}{575}$
225	$\frac{2 \text{ or } 3}{4}$	$\frac{26}{31}$	66	(1) #4—600 MCM or (2) #1/0—250 MCM	$\frac{510}{585}$
260	$\frac{2 \text{ or } 3}{4}$	$\frac{26}{31}$	66	(1) #4—600 MCM or (2) #1/0—250 MCM	$\frac{520}{595}$
400	$\frac{2 \text{ or } 3}{4}$	$\frac{26}{31}$	66	(1) #4—600 MCM or (2) #1/0—250 MCM	$\frac{530}{605}$
600	$\frac{2 \text{ or } 3}{4}$	$\frac{26}{31}$	66	(2) #4—500 MCM	$\frac{540}{615}$
800	$\frac{2 \text{ or } 3}{4}$	$\frac{26}{31}$	66	(2) #4—600 MCM or (4) #1/0—250 MCM	$\frac{550}{625}$

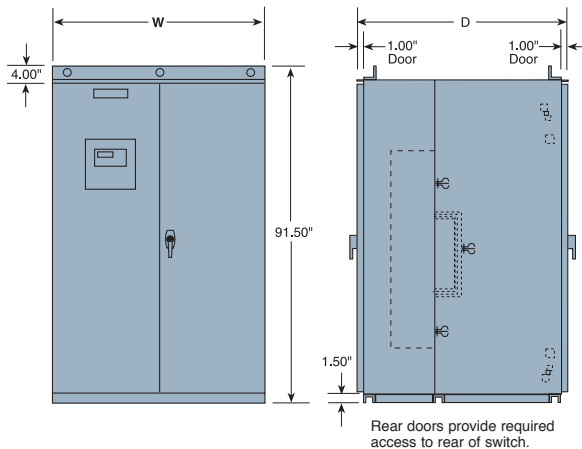
G



1000-3000 AMP ENCLOSED FREESTANDING SWITCHES | G

Switch Rating amps	Switched Poles	Dimensions inches		Lug Size: Source 1, Source 2, and Load ¹ per phase and neutral	Approximate Shipping Weight ² pounds
		W	D		
1000	$\frac{2 \text{ or } 3}{4}$	$\frac{32}{36}$	32	(3) #2—600 MCM	$\frac{1025}{1250}$
1200	$\frac{2 \text{ or } 3}{4}$	$\frac{32}{36}$	32	(3) #2—600 MCM	$\frac{1060}{1285}$
1600	$\frac{2 \text{ or } 3}{4}$	$\frac{32}{36}$	32	(4) #2—600 MCM	$\frac{1100}{1325}$
2000	$\frac{3}{4}$	$\frac{32}{36}$	32	(5) #2—600 MCM	$\frac{1150}{1365}$
2500	$\frac{3}{4}$	$\frac{32}{36}$	36	(6) #2—600 MCM	$\frac{1205}{1410}$
3000	$\frac{3}{4}$	$\frac{40}{48^3}$	40	(8) #46—600 MCM	$\frac{1265}{1480}$

H



4000 AMP ENCLOSED FREESTANDING SWITCH | H

Switch Rating amps	Switched Poles	Dimensions inches		Lug Size: Source 1, Source 2, and Load ¹ per phase and neutral	Approximate Shipping Weight ² pounds
		W	D		
4000	$\frac{3}{4}$	$\frac{51}{60}$	60	(10) #4—600 MCM or (20) #1/0—250 MCM	$\frac{3100}{3600}$

¹ All lugs are mechanical type suitable for copper or aluminum cable. Ground lugs provided to NEC.

² Weights shown are approximate and may vary according to number and types of accessories specified.

³ Double door configuration.

NOTES:

Switches are furnished with Source 1 connection at top and Source 2 connection at bottom. Positions may be reversed if desired.

Drawings are for layout purposes only and are subject to change without notice. For details on lug spacing, etc., drawings are available at www.russelectric.com. See back page of brochure for Accessories.

Accessories

Following is a list of common accessories. For a complete list, consult factory.

VFS1	Programmable under-voltage sensing of Source 1 to restore at 90% and fail at 80%, range from 100% to 115%. Under-frequency sensing, adjustable from 45.0 Hz to 59.9 Hz. Failure set at 59.0 Hz and restore set at 59.5 Hz. Over-voltage and over-frequency sensing.
VFS2	Programmable under-voltage sensing of Source 2 to restore at 90% and fail at 80%, range from 100% to 115%. Under-frequency sensing, adjustable from 45.0 Hz to 57.0 Hz. Failure set at 54.0 Hz and restore set at 57.0 Hz. Over-voltage and over-frequency sensing.
TDES	Time delay of engine start signal to prevent transfer in the event of momentary Source 1 power outage.
TDPS	Time delay on retransfer to Source 1.
TDNPS	Time delay on transfer to Source 2.
TDNNP	Time delay to control contact transition time from neutral to Source 2.
TDNP	Time delay to control contact transition time from neutral to Source 1.
TDEC	Engine overrun to provide unloaded engine operation after retransfer to Source 1 (delay for engine cooldown).
ELEVATOR CONTACT	Elevator pre-signal contacts open prior to transfer in either direction, can be configured in one of the following ways: (1) Once transfer is initiated, contacts close after an adjustable time delay (0 seconds to 60 minutes); (2) After time delay (0 seconds to 60 minutes), transfer is initiated. Contacts close immediately after transfer; (3) After time delay (0 seconds to 60 minutes), transfer is initiated. Contacts close after an adjustable time delay (0 seconds to 60 minutes).
EXF	The mode of operation of the exerciser function can be selected with a time base of 1 day, 7 days, 14 days, 28 days, or 365 days. With a time base of 365 days, up to 24 events can be scheduled. With all other time bases, the number of exercise events is limited to 7.
XF8	Programmable function to bypass time delay on retransfer to Source 1.
XL14	2-position lever-operated preferred source selector switch to select either Source 1 or Source 2 supply as the preferred source. (1) Legend plate marked: "SOURCE 1" - "SOURCE 2". (1) Nameplate marked: "PREFERRED SOURCE SELECTOR SWITCH".
CS1P	(1) Auxiliary contact closed in Source 1 position, wired to terminal strip for customer connection.
CS2P	(1) Auxiliary contact closed in Source 2 position, wired to terminal strip for customer connection.
CES	Form "C" contact to initiate engine starting or other customer functions.
CS1A	(1) Source 1 status relay with Form "C" contact to indicate Source 1 availability.
CS2A	(1) Source 2 status relay with Form "C" contact to indicate Source 2 availability.
LT1	Green LED on Operator Interface Panel to indicate switch in Source 1 position.
LT2	Red LED on Operator Interface Panel to indicate switch in Source 2 position.
LT3	Green LED on Operator Interface Panel to indicate Source 1 power available.
LT4	Red LED on Operator Interface Panel to indicate Source 2 power available.
LT20	Red LED on Operator Interface Panel to indicate transfer inhibit.
LT21	Red LED on Operator Interface Panel to indicate alarm condition.
XF20	Lamp test function to test all LEDs or Operator Interface Panel.
EMO	External Manual Operator.