

SYSTEM

A ditch irrigation system usually consists of a pump site supplying water to a long concrete ditch running perpendicular to irrigation furrows. The water is drawn from the ditch by suction hoses, which are manually inserted each time the pump is started. For proper water distribution, the furrows are sloped away from the ditch at a precise angle. On many of today's modern farms, the fields are leveled and furrows are dug using precision laser beam assisted farm equipment.

A typical pump site consists of 440 VAC 3-phase transformer/switching station and a 300 to 500 HP multi-stage vertical turbine pump. The pump discharge is horizontal, typically into a 6 to 12 inch diameter pipe approximately 8 to 16 feet in length. The water discharges from the open ended pipe into a collection pit or directly into the irrigation ditch.

PROBLEM

Ditch irrigation requires large amounts of water, frequently drawn from deep wells. These pumps are expensive to operate and occasionally wear at accelerated rates due to sand and dissolved minerals. This causes premature loss of efficiency, and can result in excessive consumption of power and reduction of capacity.

Water, itself, is a problem in certain parts of the country. Short supplies and excessive drawdown of local water tables have forced many local, county and state government agencies to require ground water usage to be monitored. This adds up to a vital need to monitor well points with reliable, cost effective flow monitoring equipment capable of field calibration.

Badger Meter's Series 1500 Monitor with a Model IR220B Sensor is an excellent choice for this application. The Series 1500 provides an indication of flow rate and total in a variety of engineering units. The keyboard is password protected so the flow total access is restricted.

Since the Model IR220B Sensor will operate in any pipe size 2½" and larger and the Series 1500 is easily calibrated in the field, no advanced calibration information is necessary at the time of order. Units can be pulled from stock as required.

SENSOR INSTALLATION

Like most flow sensors, Badger Meter's Model IR220B is designed to be installed in a straight section of pipe with a minimum of ten pipe diameters upstream and five pipe diameters downstream from any disturbance in flow profile.

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Unfortunately, in many of these applications, this requirement cannot be satisfied due to the shortness of the pipe section and the close proximity of valves, air bleeders, and pressure reliefs. Further, because the pipes are open ended and are installed at a slight downward slope to reduce problems associated with standing water, the pipe selection is frequently not full.

A full pipe is required for most flow monitoring devices. There are at least two methods of dealing with this problem. One method is to add two - 45 degree elbows to the discharge end of the pipe to insure the pipe remains full. A second is to add a slight restriction to the end of the pipe to generate sufficient back pressure to insure a full pipe. This can be as simple as a small metal plate welded in position to block the lowest portion to the pipe's radius. Properly sized, the restriction will have no significant effect on the pump efficiency or discharge pressure.

Since ideal conditions frequently are not encountered at these sites, locate the sensor before or significantly after any element that will cause disturbances in the flow profile.

DISPLAY INSTALLATION

The Series 1500 has a NEMA4X rated front panel. ANEMA4 rated wall mount enclosure is available. The Series 1500 is designated to operate on +12-24 VDC. The power requirement may be +24 VDC depending on the configuration. The two line by eight digit display can be configured by the user to display flow rate and total separately or simultaneously. The Series 1500 may be calibrated by the user. The Model IR220B produces a pulse output which is wired directly to the Series 1500. The Series 1500 is calibrated for a given pipe size by entering the appropriate K number and Offset number for that pipe size.

ADVANTAGES

The Series 1500 and Model IR220B System is a versatile, easy to calibrate, cost effective system for monitoring pump efficiency and providing flow totalization required for reporting purposes.

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