ATS-34 Ver1.0

AUTOMATIC TRANSFER SWITCH CONTROLLER FOR DUAL GENERATORS WITH REDUNDANT SYSTEM OPERATOR’S MANUAL
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SECTION 1: INTRODUCTION

1.1 Preliminary Comments and Safety Precautions

This document covers installation, operation and maintenance of the ATS-34 Automatic Transfer Switch Controller. This manual is for the use of authorized and qualified personnel only.

WARNING
High voltage can kill.

1.2 Product Overview

The ATS-34 controls the second ATS in a redundant emergency ATS system that works with two backup Gensets. A redundant ATS system consists of two ATS, the first ATS being a standard ATS (Normal-Emergency) that triggers the second ATS (GEN-1 – GEN-2) by using the ATS-34 control. This second ATS control selects which backup generator is the first to run and in the case of a fail start or a breakdown restores power by switching to a second generator. This line circuit illustrated how it works.

ATS-34 controller allows you to control the generator duty cycle and alternate operation of the two generators.

The ATS-34 control unit features:
- Microprocessor based with touch screen
- Compact with easy to understand LED display.
- Programmable for cycle-mode or fix-mode displays for 3-phase and 1-phase voltages and frequencies.
- All programming and operations are done from the front screen interface.
- Monitors over and under voltages for both primary and secondary generators.
- Monitor over and under frequencies on both generators.
- Dry-contact alarm for transfer fail and over-cranking
- Manual forced-bypass
- Compatible with almost all ATS switches
- Optional USB / RS485 / Ethernet remote (mobile proxy) communication functions.
- Program on-site or from remote (mobile) device (PC, Smart Phone).
- Auto-saved settings (memory preserved throughout all power disconnects and resets)
- Front panel display provides source status and fail alarm indications.

The ATS-34 Controller provides programming flexibility for the two backup generators. Therefore, the ATS switch operates properly through a series of sensing and timing functions.
1.3 Functions / Features

The primary function of ATS-34 controller is to monitor power sources and provide the necessary intelligence to operate a seamless and automatic transfer of load between two generators.

1.3.1 Operational Simplicity

The design of the ATS-34 PLC simplifies routine operation and programming.

1.3.2 Standard Features

All logic settings for different ATS’s are preprogrammed and stored in its non-volatile random-access memory (NVRAM), this memory retains its information when power is turned off. Some features and set points are user adjustable.

Feature 1: Generator Duty Cycle – start attempts settings

You can program the ATS-34 to switch the lead generator duty by time or start-run attempts. When the working generator times out, or runs a number of times the ATS-34 starts the next generator and makes this one the lead generator. (See lines 3 & 4)

Adjustable Duty Time range: 0 to 250 Hours or
Adjustable start attempts 1 to 10

Feature 2: Transferring Time Delay

The ATS-34 controller provides a time delay when transferring from one generator to the other. Countdown begins when the standby source becomes available. (See line 5)

Adjustable time delay range: 0 to 250 sec

Feature 3: Time Delay Engine Cool-down

Controller permits the generator to run unloaded (cool down) after transferring to the other generator. Countdown starts when the transfer is completed. (See line 6)

Adjustable time delay range: 0 to 250 sec

Feature 4: Time Delay OFF Position

Time Delay on OFF stops the switch in the center OFF position (completely disconnected) before transferring to the other generator. (See line 7)

Adjustable time delay range: 0 to 99 sec

Feature 5: Under / Over voltage Sensing

The controller monitors the output voltage for both generators. You can set the working voltage window on lines 8, 9, 10, 11, 15, & 16

Adjustable Over voltage range: 110VAC to 520VAC
Adjustable Under voltage range: 80VAC to 470VAC

Feature 6: Under / Over frequency Sensing

The controller also monitors the Hertz for each generator. (See line 12, 13, 14, 18, & 19)

Adjustable Over frequency range: 51Hz to 75Hz
Adjustable Under frequency range: 40Hz to 59Hz

SECTION 2: OPERATION PANEL

2.1 General

Familiarize yourself with ATS-34 hardware:
- The Front Display Window
- The Touch Buttons
- Panel LEDs Display

2.2 Display Window

The ATS-34 controller has a four-digit, seven-segment display panel to monitor all parameters, settings and messages.

Presenting different actions on the display window:
- Dual generator voltage / Duty time / Parameter display
- Time delay countdown display
- Program setting parameter display

2.3 Operate Touch Buttons

The front panel supports five sensitive capacitive touch and release buttons.
### Using the buttons on the control

<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| ![Increase/Selection Touch Button](▲) | **Increase/Selection Touch Button**  
  ● Press to increase value  
  ● Press to select voltage |
| ![AUTO Touch Button](AUTO) | **AUTO Touch Button**  
  ● Press to engage AUTO  
  ● Press to reset alarm |
| ![OFF Touch Button](OFF) | **OFF Touch Button**  
  ● Press OFF  
  ● Press to enter program mode |
| ![Bypass Touch Button](Bypass) | **Bypass Touch Button**  
  ● Press to force a transfer |
| ![Decrease/Selection Touch Button](▼) | **Decrease/Selection Touch Button**  
  ● Press to decrease value  
  ● Press for Volt / Duty / Freq display |

### 2.3.1 Increase (▲) Button

When the ATS-34 controller is in AUTO, each touch of the up arrow (▲) changes the display to the next phase voltage reading.

When in programming mode, each touch of the Increase (▲) key scrolls through all available parameters. When touching and releasing the increase (▲) button, the displayed parameter changes and increases in single units. The Increase (▲) button will continue to scroll when held down.

### 2.3.2 Decrease (▼) Button

Under AUTO operate status; each touch of the decrease (▼) button will change the real parameter display between voltage, duty time, and frequency.

When in programming mode, each touch of the decrease (▼) key will scroll through all available parameters. When touching and releasing the decrease (▼) button, the displayed parameter changes and decreased by one value at a time. The decrease (▼) button will continue to scroll if it is pressed and held down.

### 2.3.3 Auto Key

When selecting the AUTO key, the ATS-34 runs in automatic mode, lighting the LED under AUTO. The controller automatically starts the generator, transfer and retransfers from source to source as commanded by the preprogrammed settings.

In AUTO, all anomalies are accompanied by its matching alarm output; make sure all failures are corrected before touching the auto key to reset the alarm signal.

**WARNING**

When any failure occurs at its duty time, the controller will shut down the engine, sound an alarm output and switch to the other generator. The failed engine will not start again unless the user manually resets the alarm output by touching the AUTO key.

### 2.3.4 Bypass Function Button

The Bypass button provides for a manual override of pre-programmed functions. When the ATS-34 is in AUTO, touching the Bypass key ignores the current timers and setting, and the controller will force-start the second generator and transfer the switch from the current working generator to the second generator. The Bypass function can be activated only in AUTO.

**LEDs status under Bypass mode**

### 2.3.5 OFF Key

Touching the OFF key, turns the ATS-34 OFF engaging a flashing red LED instantly disabling all functions.

However, in program mode, touching the off button allows the user to change to the next program line to set new parameters using the decrease (▼) or increase (▲) button.
2.4 Panel LED Outputs

Eight individual red LEDs and four blue LEDs bars are lit when performing or indicating a specific function.

Information concerning the LEDs output

- Power available display for G1 and G2
- GEN-2 Over Voltage
- GEN-2 Under Voltage
- GEN-2 Over Frequency
- GEN-2 Under Frequency
- GEN-1 Transfer Failure
- GEN-1 Under Frequency
- GEN-1 Transfer Failure
SECTION 3: OPERATION

3.1 General
This section describes the operation and functions of the ATS-34 controller. It is divided into four main categories:

- Automatic mode
- OFF mode
- Bypass mode
- Programming mode

The use of each operation under each category will be explained in this section. It is assumed that prior sections are understood, and the operator has a basic understanding of the hardware.

3.2 Auto Mode
The AUTO mode of the ATS-34 controller provides for automatic start, stop, and transfer and retransfers from source to source as dictated by the programmed values.

The ATS-34 constantly monitors the condition of both generators providing the intelligence for transfer operations.

3.3 OFF Mode
In OFF the ATS-34 disables all the transfers and protection functions, the display window and all the LEDs are turned off.

Both remote start signals are also disabled in OFF and the ATS cannot transfer the load to any source automatically.

However, in program mode, touching the off button allows the user to change the program line table and set the selected parameter using decrease (▼) or increase (▲) button.

3.4 Bypass Mode
If the ATS-34 is running in AUTO, pressing the bypass button ignores its current duties and force starts the next generator, and transfers power from this generator to the other. If the second generator fails to start or its voltage and frequency does not become available, the controller keeps the load connected to the working generator and triggers an alarm.

Activate the Bypass only when in AUTO.

3.5 Programming Instruction
The controller is fully programmable from the front faceplate.

To get into programming, set the control to OFF and press and hold the OFF button for 4 seconds. The word “Vr1.0” appears on the display window for 2 seconds, indicating the software version.

Now you are ready to start the line-by-line programming sequence. Press the OFF key to advance to the next programming line. To change each parameter, press the increase (▲) or the decrease (▼) keys. When pressing and releasing the increase (▲) or decrease (▼) key, the displayed parameter can be increased or decreased by one unit. The Increase (▲) or decrease (▼) will continue to scroll if it is pressed and not released.

Always press the “OFF” button to advance to the next programming line or until the word “End” appears on the screen. Note: To end and exit at any time, simply hold the “OFF” key for 4 seconds.

If you make an error or need to return to factory settings; stay in or reenter programming mode and simultaneously hold the AUTO keys for 4 seconds, until the word “Au.Po” appears on the display confirming all settings are reset to factory. (See line by line programming table for ATS-34 factory settings).
3.6 Remote Communication Instruction
You can monitor and control the two gen-set on a remote PC using the optional USB / RS485 / Ethernet remote communication modules.

WARNING
A remote start signal can activate the ATS-34 and the engines can start at anytime without warning. Place a “Danger” warning sign next to each generator, stating that this generator can start at anytime!" also install a warning buzzer or a flash light. Unexpected engine starts can result in serious injury or death. When performing service or maintenance, always disconnect the remote start signal input.

A free App enables the customer to remotely monitor and operate the ATS or generators via portable mobile device. Operating software currently available for Apple iOS5.1 system or above and Android operating system. Free software can be downloaded from App Store or Google Play by simply keying in “Kutai” and hit search.

KCU-01 – USB communication module
KCU-02 – RS-485 communications module
KCU-03 – Ethernet communications module

The corresponding program settings for ATS-34 installed with KCU-XX module includes line [22], [23] and [24]. Programming line [22] is a must. When Line [22] is set to "00", then the remote monitoring software is restricted to read information only whereas remote command is strictly forbidden.

If KCU-02 - RS485 communication module is installed, additional program setting on lines [23] and [25] are needed.

WARNING
ATS-34 with KCU-02 module constitutes a closed LAN network. Each controller address can be set from 1 to 99 and not to be repeated. Same transmission rate is a must !!

For more detail, information refers to the KCU-XX user manual.

The installation for the KCU-XX communication module on the ATS-34 controller is fairly simple.
3.7 Voltage Adjustment (If Needed)

The ATS-34 module is factory tested and fully calibrated. Nevertheless, if you need to modify any voltage reading, follow these procedures.

Step 1: Manually start the primary and standby generators.

Step 2: Enter Program mode and set the program line [21] to (01). “VAdJ” will appear on the display window.

Step 3: Select the desired phase you wish to re-calibrate by pressing the OFF key.

Step 4: Use a calibrated voltmeter as a reference to recalibrate the ATS-34 voltage readings.

Step 5: Using the increase (▲) and decrease (▼) keys to change the voltage value as appears on your meter.

Step 6: Always press the “OFF” button to advance to the next phase calibration or until the word “End” appears on the screen. To immediately end programming, simply hold the “OFF” key at any time for four seconds to exit program.

Step 7: If the screen displays “FAIL”, then the calibration is invalid. Touch the OFF key to reset this alarm and repeat from Step 1 again.
ATS-22 Automatic Transfer Switch

REMOTE COMMUNICATION ASSEMBLY

Selected at one time
Only one of communication modules can be

KCU-03

Ethernet

PLMN

KCU-02

RS-485

GPRS

Cell Phone

PLMN

Cell Phone

ATM-3/4
### 3.8 Line by Line Programming Table

<table>
<thead>
<tr>
<th>LINE</th>
<th>DISCRIPTION</th>
<th>VALUE</th>
<th>FACTORY SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is this ATS operating in 1 phase or 3 phases?</td>
<td>00 → 1Ø  01 → 3Ø</td>
<td>01</td>
</tr>
</tbody>
</table>
| 2    | Select Switch type  
See drawing on the back of this manual for different switch types then make your selection | 00) MCCB BTS type ATS (Single motor)  
01) Mot type ATS (Dual motors)  
02) Air circuit breaker (ACB)  
03) Double throw type (Single coil)  
04) Double throw type (Dual coils)  
05) Kutai TS-XXX type ATS | 00 |
| 3    | Select the lead generator. Gen 1 or Gen 2  
Or let the controller select the lead generator & switch the lead by run time on duty cycle or by starts & run attempts | 00 → G1 Leading  
01 → G2 Leading  
02 → Alternate lead Gen by run time hours  
03 → Alternate lead Gen by starts & run attempts | 02 |
| 4    | Do not alternate the gen, but to switch only if the lead gen fails.(00)  
Alternate both generators by run time on duty cycle or by the number of starts & run.  
In any position the backup gen will always pickup the load if the lead gen fails | *Do not alternate generators ---Set to 00*  
*Change lead gen by run time on duty cycle---Set 01 to 250 Hr gen run time then switch.  
*Change lead by starts -- 01 to 10 starts after that switch | 168Hr  
10 |
| 5    | Time delay load transfer | 00 to 250 sec | 10sec |
| 6    | Time delay engine cool-down | 00 to 250 sec | 30sec |
| 7    | Time delay ATS in CENTER-OFF position | 00 to 99 sec | 5sec |
| 8    | GEN-1 over voltage setting | 11 to 50 (110V to 520V) | 25 (250V) |
| 9    | GEN-1 under voltage setting | 08 to 47 (80V to 470V) | 18 (180V) |
| 10   | Time delay if there is a problem with GEN-1 voltage output | 00 to 99sec  
(00 = Without voltage monitor function) | 10sec |
| 11   | GEN-1 over frequency setting | 51 to 75Hz | 65Hz |
| 12   | GEN-1 under frequency setting | 40 to 59Hz | 55Hz |
| 13   | Time delay if there is a problem with GEN-1 frequency output | 00 to 99sec  
(00 = Without frequency monitor function) | 10sec |
| 14   | GEN-2 over voltage setting | 11 to 50 (110V to 520V) | 25 (250V) |
| 15   | GEN-2 under voltage setting | 8 to 47 (80V to 470V) | 18 (180V) |
| 16   | Time delay if there is a problem with GEN-2 voltage output | 00 to 99sec  
(00 = Without voltage monitor function) | 10sec |
| 17   | GEN-2 over frequency setting | 51 to 75Hz | 65Hz |
| 18   | GEN-2 under frequency setting | 40 to 59Hz | 55Hz |
| 19   | Time delay if there is a problem with GEN-2 frequency output | 00 to 99sec  
(00 = Without frequency monitor function) | 10sec |
| 20   | Display mode setting | 00 → Cyclic mode  
01 → Fix mode | 00 |
| 21   | Do you want to calibrate voltage reading? | 00 → NO  
01 → YES | 00 |
| 22   | Accept remote switch transfer operation (Include emergency stop) | 00 → NO  
01 → YES | 00 |
| 23   | KCU-02 module address | 00 → KCU-02 module restricted  
01 to 99 | 00 |
| 24   | KCU-02 module transmission rate | 01 → 115200  
02 → 57600  
03 → 38400  
04 → 19200  
05 → 14400  
06 → 9600  
07 → 4800  
08 → 2400  
09 → 1200 | 03 |
3.9 Specification Summary

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SPECIFICATION</th>
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<tbody>
<tr>
<td>DC Power Supply Voltage</td>
<td>8 to 60VDC</td>
</tr>
<tr>
<td>AC Voltage Measurement Range</td>
<td>50 VAC to 510 VAC 50/60 Hz</td>
</tr>
<tr>
<td>Frequency Measurement Range</td>
<td>45Hz to 70Hz</td>
</tr>
<tr>
<td>Remote Start Contact</td>
<td>7A @ 250VAC Max</td>
</tr>
<tr>
<td>GEN-1 ON Contact</td>
<td>7A @ 250VAC Max</td>
</tr>
<tr>
<td>GEN-2 ON Contact</td>
<td>7A @ 250VAC Max</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20°C to 70°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-30°C to 80°C</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>Maximum 90% relative humidity</td>
</tr>
<tr>
<td>Weight</td>
<td>495 g ± 2%</td>
</tr>
</tbody>
</table>

SECTION 4: INSTALLATION INSTRUCTIONS

4.1 General

The designed of the ATS-34 controller is for front panel mounting.

4.2 Panel Cut-Out (All Dimensions in MM.)
4.3 Unit Dimensions (All Dimensions in MM.)

4.4 Installation Reference
5.2 MCCB Type ATS Wiring Diagram (2P)(220VAC)
5.3 MOT Type ATS Wiring Diagram (3P/4P)(220VAC)
5.5 Air Circuit Breaker Type ATS Wiring Diagram (3P/4P)(220VAC)
ATS-34 Control Unit

Air Circuit Breaker Type ATS Wiring Diagram (2P/220VAC)

ACB TYPE BTS

MX1: Trip coil
XF: ON Coil
MCH: Charging Alternator

Genset-1
Genset-2

ATS-34 Control Unit

L1 L2

Charging Alternator

5.7 Single Coil Double Throw Type ATS Wiring Diagram (3P/4P)(220VAC)
5.8 Single Coil Double Throw Type ATS Wiring Diagram (2P)(220VAC)
5.10 Dual Coil Double Throw Type ATS Wiring Diagram (2P)(220VAC)
ATS-34 Automatic Transfer Switch

5.11 KUTAI TS-XXX Type ATS Wiring Diagram (3P/4P)(220VAC)
5.13 KME WN Type and AICHI WN type ATS Wiring Diagram (3P/4P)(220VAC)
ATS-34 Automatic Transfer Switch

5.14 KME WN Type and AICHI WN type ATS Wiring Diagram (2P)(220VAC)
ATS-34 Automatic Transfer Switch

5.18 SOCOMEC ATyS-3e type ATS Wiring Diagram (2P)(220VAC)
ATS-34 Automatic Transfer Switch

5.19 SOCOMEC ATyS-6 type ATS Wiring Diagram (3P/4P)(220VAC)
ATS-34 Automatic Transfer Switch

5.20 5.20 SOCOMEC ATyS-6 type ATS Wiring Diagram (2P)(220VAC)
ATS-34 Automatic Transfer Switch

5.21 SOCOMEC ATyS-6e type ATS Wiring Diagram (3P/4P)(220VAC)
ATS-34 Automatic Transfer Switch

5.22 SOCOMEC ATyS-6e type ATS Wiring Diagram (2P)(220VAC)
ATS-34 Automatic Transfer Switch

MITSUBISHI MD TYPE BTS

5.23 MITSUBISHI MD Type ATS Wiring Diagram (3P/4P)(220VAC)

ATS-34 Control Unit

Load

Genset-1

Genset-2

B 660VDC

DC Input

#N AU>>Generator-1 Auxiliary Switch

#E AU>>Generator-2 Auxiliary Switch
ATS-34 Control Unit

5.25 MERLIN GERIN MCB type ATS Wiring Diagram (3P/4P/220VAC)

ATS-34 Automatic Transfer Switch

MC MCB Type BTS

LOAD

MCH: Charging Ammeter

MX1: Trip coil

XF: ON Coil
5.27 System Voltage different From AC220V wiring Diagram

For AC220V System with 220 V Motors controls

For AC380/440/480V System with 220V motors controls

For AC110V control system