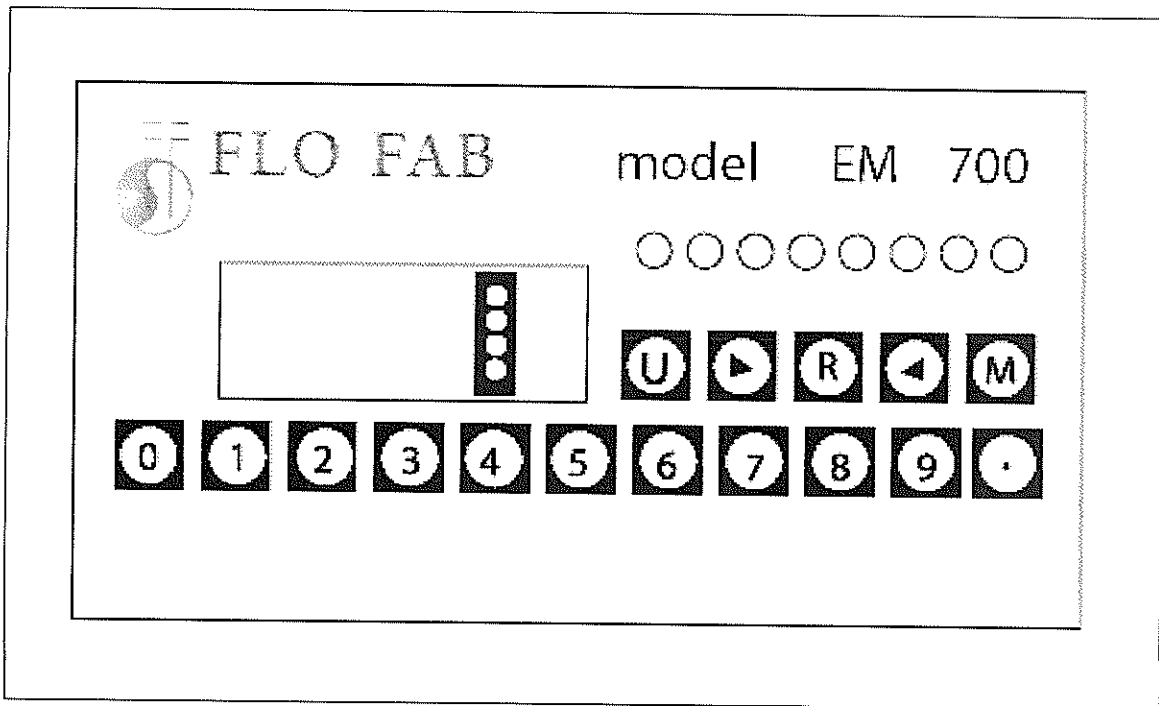







OPERATION MANUAL

BALANCING METHOD FOR LGS VALVES







BUTTON IDENTIFICATION AND FUNCTION

FOUR INDICATOR LIGHTS ARE USED FOR UNIT SELECTIONS: KPA, PSI, L/S AND USGPM

-  IS THE BUTTON FOR THE UNIT SWITCHOVER
-   ARE FOR THE SWITCHOVER BUTTONS FOR FUNCTIONS
-  IS FOR ENTERING THE ABOVE BUTTONS
-  IS THE SWITCHOVER OF THE ADJUSTMENT METHOD


- when the indicator light above **M** is on, this is the proportional method
- when the indicator light above **M** is off, this is the computer method

-  NEEDS TO READ AS ZERO
-  IS THE SIZE OF THE VALVE
-  IS THE DIFFERENTIAL PRESSURE
-  IS FOR ENTERING THE DESIGNED FLOW RATE

- when **M** is off, **Q1** is reading flow rate at first point
- when **M** is on, **Q2** is reading flow rate at second point

-  IS THE CALCULATION OF THE OPENING RANGE OF THE VALVE ACCORDING TO THE DESIGN FLOW RATE

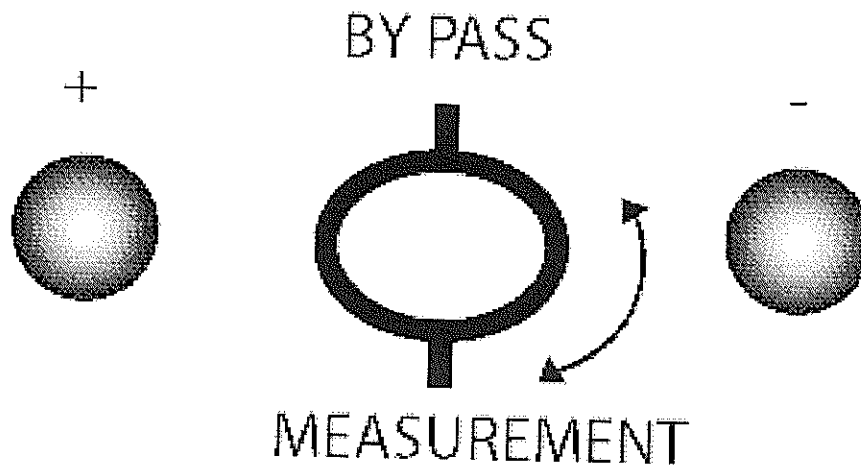
-  IS THE MULTIPLICATION OPERATION

-  CALCULATES THE ACTUAL FLOW RATE ON FIRST ATTEMPT (WHEN **M** IS ON AND UNIT IS PROPORTIONAL METHOD)

-  CALCULATES THE ACTUAL FLOW RATE ON SECOND ATTEMPT (WHEN **M** IS ON AND UNIT IS PROPORTIONAL METHOD)

-  IS THE DIVISION OPERATION

The front panel of the differential pressure transmitter is shown in drawing 9. There are two hoses for differential pressure readings and a switch connecting the valves in the middle. When the switch of the connecting valves is tuned to the "BY PASS" position, the two hose valves "+" for pressure detection will short circuit. When connecting valve switch is tuned to the "MEASUREMENT" position, the two hose valves "+" and "-" will read and measure the correct readings.



Drawing 9. The Specific differential pressure transfer for the Intelligent Adjustment Instrument of balancing valves

Main Specifications

Total Pressure: 3000Kpa (435 PSI)

Measuring Range for Differential Pressure: 1 @ 200 KPa (0.145 @ 29 PSI)

Relative Error for Differential Pressure: $\pm 1\%$ F • S

Procedures

1. Procedures For Measurement

- 1.1 Leave the balancing valve at the appropriate opening range (i.e: not completely closed). Position the switch of differential pressure transmitter to “**BY PASS**”.
- 1.2 Connect the main body of the meter to the differential pressure transmitter with connecting cables.
- 1.3 Connect the two pressure detection hoses of differential pressure transmitter to the Inlet and the Outlet of the balancing valve. The “+” hose of the transmitter should be connected to the valve’s Inlet, and the “-” hose should be connected to the valve’s Outlet.
- 1.4 Turn the meter ON using the power switch on the back panel of the meter. At that moment the indicator light is pointed at P_0 with the differential pressure and flow rates indicating the default units (i.e.: Kpa or PSI and L/s or USGPM).
- 1.5 Wait for a few minutes and press [R] button more **THAN THREE TIMES** (at certain intervals) until close values are shown two continuous times. This means that the sensor is stable and indicated value is the one at point zero.
- 1.6 Open the hose valves on both sides of balancing valve after ensuring that the two hoses are full of water. Position the tuning switch of the connecting valve to “**MEASUREMENT**”: measurements can now be read.
- 1.7 Press the [▶] or [◀] button to turn the light V_m ON. Input the valve code, according to **Chart 3**, by using the numeric buttons. Press the [R] button after entering two code numbers, the instrument will read the codes and display the size of corresponding valve. If the wrong valve is displayed you can input the codes again. There are only eleven valve codes, which are numbered from 01 to 11 (see chart 3). If any number other than the listed numbers are entered, the instrument will display “? ____”, which means that an incorrect valve code was entered.
- 1.8 Press the [▶] or [◀] button to turn the light Q_1 or Q_2 ON. Use the numeric buttons and decimal point, then enter the valve’s opening degree. Press the [R] button and flow rate will be displayed.
- 1.9 When the ΔP light is ON, press the [R] button. The measured value of differential pressure will be displayed.
- 1.10 When you are finished balancing, turn the instrument OFF by positioning the connecting valve of transmitter to the “**BY PASS**” position; close the pressure detection hose valves of the balancing valve and remove the hoses.

2. Adjustment By Valve Setting

- 2.1 See the measurement procedures from 3.1 to 3.6
- 2.2 Press the [▶] or [◀] button to turn the Q₁ light ON. Adjust the valve to a certain setting, use the numeric buttons to input the setting. Then, press the [R] button to get the flow rate; if the displayed value is close to the designed flow rate, adjust the valve and set it to lock position.
- 2.3 Press the [▶] or [◀] button to turn the Q₂ light ON. Adjust the next valve setting, repeating the last step to get the flow rate for this setting. If the flow rate is close to the designed flow, then stop the valve and set the valve.
- 2.4 Press the [▶] or [◀] button to turn T_a light ON. Using the numeric buttons, enter the designed flow rate (L/s or USGPM and KPa or PSI, within four figure number), remembering to press the [R] button to get the required setting. Adjust the valve to the displayed setting in order to obtain the required flow.
- 2.5 Finishing procedure is the same as 1.10

3. Adjustment By Flow

- 3.1 Repeat Step 1 of the method mentioned above.
- 3.2 Press the [▶] or [◀] button to turn the Q_a light ON. Using the numeric buttons to enter the designed flow rate (L/s or USGPM, within four figure number). Press the [R] button and enter the flow requirement.
- 3.3 Press the [M] button to turn ON the light above it. Four double functioning lights at the back will indicate the selection.
- 3.4 Press the [▶] or [◀] button to turn the K₁ light ON. In accordance with 3.2 above, the ratio between the actual flow rate and the designed flow rate at this open range can be achieved.
- 3.5 Press the [▶] or [◀] button to turn K₂ light ON. Adjust the open range or next valve, repeating the last step to the ratio.

3.6 If the two above mentioned ratios are not able to meet the requirements, then press the [▶] or [◀] button to turn ON the light **K₁**, and use the numeric buttons to input the required ratio (within four figure number). If you press the [R] button, you will get the required open range value. Adjust the valve according to this open range value.

3.7 To finish procedure, same as **1.10**

4. Troubleshooting And Warnings

- 4.1 The connecting valve of transfer should be positioned to “**BY PASS**“ before the two pressure hoses valves are opened or closed. Failure to do this could result in the sensor being damaged.
- 4.2 In the course of adjustment, do not fully close the balancing valve. If it is necessary to close the balancing valve completely, you should be positioned to “**BY PASS**“. Close the two pressure hose valves of the balancing valve, then close the balancing valve completely, so as not to damage the sensor because of overloading differential pressure.
- 4.3 The Display of “**OVER**“, indicates the overloading of sensor. In such case, you should be positioned to “**BY PASS**“.
- 4.4 After opening the pressure hose valves of the balancing valve, **DO NOT** shut off the instrument, otherwise, the measured data will not be precise. If necessary, prior to rereading zero, you should be positioned to “**BY PASS**“, and the pressure hose valves of the balancing valve should be closed.
- 4.5 The same switch can be used on DC. We recommend to use rechargeable batteries on account of their stable voltages. If you use dry batteries to supply power, they will have a slight influence on the measurement precision due to unstable voltages. When using batteries to supply power, do not forget to shut off meter. Once batteries are recharged, the unit can be used continuously for 24 hours.
- 4.6 When adjusting balancing valves, different settings may appear on the meter. If different readings occur, it is clear that the operation of system is very irrational.
- 4.7 If differential pressure is too high and the flow rate also too great, then considerable errors will occur. In order to remind personnel of adjustment, the meter has been specially designed with automatic cut-off devices for small differential pressures. The differential pressure will be shown as it should be, but the flow rates will be shown as “**0000**“. At this time, check for possible causes first, then take the measurements again.

- 4.8 Before pressing the [R] button, if you input nothing instead of inputting the corresponding numbers, the instrument will indicate something like “_____”. At this time, try to input one more time.
- 4.9 At time of testing **Q₁**, **Q₂**, **K₁** and **K₂**, if the valve setting has never been entered before, the instrument will give an indication like “? ____”. First, input the valve setting at the status of the **V_m** light being ON, then check **Q₁**, **Q₂**, **K₁** and **K₂**.
- 4.10 In winter, pay special attention to prevent the remaining water in the sensor from freezing. This can damage the sensor.

