



A Rockwell Automation Company

Innovation Place Research Park Research Greenhouse Facility

The Client:

Innovation Place Research Park is a world-class research and development park located adjacent to the University of Saskatchewan. The LF Kristjanson Complex is a state-of-the-art biotechnology research centre, featuring a highly-automated controlled-environment greenhouse with secure individual compartments and a total floor

space of 550 square meters. The LF Kristjanson Complex's major tenant is the Plant Biotechnology Institute's (PBI) Transgenic Plant Centre. PBI is operated by the National Research Council of Canada.

The Requirement:

Innovation Place planned a major expansion of the LF Kristjanson Biotechnology Complex. Greenhouse facilities were to be expanded by 45,000 square feet. The new greenhouse compartments needed the same level of automation and client flexibility present in the original facility.

A large number of new growth chambers would also be built in the same complex.

The Design Solution:

Hinz was chosen to design and implement the automated greenhouse control system based on their experience with the original facility.

The environmental control system consists of an Allen-Bradley PLC 5/80 Programmable Controller with distributed FLEX I/O blocks in each compartment, an Intellution FIX SCADA package for the operator interface, a FIX MMI package for the tenant interface, and a switch panel in each compartment. The processor was chosen so that the bulk of the programming in the original control system could be re-used while adding the ability to communicate to the HMI software via Ethernet.

Information from the weather tower and weather sensors at the original complex were passed to the new control system.

Environmental control includes: temperature, humidity, lighting and shading. Temperature control uses three functions: heating, venting and adiabatic cooling. Two special functions, Snow Melt, and Purge Cycle, are also included.

There are four modes of operation for each compartment:

Automatic - Normal mode of operation, the PLC is running all functions

Manual - Tenant controlled functions from the tenant

terminal take precedence over automatic mode. When a tenant clears a manual function, it returns to automatic

Override - Operator controlled functions from the operator terminal take precedence over manual and automatic mode. Override mode will have no effect if the function is in local mode

Local - Local mode is selected via tri-state (automatic/off/on) or two state (automatic/local) switches located in the compartment switch panel. Local mode takes precedence over all other modes

From the main overview screen, which is a plan view of the greenhouse, a cross-section view for each compartment can be selected which displays all functions and their status graphically. From the cross-section view each function has a pop-up screen from which modes and set points can be entered.

The operator and tenant interfaces have the same graphic screens. The operator interface can change all operating parameters while the tenant interface can change only selected parameters. The new HMI system can be easily networked to the existing facility allowing an operator to monitor conditions at either building, from either building. This will allow Innovation Place to respond rapidly to the needs of the tenants without costly additions to staff levels.



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System Specifications:

- Allen-Bradley PLC-5/80 Processor
- Allen-Bradley 1794 series Flex I/O
- 450 discrete and analog I/O points
- Intellution FIX32 HMI Application Software

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com