



**Niroo Farab Company
Technical center of consultation
design and implementation of
Intelligent control system of
greenhouse climate**



The introduction of Farab's intelligent control system

1-Aeration control of windows of each saloon regarding to temperature and humidity, temperature and light and wind speed of outside and also harmonic operation with foggier ,fan ,pad and heating system(for prevent from untimely aeration and energy loss)
 -It is necessary to mentioned that the system controls operation of window continually and reports every error in electrification, defect of gearbox motor and mechanical defect of window that lead to its incorrect operation and alarms by sound and text so prevent from continuation of window operation.

-Evacuation of saloon humidity during day and night performs regarding to inside and outside temperature and light automatically considering scientific table of VPD for make normal humidity and prevents from temperature and humidity stress on plant.

-The system has different and adjustable operation during blow of seasonal or severe winds and prevents from temperature stress on plant and damage window.

2-Control of saloon temperature base on heating system control, which during turn on the system makes delay in fan and pad operation regarding to oven temperature and also during turn off it, firstly torch and then fan are turned off regarding to getting cool the oven. This action prevents from energy loss and oven depreciation.

3-Also this system can reset heater torch automatically and if torch doesn't turn on, it alarms by sound and text quickly until user checks heater. If fan is impaired or isn't turned on, the system turns off the heater and warns to user.

-Saloon temperature is provided by heater, in fact sensors of each part of saloon undertake temperature provision and also in each time saloon temperature is determined base on hour of day and night, until reach to the best situation. This factor prevents from excess operation of heater, produce excess temperature and decrease production and also lead to considerable decrease of fuel consumption.

4-Heating control system: this control unit can control heating pumps and boiler system monotonously regarding to inside temperature sensors and temperature of heating tubes.

5-Foggier control system which sets saloon humidity and prevents from pour water on leaves and burning of them. Use of this system for control of humidity lead to control of saloon temperature and if temperature of saloon decreases unnaturally, it doesn't let foggier to operate and prevents from make stress on plant.

-In the system, foggier provides necessary humidity for each plant from VPD table. The table determines necessary humidity base on temperature, depends on plant type, so it can provide saloon humidity with foggier.



6-Fan and pad control system which operates in two modes of cooling and ventilation, base on inside and outside temperature and inside humidity acts coordinately with window aeration system.

7-Irrigation control system: In this system is performed irrigation and fertilization of production at any moment of day and night with accuracy of 1 second, that in every day it can irrigate the production in 80 steps and also you can activate or inactivate irrigation in every day of week.

-Irrigation control system can control 4 irrigation valves and one fertilization valve and their manual and automatic control and also irrigation pump.

8-Circular fan control system which base on temperature and humidity in up and down of saloon acts in two modes of night and day with separate settings and provides the same temperature and humidity for the whole saloon with new software of inside temperature control.

9-The system can undertake the whole luminosity of inside and outside of saloon and control luminosity of all saloons as network without attendance of user and prevents from switch on luminosity during the day.

10-Shade and lighting control system considers in the system too that balances saloon lighting regarding to outside and inside light, inside temperature and required photo-period for every plant. Reminded that shade and lighting control system can control operators separately.

Used instruments in the system for every control unit:

- 1-central control system with PLC industrial modules
- 2-inside temperature sensor: 6pieces
- 3-torch temperature sensor: equal to the number of heater
- 4-inside humidity sensor: 2pieces
- 5-wind speed sensor: 1piece
- 6-outside temperature sensor: 1piece
- 7-outside light sensor: 1piece
- 8-outside humidity sensor: 1piece (depend on user need)
- 9-automatic speaker and fault finding
- 10-central monitoring with a touch industrial monitor
- 11-concordant meteorological network

Reminded that above instruments such as control board, used sensors and central monitor have 12 months guaranty (replacement whole parts of system) and after sale service for 8 years.



The distinction of Farab,s intelligent control system:

- 1- Use of PLC industrial control modules (PLC controls are used for control of industrial machineries in order to assure of their correct operation and reduce to zero the possibility of error , noise ,entering virus and so on.
- 2- Use of connective industrial network between monitoring and controllers as online.
- 3-Graphing from all sensors and control items as online (real time history) and automatic and unlimited save the graphs, meanwhile, every one of different parts has graph separately (possibility of change and save the graphs in Excel).
- 4-Use of touch industrial monitor by use of online high speed industrial network.
- 5-Two languages of Persian and English with complete default of Persian language (possibility of adding of different languages according to user need).
- Use of temperature and humidity sensors with transmitter for prevent from difference between sensor temperature and actual one (automatic caliber of sensors).
- Note: The length of connection wire course of sensor doesn't derange in sensor data.
- 6-Autometric fault detection system on all sensors (if there is a problem along sensor wire course or technical hitch in processor system of sensor, the hitch is warned to user quickly as a complete text of error and exits sensor from average automatically).
- 7-Warning system at the time of hitch or change in system (warning in the form of alarm and insert error text in error page and also speaking network system).
- 8-Temperature oscillation warning system in different parts of saloon: if temperature decrease or increase in each part of saloon (because of tear of nylon cover in one part of saloon), error is warned to user regarding to desire of user.
- 9-The control of windows situation in roof and the operation of all windows in open and close position (if there is a problem in window, the system warning to user by alarm, text and speaking system).
- 10-Simple and understandable settings for novice user and also provide texts and guide signs in each setting page for guide user.
- 11-Correct settings announcement system to user in each part of saloon and prevention from incorrect settings by novice user.
- 12-The possibility of installation of different type of sensor and required exit points for user.
- 13-The possibility of control of system from outside of collection without any limitation in settings and observation of all items.
- 14-There isn't necessity to use computer for settings and observe characteristics (control all of system by easy and fast installation of 7 inch touch industrial monitor on the panel).



15-The possibility of use from wireless networked system in the saloon and access to settings and characteristics of each part of it.

16-The possibility of collection control with computer or android operating system (mobile or tablet).