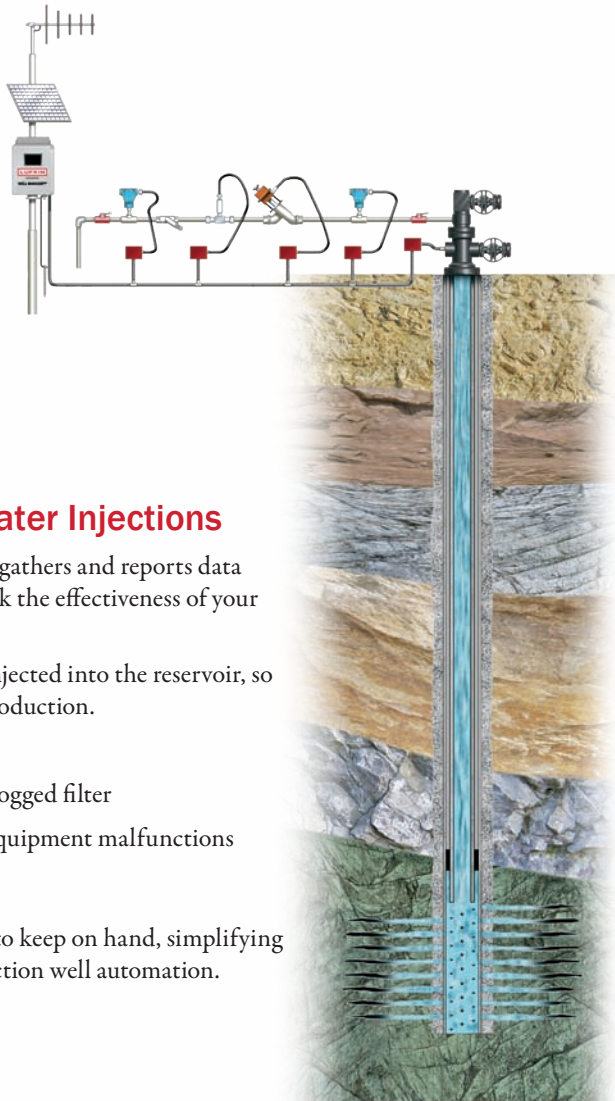
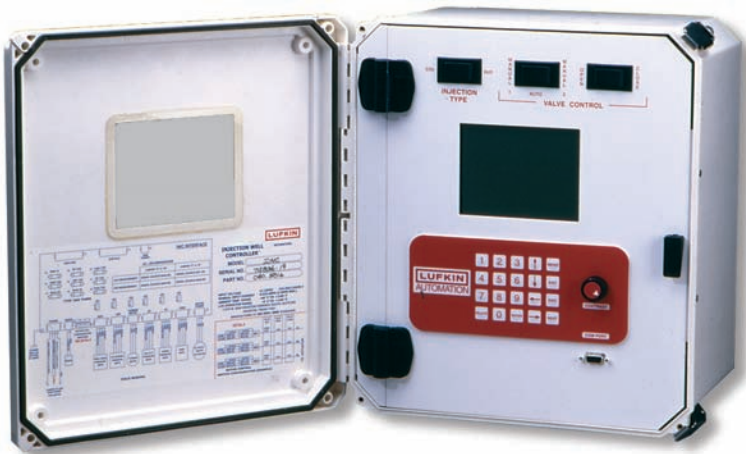


LUFKIN WELL MANAGER™

Injection Well Controller



Optimize and Monitor the Effectiveness of Your Water Injections

The LUFKIN WELL MANAGER (LWM) Injection Well Controller (IWC) gathers and reports data from your injection well operations, helping you protect your reservoir and track the effectiveness of your water and CO₂ injection.

IWC enables you to monitor both the pressure and quantity of water or CO₂ injected into the reservoir, so you can avoid reservoir damage from excessive pressure while optimizing oil production.

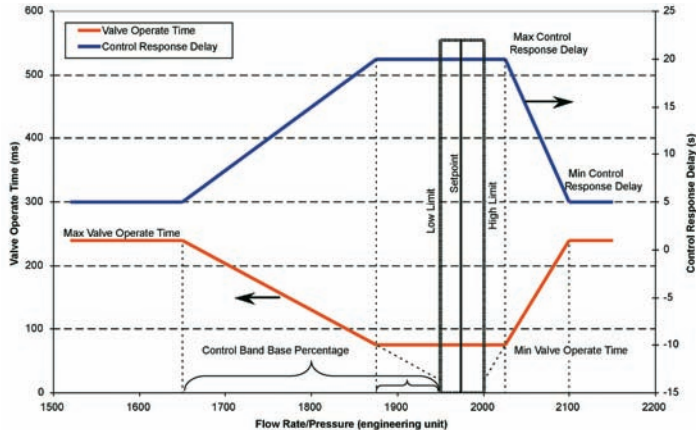
The IWC also provides optional advanced features for:

- Monitoring pressure drop across the injection well filter to alert you to a clogged filter
- Reporting over/under pressures and injection volumes that may indicate equipment malfunctions

The Power of the Lufkin Well Manager

The IWC operates on the LWM platform, reducing the number of spare parts to keep on hand, simplifying training, and giving you a convenient single source for both rod pump and injection well automation.

Injection Well Valve Control Method



- ✓ Protect your reservoir and productivity with IWC
- ✓ Avoid reservoir damage from excessive pressure
- ✓ Monitor injection speed to optimize production
- ✓ Easily track water/CO₂ supply
- ✓ Quickly identify clogged filters or equipment malfunctions

Features & Benefits

Multiple LWM configurations available

- 12VDC @ 0.41 amps nominal (standard)
- 120VAC (with optional power supply)
- Optional keypad/display (Use IPAQ/laptop as terminal interface)
- Optional RS-485 Modbus master. Special support for Control Microsystems 4102 multivariable transmitter and Rosemount 3095FB.
- Optional I/O multiplex board to select between CO₂ and H₂O meter runs at same wellhead.

Available LWM I/O (with included expansion board)

- 8 12-bit analog inputs (6 inputs dedicated to injection well controller)
 - 0-5VDC, 1-5DC, or 4-20mA.
 - 0.8-4VDC, 0.8-3.2VDC (with reduced resolution)
- 8 digital inputs/outputs
- All digitals are utilized for injection well controller (IWC) application
- 1 pulse input
 - Used for turbine meter input
- 2 communication ports
 - RS-232 up to 115.2K Baud with configurable parity and stop bits
 - External DB-9 connection for terminal emulation program.
 - Modbus RTU protocol (supports Lufkin “ELAM” extensions)

Measured process variables

- Upstream pressure
- Wellhead pressure
- Casing head pressure
- Differential pressure
- Temperature
- Data sources for each process variable:
 - Analog input
 - Smart transmitter input
 - Constant
- Actuated valve I/O
 - 3-wire solid-state control output— NO RELAYS.
 - Motor control logic output user configurable
 - Motor can have independent voltage source— up to 28VDC

IWC control methodology

- Flow rate measurement
 - Measures CO₂ or H₂O—calculates single meter run
 - Supports turbine meter, wedge meter and orifice plate
 - NIST 14 density calculation (up to 17 components). Calculation—runs in less than one minute.
 - ANSI/API 2530 differential pressure calculation
 - Live process variables are sampled once per second
- Injection pressure and rate control
 - Control is based on pressure or rate priority and is user selectable. Pressure control has override option to keep rate within limits. Rate control has override option to keep pressure within limits.
 - Dead band/high-low set points (2 set-point methods)
 - High and low dead-band set points
 - Single set point with (+/-) percentage dead-band
 - Separate parameters for CO₂ and H₂O
 - Valve reaction—3 methods
 - Constant step—fixed on and off times
 - Proportional—(Not PID)
 - Continuous
- Pressure and rate alarms are configurable
 - Disabled
 - Control (close valve or freeze control)
 - Dynamic alarm
 - Latched alarm
 - Configurable priority (high, highhigh, low, lowlow)
- Valve limit detection
 - Timeout—user programmable time out
 - Continuous
- Manual valve actuation
 - Front panel control (2 motor valves with expansion card)
- Commissioning mode
 - Initiated on first power up. Allows user to program unit while flow calculation control is disabled. User may enter commission mode at any time.

Plotting and history

- Up to 3 traces can be plotted on screen; user can select what is shown
- 24-hour injection rate (1440 minute buffer)
- 60-day injection volume

Contact Lufkin Automation

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