EATON | Cutler-Hammer

Magnum Transfer Switches

Technical Data

Introduction

Eaton's Magnum Transfer Switches are designed for a variety of standby power applications for critical and non-critical loads. They monitor both Source 1 (Normal) and Source 2 (Emergency) power sources. In the event of a Source 1 power interruption, these switches will automatically transfer the load circuits to the Source 2 power source. Once Source 1 power source has been restored, the process is automatically reversed.

The Magnum family of transfer switches covers applications ranging from 200 to 5000 amperes (A) through 600 Vac. Some of the applications are; automatic or non-automatic configurations, open or closed transition, and standard or rated sutiable for use as service entrance. They are designed for applications where total system coordination must be accomplished while achieving a high level of Withstand, Interrupting, and Closing performance.

Drawout construction is available for applications, such as critical life support systems, where preventive maintenance, inspection, and testing must be accomplished while maintaining continuity of power to the load.

Eaton Magnum Transfer Switches meet or exceed all industry standards for endurance, reliability, and performance. They are listed under Underwriters Laboratories UL 1008 Standard for Transfer Switch Equipment. With certain options, they also comply with Source 2 and standby system requirements as defined in NFPA 99 for health care facilities.

Magnum Transfer Switch Family

- Magnum fixed mount 200 – 5000 A.
- Magnum drawout 200 – 5000 A.

Eaton Magnum Transfer Switches offer the utmost in flexibility, reliability, and value. These switches must exceed many national and international standards. They are designed and built in accordance with the following:

UL 891	Standard for Switchboards carrying up to 200,000 A
UL 1008	Standard for Safety for Automatic Transfer Switches
UL 489	Standard for Circuit Breakers and Molded Case Switches

NECT Articles	Code Sections
517, 700, 701, 702	Applicable Switch Equipment
NFPA 110	Source 2 and Standby Power Systems
NFPA 99	Health Care Facilities
EGSA 100S	Standard for Transfer Switches
NEMAT ICS10	Standard for Transfer Switch Equipment
UBC	Uniform Building Code for Seismic Zone 4
ISO 9000	International Organization for Standardization
CBC	California Building Code
IBC	International Building Code
BOCA	Building Officials Code Administrators.

Design Highlights

- UL 1008 listed.
- Freestanding.
- Magnum insulated case devices.
- Fastest switching times available (< 3 cycles).
- High withstand ratings.
- Full 60-cycle short time withstand capability.
- Safe manual transfer under load.
- Multi-tap voltage selection plug.
- Integral service entrance capability.
- Integral overcurrent protection capability.
- Drawout capability.
- Programmable microprocessor controller with keypad entry and display.
- Communications capable.
- Durable powder-coated steel enclosures.
  - All NEMA 1 and NEMA 12
  - NEMA 3R 200 – 5000 A
- Seismic Zone 4 Qualified (BOCA, CBC, IBC, UBC).
- American Bureau of Shipping Qualified.
- ISO 9000.
- ISO 14000 Environmental.
- Ambient temperature range: -40°C to 40°C (-40°F to 104°F).
- Operating temperature range: -20°C to 70°C (-4°F to 158°F).
- Operating humidity: up to 90%.
- Relative humidity (non-condensing).

Typical Applications

Source 1 — Generator

Transfer switches are traditionally applied between a Source 1 (Utility) power source and a Source 2 (Emergency) power source (generator set for emergency and standby power systems).

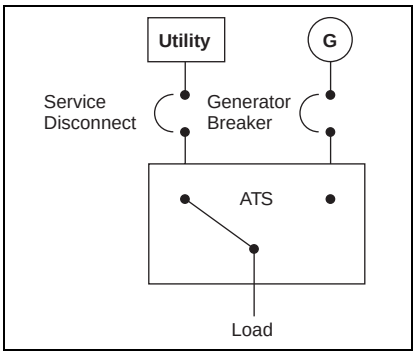


Figure 1. Standard Application Source 1— Generator.

Generator — Generator

Transfer switches are sometimes applied between two generator sets for prime power use, often in remote installations. In such applications, source power is periodically alternated between the generator sets to equally share run time between the two.

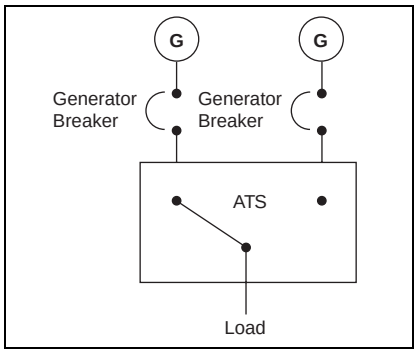


Figure 2. Standard Application Generator— Generator.

Service Entrance Equipment

Often, it is desirable to apply the transfer switch as a service equipment device thereby eliminating the need for separate service disconnects and overcurrent protective devices. This switch is particularly adaptable to wastewater and water treatment plants, pumping stations, industrial plants, telecommunications facilities, and other installations where all the loads are critical in nature and need to be backed up by an alternate power source.

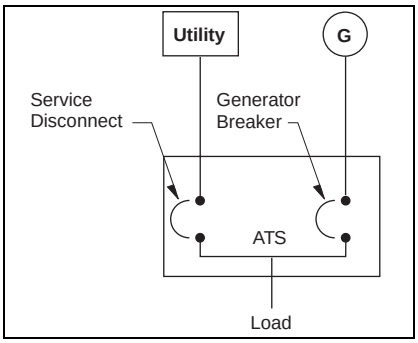


Figure 3. Service Entrance Application.

Basic Switch Components

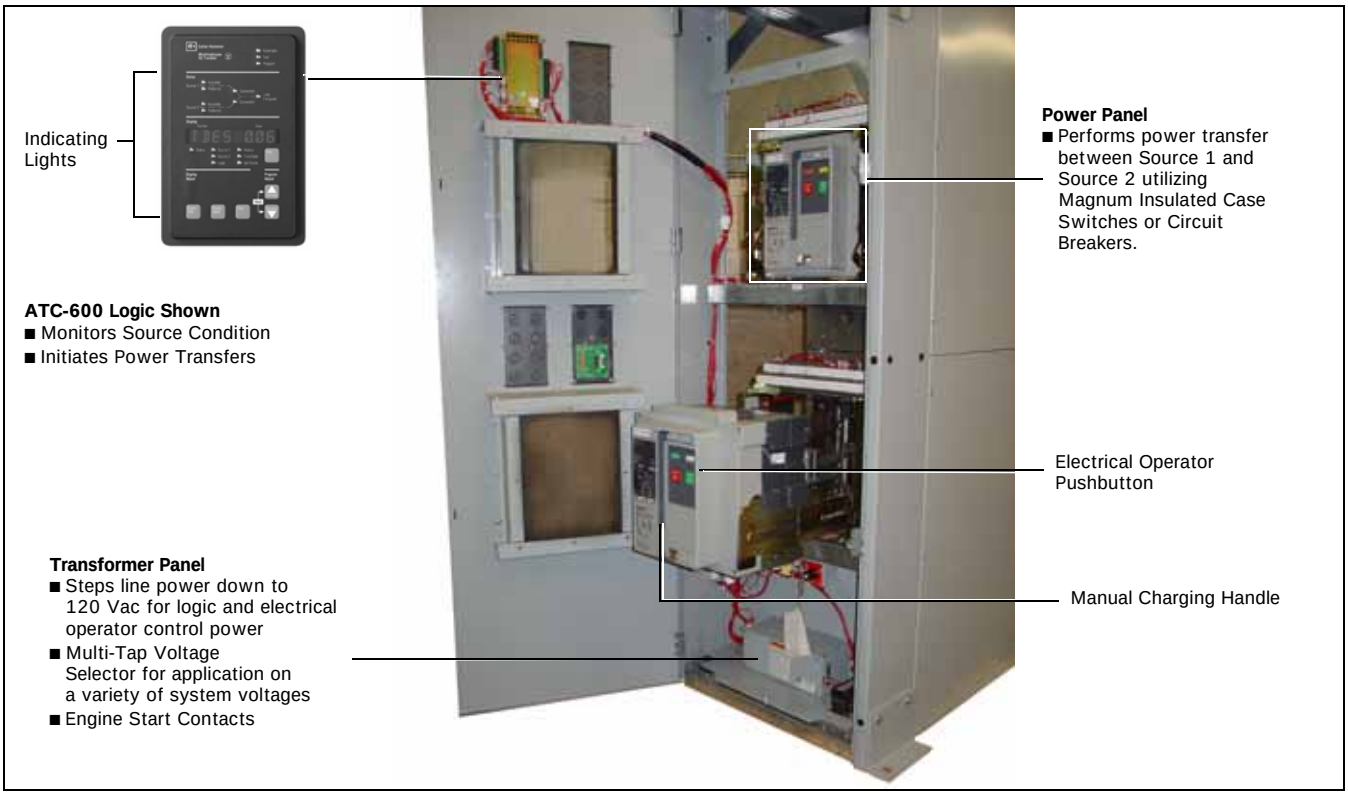


Figure 4. Basic Switch Components of Magnum Automatic Transfer Switches.

Magnum Fixed Mount Transfer Switch

1200 Ampere, 3-Pole NEMA 1 Enclosed

Mini-SPB Fixed Mount

- 600 – 1200 amperes.
- 2-, 3-, 4-pole.
- 120 – 600 Vac.
- 65,000 amperes withstand/closing/ interrupting at 480 Vac.
- Fixed mount construction.
- Available in NEMA Type 1, 3R, 4, 4X and 12 enclosures.
- Front cable access.

Catalog Number
ATVISPA31200XSU

2000 Amperes, 4-Pole, NEMA 1 Enclosed

Magnum Fixed Mount

- 200 – 5000 A.
- 2-, 3-, 4-pole (except 3200 amperes: 2- and 3-pole only).
- 120 – 600 Vac.
- 100,000 amperes withstand/closing/ interrupting at 480 Vac.
- Short Time Withstand – 85,000 for 30 cycles.
- Fixed mount construction.
- Available in NEMA Type 1 and 3R enclosures.
- Rear, side, and top cable access.

Catalog Number
ATVIMGA42000XRU

Magnum Drawout Transfer Switch

2000 Amperes, 3-Pole NEMA 1 Enclosed Drawout

Magnum Drawout

- 200 – 5000 amperes.
- 2-, 3-, 4-pole (except 4000 amperes: 2- and 3-pole only).
- 120 – 600 Vac.
- 100,000 amperes withstand/closing/ interrupting at 480 Vac.
- Short Time Withstand – 85,000 for 30 cycles.
- Drawout construction with switch position indicator.
- Completely interchangeable power switching devices.
- Available in NEMA Type 1 and 3R enclosures.
- Rear, side, and top cable access.

The Eaton Drawout Magnum Switch should be considered for any systems requiring either greater redundancy, easier maintainability, or where true selective coordination is desired.

The Eaton Drawout Magnum Switch provides the capability to isolate either of the two power sources (Source 1 or Source 2) and its associated logic, while maintaining power to the load.

Each switching section is independent and can be replaced either with a spare switch, or for less critical replacement needs, a replacement unit is available from the factory.

Catalog Number
ATVIMGE32000XSU

Transfer Switch Withstand Ratings

Table 1. Systems Coordination Information — Withstand, Closing, and Interrupting Ratings

Rating When Used with Upstream Circuit Breaker		Rating When Used with Upstream Fuse
Transfer Switch Amp Rating	3 Cycle 600 V (kA)	30 Cycle 600 V (kA)
800	100	85
1000	100	85
1200	100	85
1600	100	85
2000	100	85
2500	100	85
3200	100	85

Tested in accordance with UL1008. Eaton Drawout Magnum Transfer Switch will coordinate with a power switching device short time rating. Contact factory for details.

Standard UL 1008 3-Cycle									60-Cycle, Extended Rating			
ATS Ampere Rating	Ratings when used with Upstream Breaker (kA)			Ratings when used with Upstream Fuse (kA)					Ratings used for Coordination with Upstream Breakers with Short Time Ratings			
	Volts			Maximum Fuse Rating	Fuse Type	Volts						
	240	480	600			600	240	480	600			
Mini-SPB												
600	85	65	65	800	L	200	35	35	35			
800	85	65	65	1000	L	200	51	51	51			
1000	85	65	65	1600	L	200	51	51	51			
1200	85	65	65	1600	L	200	51	51	51			

Closed Transition IQ Transfer (ATC-800) for ATS

Introduction

The Closed Transition IQ Transfer [CTIQ Transfer (ATC-800)] is a programmable, microprocessor-based monitoring device designed for use in Eaton Closed Transition Transfer Switches (CTVI/CBVI). By using the Eaton CTIQ Transfer (ATC-800), 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. Eaton's CTIQ Transfer (ATC-800) utilizes 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. Utilizing 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 assure optimal closure of the two sources in-phase.

The Eaton Closed Transition IQ Transfer (ATC-800) must be selected with one of two feature sets: 47C or 47D. The difference between these two feature sets is the action taken by the CTIQ Transfer (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. However, if Feature set 47D is selected, failure to synchronize will result in the CTIQ Transfer (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 Considerations

- The generator used with a closed transition transfer switch must be equipped with an isochronous 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.

Switch Application Section

Eaton Closed Transition IQ Transfer (ATC-800) Features

The CTIQ Transfer (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 CTIQ (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 CTIQ Transfer (ATC-800) is communications ready and compatible with all Eaton IQ devices as well as the Eaton PowerNet system-wide supervisory and control software. This permits monitoring and control of several transfer switches, locally or remotely, from a single point.

Additional Features:

- Source paralleling duration is limited to 100 msec or less.
- Applicable for use on any low or medium voltage application through 38 kV.
- True rms three-phase voltage sensing on Normal, Source 2 and Load.
- Frequency sensing on Normal and Source 2.
- Programmable set points stored in non-volatile 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).
- Pre-transfer signal.
- Heartbeat Monitor (flashing green Automatic light signifies that the CTIQ Transfer (ATC-800) is operating properly).
- Instrumentation
  - Voltmeter (Accuracy ± 1%)
  - Reads line-to-line on Sources 1 and 2 and Load
  - Frequency Meter (40-80 Hz, accuracy ± .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 CTIQ Transfer (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.

Programming, (Continued)

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, Eaton will add, delete or adjust optional features.

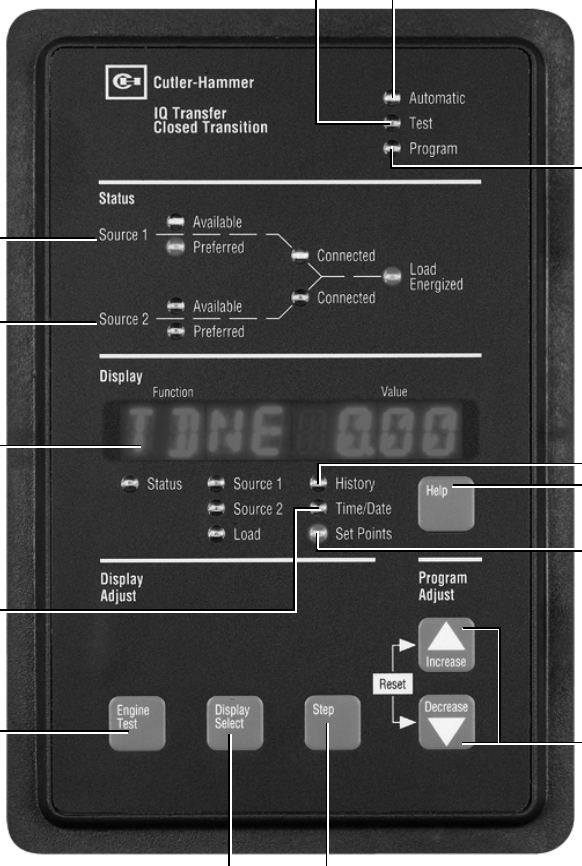
Customer Programming

Customers may reprogram set points and other parameters to match their application, using the Program switch located on the rear of the unit. One 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 CTIQ Transfer (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 off-line, 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 CTIQ's (ATC-800) non-volatile memory, and the unit returns to Automatic mode.

Closed Transition IQ Transfer (ATC-800) Front Panel Display and Button Functions



Test
Indicator light is on when unit is in Test

Automatic
LED indicates that the ATS is operating normally and is in the Automatic mode.

Program
LED indicates until is in Programming mode. (**Note:** This mode is activated using the Program switch located on the rear of the unit.

Source 1, Source 2, and Load
Colored LED lights show status of both Sources and Load.

History
By pressing the Display Select button to light the History LED and the Step button to rotate through available data, historical or cumulative values for Available Time (Both Sources), Connected Time (Both Sources), Number of Transfers and Date/Time Reason for last 16 transfers are displayed.

LED Display
Unit will provide LED readout showing actual metered values for Voltage, Frequency and Condition (including Normal, Under Voltage, Over Voltage, etc.

Help
Pressing the Help button in any function mode will bring up display messages, explanations and prompts to assist the operator.

Time/Date
Displays real-time clock. Clock can be easily set in this mode using the increase and Decrease buttons.

Set Points
Selecting this LED permits the user to display existing programmed values.

Engine Test Buttons
Pressing this button twice initiates an engine test.

Increase/Decrease
A detailed explanation of these buttons can be found in the Operation section.

Display Select
- Source 1
- Source 2
- Load
- History
- Time/Date
- Set Points

Button is discussed in Operation section.

Step Button
Shows multiple variables under each display select function.

ATC-800 Operation

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 CTIQ (ATC-800) Transfer 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.

Operation

The Eaton CTIQ (ATC-800) Transfer operates in the following modes to meet most load management applications:

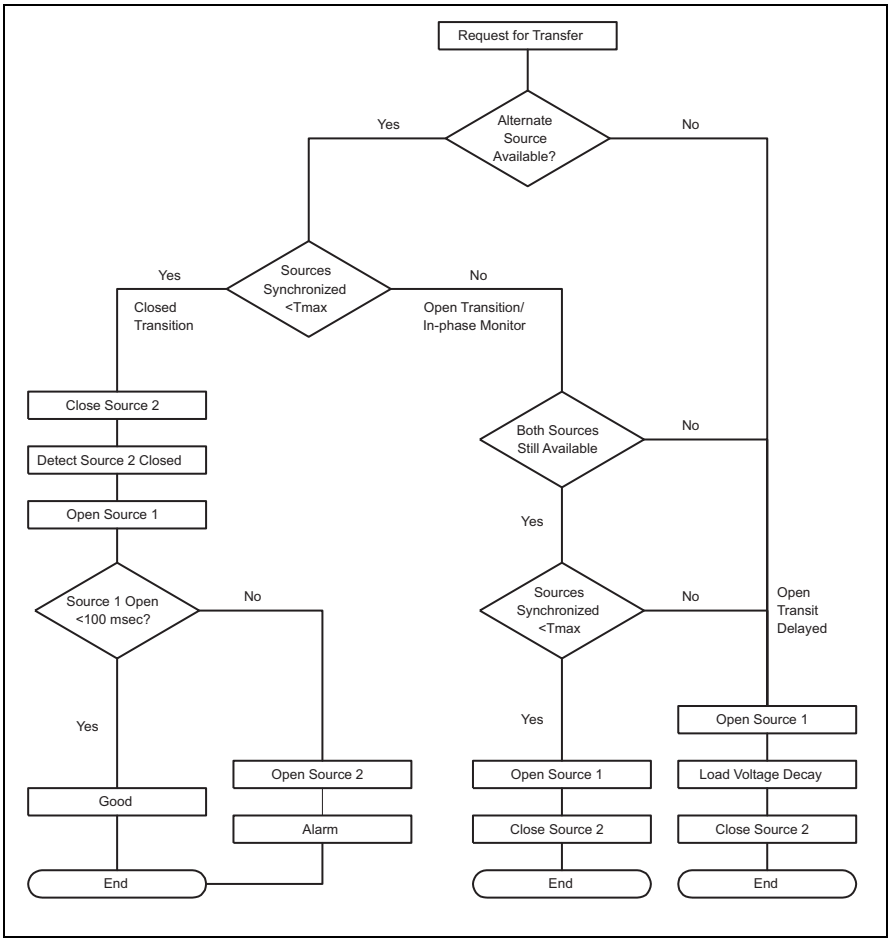
- Loss of Normal Power
  - Open Transition to Alternate Source
- Normal Power Restored
  - Closed Transition back to Normal Source
- Peak Shave (Remote or Local)
  - Closed Transition to and from Alternate Source
- Test (User Selectable)
  - Load Transfer – Closed Transition to and from Alternate Source
  - No-Load Transfer – Starts Alternate Power Source and Allows to Run Unloaded. No Transfer Takes Place

ATC-800 Programming and Options

Closed Transition Operation Modes

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

CTIQ (ATC-800) Transfer controllers equipped with Feature Set 47C execute the following sequence of operations upon receipt of a request for transfer: the controller waits (for a pre-selected 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.

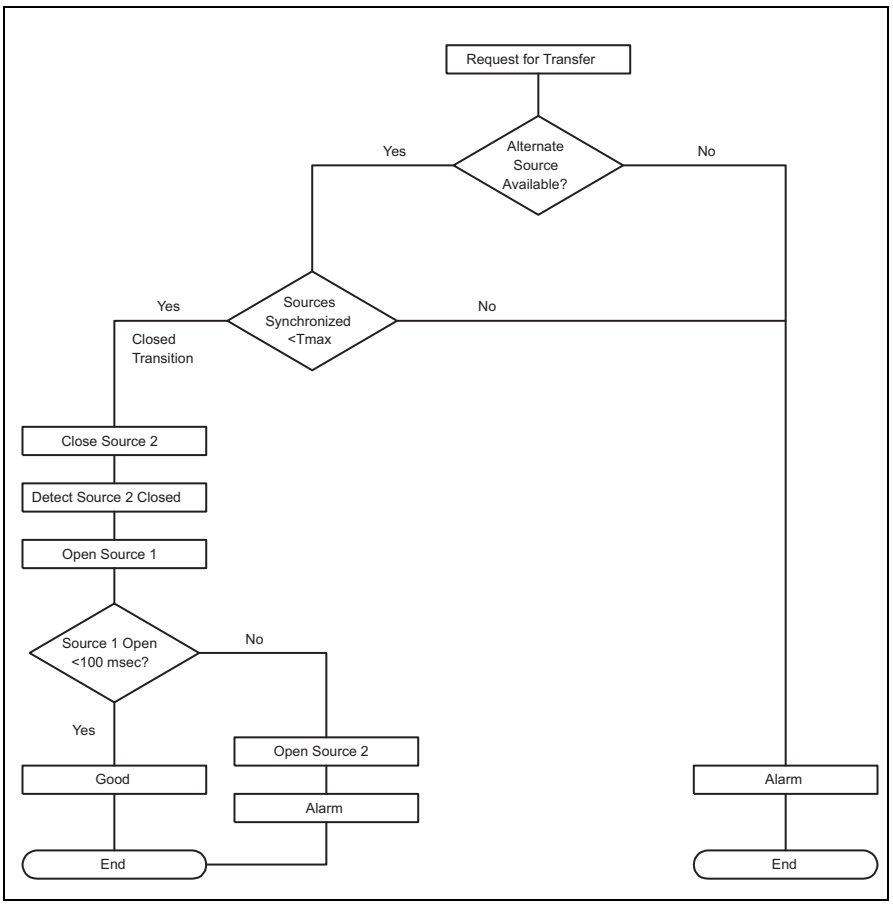


Standard Features	Customer Adjustments
Closed Transition Frequency Difference(Hz)	0.0 to 0.3 Hz
Closed Transition Voltage Difference (Volts)	1 to 5%
In-phase Transition Frequency Difference (Hz)	0.0 to 3.0 Hz
Closed Transition Synchronization Timer	1 to 60 Minutes
In-phase Transition Synchronization Timer	1 to 60 Minutes

Programming and Options, (Continued)

Feature Set 47D Closed Only

CTIQ (ATC-800) Transfer 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 pre-selected amount of time) the controller will maintain load connection to the current power source and initiate an alarm.



Standard Features	Customer Adjustments
Closed Transition Frequency Difference (Hz)	0.0 to 0.3 Hz
Closed Transition Voltage Difference	1 to 5%
Closed Transition Synchronization Timer	1 to 60 Minutes

Drawout and Fixed Switching Devices

Installing a Drawout Switching Device

In transfer switches equipped with drawout switching devices, bolted-in carriages with extendable rails support the switching devices.

Figure 5. Switching Device Drawn Out from the Transfer Switch.

To install a drawout switching device, the extendable rails must first be pulled all the way out. Once the rails are fully extended, the switching device can be carefully placed on the rails.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN PLACING A DRAWOUT SWITCHING DEVICE ON ITS EXTENDED RAILS. IF THE SWITCHING DEVICE IS NOT PROPERLY SEATED ON THE EXTENDABLE RAILS, IT COULD FALL FROM THE RAILS CAUSING EQUIPMENT DAMAGE AND/OR BODILY INJURY.

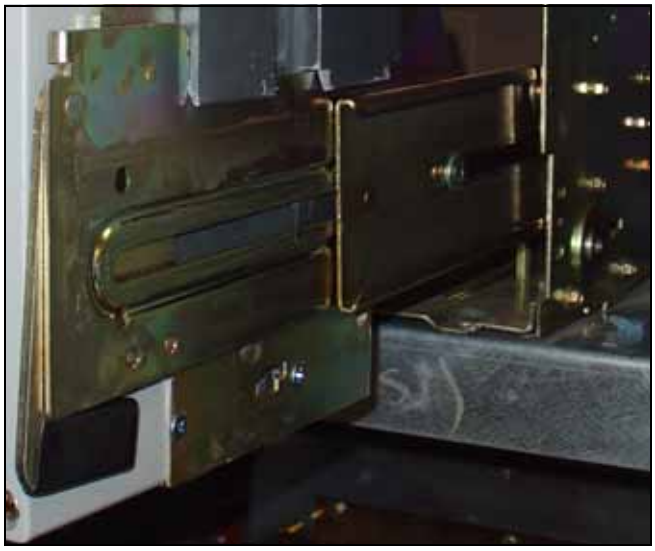


Figure 6. Drawout Rail Supports Fully Seated in the Rail Cutouts.

Carefully lower the switching device onto the extended rails. Be certain that the switching device's four molded drawout rail supports are fully seated in the extendable rail cutouts on both sides (Figure28). **Do not remove the lifting yoke from the switching device until it is properly seated on the rails.**

Figure 7. Switching Device in the REMOVE Position.

Once the switching device is properly seated on the extended rails, the lifting yoke can be removed and the rest of the switching device installation procedure can be completed.

Switching Device Positioning

The Magnum drawout switching device has four normal positions:

- REMOVE (Withdrawn) (Figure 7)
- DISCONNECT (Figure 10)
- TEST (Figure 9)
- CONNECT (Figure 8)

The REMOVE position is a position outside the compartment on the carriages drawout rails where the switching device is not engaged with the levering mechanism. The DISCONNECT, TEST, and CONNECT, positions are reached by means of the levering mechanism.

With the switching device solidly positioned on the carriage's extendable rails and the levering-in mechanism in the DISCONNECT position, carefully and firmly push the switching device into the compartment as far as it will go. The outer (recessed) portion of the switching device face plate should align with the GREEN target line (labeled DISC) on the inside top left wall of the carriage (Figure 11).

⚠ CAUTION

MAKE CERTAIN THAT THE SWITCHING DEVICE IS FULLY INSERTED INTO ITS COMPARTMENT BEFORE ANY ATTEMPT IS MADE TO LEVER THE SWITCHING DEVICE. ATTEMPTING TO LEVER THE SWITCHING DEVICE IN BEFORE IT IS FULLY POSITIONED INSIDE ITS COMPARTMENT CAN RESULT IN DAMAGE TO BOTH THE SWITCHING DEVICE AND THE COMPARTMENT.

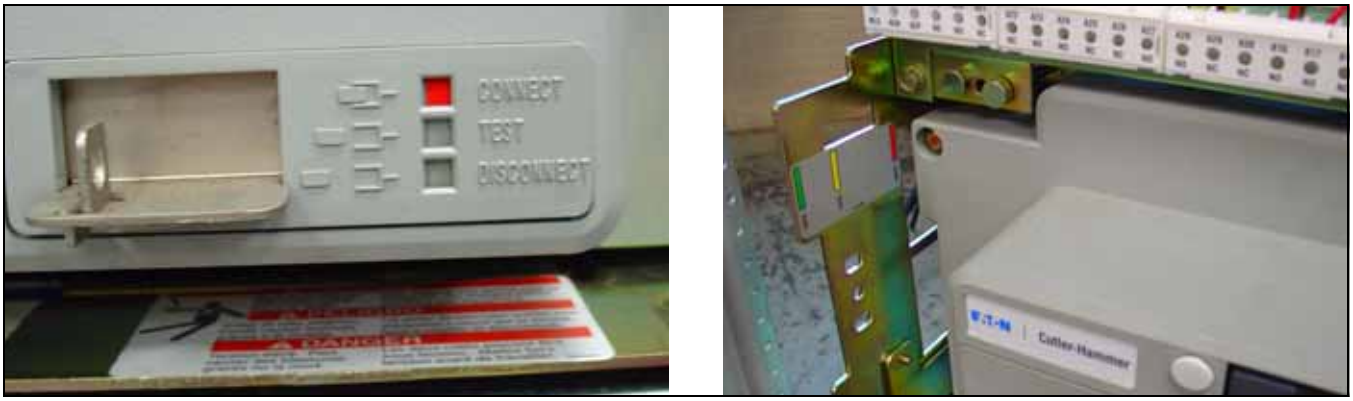


Figure 8. Switching Device in the CONNECT Position.

Figure 9. Switching Device in the TEST Position.

Figure 10. Switching Device in the DISCONNECT Position.

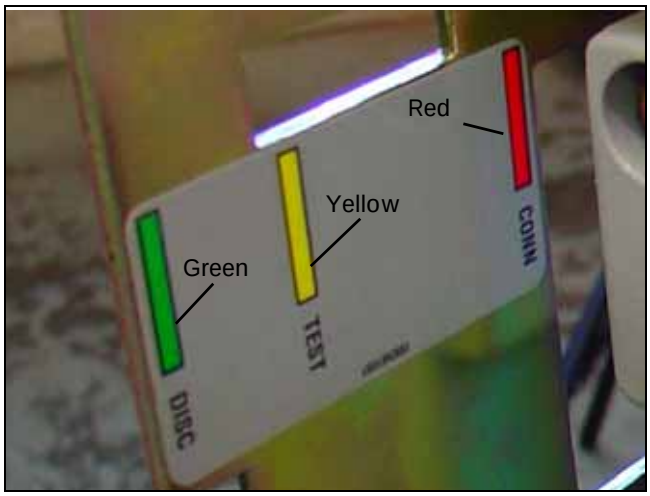


Figure 11. Carriage Label Showing DISCONNECT, TEST, and CONNECT Positions of the Recessed Cover.

Levering the Switching Device

The switching device is now ready to be levered. With the switching device OPEN, the levering device access door can be raised. The levering device is hand operated using a standard 3/8" square drive and ratchet, which is not provided (Figure 12). As long as the access door is raised, the switching device is held in the "trip free" condition. Begin by rotating the levering-in screw to the full counter clockwise (DISCONNECT) position.

Figure 12. Levering and Position Indication.

Close the compartment door and begin levering the switching device into its different positions using a clockwise ratcheting motion. When the switching device is levered fully to the DISCONNECT or CONNECT position, the levering shaft hits a hard stop. Do NOT exceed 25 ft lb (33.9 Nm) of torque or the levering mechanism may be damaged.

NOTICE

THE SWITCHING DEVICE CAN BE LEVERED WITH THE COMPARTMENT DOOR OPEN OR CLOSED, BUT IT IS ADVISABLE TO CLOSE THE DOOR PRIOR TO LEVERING.

The position of the switching device within its compartment is indicated by color coded position indicators (See Figure 8 through 11):

- Red = Connect;
- Yellow = Test; and
- Green = Disconnect.

To remove the switching device from its compartment, follow the procedure just described using a counter clockwise ratcheting motion.

NOTICE

THE SWITCHING DEVICE MECHANISM IS INTERLOCKED SUCH THAT CHARGED CLOSING SPRINGS ARE AUTOMATICALLY DISCHARGED IF THE SWITCHING DEVICE IS LEVERED INTO OR OUT OF THE CELL. DISCHARGE TAKES PLACE BETWEEN THE DISCONNECT AND TEST POSITION.

Fixed Switching Device

The Magnum fixed type switching device differs from the drawout version in that it has no levering device, primary disconnects, and secondary disconnects (Figure 13). In addition, a fixed switching device does not have a standard feature to hold the switching device in a "trip free" position

Figure 13. Typical Magnum Fixed Switching Device.

Fixed switching device terminals have holes for making bolted horizontal primary bus connections. Adapters are available for making vertical primary bus connections. Secondary connections can be made through standard terminal blocks or a special connector compatible with the drawout switching device's type secondary connector. Both secondary connection devices are mounted at the top front of the switching device.

The fixed switching device frame has two mounting feet, one on each side, to permit the fixed switching device to be securely mounted. Each mounting foot has two slotted mounting holes which are used to bolt the switching device securely in place. Use either 3/8" or M 10 bolts for this purpose. Refer to the dimensional drawings supplied with the transfer switch for switching device and bus stab dimensions.

Switching Device Operation

Switching devices should be operated manually and/or electrically before they are put into service. This can be done during the installation process or some later date prior to start-up. To check the switching device operation, follow the operational procedures outlined in switching device manual supplied with the transfer switch for both manually operated and electrically operated switching devices.

Operation of the Bypass Isolation Transfer Switch

Operator Panel

The design of this transfer switch allows quick removal of the different switching devices for inspection or maintenance or, if required, quick replacement.

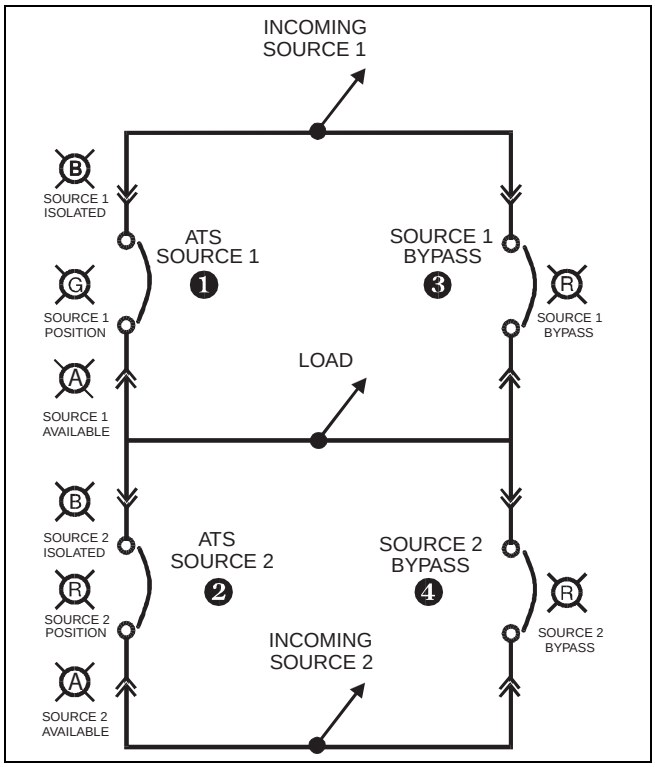


Figure 14. Typical Bypass Isolation Switch Schematic.

The bypass isolation switch has two operator panels with switches and lights (Figure **15**). The following descriptions are for those features that are standard with the bypass isolation switch. Additional features are described in the options section.

Figure 15. Bypass Isolation Switch.

The left door control panel has the following standard features:

1. Light to indicate if the Source 1 power source is available.
2. Light to indicate if the Source 2 power source is available.
3. Light to indicate if the Source 1position is energized, that is, the Source 1 switching device in the automatic transfer switch is closed.
4. Light to indicate if the Source 2 position is energized, that is, the Source 2 switching device in the automatic transfer switch is closed.
5. The Push-To-Test button allows testing of the transfer switch. Pushing the button two times will simulate a power failure, causing the transfer switch to start the transfer sequence. Pressing the button again will restore regular power.

Three-position selector switch to control the generator:

- ❑ AUTO - The intelligence circuit of the transfer switch will start the generator if the Source 1 power source is not available.
- ❑ OFF - The intelligence circuit of the transfer switch will not be able to start the generator, which eliminates nuisance starts during maintenance.
- ❑ RUN - The generator will run regardless of the availability of the Source 1 power source.

Figure 16. Magnum Bypass Lights

The right door control panel has the following standard features:

1. Light to indicate if the Source 1 switching device is isolated (only if the Source 1 switching device is racked out).
2. Light to indicate if the Source 2 switching device is isolated (only if the Source 2 switching device is racked out).
3. Light to indicate if the Source 1 bypass switching device is closed.
4. Light to indicate if the Source 2 bypass switching device is closed.

Automatic Operation

The intelligence/supervisory circuits on Eaton transfer switches constantly monitor the condition of both the Source 1 and Source 2 power sources. These circuits automatically initiate an immediate transfer of power from the Source 1 to the Source 2 power source when the power source fails or the voltage level drops below a preset value. Transfer back to the Source 1 power source is automatic upon return of the Source 1 power source.

Monitoring the power source is always performed on the line side of the power source to which the switch is connected. The Source 1 power source is the preferred source and the transfer switch will always seek this source when it is available.

Bypassing the Transfer Switch

⚠ WARNING

THE CLOSED TRANSITION PRODUCT CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

Source 1 to Source 1 BYPASS

The Source 1 switching device can be bypassed and isolated by the following sequence (Figures 16 and 17):

1. Move the generator selector switch to the OFF position to avoid nuisance starts.
2. Close the Source 1 bypass switch manually. The Source 1 bypassed light will illuminate.
3. Inspect and/or perform the needed maintenance on the Source 1 switching device.
4. Rack in the Source 1 switching device (see Drawout and Fixed Switching Devices Section). The Source 1 switching device will automatically recharge and close when it is in the CONNECT position. The Source 1 isolated light will no longer be illuminated, but the Source 1 position energized light will be illuminated.
5. Open the Source 1 bypass switch. The Source 1 bypassed light will no longer be illuminated.
6. The Source 1 switching device is now back in automatic operation.

Source 2 TO Source 2 BYPASS

The Source 2 switching device can be bypassed and isolated by the following sequence:

1. Move the generator selector switch to the RUN position to avoid losing power.
2. Close the Source 2 bypass switching device manually. The Source 2 bypass light will illuminate.
3. Open and rack out the Source 2 switching device (see Drawout and Fixed Switching Devices Section). The Source 2 isolated light will illuminate and the Source 2 position energized light will no longer be illuminated.

4. Inspect and/or perform the needed maintenance on the Source 2 switching device.
5. Rack in the Source 2 switching device (see Drawout and Fixed Switching Devices Section). The Source 2 switching device will automatically recharge and close when in the CONNECT position.

   The Source 2 isolated light will no longer be illuminated, and the Source 2 position energized light will illuminate.
6. Open the Source 2 Bypass switch. The Source 2 Bypass light will no longer be illuminated.
7. The Source 1 Switch is now back in automatic operation.

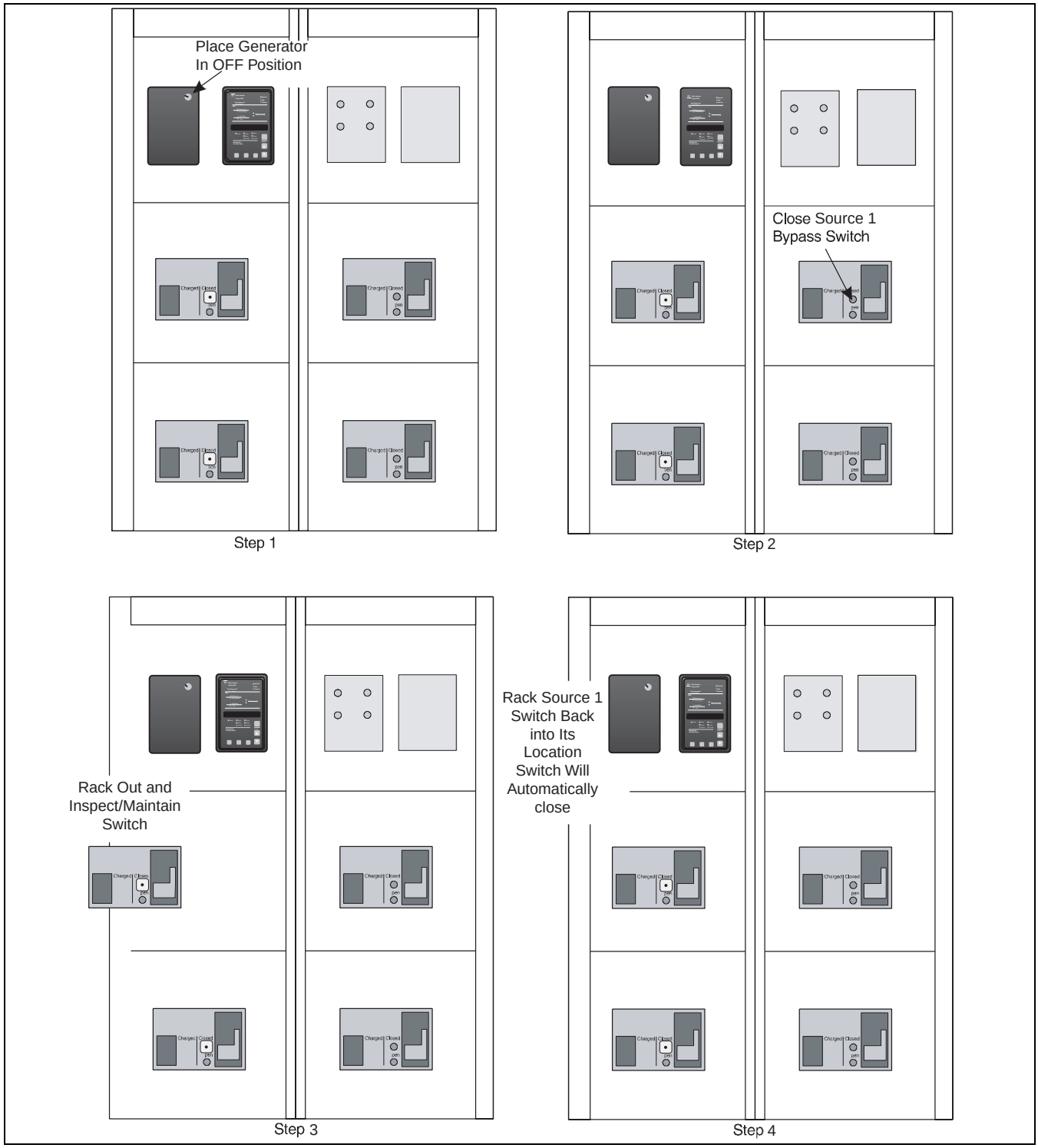


Figure 17. Transfer from Normal Switching Device to Normal Bypass Switching Device, Steps 1-4.

Figure 18. Transfer from Normal Switching Device to Normal Bypass Switching Device, Steps 5-6

Source 1 to Source 2 Bypass (Open Transition Only)

The Source 1 switch can be isolated and bypassed by the following sequence:

1. Move the generator selector switch to the RUN position because the load needs to be energized from the Source 2 power source.
2. Make sure that the Source 2 power source is available.
3. Open the source/switching device.
4. Close the Source 2 bypass switching device manually. The Source 2 bypass light will be illuminated.
5. Rack out the Source 1 switching device (see Drawout and Fixed Switching Devices Section). The Source 1 isolated light will illuminate.
6. Inspect and/or perform the needed maintenance on the Source 1 switching device.
7. Rack in the Source 1 switching device (see Drawout and Fixed Switching Devices Section). The Source 1 switching device will automatically recharge when it is in the CONNECT position. The Source 1 isolated light will no longer be illuminated.
8. Open the Source 2 bypass switching device. The Source 2 bypass light will no longer be illuminated.
9. The Source 1 switching device is now back in automatic operation.

Source 2 to Source 1 Bypass (Open Transition Only)

The Source 2 switching device can be bypassed and isolated by the following sequence:

1. Ensure that the Source 1 power is available since the load will be energized from the Source 1 power source.
2. Move the generator selector switch to the OFF position to avoid nuisance starting of the generator while work is being performed on the Source 2 switching device.
3. Open the Source 2 switching device.
4. Close the Source 1 bypass switching device manually. The Source 1 bypass light will illuminate.
5. Rack out the Source 2 switching device (see Drawout and Fixed Switching Devices Section). The Source 2 isolated light will illuminate.
6. Inspect and/or perform the needed maintenance on the Source 2 switching device.
7. Rack in the Source 2 switching device (see Drawout and Fixed Switching Devices Section). The Source 2 isolated light will no longer be illuminated.
8. Open the Source 1 bypass switching device. The Source 1 light will no longer be illuminated.
9. The switching device is now back in automatic operation.

Manual Operation When in Bypass Mode

Source 1 Bypass to Source 2 Bypass

When the transfer switch is set to Source 1 bypass, it can be transferred to Source 2 bypass by the following sequence:

1. Move the generator selector switch to the RUN position.
2. Open the Source 1 bypass switching device. The Source 1 bypass light will no longer be illuminated.
3. Close the Source 2 bypass switching device manually and the Source 2 bypass light will illuminate.

Source 2 Bypass to Source 1 Bypass

When the transfer switch is set to Source 2 bypass, it can be transferred to the Source 1 bypass switching device by the following sequence:

1. Open the Source 2 bypass switching device and the Source 2 bypass light will no longer be illuminated.
2. Close the Source 1 bypass switching device manually and the Source 1 bypass light will illuminate.
3. Move the generator selector switch to the OFF position.

Power and Transformer Panels

Unmatched Performance and Versatility

The Eaton family of Magnum transfer switches offers unmatched performance, versatility, and value for standby power applications. At the heart of these designs is the Magnum insulated case switch with the following features:

Superior Main Contact Structure

All Eaton Magnum Transfer Switches meet or exceed the standards set forth in UL 1008 and UL 489 with high withstand, totally enclosed Magnum switches. No other transfer switch manufacturer has met the rigid testing requirements of this combination of standards. Completely enclosed contacts add a measure of safety and reliability. It also ensures the integrity of the contact assemblies and minimizes the need for periodic maintenance of the contacts, reducing downtime and maintenance time.

Fast, Powerful, and Safe Switching Mechanism

The mechanism utilizes a high speed 5-cycle stored energy switching mechanism. This mechanism can be operated manually under a FULL LOAD.

Ease of Coordination and Application — Short Time Withstand

The use of electronic trips has allowed performance curve shaping to facilitate proper system coordination. The most significant is the “short time” rated trip unit.

These trip settings may be set for what are considered extremely high currents for much longer durations than the 3-cycle withstand test required under UL 1008. To facilitate improved coordination, Eaton Magnum transfer switches have been tested and are provided with 60-cycle, extended withstand ratings.

Magnum Switch Features

Magnum Insulated Case Switch

- UL 489 and UL 1008 listed.
- 65 – 100 kA standard withstand ratings.
- 60-cycle, extended withstand ratings.
- Five-cycle closing speed.
- Electrically operated.
- True 4-pole switched neutral availability.
- Totally enclosed contact assembly.
- 3A/3B auxiliary contacts for customer connection (each Magnum switch).

Optional Integral Overcurrent Protection Capability

Optional Digitrip™ Magnum Trip Unit

For service entrance and other applications, Digitrip solid-state trip units can be integrated into the power switching section. This eliminates the need for separate upstream protective devices, saving cost and space. Available with various combinations of Long, Short Time, Instantaneous, Ground Fault Protection, and Communications.

Interlocking for Open Transition Applications

Mechanical Cable Interlock

The open transition type Magnum Transfer Switches feature both mechanical (cable) and electrical interlocking to prevent paralleling of sources.

Multi-Tap Voltage Selector

Voltage Selection Terminals

Allows the transfer switch to be readily applied on most system voltages worldwide by connecting to the proper terminals. Available system voltages include 120, 208, 220, 230, 240, 380, 401, 415, 480, or 600 Vac, 50 or 60 Hz.

Logic

Application Versatility

Whether the application calls for open or closed transition, Eaton has the right logic controller for the task. IQ Transfer controllers have set a new standard for transfer switch technology featuring:

- Microprocessor-based logic.
- Digital display.
- Field set point programmability.
- Transfer history.
- PowerNet™ Communications capability.
- Voltmeter and frequency meter.
- True RMS voltage sensing.
- Mimic BUS/LED display.
- Load voltage decay delayed transition capability.
- In-phase monitor capability.
- Field upgrade capability.

Automatic Transfer Open Transition

ATC-600 IQ Transfer

Open transition type Magnum transfer switches utilize the Eaton programmable ATC-600 microprocessor-based logic controller.

Refer to technical data TD.15A.05.T.E Open Transition IQ Transfer (ATC-600) for Automatic Transfer Switches for additional information.

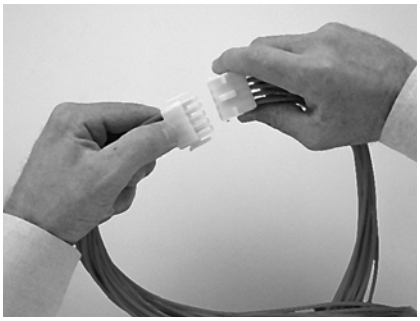
Automatic Transfer Closed Transition

ATC-800 Closed Transition IQ Transfer

Closed transition applications feature the ATC-800 Closed Transition IQ Transfer logic controller.

Refer to technical data TD.15A.09.T.E Closed Transition IQ Transfer (ATC-800) for Automatic Transfer Switches for additional information.

Ease of Maintenance



Logic Disconnect Plugs

Keyed quick-disconnect plugs are provided for easy and complete isolation of the control circuitry.

Maintenance can be performed on the logic independent from the power sections and still allow the user to manually transfer power under full load conditions.

Switch and Feature Selection

Eaton Transfer Switch Equipment offers flexibility and versatility to the system designer and user. All switches include the basic features necessary for normal operation as standard. Eaton also offers an extensive array of optional features/accessories that allows the user to customize a new transfer switch to match the application. Select the appropriate catalog number for the application from **Table 2** below. Then choose from **Table 3** any optional features/accessories needed to complete the project requirements.

Catalog Number:
ATVIMGB33200XRU with Optional Features 16B, 37B, and 42.

The example above would specify the following:

- Automatic transfer switch
- Vertical configuration
- IQ transfer logic
- Magnum DS frame
- Fixed mount
- 3-pole
- 3200 A.
- 480 volts
- NEMA 1 enclosure
- UL listed
- ATC-600 Transfer Logic
- Integral overcurrent protection both sources.
- Service entrance rated with GF protection.
- Seismic Zone 4 qualified

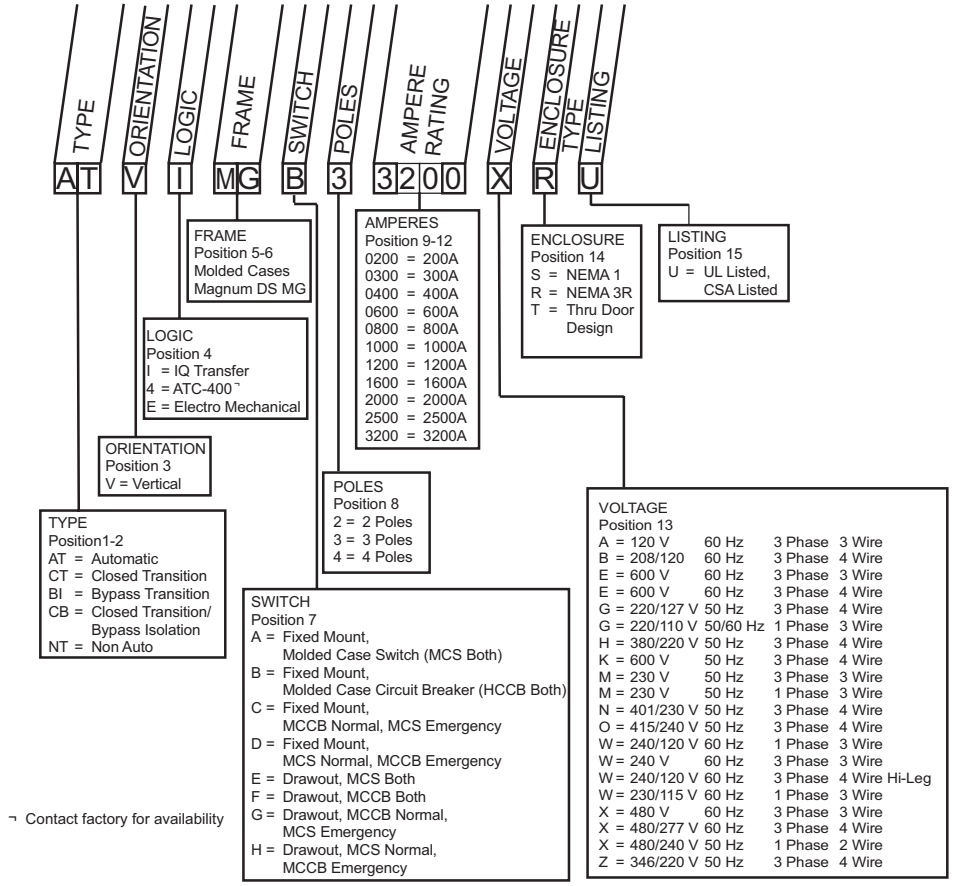
Catalog Numbering System

Table 2. Catalog Numbering Selection Guide

Magnum
Bypass, Automatic and Non-automatic
Transfer Switches
800-3200 Amperes

USING THE STYLE IDENTIFICATION GUIDE

The Style Identification Guide provides an overview of the ten basic style/feature categories which generate the 15 digit Genswitch catalog number.



¬ Contact factory for availability

Switch and Feature Selection (Continued)

Table 3. Standard and Optional Features

Feature Number and Standard Feature Group (FG) Numbers	Description	ATVISP Mini-SPB ATC-600 IQ Transfer	ATVIMG Magnum DS Fixed and Drawout Mount ATC-600	CTVISP Mini-SPB ATC-8090 Closed Transition IQ Transfer	CTVIMG Magnum DS Fixed and Drawout Mount ATC-8090 Closed Transition	NTVESP Mini-SPB Non-Automatic	NTVEMG Magnum DS Fixed and Drawout Mount Non-Automatic
Available Features							
1	Time Delay Normal to Source 2 (TDNE) Fixed 3 Seconds Adjustable 0 – 1800 Seconds	S	S	S	S		
2	Time Delay Engine Start (TDES) Fixed 10 Seconds Adjustable 0 – 120 Seconds	S	S	S	S		
3	Time Delay Source 2 to Normal (TDEN) Fixed 7 Minutes Adjustable 0 – 1800 Seconds	S	S	S	S		
4	Time Delay Engine Cooldown (TDEC) Fixed 5 Minutes Adjustable 0 – 1800 Seconds	S	S	S	S		
5 5H 5J 5K	Source 2 (S2) Source Sensing 3-Phase Rotation Protection 3-Phase Undervoltage/Under Frequency 3-Phase Overvoltage/Over Frequency	 O S S	 O S S	 O S S	 O S S		
6 6B 6H	System or Engine Test System Test Pushbutton Maintained 4-Position Test Switch	 S O	 S O	 S O	 S O		
7	Time Delay Source 2 Fail (TDEF)\ Adjustable 0 – 6 Seconds	S	S	S	S		
8 8C 8D	Pushbutton Bypass Bypass TDEN Bypass TDNE	 S S	 S S	 S S	 S S		
9 9B	Maintenance Selector Switch Electrical Operator Isolator Switch	 O	 O	 O	 O		
10 10B 10D	Preferred Source Selector Switch Source 1 to Source 1 or Source 1 to Generator Generator to Generator	 O O	 S S	 O O	 S S		
12 12C 12D 12G 12H 12L 12M	Pilot Lights Normal (S1) Source Connected Source 2 (S2) Source Connected Normal (S1) Source Connected Source 2 (S2) Source Connected Normal (S1) Source Tripped (Requires Feature 16) Source 2 (S2) Source Tripped (Requires Feature 16)	 S S S S O O	 S S S S O O	 S S S S O O	 S S S S O O	 O O O O O O	 S S S S O O
14 14E 14F 14G 14 H	Auxiliary Relay Contacts Normal (SI) Source Available 1NO/1NC Source 2 (S2) Source Available 1NO/1NC Normal (S1) Source Present 2NO/2NC Source 2 (S2) Source Present 2NO/2NC	 O O	 S S	 O O	 S S	 O O	 O O
15 15E 15F	Switch Position Indication Source 1 Position Indication Contact Source 2 Position Indication Contact	 O O	 S S	 O O	 S S	 O O	
16 16N 16E 16B	Integral Overcurrent Protection Normal (S1) Switch Only Source 2 (S2) Switch Only Normal (S1) and Source 2 (S2) Switches	 O O O	 O O O	 O O O	 O O O	 O O O	 O O O

S = Standard O = Optional

Table 3. Standard and Optional Features (Continued)

Feature Number and Standard Feature Group (FG) Numbers	Description	ATVISP Mini-SPB ATC-600 IQ Transfer	ATVIMG Magnum DS Fixed and Drawout Mount ATC-600	CTVISP Mini-SPB ATC-8090 Closed Transition IQ Transfer	CTVIMG Magnum DS Fixed and Drawout Mount ATC-8090 Closed Transition	NTVESP Mini-SPB Non-Automatic	NTVEMG Magnum DS Fixed and Drawout Mount Non-Automatic
Available Features							
18	Metering						
18O	IQ Analyzer Normal (S1)	O	O	O	O	O	O
18P	IQ Analyzer Source 2 (S2)	O	O	O	O	O	O
18Q	IQ Analyzer Switch Selectable (S1) and (S2)	O	O	O	O	O	O
18V	IQ Analyzer Load Side	O	O	O	O	O	O
18R	IQ DP- 4000 Normal (S1)	O	O	O	O	O	O
18S	IQ DP- 4000 Source 2 (S2)	O	O	O	O	O	O
18T	IQ DP- 4000 Switch Selectable (S1) and (S2)	O	O	O	O	O	O
18U	IQ DP- 4000 Load Side	O	O	O	O	O	O
20A	Rear Bus Connections		O		O		O
21A	Non-Standard Terminals	O	O	O	O	O	O
23	Automatic Plant Exerciser						
23J	Selectable – Disabled/7 Day Interval, 0 – 600 Minutes, Load/No Load, with Fail-safe	S	S	S	S		
26	Normal (S1) Source Sensing						
26D	Go to Source 2 (S2) Input	S	S	S	S		
26H	3 - Phase Rotation Protection	O	O	O	O		
26J	All-Phase Undervoltage/Underfrequency	S	S	S	S		
26K	All-Phase Overvoltage/Overfrequency	S	S	S	S		
29	Alternate Transfer Modes of Operation						
29A	Automatic Transfer and Retransfer	S	S	S	S		
29G	Selector Switch for Automatic or Non-Automatic Operation (Must be Labeled as Non-Automatic)	O	O	O	O		
29J	Automatic Transfer Operation with Selectable (Via Programming) Automatic or Non-Automatic Retransfer Operation with Fail-safe	O	O	O	O		
32	Delayed Transfer Operation Modes						
32A	Time Delay Neutral	O	O	O	O		
32B	Load Voltage Decay	O	O	O	O		
32C	In-Phase Monitor Defaults to Load Voltage Decay	O	O	O	O		
32D	In-Phase Monitor Defaults to Time Delay Neutral	O	O	O	O		
35A	Pretransfer Signal Contacts 1NO/1NC	S	S	S	S		
36	Load Shed from Source 2	O	S	O	S		
37	Rated as Suitable for Use as Service Equipment[1] (Requires 16B or 16N)	O	O	O	O	O	O
37A	Without Ground Fault Protection	O	O	O	O	O	O
37B	With Ground Fault Protection						
41	Space Heater with Thermostat						
41C	400 Watts	O	O	O	O	O	O
42	Seismic Zone 4 Certified	S	S	S	S	S	S
45	Load Sequencing Contacts						
45A	Load Sequencing Contacts (1)	O	O	O	O		
45B	Load Sequencing Contacts (2)	O	O	O	O		
45C	Load Sequencing Contacts (3)	O	O	O	O		
45D	Load Sequencing Contacts (4)	O	O	O	O		
45E	Load Sequencing Contacts (5)	O	O	O	O		
45F	Load Sequencing Contacts (6)	O	O	O	O		
45G	Load Sequencing Contacts (7)	O	O	O	O		
45H	Load Sequencing Contacts (8)	O	O	O	O		
45I	Load Sequencing Contacts (9)	O	O	O	O		
45J	Load Sequencing Contacts (10)	O	O	O	O		

[1] Ground Fault protection is required for Service Disconnects rated 1000 A or more if the electrical service is a solidly grounded wye system of more than 150 volts to ground but not exceeding 600 volts phase to phase.

S = Standard O = Optional

Table 3. Standard and Optional Features (Continued)

Feature Number and Standard Feature Group (FG) Numbers	Description	ATVISP Mini-SPB ATC-600 IQ Transfer	ATVIMG Magnum DS Fixed and Drawout Mount ATC-600	CTVISP Mini-SPB ATC-8090 Closed Transition IQ Transfer	CTVIMG Magnum DS Fixed and Drawout Mount ATC-8090 Closed Transition	NTVESP Mini-SPB Non-Automatic	NTVEMG Magnum DS Fixed and Drawout Mount Non-Automatic
Available Features							
47	Closed Transition Operational Modes (User Must Specify Mode)						
47C	Closed Transition/In-Phase/Load Voltage Decay	O	O	S	S	O	O
47D	Closed Transition	O	O	O	O	O	O
47E	Closed Transition/In-Phase/Time Delay Neutral	O	O	O	O	O	O
48	Communications						
48A	IPONI Module	O	O	O	O	O	O
48B	IPONI Module and PMCOM5	O	O	O	O	O	O
48C	IPONI Module, PMCOM5 and Null Modem Cable	O	O	O	O	O	O
48D	EPONI Module (10Base-T only)	O	O	O	O	O	O
48E	EPONI Module (10Base-T and 10base-FL)	O	O	O	O	O	O
48F	MPONI Module	O	O	O	O	O	O
51N	100KA Surge Suppression Source 1	O	O	O	O	O	O
51Q	160KA Surge Suppression Source 1	O	O	O	O	O	O
51S	200KA Surge Suppression Source 1	O	O	O	O	O	O
51J	Telephone Surge	O	O	O	O	O	O
51K	Cable Surge	O	O	O	O	O	O
51MA	12 VDC Surge	O	O	O	O	O	O
51MB	24 VDC Surge	O	O	O	O	O	O

S = Standard O = Optional

Dimensions and Weights

Mini-SPB Fixed Mount

Automatic, Non-Automatic and Manual Transfer Switches

Enclosures meet all current applicable NEMA and UL standards for conduit entry, cable bending, gutter space and shielding of live components.

Available Enclosures

- NEMA 1
- NEMA 3R
- NEMA 4
- NEMA 4X
- NEMA 12

Enclosures

- All mini enclosures come with a front door only; they can be mounted in a corner or against a wall.
- NEMA 4, 4X, and 12 enclosures are designed for front cable access only.
- NEMA 1 and 3R enclosures are designed for cable access from the sides, rear, top, bottom, or front.

Table 4. Mini-SPB Fixed Mount Transfer Switches — Dimensions in Inches (mm)

Ampere Rating	Number of Poles	Height in. (mm)	Width in. (mm)	Depth in. (mm)	Shipping Weight Lbs. (kg)
NEMA 1 Enclosed Fixed Mount Transfer Switch					
600 – 1200	3	72 (1829)	38 (965)	28 (711)	850 (386)
600 – 1200	4	72 (1829)	38 (965)	28 (711)	900 (409)
NEMA 3R Enclosed Fixed Mount Transfer Switch					
600 – 1200	3	72 (1829)	38 (965)	34 (864)	1050 (477)
600 – 1200	4	72 (1829)	38 (965)	34 (864)	1100 (500)

Note: Weights are approximate.

Dimensions and Weights — Magnum Fixed Mount and Drawout Transfer Switches

Automatic, Non-Automatic, and Manual Transfer Switches

Enclosures meet all current applicable NEMA and UL standards for conduit entry, cable bending, gutter space, and shielding of live components.

NEMA 1 and NEMA 3R Enclosures

Magnum Transfer Switches are supplied with a front door only. They can be mounted in a corner or against a wall. Access to cable space can be via either side, bottom, top, or the rear.

Note: Add 3 inches to the height, 6 inches to the width, and 3 inches to the depth to all enclosure dimensions to account for the siesmic zone 4 mounting brackets

Table 5. Magnum Fixed Mount Transfer Switches — Dimensions in Inches (mm)

Ampere Rating	Number of Poles	Height in. (mm)	Width in. (mm)	Depth in. (mm)	Shipping Weight Lbs. (kg)
NEMA 1 Enclosed Fixed Mount Transfer Switch					
200 – 2000	2	90 (2286)	32 (711)	48 (1219)	1050 (477)
200 – 2000	3	90 (2286)	32 (711)	48 (1219)	1050 (477)
200 – 2000	4	90 (2286)	32 (711)	48 (1219)	1250 (568)
2500 – 3200	2	90 (2286)	44 (1118)	48 (1219)	1900 (863)
2500 – 3200	3	90 (2286)	44 (1118)	48 (1219)	1900 (863)
2500 – 3200	4	90 (2286)	44 (1118	48 (1219)	2000 (910)
4000 – 5000	2	Consult Factory			
4000 – 5000	3				
4000 – 5000	4				
NEMA 3R Enclosed Fixed Mount Transfer Switch					
200 – 2000	2	90 (2286)	32 (711)	63 (1600)	1600 (727)
200 – 2000	3	90 (2286)	32 (711)	63 (1600)	1600 (727)
200 – 2000	4	90 (2286)	32 (711)	63 (1600))	1800 (818)
2500 – 3200	2	90 (2286)	44 (1118)	63 (1600)	2400 (1091)
2500 – 3200	3	90 (2286)	44 (1118)	63 (1600)	2400 (1091)
2500 – 3200	4	90 (2286)	44 (1118	63 (1600))	2500 (1136)
4000 – 5000	2	Consult Factory			
4000 – 5000	3				
4000 – 5000	4				

Note: Weights are approximate.

Table 6. Magnum Drawout Transfer Switches — Dimensions in Inches (mm)

Ampere Rating	Number of Poles	Height	Width	Depth	Shipping Weight Lbs. (kg)
NEMA 1 Enclosed Drawout Transfer Switch					
200 – 2000	2	90 (2286)	32 (813)	60 (1524)	1600 (727)
200 – 2000	3	90 (2286)	32 (813)	60 (1524)	1600 (727)
200 – 2000	4	90 (2286)	32 (813)	60 (1524)	1900 (864)
2500 – 3200	2	90 (2286)	44 (1118)	60 (1524)	2500 (1136)
2500 – 3200	3	90 (2286)	44 (1118)	60 (1524)	2500 (1136)
2500 – 3200	4	90 (2286)	44 (1118)	60 (1524)	2800 (1273)
4000 – 5000	2	Consult Factory			
4000 – 5000	3				
4000 – 5000	4				
NEMA 3R Enclosed Drawout Transfer Switch					
200 – 2000	2	90 (2286)	32 (813)	75 (1905)	2100 (955)
200 – 2000	3	90 (2286)	32 (813)	75 (1905)	2100 (955)
200 – 2000	4	90 (2286)	32 (813)	75 (1905	2400 (1009)
2500 – 3200	2	90 (2286)	44 (1118)	75 (1905)	3000 (1364)
2500 – 3200	3	90 (2286)	44 (1118)	75 (1905)	3000 (1364)
2500 – 3200	4	90 (2286)	44 (1118)	75 (1905	3300 (1500)
4000 – 5000	2	Consult Factory			
4000 – 5000	3				
4000 – 5000	4				

Note: Weights are approximate.

Table 7. Magnum BIVI Drawout Transfer Switches - Dimensions in Inches (mm)

Ampere Rating	Number of Poles	Height	Width	Depth	Shipping Weight Lbs. (kg)
NEMA 1 Enclosed Drawout Transfer Switch					
200 – 2000	2	90 (2286)	64 (1626)	60 (1524)	3100 (1409)
200 – 2000	3	90 (2286)	64 (1626)	60 (1524)	3100 (1409)
200 – 2000	4	90 (2286)	64 (1626)	60 (1524)	3700 (1682)
2500 – 3200	2	90 (2286)	64 (1626)	60 (1524)	4700 (2136)
2500 – 3200	3	90 (2286)	64 (1626)	60 (1524)	4700 (2136)
2500 – 3200	4	90 (2286)	64 (1626)	60 (1524)	5500 (2500)
4000 – 5000	2	Consult Factory			
4000 – 5000	3				
4000 – 5000	4				
NEMA 3R Enclosed Drawout Transfer Switch					
200 – 2000	2	90 (2286)	64 (1626)	75 (1905)	3700 (1682)
200 – 2000	3	90 (2286)	64 (1626)	75 (1905)	3700 (1682)
200 – 2000	4	90 (2286)	64 (1626)	75 (1905	4300 (1955)
2500 – 3200	2	90 (2286)	64 (1626)	75 (1905)	5300 (2410)
2500 – 3200	3	90 (2286)	64 (1626)	75 (1905)	5300 (2410)
2500 – 3200	4	90 (2286)	64 (1626)	75 (1905	6000 (2730)
4000 – 5000	2	Consult Factory			
4000 – 5000	3				
4000 – 5000	4				

Note: Weights are approximate.

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