ETSCT Series

Automatic Closed Transition Transfer Switches

An automatic closed transition transfer switch shall be furnished as specified herein.

1 GENERAL

1.1 The automatic closed transition transfer switch shall be rated for voltage and ampacity as shown on the plans and shall have 600 volt insulation on all parts in accordance with NEMA standards.

1.2 The current rating shall be a continuous rating when the switch is installed In an unventilated enclosure, and shall conform to NEMA temperature rise standards.

1.3 The unit shall be rated based on all classes of loads; i.e., resistive, tungsten, ballast, and inductive loads. Switches rated at 400 amperes or less shall be UL listed for 100% tungsten lamp loads.

1.4 As a precondition for approval, all transfer switches shall be listed by Underwriters Laboratories, under Standard UL 1008 (automatic transfer switches) and approved for use on emergency systems.

1.5 The withstand current capacity of the main contacts shall not be less than 20 times the continuous duty rating when coordinated with any molded case circuit breaker established by certified test data. Refer to the required withstand and close ratings as detailed in this specification.

1.6 Temperature rise tests in accordance with UL 1008 shall have been conducted after the overload and endurance tests to confirm the ability of the units to carry their rated currents within the allowable temperature limits.

1.7 Transfer switches shall comply with the applicable standards of UL, CSA, ANSI, NFPA, IEEE, NEMA and IEC.

1.8 The transfer switches shall be supplied with a microprocessor based control panel as detailed further in these specifications.

1.9 The closed transition switch shall transfer the load in a parallel mode, thus momentarily connecting both sources of power. A closed transition transfer shall occur only when both sources are available and within specified limits. The maximum interconnect time is 100 milliseconds. The transfer switch shall operate in an “open transition” mode (break before make) when the power source servicing the load fails.

2 SEQUENCE OF OPERATION

2.1 The ATS shall incorporate adjustable three phase under and over-voltage and three phase under and over-frequency sensing on the normal source.

2.2 When the voltage on any phase of the normal source is reduced to 85% of rated voltage for 10 seconds (programmable), a pilot contact shall close to initiate starting of the standby plant.

2.3 The ATS shall incorporate adjustable three phase under and over-voltage and three phase under and over-frequency sensing on the emergency source.

2.4 When the standby plant is delivering not less than 90% of rated voltage and 95% of rated frequency, the load shall be transferred to the emergency source after an adjustable time delay. During test or other source to source transfer, 95% voltage and frequency, phase rotation and angle shall be verified.

2.5 When the normal source has been restored to not less than 95% and not more than 105% of nominal voltage on all phases, proper phase rotation is verified, and after a time delay of 0 to 30 minutes (adjustable), the load shall be transferred to the normal source in a closed transition operation. The standby plant shall run unloaded for 5 minutes (adjustable) and then shut down. The generator shall be ready for automatic operation upon the next failure of the normal source.

2.6 If the engine generator should fail while carrying the load, open transition retransfer to the normal source shall be made instantaneously upon restoration of proper voltage (90%) on the normal source.

2.7 A synch check relay (in-phase monitor) shall be provided for closed transition operation. The monitor shall control transfer and retransfer between live sources and operate by sensing the zero voltage point. It shall be factory set to accomplish transfer within 5 electrical degrees and +/-5% voltage differential. An alarm shall be provided to indicate if closed transition transfer is not accomplished within a preset time period due to a failure to meet operational parameters.

2.8 Closed transition transfer in conjunction with over/under-voltage, phase rotation and angle sensing shall be accomplished when both sources are within specified parameters without any power interruption and without altering the speed or actively controlling the standby plant.

2.9 During closed transition operation, the control circuit shall monitor interconnect time. Should connection exceed 100 ms, the set of power contacts just closed shall be reopened and an alarm circuit shall be energized. If the main contacts fail to open, the control system shall energize a 24 VDC shunt trip circuit to the standby feeder breaker to disconnect this source and the alarm circuit shall be closed. 24 VDC from the engine batteries shall be supplied for the shunt trip and alarm backup circuits.

2.10 The transfer switch shall be equipped with a microprocessor based control panel. The control panel shall perform the operational and display functions of the transfer switch. The display functions of the control panel shall include ATS position and source availability.

2.11 The digital display shall be accessible without opening the enclosure door and shall be provided with a 4 line by 20 character LCD display screen with touch pad function and display menus. The programming functions shall be pass code protected.

2.12 The control panel shall be provided with menu driven display screens for transfer switch monitoring, control and field changeable functions and settings.

2.13 The control panel shall be opto-isolated from electrical noise and provided with the following inherent control functions and capabilities:

a. Multipurpose display for continuous monitoring and control of the ATS functions and settings. All field changeable functions shall be pass code protected and accessible through the keypad.

b. Built-in diagnostic display that includes the capturing of historical data, such as number of transfers and time on emergency power source, for ease of troubleshooting.

c. Capability for external communication and network interface.

d. Touch pad test switch with Fast Test/Load/No Load positions to simulate a normal source failure.

e. Time delay to override momentary normal source failure prior to engine start. Field programmable 0-10 seconds (adjustable by increments of 0.1 second) factory set at 3 seconds.

f. Time delay on retransfer to normal source, programmable 0-60 minutes (adjustable by increments of 0.1 minute) factory set at 30 minutes. If the emergency source fails during the retransfer time delay, the transfer switch controls shall automatically bypass the time delay and immediately retransfer to the normal position.

g. Time delay on transfer to emergency, programmable 0-5 minutes, factory set at 1 second.

h. Time delay on transfer in either direction in the center-off position, programmable 0-2 minutes, factory set at 5 seconds.

i. Terminals for remote test/peak shave operation and transfer inhibit to the emergency source.

j. Auxiliary contacts (1 N.O.) shall be provided to indicate normal and emergency source availability.

k. A load/no load clock exerciser shall be incorporated within the microprocessor and shall be programmable to start the engine generator set and transfer the load (when selected) for exercise purposes on a weekly basis. The exerciser shall contain a lithium battery for memory retention during an outage.

l. A timed auxiliary contact (1 N.C.) adjustable 0-60 seconds shall be provided to allow motor loads to be disconnected prior to transfer in either direction.

m. Provide a momentary pushbutton to bypass the time delays on transfer and retransfer and programmable commit/no commit control logic.

3 CONSTRUCTION AND PERFORMANCE

3.1 The automatic transfer switch shall be a double throw switch operated by a reliable dual electrical mechanism momentarily energized.

3.2 For switches installed in systems having ground fault protective devices, a 4th pole shall be provided. The neutral pole shall have the same withstand and operational ratings as the other poles and shall be arranged to break last and make first during open transition to minimize neutral switching transients. Add on poles that are not of identical construction and withstand capabilities are not acceptable.

3.3 The contact structure shall consist of a main current carrying contact which is a silver alloy with a minimum of 50% silver content. The current carrying contacts shall be protected by silver tungsten arcing contacts on all sizes.

3.4 The transfer switch manufacturer shall submit test data for each size switch, showing it can withstand fault currents of the magnitude and the duration necessary to maintain system integrity. Minimum UL listed withstand and closing ratings shall be as follows:

Size (Amps)	Any Molded Case Breaker* (RMS Symmetrical)
100 - 400	35,000
401 - 600	50,000
601 - 1200	50,000
1201 - 4000	100,000

Size (Amps)	Specific Coordinated Molded Case Breaker
100 - 400	50,000
401 - 800	65,000

801 - 1200	85,000
1201-4000	100,000

Size (Amps)	Current Limiting Fuse
100 - 4000	200,000

*All values 480 volt, RMS symmetrical, less than 20% power factor.

3.5 A dielectric test at the conclusion of the withstand and closing tests shall be performed.

3.6 During open transition operation, the transfer switch manufacturer shall certify arc interrupting capabilities for 50 cycles of operation between a normal and emergency source that are 120 degrees out of phase at 480 volts, 600% of rated current at .50 power factor. This certification is to ensure that there will be no current flow between the two isolated sources during switching.

3.7 Temperature rise tests in accordance with UL 1008 shall have been conducted after the overload and endurance tests to confirm the ability of the units to carry their rated currents within the allowable temperature limits.

3.8 All relays shall be continuous duty industrial type with wiping contacts. Customer interface contacts shall be rated 10 amperes minimum. Coils, relays, timers and accessories shall be front accessible. The control panel and power section shall be interconnected with a harness and keyed disconnect plugs for maintenance.

3.9 Main and arcing contacts shall be visible without major disassembly to facilitate inspection and maintenance.

3.10 A manual handle shall be provided for maintenance purposes with the switch de-energized. An operator disconnect switch shall be provided to defeat automatic operation during maintenance, inspection or manual operation.

3.11 The switch shall be mounted in NEMA 1 enclosure unless otherwise indicated on the plans.

3.12 Switches composed of molded case breakers, contactors or components thereof not specifically designed as an automatic transfer switch will not be acceptable.

3.13 The automatic transfer switch shall be protected by Enercon's 2/5/10 year warranty or the equivalent.

3.14 The automatic transfer switch must be equipped with a solenoid protection scheme that removes any attempts of operating the solenoids after (3) consecutive trials until manual intervention by an operator.

3.15 The automatic transfer switch shall be Enercon ETSCT Series or approved equal.

SPECIFIER NOTES:

1. ETSCT switches are in conformance with the applicable portions of:

UL 1008:	Underwriters Laboratories standard for automatic transfer switches
CSA:	C22.2 No. 178 certified at 600 VAC
IEC:	947-6-1 certified at 480 VAC
NFPA 70:	National Electrical Code including use in emergency and standby systems in accordance with Articles 517,700, 701, 702

NFPA 99:	Essential electrical systems for health care facilities
NFPA 101:	Life safety code
NFPA 110:	Standard for emergency and standby power systems
IEEE 241:	I.E.E.E. recommended practice for electrical power systems in commercial buildings
IEEE 446:	I.E.E.E. recommended practice for emergency and standby power systems
NEMA ICS10:	AC automatic transfer switch equipment (supercedes ICS2-447)
UL 50/508:	Enclosures
ICS 6:	Enclosures
ANSI C33.76:	Enclosures
NEMA 250:	Enclosures
IEEE 472:	(ANSI C37.90A): Ringing wave immunity
EN55022 ClassB:	(CISPR11): Conducted and radiated emissions (Exceeds EN55011 & MILSTD 461 Class 3)
EN61000-4-2:	(Level 4): ESD immunity test
EN61000-4-3:	(ENV50140): Radiated RF, electromagnetic field immunity test
EN61000-4-4:	Electrical fast transient/burst immunity test
EN61000-4-5:	IEEE C62.41: Surge immunity test (1.2 x 50・s, 5 & 8 kV)
EN61000-4-6:	(ENV50141): Conducted immunity test
EN61000-4-11:	Voltage dips and interruption immunity

2. The closed transition transfer switch requires an isochronous governor which operates at 60 Hz (+/.25 Hz).

3. A 24 VDC shunt trip operator must be provided on the generator feeder breaker to operate should the two sources be paralleled for longer than specified parameters.

4. 24 VDC must be supplied from the engine batteries for use with the shunt trip circuit and as a backup source for alarm functions.

5. This system momentarily interconnects (apx. 100 ms) the utility and standby source during transfer. Local utility approval may be required. Enercon can provide documentation to assist in this procedure. Consult the factory for details.

6. Listed below are other frequently requested optional features which are available for ETSCT transfer switches:

B	Battery Chargers
F	Fan Contact: Closed when engine runs (S.P.N.O.)

H	Time Delay - Engine Start: Non-adjustable delay on starting engine after normal failure. Factory set at 3 seconds; includes Accessory E
HT	Heater and Thermostat
K	Frequency Meter
M	Meters:
	M1 Ammeter: Single phase
	M2 Ammeter: Three phase with phase selector switch
	M3 Voltmeter: Single phase
	M4 Voltmeter: Three phase with phase selector switch
P2	Extended Time Delay - Engine Start: Adjustable 0.5 to 300 seconds
Q7	Inhibit Transfer to Normal: Input circuit to inhibit transfer to normal; 120 VAC or 24 VDC
R15	Load Shed Control (ETS): Input to remote circuit for load shed from emergency to "dead" normal; 120 VAC or 24 VDC
R15D	Load Shed Control (ETSD): Input to remote circuit for load shed from emergency to center-off position; 120 VAC or 24 VDC
S	Selector and Disconnect Switches:
	S1 Three-position selector switch; Stop/ Test/Automatic
	S2 Disconnect switch in series with Accessory E to disconnect engine starting circuit
	S3 Source selector switch circuit to select either source as primary
	S5 Combination auto/manual retransfer selector switch
	S12 Automatic/manual operation for ATS
	S14 Retransfer to normal/test/auto (key operated)
6	Test Switch: A pushbutton (momentary) test switch is standard on all ETS Automatic Transfer Switches; MX200 microprocessor switches are standard with load/no load and fast test (with load) modes and are pass code protected; other selector switches, available at additional cost, include:
	6A Maintained Auto - Maintained Test
	6B Maintained Auto - Momentary Test (key operated)
	6C Maintained Auto - Maintained Test (key operated)

Many additional accessories are available to meet your installation requirements. Consult your Enercon representative with your project needs.