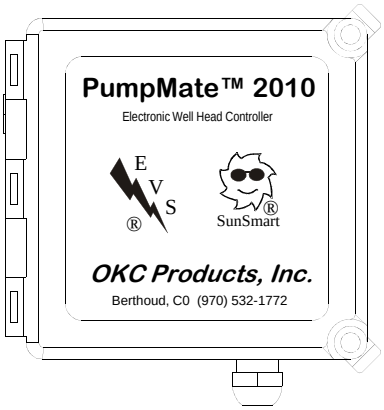
Site Resources Ltd.

OKC Products, Inc.

Flow Rate Control
User Guide Supplement



SunSmart® with vTagNet™ Technology

Non-Incendive, Intrinsically Safe for Use in
Class 1 Division 1 and Class 1 Division 2
Group C and Group D Hazardous Locations

Introduction

FRC application program

The Flow Rate Control (FRC) program is configured for applications where a continuously flowing well is unloading fluids through the Tubing and producing gas from the Casing.

Critical velocity regulation in the Tubing.

To effectively unload fluids through the Tubing, the "critical velocity" of Tubing gas flow is maintained by regulating gas flow out of the Casing and diverting it to the Tubing to increase or decrease flow.

Flow rate sensor measurement.

The FRC program monitors the flowing differential (InW) across an orifice plate placed in-line with the Tubing gas flow. Tubing flow rate is compared with a target set point range to determine if critical velocity is Low, OK or High.

Casing motor valve control

The Casing motor valve is adjusted by incrementally closing or opening the valve in response to changes in the Tubing flow rate. The FRC program can adjust the Casing motor valve in small or large increments as required.

GoTo Key

GoTo

The orange GoTo key is used to manually override controller operation to "go to" the next OFF or ON cycle.

GoTo key toggles to OFF if current cycle is ON.

```
|OFF
/ToGo  000:00:00
```

GoTo key toggles to ON if current cycle is OFF.

```
|ON
|ToGo  000:00:00
```

FRC Option

When configured for FRC, both OFF and ON cycle times are set to zero (000:00:00) to disable cycle timeout.

When power is turned "On" the OFF cycle is initiated, closing the CSG motor valve to force all flow through the TBG. Pressing the GoTo key initiates the ON cycle, opening the CSG motor valve full and starting the CHECK timer to begin the FRC operation that regulates TBG flow rate.

Setting OFF and ON cycle times to zero (000:00:00) disables timing of these cycles. Manually switching OFF and ON is done using the manual "GoTo" override key.

DATA Key

DATA

The DATA key provides menus for viewing current status and well data.

Current status:
< Low – Choke CSG
** OK – On Target*
> High – Open CSG

```
| CHECK    >High
/ ToGo 000:01:31
```

Adjustment Stats: Percentage of CHECKs adjusted for Low and High TBG flow rate.

```
FRC Low  High
    031% 047%
```

TBG Gas Flow: Flow Rate per hour. Total flow meter.

```
GAS 023.5 MCF/HR
  001743.528 MCF
```

Sensor Readings: TBG flow rate. TBG static pressure.

```
> RATE   STATIC
  043InW 0345psi
```

PLEASE NOTE
Gas flow measurements show gas flow through the Tubing (TBG) only. Additional sensors would be required to measure Casing (CSG) or total, combined gas production from the well.

SET Key - FRC

SET

The SET key provides setup menus to set valve adjustment, adjust frequency, rate set points and clear stored data..

Set FRC parameters.
… Valve adjust time Tenths of seconds.
… Check time (h:m:s) Is flow on target?

```
TIME  Valve 010
Check 000:05:00
```

Set FRC target range.
Low: Low OK Limit
High: High OK limit

```
SET  Low  High
Rate 0018 0022
```

VALVE time (tenths of seconds) is the amount of time gas will be either put to the CSG motor valve (open) or vented from the CSG motor valve (close) to adjust flow through the TBG. Set valve time to suit specific motor valve size and supply gas pressure. Valve time set too high will over adjust. Valve time set too low will under adjust.

CHECK time is how often (h:m:s) to check flow rate against flow rate target range and make adjustments accordingly. The target range is set using the Low and High limit for the desired TBG flow rate. The example above illustrates how to set the flow rate target at 20 InW with a ±10% Low/High limit.

SET Key – Gas Flow

SET

The SET key provides setup menus to enter AGA-3 1992 calibration factor, and calculation parameters.

Set calibration factor for AGA-3 1992 gas flow calculations.

```
SET Cal. Factor
(Fb)    004.626
```

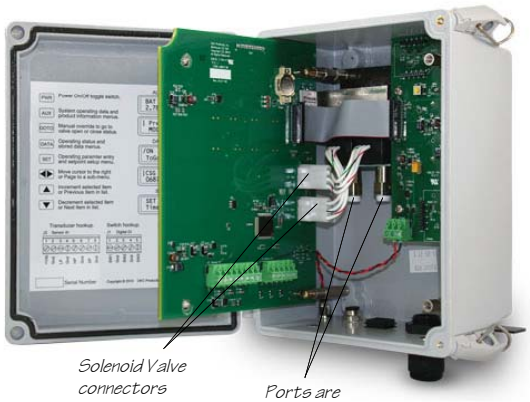
Gas characteristics:
Atmospheric pressure.
Avg. gas temperature.

```
SET psia  T(C)
    14.73 15.00
```

Pipe and orifice size calibration is required for accurate flow calculations. The calibration factor (Fb) for meter run setup is obtained using free on-line Integrated Device Manager (IDM) PC application's AGA-3 1992 Gas Flow calculator utility or call OKC Products for assistance. The above example is for a 2" pipe with a 1" orifice plate diameter.

Although this application is accurate (± 1%) and repeatable, it is not intended to replace Custody Transfer EFM systems. Including atmospheric adjustment for gauge pressure sensors and the average gas temperature is sufficient to provide ± 1% accuracy.

Internal Hardware



Internal solenoid valve assemblies (V1, V2), power module with four rechargeable Nimh AA batteries (underneath power module) and control panel connections are easily accessed by opening the hinged control panel. Vent tubes are removed and plugged for the FRC application.

Motor Valve Ports

Note: *Standard port connections are changed to implement FRC as noted below!*

Rear panel fitting supplies 0-100 psi supply gas to open one normally closed (NC) diaphragm operated motor valve. Rear panel fitting vents pressurized gas from normally closed (NC) motor valve to close the motor valve. The side panel fitting goes to the Casing motor valve to proportionately close or open the valve. All fittings are 316 SS Female ¼-NPT.

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