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VFM-T3 Quick Start Guide

This Quick Start Guide contains an explanation of only the basic system calibration of the VFM-T3, and must be used in conjunction with the "VFM-T3 Instruction Manual."

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Introduction

This "Quick Start Guide" provides an easy-to-understand explanation of only the most basic instructions to display flow rate.

For detailed settings or operation, see the "Instruction Manual".

The VFM-T3 is an outstanding steam flow computer that accurately measures the flow rates of steam in various conditions.

If offers an extremely varied number of display options, including mass flow rate, corrected volume, energy flow (rate and total), temperature, pressure, specific weight and enthalpy.

This guide contains information on wiring connections, calibration and operation.

Be sure to calibrate the unit before use.

Wiring Connections

Use <u>shielded cable</u> for the VFM to VFM-T3 wiring connections. Connect the shielded cable to the T3 ground terminal, and do not connect it to the VFM.



Connection with the VFM

NOTE: Check the voltage and wiring connections.

If used incorrectly, accurate flow rates cannot be indicated and there is danger of damage to equipment.

For details on the T3 terminal block, refer to the "Installation" and "Terminal Block Particulars" sections of the separate "Instruction Manual".

Calibration

If the VFM-T3 is not properly calibrated, accurate flow rate measurement cannot be <u>achieved</u>. The flow rate indicated will not be correct.

Be sure to correctly calibrate the unit before use.

The calibration routine can be entered in either of the following 2 ways:

- By connecting a wire link to the rear terminal strip across terminals (1) and (2).
- 2. By pressing and holding down the [TOTAL] and [DISPLAY] keys for 6 seconds.

The key switch actions during calibration are as follows:

[RATE, ▶]: used to change a selected (flashing) digit or a setting option
[TOTAL, ▲]: used to increment the selected digit or change a parameter selection
[RESET]: used to reset the selected digit to zero
[DISPLAY, PROGRAM]: used to step through program sequences

In calibration, there are six main menu items as follows:

- 1. GENERAL SETUP
- 2. GAS PARAMETERS
- 3. FLOW PARAMETERS
- 4. OPTIONS
- 5. SYSTEM TEST
- 6. EXIT

<u>To change the option displayed, press the [RATE] key.</u> When the option to be modified appears, press [DISPLAY] to enter the routine below corresponding to the selected option.

NOTE: This "Quick Start Guide" explains only the 3 options that must be set without fail: "GENERAL SETUP", "GAS PARAMETERS" and "FLOW PARAMETERS". Refer to the "Instruction Manual" for details concerning other options.

Perform the calibration slowly and carefully.

General Setup

SELECT (GENERAL SETUP)

DISPLAY CONTRAST ADJUST

FLOW UNITS (SI UNITS, US UNITS)

TOTAL UNITS (UNITS × 1000, × 1)

FLOW TIMEBASE (DAYS, HOURS, MINUTES, SECONDS)

> FRONT ACCESS (ENABLE, DISABLE)

Press the [DISPLAY] key once to move to the next step.

Adjust the contrast of the display using the [TOTAL] key.

Select the type of units to be used with the [TOTAL] key. (Typically, "SI UNITS" (kPa) are selected.)

Select the units to be used in total flow rate display with the [TOTAL] key. If "x 1000" is selected, "k" appears at the end of the value.

Select the displayed units (time) with the [TOTAL] key. (Typically, "HOURS" is selected.)

If disabled, access to the calibration routine is not possible via the front panel. This is a type of "key lock". (Typically, "ENABLE" is selected.)

If disabled, total flow rate reset is not possible

(Typically, "ENABLE" is selected.)

via the front panel.

FRONT RESET (ENABLE, DISABLE)

RESET TOTALS NOW? (PRESS RESET)

This is displayed only when "DISABLE" was selected in the above step. Press to reset the total flow rate.

SELECT (EXIT)

Press [DISPLAY] to exit the calibration routine. To continue the calibration routine, press "RATE" to select the next option.

Gas Parameters

SELECT		
(GAS PARAMETERS)		
` ∀ `	Press the [DISPLAY] key once to move to the next step.	
GAS EQUATION		
(STEAM, IDEAL GAS	Select "STEAM" and proce the [TOTAL] key	
GENERAL GAS,	Select STEAM and press the [TOTAL] key.	
NATURAL GAS) ♥		
STEAM TYPE	Typically, "SATURATED" is selected.	
(SATURATED,	When using a temperature sensor and measuring	
SUPERHEATED)	superheated steam, "SUPERHEAT" is selected.	
SAT STEAM INPUT	To enable pressure compensation by the pressure	
(PRESSURE,	sensor, select "PRESSURE".	
TEMPERATURE)	For temperature compensation, select "TEMPERATURE".	
DEFAULT DISPLAY		
(MASS, ENERGY) ♥	Select MASS.	
BASE TEMPERATURE	It is not necessary to set this.	
+ XXX.XX		
BASE PRESSURE		
XXXXX	It is not necessary to set this.	
SELECT	Press [DISPLAY] to exit the calibration routine.	
(EXIT)	To continue the calibration routine, press [RATE] to select the next option.	

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This is the MOST CRITICAL option!

Flow Parameters	
Select (Flow Parameters)	
↓	Press the [DISPLAY] key once to move to the next step.
FLOW INPUT TYPE (FREQUENCY, ANALOG) ↓	Select "FREQUENCY".
FLOW SIGNAL TYPE (LINEAR, NON-LINEAR)	Select "LINEAR".
K-FACTOR XXXXXX.X	K-factor is: the reciprocal of the meter factor (found on the VFM nameplate) \times 1000. For example, if the METER FACTOR = 0.01627 I/P: K-factor = (1/0.01627) \times 1000 = 61462.8 Enter 61462.8. Move the curser using the [RATE] key and change the numbers using the [TOTAL] key.
FILTER FACTOR XX	It is not necessary to set this.
FLOW DECIMAL XXX.XX	Select the number of decimal points with which the instantaneous flow rate is to be displayed for the [TOTAL] key.
TOTAL DECIMAL XXXX.XX	In the same manner, select the number of decimal points with which the total flow rate is to be displayed.
PRESSURE INPUT (ABSOLUTE, GAUGE)	Select "GAUGE".
ATMOSPHERIC PRESSURE	It is not necessary to set this.
PRESSURE at 4mA XXXXX	Though typically this is "0", check the specifications of the pressure sensor being used.
PRESSURE at 20mA XXXXX	Enter the pressure at which the pressure sensor produces 20mA (maximum value). Check the pressure sensor specifications. Note: if SI units were selected, the units used here will be in Pascal (kPa).
SELECT (EXIT)	Press [DISPLAY] to exit the calibration routine. To continue the calibration routine, press [RATE] to select the next option.

Pascal Conversion

The flow units chosen during the general setup could be either SI units or US units. If SI units were selected, the units to used must be in Pascal (kPa). If using a different system of units, convert them to kPa before entering.

NOTE: If the pressure sensor specifications are in Pascal, enter them without conversion.

A pressure of 1 kg/cm² is converted to 98.06 kPa. A pressure of 1 bar is converted to 100 kPa.

This completes calibration. For information on detailed settings and functions, see the separate "Instruction Manual".

Front Panel Operation

After calibrating the unit, test the operation by supplying steam flow and checking the flow rate.

To display the instantaneous mass flow, press the "RATE" key; to display the total flow rate, press the [TOTAL] key.

Press the [DISPLAY] key to sequence through the display of mass flow rate, corrected volume, energy flow (rate and total), temperature, pressure, specific weight and enthalpy. (These are only displayed for 5 seconds.)

Troubleshooting

No flow rate is displayed	 Check the wiring connections, referring to "Wiring Connections".
The displayed value differs greatly	Check the input values for the "K- FACTOR" in "FLOW PARAMETER" and "PRESSURE at 20mA"
The number displayed for the total flow rate is too large to be read	 Select "x 1000" for the "TOTAL UNITS" in the "GENERAL SETUP".
easily	The display units change to tones.

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