GREEN GARDENS IN DESERT

Overview

The automated irrigation system is a complete SCADA system, which is developed using industry standard hardware, software and communication modules.

The system is mainly based on National Instrument's technologies, particularly using NI CompactRIO, Single Board RIO, NI RMC hardware and LabVIEW software. There can be as many Weather Stations as needed. Each cRIO-100 and sbRIO-200 RTUs can be connected to one of any Weather Stations as per the configuration of the operator.

System Components

- Decentralized and integrated application
- Development station
- Operator Workstation
- Communication Server
- Printer
- Telecommunication network and SM cards
- UPS
- Weather station(s)
- cRIO 100, sbRIO 200

Software Functions

- Irrigation schedule
- Life display of the site inputs
- Data storing in database
- Alarm and events handling and monitoring
- Weather monitoring (temperature, humidity, solar radiation, wind speed and direction, rainfall, etc.)
- Calculation of ET0
- Historical data
- Report generation
- Detection the erroneous valves
- Linking with the Google maps and GPS position
- Different user authentication levels

Benefits

- The panel is strictly protected from dust, water and also has a lock with a key
- System does not interfere to the existing system of the other sites
- System is connected to multiple weather stations
- Communication over industry standard DNP3.0 protocol
- Capable of any standard communication media (3G, fiber optic, etc.)
- Weather station monitors 6 parameters per each 5 seconds for 24 hours, calculates ET factor and control irrigation time

- System automatically adjusts the irrigation to avoid over-irrigation and under-irrigation
- System automatically controls and monitors the problems of the channels for main line and sprinklers
- System read from flow sensors with pulse output, Alarm enabled for flow limit, if there is a high flow alarm, the pump will be stopped

Specifications

Parameter	Value
RTU types	cRIO-100, sbRIO-200, weather station
Number of cRIO-100	unlimited
Number of sbRIO-200	unlimited
cRIO-100	
Number of Valves to be Controlled	30
Number of pumps to be Controlled	1
Number of pumps to be Monitored	1
Voltage Analog Input	3-channels, 300Vrms, 50kS/s, 24-bit, simultaneous
Current Analog Input	4-channels, 5Arms, 50kS/s, 24-bit, simultaneous
Analog Input	32-channel, ±200 mV to ±10 V, 16-Bit, 250 kS/s
High Voltage Digital Inputs	12-channels, 250VAC/DC, universal sinking/sourcing
Relay Outputs	32-Channel Relay, 60 VDC/30 Vrms, 750 mA
Digital Input	8-Channel 24 V Logic, 100 µs, Sinking
Power Supply	120/220VAC, 50/60Hz
sbRIO-200	
Number of Valves to be Controlled	30
Number of Pumps to be Controlled	1
Analog Input	32-channel, ±200 mV to ±10 V, 16-Bit, 250 kS/s
Digital Input/Output	32-channel digital inputs, 32-channel digital outputs, 24VDC
Power Supply	120/220VAC, 50/60Hz
Weather Station	
Weather Sensors	Temperature, solar radiation, wind direction and speed, rain fall
Power Supply	120/220VAC, 50/60Hz
Operator Workstation	Based on NI RMC server computer
Communication Server	Based on NI RMC server computer
Communication	Wireless over 3G VPN network
Communication Application Layer	DNP3.0
Communication Modems	Industrial 3G VPN modems and server

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Hardware Pictures

Software Screenshots

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