

Ins. No. E-889-8-E

# **Calorie Computer**

## MODEL : EL4801



Thank you very much for your purchase of the CALORIE COMPUTER.

This product was manufactured and shipped under our company's strict quality control.

This document describes necessary precautions for operating this product correctly. Please read this document thoroughly before using the product. Please keep this document in an easily accessible place.

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The indications **NOTE**, **CAUTION**, and **WARNING** shown throughout this manual are to draw your attention to specific items:

- NOTE: Notes are separated from the general text to bring user's attention to important information.
- CAUTION: Caution statements call attention to user about hazards or unsafe practices that could result in minor personal injury or property damage.
- **WARNING:** Warning statements call attention to user about hazards or unsafe practices that could result in serious personal injury or death.

## **1. PRECAUTIONS FOR HANDLING**

Every OVAL product goes through strict inspection at our factory before shipment. Please check the exterior of the device to make sure that there are no damages during delivery.

This section describes necessary precautions for handling this device, therefore please read this section carefully before placing this device in your operation.

If used in an inappropriate manner, protected performance of the device may be lost.

For inquires, please contact your sales representative.

NOTE: On-site calibration will be required.

#### **1.1 Precautions for Transporting**

- (1) To prevent damage due to accidents during transportation, transport this device to the installation location using the original packaging as long as it allows.
- (2) Do not apply strong shock to the device while transporting.

#### **1.2 Precautions for Storage**

Storing this device for a long period before installation can result in unexpected and undesirable conditions. When long term storage is anticipated, take the following precautions.

- (1) Store this product in the original packaging as long as it allows.
- (2) Select a place of storage that satisfies the following conditions:
  - $\boldsymbol{\cdot}$  Free from rain and water
  - Free from vibration or shock
  - $\cdot$  At normal room temperature and humidity (approximately 25°C , 65%)

#### 1.3 Installation

#### 1.3.1 Installation Location

Select an installation location where

(1) Mechanical vibration, shock or corrosive gases least exist.

- (2) Temperature at stable room temperature.
- ► NOTE: Although the manufacturer guarantees stated performance at ambient temperatures of 0 to +50°C, it is recommended that the instrument be placed in service at room temperature.
- (3) Allow a proper slack to the wiring harness and provide a sufficient working space behind the instrument to facilitate maintenance and servicing.

#### 1.3.2 Installation

- (1) This instrument is of panel mount type.
- (2) Although the manufacturer guarantees installation inclined to a maximum of ± 10 deg. from the horizontal or vertical, recommended physical orientation is either horizontal or vertical.

## 2. GENERAL

The EL4801 calorie computer is a digital instrument designed with the latest electronic technology to fulfill the demand for faster calorimetry. The EL4801 calculates the calorific value of natural gas or city gas using the sonic velocity measured by an ultrasonic flowmeter. This instrument is also capable of simultaneous flow rate calculation by the flow velocity measured with the ultrasonic flowmeter.

Densitometers are commonly used for calorimetry of city gas and natural gas that does not include inert gas by using the correlation between molecular weight (density) of the gas and calorific value. This calorie computer, however, calculates calorific value by utilizing the correlation between molecular weight and sonic velocity as well as the correlation between process temperature/pressure and calorific value as computational logic.

This calorie computer was co-developed with Osaka Gas Co., Ltd.

NOTE: This computer is a dedicated computer for the ultrasonic flowmeter of OVAL product.

#### 2.1 Device Connections

This instrument loads sound speed values and flow rate values from the ultrasonic flowmeter via RS485 communication, loads temperature and pressure values from the analog input of 1 to 5V/4 to 20mA, calculates the calorie, displays calculated results such as the flow rate, and performs analog output of 1 to 5V/4 to 20mA.

Input Signals

Temperature input(analog 1 to 5V/4 to 20mA)Pressure input(analog 1 to 5V/4 to 20mA)Sound speed value, flow speed value (RS485<br/>communication)

Output Signals
 Calorie output (analog 1 to 5V/4 to 20mA)
 Flowrate output (analog 1 to 5V/4 to 20mA)
 Temperature output (analog 1 to 5V/4 to 20mA)
 Pressure output (analog 1 to 5V/4 to 20mA)
 Specific gravity output (analog 1 to 5V/4 to 20mA)

#### 2.2 Component Names



## **3. EXTERNAL DIMENSIONS**



## 4. PANEL-CUT DIMENSIONS



## 5. WIRING

#### 5.1 Wiring Procedure

- (1) Conduit work is recommended for wiring.
- NOTE: In the case of conduit work, feed the power cable and other signal cables through different conduits. Failure to do so may cause conductance failure.
- (2) Keep wiring away from other wiring/circuit for strong electricity, so that it will not be affected by possible conductance failure.
- (3) Securely terminate wiring using terminal lugs. Connecting terminals are provided on the rear side of this device.
- ► NOTE: If precision resistance is outfitted on this device, do not remove it since this is necessary condition for delivering optimal performance.



Fig. 5.1.1 Input/Output Terminals



Fig. 5.1.2 Power Terminals

#### Wiring Specification

| Item                        |   | Description  |
|-----------------------------|---|--|
| Power supply cable          | General instrumentation cable with max. | 1.5mm <sup>2</sup> (Terminal type: round terminal M3 screw ) |
| Analog/alarm output         | General instrumentation cable with max. | 1.5mm <sup>2</sup> (Terminal type: round terminal M4 screw ) |
| Communication cable (RS485) | Shielded twisted pair cable             | (Terminal type: round terminal M4 screw)                     |

NOTE: Power of this device passed IEC instantaneous power failure test. However, problems may be caused when momentary voltage drop exceeds IEC standards. If instantaneous power failure is a concern, please reserve backup unit.

#### **5.2 Connecting Method**

|     | TB1      |                   |     |   |                 |
|-----|----------|-------------------|-----|---|-----------------|
| No. | l        | Label             | No. |   | Label           |
| 1   | +        | Temperature       | 11  | + | Analog output 1 |
| 2   | -        | input V/I         | 12  | - | Analog output 1 |
| 3   | +        | Pressure          | 13  |   |                 |
| 4   | -        | input V/I         | 14  |   |                 |
| 5   | No       | Error             | 15  | + | Analag autaut 0 |
| 6   | polarity | (a contact point) | 16  | - | Analog output 2 |
| 7   | No       | Error             | 17  |   |                 |
| 8   | polarity | (b contact point  | 18  |   |                 |
| 9   |          |                   | 19  |   |                 |
| 10  |          |                   | 20  |   |                 |

|     | TB2 |          |     |   |               |  |
|-----|-----|----------|-----|---|---------------|--|
| No. | l   | Label    | No. |   | Label         |  |
| 1   | +   | Analog   | 11  | + | Communication |  |
| 2   | -   | output 3 | 12  | - | RS485         |  |
| 3   |     |          | 13  |   |               |  |
| 4   |     |          | 14  |   |               |  |
| 5   | +   | Analog   | 15  |   |               |  |
| 6   | -   | output 4 | 16  |   |               |  |
| 7   |     |          | 17  |   |               |  |
| 8   |     |          | 18  |   |               |  |
| 9   |     |          | 19  |   |               |  |
| 10  |     |          | 20  |   |               |  |

| -   |     |          |  |  |
|-----|-----|----------|--|--|
|     | TB0 |          |  |  |
| No. |     | Label    |  |  |
| 1   | Ν   | Douvor   |  |  |
| 2   | L   | Power    |  |  |
| 3   | G   | G Ground |  |  |
|     |     |          |  |  |

\* For the assignment of analog output 1 to 4, select up to four out of temperature, pressure, calorie, flow rate, and specific gravity.

## 6. SOFTWARE

The calorie computer runs on Windows Embedded Standard 2009. Errors due to OS are not covered by the warranty.

## 7. SCREEN CONFIGURATION

#### 7.1 RUN Mode Display Screen

The following items are displayed in RUN mode.

- 1. Temperature (°C, etc.)
- 2. Pressure (MPa[abs], etc.)
- 3. Sound speed (m/s, etc.)
- 4. Calorie (MJ/Nm<sup>3</sup>, etc.)
- 5. Flowrate (Nm<sup>3</sup>/h, etc.)
- 6. Specific gravity
- 7. Error display
- 8. Communication status (communicating)
- 9. Data logging status



Fig. 7.1.1 RUN Mode Display

CAUTION: The above items are displayed on full screen (resolution: 640 x 480) instead of in a window. Displayed units can be changed in Settings.

#### 7.1.1 Indicators

In the lower right corner of the screen, three statuses: Disp (Refresh), Trend (Record Trend) and Com (Record Communication), are displayed.

1) Disp

It flashes every 1 second. Calculation and analog I/O are updated at this timing. (If communication has not been updated, only temperature and pressure will be updated.)

2 Trend

This flashes at the specified frequency when Trend is checked (ON) under Options in Menu. Set the frequency (minimum 1 second) in Parameter Setting items on the Parameter Setting Screen.

③ Com

This flashes when messages are normally received during communication. It does not flash if sent messages could not be received normally. (If messages are not received, data other than temperature and pressure will not be updated.)



Fig. 7.1.2 Indicators

### 7.1.2 Progress Bar Display

The ratio of the currently displayed value to the designated range is displayed under each display item.

## CAUTION: Progress bar is not displayed if analog output is not selected.



### 7.1.3 Error Display

The currently occurring error is displayed in the bottom of the screen. The error messages that may be displayed are listed in Table 7.1 together with their meanings.

If more than one error has occurred, error messages are displayed in the order of error numbers at every 0.5 seconds.



Fig. 7.1.4 Error Message Display 1

| Error message     | Error message  |  |
|-------------------|--|--|
| 温度入力が異常です。        | When the temperature input is 1V (4mA) or less   |  |
| 温度入力が上限を超えています。   | When the temperature input is 5V (20mA) or more  |  |
| 圧力入力が異常です。        | When the pressure input is 1V (4mA) or less  |  |
| 圧カ入力が上限を超えています。   | When the pressure input is 5V (20mA) or more   |  |
| 温度値が出力の上限を超えています。 | When the temperature value exceeds the output 5V (20mA)                                      |  |
| 温度値が出力の下限を超えています。 | When the temperature value less than the output 1V (4mA) or less                             |  |
| 圧力値が出力の上限を超えています。 | When the pressure value exceeds the output 5V (20mA)   |  |
| 圧力値が出力の下限を超えています。 | When the pressure value less than the output 1V (4mA) or less                                |  |
| 流量値が出力の上限を超えています。 | When the flow rate value exceeds the output 5V (20mA)( $\%$ )                                |  |
| 流量値が出力の下限を超えています。 | When the flow rate value less than the output 1V (4mA) or less ( $\%$ )                      |  |
| 熱量値が出力の上限を超えています。 | When the heat quantity value exceeds the output 5V (20mA)                                    |  |
| 熱量値が出力の下限を超えています。 | When the heat quantity value less than the output 1V (4mA) or less                           |  |
| 比重値が出力の上限を超えています。 | When the specific gravity value exceeds the output 5V (20mA)                                 |  |
| 比重値が出力の下限を超えています。 | When the specific gravity value less than the output 1V (4mA) or less                        |  |
| 超音波流量計との通信が異常です。  | When the data in incorrect format is received at the communication with ultrasonic flowmeter |  |
| 通信タイムアウト          | When there is no response for five seconds at the communication with ultrasonic flowmeter    |  |
| A/D変換異常(CH1)      |  |  |
| A/D変換異常(CH2)      | In case of failure of A/D board or contact failure of A/D board                              |  |
| A/Dボード異常          |  |  |
| D/A変換異常           | In case of failure of $D/A$ beard or contact failure of $D/A$ beard                          |  |
| DAボード異常           | In case of failure of D/A board of contact failure of D/A board                              |  |

► NOTE: ※ At the "measurement of forward / backward flow rate", the message "The flow rate value exceeds the output range" is displayed.

The error messages for the operating system are in accordance with the operating system. Figure 7.1.5 below shows an example of error message display.

| 熱量演算 | 第 文   |
|------|---|
| ♪    | 実行時エラー '53':<br>ファイルが見つかりません: FbiDa.DLL<br>OK |

Fig. 7.1.5 Error Message Display 2

## **8. PARAMETER SETTINGS**

### 8.1 Configuration of Parameter Settings

The configuration of parameter settings for this computer is as shown below.

Table 8.1.1

| Item  | Description                     |   |  |  |  |
|---|---------------------------------|---|--|--|--|
| [Tab1] Analog input-output/Unit settings                  |                                 |   |  |  |  |
|   | Temperature input unit          |   |  |  |  |
| Analog input unit   | Pressure input unit             | Determine the unit of analog input.   |  |  |  |
| Analog input  | Temperature input range         | Determine the render of englishing input  |  |  |  |
| Analog Input  | Pressure input range            | Determine the range of analog input.  |  |  |  |
|   | Temperature display unit        |   |  |  |  |
|   | Pressure display unit           | Determine the unit displayed in DLNI mode and   |  |  |  |
| Display & Analog output                                   | Calorie display unit            | analog output   |  |  |  |
|   | Flow rate display unit          |   |  |  |  |
|   | Sound speed display unit        |   |  |  |  |
|   | Temperature output range        |   |  |  |  |
|   | Pressure output range           | Determine the range of analog output.   |  |  |  |
| Analog output   | Calorie output range            | Select and determine the analog output and  |  |  |  |
|   | Flow rate output range (%1)     | output number.  |  |  |  |
|   | Specific gravity output range   |   |  |  |  |
| Display option  |                                 | Unused  |  |  |  |
| Watchdog timer  |                                 | Unused  |  |  |  |
| Communication port  |                                 | Determine the communication port to be  |  |  |  |
|   |                                 | connected. Standard: COM4   |  |  |  |
| Meter selection   |                                 | Determine the meter to be connected.  |  |  |  |
| Approximate calculation                                   |                                 | Determine the method for approximate  |  |  |  |
|   |                                 | calculation of calorie and specific gravity.  |  |  |  |
| Analog output   |                                 | Determine the state of analog output during   |  |  |  |
|   |                                 | parameter setting. Standard: maintain   |  |  |  |
| Status output   |                                 | Unused  |  |  |  |
| [Iab2] Flowmeter setting & Smoothing                      |                                 |   |  |  |  |
| Meter diameter  |                                 | Determine the meter diameter for instantaneous flow rate calculation.   |  |  |  |
| Flow rate correction (a)                                  |                                 | Determine the correction coefficient for instantaneous  |  |  |  |
| Flow rate correction (b)                                  |                                 | flow rate calculation. Standard: (a)-1, (b)-0. (a) is used for compression correction of fixed value. (before ver. 4.0.7) |  |  |  |
| Reference temperature                                     |                                 |   |  |  |  |
| Reference pressure  |                                 | Reference temperature and pressure for  |  |  |  |
| Deviation correction                                      |                                 | calculation. (to be adjusted on-site)   |  |  |  |
| Sound speed coefficient correction (pressure)             |                                 |   |  |  |  |
| Sound speed coefficient correction (temperature)          |                                 | Parameters for calorie calculation (fixed value)  |  |  |  |
| Sampling frequency  |                                 | Determine the frequency for trend (data saving)   |  |  |  |
| Smoothing (input)   |                                 |   |  |  |  |
| Smoothing (calorie)                                       |                                 | Determine the format of smoothing, number   |  |  |  |
| Smoothing (flow rate)                                     |                                 | and time of calculation for each output.  |  |  |  |
| Smoothing (specific gravity)                              |                                 |   |  |  |  |
| Bi-directional flow measurement                           |                                 | Enable/disable bi-directional flow measurement.   |  |  |  |
| Low-cut function  |                                 | Check if the low-cut function of flow rate display<br>is enabled or disabled  |  |  |  |
| Temperature correction coefficient Ac to Bd               |                                 | is enabled of disabled.   |  |  |  |
| Sound speed correction setting                            |                                 | Unused  |  |  |  |
| Tab3] Compression coefficient correction                  | flow rate>                      |   |  |  |  |
| Compression coefficient correction < flow rate>           |                                 | Enable/disable real-time compression coefficient correction   |  |  |  |
| Correction coefficient Pa to Pc. Ta to Tc. B. C. 7        |                                 | Lised to calculate the compression coefficient  |  |  |  |
| Tab4] Other   |                                 |   |  |  |  |
| Compression coefficient calculation correction - calories |                                 | Unused  |  |  |  |
|   |                                 | Function to display and output communication  |  |  |  |
| Communication warning OFF                                 |                                 | errors. Standard: unchecked   |  |  |  |
| Calorie calculation parameter                             |                                 | Switch parameters according to specified pressure.  |  |  |  |
| %1: The lower limit that can be set for the flow          | rate output range is "0" or hig | aher.   |  |  |  |

#### 8.2 Transition from RUN Mode Display Screen to Parameter Settings Screen

Transition from the RUN Mode Display screen to the Parameter Settings screen is performed according to the following procedure.

- 1. Click [ファイル] [File].
- 2. When the screen as shown in Fig. 8.2.1 appears, click [パラメータ設定 Ctrl+P] [Parameter Settings Ctrl+P].
- 3. The message box as shown in Fig. 8.2.2 appears.
- 4. Here, click [はい(Y)] [Yes] to transit to the Parameter Settings screen. When not transiting, click [いいえ (N)] [No].
- 5. When [ltv(Y)] [Yes] is clicked, the screen transits to the Parameter Settings screen.



Fig. 8.2.1 Transiting to the Parameter Settings Screen

#### 8.3 Transition from Parameter Settings Screen to RUN Mode Display Screen

Transition from the Parameter Settings screen to the RUN Mode Display screen is performed according to the following procedure.

- 1. Click [ファイル] [File].
- 2. When the screen as shown in Fig. 8.3.1 appears, click [終了Ctrl+E] [Exit Ctrl+E] in File or [終了] [Exit] in the lower right of the screen.
- 3. The message box as shown in Fig. 8.3.2 appears.
- 4. Here, click [はい (Y)] [Yes] to transit to the RUN Mode Display screen. To cancel transition, click [いいえ(N)] [No].
- 5. When [ltv(Y)] [Yes] is clicked, the screen transits to the RUN Mode Display screen.

| アナログ入力単位<br>温度入力単位 № ・                          | 表示&アナログ出ナ   |  | 通信ボート<br>C CO M3<br>C CO M4(標準)   | <ul> <li>近似演算</li> <li>分数近似</li> <li>二次近似(標準)</li> </ul>  |
|---|---|--|---|---|
|   | 上刀表示単位 M<br>熱量表示単位 M<br>流量表示単位 N<br>音速表示単位 n          | Pa(abs) ▼<br>J/Nm3 ▼<br>m3/h ▼<br>/s ▼ | - メータ種別<br>C Psonic-1 (PA1B)<br>C GASSONIC<br>G FLOWSIC600 (-X<br>C Psonic-1 (PA2B) | <ul> <li>アナログ出力</li> <li>○ 初期化</li> <li>○ 保持(機準)</li> <li>ステータス出:</li> <li>○ エラー(標準)</li> </ul> |
| 77日<br>道度入力レンジ<br>0.00000000 E 00 ~ 5           | 0000000 E 01  | <b>圧力</b><br>1.01325                   | I入カレンジ<br>00 E-01 ~ 1.  | MPa(abs)<br>0101325 E   |
| 7ナログ出力<br>温度出力レンジ 「 *C<br>0.00000000 E ··· ~ 5  | <u>出力Ch 2 -</u><br>.00000000 E 01                     | <b>圧力出力レ</b><br>2.60132                | ンジ MPa(abs)<br>50 E 00 ~ 5  | <b>ШЛС</b> Ь -<br>1013250 E   |
| 熱量出力レンジ MJ/Nm3<br>3.9000000 E 01 ~ 7<br>比重出力レンジ | 出刀Ch - <u>・</u><br>.00000000 E 01<br> 出力Ch - <u>・</u> | 流量出力レ<br>  0.00000                     | ンジ   Nm3/h<br>00 E <sup>00</sup> ~ 5.   | <u> Жлсь -</u><br>0000000 E   |



Fig. 8.3.2 Message Box

Fig. 8.3.1 Transiting to the RUN Mode Display Screen

#### 8.4 Transitions to the Parameter Settings Screens

The method for transiting to the various parameter setting screens is described here.

- 1. Open the Parameter Settings screen by performing the operation in Section 8.2.
- 2. When the screen as shown in Fig. 8.4.1 appears, click the item (tab) you want to transit to.

| パラメータ設定  | パラメータ設定  |
|--|--|
| ファイル 説明  | ファイル 説明  |
| [アナログ入出力/単位設定] 流量計設定&スムージング  圧縮係数補正<流量>  その他   | アナログ入出力/単位設定 流量計設定&スムージング 圧縮係数補正<流量>   その他   |
| アナロジ入力単位     プロジカプログ     プロジカプログ     プロジカプログ     プロジカプログ     プロジカプログ     プログログ     プログログ     プログログ     プログログ     プログログログ      プログログログ      プログログログ      プログログログ      プログログログ      プログログログ      プログログ      プログログログ      プログログログ      プログログ      プログログログ      プログログ      プログログログ      プログログログ      プログログ      プログログログログ      プログログ      プログログログ      プログログログ      プログログログ      プログログ       プログログ      プログログ      プログログ      プログログ      プログログ      プログログ      プログ      プログログ      プログ       プログ      プログ       プログ       プログ      プログ      プログ | <u>メータロ径 mm</u> <u>温度補正係換Ac</u> 1.0230000 目 <sup>02</sup> 0.0000000 目 <sup>00</sup> 形式     下式     下式     したいののの目 <sup>01</sup>   |
| Click this.     Joint Click this.     Click this.  | <u>法生補正(a)</u><br>1.00000000 <u>00</u><br>3.0000000 <u>00</u><br>3.0000000 <u>00</u><br>78助平均  |
|  | 0.0000000         00         0.0000000         回数 32         回 32         回数 32         回数 32  |
| - アナログ入力   | 0.0000000 E 00 0.0000000 E 00 時間 32 秒 時間 5 秒   |
| 温度入力レンジ         *C         圧力入力レンジ         MPa(abs)           0.0000000 E         00 ~         5.0000000 E         01         1.0132500 E         01   | <u>毎素5補正</u> 1.0035161 <u>■</u> 1.0035161 |
| 7ナログ出力   |  |
| 0.0000000 <u>0</u> <sup>00</sup> ~ 5.0000000 <u>0</u> <sup>01</sup> 2.6013250 <u>0</u> ~ 5.1013250 <u>0</u> <sup>00</sup><br>熱量出力レンジ MJ/Nm3 出力Ch - ▼ 流量出力レンジ Nm3/h 出力Ch - ▼  | <b>音速係数補正(班力)</b><br>0.0088000 目 00<br>○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○   |
| 3.9000000目         01 ~         7.0000000目         0.0000000目         00 ~         5.0000000目         02           比重出力レンジ         出力ch -  | <b>音速係熱補正(温度)</b><br>0.0400000 目 00<br>0.0400000 目 00<br>○ ○ ○ ○ ○ ○ ○ ○ □ □ □ □ □ □ □ □ □ □ □ □   |
| 5.5000000 E <sup>-01</sup> ~ 9.5000000 E <sup>-01</sup>  | サンプンが期期     10 See     □.10000000 □ 00     □   |
| 数値をダブルクリックすると数値設定画面が表示されます。 更新 取消 終了   | 数値をダブルクリックすると数値設定画面が表示されます。 更新 取消 終了   |
|  |  |

Fig. 8.4.1 Transiting to the Parameter Setting Screens

#### 8.5 Unit Settings

On this screen, set the units for input signals and the display units for the computer.

• Analog input:

Enter the units for the thermometer or pressure gauge to be used.

Display & analog output:

Enter the units to be displayed on the computer and the units for analog output.

| <b>(ラメータ</b> 設定<br>ファイル 説明<br>「アチロダ人出力/単位談 Unit in  | put boxes   | _系数補正<流量>                             | その他   |  |
|---|---|---------------------------------------|---|--|
| - アナロダ入力単位<br>- アナロダ入力単位<br>で<br>- 東方入力性位<br>MPa(dab)<br>- 東示オジョン<br>- ロッテ<br>- ロッチ<br>- ロッ<br>- ロッチ<br>- ロッ<br>- ロ<br>- ロ<br>- ロ<br>- ロ<br>- ロ<br>- ロ<br>- ロ<br>- ロ | 表示&アナロシーク<br>温度表示単位 10<br>圧力表示単位 MP.<br>熱量表示単位 MJ.<br>差量表示単位 Nm<br>音速表示単位 m/4 | A (abs)                               | ポート<br>OM3<br>OM4(標準)<br>夕種別<br>ASSONIC<br>LOWSIO500 (-XT)<br>conic-1(PA2B) | 近似演算<br>C 対要近以<br>(* 二次近以(標準)<br>アナログ出力-<br>(* 初期化<br>(* 得持(標準)<br>- ステータス出力<br>(* エラー(標準) |
| アナログ入力         温度入力レンジ           0.0000000 目 <sup>00</sup> ~ 5.0           アナログ出力   |   | нала<br>1.01/32500 E                  | ッンジ<br>-01 ~ 1.0  | С #жийл<br>МРа(abs)<br>101325 E 01   |
| は<br>開催3月ンジッ で<br>0.0000000 目 00 ~ 5.0<br>熱量出力レジジ MJ/Nm3<br>3.900000 目 01 ~ 7.0<br>比重出力レジジ<br>5.5000000 目 01 ~ 9.5  | 000000 E 01<br> 出力ch - ・<br> 出力ch - ・<br> 出力ch - ・<br> 出力ch - ・               | 2.6013250 E<br>注量出カレンジ<br>0.0000000 E | MPa(abs)<br>00 ~ 5.1<br>Nm3/h<br>00 ~ 5.0                                   | <u>Шлск</u> ]- <u>×</u><br>013250 E 00<br>  <u>Шлск</u> ]- <u>×</u><br>0000000 E 02        |
| 数値をダブルクリックすると数値設定画  | 画が表示されます。   | 更新                                    | 取消  | 終了   |

Fig. 8.5.1 Unit Settings

#### 8.5.1 Input Procedure

- 1. Transit to [パラメータ設定] [Parameter Settings] by performing the operation in Section 8.2.
- 2. The screen as shown in Fig. 8.5.1 Unit Settings, appears.
- 3. When the J button at the right of each item is clicked, a selection list appears. Select the unit you want to set, and click it.
- 4. After all values are entered, click [更新] [Update] button.
- 5. When the message box as shown in Fig. 8.5.2 appears, click [はい (Y)] [Yes] to confirm the changes you made. Click [いいえ (N)] [No] if you are not confirming.
- 6. When [取消] [Cancel] button is clicked before confirming the changes, the status reverts to the status before change.
- 7. To exit parameter settings, click [終了] [Exit] button. Screen display returns to the RUN Mode Display screen.



Fig. 8.5.2 Message Box

#### 8.6 Analog Input/Output Settings

Here, set analog input and analog output.

Input:

Enter values for analog input (4 to 20mA/1 to 5V).

Enter a value for 4mA (1V) in the lower limit value input box, and a value for 20mA (5V) in the upper limit input box.

• Output:

Enter values for analog output (4 to 20mA/1 to 5V).

Enter a value for 4mA (1V) in the lower limit value input box, and a value for 20mA (5V) in the upper limit input box.

| パラメータ設定   |   |  |  |
|---|---|--|--|
| ファイル 説明   |   |  |  |
| アナログ入出力7単位設定 流量計設定  | 定&スムージング│圧縮係数補Ⅱ                                 | E<流量>   その他                                  |  |
| アナログ入力単位<br>温度入力単位 ℃ ▼  | 表示&アナログ出力<br>温度表示単位 1°0                         | 通信ボート<br>C ∞ M3<br>C ∞ M4(標準)                | 近似演算<br>ご 対数近似<br>(・二次近似(標準)                                     |
| ビリハワ単位 (Mirakabs)         ・           -表示オブション         標準         ・ | たり表示単位 Mrados/<br>熱量表示単位 MJ/Nm3<br>流量表示単位 Nm3/h | ・メータ種別<br>C Psonic-1 (PA1 B)<br>▼ C GASSONIC | <ul> <li>アナログ出力</li> <li>○ 初期化</li> <li>○ 保持(標準)</li> </ul>      |
| ウォッチドックタイマー<br>「WDT 回数 10 回   | 音速表示単位 m/s                                      | C Psonic-1 (PA2B)                            | <ul> <li>ステータス出力</li> <li>() エラー(標準)</li> <li>() 音速補正</li> </ul> |
| アナログ入力  | - •c  |  | MPa(aba)   |
| 0.0000000 E 00 ~ 5.0  |   | nit display area                             | 01325 E 01   |
| 7ナログ出力<br>温度出ウレンジ 0   | 出力○ 2 → 圧力出                                     | カレンジ MPa(abs)                                | 出力Ch - 🗸   |
| 0.00000000 E 00 ~ 5.0<br>熱量出力レンジ MJ/Nm3                             | 0000000 Ц Upper lii<br>Шлсь - 🔄 🛲               | mit value input                              | box pole   |
| 3.90<br>比重出 Lower limit va  | lue input box                                   | 00000 E · · · 5.0                            | 000000 E 02  |
| 5.5000000 E-01~ 9.5   | 5000000 EI-01                                   |  |  |
| 数値をダブルクリックすると数値設定画  | 画面が表示されます。                                      | ■ 取消   | 終了   |

Fig. 8.6.1 Analog Input/Output

#### 8.6.1 Input Procedure

- 1. Transit to [パラメータ設定] [Parameter Settings] by performing the operation in Section 8.2.
- 2. Click [アナログ入出力設定] [Analog Input/Output Settings]. The screen as shown in Fig. 8.6.2 appears.
- Enter an appropriate value in each input box. %1 (Related to section 8.10.) The left side of the screen shows the lower limit values (values for 4mA or 1V), and the right side shows the upper limit values (values for 20mA or 5V).

Click each item with the mouse button, and enter a numeric value. Note that the index method is used for input.

- 4. After all values are entered, click [更新] [Update] button.
- 5. When the message box as shown in Fig. 8.6.3 appears, click [はい (Y)] [Yes] to confirm the changes you made. Click [いいえ(N)] [No] if you are not confirming.
- 6. When [取消] [Cancel] button is clicked before confirming the changes, the status reverts to the status before change.
- 7. To exit parameter settings, click [終了] [Exit] button. Screen display returns to the RUN Mode Display screen.

| アナロク入力単位<br>温度入力単位 № ・  | 表示&アナログ出力<br>温度表示単位 ©   |  | ポート<br>つM3<br>OM4(標準)   | <ul> <li>近似演算</li> <li>○ 対数近以</li> <li>○ 二次近似(標)</li> </ul>             |
|---|---|--|---|---|
| ま示オブション<br>標準<br>ウォッチドックタイマー  | 上 刀表示单位 MJ/<br>熱量表示単位 MJ/<br>流量表示単位 Nm/   | Nm3 ▼ C Pa<br>3/h ▼ C Pa   | 9種別<br>ionio-1(PA1B)<br>ASSONIC<br>.OWSIC600(-XT              | アナログ出た<br>○ 初期化<br>○ 保持(標準)<br>ステータスと                                   |
| WDT 回数 10 0 Cli   | ck an input bo  | ox and ente  | r a value   | ○ エラー(機<br>○ 音速補正   |
| 温度入力レンジ   | 1 °C/   | 圧力人力し  | ハンジ   | MPa(abs)  |
| 温度入カレンジ<br>   |   | 止力入力L<br>1.0132500 E   | ッンジ<br><u>-01~ 1.(</u>  | MPa(abs)<br>)101325 E   |
| 温度入カレンジ<br>0.00000000 日 <sup>00</sup> ~ 5<br>アナログ出力   |   | <u>нл</u> , л.<br>1.0132500 E  | ッンジ<br>-01~ 1.0   | MPa(abs)<br>)101325 E   |
| 温度入カレンジ<br>0.00000000 E <sup>00</sup> ~ 5<br>アナログ出力<br>温度出力レンジ / ℃  | .0000000 F 01   | 田カスカレ<br>1.0132500 E<br>田力出カレンジ  | ッンジ<br>-01~  1.(<br>MPa(abs)                                  | MPa(abs)<br> 101325 E<br> 出力Ch  -                                       |
| <u>温度入カレンジ</u><br>0.00000000 El <sup>100</sup> ~ 5<br>7ナログ出力<br>温度出力レンジ <sup>1</sup> C<br>0.00000000 El <sup>100</sup> ~ 5        | 0000000 E 01<br>(ШЛСЬ 2 -   | <ul> <li>Eカスカレ</li> <li>1.0132500 E</li> <li>Eカ出カレンジ [</li> <li>2.6013250 E</li> </ul>   | ッンジ<br>-01 ~ 1.0<br>MPa(abs)<br>-00 ~ 5.1                     | MPa(abs)<br>)101325 E<br>  <b>Шлс</b> h  -<br>013250 E                  |
| <u>温度入カレンジ</u><br>0.00000000 E <sup>100</sup> ~ 5<br>アナログ出力<br>温度出カレンジ <sup>100</sup> ~ 5<br>熟量出力レンジ MJ/Nm3                       |   | <ul> <li>         圧力入力に     </li> <li>         1.0132500 E     </li> <li>         圧力出力レンジ [     </li> <li>         2.6013250 E     </li> <li>         流量出力レンジ [     </li> </ul>                                    | ンジ<br>-01 ~ 1.0<br>MPa(abs)<br>00 ~ 5.1<br>Nm3/h              | MPa(abs)<br>)101325 E<br>  <b>ШЛС</b>  -<br>013250 E<br>  <b>ШЛС</b>  - |
| <u>温度入力レンジ</u><br><u>0.0000000 E 00 ~ 5</u><br>プナロウ出力<br>温度出力レンジ C<br>0.0000000 E 00 ~ 5<br>熱量出力レンジ M.J/Nm3<br>3.9000000 E 01 ~ 7 | С         С           .0000000         E         01           .00000000         E         01           .00000000         E         01           .00000000         E         01           .00000000         E         01 | <ul> <li>         Eカスカに     </li> <li>         1.0132500 F     </li> <li>         Eカ出カレンジ [     </li> <li>         2.6013250 E     </li> <li>         流量出カレンジ [     </li> <li>         0.0000000 E     </li> </ul> | ンジ<br>-01 ~ 1.(<br>MPa(abs)<br>00 ~ 5.1<br>Nm3/h<br>00 ~ 5.(  | МРабара)<br>101325 日<br>(出力Сh -<br>013250 日<br>(出力Ch -<br>0000000 日     |
| 温度入力レンジ<br>0.0000000日 m ~ 5<br>7+ログ出力<br>温度出力レンジ ℃<br>0.0000000日 m ~ 5<br>熱量出力レンジ M J/Nn3<br>3.9000000日 01 ~ 7<br>比重出力レンジ         | С<br>.0000000 E 01<br> ШЛСЬ 2 ⊻<br> 0000000 E 01<br> ШЛСЬ - ⊻<br> ШЛСЬ - ⊻  | <ul> <li>Eカ人カL</li> <li>1.0132500 F</li> <li>Eカ出カレンジ 「</li> <li>2.6013250 F</li> <li>流量出カレンジ 「</li> <li>0.00000000 F</li> </ul>  | →>ジ<br>-D1 ~ 1.0<br>MPa(abs)<br>00 ~ 5.1<br>Nm3/h<br>00 ~ 5.0 | МРабара)<br>101325 E<br>(Шлоса) -<br>013250 E<br>(Шлоса) -<br>0000000 E |



Fig. 8.6.3 Message Box

Fig. 8.6.2 Input Procedure for Analog Input/Output Settings

#### 8.7 Other Parameter Settings

The parameter settings shown in Fig. 8.7.1 are as shown below.

- Meter selection: Select the type of the ultrasonic flowmeter to be used.
- Approximate equation selection: Select the approximate equation to be used.
- Communication port selection: Select the communication port to be used.
- Analog output settings: Select the status of analog output on the Parameter Settings screen.



Fig. 8.7.1 Other Parameters

#### 8.8 Parameter Settings

On this screen, set parameters related to the flowmeter, the parameters related to correction and the parameters related to trend data collection.

- Meter diameter: Enter the diameter of the ultrasonic flowmeter to be connected.
- Flowrate corrections a, b: Enter coefficients a and b for correcting the instantaneous flowrate.
- Sound speed coefficient correction (pressure): Enter the coefficient for correcting the pressure of the sound speed transmitted from the ultrasonic flowmeter. (Fixed value)
- Sound speed coefficient correction (temperature): Enter the coefficient for correcting the temperature of the sound speed transmitted from the ultrasonic flowmeter. (Fixed value)
- Deviation correction: Enter the coefficient for correcting the deviation. (adjusted on-site)
- Reference temperature: Enter the reference temperature value for correcting the flow rate.
- Reference pressure: Enter the reference pressure value for correcting the flow rate.
- Sampling frequency: Set the sampling time for collecting trend data. The minimum value that can be entered is 1 second.
- Bi-directional flow rate measurement: By checking the checkbox, settings of bidirectional flow measurement and low-cut range become available.
- Low-cut function: Enter a value for low-cut flow velocity (m/s) after clicking the input box. (max. 9.9m/s)

(Do not change the unused parameters such as temperature correction coefficient Ac to Bd, and sound speed correction settings.)

|  | -Rit                            | スムージノク防衛                    |
|--|---------------------------------|-----------------------------|
| INNEW LENERBO                                | 17 加し C 801年の<br>C ダンビンダ        | F 55, C #874                |
| 0000000 E 10 0 0000000 E 10                  | - 料款平均                          | 一种秩序的                       |
|  | 回数 32 回                         | 回数 32 回                     |
| OCCOCCO E TO Input box                       | <b>時間 32 1</b> 秒                | 新闻 32 [移                    |
| ■素分補王<br>「 音速論正設定                            | - スムージンジ(注意)                    | スムージング(社会)                  |
| 19687000 日 00<br>本本田力<br>新年日力<br>「「三田三」「三田三」 | 新式<br>(F 41, C 参加テカ<br>(C ダンビング | 形式<br>(デル)、クラカテロ<br>(クタンジンク |
| 0132192 E                                    | 野軟中加                            | - 那些中世                      |
| 1 0000000 E 00                               | 回致 32 回                         | 回歌 32 回                     |
| WARME CL                                     |                                 | Pira .                      |

Fig. 8.8.1 Parameter Settings

#### 8.8.1 Input Procedure

- 1. Transit to [パラメータ設定] [Parameter Settings] by performing the operation in Section 8.2.
- 2. Click [パラメータ設定] [Parameter Settings]. The screen as shown in Fig. 8.8.2 appears.
- 3. Enter an appropriate value in each input box. %1 (Related to section 8.10.) Click each item with the mouse button, and enter a numeric value. Note that the index method is used for input, except for the sampling frequency.
- 4. After all values are entered, click [更新] [Update] button.
- 5. When the message box as shown in Fig. 8.8.3 appears, click [はい(Y)] [Yes] to confirm the changes you made. Click [いいえ(N)] [No] if you are not confirming the changes.
- 6. When [取消] [Cancel] button is clicked before confirming the changes, the status reverts to the status before change.
- 7. To exit parameter settings, click [終了] [Exit] button. Screen display returns to the RUN Mode Display screen.

| 7-200 mm   | 国家湘王将融Ac   | -24-5250.73    | - スムージング(動量)   |
|--|--|----------------|--|
| 2 3720000 E 12   | 0.0000000 E 00   | EX. C HORD     | FAL C PDT  |
| HOMEGS   | 温度加工品数80   | C 37573        | C 27572  |
| T DODDODOE N   | COCCORDE IN  | 帮款平均           | 和时任之   |
| 0.0000000 8.00   | 0.0000000 E 10   | 回数 32 回        | 回激 32 回  |
|  |  | CHIGFDW.       | 1. AD 377.95   |
| 37 AL U  | 温度相正体数Bd   | 1300           |  |
| 0.000 Clink  | minnut her and   | onton a v alua | 時間 32 形  |
| 0 000 Click a  | n input box and  | enter a value. | 時間 32 形  |
| 0 000 Click a  | n input box and  | enter a value. | 時同  32   初<br> スムージング世堂)<br> 加式  |
| 0.000 Click a  | n input box and  | enter a value. | 時間  32  形<br> スムージング欧重)<br> 形式<br>(7 なし C 参D FG<br> C ダンビノク  |
| 0.000<br>0.9687000 El 00<br>878.E27<br>HFatabal<br>1.0132192 El-01   | n input box and  | enter a value. | 時間  32  形<br> スムージング電査)<br> 素式<br> 7 ない C DDTS<br>  C ない C DDTS<br>  C ない C DDTS<br>  C ない C DDTS<br>  C ない C DDTS |
| 0.000 Click a<br>0.9667000 El 10<br>0.9667000 El 10<br>0.967000 El 10<br>0.977000 El 10<br>0.9770000 El 10<br>0.9770000 El 10<br>0.97700000 El 10<br>0.977000000000000000000000000000000000 | n input box and  | enter a value. | 時間  32  初<br>えムージング集新<br>「すな」、「きわずな<br>「ない」、「きわずな<br>「ない」、「きわずな<br>「ない」、「きわずな<br>「ない」、「きわずな                        |
| 0 000<br>ES<br>0 9687000 El 10<br>0 9687000 El 10<br>0 9687000 El 10<br>0 0088000 El 10  | ACTING   | enter a value. | 時間  32  初<br> スムージング戦争 <br> 素式<br> 「 なん」( つわすな<br> 「 ないだめ<br>  141111<br> 回数  32  回                                |
| Click 2<br>0 000<br>0 000<br>0 000 Click 2<br>0 9687000 El 0<br>0 0088000 El 00<br>0 0088000 El 00<br>0 0088000 El 00  | Action of the second se | enter a value. | 時間 32 例<br>スムージン学戦争<br>高式<br>でないで90年6<br>でないだう<br>1811年<br>回覧 32 回<br>時間 32 例                                      |

Fig. 8.8.2 Input Procedure for Parameter Settings

| バラメータ設定                      | X                                |
|------------------------------|----------------------------------|
| (?) 設定を確定し;                  | ます。よろしいですか。                      |
|                              | <u>しいえ(N)</u>                    |
| Click to<br>confirm settings | Click to not<br>confirm settings |

Fig. 8.8.3 Message Box

#### 8.9 Smoothing

Here, enter the smoothing settings for data collection, the type of the flowmeter to be used, communication port setting and the approximation calculation method.

#### Smoothing

None: Smoothing is not performed.

Moving average: Data is averaged from the newest measurement data to the data immediately before the designated time constant (count).

If the number of data is less than the time constant (count), the data is averaged by the number of measured data. The maximum is 60 seconds.

Damping: The new calculated value is obtained by adding the value, which is obtained by multiplying the difference between the newest measured value and the immediately previous calculated value by the smoothing coefficient, to the immediately previous calculated value.

Gn: New calculated value

Gn-1: Immediately previous calculated value

G: Current calculated value

R: Smoothing coefficient; R = Cycle/time constant

Note that the value set for damping time is used as time constant.

(Update cycle of calculation is 1 second.)

| ラメータ語史                           |   |
|----------------------------------|---|
| r(16 (1981)                      |   |
| サロジス出力/単位換定 アナロジ出力設定(オジション)をダンピン | 99 Gmoothing format   |
| メータロ日 mm 国際補正係換Ac 2              | Shooming for mat  |
| 2 3720000 E 🔍 0 0000000 E 🕬      | Rit Canada Rite Canada  |
| TOME(2) TEMERSO                  | C #2/82/7 C #2/82/7   |
| 1.0000000 E 20 0.0000000 E 20    | STREE 0   |
|                                  | 回数 32 回 回数 32 回   |
| 0.0000000 El m 0.0000000 El m    | 8 40.8  |
|                                  | 時間 32 (抄) (時間 32 (抄)  |
|                                  | The second |
| 0.96 Moving average input box    | ムージングは集) スムージングは重)  |
| (CIFIC/)                         | FALCODER FALCODER   |
| MPa(aba) C Distant C State       | C 9   |
| 1.0132192 日-07 日常補正体報5           | Damping time setting box  |
| 1.0000000 E (0)                  | This as les lesses as les   |
| D DOSSOOD EI W                   | Sett - Start  |
| Indete hutten                    | Canal hutton . Fuit hutton  |
| Opdate Button                    | Cancel Dumon Exit Button  |
| 1/2/10 0 1000000 E               |   |
| 1 Jone                           |   |
| 目間をジラルクリックすると前の国家定義国が表示されます。     | (更新)(取消)( 取消)( 終了)  |

Fig. 8.9.1 Parameter Settings

#### 8.9.1 Input Procedure

- 1. Transit to [パラメータ設定] [Parameter Settings] by performing the operation in Section 8.2.
- 2. Click [ダンピング] [Damping].
- 3. Enter an appropriate value in each input box. %1 (Related to section 8.10.) Click each item with the mouse button, and enter a numeric value. For items not requiring to enter a numeric value, select an appropriate value and then click.
- 4. After all values are entered, click [更新] [Update] button.
- 5. When the message box as shown in Fig. 8.9.2 appears, click [はい(Y)] [Yes] to confirm the changes you made. Click [いいえ (N)] [No] if you are not confirming the changes.
- 6. When [取消] [Cancel] button is clicked before confirming the changes, the status reverts to the status before change.
- 7. To exit parameter settings, click [終了] [Exit] button. Screen display returns to the RUN Mode Display screen.



Fig. 8.9.2 Message Box

#### 8.10 %1 Other Input Procedure

In addition to directly entering values, the following parameter input procedure is also available.

An example of analog input/output is explained below.

- 1. On the Analog Input/Output Settings screen, double-click in the numeric input box shown in Fig. 8.10.1.
- 2. Then, the window as shown in Fig. 8.10.2 appears.
- 3. On the screen shown in Fig. 8.10.2, align the cursor (highlight) on the digit you want to change using the mouse or the tab button.
- 4. Then, change the parameters with the numeric buttons on the screen or by entering a value from the keyboard.
- 5. The sign switch button switches between [+] and [-] each time the button is clicked.
- 6. When you finish entering a value, click [確定] [Confirm] button.
- 7. When the window (Fig.8.10.2) disappears, click [更新] [Update] button.
- 8. If [取消] [Cancel] button is clicked before [確定] [Confirm] button is selected, the value will revert to the previous setting.

The procedure is the same for the items in which numeric values are entered in other parameter settings.

| アナログ入出力/単位設定         注意計説定るスムージング         圧縮係数構正<<流量>         その他           アナログ入力単位         要示るアナログ出力         通信ボート         近辺渡道           一日カ入力単位         要示るアナログ出力         通信ボート         ごのM3         ご M参送後           日カ入力単位         ■         日カネ市単位         ●         ●         ●         ●           東示オブション         ● </th <th>パラメータ設定</th> <th></th> <th></th> <th></th> <th></th>  | パラメータ設定                    |                     |              |                      |  |
|--|----------------------------|---------------------|--------------|----------------------|--|
| (アナロダムガン単位)         (国金田田市区)         (日金田田市区)         (日金田田市区)         (日金田田市区)         (日金田田市区)         (日金田市区)         (日金田市E)         (日金田市E)         (日金田市E)         (日金田市E)         (日金田市E)         (日金田 E)         (日金田E)         (日金田E)         (日金田E)         (日金田E)         (日金田E)         (日金田E)         (日金田E)         (日金HE)         (日金HE)         (日金HE)         (日金HE)         (1)         (1)         (1)         (1)         (1)         (1)         (1)        (1)         (1)         (1)         (1)         (1)   | ファイル 説明                    |                     |              |                      |  |
| アナロジ入力単位     ●   | アナログ人出力7単位設定 流量計設定         | &スムージング   F         | E縮係數補正<流     | 量>   その他             |  |
| 温度大力単位         ○         ●   | アナログ入力単位                   | 表示&アナログ出力           | <del>ا</del> | 通信ポート                | 近似演算   |
| 圧力         圧力         圧力         ボーク         ビーク   | 温度入力単位 10 王                | 温度表示単位              | <u> </u>     | ○ CO M3 ○ CO M4(標準)  | <ul> <li>() 対数近似</li> <li>() 二次近似(標準)</li> </ul> |
| またオジョン   | 圧力入力単位 MPa(abs) 👤          | 圧力表示単位              | MPa(abs) 🗾   |                      |  |
| 建築表示単位         Nm3/h         C         GASSONC         Ø         #(#(#2))           ウオッチドックタイマー         音速表示単位         n/s         C         GASSONC         Ø         (#(#2))           W0T (可放 10 回)         音速表示単位         n/s         C         CASSONC         (7 = 5/24/2)           アナロジ入力           (* 10 = 10)         (* 10 = 10)         (* 25 - (#2))           アナロジ入力           (* 10 = 10)         (* 10 = 10)         (* 25 - (#2))           アナロジ入力           (* 10 = 10)         (* 10 = 10)         (* 10 = 10)           アナロジ入力            (* 10 = 10)         (* 10 = 10)         (* 10 = 10)           アナロジ入力           (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)           0.00000000           (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)           アナロジカンジ           (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         (* 10 = 10)         <  | 表示オプション                    | 熱量表示単位              | MJ/Nm3 💌     | C Psonic-1(PA1B)     | ○ 初期化  |
| C29 29472-29472-     WOT 回数 10 0     Provice-1PA(E)     Provice-1PA(E)     Provice-1PA(E)     C      Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     C     Provice-1PA(E)     Provice-1PA(E) | 標準                         | 流量表示単位 ▶            | Nm3/h 💌      | C GASSONIC           | (● 保持(標準)  |
| T (回数) 10 回  | ウォッチドックタイマー                | 音速表示単位 🔽            | n/s 💌        | C Psonic-1(PA2B)     | リーステータス出力・                                       |
| アナロジ入力         単音なわたンジ         WFache>           0.00000000 目 00         ~         5.0000000 目 01         1.0132500 目 01         1.0101325 目 01           アナロジ出力         *         5.0000000 目 01         1.0132500 目 01         1.0101325 目 01           アナロジ出力         *         *         第カルンジ         MPache>           *         *         *         5.0000000 目 01         1.013250 目 01         *           *         *         *         *         *         *         *           *         *         *         *         *         *         *         *           * <td>□ WDT 回叙 10 回</td> <td></td> <td></td> <td></td> <td>○ ① ① ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦</td>  | □ WDT 回叙 10 回              |                     |              |                      | ○ ① ① ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦          |
|  | アナログ入力                     |                     |              |                      |  |
| C 00000000 目 <sup>00</sup> ~ 5.0000000 目 <sup>01</sup> 1.0132500 目 <sup>01</sup> ~ 1.0101325 目 <sup>01</sup><br>Tプナロジ出力<br>Tプナロジ出力<br>Tプナロジ出力<br>Tプナロジ出力<br>Tプナロジ出力<br>Tプナロジ出力<br>T<br>Tクリンジ<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO<br>TO   | 温度人力レンジ                    | °C                  | <u> </u>     | 人力レンジ                | MPa(abs)   |
| P7+02地力     Set 200000 ■ 00 ~ 5.0000000 ■ 01     Set 200000 ■ 00 ~ 5.0000000 ■ 01     Set 2000000 ■ 00 ~ 5.1013250 ■ 00     Set 2000000 ■ 00 ~ 5.0000000 ■ 01     Set 2000000 ■ 00 ~ 5.0000000 ■ 02  | 0.0000000 E 0.00           | 000000 El 01        | 1.013250     | 0 <b>E</b>  -01 ~  1 | 0101325 E 01                                     |
| 単数のレンタ で 単分のk 2 エ ビガ出カレンタ MP3 Gbb 単分のh - エ<br>0.0000000 目 00 2 6013250 目 00 ~ 51013250 目 00 ~ 51013250 目 00 ~ 51013250 目 00 ~ 51013250 目 00 ~ 50000000 目 00 ~ 500000000 目 00 ~ 50000000000   | アナログ出力                     |                     |              |                      | -  |
| 000000000 00 - 00 ~ 50000000 日 01 2.6013250 日 00<br>熱量出力レンジ MJ/Nm3 出力のト → 法量出力レンジ Nm3/h 出力のト →<br>3.9000000 - 10 ~ 7.0000000 日 01 0.0000000 日 02<br>比重出力レンジ Numeric input box<br>5.5000000 日 01 ~ 3.0000000 日 01   | 温度出力レンジ   ℃                | 出力Ch  2 <u>・</u>    | 圧力出力レン       | シー MPa(abs)          | 出刀Ch - 💌   |
|  | 0.0000000 E 00~ 5.00       | 000000 티 01         | 2.601325     | 50 E 00~ 5           | 1013250 <b>E</b> 00                              |
| 3.9000000 FW ~ 7.000000 日 01 0.0000000 日 02 5.0000000 日 02<br>比重出カレンジ Numeric input box<br>5.5000000 日 07 9.0000000日 01  | 熱量出力レッジ MJ/Nm3             | 出力Ch - 👱            | 流量出力し        | パジ Nm3/h             | 出力Ch - ▼   |
| 比重出カレンジ<br>5 5000000 日 ····························  | 3.9000000 ENI~ 7.00        | 000000 E 01         | 0.000000     | 0 E 00 ~ 5           | 0000000 E 02                                     |
| 5.5000000 9.5000000  | 比重出カレンジ<br>Numeric         | input box           |              |                      |  |
|  | 5.5000000                  |                     | -            |                      |  |
|  |                            |                     |              |                      |  |
| 数値まるブルクリックすると数値設定画面が表示されます。 <b>百新 取消 救了</b>  | 数値をダブルクロックオスと数値設定面         | 面が表示されます。           | 百新           | 1 取消                 | 約7   |
| MECS ////////////////////////////////////  | SALE CONTRACTOR OF SCIENCE | mun service tot 9 6 |              | 4X/H                 | <u>करें</u> ]                                    |



Fig. 8.10.2 Numeric Input

## 9. OPERATING PROCEDURE

#### 9.1 When Turning Off the Power (Program Exit Procedure)

To turn off the power of the computer, follow the procedure below.

## CAUTION: Even if the power switch is turned off while the computer is in operation, it will not damage the computer, but its data may be damaged.

#### 9.1.1 Transiting to the RUN Mode Display Screen

The program can only be exited on the RUN Mode Display screen.

If Parameter Settings is being displayed, it is necessary to transit to the RUN Mode Display screen. For more information about how to transit to the RUN Mode Display screen, see Section 8.3.

#### 9.1.2 Exiting the Program

On the RUN Mode Display screen, click [ファイル][File]. The screen as shown in Fig. 9.1.1 appears. Here, click [終了] [Exit].



Fig. 9.1.1 Exiting the Program

When the message box as shown in Fig. 9.1.2 appears, click [liv (Y)] [Yes] to exit the program. If you are not exiting the program, click [ $lvv\lambda\lambda$  (N)] [No].



Fig. 9.1.2 Message Box

#### 9.1.3 Exiting Windows

After exiting the program, exit Windows according to the following procedure.

Click **MARCH**. The menu as shown in Fig. 9.1.3 appears.







## Click [シャットダウン][Shutdown]. The message as shown in Fig. 9.1.4 appears.

Select [シャットダウン][Shutdown], and then click [OK].

After a while, Display Screen disappears. Then after a long while, turn off the power.

#### 9.2 Removing USB Devices

To remove USB devices, select [メニュー] [Menu] and then [ファイル] [File]. Then select [USB取り外し] [Remove USB].

The menu screen as shown below appears. For example, in the case of USB memory, select [USB Mass Storage Device] and then click [停止] [Stop].



Fig. 9.2.1 Removing USB Devices



#### 9.3 Turning On the Power

When the computer is powered on, the program is automatically started. Therefore, no special operation is required when turning on the power.

When the program is started, the RUN Mode Display screen appears.

#### 9.4 Parameter File Operation

On this computer, it is possible to save the parameters used for measuring as a file. Also, by loading the file, the saved parameter values can be changed in a batch.

#### 9.4.1 Saving a File

The following is the procedure for saving the specified parameters as a file.

1. Open [パラメータ設定] [Parameter Settings].

For more information about how to shift from RUN mode display to parameter settings, see Section 8.2.

- 2. Click  $[7 r 4 \mu]$  [File]. The screen as shown in Fig. 9.4.1 appears. Then, click [t 7] [Save].
- 3. When the window as shown in Fig. 9.4.2 appears, enter the name of the file, and then click [保存 (S)] [Save].
- 4. When [保存(S)] [Save] is clicked, the message box as shown in Fig. 9.4.3 appears. Here, click [はい(Y)] [Yes]. The contents of the currently set parameters are saved as a file.
- 5. Note that if a file having the same name exists, the message box as shown in Fig. 9.4.4 appears. If you want to overwrite, click [はい(Y)] [Yes]. If you do not want to overwrite, click [いいえ(N)] [No], and enter a different file name.



Fig. 9.4.1



Fig. 9.4.2



Fig. 9.4.3 Message Box



Fig. 9.4.4 Message box

#### 9.4.2 Loading a File

Load a saved parameter file, and change the parameters in a batch.

- 1. Open [パラメータ設定] [Parameter Settings].
- For more information about how to shift from RUN mode display to parameter settings, see Section 8.2. 2. Click  $[ \mathcal{T} \mathcal{T} \mathcal{I} \mathcal{V}]$  [File]. The screen as shown in Fig. 9.4.5 appears. Then, click  $[ \Box - \check{\Gamma}]$  [Load].
  - パラメータ設定 マイル 説明 (補正<流量> | その他 | 通信ボート 〇 CO M3 (● CO M4(標準 表示&アナログ出 温度表示単位 近似演算 -• 対数近似 二次近似(標準 圧力表示単位 MPa(abs) • -メータ種別 (^ Psonic-1(PA1B) (^ GASSONIC (~ FLOWSIC600(--) ナログ出力 熱量表示単位 MJ/Nm3 ٠ Click this. 2 但持(靜液 量表示単位 ٠ -音速表示単位 m/s WDT 回数 10 回 アナロジ入力 温度入力レンジ 圧カ入力レンジ M Pa (abs. 0.0000000 E 00 ~ 5.0000000 E 01 1.0132500 E -01 ~ 1.0 01325 E 0 00000000 E 00 ~ 50000000 E 01 2.6013250 独立ないためである。 独立たる 2 またまたのである。 2.6013250 温度出力レンジ 出力Ch -熱量出力レンジ 流量出力レンジ Nm3/h 出力Ch • 比重出力レ 出力Ch ø 5000000 E-01 E 数値をダブルクリックすると数値設定画面が表示されます。 更新 取消 終了

Fig. 9.4.5 Loading a File

3. When the window as shown in Fig. 9.4.6 appears, enter the name of the file you want to load, and then click [開 < (O)] [Open].

| ファイルを聞く         |                    |   | ? ×         |
|-----------------|--------------------|---|-------------|
| 7ヶイルの場所型:       | 1) 通信演算            |   |             |
| data            |                    |   |             |
| a parameter.PRM |                    |   |             |
| Parameter1.PBM  |                    | _ |             |
|                 | Enter a file name. |   | Click this. |
|                 |                    | _ |             |
| 77/14名(N): [F   | aramote 1.PRM      |   | <u> </u>    |
| 7711の種類(1): 1   | (ラメータファイル(*.PRM)   |   | キャンセル       |

Fig. 9.4.6 Opening a File

4. When  $[\exists \leq (O)]$  [Open] is clicked, the message box as shown in Fig. 9.4.7 appears. Here, click  $[\exists v (Y)]$  [Yes]. The values of the currently set parameters are changed to the values saved in the file.





#### 9.5 Trend Data

On this computer, the data being displayed on the RUN Mode Display screen can be saved as trend data. The data is collected at every "sampling frequency". The amount of data that can be stored depends on the storage size of the external memory (USB memory).

#### 9.5.1 Collecting and Saving Data

#### CAUTION: Before collecting (saving) the trend data, make sure to isolate this computer from the process line.

1. Set sampling frequency.

Open [アナログ出力(オプション)&ダンピング][Analog output(Options) & Damping] in Parameter Settings, and enter the sampling time of data. Data is collected at every sampling time entered here as trend data.

2. Transit to the RUN Mode Display screen.

For more information about how to shift to the RUN Mode Display screen, see Section 8.2.

- 3. Click  $[ \dagger \tau ] \forall \exists \nu ]$  [Options]. The screen as shown in Fig. 9.5.1 appears. Here, click  $[ \vdash \nu \nu \lor ]$  [Trend].
- 4. Once the window (Fig. 9.5.2) opens, specify the location to save the data. While collecting data, [ $h \nu$  $\succ$  K [Trend] in [ $\forall = 1$  -] [Menu] is being checked, and [Trend] in the lower right corner of the screen flashes (Fig. 9.5.3).
- again.
- 6. The message box as shown in Fig. 9.5.4 appears. A file name is automatically generated.



| Fig. 9.5.1 7 | Frend |
|--------------|-------|
|--------------|-------|



Fig. 9.5.3 Flashing

| → → → ペ Program Files → 熱量計演算器 →   | <ul> <li>✓ 4→ 熱量計演算器</li> </ul> | の検索 🖌          |
|--|---------------------------------|----------------|
| 整理マ 新しいフォルダー   |                                 | 8≕ • 0         |
| <ul> <li>○ ドキュメント ▲ 名前</li> <li>○ ビクチャ</li> <li>○ ビクチャ</li> <li>○ ニージック →</li> </ul> | 更新日時<br>2013/07/21 14:15        | 種類<br>ファイル フォル |
| ☆ホームグループ ⊨   |                                 |                |
| S3A7926D003     DATE (E:)  | III                             |                |
| ファイル名(N): 20141110133036.csv<br>ファイルの種類(T): トレンドデータファイル(*.csv)                       |                                 |                |
|  | 保存(S)                           | =+v>+v         |

Fig. 9.5.2 Saving by Entering a File Name

| 終 | 了確認 | x               |  |
|---|-----|-----------------|--|
|   | i   | トレンドの記録を終了しました。 |  |
|   |     | ОК              |  |

Fig. 9.5.4 Message Box

#### CAUTION: Do not save the data log of trend data to the C drive.

#### 9.5.2 Data Display

1. Click [ファイル] [File]. The screen as shown in Fig. 9.5.5 appears. Here, click [トレンドデータ] [Trend data].



Fig. 9.5.5 Trend data

2. When the window as shown in Fig. 9.5.6 appears, select a file and click [ $\mathbb{R} \leq$  (O)] [Open].

| アイルを開く                 |                          |                   |           | <u> 7 ×</u>             |
|------------------------|--------------------------|-------------------|-----------|-------------------------|
| ファイルの場所の               | 白熱動物道務                   |                   | ¢ € d* ⊡• |                         |
| <b>1</b><br>最近很5次77-01 | Codete<br>Trend.txt      |                   |           |                         |
| <b>6</b><br>72,01-07   |                          |                   |           |                         |
| 74 1861.801            |                          |                   |           |                         |
| 74 1741-9              |                          |                   |           |                         |
| क्ष<br>१२ २२ २२        |                          |                   |           |                         |
|                        | ファイル名(1)0<br>ファイルの新聞(1): | Trend Int         |           | 開い( <u>0</u> )<br>キャンセル |
|                        | The second               | Treets second and |           |                         |

Fig. 9.5.6 Opening a File

- 3. Trend data of selected file as shown in Fig. 9.5.7 appears.
- 4. To close the Trend data window, click the 🗵 button in the upper right corner of the window.

| ニトレンドデータ  |  | ×                                      |
|---|--|--|
| yyyy/mu/dd <sup>+</sup> , <sup>-</sup> hh:m:ss <sup>-</sup> , <sup>-</sup> /28,15<br>2009/05/11 <sup>+</sup> , <sup>-</sup> 14:54:45 <sup>-</sup> , <sup>-</sup> 288,15<br>2009/05/11 <sup>+</sup> , <sup>-</sup> 14:54:45 <sup>-</sup> , <sup>-</sup> 288,15<br>2009/05/11 <sup>-</sup> , <sup>-</sup> 14:54:58 <sup>-</sup> , <sup>-</sup> 288,15<br>2009/05/11 <sup>-</sup> , <sup>-</sup> 14:55:03 <sup>-</sup> , <sup>-</sup> 288,15<br>2009/05/11 <sup>-</sup> , <sup>-</sup> 14:55:08 <sup>-</sup> , <sup>-</sup> 288,15 <sup>+</sup> , <sup>-</sup><br>2009/05/11 <sup>-</sup> , <sup>-</sup> 14:55:08 <sup>-</sup> , <sup>-</sup> 288,15 <sup>+</sup> , <sup>-</sup> | MPa", MJ/Ma3         Mk1/nin', Mk1/nin', Mk3, FC           1.86, 4.85, 4.85, 4.86, 0.8373, 386.85, 97           1.86, 4.85, 4.85, 4.86, 0.8373, 386.85, 97           1.86, 4.85, 4.85, 4.86, 0.8373, 386.85, 97           1.86, 4.85, 4.85, 4.86, 0.8373, 386.85, 97           1.86, 4.85, 4.85, 4.86, 0.8373, 386.85, 97           1.86, 4.85, 4.85, 4.85, 0.8373, 386.85, 97           1.86, 4.85, 4.85, 4.85, 0.8373, 386.85, 07           1.86, 4.85, 4.85, 4.85, 0.8373, 386.85, 07           1.96, 4.85, 4.85, 4.85, 0.8373, 386.85, 07           1.96, 4.85, 4.85, 4.85, 0.8373, 386.85, 07 | *0*<br>*0*<br>*0*<br>*0*<br>*0*<br>*0* |
|   | Click this<br>to close the window.   |  |
|   |  |  |

Fig. 9.5.7 Trend data Window

#### 9.6 Event Window

The Event window displays events that occur inside the computer.

- 1. On the RUN Mode Display screen, click [オプション] [Option]. The menu as shown in Fig. 9.6.1 appears. Here, click [デバック] [Debug].
- 2. Next, the Event window as shown in Fig. 9.6.2 appears. The time when an event has occurred and its description are displayed.
- 3. When you click [停止] [Stop] button in the lower left corner of the Event window, event display stops. Note that the button display changes to [更新] [Update] button while event display is being stopped.
- 4.To restart event display, click [更新] [Update] button.
- 5. To close the Event window, click the 🗵 button in the upper right corner of the window.



#### 9.7 Error Log

The error log displays a list of errors occurred inside the computer.

- 1. On the RUN Mode Display screen, click [オプション] [Option]. The menu as shown in Fig. 9.7.1 appears. Here, click [エラーログ] [Error Log].
- 2. Next, the Event window as shown in Fig. 9.7.2 appears. The time when an error has occurred and its description are displayed.
- 3. To close the Error window, click the 🗷 button in the upper right corner of the window.
- 4. For more information about the descriptions of events that may occur, see page p.9.







### 9.8 Menu [Version information]

In RUN mode display, [バージョン情報] [Version information] menu displays the following items. ① [バージョン情報] [Version information]

② [自己診断] [Self check]

#### $\bigwedge$ CAUTION: Do not select 2



Fig. 9.8.1

#### 9.8.1 Version information

The dialog box displays the software version. This window can be closed by pressing [OK].

▶ NOTE: Software upgrade is subject to change without notice.



Fig. 9.8.2 Version information

## **10. STANDARD SPECIFICATIONS**

#### General Specifications

| Item                        | Description   |  |  |  |  |  |
|-----------------------------|---|--|--|--|--|--|
| Guaranteed calorie range    | 39 to 50 MJ/m³ (normal)   |  |  |  |  |  |
| Operating temperature range | 0 to 50°C % 1 (Recommended range: ±10°C of calibration point % 2) |  |  |  |  |  |
| Operating pressure range    | 0.2 to 5 MPa [G]<br>5 to 10 MPa [G]                               |  |  |  |  |  |
| Calorimetric accuracy       | ±0.25 MJ/m <sup>3</sup> (normal)                                  |  |  |  |  |  |
| Response time               | Minimum 1 Sec.  |  |  |  |  |  |

\* 1: At low temperature, measured gas may condensate. Please take necessary measures to prevent gas condensation in the process.

- 2: "Calibration point" refers to the measuring conditions during on-site calibration, including temperature, pressure, and calorific value of the gas.
   Due to the principle of measurement, we recommend re-calibration to prevent meter error in case temperature, pressure, or gas composition fluctuates drastically from the calibration point.
  - Indicated calorific value may fluctuate due to measuring error of thermometer or pressure meter, or change in gas composition. In case the fluctuation of indicated calorific value exceeds the calorimetric accuracy, please confirm the reproducibility of the process.
  - Interfusion of inert gas (N<sub>2</sub>, CO<sub>2</sub>, etc.) may cause meter error.
  - Contact OVAL in case when using at the temperature lower than 0°C.

#### Computer Specifications

| ltem             | Description                   |  |   |  |  |  |  |  |
|------------------|-------------------------------|--|---|--|--|--|--|--|
|                  | BX-710P2-AC5411 (manufac      | tured by CONTEC)   |   |  |  |  |  |  |
|                  | CPU                           | Celeron (R) processor 1.06GHz (FSB533MHz)  |   |  |  |  |  |  |
| BOX-PC           | Main memory                   | 1GB (200 pin SO-DIMM ×1)   |   |  |  |  |  |  |
|                  | HDD                           | SATA SSD (2GB)   |   |  |  |  |  |  |
|                  | OS                            | Windows Embedded Standard 2009   |   |  |  |  |  |  |
|                  |                               | A/D converter board PCI-3178 (manufactured by Interface)   |   |  |  |  |  |  |
|                  |                               | Insulation system Channel-to-channel independent insulation input  |   |  |  |  |  |  |
|                  |                               | Input range  | 1 to 5V, 4 to 20mA ※ 1  |  |  |  |  |  |
| Input signal     | Temperature input             | Resolution   | 16bit   |  |  |  |  |  |
|                  | Pressure input                | Input impedance  | 2GΩ (TYP)   |  |  |  |  |  |
|                  |                               | Relative accuracy  | ±4LSB (at 25°C )  |  |  |  |  |  |
|                  |                               | Error (Max.)   | ±0.15% of SPAN (0 to 50°C )                                   |  |  |  |  |  |
|                  |                               | D/A converter board P0   | CI-3347 (manufactured by Interface)                           |  |  |  |  |  |
|                  |                               | Load resistance  | when current output:450Ω Max.                                 |  |  |  |  |  |
|                  |                               | Load capacity  | 450pE or less   |  |  |  |  |  |
|                  | Select 4 out of heat quantity | Insulation system  | Channel-to-channel insulation output                          |  |  |  |  |  |
| Output signal    | gravity output, temperature   |  | 4 to 20mA 1 to 5V % 1   |  |  |  |  |  |
|                  | output, and pressure output   | Besolution   | 16bit   |  |  |  |  |  |
|                  |                               | Relative accuracy  | +8LSB (Max.) (at 25°C.)                                       |  |  |  |  |  |
|                  |                               | Fror (Max.)  | $\pm 0.10\%$ of SPAN (Max.) (0 to 50°C.)                      |  |  |  |  |  |
|                  |                               | Allowable load   | $\pm 0.10\%$ of of AIV (Max.) (0.10.50 C )                    |  |  |  |  |  |
| Display mode     |                               | ACZ SUV SA DOSOV SA TOUCOUL a contact point, b contact point   |   |  |  |  |  |  |
| Display mode     | Temperature                   | 2 digits after decimal point (°C etc.)   |   |  |  |  |  |  |
|                  | Pressure                      | 2 digits after decimal point (MPa [abs] etc.)  |   |  |  |  |  |  |
|                  | Sonic speed                   | 2 digits after decimal point (m/s etc.)  |   |  |  |  |  |  |
|                  | Heat quantity                 | 2 digits after decimal point (MJ/Nm <sup>3</sup> etc.)   |   |  |  |  |  |  |
| Display items    | Flow rate                     | Nm³/h etc.   |   |  |  |  |  |  |
|                  | Specific gravity              | 4 digits after decimal p   | oint  |  |  |  |  |  |
|                  | Annunciation of abnormality   | Error Messages   |   |  |  |  |  |  |
|                  | Indicator                     | Display update, Communication, Logging   |   |  |  |  |  |  |
| Operation        | RUN MODE                      | Calorie computing disp   | lay mode (Update interval of computation and display: 1 sec.) |  |  |  |  |  |
| mode             | SET MODE                      | Parameter setting mode   |   |  |  |  |  |  |
| Data logging     |                               | Interval: 1 to 600 sec. (Number of data entries: depends on the capacity of external USB memory)                             |   |  |  |  |  |  |
| Communicatio     | on                            | RS485 (to communicate with ultrasonic flowmeter) ※ 2   |   |  |  |  |  |  |
| External input   |                               | Display unit front touch-sensitive panel (touch pen equipped),<br>USB (connectable with keyboard and/or mouse on front side) |   |  |  |  |  |  |
| External stora   | ge                            | Connectable to USB port (USB memory, etc.)   |   |  |  |  |  |  |
| Fan service life | e                             | Approx. 10 years (operating 24 hours per day)  |   |  |  |  |  |  |
| Power supply     |                               | 100 to 120VAC, 200 to 240VAC   |   |  |  |  |  |  |
| Ambient temp     | erature                       | 0 to 50°C  |   |  |  |  |  |  |
| Power consun     | nption                        | 80VA Max.  |   |  |  |  |  |  |
| Installation     |                               | Panel mount type   |   |  |  |  |  |  |
| Finish           |                               | Matte black  |   |  |  |  |  |  |
| Weight           |                               | Approx. 20kg   |   |  |  |  |  |  |
| Accessories      |                               | 1 touch pen, 1 fuse, and 4 unit fittings   |   |  |  |  |  |  |

% 1: Available by connecting a 250 $\Omega$  accurate resistance to the terminal block.

% 2: Only an ultrasonic flowmeter of OVAL product is connectable.

## **11. PRODUCT CODE**



#### Main code

| U    | (2)                       | 3 4                        | (5)    | (6)  | Model         |  |  |  |  |  |  |  |  |
|------|---------------------------|----------------------------|--------|------|---------------|--|--|--|--|--|--|--|--|
| Е    | L                         | L 4 8 0 1 Calorie computer |        |      |               |  |  |  |  |  |  |  |  |
| 1    | _                         | <u> </u>                   |        |      |               |  |  |  |  |  |  |  |  |
| (8)  | Power supply              |                            |        |      |               |  |  |  |  |  |  |  |  |
| Е    | 100VAC                    |                            |        |      |               |  |  |  |  |  |  |  |  |
| G    | 200VAC                    |                            |        |      |               |  |  |  |  |  |  |  |  |
| 9    | Inp                       | out pu                     | lse    | sigr | al            |  |  |  |  |  |  |  |  |
| Ν    | No                        | n                          |        |      |               |  |  |  |  |  |  |  |  |
| 10   | Те                        | mp. in                     | put    |      |               |  |  |  |  |  |  |  |  |
| В    | 1 t                       | o 5V                       |        |      |               |  |  |  |  |  |  |  |  |
| Е    | 4 t                       | o 20m                      | A      |      |               |  |  |  |  |  |  |  |  |
| 1    | Pr                        | essur                      | e inp  | out  |               |  |  |  |  |  |  |  |  |
| В    | 1 t                       | o 5V                       |        |      |               |  |  |  |  |  |  |  |  |
| Е    | 4 t                       | o 20m                      | A      |      |               |  |  |  |  |  |  |  |  |
| (12) | De                        | ensity                     | inpu   | ıt   |               |  |  |  |  |  |  |  |  |
| Ν    | No                        | n                          |        |      |               |  |  |  |  |  |  |  |  |
| (13) | Со                        | nnect                      | ed f   | low  | meter         |  |  |  |  |  |  |  |  |
| 1    | Ps                        | onic-1                     | (no    | ver  | sion code)    |  |  |  |  |  |  |  |  |
| Ρ    | Ps                        | onic-1                     | (Vei   | rsio | n code: A)    |  |  |  |  |  |  |  |  |
| F    | FL                        | OWSI                       | C600   | ) or | FLOWSIC600-XT |  |  |  |  |  |  |  |  |
| Ζ    | Sp                        | ecial                      |        |      |               |  |  |  |  |  |  |  |  |
| 14   | _                         |                            |        |      |               |  |  |  |  |  |  |  |  |
| (15) | 16                        | Outp                       | ut it  | em   | 1             |  |  |  |  |  |  |  |  |
| An   | alo                       | g out                      | out 1  | l as | signment      |  |  |  |  |  |  |  |  |
| Н    | Ν                         | Calor                      | ie     |      |               |  |  |  |  |  |  |  |  |
| V    | Ν                         | Flow                       |        |      |               |  |  |  |  |  |  |  |  |
| Т    | Ν                         | Temp                       | erat   | ure  |               |  |  |  |  |  |  |  |  |
| Ρ    | Ν                         | Press                      | ure    |      |               |  |  |  |  |  |  |  |  |
| Q    | Ν                         | Spec                       | ific g | jrav | ity           |  |  |  |  |  |  |  |  |
| Ζ    | Ζ                         | Spec                       | ial    |      |               |  |  |  |  |  |  |  |  |
| 17   | Alv                       | ways N                     | 1      |      |               |  |  |  |  |  |  |  |  |
| Ν    | Alv                       | ways N                     | 1      |      |               |  |  |  |  |  |  |  |  |
| 18   | (19) Output item 2        |                            |        |      |               |  |  |  |  |  |  |  |  |
| An   | nalog output 2 assignment |                            |        |      |               |  |  |  |  |  |  |  |  |
| Н    | Ν                         | Calor                      | ie     |      |               |  |  |  |  |  |  |  |  |
| ۷    | Ν                         | Flow                       |        |      |               |  |  |  |  |  |  |  |  |
| Т    | Ν                         | Temp                       | erat   | ure  |               |  |  |  |  |  |  |  |  |
| Ρ    | Ν                         | Press                      | ure    |      |               |  |  |  |  |  |  |  |  |
| Q    | Ν                         | Spec                       | ific g | jrav | ity           |  |  |  |  |  |  |  |  |
| Ζ    | Z Special                 |                            |        |      |               |  |  |  |  |  |  |  |  |

| 20  | Always N  |                       |  |  |  |  |  |  |  |  |
|-----|---|-----------------------|--|--|--|--|--|--|--|--|
| Ν   | Always N  |                       |  |  |  |  |  |  |  |  |
| 21  | 2 Output item 3                                   |                       |  |  |  |  |  |  |  |  |
| An  | nalog output 3 assignment                         |                       |  |  |  |  |  |  |  |  |
| Н   | N Calorie   |                       |  |  |  |  |  |  |  |  |
| ۷   | Ν   | Flow                  |  |  |  |  |  |  |  |  |
| Т   | Ν   | Temperature           |  |  |  |  |  |  |  |  |
| Ρ   | Ν   | Pressure              |  |  |  |  |  |  |  |  |
| Q   | Ν   | Specific gravity      |  |  |  |  |  |  |  |  |
| Ζ   | Ζ   | Special               |  |  |  |  |  |  |  |  |
| 23  | Alv   | ways N                |  |  |  |  |  |  |  |  |
| Ν   | Al  | vays N                |  |  |  |  |  |  |  |  |
| 24  | Οι  | tput item 4           |  |  |  |  |  |  |  |  |
| An  | alo   | g output 4 assignment |  |  |  |  |  |  |  |  |
| Н   | Ca  | lorie                 |  |  |  |  |  |  |  |  |
| ۷   | Flo   | W                     |  |  |  |  |  |  |  |  |
| Т   | Te  | mperature             |  |  |  |  |  |  |  |  |
| Ρ   | Pr  | essure                |  |  |  |  |  |  |  |  |
| Q   | Sp  | ecific gravity        |  |  |  |  |  |  |  |  |
| Ζ   | Sp  | ecial                 |  |  |  |  |  |  |  |  |
| 25  | An  | alog output hard      |  |  |  |  |  |  |  |  |
| 2   | 1 to 5V   |                       |  |  |  |  |  |  |  |  |
| 5   | 4 to 20mA   |                       |  |  |  |  |  |  |  |  |
| Ζ   | Special   |                       |  |  |  |  |  |  |  |  |
| 26  | Communication function                            |                       |  |  |  |  |  |  |  |  |
| R   | RS-485 (to communicate with ultrasonic flowmeter) |                       |  |  |  |  |  |  |  |  |
| 27) | Version code                                      |                       |  |  |  |  |  |  |  |  |
| А   | Version code: A                                   |                       |  |  |  |  |  |  |  |  |
| 28  |   |                       |  |  |  |  |  |  |  |  |
| 29  | Ch  | aracteristic          |  |  |  |  |  |  |  |  |
| 0   | Standard  |                       |  |  |  |  |  |  |  |  |
| Ζ   | Sp  | ecial                 |  |  |  |  |  |  |  |  |

#### Additional code

Desument

|   | Ju   | mei |  |  |  |  |  |  |  |  |  |
|---|------|-----|--|--|--|--|--|--|--|--|--|
| D | S    | J   | SPEC. & DWG (Approval Drawing) (Japanese)                                      |  |  |  |  |  |  |  |  |
| D | S    | Е   | SPEC. & DWG (Approval Drawing) (English)                                       |  |  |  |  |  |  |  |  |
| D | R    | 0   | Re-submission of SPEC. & DWG   |  |  |  |  |  |  |  |  |
| D | С    | J   | Final DWG (Japanese)   |  |  |  |  |  |  |  |  |
| D | С    | Е   | Final DWG (English)  |  |  |  |  |  |  |  |  |
| D | W    | J   | Wiring diagram (Japanese)  |  |  |  |  |  |  |  |  |
| D | W    | Е   | Wiring diagram (English)   |  |  |  |  |  |  |  |  |
| S | D    | J   | Inspection report of electronics (Japanese)                                    |  |  |  |  |  |  |  |  |
| S | D    | Е   | Inspection report of electronics (English)                                     |  |  |  |  |  |  |  |  |
| D | А    | 1   | Compression coefficient calculation process JIS M8010-1993 (Japanese)          |  |  |  |  |  |  |  |  |
| D | А    | 2   | Compression coefficient calculation process JIS M8010-2020 (English)           |  |  |  |  |  |  |  |  |
| D | Т    | J   | Inspection procedure (Japanese)  |  |  |  |  |  |  |  |  |
| D | Т    | Е   | Inspection procedure (English)   |  |  |  |  |  |  |  |  |
| С | В    | J   | Traceability certificate: B set Only available in Japanese                     |  |  |  |  |  |  |  |  |
| W | itne | ss  | by customer  |  |  |  |  |  |  |  |  |
| V | 1    | 1   | Appearance, dimensions, quantity check   |  |  |  |  |  |  |  |  |
| V | 1    | 4   | Appearance, dimensions, quantity check/performance (output confirmation, etc.) |  |  |  |  |  |  |  |  |

## **《PRODUCT CODE EXPLANATION OF THE OLD PRODUCT CODE》**

The new product code has been implemented since April 2017.

Therefore, the product code explanation of the old product code will not be updated after April 2017.

Contact OVAL if you wish to order with the old product code for reasons such as type approval.

| Model                 |    | C   | Cod | eΝ | lo.   |   |   | S | uppl | eme | entar          | у Со | de                     | Description  |                                      |  |  |  |  |  |
|-----------------------|----|-----|-----|----|-------|---|---|---|------|-----|----------------|------|------------------------|--|--------------------------------------|--|--|--|--|--|
| Woder                 | 1  | 2   | 3   | 4  | ) (5) | 6 | - |   | 8    | 9   | ) 10           | 1    | 12                     |  |                                      | Description                                |  |  |  |  |
| Model                 | E  | L   | 4   | 8  | 0     | 1 |   |   |      |     |                |      |                        | Calorie Computer                                       |                                      |  |  |  |  |  |
|                       |    |     |     |    |       |   |   |   |      |     | 100VAC 50/60Hz |      |                        |  |                                      |  |  |  |  |  |
| Power S               | up | ріу |     |    |       |   |   | 2 |      |     |                |      |                        | 200VAC 50/60Hz   |                                      | Power consumption. 80VA Max.               |  |  |  |  |
| Innut                 |    |     |     |    |       |   |   |   | 1    |     |                |      |                        | 1 to 5VDC (Ten   | 1 to 5VDC (Temperature and pressure) |  |  |  |  |  |
| Input                 |    |     |     |    |       |   |   |   | 2    |     |                |      |                        | 4 to 20mADC (Temperature and pressure)                 |                                      |  |  |  |  |  |
| Output                |    |     |     |    |       |   |   |   |      | 1   |                |      |                        | 1 to 5VDC  | Selec                                | Select 4 outputs from heat quantity, flow, |  |  |  |  |
|                       |    |     |     |    |       |   |   |   |      | 2   |                |      |                        | 4 to 20mADC specific gravity, temperature, and pressur |                                      |  |  |  |  |  |
|                       |    |     |     |    |       |   |   |   |      |     | 1              |      |                        | FLOWSIC600 or FLOWSIC600-XT                            |                                      |  |  |  |  |  |
|                       |    | fla |     |    |       |   |   |   |      |     | 2              |      |                        | Psonic-1 (Version "none")                              |                                      |  |  |  |  |  |
| Connected flowmeter 3 |    |     |     |    |       |   |   |   |      | 3   |                |      | Psonic-1 (Version "A") |  |                                      |  |  |  |  |  |
| 9                     |    |     |     |    |       |   |   |   |      |     | 9              |      |                        | Special  |                                      |  |  |  |  |  |
| Communication 1       |    |     |     |    |       |   |   |   |      |     |                | 1    |                        | RS485 (to communicate with ultrasonic flowmeter)       |                                      |  |  |  |  |  |
| Finish 1              |    |     |     |    |       |   |   |   |      |     |                |      | 1                      | Matte black  |                                      |  |  |  |  |  |

All specifications are subject to change without notice for improvement.



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