# 76-ATC300-00

Operation Manual Version 1.0.0.0 Automatic Transfer Switch Operation

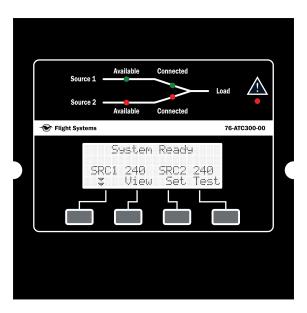
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The 76-ATC300 is a drop-in replacement for the Eaton ATC300/300+. The on-board LCD was changed from a 2x16 character display to a larger 4x20 character display. This greatly reduces setup time and provides more information on a single screen to the operator. The human machine interface (HMI) has been completely redesigned from the OEM and uses a modified version of the Flight Systems ATS1500 firmware.

#### **Features**

- Voltage ranges from 120VAC to 600VAC; 50 or 60Hz operation
- Voltage and frequency settings compatible with the ATC300+
- In-phase and phase rotation monitoring
- CNT2, CNT3, and BRKR switch type operation modes
- Utility to generator operation
- Source 1 and Source 2 time delays compatible with the ATC300+
- 16 programmable exercise cycles
- Increased display size (4x20)
- Programmable inputs and outputs
- Modbus communications
- Setup Assist menu for expedited setup
- Replaced Unit Status LED with Fault LED

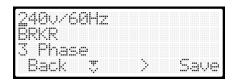


### **Device Setup**

It is suggested to use the Setup Assist menu to do the initial setup of the replacement control. Since the OEM controllers were mainly pre-configured at the time of ordering, this section will go over how to derive setup parameters based on the catalog number of the transfer switch assembly. It is possible to manually configure the controller, however, it is not recommended.

#### **Setup Assist**

From the main menu, press SET, enter the default password '0000' and select NEXT. Use the navigation keys to select Setup Assist and press next. Once in the Setup Assist menu, press next to modify the parameters. Use the down button to select the parameter and the right arrow to modify the value. Press SAVE to commit these settings to memory. Below is an example of an Eaton ATS catalog number and its configuration.



Example Eaton Transfer Switch Catalog Number ATV3NBC30800XSU

AT: Transition Type (Automatic/Open Transition)



Example Transfer Switch Data Sticker

V: Orientation (Vertical)

NOTE: H and V orientations will always be configured for the BRKR (Breaker) switch type

3: Logic (ATC300 Controller)

**NB**: Mechanism (In this example, NB represents a molded case (breaker or switch) with a current rating of 800-1000 Amps

**C:** Mount (In this example, C represents a configuration with a molded case breaker (MCB) on the Normal source and a molded case switch (MCS) on the Emergency source)

3: Number of Poles (3 Poles) Three Phase

0800: Current Rating (800 Amps)

X: Voltage Configuration (X represents a 480V, 60Hz configuration)

**S**: Enclosure Type (NEMA 1)

U: UL 1008 Listed

## **Eaton ATS Catalog Number Table**

		EA	ATON ATS C	ATALOG NUMBER DES	SIGNATIONS	6			
Туре	Orientation	Logic	Mechanism	Mount	Poles	Amperes (XXXX)	Voltage	Enclosure	Listing
AT: Automatic (Open Transition)	C: Contactor (CNT2/CNT3)	3: ATC-300	C2: <b>CNT2</b>	Contactor (CNT2/CNT3)	2: Two-Pole		A: 120V, 60Hz	D: NEMA 4X	R: UL Recognized
BI: Bypass Isolation (Open Transition)	H: Horizontal (BRKR)		C3: <b>CNT3</b>	C: Fixed mount, 100% rated circuit breaker (normal side)	3: Three-Pole		B: 208V, 60Hz	J: NEMA 12	U: UL 1008 Listed
CB: Bypass Isolation (Closed Transition)	V: Vertical (BRKR)		C5: <b>CNT3</b>	E: Dual Drawout	4: Four-Pole		E: 600V, 60Hz	K: Open	X: No Listing
CT: Automatic (Closed Transition)			F5: <b>CNT3</b>	X: Fixed Mount			G: 220V, 50/60Hz	S: NEMA 1	
NT: Non-Automatic (Open Transition)			G5: <b>CNT3</b>	X: On BI and CB, Drawout ATS, fixed bypass			H: 380V, 50Hz	R: NEMA 3R	
							K: 600V, 50Hz	L: NEMA 4	
Closed Transition (Inphase On)			Molded Case (BRKR)	Molded Case (BRKR)			M: 230V, 50Hz		
			FD	A: FM, N (MCS), E (MCS)			N: 401V, 50Hz		
			KD	B: FM, N (MCB), E (MCB)			O: 415V, 50Hz		
Shaded cells indicate			LD	C: FM, N (MCB), E (MCS)			W: 240V, 60Hz		
parameters critical to transfer			MD	D: FM, N (MCS), E (MCB)			X: 480V, 60Hz		
switch configuration			NB				Z: 365V, 50Hz		

### **Description of Transfer Switch Types**

CNT2 - 2 Position Contactor (No Time Delay Neutral/TDN Setting)

CNT3 - 3 Position Contactor (Time Delay Neutral)

BRKR - Molded Case Breaker/Switch (Motor Drive)

**NOTE:** It may be helpful to highlight/mark the parameters in the table above to match the transfer switch data sticker.

# **Set Menu Navigation**

#### **Set Time/Date**

Set Time 12:00	Set Date	Clock	Ahead :	l Hour
	Twe 01/03/00	2nd	Sun of	Mar
Back 😩 🗦 Save	Back 🛕 > Save	Back	<u> </u>	Save

#### **Set Exerciser**

Disabl	₹	Unloa	yed	Dail <sup>.</sup>	⊒
Back ⊈	Next	Back î	Next	Back î	Next
Exerciser E Repeat Ra	vent 1 te 00	Exerciser   Duration	Event 1 90:00	Exerciser Start Date	Event 1 <u>0</u> 0/00/00
l Back û	Next	Back ⊋	> Next	l Back ≎	> Mext

Exerciser Event 1 Start Time 00:00 Back 2 > Save

Set S1 Time Delays			
Set S1 Time Delays Engine Start	Engine Start Ø0:03		
‡ ± > Back	Back 😩 > Save		
Set S1 Time Delays Engine Cooldown	Engine Cool Down 00:05		
≇ ± > Back	Back 😩 > Save		
Set S1 Time Delays Xfer Pref>Stby	Xfer Pref>Stby 0 <u>0</u> :03		
🍹 🛕 > Back	Back 🟠 > Save		
Set S1 Time Delays Xfer Off>Stby	Xfer Off>Stby 0 <u>0</u> :02		
‡ ‡ > Back	Back î > Save		
Set S1 Time Delays Fail to Acquire Pref	Fail to Acquire Pref Enable	Fail to Acquire Pref 01:00	
‡ ± > Back	Back 😩 > Save	Back 😩 > Save	
Set S1 Time Delays Control Mode Time	S1 Time Delays Load Control Mode	S1 Time Delays	
Loads to Control: 1	Back 2 > Save	Loads to Control: 1 Back 2 > Save	
Set S1 Time Delays Time—Based Control	Time-Based Control Load Control 1	Load 1 Disc N>E 00:03	Load 1 20
. I	‡ ‡ > Back	Back 2 > Next	Back û

## **Set S2 Time Delays**

Set S2 Time Delays En9ine Start	Engine Start @0:03		
¥ å > Back	Back 🏠 > Save		
Set S2 Time Delays Engine Cool Down	En9ine Cool Down Q0:05		
‡ å > Back	Back 🖫 > Save		
Set S2 Time Delays Xfer Stby>Pref	Xfer Stby>Pref 0 <u>1</u> :00		
‡ ‡ > Back	Back 🏠 > Save		
Set S2 Time Delays Xfer Off>Pref	Xfer Off>Pref 0 <u>0</u> :02		
‡ ‡ > Back	Back 🟠 > Save		
Set S2 Time Delays Fail to Acquire Stby	Fail to Acquire Stby Enable	Fail to Acquire Stby 0 <u>1</u> :00	
‡ å > Back	Back 🏠 > Save	Back 🙎 > Save	
Set S2 Time Delays Control Mode Time	S2 Time Delays Load Control Mode	S2 Time Delays	
Loads to Control: 1  Back	Time Back 1 > Save	Loads to Control: 1 Back 1 > Save	
Set S2 Time Delays Time-Based Control	Time-Based Control Load Control 1	Load 1 Disc E>N @0:03	Load 1 Rec N>E <u>0</u> 0:03
¥ 4 > Back	‡ ‡ > Back	Back û > Next	Back û > Save
Set Sources			
Phase Rotation	Disable Rotation	BAC Rotation	ABC Rotation
‡ å > Back	\$	🏅 🙏 Save Back	🚛 🛕 Save Back
In Phase Monitor	Disable	Enable	
🏅 🛕 > Back	‡	I I Save Back	
In Phase Angle	10 Degrees		
‡ å > Back	‡		
In Phase Xfer Fail	In Phase Xfer Fail Enable	In Phase Xfer Fail 01:00	
¥ 1 > Back	Back 2 > Save	Back 2 > Save	

## Set Sources (cont.)

Volt Differential  3 \$ > Back	5 Percent ‡	
Frem Differential	1.0 Hz ‡	
Preferred Source	Preferred Source Normal	Preferred Source Emergency
‡ ‡ > Back	∓ ± Save Back	‡ ± Save Back

### **Applicable for both Normal and Emergency Source**

Applicable for both North	- Intergency Court	
Normal Source	Emergency Source	
∓ å > Back	∓ å > Back	
Number of Phases	3 Phase	Sin9le Phase
‡ ‡ > Back	\$ 1 Save Back	‡ ‡ Save Back
Voltage	Set Voltage 2 <u>4</u> 0 VAC	
∓ ± ≻ Back	Back 2 > Save	
Frequency	Set Frequency 60 Hz	
∓ ± > Back	Back 2 🏅 Save	
Under Voltage Pickup \$ \$ > Back	Pickup 90 % of Nominal 85-100% \$ \$ Save Back	
Under Voltage Dropout \$ \$ > Back	Dropout 90 % of Pickup 75-98% \$ \$ Save Back	
Over Voltage Pickup \$ \$ > Back	Pickup 95 % of Dropout 95-100% \$ \$ Save Back	
Over Voltage Dropout \$ \$ > Back	Dropout 115 % of Nominal 106-135% \$ \$ Save Back	

### Set Sources (cont.)

Set Sources (cont.)			
Volta9e Debounce \$ \$ > Back	Debounce Time 5 Seconds 0.1-9.9 Seconds \$ \$ Save Back		
Volta9e Unbalance Enable/Disable \$ \$ Back	Voltage Unbalance Disable \$ \$ Save Back	Volta9e Unbalance Enable \$ \$ Save Back	
Volta9e Unbalance Pickup \$ \$ > Back	Pickup 10 % 3-18% \$ \$ Save Back		
Volta9e Unbalance Dropout \$ \$ > Back	Dropout 20 % 5-20% \$ \$ Save Back		
Under Frequency Pickup \$ \$ > Back	Pickup 90 % of Nominal 80-95% \$ \$ Save Back		
Under Frequency Dropout \$ \$ > Back	Dropout 99 % of Pickup 95-99% \$ \$ Save Back		
Over Frequency Pickup \$ \$ > Back	Pickup 110 % of Nominal 105-120% \$ \$ Save Back		
Over Frequency Dropout \$ \$ > Back	Dropout 101 % of Pickup 101-115% Nominal \$ \$ Save Back		
Freq Debounce	Debounce Time 3 Seconds 0.1-15.0 Seconds \$ \$ Save Back		
Set Inputs/Outputs			
Main Board I∕O \$ \$ > Back	Main Board I/O Inputs \$ \$ > Back	Main Board I∕O Input 1 \$ \$ > Back	Main Board I∕O Input 1 Lock Out ∓ ‡ Save Back
		Main Board I/O Input 2 \$ \$ > Back	Main Board I/O Input 2 Remote Test \$ \$ Save Back

#### Set Inputs/Outputs (cont.)

Oet inputs/Outputs (cont.	/ Main Board I/O	Main Board I/O	Main Board I/O
Main Board I/O	Outputs	Output 1	Output 1 Load Control 1
‡ ± > Back	‡ 1 > Back	🏮 🔹 🗦 Back	\$ \$ Save Back
		Main Board I/O Output 2 \$ \$ > Back	Main Board I/O Output 2 Audible Alarm \$ \$ Save Back

#### **Set System**

Switch Type	Switch Type BRKR		Sω	itch T 3KC	YPe	Su	uitch T MGNM	YP8
∓ ± > Back	Back û	Save	Back	â	Save	Back	<u> </u>	Save
Switch Type CNT2	Switch Type CNT3							

Save

### **Set Passwords**

Setup Password	Old Password 8021 New Password 6020
∓ ± > Back	Back 🛕 🗦 Save
	Old Password 8021 New Password 6020
Test Password	New Lassword 0070

Back 2

### Calibration

Calibrate L-L Voltage Source N	Calibrate L1-L2 Source N	L1-L2 VAC 240 Calibrate 240
Tource N Back	‡ ‡ > Back	Back 2 5 Save
	Calibrate L2-L3 Source N	L2-L3 VAC 240 Calibrate 240
	∓ ± > Back	Back 2 🌣 Save
	Calibrate L3-L1 Source N	L3-L1 VAC 240 Calibrate 240
	‡ ‡ > Back	Back 2 🌣 Save
Calibrate L-L Voltage Source E	Calibrate L1-L2 Source E	L1-L2 VAC 240 Calibrate 240
T 1 Back	‡ ‡ > Back	Back û 🌣 Save
	Calibrate L2-L3 Source E	L2-L3 VAC 240 Calibrate 240
	‡ ‡ > Back	Back 2 🌣 Save
	Calibrate L3-L1 Source E	L3-L1 VAC 240 Calibrate 240
10	‡ ‡ > Back	Back 🙎 🌣 Save

#### **Setup Assist**

The Setup Assist menu enables the operator to quickly and easily modify critical transfer switch parameters on a single menu screen. Press Next, Use the down arrow to change the parameter and the right arrow to change the value.



#### **Factory Default**

Press the right arrow button to apply factory default settings

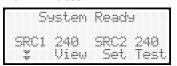


## **Display Settings**

#### Main Menu

Use the left 2 buttons to navigate through the main menu. The main display will cycle through 6 screens to display various parameters and alternate functions.

#### **Down Button**



Displays current status, active time delay, and faults

51	AB	BC	AC
60Hz	240U	240U	240U
Disab	ole –	Lame	
#	#	Test	Main

Displays Normal L-L

52	AB	BC	AC
60Hz	240U	240U	240U
Disa	ble		
#	#		Main

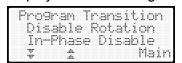
Displays Emergency L-L



Displays date and time



Displays source settings



Displays system settings

**View Button** 



Displays exercise setup



Displays S1 delays



Displays S2 delays



Displays source setup



Displays I/O setup

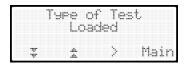


Displays system setup

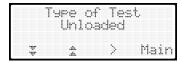
#### **Test Button**



Initiates a Sync Test



Initiates a Loaded Test



Initiates an Unloaded Test

#### **Lamp Test**

Press the down arrow to access main display screen 2. Press button 3, LAMP TEST to temporarily illuminate all LEDs and characters on the display.

#### **Contrast Adjustment**

Press and hold VIEW for 2 seconds until all of the keypad indicators illuminate.

XXXF	1 i	.9htXSystemsXXX
XXXF	1 i	.ghtXSystemsXXX
XXXF	1	.ghtXSystemsXXX
XXXF	li	.9htXSystemsXXX

Use the 2 left buttons to adjust the screen contrast. Press Back to exit the contrast adjustment.

## **Exercise Settings**

The 76-ATC300-00 supports up to 16 exercise cycles. Each exercise cycle is entered as an event. When the control board is initially powered on it first searches all saved events to determine if they have already passed. All expired events are automatically updated to their next valid cycle and saved in eeprom. Each exercise event has several parameters that must be set correctly to function properly. Even if an event is disabled and left to expire it will be updated to its next valid exercise time upon enabling the cycle.

#### Example Exercise Setup:



The above exercise cycle would begin Wednesday January 3, 2024 @ 10:00. It would run a loaded exercise cycle for 15 minutes before transferring to normal, executing all transition delays in addition to the 15 minutes exercise cycle. With a repeat rate of one it would wait 1 week before exercising again on Wednesday January 10, 2024. If the rep[eat rate was set to 2, it would wait 2 weeks.

If the unit was powered down due to a malfunction or removed from service, then put back into service on March 18, 2024 it would immediately update the exercise event to March 20, 2024. Providing the exercise event was set to enabled.

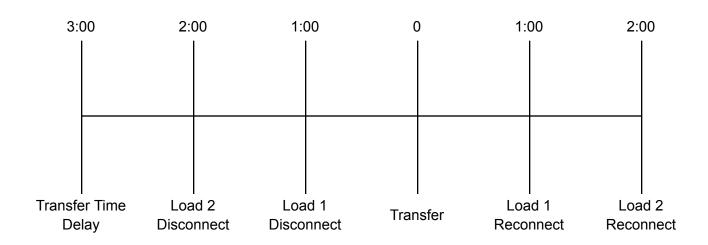
If the exercise interval was set for Monthly with a repeat rate of 1, the exercise event would cycle once per month. With the interval set for daily and the repeat rate at 4, it would exercise every 4 days.

#### **Load Control**

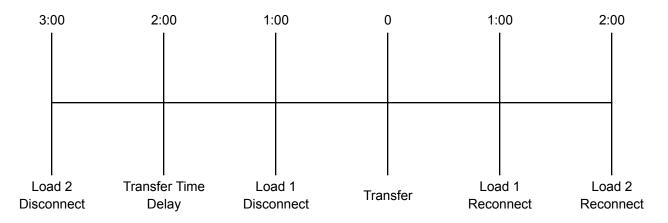
The 76-ATC300-00 control supports up to 2 different load control outputs. Each load control output has a programmable disconnect and reconnect time for both source 1 and source 2 independently. This is different compared to the OEM controller which only supported 1 Pretransfer output and does not have configurable disconnect and reconnect time delays. The factory default configuration assigns Output 1 to Load Control 1, however, this output is fully configurable for different functions; See I/O page.

In the event that the load control disconnect delay is set longer than the transfer delay, the controller will respect whichever delay is longer. It is good practice to keep the longest pre-transfer delay shorter than the transfer delay.

#### Transfer time delay is set longer than the load control delays.



#### One or more load control delays are set longer than the transfer time delay.



#### Sequence of Operation for BRKR (Breaker/Switch Motor Driven)

- 1. Preferred source fails.
- 2. Engine start delay expires and remote start contacts close.
- 3. Standby power is available.
- 4. Preferred to standby time delay expires.
- 5. K2 relay energizes. Motor drive transfers to neutral position.
- 6. Off to standby time delay expires.
- 7. K2 relay energizes. Motor drive transfers to standby position.
- 8. Load control reconnect timers expire and load control contacts close.
- 9. Preferred source returns.
- 10. Standby to off time delay expires.
- 11. Load control disconnects.
- 12. K1 relay energizes. Motor drive transfers to off position.
- 13. Off to preferred time delay expires.
- 14. K1 relay energizes. Motor drive transfers to preferred position.
- 15. Load control reconnect timers expire and load control contacts close.
- 16. Cool down timer expires and the generator shuts down.

#### In BRKR operation mode, the in-phase monitor is disabled.

#### **Sequence of Operation for CNT2 (2 Position Contactor)**

- 1. Preferred source fails.
- 2. Engine start delay expires and remote start contacts close.
- 3. Standby power is available.
- 4. Preferred to standby time delay expires.
- 5. K2 relay energizes. Contactor transfers to standby position.
- 6. Load control reconnect timers expire and load control contacts close.
- 7. Preferred source returns.
- 8. Standby to preferred time delay expires.
- 9. Load control disconnects.
- 10. In-phase monitor is activated, if enabled.
- 11. K1 relay energizes. Contactor transfers to preferred position.
- 12. Load control reconnect timers expire and load control contacts close.
- 13. Cool down timer expires and the generator shuts down.

In CNT2 operation mode, any time delays configured for the neutral position will be ignored.

## **Switch Types (cont.)**

#### **Sequence of Operation for CNT3 (3 Position Contactor)**

- 1. Preferred source fails.
- 2. Engine start delay expires and remote start contacts close.
- 3. Standby power is available.
- 4. Preferred to standby time delay expires.
- 5. K2 relay energizes. Contactor transfers to neutral position.
- 6. Off to standby time delay expires.
- 7. K4 relay energizes. Contactor transfers to standby position.
- 8. Load control reconnect timers expire and load control contacts close.
- 9. Preferred source returns.
- 10. Standby to off time delay expires.
- 11. Load control disconnects.
- 12. K1 relay energizes. Contactor transfers to off position.
- 13. Off to preferred time delay expires.
- 14. K3 relay energizes. Contactor transfers to preferred position.
- 15. Load control reconnect timers expire and load control contacts close.
- 16. Cool down timer expires and the generator shuts down.

#### **Relay Functions per Switch Type**

	CNT2	BRKR	CNT3, 3KC, MGNM	
K1 Relay	Close Source 1	Close Source 1	Open Source 2	
K2 Relay	Close Source 2	Close Source 2	Open Source 1	
K3 Relay	N/A	N/A	Close Source 1	
K4 Relay	N/A	N/A	Close Source 2	

## I/O Options Programmable Inputs and Outputs

While the 76-ATC300-00 does come factory configured for a load control and alarm relay output, these functions can be reconfigured to better suit any application. There are 2 inputs and 2 outputs that can be reconfigured on the controller. From the factory, Output 1 is configured for Load Control 1 (Pretransfer) and Output 2 is configured for Audible Alarm. Input 1 is configured for Lock out and Input 2 is configured for Remote Test (Go to S2).

#### **Input Functions**

**Bypass Contactor Disabled** 

Forced to OFF Inhibit Transfer

Remote End Time Delay Remote Common Alarm

Remote Test

Service Disconnect

#### **Output Functions**

Audible Alarm
Aux Switch Fault

Aux Switch Open

Contactor in Off

Contactor in Preferred

Contactor in Source E

Contactor in Source N

Contactor in Standby

**Exerciser Active** 

Fail to Acquire Preferred

Fail to Acquire Standby

Fail to Transfer

Fail to Open Source 1

Fail to Close Source 1

Fail to Open Source 2

Fail to Close Source 2

In-Phase Monitor

Fail to Transfer

#### **Output Functions (cont.)**

**Load Control Active** 

Load Control 1-2

Non-Emergency Transfer

Not in Auto Mode

Peak Shave Active

Preferred Source Available

Service Disconnect

**Emergency Rotation Error** 

**Emergency Loss of Phase** 

**Emergency Over Frequency** 

**Emergency Over Voltage** 

**Emergency Start** 

**Emergency Under Frequency** 

**Emergency Under Voltage** 

Emergency Unbalanced

Normal Rotation Error

Normal Loss of Phase

Normal Over Frequency

Normal Over Voltage

**Normal Start** 

Normal Under Frequency

Normal Under Voltage

Normal Unbalanced

Normal Standby Available

Test Mode Active

### **Calibration**

Should the controller require calibration, the calibration function can be accessed from the main menu > SET > CALIBRATION. Proper calibration will require taking a physical measurement from line to line. See page 10 for the calibration menu screens.



The current reading is displayed on top and the adjusted reading can be entered below. Enter the corrected reading for each of the relevant measurements. Press **SAVE** and return to the main menu.

## **Factory Default Settings**

Factory defaults can be set by navigating to the Set Factory Defaults entry in the **SET** menu. Applying factory defaults will overwrite all previous parameters and clear all exercise cycles, load control configurations for source 1 and source 2, revert I/O settings, and calibration settings returned to default.

Preferred Source - Normal

Switch Type – BRKR

In-Phase - Disabled

S1 / S2 Control Mode - Time

S1 / S2 Loads to Control - 1

Sync Differential Voltage - 5%

Sync Differential Frequency – 2Hz

Sync Angle - 10 degrees

S1 / S2 Nominal Voltage - 240

S1 / S2 Nominal Frequency – 60

S1 / S2 Phases – Single Phase

Set Password - 0000

Test Password - 0000

S1 / S2 Engine Start - 3 Seconds

S1 / S2 Engine Cool Down - 5 Seconds

Standby to Preferred – 60 Seconds

Preferred to Standby - 3 Seconds

Off to Preferred - 2 Seconds

Off to Standby - 2 Seconds

Over Voltage Dropout – 115% of Nominal

Over Voltage Pickup – 95% of Dropout

Under Voltage Pickup – 90% of Nominal

Under Voltage Dropout – 90% of Pickup

Over Frequency Dropout – 101% of Pickup

Over Frequency Pickup – 110% of Nominal

Under Frequency Dropout – 99% of Pickup

Under Frequency Pickup – 90% of Nominal

S1 / S2 Unbalance - Disabled

S1 / S2 Unbalance Dropout – 20%

S1 / S2 Unbalance Pickup - 10%

Rotation Expected - Disabled

S1 / S2 Fail to Acquire – Disabled (60 Seconds)

Fail to Sync - 60 Seconds

Fail to Sync Fallback - Enabled

Input 1 – Lockout

Input 2 - Remote Test

Output 1 - Load Control 1

Output 2 - Audible Alarm

## **Modbus Communications**

Supported Registers v1.0.0.0 Registers with strikethrough are not supported on the 76-ATC300-00 Hardware

40001	System Overview	RO	40063	Normal Cool Down Delay	RW
40002	Source N Line-Neutral L1-L0	RO	40064	Emergency Cool Down Delay	RW
40003	Source N Line-Neutral L2-L0	RO	40065	Standby to Preferred Delay	RW
40004	Source N Line-Neutral L3-L0	RO	40066	Preferred to Standby Delay	RW
40005	Source E Line-Neutral L1-L0	RO	40067	Off to Standby Delay	RW
40006	Source E Line Neutral L2 L0	RO	40068	Off to Preferred Delay	RW
40007	Source E Line-Neutral L3-L0	RO	40069	Fail to Acquire Preferred	RW
40008	Source N Line-Line L1-L2	RO	40070	Fail to Acquire Standby	RW
40009	Source N Line-Line L2-L3	RO	40071	Fail to Synchronize	RW
40010	Source N Line-Line L3-L1	RO	40072	Fail to Sync Enabled	RW
40011	Source E Line-Line L1-L2	RO	40073	RESERVED	
40012	Source E Line-Line L2-L3	RO	40074	RESERVED	
40013	Source E Line-Line L3-L1	RO	40075	Active Time Delay	RO
40014	Source N Frequency	RO	40076	Active Time Delay Remaining	RO
40015	Source E Frequency	RO	40077	Active Time Delay Preset	RO
40016	Current L1	RO	40078	Normal Over Voltage Dropout	RW
40017	Current L2	RO	40079	Normal Over Voltage Pickup	RW
40018	Current L3	RO	40080	Normal Under Voltage Pickup	RW
40019	Closed Transition In-Phase Delta	RO	40081	Normal Under Voltage Dropout	RW
40020-40038	RESERVED		40082	Normal Unbalance Enabled	RW
40039	Closed-Programmed Transition Override Mode	RW	40083	Normal Unbalance Voltage Dropout	RW
40040	Password	WO	40084	Normal Unbalance Voltage Pickup	RW
40041	Synchronous Voltage Phase Angle	RO	40085	Normal Voltage Debounce	RW
40042	Synchronous Voltage Differential	RW	40086	Emergency Over Voltage Dropout	RW
40043	Synchronous Frequency Differential	RW	40087	Emergency Over Voltage Pickup	RW
40044	Service Entrance Type	RW	40088	Emergency Under Voltage Pickup	RW
40045	Phase Rotation Actual	RO	40089	Emergency Under Voltage Dropout	RW
40046	Phase Rotation Expected	RW	40090	Emergency Unbalance Enabled	RW
40047	Nominal Normal Voltage	RW	40091	Emergency Unbalance Voltage Dropout	RW
40048	Nominal Emergency Voltage	RW	40092	Emergency Unbalance Voltage Pickup	RW
40049	Nominal Normal Frequency	RW	40093	Emergency Voltage Debounce	RW
40050	Nominal Emergency Frequency	RW	40094	Normal Over Frequency Dropout	RW
40051	Normal Number of Phases	RW	40095	Normal Over Frequency Pickup	RW
40052	Emergency Number of Phases	RW	40096	Normal Under Frequency Dropout	RW
40053	Rated Amps	RW	40097	Normal Under Frequency Pickup	RW
40054-40056	RESERVED		40098	Normal Frequency Dropout Time	RW
40057	Transition Mode Mode of Operation Auto/Manual	RW	40099	Emergency Over Frequency Dropout	RW
40058	Password	WO	40100	Emergency Over Frequency Pickup	RW
40059	Normal Engine Start Delay	RW	40101	Emergency Under Frequency Dropout	RW
40060	Emergency Engine Start Delay	RW	40102	Emergency Under Frequency Pickup	RW
40061	Normal Ext Start Delay	RW	40103	Emergency Frequency Dropout Time	RW
40062	Emergency Ext Start Delay	RW			

## **Firmware Revisions**

Version 1.0.0.0 Initial release