DIGILINE SYSTEMS

The Complete Electronic Solution

AC Sequence Controller

Version 1.1

2/4 Air Conditioner Control

USER MANUAL

DIGILINE SYSTEMS
ISO 9001:2008 CERTIFIED
MFG. OF POWER SUPPLIES, SMPS, BATTERY CHARGERS
AC CONTROLLERS

B1/18, DSIDC FLATTED FACTORY COMPLEX
A - BLOCK, JHILMIL INDUSTRIAL AREA
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AC Sequence Control System

(Two/Four Air-conditioners Control)

1. Introduction.

The Sequence Control System has been designed to control the automatic sequencing of two Air-conditioners.The ON/OFF sequencing of the Air-conditioners is based on temperature and time dependent.The data retention memory has been used to save the user parameters and time passed by each air-condition. The time based ON/OFF sequencing efficiently utilizes life span of both Air-conditioners.

When room temperature is above the Low temperature and below the High temperature then only one air-conditioner will remain ON. When the set value of time is achieved the running air-conditioner will turn OFF and the other air-conditioner that was off will turn ON after 1 minute for the set value of time.

When the room temperature is above or equal to High temperature and both the air conditioners will run. When the temperature goes normal(below high temp) and time passed for the both air-conditioners is below the set value of time then one of the air-conditioner that was turned ON later to decrease the room temperature will go OFF and its running time will be saved in data retention memory of the system.

The sequence will be perform correctly when normal screen is opened that shows room temperature, make it sure that no setting screen is opened. If no key is pressed for 30 sec then the system will jump to main screen automatically.

1.0 Features.

1. Microcontroller based system with Digital Temperature Sensor
2. 4 - 7 Segment LED Display.
3. Data retention Memory for Time and Temperature settings.
4. Parameters setting from Sequence controller Module.
5. 1 minute Switching delay for each Air-conditioner.
6. Configurable Set Value for Time.
7. Configurable Set value for Temperature.
8. Configurable Set value for High Temperature.
9. Configurable Set Value for High / Low Voltages.
10. High Temperature Alarms.
11. High/ Low Voltage Alarms.

1.1 Parameters Setting.

The user settings are very important to operate this module properly.
There are five parameters for settings.

1. High Voltage.	HVOL
2. Low Voltage.	LVOL
3. Hysteresis For Temperature.	HYST
4. Time Delay.	HOUR
5. Temperature.	HTMP

The following procedure is used to change these settings.

There are Four Switches provided on the front panel.
1. SELECT - Used for Setting desired parameter.
2. ENTER - Used for Saving desired parameter.
3. UP - Used for increment a value.
4. DOWN - Used for setting decrement a value.

Programming, this can be done by.

1. Press SEL key, on pressing SEL the screen will display **HVOL,**
   if you again press SEL key the screen will display following repeatedly
   LVOL, HYST, HOUR, HTMP

2. Select desired parameter by SEL key and edit values using UP, DOWN Key

3. Now Press ENTER key to save values.

1.2 Factory Default Settings

When the Sequence Controller is first time turned on the following settings are loaded by default, these settings can also be changed.

1. High Voltage.	HVOL = 250 Volts
2. Low Voltage.	LVOL = 210 Volts
3. Hysteresis For Temperature.	HYST = 5 Deg C
4. Time Delay.	HOUR = .1 Hour (6 Minutes)
5. Temperature.	HTMP = 35 Deg C

1.3 Parameters Range

1. Set value High Voltage 230 - 250 Volts
2. Set value Low Voltage 180 - 210 Volts
3. Set value Hysteresis For Temperature 1 - 10 Deg C
4. Set value Time Delay 00.1 - 20.0 Hour
5. Set value Temperature 1 - 99 Deg C

2. Specification Chart

SPECIFICATIONS	
GENERAL	
Capacity	2 OR 4 AC UNITS.
Types of AC units	Window, Split or Cassette.
Power Source	220 V Single Phase.
Control method	Time & Room Temperature sensing based.
Control Hysterisis	Selectable 3 Degree Centigrade
Control Range	Selectable 15 – 35 Degree Centigrade
Measurement Resolution	0.1 Degree Centigrade
Control points sensed	Room temperature
Bad AC unit isolation	Based on current and grill temperature.
Runtime balancing	Cyclic Running or Resting.
Readouts	7 Segment Displays & Bi-color LEDs.
Modes of operation	Auto & Manual.
INDICATIONS	
Room Temperature High. Voltage High AC1/2/3/4 - On / Off Faulty unit. Mains Voltage.	
PROTECTION	
Under & over voltage Cut-offs. Under & over voltage protection for the contactors. MCB for each AC unit, in addition to the above, active in both manual and auto modes. Also acts as backup protection, in manual mode.	
ALARMS	
High room temperature. Supply over / under voltage.	
DATA LOGGING	
Daily Usage Logs 60 days for each AC	

3. Working Principle of Sequence Controller

3.1 Power On Switching

When the power is turned ON the controller will display
The 1st message
VOLT for 1 Sec and then its value like **215V** for 6 Sec.
Then 2nd message
t - . C for 1 Sec and then its value like **25.5C** for 6 Sec.
Then 3rd message
AC1h for 1 Sec and then its value like **00.1H** for 6 Sec.
Then 4th message
AC2h for 1 Sec and then its value like **00.1H** for 6 Sec.

After this cycle will keep on repeating. Till you press any key.

3.2 Temperature based on/off Sequencing.

When room temperature is below the High temperature then only one air-conditioner will remain ON. When the set value of time is achieved the running air-conditioner will turn OFF and the other air-conditioner that was off will turn ON for the set value of time.

When the room temperature is above or equal to High temperature and both the air conditioners will run.

The sequence will be perform correctly when normal screen is opened that shows room temperature, make it sure that no setting screen is opened. If no key is pressed for 30 sec then the system will jump to main screen automatically.

3.3 Time based on/off Sequencing.

The time based ON/OFF sequencing plays very important role to utilize both the Air-conditioners efficiently. When the room temperature is below the high temperature then both air-conditioner will run alternately for the set value of time.

3.4 High/Low voltage alarm relay.

When Input voltage is less than low voltage and greater than high voltage then voltage alarm relay will turn On.

3.5 High temperature alarm relay.

When temperature greater than high high temperature setting then temperature alarm relay will turn On. And also both ACs will ON.

3.6 Example: Parameters Setting.

Consider the follow settings.

Set Hystresis : 3 º C
Set High Temperature : 27 º C

System behavior on various room temperatures will be as follows

Room Temperature = 27 ºC or less Only One Air-conditioner will be ON
Room Temperature = 30 ºC or greater AC1=ON AC2 =ON
Room Temperature = 30 ºC or greater High Temp Relay = ON

3.7 Connection Details