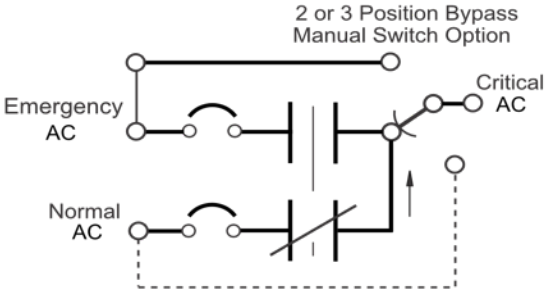
Automatic transfer switches, enabling dual AC power sources, are the first line of defense against power failures for critical safety devices, controls, instrumentation, alarms, signals and computers. Robust **StatiVolt ATSs** are designed and built for decades of industrial / utility duty. Time-proven applications are testimony to their reliability.



kVA	Phase	V	Amps	Poles
6	1	120	50	1
12	1	120	100	1
24	1	120	200	1
48	1	120	400	1
12	1	120	100	2
24	1	120	200	2
6	1	208-240	25	2
24	1	208-240	100	2
48	1	208-240	200	2
48	1	220-240	200	1
96	1	220-240	400	1
55	1	277	200	2
35	1	347	100	2
48	1	480	100	2
60	1	600	100	2
36	3	208	100	3, 4
69	3	380-415	100	3, 4
83	3	480	100	3, 4
104	3	600	100	3, 4

Features

Reliability by Design

- Robust fast break (≤ ¾ cycle)
- Close differential V sensing
- Transistor switch logic
- Fast contactor transfer
- 30 year design life

Protection

- Normal AC breaker
- Emergency AC breaker
- Contactor rated 990 A for 1s
- Contactor rated 8 kV impulse

Versatile Options

- No-break manual BP switch
- Extra AC V alarms
- Digital V & V+A meters
- Load multi-function meter
- High kA rated breakers
- Special Utility Options

Warranty & Service

- 3 year full warranty
- Fully field serviceable
- 20 year parts availability

Standards

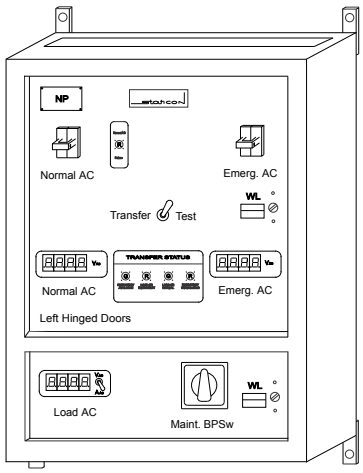
- CSA, UL, IEC

Voltages

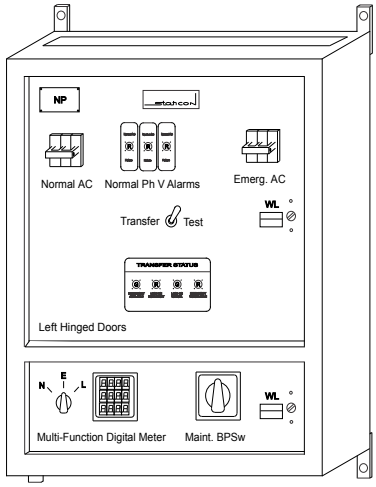
Voltage	Phase	Code
110-120-127	1	A
208-240	1	B
220-230-240	1	UX
277	1	Q
347	1	N
480	1	G
600	1	H
208	3	E
230	3	M
380-400-415	3	LX
480	3	F
600	3	K

60 Hz: no suffix
50 Hz: add suffix **X** to code
100 Hz: add suffix **2X** to code

AC 60 B 2P 2W TS 86 61 WM-T-V
- Options
- Wall Mount
- Cabinet W (cm)
- Cabinet H (cm)
- Number of Conductors
- Number of Switched Poles
- AC Voltage Code (table at left)
- ATS kVA Rating



1 Phase ATS



3 Phase ATS

Contents

ATS Specs

Transfer Speed, Design

- Fast break ≤ ¾ cycle (12 ms)
- ITI (CBEMA) Curve 2000 compliant
- V sensing, transistor-based logic
- Contactor-based transfer
- 30 year design life

Protection

- Normal AC breaker, 100% ATS Amps
- Emerg. AC breaker, 100% ATS Amps
- 110 A resistive load continuous rated
- 8 kV contactor impulse withstand V
- Isolated and / or fused electronics

Voltage Sensing

- Differential V sensing relay
- Dropout V, nominal V to -20% adj.
- Pickup V, nominal V to -20% adj.

Transfer Logic

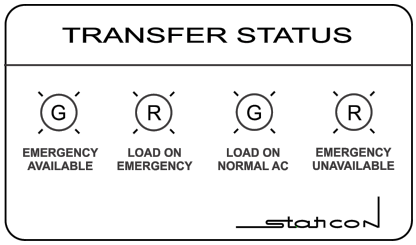
- Vac sensing initiated, DC Powered
- Transistor-based switch
- Rated @ 500 V, 12 A
- Energizes coil @ 10 Vdc 175 mA
- Auto re-transfer, delayed return

Contactor(s)

- Type AEG LS37K
- 4 Poles (2 NO, 2 NC), 110 A / pole
- Rated @ 600 Vac
- Parallel contactor poles are used for high current 1 ph and all 3 ph ATS's

Annunciation

- Normal AC V Sensing Alarm:
  - V In Range green LED, contacts
  - V Out of Range red LED, contacts
- Transfer Annunciation:
  - Emerg. Avail. green LED
  - Load on Emerg. red LED, contacts
  - Load on Normal green LED, contacts
  - Normal Unavail. red LED
- Each set of NO+NC contacts is rated: 10 A (120 V_{AC} & 28 V_{DC}), form 'C'



Meters

- 1Φ Norm. AC V digital, 1% acc.
- 3Φ Power digital, 0.5% acc.
  Multi-Function Acuvim L ®
- Optional:
  - 1Φ Emerg. AC V digital, 1%acc.
  - 1Φ Load AC V+A digital, 1% acc. switch selectable

Wiring

- Stranded Cu TEW 105°C Power Cables
- Stranded Cu 16 AWG control wires
- Plastic sleeve-type wire markers
- Wire (≤ 10 AWG) connection ferrules

Wall Mount Cabinets

- NEMA 2 (IEC 60529 IP 22)
- Front accessible, side / top cable entry
- Left-hinged, recessed front door
- 14 / 10 gage steel panels / mounts
- Powder-coated, baked enamel finishes

Environmental Requirements

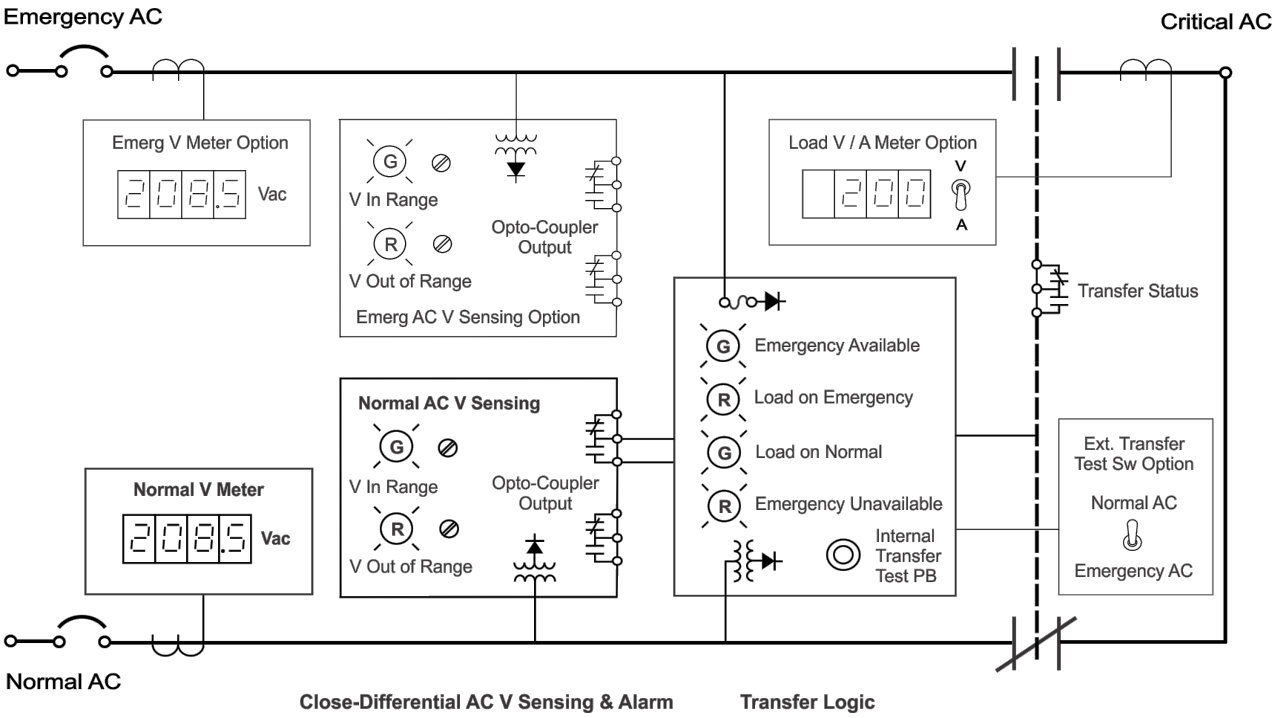
- -20°C to +40°C continuous operation
- RH < 95% non-condensing

Reliability

- Electrical life (B10d): 800 k cycles (SchE)
- MTBF is 560 k hrs (Staticon)
- MTTR is 1 hr (Staticon)

Design & Test Standards

- CSA SPE-1000 inspected & approved
- Built to CSA C22.2 No. 178.1
- IEC 60947 certified contactors
- UL 508, CSA C22.2 #14 cert. contactors
- UL 489, CSA C22.2 #5 cert. breakers



Manual Bypass Switch Specs (Option) [1]

Manual Switch Speed, Design

- MBB rotary cam switch, 2 or 3 position
- Make-before-break (no-break, < ¼ cycle)
- Isolates ATS for maintenance
- Provision for padlocking in one position
- Type Kraus & Naimer C125 & C315 ®
- 2, 3 & 4 pole switches
- c/w silver plated contacts

Operational Ratings

- C125 rated @ 600 Vac, 150 A / pole
- C315 rated @ 600 Vac, 240 A / pole

Protection

- 6 kV switch impulse withstand V
- 2000 A for 1 s switch withstand Amps
- Rated 5 kA short circuit current

Annunciation

- Load on ATS NO contacts
  Load on Bypass NC contacts
- Set of NO+NC contacts is rated:
  10 A (120 V_{AC} & 28 V_{DC}), form 'C'

Housing

- In ATS cabinet, externally operable
- Optional, external wall mount cabinet

Wiring

- Stranded Cu TEW 105°C Power Cables
- Stranded Cu 16 AWG control wires
- Plastic sleeve-type wire markers
- Wire (≤ 10 AWG) connection ferrules

Environmental Requirements

- -20°C to +40°C continuous operation
- RH < 95% non-condensing

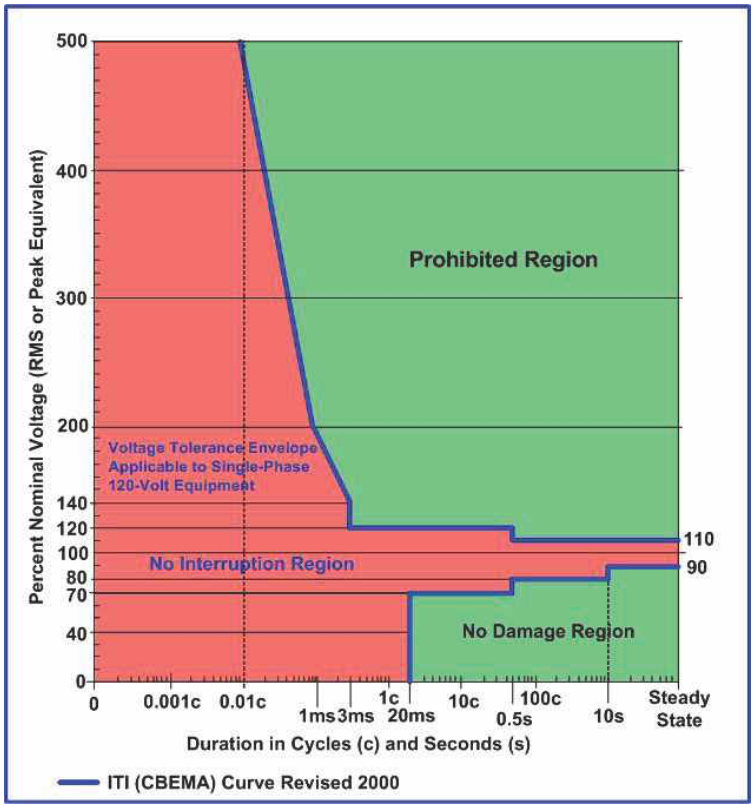
Reliability

- Electrical life (B10d): 15 k cycles (K&N)
- Per IEEE Std 493-2007, Annex Q, #188
- MTTF is 4.2 M hrs
- MDT is 1.1 hrs (mean down time)

Design & Test Standards

- CSA SPE-1000 inspected & approved
- IEC 60947 certified switches
- UL 508, CSA C22.2 #14 cert. switches

[1] To service a safely disconnected (unpowered) ATS, a manual BP switch is absolutely required for critical load power continuity.



Staticon ATSs provide for critical load voltage and power between 2 sources (< 16 ms switch-over time) in compliance with the no interruption region of the ITI (CBEMA) curve (20 ms max. acceptable power interruption). This refined, 40 year old, de facto industry standard curve defines AC power quality criteria for electronic equipment and power quality contracts between electric utilities and large industrial customers in North America.

© Mark Stephens, "Power Quality Standards: CBEMA, ITIC, SEMI F47, IEC 61000-4-11/34", (Electric Power Research Institute, 2009), p 7.

Also per:

IEEE Std 1100-2005 IEEE Recommended Practice for Powering and Grounding Electronic Equipment, "Figure 3.10 New ITI (CBEMA) curve (2000)", (Institute of Electrical and Electronics Engineers Inc., 2006), p 41.

IEEE Std 493-2007 IEEE Recommended Practice for The Design of Reliable Industrial & Commercial Power Systems, "Figure 7-2 ITI / CBEMA curve", (Institute of Electrical and Electronics Engineers Inc., 2007), p 137.

ATS Function

Contactor Transfer

The Staticon ATS uses 1 or 2 contactors (parallel contacts, series coils) as a switch between 2 power sources. In the forward direction (Normal to Emergency AC), contactor(s) are electromagnetically driven by their energized coil(s). In the reverse direction (Emergency back to Normal AC) contactor(s) are mechanically driven (de-energized coils) by the contactor spring(s). This design is electrically robust and provides fast transfers regardless of discrepancies in source frequencies and waveforms. With the ATS operating on Normal AC in the de-energized mode most of the time, contactor and electronic switch longevity is maximized.

Transfer Speed

ATS transfers to ***Emergency AC*** are uniquely fast, within 12 ms (< 3/4 cycle). Fast contactor speed is achieved by driving the contactor coils with low V DC. DC coil resistance is very low and there are no AC inductive time constants and impedances associated with AC coil energization. Re-transfers to ***Normal AC*** are also fast, as DC coil de-energization is faster than AC coil de-energization, enabling faster spring action.

AC V Sensing

Normal AC power failure sensing is via an adjustable, differential V sensing relay card and the V sensing circuit of the transfer logic card, which operate with the sensing relay non-alarm (normal AC power) position being in the energized (closed) state. These circuits sense the Normal AC voltage and output the status to the switching circuit of the transfer logic.

Switching Logic

Normal AC V failure sensing circuits input a DC signal to the switching circuit of the transfer control logic card (rectified ***Emergency AC*** source powered). This signal drives the DC operation of the very fast switching transistor which in turn, energizes or de-energizes the contactor coil(s) to effect a transfer of power.

Failure Modes

Very rare ***voltage sensing*** or ***switching*** circuit failure will most probably cause a transfer of power to the ***Emergency AC*** source (energized contactor state), and stay there until the electronics are repaired.

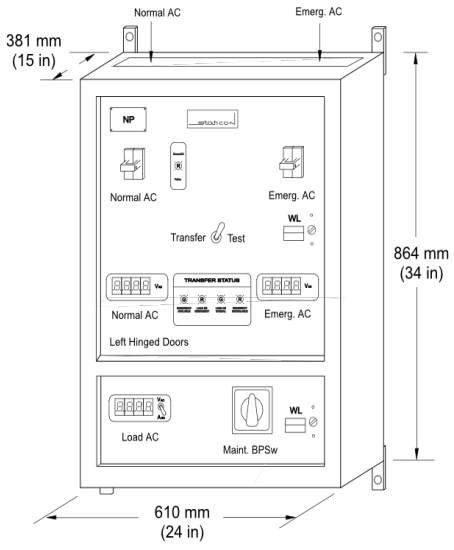
Voltage sensing circuit failure is most probably an open circuit state (de-energized sensing relay) resulting in an energized switching transistor and contactor coil, and transfer of power to the ***Emergency AC*** source.

Switching circuit failure is most probably a closed (short) circuit state (energized transistor and contactor coil) resulting in a transfer of power to the ***Emergency AC*** source.

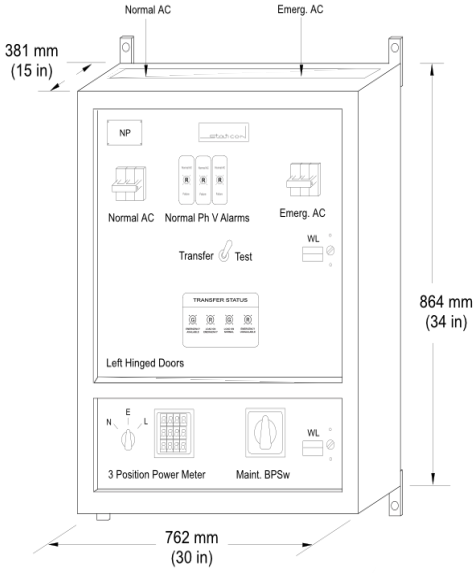
Input Breaker

Normal AC input circuit breaker CB1, is equipped with a set of auxiliary contacts (NO+NC) which annunciate an open breaker. Opening of this breaker will cause a transfer to the ***Emergency AC*** source. Closing of this breaker will result in a time-delayed, re-transfer of power back to the ***Normal AC*** source.

ATS Cabinets



1 Phase ATS, 40 kg (88) lbs)



3 Phase ATS, 50 kg (110 lbs)

Options

Auto Transfer Options	Option Code
Auto re-transfer delay of __ seconds (other than our standard 30 s)	_D
Transfer test, spring-loaded toggle switch, external on front door	T
Normal or Emergency power external reference voltage terminal & fuses	R
Synchronized transfer / retransfer between multiple ATS's (extra V sensing relay for each ATS)	S
Protection Options	
Auxiliary load-side circuit breaker sized << ATS current rating for output parallel control loads	B
Manual Bypass Switch Options	
1 phase, 1-2 poles, 125-250 A / pole, 2 position bypass switch, make-before-break (no-break)	M2
1 phase, 1-2 poles, 125-250 A / pole, 3 position bypass switch, make-before-break (no-break)	M3
3 phase, 3-4 poles, 125 A / pole, 2 position bypass switch, make-before-break (no-break)	M2
3 phase, 3-4 poles, 125 A / pole, 3 position bypass switch, make-before-break (no-break)	M3
Alarm Options	
Emergency 1 phase AC V alarm (1 red LED, 1 set NO+NC contacts), low differential V sensing relay	A
Emergency 3 phase AC V alarm (3 red LEDs, 1 set NO+NC contacts), low differential V sensing relay	A
Transfer logic open failure alarm (1 red LED, dry contacts)	La
Transfer position, extra alarm contacts (1 set NO+NC contacts)	Tc
Meter Options	
Emergency 1 phase digital V meter (1%% accuracy)	V
Load 1 phase digital V + A meter (1% accuracy), position switch selectable	VA
Other Utility Options	
High interrupting-ampere capacity normal / emergency breakers (consult Staticon)	I
Auxiliary contacts for any single breaker	Ac
Zinc Rich powder coat paint primer for enhanced corrosion protection	Z
Keyed door locks with handles (2)	K
Packaging Options	
Tropical / humidity proofing, acrylic sprayed components and wires	Tr
Export packaging per international ocean freight requirements (consult Staticon)	

