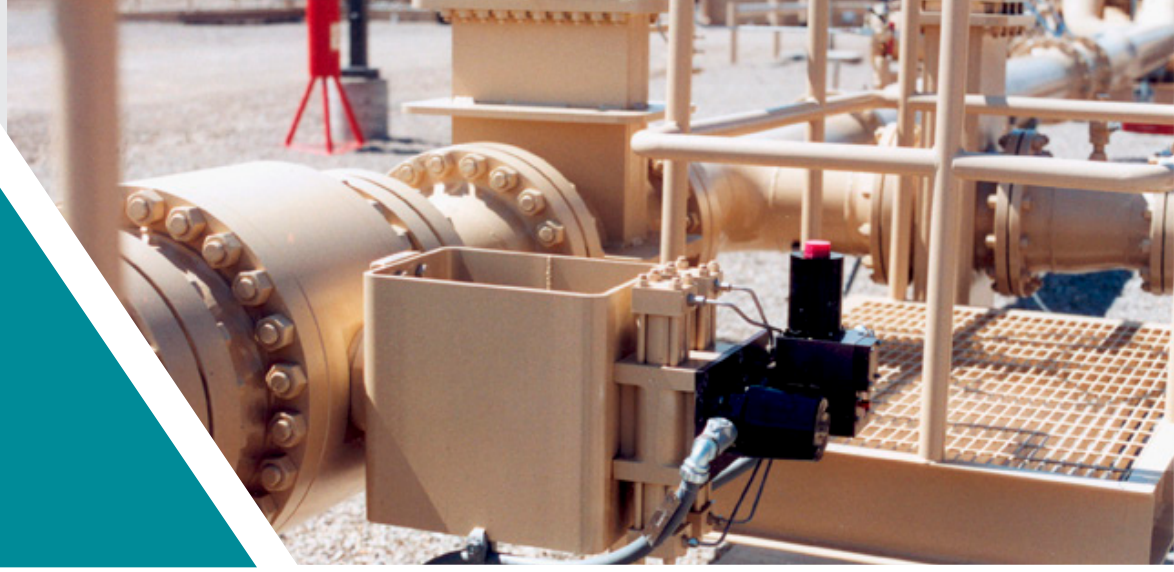
PIPELINE



METER BALANCE VALVE & METER BACK PRESSURE VALVE

BACKGROUND: In transporting crude oil and pipeline petroleum products to refineries, storage tanks, and other delivery points, metering of the fluid is essential for determining flow rate, volume, and ultimately, cost. In situations where the flow in the input line may vary significantly, multiple meter runs are required in order to maintain flow rates within the optimum accuracy range of each flowmeter. Such meter runs branch off of a manifold and run in parallel, dividing the flow among the individual runs.

The flows from the individual meter runs are then combined into a single line before the petroleum enters the refinery or storage tank. Accuracy in metering pipeline flow and in preventing a phase change during the flow through the meters is essential in delivery and in determining product costs and pricing.

KEY TO SUCCESS in metering crude oil and petroleum products is ensuring that flow through the meters is controlled to the extent that the liquid is laminar and is flowing at a rate within the capability of the meters to accurately measure the volume. Turbulent flow and changes in the phase of the fluid will result in erroneous readings.

PROBLEM: Each meter run typically consists of a flowmeter and a meter balance valve, for controlling the flow through the line to ensure that it is within the effective accuracy range of the meter and that it is consistent with the flow through the other meter runs. In combining the individual meter runs, the liquid flows through a meter back pressure valve before the petroleum enters the refinery or storage tank. The purpose of the meter back pressure valve is to maintain sufficient back pressure on the flowmeters

ELECTRAULIC™ ACTUATION

to ensure there is no phase change as the product flows through the meter.

With regard to both meter balance valves and meter back pressure valves, ball valves are generally preferred, although globe valves and butterfly valves may be used. Ball valves provide good control characteristics with wide range ability at moderate costs. Globe valves offer the advantage of better throttling control, while butterfly valves are a lower cost solution, but with reduced control performance.

Solution: To meet the requirements of precise and reliable actuator control, REXA Actuators based on the company's proprietary Electraulic® Technology are finding growing use in the industry. The self-contained actuators combine the simplicity of electric operation, the power of hydraulics, the reliability of solid state electronics, and the flexibility of user-configured control.

Electraulic™ Technology is comprised of two primary subassemblies: a mechanical subassembly and an electrical subassembly. The principle behind its technology is a unique hydraulic circuitry called the flow match valve system. The actuator incorporates a bi-directional gear pump coupled to either a stepper or a servo motor that provides a highly efficient method of pumping hydraulic fluid from one side of a double-acting cylinder to the other. The discrete operation of the motor and pump creates action only when a position change is required. Once the required position is reached, the motor shuts off and the flow match valve system hydraulically locks the actuator in place. Minimal power is required to maintain actuator position. The motor and pump sit idle until a new command signal is received.

Result

The substitution of REXA X2 actuators have provided the quick response and precise level of control required to maintain flow rates within the optimum accuracy range of flowmeters in the meter runs. REXA Actuators are also used to create the back pressures essential for ensuring against phase changes and the possibility of cavitation. With valve control provided by Electraulic™ Actuators, crude oil and petroleum products are reaching customers without problems in pipeline flow and at accurately determined pricing.

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