



iATS-S300
50-2000 Amps

Installation and user manual.

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By Accretive technology.
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ACCRETIVE TECHNOLOGY

Operation and maintenance manual for the **iACS-S300**.
Intelligent Automatic Change Over Switch.

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INTRODUCTION

Congratulations on your purchase of S300. When contacting Accretive Technology about parts, services and support, you will need to supply the information of your product. Transcribe the information found on your product's nameplate label to the table below.

- Model number.
- Serial number.
- Date of purchase.
- Purchase location.

Preliminary Comments and Safety Precautions: This technical document is intended to cover most aspects associated with the installation, application, operation, and maintenance of the Intelligent Automatic Change over Switch iATS-S300 Controller. It is provided as a guide for authorized and qualified personnel only in the selection and application of the iATS-S300 Controller. Please refer to the specific **WARNING** and **CAUTION**, before proceeding. If further information is required by the purchaser regarding a particular installation, application, or maintenance activity, please contact an authorized Accretive technology sales representative, service engineer or the installation contractor.

Warranty and liability information: This product comes with 1 year warranty, during the course of this period if any mishap within this period, Accretive technology will take responsibility of it, but if by default internal component was tampered with, internal damage of the equipment or the company seal found broken, Accretive technology will not be liable for the damage and if need be for replacement of any component on the equipment it will attract the purchaser a maintenance fee charge.

SAFETY PRECAUTIONS: All safety codes, safety standards, and/or regulations must be strictly observed in the installation, operation, and maintenance of this device.

WARNING

The warnings and cautions included as part of the procedural steps in this document are for personnel safety and protection of equipment from damage. An example of a typical warning label heading is shown above to familiarize personnel with the style of presentation. This will help to ensure that personnel are alert to warnings, which appear throughout the document. In addition, warnings and cautions are all upper case and boldface.

CAUTION:

Completely read and understand the material presented in this document before attempting installation, operation, or application of the equipment. In addition, only qualified persons should be permitted to perform any work associated with this equipment. Any wiring instructions presented in this document must be followed precisely. Failure to do so could cause permanent equipment damage.

BACKGROUND

Automatic changeover switches are used to protect critical electrical loads against loss of power. The load's PHCN power source is backed up by a Generator power. The automatic changeover switch is connected to both the PHCN and Generator power sources and supplies the load/home with power from one of the two sources. In the event that power is lost from PHCN, the transfer switch transfers the load to the Generator power source. This transfer can be automatic or manual, depending upon the type of ACS equipment being used or if the ACS is operated in manual or automatic mode. Once PHCN power is restored, the load is automatically or manually transferred back to the PHCN power source, again depending upon the type of transfer equipment being used or the ACS operational mode. In automatic changeover switch (ACS) equipment, the switch's intelligence system initiates the transfer when the PHCN power falls below or rises above a preset voltage. When PHCN power is restored, the ATS automatically transfers back to the PHCN power source and initiates generator engine shutdown command.

The iATS-S300 has 3nos of power source that can be connected.

1. PHCN.
2. Generator 1.
3. Generator 2.

Note: The PHCN power supply is priority 1 and both Generators are priority 2.

The iATS-S300 controller transfers power from one of the two sources to the load/home according to priority.

An ATS consist of two basic elements:

1. Main contactors to connect and disconnect the load to and from the power sources.
2. Intelligence/supervisory circuits to constantly monitor the condition of the power sources and thus provide the intelligence necessary for the switch and related circuit operation.

This manual deals with the second basic element of the ACS, the required intelligence/supervisory circuits. Earlier ACSs were controlled by relay logic type or solid-state, single board controllers. In either case, the control panel consisted of several individually mounted and wired devices offering a limited amount of system flexibility, especially in the case of the relay logic design. The iATS-S300 Controller advances the application of intelligence, supervisory, and programming capabilities for ACS equipment.

Product Overview

The iATS-S300 is a comprehensive, multi-function, microprocessor-based ACS controller. It is a compact, self-contained, panel mounted device designed to replace traditional relay and solid-state logic panels.

Designed to meet the needs of markets worldwide, the iATS-S300 Controller is a UL Recognized Component

- Meets IEC 1000-4-2, 1000-4-3, 1000-4-4, 1000-4-5, 1000-4-6, and 1000-4-11
- Meets CISPR 11, Class A
- Complies with FCC Part 15, Class A
- Meets African Standards Conformance.

The iATS-S300 Controller provides an unmatched degree of programmed flexibility to address the needs of any system. It operates from all system voltages between 180 and 260 Vac, single-phase at 50 or 60 Hz. The iATS-S300 Controller monitors the condition of the voltage of the PHCN & Generator power sources. The iATS-S300 Controller provides the necessary intelligence to ensure that the switching operates properly through a series of programmed sensing and timing functions.

FEATURES OF THE STANDARD iATS-S300 CONTROLLER:

- Triple power source (PHCN + 2 Generator).
- Fully computerized controls and operations.
- Switch operated.

- Single control package for sensing and timing delays.
- Voltage surge immunity.
- Under voltage and over voltage protection.
- Manual generator automatic OFF.
- Generator operational time function.
- Automatic and Manual operation.
- On-board diagnostics and fault detection and indication.
- Special load power configuration.
- End-user desirable programming.
- Fully adjustable timers and control parameters.
- Optimum generator runtime maintenance hours and fuel economy.
- Store customer/factory established parameters in nonvolatile memory.

GLOSSARY

With respect to their use within this document and as they relate to ACS and controller operation, the following terminology is defined.

AVAILABLE: A source is defined as “available” when it is within its under voltage/overvoltage (if applicable) set point ranges for the nominal voltage.

CONNECTED: Is defined as when the input is shorted by an external contactor or connection.

FAILED OR FAILS: A source is defined as “failed” when it is outside of the applicable voltage set point, ranges for the nominal voltage setting for a time exceeding the set seconds after the time delay expires for low voltage, power supply is cut off and instantly cut off power supply when high voltage is experienced.

MANUAL MODE (Failsafe)

Manual operation is a feature that enable only single power operation from the only available power source and forces a transfer or re-transfer operation to the only that available power source. This fail save can only operate in manual mode only

RE-TRANSFER

Re-transfer is defined as a change of the load connection from the Generator or PHCN (Vise-versa).

PHCN

PHCN is the primary source (normal source, normal power source, or normal).

Generator

Generator is the secondary source (emergency source, emergency power source, emergency, standby, or backup source).

PHCN: Failed or Fails

PHCN is defined as “failed” when it is outside of its under-voltage/overvoltage (if applicable) set point ranges for the nominal voltage.

Generator: Failed or Fails

Generator is defined as “failed” when it is outside of its under-voltage/overvoltage (if applicable) set point ranges for the nominal voltage setting for a time exceeding set seconds after the time delay expires.

TRANSFER

Transfer is defined as a change of the load connection from the PHCN to Generator power source, except when specifically used as “Transfer to Neutral”.

TRANSFER TO NEUTRAL

Transfer to neutral is defined as when the load circuits are disconnected from both the PHCN and generator power sources.

UNCONNECTED

Unconnected is defined as when the input is not shorted by an external contactor or connection.

FUNCTIONS/FEATURES/OPTIONS

The primary function of S300 Controller is to accurately monitor power sources and provide the necessary intelligence to operate in an appropriate and timely manner. In addition, the S300 Controller provides programming through the device’s switches, button and LED indicators to precisely show the parameter values.

OPERATIONAL SIMPLICITY

From installation to programming to usage, the S300 was designed with operational simplicity in mind. Only one style needs to be considered, regardless of input/output requirements or system voltages. The S300 provides the functionality of numerous other devices combined in one package. The user-friendly switches, button and LED

indicators simplifies routine operation, programming, data presentation, and setting adjustments.

STANDARD AND OPTIONAL FEATURES

A variety of programmable features are available with the S300 to meet a wide variety of application requirements. Individual features or feature combinations provide the intelligence required to tailor S300 to individual needs. The model is also equipped with special load function which can be configured for any or both power sources. The features are factory activated, depending upon customer requirements. The specific variable set points associated with standard and factory activated features are stored in nonvolatile memory. Activated feature set points are available for customer adjustment.

HARDWARES

The purpose of this section is to familiarize the reader with the S300 hardware.

FRONT (OPERATOR) PANEL:

The front panel, depending on the installation, is normally accessible from the outside of a panel or door. S300 front panel serves two primary functions: output and input.

- Alert the user to specific conditions/alerts.
- Program the S300.
- Operation of the S300.

INDICATOR LAMP: The indicator lamp shows the physical status of the S300, if PHCN/Generator is available, if there is any fault and countdown timer ON/OFF status.

IACS-S300 CONTROLLER: This is the brain behind the ACS, it controls and monitors all operations and functions of the entire unit.

CONTACTORS: This is an electrically controlled giant switches, which make or breaks the power supply to the load/home. These contactor ratings tell the capacity of the ACS which ranges from 50 – 2000A.

TRANSFORMER: The transformer (220vac/12vac, 300ma) provides power supply to the controller. Its major function is to provide the equivalent power supply voltage which is being monitored by the controller.

ENCLOSURE: the S300 is packaged in a metal enclosure, (IP65) which the size depends on the rating of the unit.

OPERATION

ACS OPERATION SWITCHES AND ITS FUNCTIONS:

- Power switch.
- Auto/manual switch.
- PHCN/Generator switch.
- Generator 1 ignition switch.
- Generator 2 ignition switch.
- Operational timer knob.
- Bypass mode.
- LED indication.

POWER SWITCH:

The S300 power switch should be ON, else the ACS will no functions.

Note: once the power switch is ON the onboard PCB LED flashes every continuously.

AUTO/MANUAL SWITCH

The auto/manual operation of the S300 can be selected depending on the operational requirement. If auto is selected the S300 will function automatically either in PHCN or Generator, depending on which is available, based on the priority.

The Automatic Mode of the S300 Controller provides for automatic transfer and re-transfers from PHCN/Generator as dictated by the features supplied and their programmed set point values. It provides a summary of the S300 Controller intelligence and supervisory circuits that constantly monitor the condition of all two power sources, thus providing the required intelligence for transfer operations. These circuits, for example, automatically initiate an immediate transfer of power when the power fails, or the voltage level drops below a preset value. Exactly what the S300 Controller will initiate in response to a given system condition depends upon the combination of standard and selected optional features.

Note: In manual operational mode, either PHCN or Generator switch can be operated or selected at a time.

MANUAL PHCN:

The S300 auto/manual switch should be manual position. Select PHCN with the PHCN/Generator switch if the switches are correctly operated the S300 will power the load/home only on PHCN and other source will not be recognized.

MANUAL GENERATOR:

Select Generator with the PHCN/Generator switch if the switches are correctly operated the S300 will power the load only on Generator and other source will not be recognized. But to select between the two generators the ignition switch must be used. Whichever generator ignition switch is ON, will power the load and the other generator ignition must be OFF.

GENERATOR 1 STANDBY SWITCH (Generator ignition):

Generator ignition should always be in the ON position before starting the generator. It can be used to stop the generator 1 if it's running.

GENERATOR 2 STANDBY SWITCH (Generator ignition):

Generator ignition should always be in the ON position before starting the generator. It can be used to stop the generator 2 if it's running.

Note: To start the manual generator via start recoil, the generator standby switch should be in ON position always.

If the generator is switched OFF by the ACS unit either automatically or via the generator standby switch, wait for at least 1min before restarting the generator.

SET RUN TIMER

Runtime is functions of the S300 to enable the user to run the generator for some time duration, based on the set requirement. In this case you can run your generator without monitoring and helps manage your gasoline more efficiently.

The timer works for both generators (which ever generator is online). The timer ranges from 1 – 9hrs.

To set the timer, position the timer knob at zero position and press the knob (this refreshes the timer to zero internally).

Rotate the timer knob to the desired hours, the timer LED flashes corresponding to the hours value computed inside the S300. After the flashing, the LED blinks every 0.5sec till the countdown timer is completed and initiates the stop command to the generator.

To OFF the timer, press the timer knob once and the timer LED stops blinking.

Note: The timer will only function when any or either generator is online powering the load.

CUSTOMER OUTPUT RELAY

The output relays are meant for Customer Connections. The primary control outputs of the S300 are dry relay contacts.

S300 GENERATOR IGNITION RELAY:

The S300 comprises of only one relay to provide the generator ignition ON/OFF for manual generator, necessary to complete the electrical control function. The relay is rated DC rating is 3 A, 30 Vdc, 3 A, 250 Vac. An auxiliary relay is provided with the ACS, if the generator is installed more than 20m away from the unit, see the drawing for proper connection.

Note: The auxiliary relay must be powered with the generator starter battery (6 – 12vdc).

BYPASS MODE:

The bypass mode disables the ACS completely. It's meant to act as an interlock between the manual changeover switch and the auto changeover switch. The bypass is available on the ACS for this reason, if there is a problem with the ACS, (extremely low or high voltage) which is not in range as per the setup parameter the ACS. In this case the existing manual changeover will be used to achieve this aim. Hence this will prevent the ACS from closing its contactors while the manual changeover is engaged, which might result to serious short circuit or damage to the ACS unit or personal injuries. When the ACS is on bypass mode all LED starts blinking. If the manual changeover switch is equipped with auxiliary contacts, hence the bypass connection can be made.

Note: if the bypass is not connected, ensure to switch OFF the power switch before using the manual change over.

The bypass terminal has been internally linked inside the ACS unit, if the link is opened the ACS is disabled and goes into bypass mode.

LED INDICATIONS

PHCN LED INDICATOR: This LED blinks when PHCN is available and when the load is powered, it remains permanently ON.

GENERATOR 1 LED INDICATOR: This LED blinks when Generator is available and when the load is powered, it remains permanently ON.

GENERATOR 2 LED INDICATOR: This LED blinks when Generator is available and when the load is powered, it remains permanently ON.

TIMER LED INDICATOR: This LED blinks every 0.5sec when countdown timer is ON. This also LED flashes when fault occurs on the S300. The numbers of blinks are references to the fault number as per troubleshooting section.

IACS-S300 SETUP

There are two basic setups of the S300.

- Normal parameter setup.
- Load-Factory default parameter.

At first power up of the S300, the controller loads the factory default parameters necessary for operation.

For normal parameter setup if the factory defaults parameter does not meet up with the owner's requirement.

Note: Either PHCN or Generator supply can be used for this setup. (Preferably generator supply to avoid interruption during the configuration).

START NORMAL PARAMETER SETUP FOR S300.

- PHCN/generator must be available.
- Power ON/OFF switch should be on OFF position.
- Generator ignition switch should be ON position.
- PHCN/Generator switch should be on PHCN position.
- Auto/manual switch should be on manual position.
- Press the timer knob for 15sec and wait till both PHCN/Generator indicators start blinking.

Note:

In setup mode, toggling the AUTO/MAN switch moves the present parameter to the next. The parameter number is flashed by the PHCN, Generator or both LED light.

The timer knob (range value 1 - 9) is used to set the value for each parameter and the value is flashed by the timer LED.

After any setting is made against the parameter, toggle (ON/OFF) the AUTO/MANUAL switch once. (Fast flashing occurs on all LED indicators; it indicates the parameter setting has been accepted and automatically proceeds to the next parameter).

Any change of switch position will exit the setup mode.

All setup parameters will only be saved at the end of the setup.

If for any reason, just a single parameter is needed to be adjusted, set other parameters to zero till you reach the parameter intended to be adjusted. Proceed till the setup procedure is completed. At the end of the set up the S300 saves only the parameter that was not set at zero.

- Generator ignition switch should be ON position.
- PHCN/Generator switch should be on Generator position.
- Auto/manual switch should be on manual position.
- Press the timer knob for 30sec and wait till all indicators starts flashing.
- After loading the factory default parameters, the S300 restarts and ready for operation.

LOAD-FACTORY DEFAULT PARAMTERS FOR S300.

- Power ON/OFF switch should be on OFF position.

NORMAL PARAMETER SETUP FOR S300.

After initiating the setup mode below is the programming steps.

	PARAMETER	DESIGN STANDARD	LED FLASH INDICATION			OPTION (Timer knob, computes this values)	DEFAULT VALUE	HELP
			PHCN	Generator	FAULT			
PHCN SETTINGS								
1	STANDARD VOLTAGE	Voltage	1	1	0	Range 1 – 5 (position 1 is 180vac, position 2 is 200vac, position 3 is 220vac, position 4 is 240vac, position 5 is 260vac.	220vac	The IACS is originally designed for 1phase 220vac operations.
2	PHCN OVER VOLTAGE	%	2	0	0	Range 1 – 3 (position 1 is 10%, position 2 is 20% & position 3 is 30%	20%	PHCN over voltage protection immediately cuts OFF power supply to the load if the voltage exceeds the settings.
3	PHCN OVER VOLTAGE RECOVERY DELAY	Delay (Seconds).	3	0	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	30sec	If over voltage is experienced, the S300 controller continuously checks the voltage as per the preset set delay, after which power is restored to the load.
4	PHCN UNDER VOLTAGE	%	4	0	0	Range 1 – 6 (position 1 is 10%, position 2 is 20%, position 3 is 30%, position 4 is 40%, position 5 is 50% & position 6 is 60%	50%	If under voltage is experienced, the S300 continuously checks the voltage as per the preset set delay (parameter 5), after which power is cut OFF to the load.
5	PHCN UNDER VOLTAGE CUTOFF DELAY	Delay (Seconds).	5	0	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is	30sec	If under voltage is experienced, the S300 controller continuously checks the voltage as per the preset set delay, after which power is cut OFF

						80sec & position 9 is 90sec.		to the load.
6	PHCN AUTO DELAY	Delay (Seconds).	6	0	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	10sec	In AUTO operation, If PHCN supply is available and OK, this delay is initiated and after it elapses the load is energized.
7	PHCN MANUAL DELAY	Delay (Seconds).	7	0	0	Range 1 – 9 (position 1 is 1sec, position 2 is 2sec, position 3 is 3sec, position 4 is 4sec, position 5 is 5sec, position 6 is 6sec, position 7 is 7sec, position 8 is 8sec & position 9 is 9sec.	5sec	In MANUAL operation, If PHCN supply is available and OK, this delay is initiated and after it elapses the load is energized.
8	TRANSITION DELAY	Delay (Seconds).	8	0	0	Range 1 – 9 (position 1 is 1sec, position 2 is 2sec, position 3 is 3sec, position 4 is 4sec, position 5 is 5sec, position 6 is 6sec, position 7 is 7sec, position 8 is 8sec & position 9 is 9sec.	5sec	The transition delay is the changeover time interval between generator supply to PHCN supply.
9	PHCN AVAILABLE Generator OFF DELAY	Delay (Seconds).	0	9	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	15sec	In the case of when generator is online and PHCN is available, S300 transfers the power to PHCN and initiate a stop command to the generator after the delay elapses.
Generator 1 SETTINGS								
10	Generator OVER VOLTAGE	%	0	10	0	Range 1 – 3 (position 1 is 10%, position 2 is 20% & position 3 is 30%	20%	Generator over voltage protection immediately cuts OFF power supply to the load if the voltage exceeds the settings.
11	Generator OVER VOLTAGE RECOVERY DELAY	Delay (Seconds).	0	11	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	30sec	If over voltage is experienced on Generator, the S300 controller continuously checks the voltage as per the preset set delay, after which power is restored to the load.
12	Generator UNDER VOLTAGE	%	0	12	0	Range 1 – 6 (position 1 is 10%, position 2 is 20%, position 3 is 30%, position 4 is 40%, position 5 is 50% & position 6 is 60%	50%	If under voltage is experienced, the S300 continuously checks the voltage as per the preset set delay (parameter 5), after which power is cut OFF to the load.
13	Generator UNDER VOLTAGE CUTOFF DELAY	Delay (Seconds).	0	13	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	30sec	If under voltage is experienced, the S300 controller continuously checks the voltage as per the preset set delay, after which power is cut OFF to the load.
14	Generator AUTO DELAY	Delay (Seconds).	0	14	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	10sec	In AUTO operation, If Generator supply is available and OK, this delay is initiated and after it elapses the load is energized.
15	Generator MANUAL DELAY	Delay (Seconds).	0	15	0	Range 1 – 9 (position 1 is 1sec, position 2 is 2sec, position 3 is 3sec, position 4 is 4sec, position 5 is 5sec, position 6 is 6sec, position 7 is 7sec, position 8 is 8sec & position 9 is 9sec.	5sec	In MANUAL operation, If Generator supply is available and OK, this delay is initiated and after it elapses the load is energized.
16	Generator	Delay				Range 1 – 9 (position 1 is 25sec, position	10sec	If generator voltage is out of range

	VOLATGE OUT OF RANGE	(Seconds).	0	16	0	2 is 50sec, position 3 is 75sec, position 4 is 100sec, position 5 is 125sec, position 6 is 150sec, position 7 is 175sec, position 8 is 200sec & position 9 is 225sec.		as per the setting (parameter 8 & 10), after the preset delay S300 initiate a stop command to the generator.
Generator 2 SETTINGS								
17	Generator OVER VOLTAGE	%	0	0	17	Range 1 – 3 (position 1 is 10%, position 2 is 20% & position 3 is 30%	20%	Generator over voltage protection immediately cuts OFF power supply to the load if the voltage exceeds the settings.
18	Generator OVER VOLTAGE RECOVERY DELAY	Delay (Seconds).	0	0	18	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	30sec	If over voltage is experienced on Generator, the S300 controller continuously checks the voltage as per the preset set delay, after which power is restored to the load.
19	Generator UNDER VOLTAGE	%	0	0	19	Range 1 – 6 (position 1 is 10%, position 2 is 20%, position 3 is 30%, position 4 is 40%, position 5 is 50% & position 6 is 60%	50%	If under voltage is experienced, the S300 continuously checks the voltage as per the preset set delay (parameter 5), after which power is cut OFF to the load.
20	Generator UNDER VOLTAGE CUTOFF DELAY	Delay (Seconds).	0	0	20	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	30sec	If under voltage is experienced, the S300 controller continuously checks the voltage as per the preset set delay, after which power is cut OFF to the load.
21	Generator AUTO DELAY	Delay (Seconds).	0	0	21	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	10sec	In AUTO operation, If Generator supply is available and OK, this delay is initiated and after it elapses the load is energized.
22	Generator MANUAL DELAY	Delay (Seconds).	0	0	22	Range 1 – 9 (position 1 is 1sec, position 2 is 2sec, position 3 is 3sec, position 4 is 4sec, position 5 is 5sec, position 6 is 6sec, position 7 is 7sec, position 8 is 8sec & position 9 is 9sec.	5sec	In MANUAL operation, If Generator supply is available and OK, this delay is initiated and after it elapses the load is energized.
23	Generator VOLATGE OUT OF RANGE	Delay (Seconds).	0	0	23	Range 1 – 9 (position 1 is 25sec, position 2 is 50sec, position 3 is 75sec, position 4 is 100sec, position 5 is 125sec, position 6 is 150sec, position 7 is 175sec, position 8 is 200sec & position 9 is 225sec.	10sec	If generator voltage is out of range as per the setting (parameter 8 & 10), after the preset delay S300 initiate a stop command to the generator.
BYPASS								
24	BYPASS DELAY	Delay (Seconds).	24	24	0	Range 1 – 9 (position 1 is 10sec, position 2 is 20sec, position 3 is 30sec, position 4 is 40sec, position 5 is 50sec, position 6 is 60sec, position 7 is 70sec, position 8 is 80sec & position 9 is 90sec.	30sec	If bypass interlock is connected to the manual change-over switch. If for any reason the manual changeover is operated S300 immediately goes to standby mode, and if the manual changeover switch is put back to neutral position this delay is initiated and after the delay elapses, S300 goes back to normal operation.
FAULT RESET								

25	AUTO/MANUAL FAULT RESET	SELECT	25	25	0	Range 1 – 2 (position 1 is AUTO fault reset, position 2 is manual fault reset)	1	If set in AUTO, when fault occurs after 4mins the IACS-S300 resets the fault.
26	NUMBERS OF FAULT RESET	SELECT	26	26	0	Range 1 – 9	3	If parameter 19 is set at AUTO, hence the number of faults reset depends on this parameter, after which the user attention is required for further checks and troubleshooting if the fault persist.
27	SPECIAL LOAD POWER SUPPLY	SELECT	27	27	0	Range 1 – 8 (position 1 is special load on PHCN, position 2 is special load on generator 1, position 3 is special load on generator 2, position 4 is special load on PHCN & generator 1, position 5 is special load on PHCN & generator 2, position 6 is special load on generator 1 & generator 2, position 7 is special load on PHCN & generator 1 & generator 2, position 8 is special load is disabled).		If set at 1 special load on PHCN, If set at 2 special load on generator 1, If set at 3 special load on generator 2, If set at 4 special load on PHCN & generator 1, If set at 5 special load on PHCN & generator 2, If set at 6 special load on generator 1 & generator 2, If set at 7 special load on PHCN & generator 1 & generator 2, If set at 8 special is disable).

THIS SECTION DEALS WITH VOLTAGE CALIBRATION OF THE ACS UNIT. AND HAS TO BE PERFORMED WITH A MULTIMETER.

PROCEDURE: use the digital multimeter to measure the actual voltage supply either PHCN or generator whichever is available on the ACS. Example if the voltage is 215vac, enter the below parameter accordingly.

- Parameter 28 = 2
- Parameter 29 = 1
- Parameter 30 = 5

28	Actual voltage	value	28	28	0	Range 1 – 4 (position 1 is 100v, position 2 is 200v, position 3 is 300v, position 4 is 400v.	2	
29	Actual voltage	value	29	29	0	Range 1 – 9 (position 1 is 10v, position 2 is 20v, position 3 is 30v, position 4 is 40v, position 5 is 50v, position 6 is 60v, position 7 is 70v, position 8 is 80v & position 9 is 90v.	2	
30	Actual voltage	value	30	30	0	Range 1 – 9 (position 1 is 1v, position 2 is 2v, position 3 is 3v, position 4 is 4v, position 5 is 5v, position 6 is 6v, position 7 is 7v, position 8 is 8v & position 9 is 9v.	1	
31	BYPASS ENABLE/DISABLE	SELECT	31	31	0	Range 1 – 2 (position 1 is ENABLE BYPASS, position 2 is DISABLE BYPASS)	2	

TROUBLESHOOTING AND MAINTENANCE

LEVEL OF REPAIR: This manual is written with the assumption that only ACS troubleshooting will be performed. If the cause of malfunction is traced to an S300 controller, the unit should be

replaced with a new unit. The malfunctioning unit should then be returned to Accretive technology for factory repairs.

MAINTENANCE AND CARE: The S300 is designed to be a self-contained and almost maintenance-free unit. The printed circuit boards are calibrated and conformably coated at the factory. They are intended for service by factory-trained personnel only, cleaning of the panel, tightening of cable

terminals, temperature checks can be carried out on the unit periodically.

S/N	No's OF LED FLASING	FAULT LED STATUS	PROBABLE CAUSES AND SOLUTIONS
1	1	WARNING! PHCN VOLTAGE LOW	Check PHCN voltage if lower than the low voltage cut-off set point. Wait till the voltage is normal or in the range of the acceptable voltage by the S300. If voltage is ok the S300 will reset automatically. If the voltage remains low, check with PHCN for further assistance on voltage problems.
2	2	WARNING! PHCN VOLTAGE HIGH	Check PHCN voltage if higher than the high voltage cut-off set point. Wait till the voltage is normal or in the range of the acceptable voltage by the S300. If voltage is ok the S300 will reset automatically according to the high voltage recovery delay. If the voltage remains high, check with PHCN for further assistance on voltage problems.
3	3	PHCN CONTACTOR FAULT	Check the PHCN contactor auxiliary feedback contact for any loose connection. Confirm contactor OK, check contactor mechanism, and check contactor is stock up due to overheating or loose connection. Else replace defective contactor
4	4	PHCN CONTACTOR JAM WITH GENERATOR 1 CONTACTOR	Check for contactor short of overheating due to lose connection between PHCN contactor and generator 1 contactor. Check for contactor feedback for loose connection. Check if contactor is stock up due to mechanical failure. Replace defective contactor.
5	5	PHCN CONTACTOR JAM WITH GENERATOR 2 CONTACTOR	Check for contactor short of overheating due to lose connection between PHCN contactor and generator 2 contactor. Check for contactor feedback for loose connection. Check if contactor is stock up due to mechanical failure. Replace defective contactor.
6	6	PHCN CONTACTOR DROP-OUT	PHCN contactor drops out, due to low voltage or voltage dip. Check PHCN voltage, check PHCN contactor feedback contact, check connected load and ensure there's no overload or shot circuit.
7	7	WARNING! GENERATOR VOLTAGE LOW	Check generator output voltage if lower than the low voltage cut-off set point. Wait till the voltage is normal or in the range of the acceptable voltage by the S300. If voltage is ok the S300 will reset automatically. If the voltage remains low, check with local generator technician for further assistance on voltage problems with the generator.
8	8	WARNING! GENERATOR VOLTAGE HIGH	Check generator voltage if higher than the high voltage cut-off set point. Wait till the voltage is normal or in the range of the acceptable voltage by the S300. If voltage is ok the S300 will reset automatically according to the high voltage recovery delay. If the voltage remains high, check with local generator technician for further assistance on voltage problems with the generator.
9	9	GENERATOR	Check the Generator contactor auxiliary feedback contact for any loose connection.

		CONTACTOR FAULT	Confirm contactor OK, check contactor mechanism, and check contactor is stock up due to overheating or loose connection. Else replace defective contactor
10	10	GENERATOR CONTACTOR JAM WITH PHCN CONTACTOR	Check for contactor short of overheating due to lose connection between generator contactor, and PHCN contactor. Check contactor feedback for loose connection. Check if contactor is stock up due to mechanical failure. Replace defective contactor.
11	11	GENERATOR CONTACTOR JAM WITH GENERATOR 2 CONTACTOR	Check for contactor short of overheating due to lose connection between generator 1 contactor, and generator 2 contactor. Check contactor feedback for loose connection. Check if contactor is stock up due to mechanical failure. Replace defective contactor.
12	12	AUTO GENERATOR FAIL TO STOP	Check generator ignition relay contact, check generator ignition cable if ok. Check for loose connection in the S300 terminal connector check for loose connection in the generator start/stop command; check the ignition cable is ok. Check the ignition switch and cable if defective replace defective parts.
13	13	GENERATOR 2 CONTACTOR DROP-OUT	Generator contactor drop-out, due to low voltage or voltage dip. Check Generator voltage, check Generator contactor feedback contact, check connected load and ensure there's no overload or shot circuit.
14	14	WARNING! GENERATOR 2 VOLTAGE LOW	Check generator output voltage if lower than the low voltage cut-off set point. Wait till the voltage is normal or in the range of the acceptable voltage by the S300. If voltage is ok the S300 will reset automatically. If the voltage remains low, check with local generator technician for further assistance on voltage problems with the generator.
15	15	WARNING! GENERATOR 2 VOLTAGE HIGH	Check generator voltage if higher than the high voltage cut-off set point. Wait till the voltage is normal or in the range of the acceptable voltage by the S300. If voltage is ok the S300 will reset automatically according to the high voltage recovery delay. If the voltage remains high, check with local generator technician for further assistance on voltage problems with the generator.
16	16	GENERATOR 2 CONTACTOR FAULT	Check the Generator contactor auxiliary feedback contact for any loose connection. Confirm contactor OK, check contactor mechanism, and check contactor is stock up due to overheating or loose connection. Else replace defective contactor
17	17	GENERATOR 2 CONTACTOR JAM WITH PHCN CONTACTOR	Check for contactor short of overheating due to lose connection between generator contactor, and PHCN contactor. Check contactor feedback for loose connection. Check if contactor is stock up due to mechanical failure. Replace defective contactor.
18	18	GENERATOR 2 CONTACTOR JAM WITH GENERATOR 1 CONTACTOR	Check for contactor short of overheating due to lose connection between generator 1 contactor, and generator-2 contactor. Check contactor feedback for loose connection. Check if contactor is stock up due to mechanical failure. Replace defective contactor.
19	19	AUTO GENERATOR 2 FAIL TO STOP	Check generator ignition relay contact, check generator ignition cable if ok. Check for loose connection in the S300 terminal connector check for loose connection in the generator start/stop command; check the ignition cable is ok. Check the ignition switch and cable if defective replace defective parts.
20	20	GENERATOR 2 CONTACTOR DROP-OUT	Generator contactor drop-out, due to low voltage or voltage dip. Check Generator voltage, check Generator contactor feedback contact, check connected load and ensure there's no overload or shot circuit.

21	21	SPECIAL LOAD CONTACTOR FAULT	Check the SPL contactor auxiliary feedback contact for any loose connection. Confirm contactor OK, check contactor mechanism, and check contactor is stock up due to overheating or loose connection. Else replace defective contactor
22	0	S300 NOT FUNCTIONAL	Check the onboard PCB LED if flashing when power switch is ON. If not check the power button and cables if connected check all switched if ok, else replace defective parts.

CONTROL AND POWER CONNECTIONS INSTALLING S300

- ACS is rated 50A – 200A, depending on the rating purchased.
 - Install the S300 in a well-ventilated area.
 - Use the appropriate cable size for the power supplies and output supplies.
 - For the control connections, use 1.5sqmm cable if the distance to the generator ignition remote signal is less than 15 meters. Use 2.5sqmm fir greater than 15 meters.
 - Follow the below control wiring and ensure the control cables are connected appropriately. This connection is meant for only the panel terminal as shown below.
-
- Terminal 9, 10 & 11 will be connected to generator-1 ignition.
 - Terminal 14, 15 & 16 will be connected to generator-2 ignition.
 - Terminal 17 & 18 will be connected to bypass interlock if available on the manual ATS. Else jumper to made to disable it.
 - Terminal 1 & 2 will be connected to live and neutral PHCN input supply via 63A, 2 Pole MCB.
 - Terminal 3 & 4 will be connected to the load.
 - Terminal 5 & 6 will be connected to live and neutral generator 1 input supply via 63A, 2 Pole MCB.
 - Terminal 7 & 8 will be connected to live and neutral generator 2 input supply via 63A, 2 Pole MCB.
 - Terminal 9 & 10 will be connected to special loads.

Note: if the generator is installed more than 10m away from the S300, hence use the auxiliary relay.

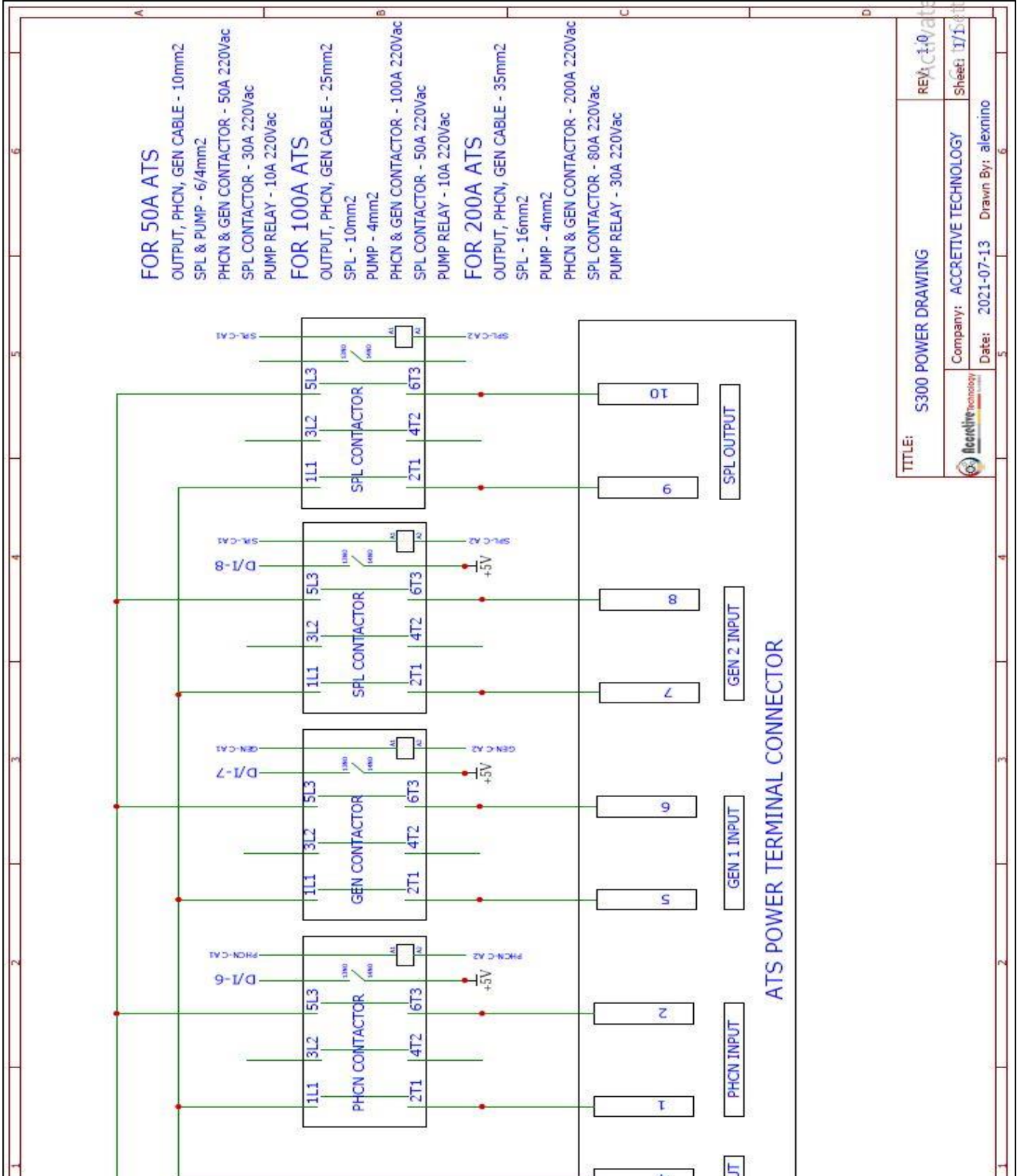
INSTALLING THE AUXILIARY RELAY

- Connect the Ignition terminal to the S300 generator ignition switch.
- Connect the command terminal to the S300 ignition terminal 1 & 2 or 2 & 3.
- Connect the battery terminal to the generator battery 12v.
- Note: ensure the battery polarity is correctly connected.

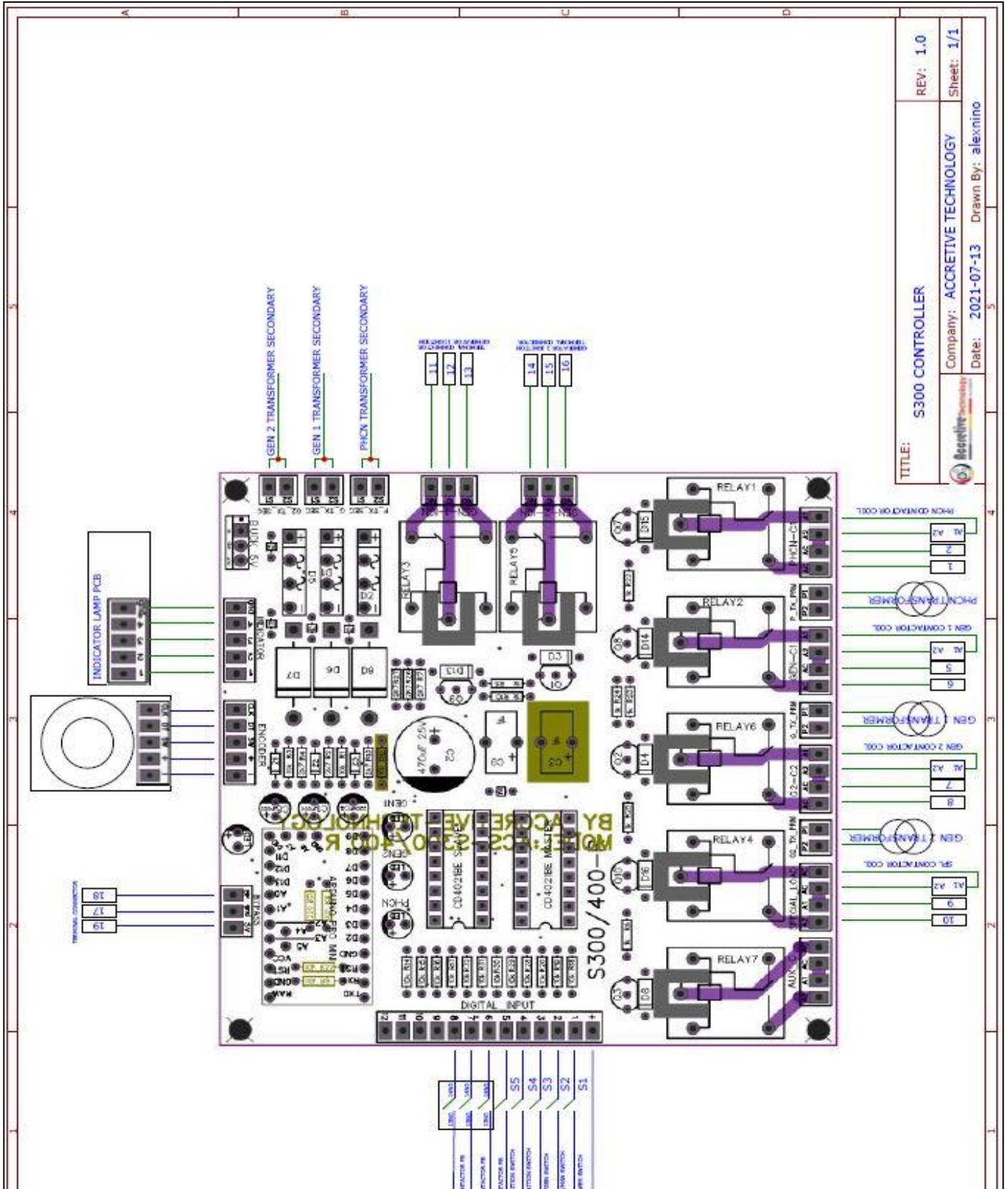
S300 CABLE TERMNIANTION			DIN RAIL CONNECTOR
NEPA TF	P1	PHCN TRANSFORMER PRIMANRY 220V	internal
	P2	PHCN TRANSFORMER PRIMANRY 220V	internal
	S1	PHCN TRANSFORMER PRIMANRY 220V	internal
	S2	PHCN TRANSFORMER PRIMANRY 220V	internal

Generator 1 TF	P1	Generator 1 TRANSFORMER PRIMANRY 220V	internal
	P2	Generator 1 TRANSFORMER PRIMANRY 220V	internal
	S1	Generator 1 TRANSFORMER PRIMANRY 220V	internal
	S2	Generator 1 TRANSFORMER PRIMANRY 220V	internal
Generator 2 TF	P1	Generator 2 TRANSFORMER PRIMANRY 220V	internal
	P2	Generator 2 TRANSFORMER PRIMANRY 220V	internal
	S1	Generator 2 TRANSFORMER PRIMANRY 220V	internal
	S2	Generator 2 TRANSFORMER PRIMANRY 220V	internal
Generator 1 Ignition	NO	IGNITION NORMALLY OPEN	Terminal 11
	C	IGNITION COMMON	Terminal 12
	NC	IGNITION NORMALLY CLOSED	Terminal 13
Generator 2 Ignition	NO	IGNITION NORMALLY OPEN	Terminal 14
	C	IGNITION COMMON	Terminal 15
	NC	IGNITION NORMALLY CLOSED	Terminal 16
BY-PASS	1		Terminal 17
	2		Terminal 18
	3		Terminal 19
DIGITAL I/O	1	POWER ON/OFF SWITCH	internal
	2	AUTO/MANUAL SWITCH	internal
	3	PHCN/GENERATOR SWITCH	internal
	4	GENERATOR 1 IGNITION ON/OFF	internal
	5	GENERATOR 2 IGNITION ON/OFF	internal
	6	PHCN CONTACTOR FEEDBACK	internal
	7	GENERATOR 1 CONTACTOR FEEDBACK	internal
	8	GENERATOR 2 CONTACTOR FEEDBACK	internal
+	POSITIVE	internal	
INDICATOR	1	PHCN INDICATOR	internal
	2	GENERATOR 1 INDICATOR	internal
	3	GENERATOR 2 INDICATOR	internal
	4	TIMER/FAULT INDICATOR	internal
	GND		
ENCODER	CLK	CLK	internal
	DT	DT	internal
	SW	SW	internal
	+	+	internal

	-	-	internal
PHCN INPUT	LIVE		Terminal 1
	NUETRAL		Terminal 2
ATS INPUT	LIVE		Terminal 3
	NUETRAL		Terminal 4
GENERATOR 1 INPUT	LIVE		Terminal 5
	NUETRAL		Terminal 6
GENERATOR 2 INPUT	LIVE		Terminal 7
	NUETRAL		Terminal 8
SPL OUTPUT	LIVE		Terminal 9
	NUETRAL		Terminal 10
PHCN CONTACTOR	AC	220V Supply from PHCN	internal
	AC	220V Supply from PHCN	internal
	A2	220v to PHCN contactor A2	internal
	A1	220v to PHCN contactor A1	internal
GENERATOR 1 CONTACTOR	AC	220V Supply from GEN 1	internal
	AC	220V Supply from GEN 1	internal
	A2	220v to Generator 1 contactor A2	internal
	A1	220v to Generator 1 contactor A1	internal
GENERATOR 2 CONTACTOR	AC	220V Supply from GEN 2	internal
	AC	220V Supply from GEN 2	internal
	A2	220v to Generator 2 contactor A2	internal
	A1	220v to Generator 2 contactor A1	internal
SPECIAL LOAD CONTACTOR	AC	220V Supply from ACS OUTPUT	internal
	AC	220V Supply from ACS OUTPUT	internal
	A2	220v to SPL contactor A2	internal
	A1	220v to SPL contactor A1	internal

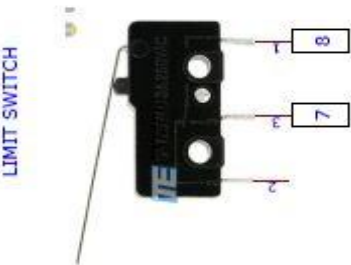
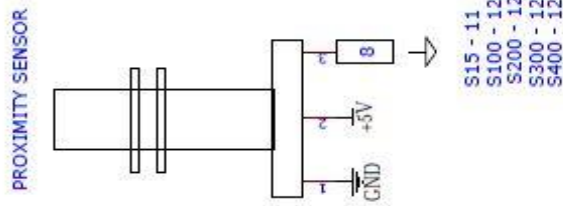


TITLE: S300 POWER DRAWING	REV: 1.0/1/2021
Company: ACCRETIVE TECHNOLOGY	Sheet: 11/15/2021
Date: 2021-07-13	Drawn By: alexmino



TITLE:	S300 CONTROLLER	REV:	1.0
Company:	ACCRETIVE TECHNOLOGY	Sheet:	1/1
Date:	2021-07-13	Drawn By:	alexmino

- S1 16V SWITCH
- S2 16V SWITCH
- S3 16V SWITCH
- S4 16V SWITCH
- S5 16V SWITCH



TITLE: FEILD DEVICES		REV: 1.0
Company: ACCRETIVE TECHNOLOGY		Sheet: 4
Date: 2020-11-06	Drawn By: alexnino	