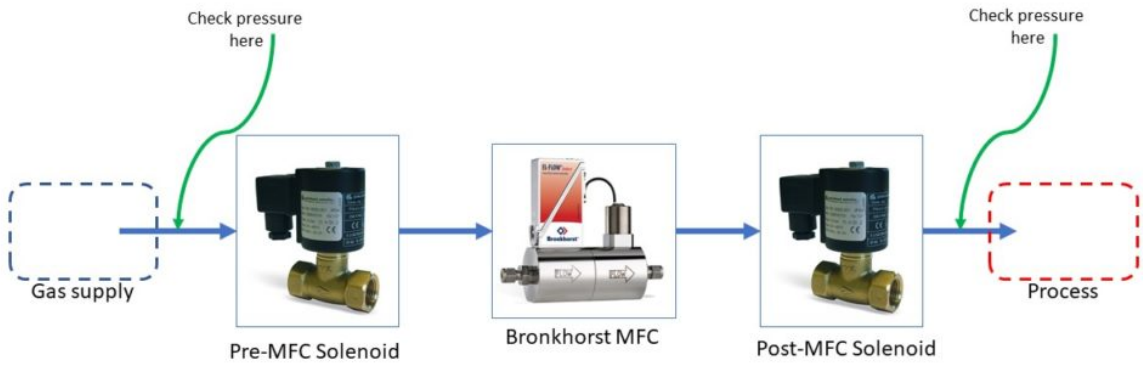
can be mounted to provide CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus or FLOW-BUS protocols.



Mass flow line schematic

Extracted from Bronkhorst document #9.17.023.

```
One time setting……..
 Read Parameter [4.17 - Sensor Type],Verify it is set TO 3,IF NOT then write 3 TO
 Read Parameter [4.20 - Capacity Unit Index],Verify it is set TO 0,IF NOT then wr
 Read Parameter [7.6 - Counter Unit Index],Verify it is set TO 0,IF NOT, write 0
 Set [7.3 - Counter Setpoint Mode] = 0 (Allows new set-point when Counter limit r
 Set [7.4 - Counter New Setpoint] = 0
Every loop setting……
 Set [7.2 - Counter Mode] = 0
 Enter a value for [4.4 - Setpoint],Range = 0-32000, where 0 = No flow & 32000 =
 Enter a value for [7.5 - Counter Limit] (Gas Volume)
 Set [7.2 - Counter Mode] = 2; 2 to count UP to limit
 Set [4.10 - Control Mode] = 0, 0 to Start and 3 to Stop
 Read Counter Value during Dosing cycle
 Read Alarm Info parameter to determine when Counter limit is reached
 When Counter has reached its limit *Set [7.2 - Counter Mode] = 0 &
 When Counter has reached its limit *Set [4.10 - Control Mode] = 3
 Reset counter(3 for reset and 0 to start (requires change of state)
```

Most relevant variables to control the Bronkhorst MFC:

//INPUTS
IB > BYTE > 1 (8 bit)
IW > WORD > 2 (16 bit)
ID > REAL > 4 (32 bit)
****
IW_Setpoint_Integer
IW_Control_Mode
ID_Count_Value
IB_Counter_Mode
IB_Counter_Setpoint_Mode
IB_Counter_New_Setpoint
ID_Counter_Limit
IB_Counter_Unit
IB_Capacity_Unit
IB_Reset_Count_Enb
ID_Valve_Output
IB_Alarm_Info

//OUTPUTS
QB > BYTE > 1 (8 bit)
QW > WORD > 2 (16 bit)
QD > REAL > 4 (32 bit)
****
QW_MFC_SP_Integer
QB_MFC_Control_Mode
QB_MFC_Counter_Mode
QB_MFC_Counter_SP_Mode
QW_MFC_Counter_New_SP
QD_MFC_Counter_Limit
QB_MFC_Reset

Below is a basic program to test the MFC, written in CASE statement:

```
CASE #state_FB702 OF
        0:
            //Waiting for HMI button for MFC activation to
            IF #IX_HMI_Button_ActivateMFC THEN
                //Reset [QB_MFC_Control_Mode], 3 to Stop, (
                #Outputs_MFC.QB_MFC_Control_Mode := 3;

                //Reset [QB_MFC_Counter_Mode] = 0; 0 to Res
                #Outputs_MFC.QB_MFC_Counter_Mode := 0;

                //Reset;3 to RESET &amp;amp; 0 to START
                #Outputs_MFC.QB_MFC_Reset := 3;

                #ton_1(IN := NOT #ton_1.Q,
                       PT := t#2s);
                IF #ton_1.Q AND #Interlock_AllowMFC THEN
                    #state_FB702 := 20;
                    //#ton_1(IN := FALSE,PT := t#0s);
                END_IF;
            END_IF;

        20: //Here the Mass Flow starts
            //Enter a value for [QW_MFC_SP_Integer],Range =
            #Outputs_MFC.QW_MFC_SP_Integer := #IW_HMI_Recip

            //Enter a value for [QD_MFC_Counter_Limit] (Gas
            #Outputs_MFC.QD_MFC_Counter_Limit := #IW_HMI_Re

            //Reset;3 to RESET &amp;amp; 0 to START
            #Outputs_MFC.QB_MFC_Reset := 0;

            //Set [QB_MFC_Control_Mode], 0 TO Start
            #Outputs_MFC.QB_MFC_Control_Mode := 0;

            //Set [QB_MFC_Counter_Mode] = 2; 2 TO count UP
            #Outputs_MFC.QB_MFC_Counter_Mode := 2;

            #state_FB702 := 30;

        30: //Mass Flow stops when Counter has reached its
            IF #Inputs_MFC.ID_MFC_Count_Value>=#Inputs_MFC
                //Reset [QB_MFC_Control_Mode_O2], 3 TO Stop
                #Outputs_MFC.QB_MFC_Control_Mode := 3;
                //state change
                #state_FB702 := 40;
            END_IF;

```

```
48              IF #Interlock_AllowMFC = FALSE OR MFC_Alarm <>(
49                  //Reset HMI button
50                  #IX_HMI_Button_ActivateMFC := False;
51                  //Reset [QB_MFC_Control_Mode_O2], 3 TO Sto
52                  #Outputs_MFC.QB_MFC_Control_Mode := 3;
53                  //state change
54                  #state_FB702 := 40;
55              END_IF;
56
57          40: //Waiting for HMI button for MFC activation to
58                  //User must de-activate supply button once
59              IF  #IX_HMI_Button_ActivateMFC= FALSE THEN
60                  //Reset [QB_MFC_Counter_Mode] = 0; 0 TO Re
61                  #Outputs_MFC.QB_MFC_Counter_Mode := 0;
62
63                  //Reset all parameters; 3 to Reset
64                  #Outputs_MFC.QB_MFC_Reset := 3;
65
66                  //state change
67                  #state_FB702 := 0;
68              END_IF;
69
70          99://Error state
71              ;
72      END_CASE;
```

Join the Conversation

1 Comment

Markus F

March 4, 2020 at 8:12 am

I was looking for a suitable to the point tutorial on this Bronkhorst MFC, your tutorial helped me greatly. Thanks!

Configure Bronkhorst MFC with Siemens TIA portal via Profibus

Jamal February 26, 2020 1 Comment

Bronkhorst® model F-202AV Mass Flow Controllers (MFCs) are suited for accurate measurement and control of flow ranges between 0,8...40 ln/min and 5...250 ln/min at operating pressures between vacuum and 64 bar. The MFC consists of a thermal mass flow sensor, a precise control valve and a microprocessor based pc-board with signal and fieldbus conversion. As a function of a setpoint value, the flow controller swiftly adjusts the desired flow rate.

EL-FLOW® Select series are equipped with a digital pc-board, offering high accuracy, excellent temperature stability and fast response. The main digital pc-board contains all of the general functions needed for measurement and control. In addition to the standard RS232 output the instruments also offer analog I/O. As an option, an on-board interface