

ATC-800 Controller



ATC-800 Controller

General Description

Taylor's ATC-800 is a microprocessor-based logic controller to be used with transfer switches. This device is door-mounted and provides the operator with an at-a-glance overview of switch status and parameters, as well as key diagnostic data. Real-time values for volts and frequency can be viewed via the front panel LED display, along with an indication of the power source currently in use.

The ATC-800 is a programmable, microprocessor-based monitoring device designed for use in Taylor closed transition transfer switches and for open transition contactor-based designs.

For closed transition applications, the user may avoid intentional interruption of power when both sources of power are available. This make-before-break mode of operation is useful during testing of the engine generator under load and where a predetermined transfer to the generator is desired. Source paralleling duration is limited to less than 100 msec.

Passive Closed Transition

The closed transition mode of operation requires that both power sources be synchronized in voltage, frequency and phase angle within prescribed limits. Taylor's ATC-800 uses a technique that involves waiting for synchronization of the two sources without actively controlling the generator's voltage or frequency. The mode of operation is anticipatory in that the switch close command is initiated before the sources are exactly in phase. Using the phase angle and frequency difference between the two sources, a calculation is made to predict when both sources would be in phase. The response time of the switch is then factored in to determine when the switch close signal should be given to ensure optimal closure of the two sources in phase.

Taylor's closed transition ATC-800 must be selected with one of three feature sets: 47C, 47D or 47E (47D, 47F, 47G on contactor-based designs). The difference between these three feature sets is the action taken by the closed transition ATC-800 if it is determined that the two sources will not achieve synchronization. If feature set 47C is selected, failure to synchronize results in the switch reverting to an Open Transition mode of operation with low voltage decay. If feature set 47E is selected, then failure to synchronize results in the switch reverting to time delay neutral. However, if feature set 47D is selected, failure to synchronize will result in the ATC-800 refusing to transfer to Source 2 and an alarm signal being activated. In neither case will there be a paralleling of sources if synchronization is not achieved.

Application Description

- The generator used with a closed transition transfer switch must be equipped with an isynchronous governor
- When paralleling sources, fault current contributions from both sources should be considered in the system design
- Closed Transition (make-before-break) technology causes paralleling with the Source 1. It is the user's responsibility to comply with any requirements regarding protective relaying. Protective relaying is not supplied with the standard transfer switch, but is available as an option

Features, Benefits and Functions

Switch Application Section—Taylor Closed Transition (ATC-800) Features

The closed transition ATC-800 is a door-mounted, totally enclosed device that is customer accessible from the transfer switch front panel.

Data access and programming operations are performed using the ATC-800 Transfer's touch-sensitive function buttons in conjunction with an easy-to-read, illuminated, alphanumeric LED display. Both the function buttons and the display window are part of the device's front panel. A built-in Help button provides user assistance in the form of message displays.

The ATC-800 is communications ready and compatible with all Taylor IQ devices as well as Taylor's Power Xper® system-wide monitoring software. This permits monitoring of several transfer switches, locally or remotely, from a single point.

Additional Features

- Source paralleling duration is limited to 100 msec or less
- True rms three-phase voltage sensing on normal, Source 2 and Load
- Frequency sensing on normal and Source 2
- Programmable set points stored in nonvolatile memory
- PowerNet communication to personal computer either on site or remote
- Historical data on most recent transfers (up to 16 events) viewable at switch. Unlimited history storage (remote) available when used with PowerNet software
- Wide range of user-selectable option combinations
- Load sequencing
- Engine start contacts
- Engine test switch with user-selectable test mode and fail-safe
- Alarm contact (multiple alarm functions available)
- Pretransfer signal
- Heartbeat monitor (flashing green Automatic light signifies that the ATC-800 is operating properly)

■ Instrumentation:

- Voltmeter (accuracy $\pm 1\%$)
- Reads line-to-line on Sources 1 and 2 and Load
- Frequency meter (40–80 Hz, accuracy ± 0.1 Hz)
- Source available time (both sources)
- Source connected time (both sources)
- Source run time

ATC-800 Programming

Button Functions

Three buttons provide easy access to all commonly used ATC-800 functions.

When the preferred source is connected and the ATS is operating normally, the automatic indicator light will be flashing and the display window will be blank.

Using the Display Select button, the operator can step through each of the six display families:

- Source 1
- Source 2
- Load
- History
- Time/date
- Set points

Note: Stepping through the various display modes does not alter preset values or otherwise affect operation of the ATS.

Once the desired display family is selected, the user may press the Step button to cycle through specific parameters or metered values shown in the display window.

Initial Programming

Factory programming will load all customer-specified functions and presets. At the customer's request, Taylor will add, delete or adjust optional features.

Customer Programming

Customers may reprogram set points and other parameters to match their application, using the program switch located on the rear of the unit. Once the programming mode has been activated and the program light is flashing, the user may access set point settings by pressing the Display Select button until the set points LED is illuminated. Values for individual set points may then be altered by pressing the Increase or Decrease buttons. Once a parameter has been reset, the user advances to the next set point by pressing the Step button.

While the ATC-800 is in the program mode, the device continues to operate in accordance with the previously programmed set points and parameters. The unit is never offline, and preset values do not change until programming has been completed.

Once reprogramming is complete, the user may return the program switch to the run position. At this point, all new values are stored in the ATC-800 non-volatile memory, and the unit returns to Automatic mode.

Definitions

Closed transition: Closed transition is a feature that will temporarily parallel two live sources in a make-before-break scheme when performing a transfer. The ATC-800 will close the switching devices for both sources, paralleling both sources, for a maximum time of 100 milliseconds after the sources are synchronized.

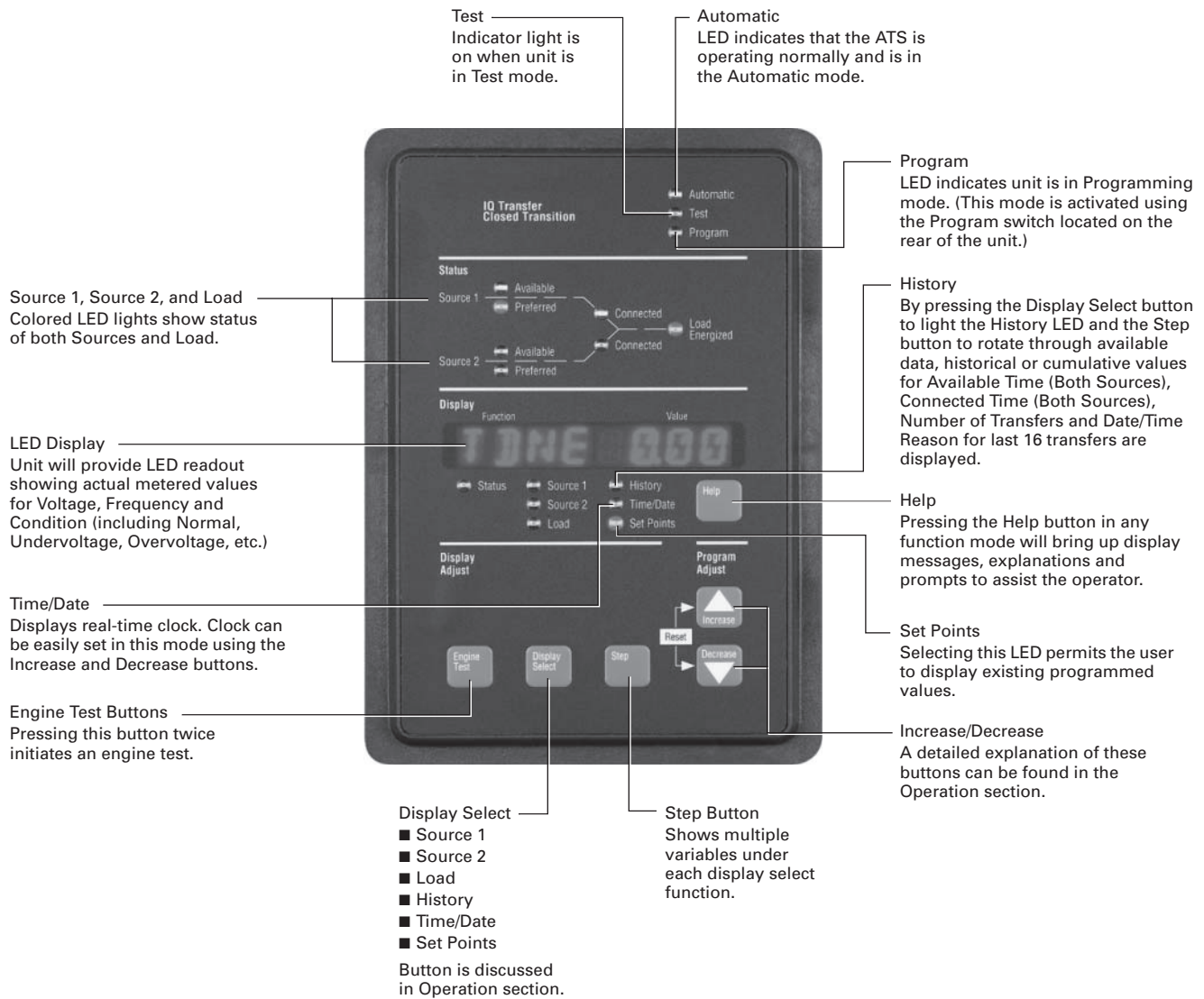
Open transition/in-phase monitor:

In-phase monitor is a feature that will allow a transfer between two sources only when the phase difference between the two sources is near zero. This is an open transition transfer that prevents inrush currents from exceeding normal starting currents in the case where motor loads are being transferred.

Open transition/delayed with load

voltage decay: Load voltage decay transfer is a feature that, after opening the switch for the original source, holds in the neutral position until the voltage on the load is less than 30% of rated voltage. This is an open transition that prevents inrush currents from exceeding normal starting currents in the case where motor loads are being transferred.

ATC-800 Controller—Features, Benefits and Functions



Closed Transition ATC-800 Front Panel Display and Button Functions

Operation

The ATC-800 operates in the following modes to meet most load management applications:

- Loss of normal power
 - Open transition to alternate source
- Normal power restored
 - Closed transition back to normal source
- Peak shave (remote or local) closed transition to and from alternate source
- Test (user selectable)
 - Load transfer—closed transition to and from alternate source
 - No-load transfer—starts alternate power source and allows to run unloaded. No transfer takes place

Programming and Options

Closed Transition Operation Modes

Feature Set 47C Closed/In-Phase/Load Voltage Decay

ATC-800 controllers equipped with Feature Set 47C execute the following sequence of operations upon receipt of a request for transfer: the controller waits (for a preselected time frame) for synchronization of voltage and frequency. If achieved, a closed transition transfer occurs. Failure to synchronize results in the controller defaulting to an in-phase monitor, open transition mode of operation. If the two sources fail to achieve frequency synchronization within the user-selectable range, the controller defaults to an open transition using a load voltage decay delayed transition.

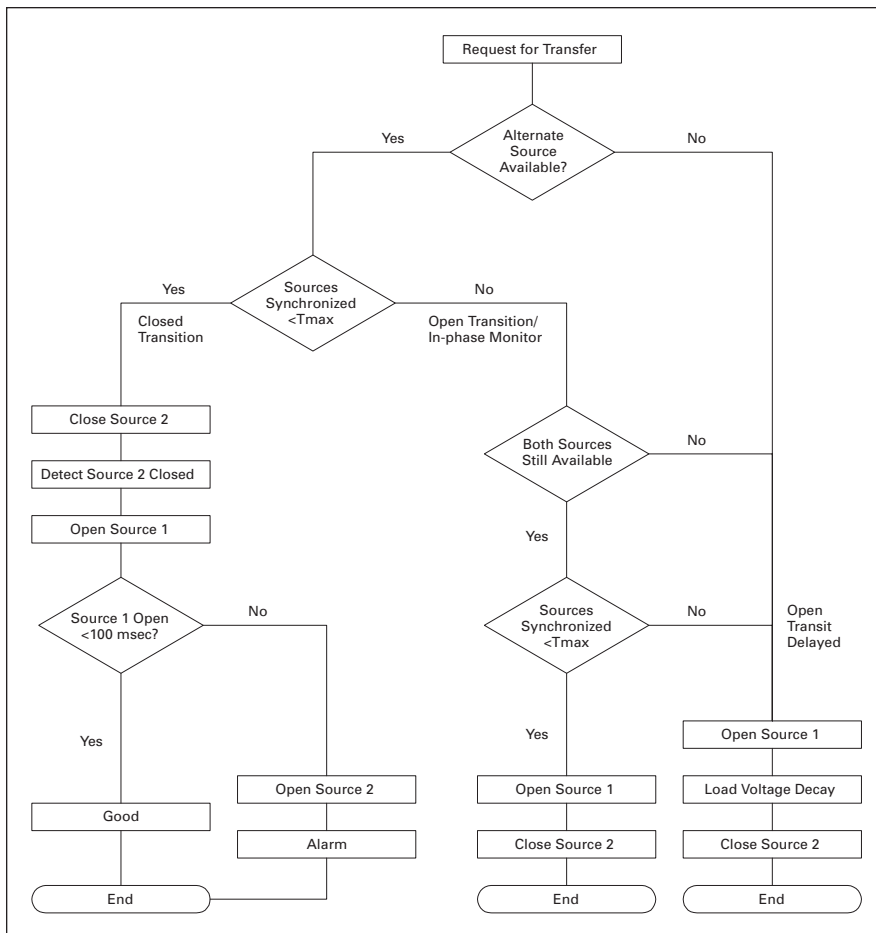


Figure 25.4-1. Feature Set 47C Schematic

Table 25.4-9. Closed Transition/In-Phase Standard Features

Standard Features	Customer Adjustments
Closed transition frequency difference (Hz)	0.0 to 0.3 Hz
Closed transition voltage difference (V)	1–5%
In-phase transition frequency difference (Hz)	0.0–0.3 Hz
Closed transition synchronization timer	1–60 minutes
In-phase transition synchronization timer	1–60 minutes

In-Phase Transfer

Feature Set 47D Closed Only

ATC-800 controllers equipped with Feature Set 47D only transfer to an alternate source when both sources are synchronized. For synchronization to occur, both voltage and frequency differentials must fall within the user-selectable ranges. If synchronization does not occur (within a preselected amount of time), the controller will maintain load connection to the current power source and initiate an alarm.

Closed Transition With Default to In-Phase Transition With Default to Time Delay Neutral

Provides a closed transition transfer as the primary transfer mode. In the event Source 1 and Source 2 fail to synchronize within the permitted voltage difference, frequency difference, phase angle difference and time, then the controller defaults to the In-phase transition with default to time delay neutral operation as described in **Features 32D and 32A**. Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5% volts. Adjustable synchronization time allowance 1–60 minutes.

Feature Set 47F Closed/Load Voltage Decay

ATC-800 controllers equipped with Feature Set 47F will perform a closed transition when both sources are synchronized in frequency, phase and voltage. Failure to synchronize will result in an open transition Time Delay Load Voltage Decay transfer. Time Delay Load Voltage Decay uses the load voltage measurements to sense back EMF that is generated when the transfer switch is in the Neutral position. It provides a delay in transfer in either direction if an unacceptable level is sensed as established by a customer programmed level. The transfer will not take place until the back EMF decays below the acceptable programmed level. This feature has a separate setting of enabling or disabling the operation. If disabled, the transfer switch will not delay in the Neutral position and will transfer between the sources as fast as possible. This feature is not available with the Time Delay Neutral Optional **Feature 32A**.

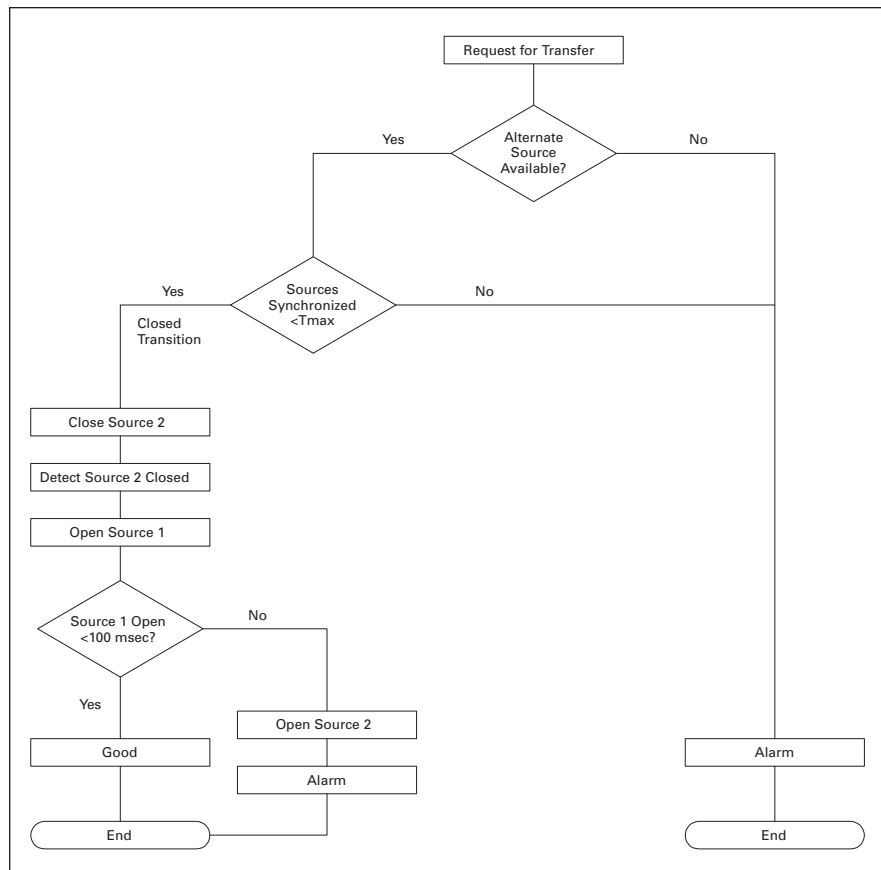


Figure 25.4-2. Feature Set 47D Schematic

Table 25.4-10. Closed Transition Standard Features

Standard Features	Customer Adjustments
Closed transition frequency difference (Hz)	0.0–0.3 Hz
Closed transition voltage difference	1–5%
Closed transition synchronization timer	1–60 minutes

Feature Set 47G Closed/Time Delay Neutral

ATC-800 controllers equipped with Feature Set 47G will perform a closed transition transfer when both sources are synchronized in frequency, phase and voltage. Failure to synchronize will result in an open transition Time Delay Neutral transfer. Time Delay Neutral provides a time delay in the transfer switch neutral position when both sources are open. This delay takes place when the load is transferred in either direction to prevent excessive in-rush currents due to out-of-phase switching of large motor loads.