



FEATURES

- 4 YEARS ON A SINGLE AA SIZE BATTERY
- UNIVERSAL INPUT, 5 kHz
- NO NEED OF AMPLIFIERS OR LINEARIZERS
- ISOLATED 0 – 5 V, 12 BIT ANALOG OUTPUT
- 7 DIGIT RATE AND THREE 7 DIGIT TOTALS WITH PROGRAMMABLE DECIMAL PLACES
- SINGLE KFACTOR OR 10 POINT CALIBRATION CURVE
- KFACTORS FROM 0.00001 TO 9,999,999
- TOTAL UP TO 999,999,999
- MILLILITERS, LITERS, GALLONS, CUBIC FEET, CUBIC METERS, ACRE FEET
- PER SECOND, PER MINUTE, PER HOUR, PER DAY
- PROGRAMMABLE SLEEP MODE FOR THE DISPLAY TO SAVE POWER
- SETTINGS LOCK/UNLOCK FOR SECURITY
- HIGH CONTRAST IN THE ENTIRE TEMPERATURE RANGE
- BATTERY LOW INDICATOR
- SIMPLE PROGRAMMING
- DIN 72x72 mm PANEL MOUNT

APPLICATIONS

- FLOW RATE AND TOTAL MEASUREMENT AND CONTROL



1. DESCRIPTION

GFCP101V is a micro power battery powered flow computer totalizer with an outstanding combination of excellent features, extremely long battery life, universal input, high input frequency and an isolated 0 – 5 V analog output. It accepts open drain/collector npn/pnp, reed switch, dry contact, coils, almost any wave and logical signals.

For better accuracy, GFCP101V provides capabilities of using calibration tables for up to 10 points. In seconds the operator can switch between a single KFACTOR and the curve of up to 10 points.

The GFCP101V software implements a version of our proprietary predictive/adaptive, self-adjusting digital filtering which provides extremely stable reading at any input frequency, plus very fast response to any change in the flow.

GFCP101V is the perfect solution for flow measurement and control applications that require high accuracy and reliability, small size, industrial grade performance and low maintenance.



2. ABSOLUTE MAXIMUM RATINGS *

Operating temperature	-20 °C to +70 °C
	The electronics system is industrial (-40 °C to +85 °C) and higher grade .
	The Liquid Crystal Display (LCD) limits the temperature range.
Voltage for the analog output	40 VDC
Input voltage (term. 2 to 4)	5 VDC

*** NOTICE: Stresses above those ratings may cause permanent damage to the device.**

3. CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Power Supply					
Battery life	25 ° C, LCD sleep enabled, coil, typical values, Fig. 1, NOTE 2	4			years
Battery life	25 ° C, LCD sleep enabled, 50 uA, typical values, Fig. 2, NOTE 2	2.5			years
Input					
Voltage for the sensor	-20 °C to +70 °C		3	3.7	V DC
Input threshold, high	Rectangular wave 5 V, 50 % duty cycle		1.75		V
Input threshold, low	Rectangular wave 5 V, 50 % duty cycle		1.25		V
Coil voltage	Symmetrical signal from the coil (sine, triangle, saw etc)	20			mVpp
Input frequency	Rectangular wave, 50 % duty cycle	0 - 3	0 - 5		kHz
Analog Output					
Power supply	-20 °C to +70 °C	9		36	V DC
Resolution	-20 °C to +70 °C, 9.0 – 36 V		1.2		mV
Error	100 kohm load, 24 V, 25 °C, Note 1			0.05	% FS
Temperature coefficient	-20 °C to +70 °C, 24 V		35		ppm/°C

Note 1: The parameter includes all errors, non-linearity and noise at constant voltage and temperature

Note 2: The consumption depends also on the temperature, the type of the flow sensor, the frequency of the input pulses and others. The numbers are for reference only.

3.1. BUTTONS

There are three buttons: **SET** , **UP**  and **RIGHT**  :

- **SET** is used to enter and exit menus and confirm options chosen
 - **UP** is used to change the data
 - **RIGHT** is used to move the cursor (blinking digit or icon) to the right
- Additional button functions:

There are two types of buttons accepted by the GFCP101V flow computer:

- Short is when the button is pressed and released in less than 0.5 second
- Long is when it is kept pressed for more than 5 seconds
- All other durations are ignored

NOTE: The UP button will not change the value if the settings are locked.



3.2. INPUT

GFCP101V has one input:

- Pulse input from flow sensors. This input can power micro power sensors. It accepts open drain/collector npn/pnp sensors, reed switches, dry contacts, different types of waves, logical signals and coils. There is no need for external amplifiers or linearizers.

3.3. OUTPUT

GFCP101V has one isolated analog output.

3.3.1. Analog output

The isolated analog output is 0 - 5V, two wire, 12 bit, and requires external power in order to be isolated from the sensor input. Using the **SET20** menu, it can be programmed to represent the flow rate.

3.4. DISPLAY

The liquid crystal display (LCD) has 7 digits with 1, 2, 3, 4 or 5 decimal places and multiple icons. It shows rate, total and all the variables and options that can be set or programmed. The rate and the totals have programmable auto, none, 1, 2, 3, 4 or 5 decimal places.

When the display shows rate, a "**RATE**" icon is displayed. If it shows total, a "**TOTAL**" icon will be displayed along with "**A**", "**B**" or "**C**" (GFCP101V has three totals).

When input pulses are present, an "**INP**" (input) icon will be displayed.
If the total on the LCD is allowed to be reset, a "**RESET**" icon will be displayed.

3.4.1. Volume and time units

- GFCP101V flow computer has milliliters (**mL**), liters (**L**), gallons (**G**), cubic feet (**CF**), cubic meters (**M³**) and acre feet (**AF**) PER second (**S**), minute (**M**), hour (**H**) and day (**D**).

3.4.2. Normal mode

Automatically after replacing the battery or exiting a menu, GFCP101V enters the normal mode. Normal mode displays:

- Rate
- Total A, B or C. Total A reset can be enabled or disabled. It is stored in a non-volatile memory every 50 seconds or immediately when cleared.
If a total is allowed to be reset, the **RESET** icon is shown. Reset a total with long **RIGHT** button.
- To switch between rate and total on the display, use short **UP** button.



3.4.3. Menus

To enter the menus, use long **SET** button in normal mode. About 5 seconds after pressing (and holding pressed) the **SET** button, the first menu will appear on the LCD:

- **KFACTOR** icon along with a blinking decimal point and the KFACTOR number is shown. The decimal places for the KFACTOR can be programmed using **UP** button. KFACTORs ranging from 0.00001 to 9,999,999 can be entered this way. To move from the blinking decimal point away and start entering the KFACTOR digits use the **RIGHT** button. The main **KFACTOR** for the particular flow meter connected to the GFCP101V can be entered. This is how many **pulses** the flow computer will receive **per gallon**. While in this menu all the settings can be locked/unlocked. Use **RIGHT** button to move the cursor to the furthest digit on the right and then use long **SET**.
 - Use short **UP** to lock/unlock the settings. Then use short **SET** to go back to **KFACTOR** menu.
 - If the settings are locked, they can be viewed, but not changed.

From the **KFACTOR** menu use short **SET** to enter the next menu.

NOTE: the computer will not accept zero for the KFACTOR.

- In the **CUrve** menu, use short **UP** to change between blinking **CUrve** and blinking **KFACTOR**. The flow computer will use either the single **KFACTOR** or the calibration **CUrve** of up to 10 points for calculations. The points have to be entered before using the calibration curve. The curve is stored in a non-volatile memory, and the points can be entered in any order. The computer will order and validate them.
 - Enter the calibration data mode by using long **SET** in the **CUrve** menu for either a blinking **CUrve** or **KFACTOR**.
 - “**CAL Crv**” will appear on the LCD, and “**NO**” icon will be blinking. To continue choose **YES** and press short **SET**. To leave calibration curve data mode and leave the previous calibration data untouched, choose **NO** and press short **SET** to go back to the **CUrve** menu.

This feature is very useful for flow meters that have a calibration sheet provided by the manufacturer or the calibration laboratory. Each point consists of an input frequency in Hz and a KFACTOR (in pulses per gallon) for that frequency.

Once you enter the calibration curve data menu, you have to go to the last point (point 9). If you have data for less points enter 0.0 for the frequency for all unused points. The GFCP101V will not accept 0.0 for any KFACTOR.

If **YES** has been chosen, “**Point 0**” will appear on the LCD. Press short **SET** and enter the input frequency in Hz for point 0. Press short **SET** and then enter the KFACTOR for that input frequency. Press short **SET** to do the same for the next point.

Repeat the above for up to 9 more points. After point 9, the flow computer will automatically return to the **CUrve** menu.

There is no need to enter the frequency at each point in a special (ascending/descending) order. The computer will automatically sort and validate the data and calculate all the parameters.

In the **CUrve** menu press short **SET** to move to **SET20** menu.



- In the **SET20** menu, set the flow rate in G/M at which you want the analog output to be 5.000 V. Analog output will be 0.000 V at 0.0 G/M. If **SET20** = 0.0 the analog output will stay at 0.000 V and will not change with the rate. Press short **SET** to move to the “**volume units menu.**”
- In the “volume units” (**vU**) menu, use **UP** to choose the volume units among **mL, L, G, CF, M³** and **AF**. Press short **SET** to move to the “**time unit menu.**”
- In the “time unit” (**tU**) menu, use **UP** to choose the time units among **S, M, H** and **D**.
- Press short **SET** to move to the “Rate **decimal Places**” menu where (using short **UP**) auto, none, 1, 2, 3, 4 or 5 decimal places for the rate can be programmed.
- Press short **SET** to move to the “Total **decimal Places**” menu where (using short **UP**) auto, none, 1, 2, 3, 4 or 5 decimal places for all totals can be programmed.
If **AUTO** has been chosen GFCP101V will use the icons “**x10**” and “**x100**”. When the total reaches 9 999 999 it will not clear but the icon **x10** will be used. When it reaches again 9 999 999, it will not clear but the icon **x100** will be used. This way the total extends to 9 digits and will clear after it reaches 999 999 999 (one billion).
- Press short **SET** to move to the **Total A Reset enable/disable** menu. In this menu using **UP** button the total A reset can be enabled or disabled.
If enabled and GFCP101V is in normal mode displaying total A, the **RESET** icon will also be displayed and long **RIGHT** will clear total A.
- Press short **SET** to move to the **SLEEP** menu.
In the **SLEEP** menu, (using **UP** button) the sleep of the LCD feature can be enabled or disabled.
If this feature is enabled the GFCP101V computer will turn off the LCD after not having any input pulse or button pressed for one minute, extending the battery life.

NOTE: Only the LCD is powered down during sleep. The computer is fully functioning and no input pulse or button press will be missed. The computer will turn the LCD on immediately after the first input pulse or button pressed.

If this feature is disabled, the LCD is always powered but the total consumption of the GFCP101V computer will be higher and the battery life will be reduced.

Because the **SLEEP** menu is the last one, pressing long **SET** will move the computer to the **LOCK** menu. Use **UP** to lock the settings and press short **SET** to go back to **SLEEP** menu. General practice would be to unlock the settings at the **KFACTOR** menu. Settings can be changed changed and locked again before exiting at the last menu (**SLEEP** menu). Press short **SET** to exit. After a couple of seconds during which all the setting are checked, validated and stored into the non-volatile memory, the computer will return to normal mode.

NOTE: The software time out feature will reset the computer and force it to the normal mode WITHOUT saving any changes made in any of the menus. The changes will only be saved after exiting the SLEEP menu by pressing short SET.

NOTE: Even in menu mode, the computer always continues to measure and calculate rate and total and control the output so no total will be lost. In some circumstances, such as changing the KFACTOR, the total accumulated will be invalidated The user must take appropriate actions after changing the settings, such as resetting the total or returning it to the previous state.



3.5. Checking the LCD

All the icons of the LCD can be checked by pressing and holding the **RIGHT** button while replacing the battery or after exiting the **SLEEP** menu. Releasing the button will allow the computer to return to normal mode.

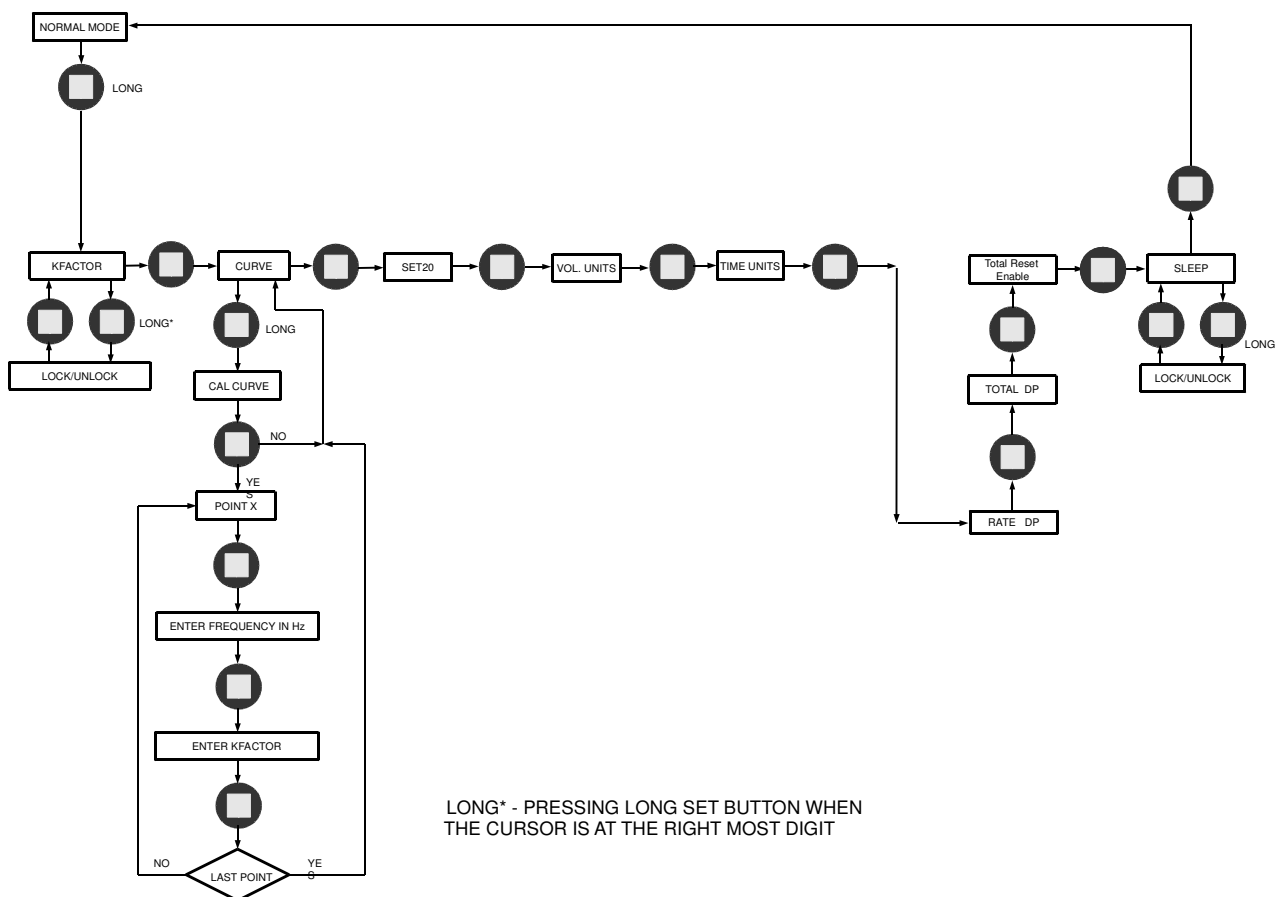
NOTE: Removing the battery will clear total B and total C.

Total A is stored in the non-volatile memory every 50 seconds.

Before removing the battery make sure that there was no flow for the last minute.

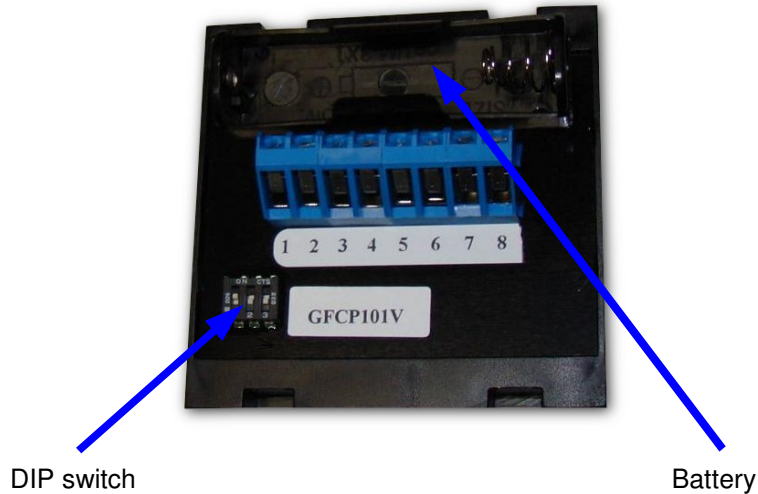
All important settings are stored in a non-volatile memory and will not be lost.

4. MENU DIAGRAM



5. APPLICATION

5.1. ELECTRICAL

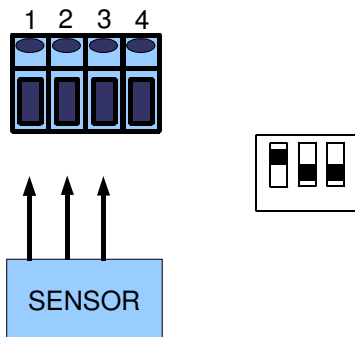


- 1 – Power for the flow sensor, **do not exceed 50-100 uA**
- 2 – Signal from the sensor
- 3 – Ground
- 4 – Coils second wire
- 5 – Power for the analog output, plus
- 6 – Power for the analog output, minus
- 7 – Analog output 0 – 5 V, plus
- 8 – Analog output 0 – 5 V, minus

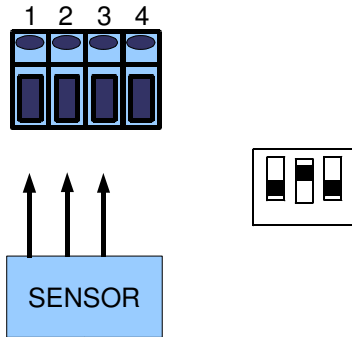
5.1.1. Wiring the sensor

GFCP101V accepts a variety of sensors. See below for wiring specifications.

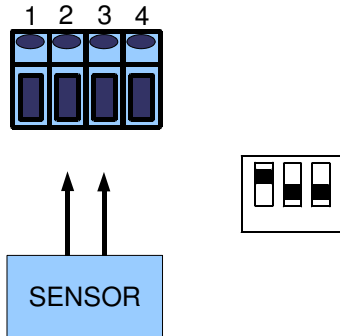
5.1.1.1. NPN Open Drain, Open Collector



5.1.1.2. PNP Open Drain, Open Collector

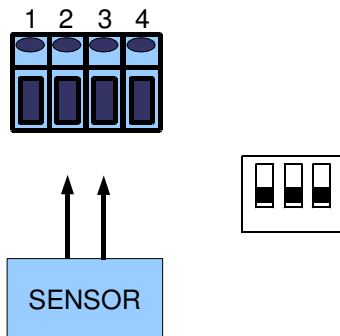


5.1.1.3. Reed Switch, Dry Contact

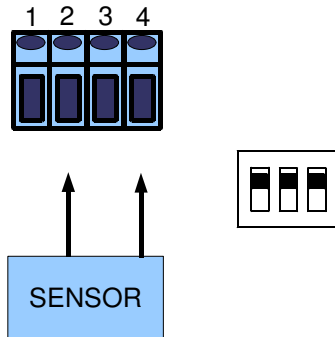


NOTE: A small capacitor in parallel may be needed. Different reed switches and dry contacts have different bouncing time. Test and evaluate carefully to determine the right capacitor.

5.1.1.4. Wave (square, sine, triangle, saw etc.), Logical Signal (CMOS, TTL etc.)



5.1.1.5. Coils



NOTE: If the cable to the coil is shielded, connect the shield to “-” (terminal 3) ONLY. Do not connect the shield to anything at the other (coil) end of the cable. In order to keep the isolation the shield has to be isolated from all other equipment or electrical connections.

If the isolation requirements of the application allow, it is recommended terminal 3 (“-”) to be connected to a good earth ground, for a better protection and noise reduction.

Carefully evaluate and test the wiring.

5.2. MECHANICAL

Mounting GFCP101V on a panel requires a cut out 68.0x68.0 mm (max 68.7x68.7 mm), or 2.68”x2.68” (max 2.70”x2.70”).

6. ORDERING

For ordering please use G Instruments part number 30535.

Replace the AA size battery with G Instruments part number (PN) 30030 only.

If another type of battery has been used, the specifications of the GFCP101V flow computer can not be guaranteed and the device can be damaged.



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