

# BLENDTECH

## Wild Stream Blending Controller

# MARK IV

*The BLENDTECH MARK IV ADDITIVE BLENDING CONTROLLER is a modern electronic microprocessor based controller designed for use in a variety of additive injection and wild stream blending systems. When configured as a wild stream blending system, the unit will control the blending of a secondary stream into the wild stream at a programmed ratio. The blending controller is also able to simultaneously inject one or two additives. The solid state unit is suitable for indoor or outdoor use.*

### Key Feature

- Controls blending of two product streams
- Supports injection of up to two additives
- Supports a variety of flow meters
- Accepts flow meter pulse rates up to 10kHz.
- Error checking and alarm generation
- Provides for calibration of each flow meter pulser
- Pump control for secondary product and additives Overtreat and flushing at end of load
- RS-485 data communications and remote control
- Non-volatile memory
- BlendCOMM Management and Control Compatible

### Description

The ADDITIVE BLENDING CONTROLLER unit operates as an intelligent slave to a main product system. When enabled, the unit can operate as a wild stream blender controlling the flow of the secondary product stream, as an additive injection unit sequentially injecting one or two additives or a combination of the two.

The additive blending controller is designed for completely unattended operation. In the blending mode of operation the unit monitors the main product flow meter and varies the flow of the secondary stream to maintain the required blend ratio. The secondary stream flow rate is controlled by a flow control valve operated by two solenoid valves or by a motor operated valve controlled by two electrical signals. The configuration of the secondary stream flow control valve is specified by a parameter.

To initiate a product transfer operation in manual mode, the ADDITIVE BLENDING CONTROLLER uses an enable and high flow signals. The enable signal allows a new product transfer transaction to take place. The high flow signal allows blending or injection of additive.

The blend controller will turn on the required secondary or additive pumps, allow secondary and additive pressure to build up, will reset all current load product counters to zero, turn on the permissive signal and start monitoring the main product flow. When the required volume of main product is reached for blending or injection to start, the flow control valve will be opened and adjusted to maintain the correct ratio of secondary to main product, and the appropriate injector valve will be opened and closed to maintain the required treat rate.



At all times, the ADDITIVE BLENDING CONTROLLER unit will monitor the main product flow and update the required totalizer volumes. At the end of a load, the unit will determine if there is secondary product or additive in the system pipes indicating incomplete flushing and prevent additional loading until flushing is complete.

### **Calibration Factors**

The ADDITIVE BLENDING CONTROLLER can operate with a variety of flow meters and pulsers. To ensure accuracy, the unit internally maintains separate meter and calibration factors for the main product flowmeter, the secondary stream flow meter and the additive flowmeter. Since the design is all digital, accuracy is determined only by the accuracy of the flow meters plus or minus one pulser count. The main flow meter may be positioned in either the wild product stream or in the end product stream.

### **System Configuration and Parameters**

All user changeable parameters required for the operation of the ADDITIVE BLENDING CONTROLLER are maintained in a non-volatile memory and the unit allows loading of up to 7 default sets of parameter values into the memory.

These parameters can be displayed or changed by means of the unit's four front panel pushbutton switches or through the serial communications link with a remote computer. This RS-485 party line communications circuit permits monitoring of the controller status and all volumes allowing the unit to be integrated into a complete fluid transfer automation and control system.

### **Product Blends**

The ADDITIVE BLENDING CONTROLLER allows up to eight products to be defined each specifying the products to be blended, the blend ratio in per cent or ppm, the additives to be added and the frequency of injection of these additives. The product definition can specify for each product one of three blend ratios and one of three additive injection rates for each of the two possible additives. Products may be selected by means of three contact closure input signals or by communications with a remote computer.

### **Front Panel Displays and Controls**

The additive blending controller unit incorporates a 6 digit LED display that can show the blend ratio or flow volumes for the current load, grand totals for flow streams and grand totals for each of the eight possible product blends. Other data may be displayed using an optional selector switch. This includes wild stream volume, secondary stream volume, main and secondary flow rates, main and secondary volume totalizers and end volume totalizers.

The system software provides for the scaling of any displayed value and positioning of the decimal point so that the data is presented in a user meaningful format. The display is also able to show " error codes.

Three LED annunciators are used to indicate communications by the controller unit, arming of the controller unit and cycling of the inject solenoid. The additive blending controller unit



has four pushbutton switches that are used to select, display and modify any parameter or totalizer.

### **Alarms and Error Checks**

The ADDITIVE BLENDING CONTROLLER unit performs extensive error checking during a product transfer operation and if an error is detected, can alarm the transfer system by removing the permissive output signal or by sending a separate error signal terminating the product transfer. In a blending configuration, the ratio of the two product streams is monitored and if it is outside of acceptable limits then an error condition is signaled.

The unit is capable of monitoring the additive and secondary stream pressures, the flow of main, secondary and additive flows, flushing at end of load, and initiate a lockout if repeated failures occur. In addition, to facilitate testing and troubleshooting, all errors can be inhibited by means of a switch on the injector units front panel.



*A typical flow control valve*

### **Pump Controls**

The ADDITIVE BLENDING CONTROLLER provides control of the secondary stream and additive pumps as required for the product blend. At the end of a product transfer, turning off the pumps is delayed by a period of time to minimize wear in case another transfer is required. A signal for the secondary stream block valve is available for fail safe operation when using a motor operated valve for blending.

### **Calibration**

The ADDITIVE BLENDING CONTROLLER incorporates a calibration mode allowing the secondary or additive to flow without any main product flow. A calibration volume for the secondary stream may be programmed by parameter to facilitate proving the secondary meter. The unit will display the calculated volume delivered at the proving or test port. By comparing this with the volume actually delivered, the meter factors for the secondary stream and additive flow meters can be updated.

### **Operation by Remote Computer**

The unit also incorporates a party line serial communications link. All statistical data such as total volumes of various products can be obtained through this communications circuit. Complete control of the unit can also be exercised through this communications link. The remote computer would authorize the additive blending controller unit by specifying the additive injection volume and interval or by specifying one of eight products.

If a secondary product is to be blended into the main product stream, then the inject volume and interval would be interpreted to be the required blend ratio. The blending controller will monitor main product pulses from the register unit and control the secondary flow and additive injections as required.

To ensure that the delivery pipes are purged of any blended product, the controlling computer can specify the size of the load and the blending controller will then shut off flow of the secondary product or stop additive injections before the end of the load as determined by a system parameter.

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## Technical Specifications

### Electrical Power Supply

115 VAC, 60 Hz, 100 Watts.  
220 VAC, 50 Hz, 100 Watts

### Digital Inputs

12 DC Inputs:  
Used for product select, enable, main and secondary flows, additive pressures, low flow, display select etc.

*Type:*

Dry contact closure (TTL compatible).  
Max. open circuit voltage 5 VDC.  
Max. short circuit current 1 mA.  
Will accept 12 Volt logic level signals.

2 High Speed Flowmeter Pulser  
Inputs

*Type:*

same as digital inputs above.  
10 kHz. maximum count rate.

### Digital Outputs

8 AC Outputs:  
Used for permissive, error, secondary flow and block valve and pump, and additive inject valves and pump.

*Type:*

Optically isolated solid state switch.  
1 amp at 250 VAC.

2 DC Outputs:  
Secondary or additive pulse output  
Error signal - dry contact

### Display

6-digit red LED display., 0.56" character height.

### Event Log *(optional)*

Up to 500 entries or transactions

### Communications

RS-485 data communications.  
Baud Rate: Selectable, 1200 to 9600 Baud.

### Environment

Unit suitable for indoor or outdoor use with appropriate enclosure.

### Safety

All solid state design.  
No open electrical contacts.

### Hazardous Areas

System UL and CSA Approved for Class I, Group D, Division 1 Hazardous Areas with enclosure shown.

### Dimensions

Approximately 13" high X 11" wide X 8" deep when mounted in explosion proof enclosure.



Specifications subject to change without prior notification

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