Instruction Manual

FLOWMETER
PC LOADER SOFTWARE
INSTRUCTION MANUAL

TYPE: FSC

INF-TN5A3267a-E Fuji Electric Co., Ltd.

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Thank you very much for purchasing our PC Loader Software.Read this instruction manual carefully before using this personal computer communication software.

(*) Caution: This manual is subject to change without prior notice.

1. OUTLINE

1.1. Copyright of this software

- The copyright of this software belongs to Fuji Electric Co., Ltd.No part of this software may be reproduced or transmitted in any form.

1.2. General

- By using this software, you can configure the flowmeter setting, acquire the measurement data, and view the data in graphical display on your PC.
- This software is dedicated to FSC-3 and FSC-4 (the 8th digit of the code symbol is "3" or "4"). For FSC-1 and FSC-2, use the software provided with them.

1.3. System requirements

1.3.1. PC

IBM PC compatible computer
CPU: Pentium IV 1 GHz, Celeron 1 GHz, or later
Display resolution: 1024 × 768
CD-ROM drive
.NET framework 3.5 or .NET framework 4.0/4.5/4.6
*Use of small font is recommended.

1.3.2. Memory capacity

- 128 MB or more (256 MB or more recommended) [52 MB memory or more for free space required]

1.3.3. Interface

USB 2.0 port × 1

1.3.4. OS

The operating systems on which we have tested this software are: Microsoft Windows 7/8.1/10

1.4. Scope of delivery

CD-ROM: 1
- Setup disk: Installing software to PC
- Instruction manual

2. INSTALLATION

Insert the setup disc to the drive.
In CD-ROM folder, double-click index.htm, and then click the Installer button.
Read through "read_before_using".

2.1. Installing the USBXpress Device Driver

① Insert the setup disc to the drive, and double-click **USBXpressInstaller_x64** or **USBXpressInstaller_x86** in the USBXpress folder.

【64-bit Windows】

Double-click **USBXpressInstaller_x64**.

【32-bit Windows】

Double-click **USBXpressInstaller_x86**.

You can check the operating system version of your PC from *Control Panel* > *System.*

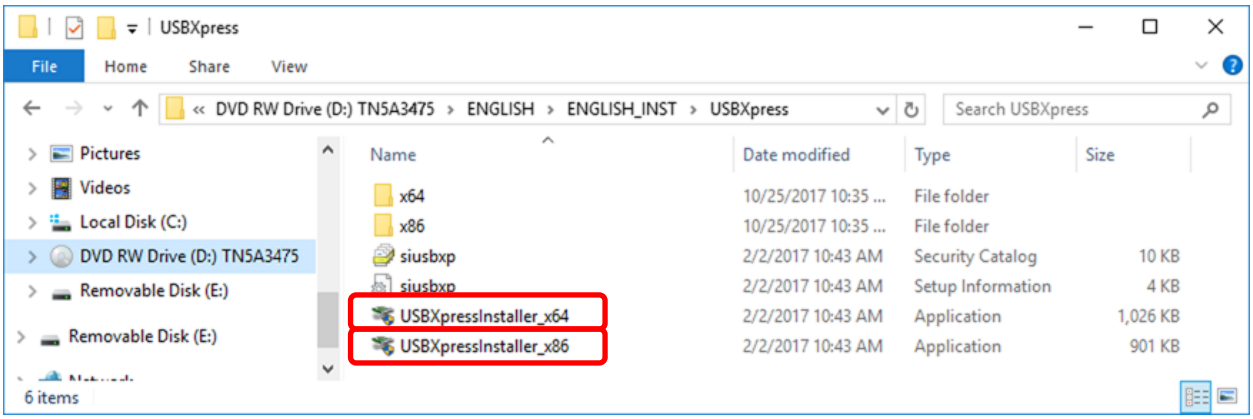


Fig. 2-1 Installer

② If the **User Account Control** appears, click **Yes** to enable the installation.

③ Installation Wizard appears. Click **Next**. If you want to stop installation, click **Cancel**.

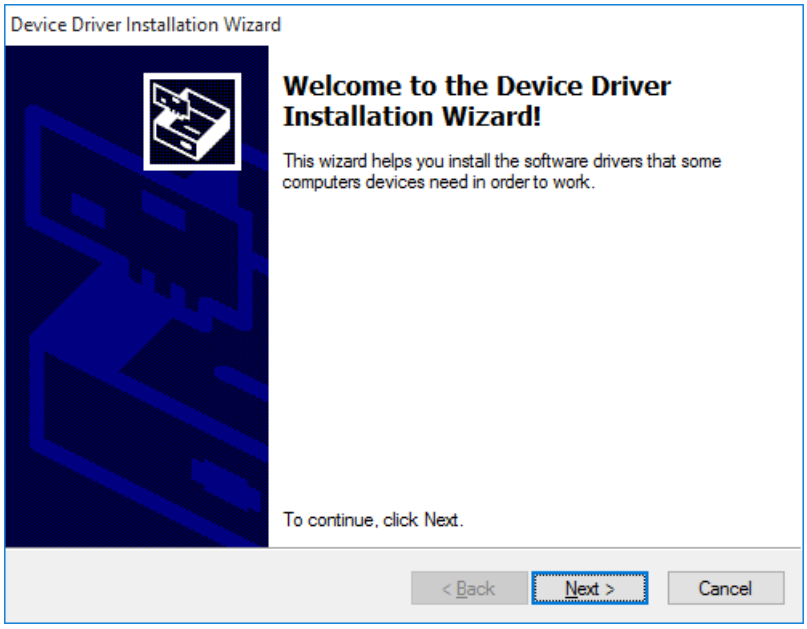


Fig. 2-2 Installation Wizard

④ Wait until the device driver installation is complete.

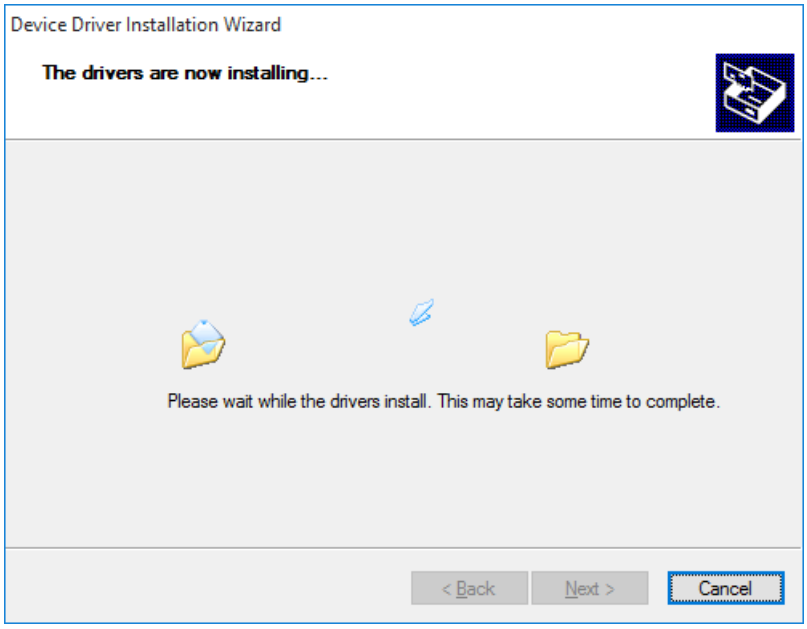


Fig. 2-3 Installing the USBXpress device driver

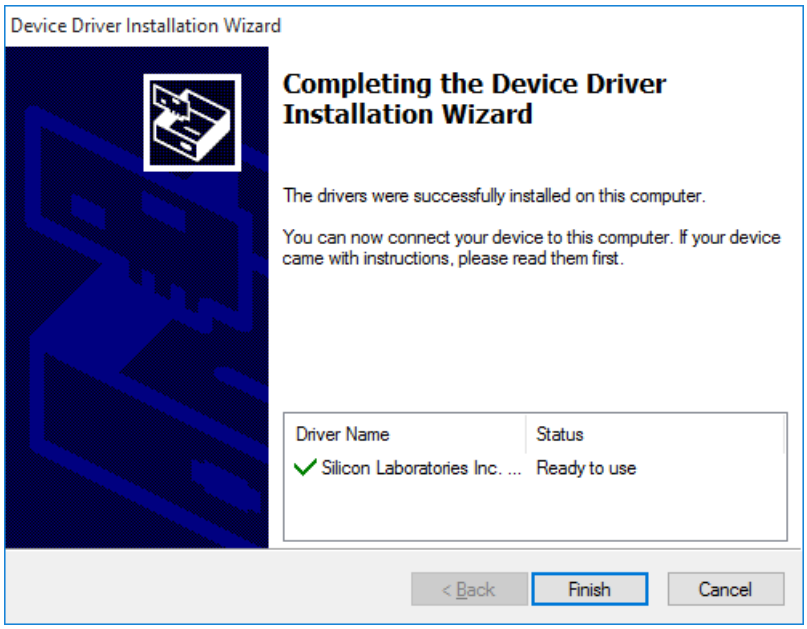


Fig. 2-4 Installation complete

2.2. USBXpress Device Recognition

① After you successfully install the driver, connect the portable ultrasonic flowmeter to your PC with a USB cable. The computer runs hardware detection and detects the USBXpress device.

② Access **Control Panel** > **Device Manager > Universal Serial Bus Controllers** to check if the USBXpress device is recognized.

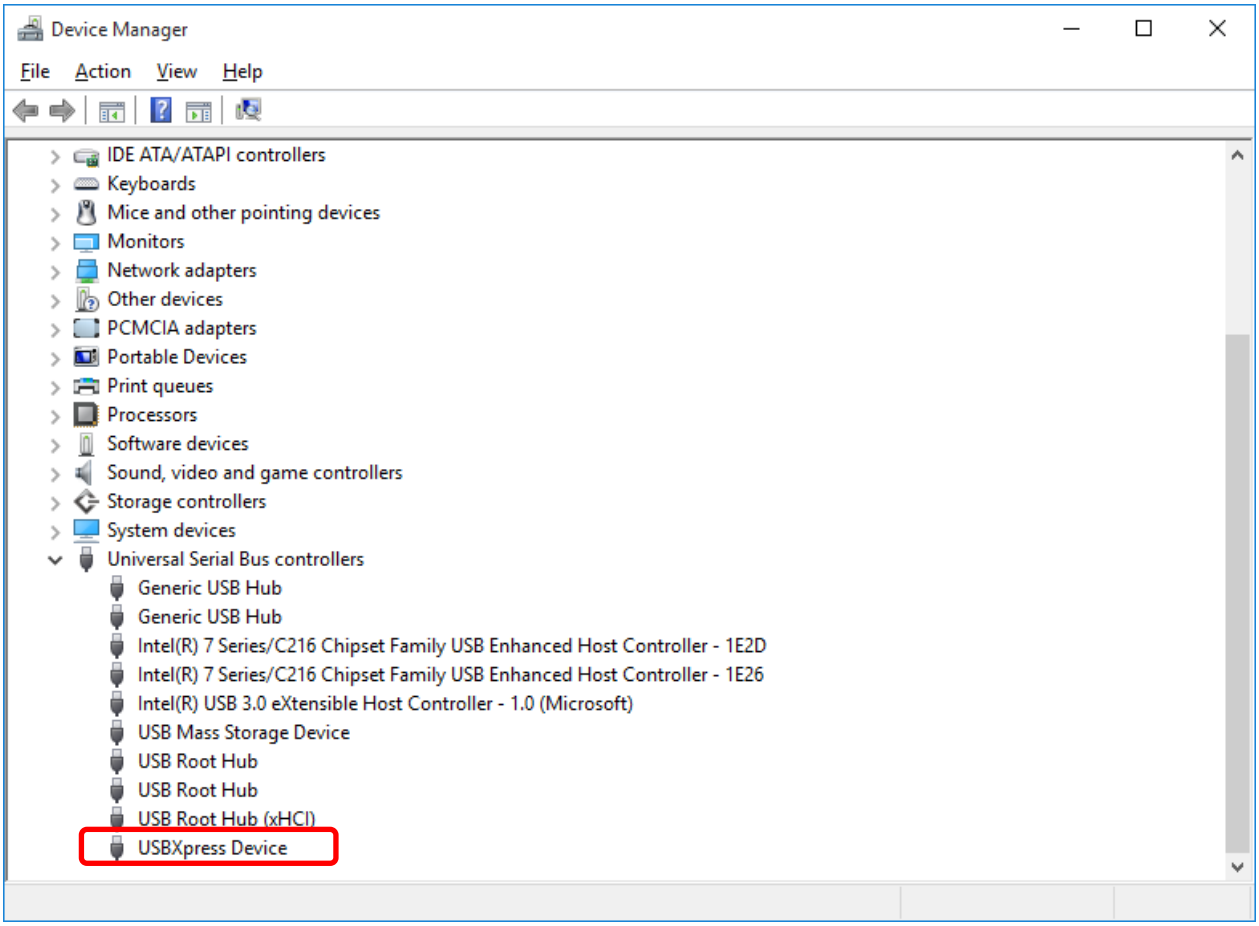


Fig. 2-5 Device Manager

2.3. Installing the Parameter Loader Software

① Insert the setup disc to the drive, and double-click **PFC_Setup_ENG.msi**.

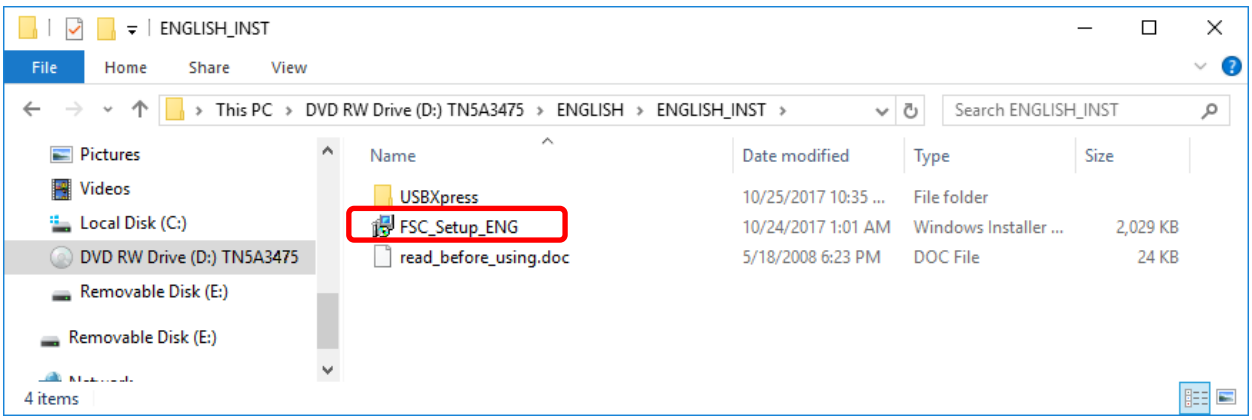


Fig. 2-6 Installer

② Setup wizard starts. Click **Next**. If you want to stop installation, click **Cancel**.

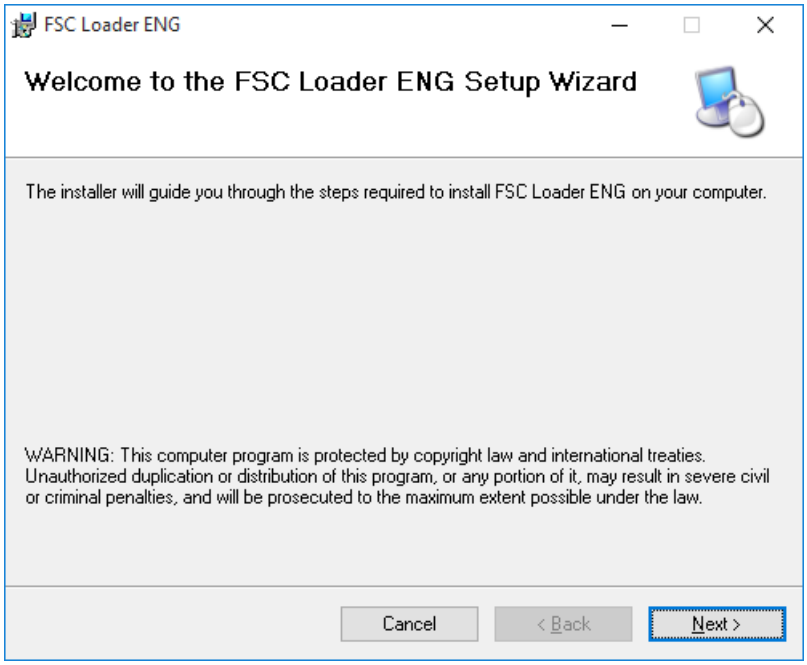


Fig. 2-7 Setup Wizard

③ "Select Installation Folder" dialog box appears. If you install the software into the default installation folder, click **Next**. If you want to stop installation, click **Cancel**. Do not use the **Back**, **Browse**, and **Disk Cost** buttons.

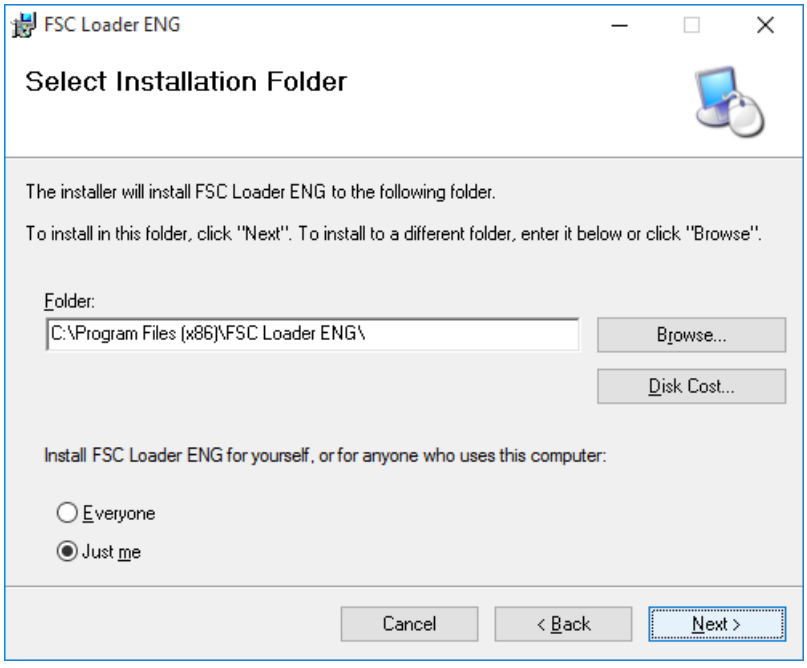


Fig. 2-8 Select Installation Folder dialog box

④ “Confirm Installation” dialog box appears. Click **Next** to start installation. If you want to stop installation, click **Cancel**. Do not use the **Back** button.

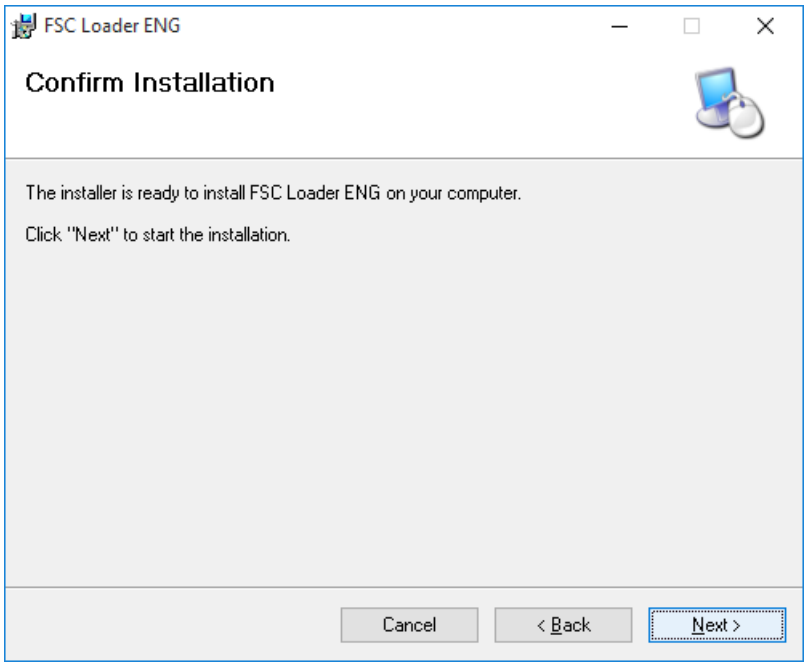


Fig. 2-9　Confirm Installation

⑤ If the **User Account Control** appears, click **Yes** to enable the installation.

⑥ Installation starts. If you want to stop installation, click **Cancel**.

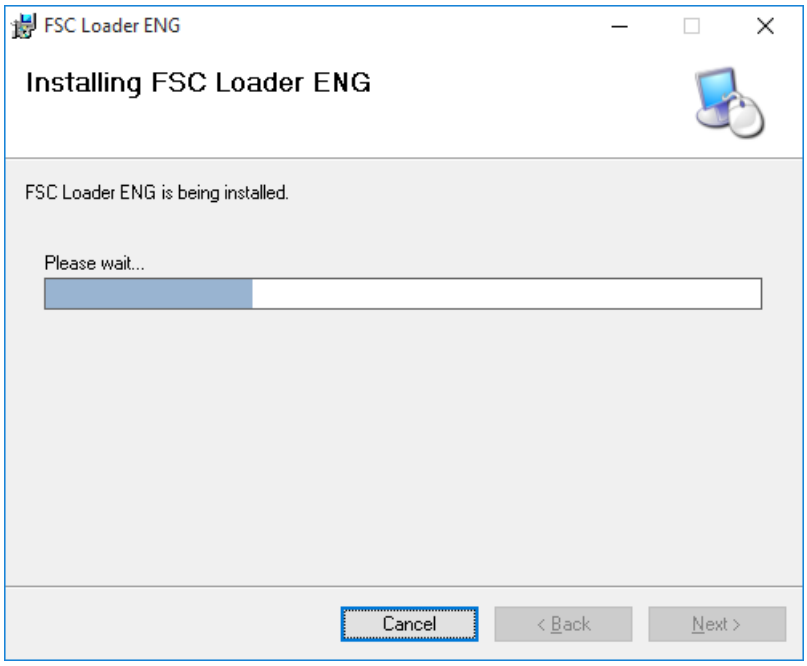


Fig. 2-10　stalling

⑦ “Installation Complete” dialog box appears. Click **Close** to exit.

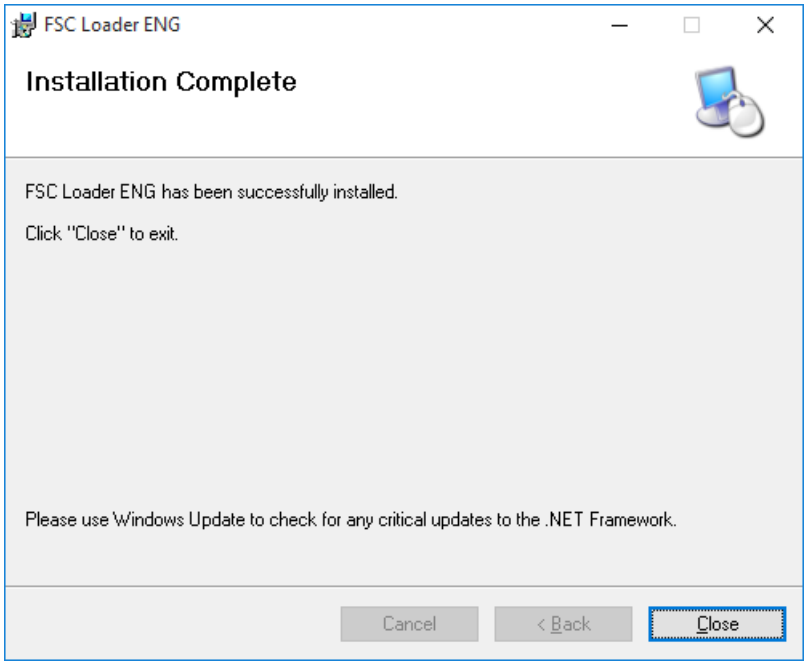


Fig. 2-11　stallation Complete dialog box

⑧ When the installation is successfully complete, the shortcut “FSC Loader ENG” is added to the start menu and the desktop.

3. COMMUNICATION SPECIFICATION

See the following table for communication specifications.

(1) Genearal specification

Table 3-1 Communication specifications

Item	Specifications
Standard (Electrical specification)	USB communication
Transmission system	Half-duplex
Synchronizing method	Start-stop synchronous transmission
Transmission rate	500kBPS
Parity	Odd-parity
Start/Stop bit	1 bit
Data length	8 bits
Station	0 fixed
Number of units connected	Max. 1
Transmission code	HEX value (MODBUS RTU mode)
Error detection	CRC-16
Echo back	None
Flow control	Xon/of

(2) Interface specification
Electrical specification: Confirms to USB standard. USB 2.0
Cable length: 3m or less
Conforming cable: Mini USB cable
Connection scheme: 1:1 connection.

4. STARTUP METHOD

Select “FSC Loader ENG” from the Start menu and the following Menu screen appears.

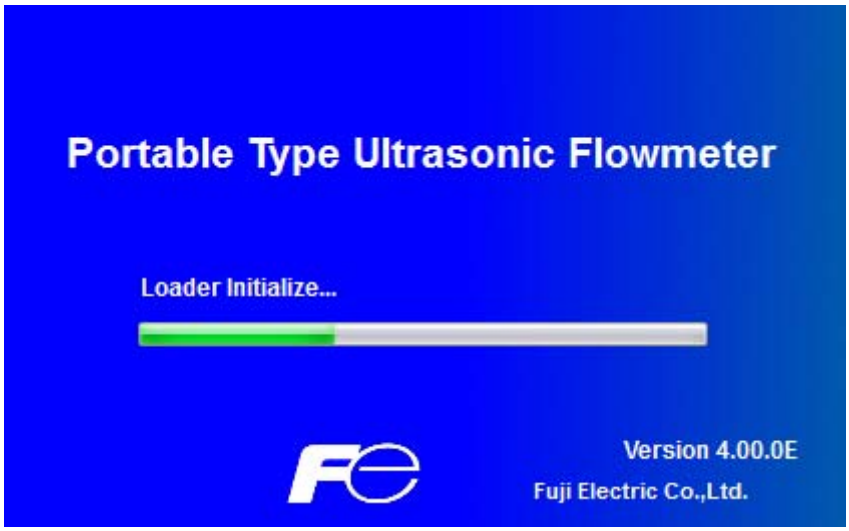


Fig. 4-1 Startup screen

- The Menu Window (Fig. 4-2).
  At this time, read the ini file, perform communication with the flowmeter, and the unit information is acquired.
- If error occurs during communications, a pop-up message "Check the connection" is displayed. Check the connection using the wired device.

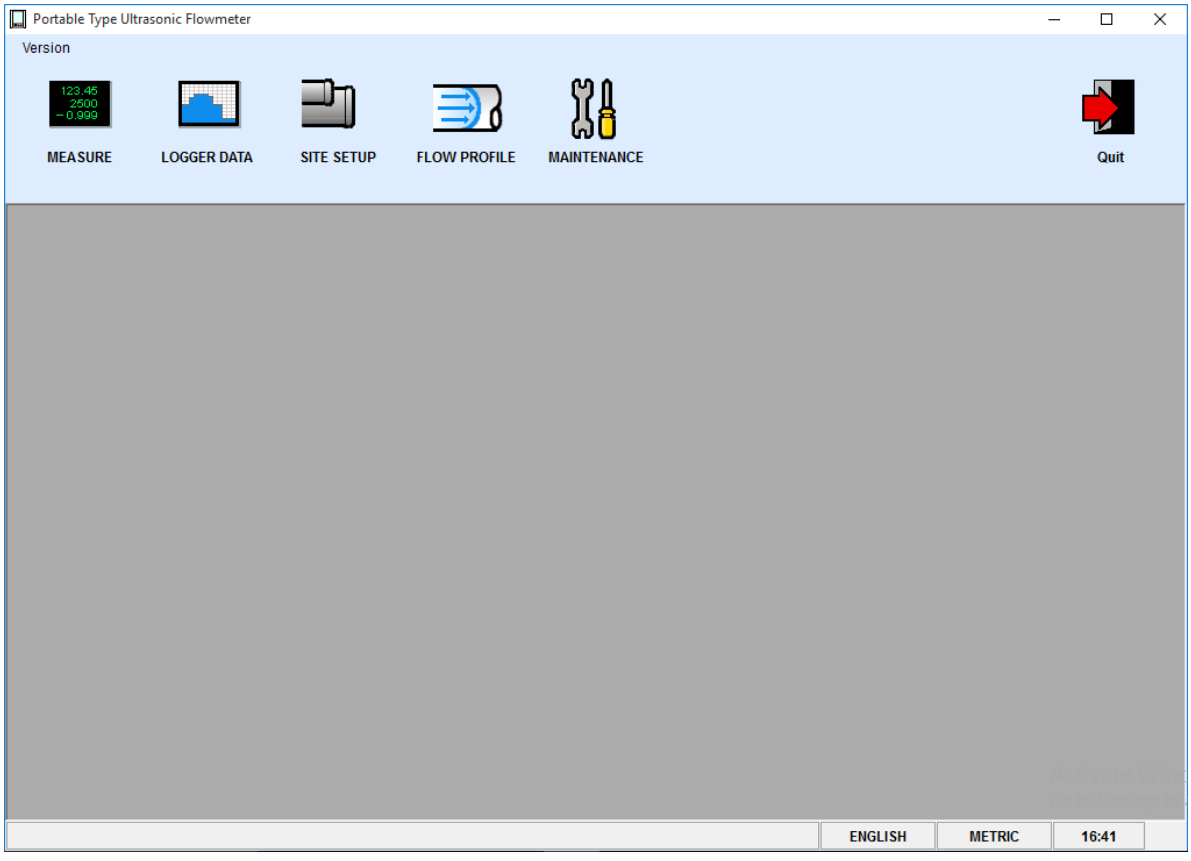


Fig. 4-2 Menu screen

- Click the Main menu and each function button to execute a desired function

4.1. Version

On the Menu screen, click “Version” of the main menu item, and the following screen appears.

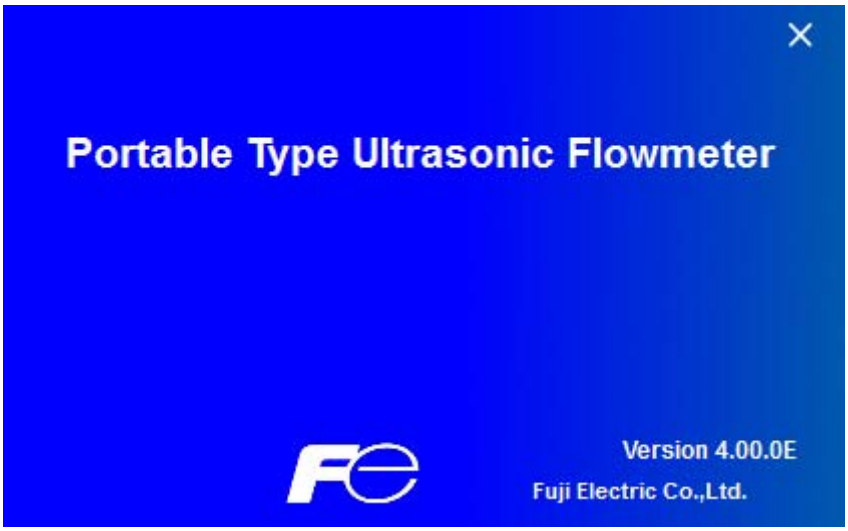


Fig. 4-3 Version screen

- Click the [X] button on the upper right to close the screen.

5. SETTING SCREEN

Set the check box of each setting item to ON “☑” so that the item can be input or selected. When it is set to OFF “☐” , the item cannot be input or selected. Click the [Set up] and send the setting value of the item (check box set to ON “☑”) one by one, and reflect the response value to the setting value. Click the [load] and read the setting value of the item (check box set to ON “☑”), and reflect the response value to the setting value. Click the [Save] and write the current setting value into Flash ROM. If you change your setting, this operation above must be required.

When the unit in the system setting is changed, it reflects the corresponding item. Be sure to reflect the setting value or the range unit after reading is completed. (The flowmeter returns values in a unit specified.) The values are displayed in a set unit. (Read or change the unit when the flowmeter is started. You cannot change the unit by key operation at the loader.)

In the case of the unit whose input range is limited, the input value is not checked by the loader and sent as it is. The range is checked on the flowmeter side. If the range is exceeded, the flowmeter does not update the request and respond the current value.

⚠ CAUTION

- For changing Flow meter setting, make sure to switch from flow meter screen to measurement screen.
  If the setting change is operated except measurement screen, communication error will occur

6. MEASUREMENT

Click the “MEASURE” button on the Menu screen, and the following screen appears.

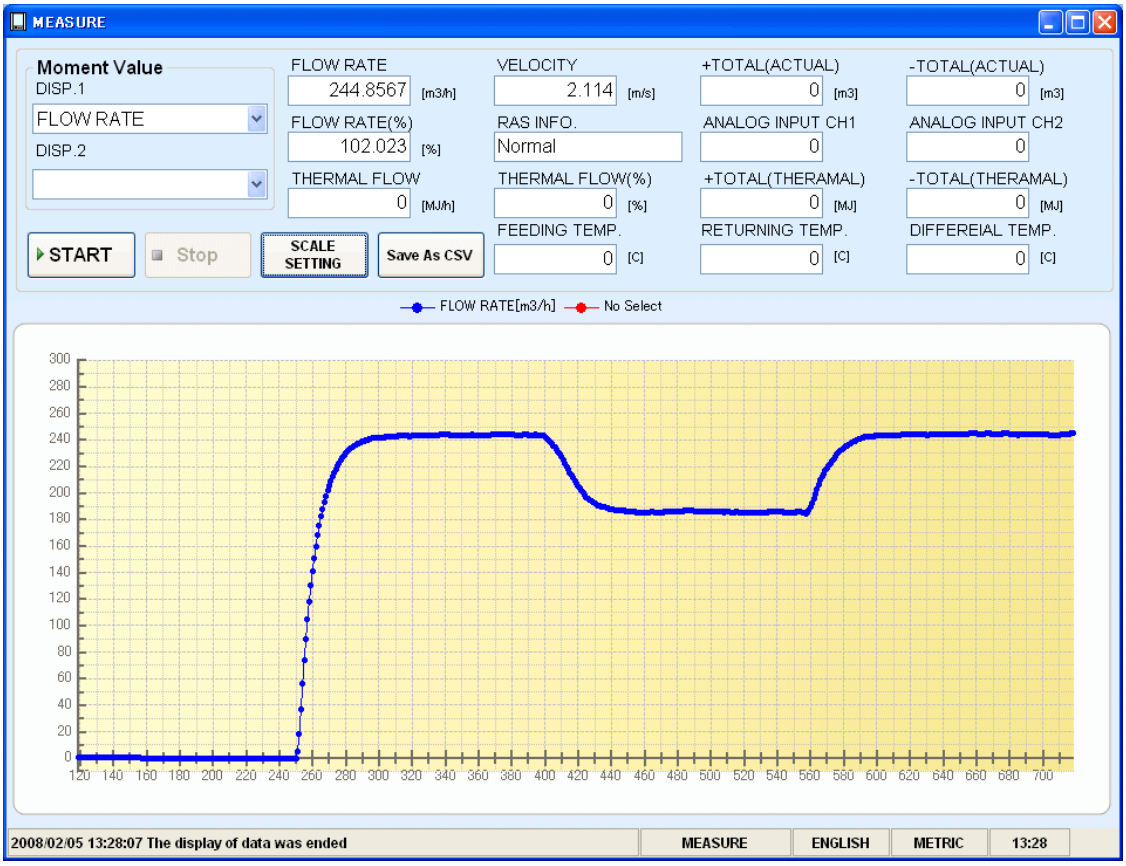


Fig. 6-1 MEASURE screen

- First, select instantaneous trend value from [FLOW RATE], [FLOW RATE%], [VELOCITY], [THERMAL FLOW], [THERMAL FLOW%], [ANALOG INPUT1], [ANALOG INPUT2], [FEEDING TEMP], [RETURNING TEMP] and [DIFFEREIAL TEMP].
- Up to 2 instantaneous values can be selected.

- Click the [SCALE SETTING] button to set [Max.] and [Min.] of Y scale and [Cycle] and [Point] of X scale. Press the [Setting] button to reflect the setting.Press the [Cancel] button to cancel the setting. When setting is not made, the initial value is reflected.

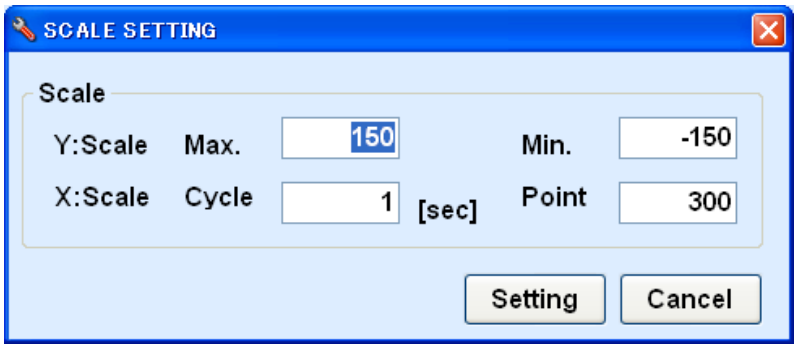
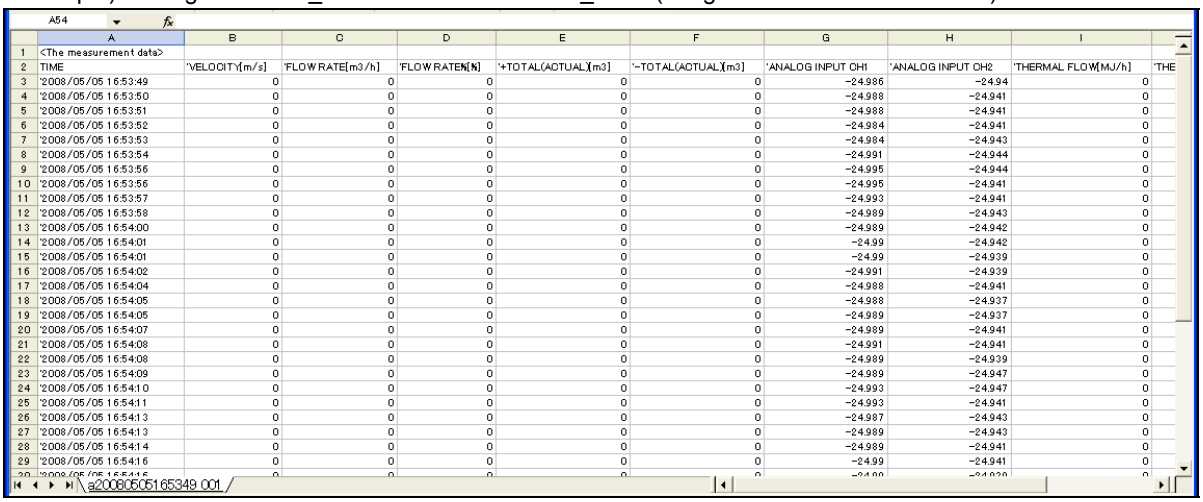


Fig. 6-2 Scale setting screen

- Click the [Save as CSV] button and you are prompted to enter the name of a file to which the data is to be saved. Specify the destination to save and enter the file name, and a CSV file is created. When the save file is set, the [START] button can be pressed.If number of data exceeds 65531, create a separate file to save the data.Note that the number of files to be created (serial number) is up to 500.

Example) Setting file name _ YYYYMMDDHHMMSS _ XXX (3-digit serial number. 1 START)



	A	B	C	D	E	F	G	H	I
1	<The measurement data>								
2	TIME	'VELOCITY[m/s]	'FLOW RATE[m3/h]	'FLOW RATE%[%]	'+TOTAL(ACTUAL)[m3]	'–TOTAL(ACTUAL)[m3]	'ANALOG INPUT CH1	'ANALOG INPUT CH2	'THERMAL FLOW[MJ/h]
3	'2008/05/05 16:53:49	0	0	0	0	0	-24.986	-24.94	0
4	'2008/05/05 16:53:50	0	0	0	0	0	-24.988	-24.941	0
5	'2008/05/05 16:53:51	0	0	0	0	0	-24.988	-24.941	0
6	'2008/05/05 16:53:52	0	0	0	0	0	-24.984	-24.941	0
7	'2008/05/05 16:53:53	0	0	0	0	0	-24.984	-24.943	0
8	'2008/05/05 16:53:54	0	0	0	0	0	-24.991	-24.944	0
9	'2008/05/05 16:53:55	0	0	0	0	0	-24.995	-24.944	0
10	'2008/05/05 16:53:56	0	0	0	0	0	-24.995	-24.941	0
11	'2008/05/05 16:53:57	0	0	0	0	0	-24.993	-24.941	0
12	'2008/05/05 16:53:58	0	0	0	0	0	-24.989	-24.943	0
13	'2008/05/05 16:54:00	0	0	0	0	0	-24.989	-24.942	0
14	'2008/05/05 16:54:01	0	0	0	0	0	-24.99	-24.942	0
15	'2008/05/05 16:54:01	0	0	0	0	0	-24.99	-24.939	0
16	'2008/05/05 16:54:02	0	0	0	0	0	-24.991	-24.939	0
17	'2008/05/05 16:54:04	0	0	0	0	0	-24.988	-24.941	0
18	'2008/05/05 16:54:05	0	0	0	0	0	-24.988	-24.937	0
19	'2008/05/05 16:54:05	0	0	0	0	0	-24.989	-24.937	0
20	'2008/05/05 16:54:07	0	0	0	0	0	-24.989	-24.941	0
21	'2008/05/05 16:54:08	0	0	0	0	0	-24.991	-24.941	0
22	'2008/05/05 16:54:08	0	0	0	0	0	-24.989	-24.939	0
23	'2008/05/05 16:54:09	0	0	0	0	0	-24.989	-24.947	0
24	'2008/05/05 16:54:10	0	0	0	0	0	-24.993	-24.947	0
25	'2008/05/05 16:54:11	0	0	0	0	0	-24.993	-24.941	0
26	'2008/05/05 16:54:13	0	0	0	0	0	-24.987	-24.943	0
27	'2008/05/05 16:54:13	0	0	0	0	0	-24.989	-24.943	0
28	'2008/05/05 16:54:14	0	0	0	0	0	-24.989	-24.941	0
29	'2008/05/05 16:54:16	0	0	0	0	0	-24.99	-24.941	0

a20080505165349 001

- Click the [START] button, and the trend is displayed (X-axis is a collection time. When the specified number of items is stored, the oldest data is deleted and the time display is changed so that the latest value is displayed.), the data is read in the specified cycle, and the following are updated: [FLOW RATE], [FLOW RATE%], [VELOCITY], [THERMAL FLOW], [THERMAL FLOW%], [ANALOG INPUT1], [ANALOG INPUT2], [FEEDING TEMP], [RETURNING TEMP], [DIFFERELAL TEMP], [+TOTAL(ACTUAL)], [–TOTAL(ACTUAL)], [+TOTAL(THERMAL)], [–TOTAL(THERMAL)], [RAS INFO.].The line of graph in the display 1 is blue and that in the display 2 is red. For stop collecting, click [Stop].

7. LOGGER DATA

Click the “Logger data” button on the Menu screen, and the following screen appears.

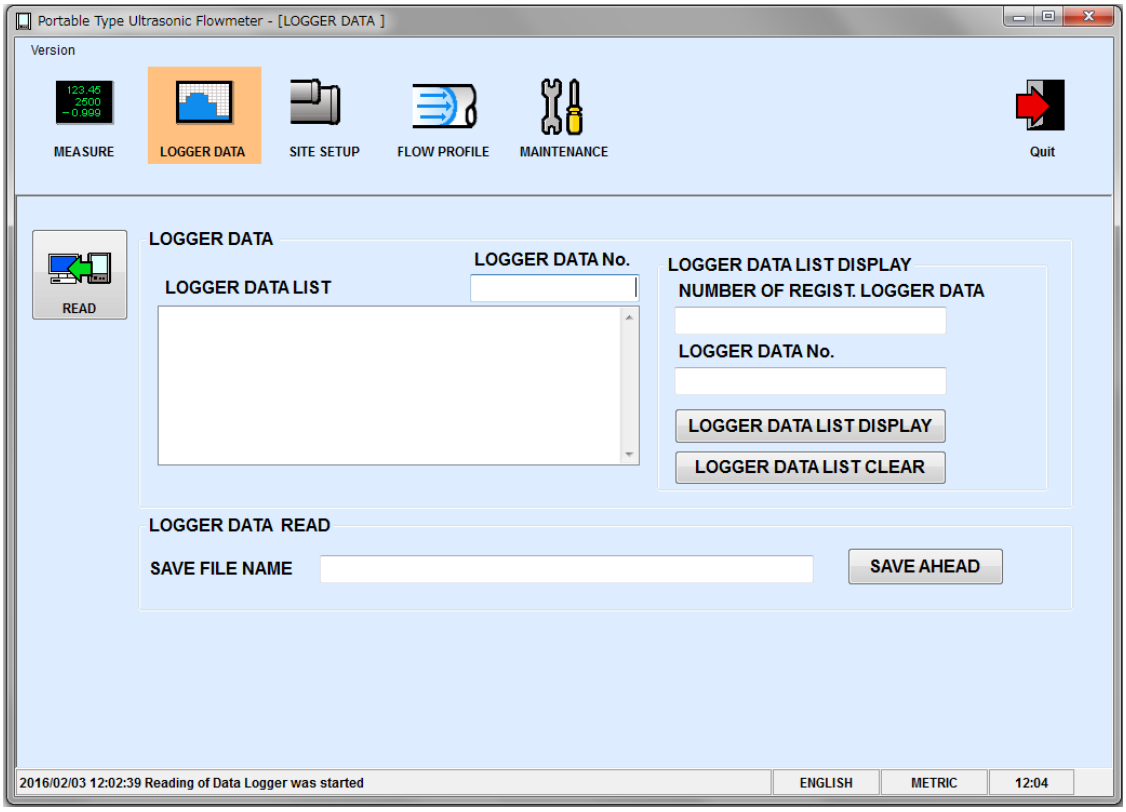


Fig. 7-1 LOGGER DATE screen

Table 7－1 LOGGER DATE screen specifications

Item	Contents
LOGGER DATA LIST	Name list of the logger data numbers from 0 to 100. You cannot select multiple data. To select a logger data in the list to be read, check the check box of the logger data.
LOGGER DATA No.	Displays the logger data number selected in the list.
NUMBER OF REGIST. LOGGER DATA	Displays total number of logger data files registered.
LOGGER DATA No. Setting	To display a [LOGGER DATE LIST] of an arbitrary first and subsequent data, manually input the first logger data number.
LOGGER DATA LIST DISPLAY	Redisplays the logger data list from the [LOGGER DATE No] (setting).
LOGGER DATA LIST CLEAR	Deletes the logger data list.
SAVE AHEAD	Specify the storage area for logger data during read operation. If specified, press the [READ] button to save the file.
SAVE FILES NAME	Full pathname including a name of a destination file to save data that is specified in the “Select a destination to save the data” is displayed. You cannot directly edit this item. The extension of save files is in CSV format.

CAUTION

- The time of reading logger data to PC will take about 25 min. in case of 1.6MB.
  The reading will take time for a while; regularly reading SD memory card directly via a PC is recommended.

8. SITE SETTING

Click the “SITE SETUP” button on the Menu screen, and the following screen appears.

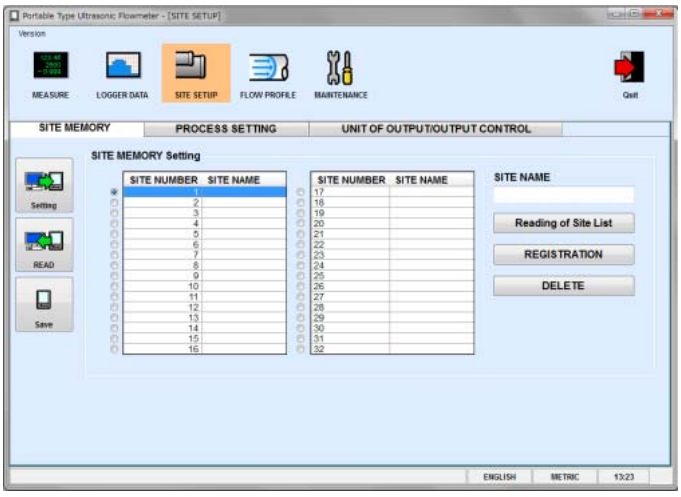


Fig. 8-1 SITE MEMORYscreen

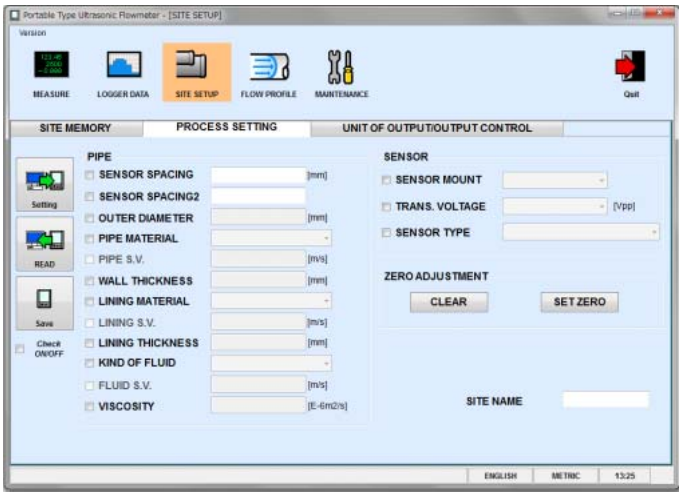


Fig. 8-2 PROCESS SETTING screen

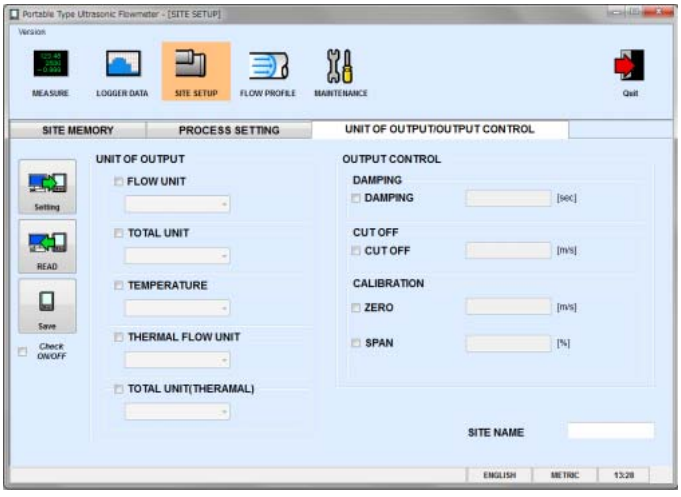


Fig. 8-3 UNIT OF OUTPUT/OUTPUT CONTROL

8.1. Site Memory

Select Tab Page 1 on the SITE SETUP screen and the following screen appears.

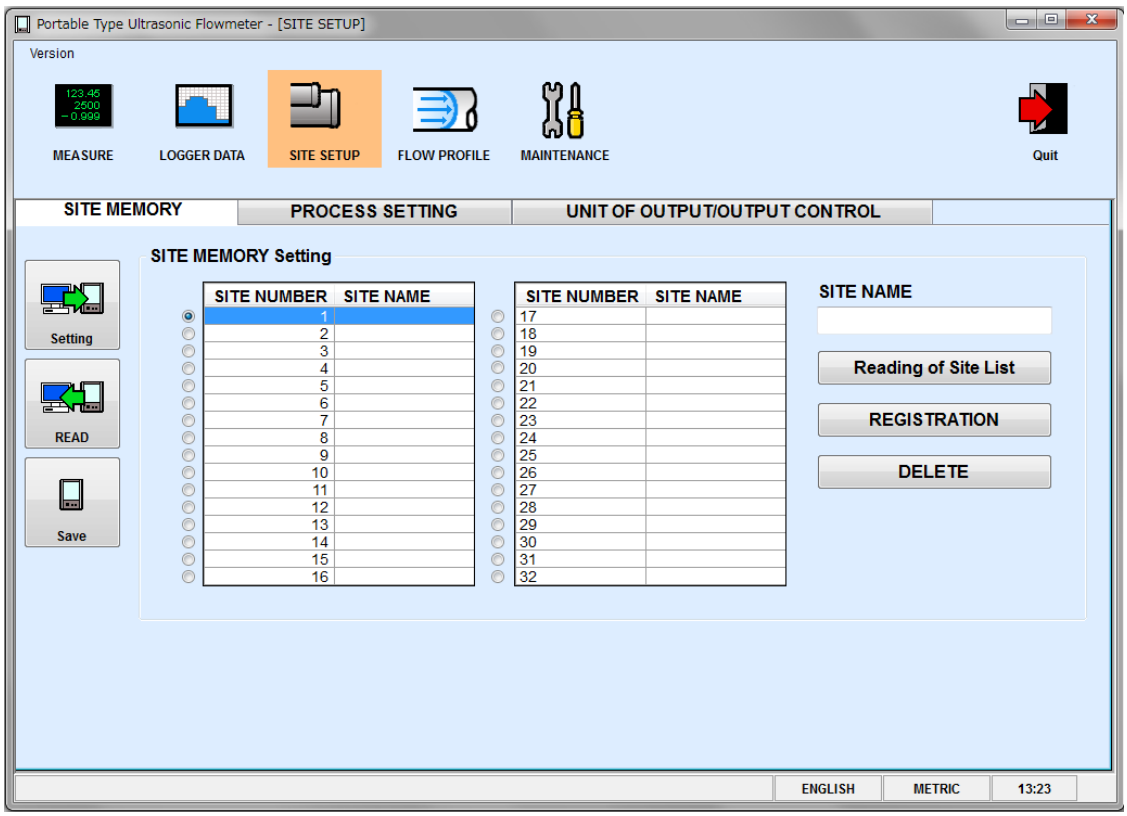


Fig. 8-4 SITE MEMORY screen

Table 8－1

Item	Contents
SITE MEMORY setting	Name list for site memory number 1 to 32.The number of lists to be displayed is fixed to 32 and multiple selections are not allowed. Check the site number 1 in case of initial display.
SITE NAME	Displays the name of site memory selected in the list.
Reading of Site List	Pressed when the site memory list is being acquired. Acquire the name list for site memory number 1 to 32 to be displayed in the site memory setting.
REGISTRATION	Registers the site memory as a new entry. On the site memory setting list, select the site number that has not been registered in the site memory, and press it after entering the site name.
DELETE	Deletes the site memory. On the site memory setting list, select the site number registered in the site memory, and press it.

- Press the [Setting] button, and set all the tab pages of the site setting only on this screen. The setting is performed only for checked setting items in the [PROCESS SETTING] and [UNIT OF OUTPUT/OUTPUT CONTROL] pages.
- Press the [READ] button, and set all the tab pages of the site setting only on this screen. The setting is performed only for checked setting items in the [PROCESS SETTING] and [UNITOF OUTPUT/OUTPUT CONTROL] pages.

8.2. Process Setting

Select Tab Page 2 on the SITE SETUP screen and the following screen appears.

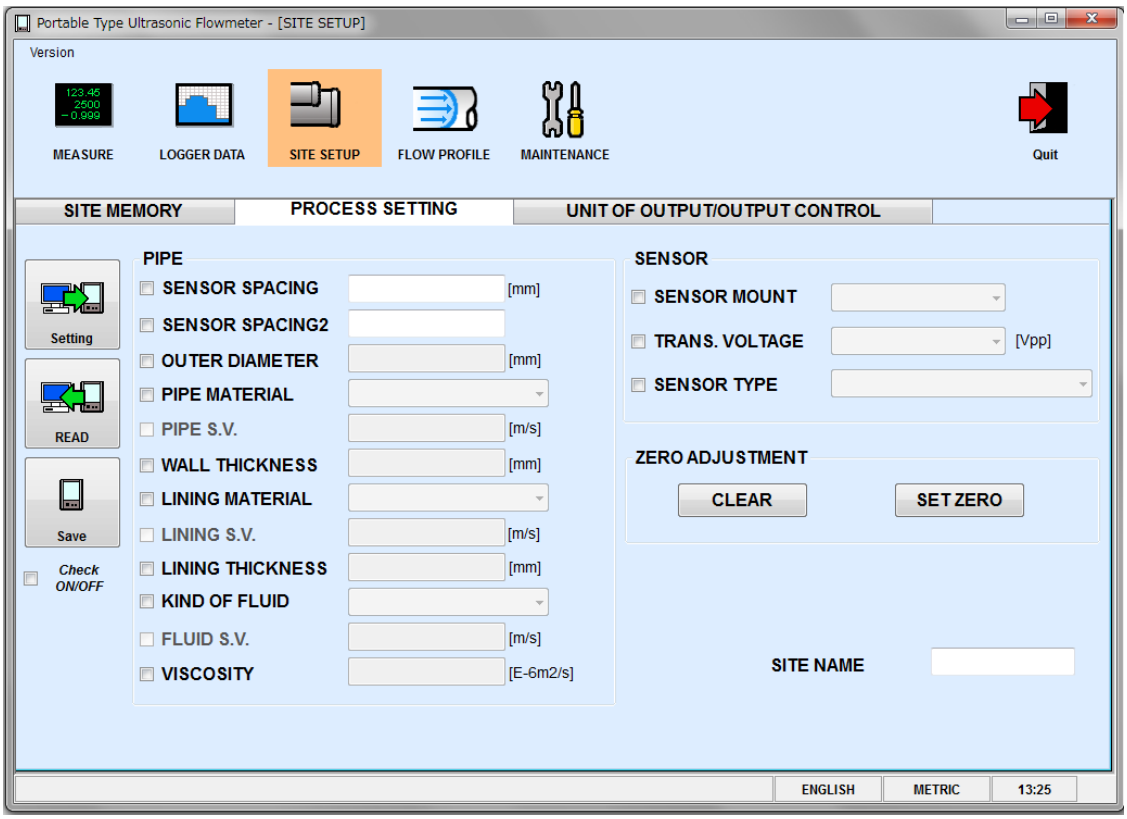


Fig. 8-5 PROCESS SETTING screen

Table 8—2 Piping specifications

Item	Contents
OUTER DIAMETER	Enter in the range of 13.00 to 6000.00mm [0.5118 to 236.22inch].
PIPE MATERIAL	Select from carbon steel, stainless steel, PVC, Copper, Cast iron, aluminum, FRP, ductile iron, PEEK, PVDF, acrylic, PP and others.
PIPE S.V.	Enter in the range of 1000 to 3700m/s [3280 to 12140ft/s].(Unit dependent)
WALL THICKNESS	Enter in the range of 0.10 to 100.00mm [0.0039 to 3.9370inch].(Unit dependent)
LINING MATERIAL	Select from no lining, tar epoxy, mortar, rubber, Teflon, pyrex, glass, PVC and others.
LINING S.V.	Enter in the range of 1000 to 3700m/s [3280 to 12140ft/s].(Unit dependent)
LINING THICKNESS	Enter in the range of 0.01 to 100.00mm [0.0003 to 3.9370inch].(Unit dependent)
KIND OF FLUID	Select from water, seawater, dist. water, ammonia, alcohol, benzene, bromide, ethanol, glycol, kerosene, milk, methanol, toluol, lube oil, fuel oil, petrol and others.
FLUID S.V.	Enter in the range of 300 to 2500m/s [984 to 8203ft/s].(Unit dependent)
VISCOSITY	Enter in the range of 0.0010 to 999.999×10^{-6} m^2/s [0.0107 to 10763.9094×10^{-6} ft^2/s].(Unit dependent)
SENSOR SPACING	Displayed during [READ] only.
SENSOR SPACING	Displayed during [READ] operation or when the sensor type is FSSA/FSSG or FLS_12/FLS_22.

- If “Other” is selected as pipe material, pipe sound velocity becomes valid.
- If “Other” is selected as lining material, lining sound velocity becomes valid.
- If other than “No lining” is selected as lining material, lining thickness becomes valid.
- If “Other” is selected as fluid type, fluid sound velocity becomes valid.

Table 8－3 Sensor specifications

Item	Contents
SENSOR MOUNT	Select from Z method and V method.
TRANS. VOLTAGE	Select from 20, 40, 80 and 160.
SENSOR TYPE	Select from FSD12/FLD12, FSSD/FSD22/FLD22, FSSH, FSSC, FSSF, FLD11/FSG31/FLW11, FSG32/FLW12, FSD32/FLD32/FLW32, FSD41/FLD41/FSG41/FLW41, FSD51/FLD51/FSG51/FLW51, FSSE/FSG50/FLW50, FSSA/FSSG, FLS_12/FLS_22, FSW12, FSW21, FSW40 and FSW50.

Table 8－4 Zero point calibration specifications

Item	Contents
ZERO ADJUSTMENT	Perform zero point calibration using the Clear and the Adjust button. ZERO ADJUSMENT is different from the method below of other parameters. Click the [SET ZERO] button and display the confirmation message screen.

- The site name which belongs to reading/writing information is displayed in SITE NAME.

8.3. Output unit/Output control

Select Tab Page 3 on SITE SETUP screen and the following screen appears.

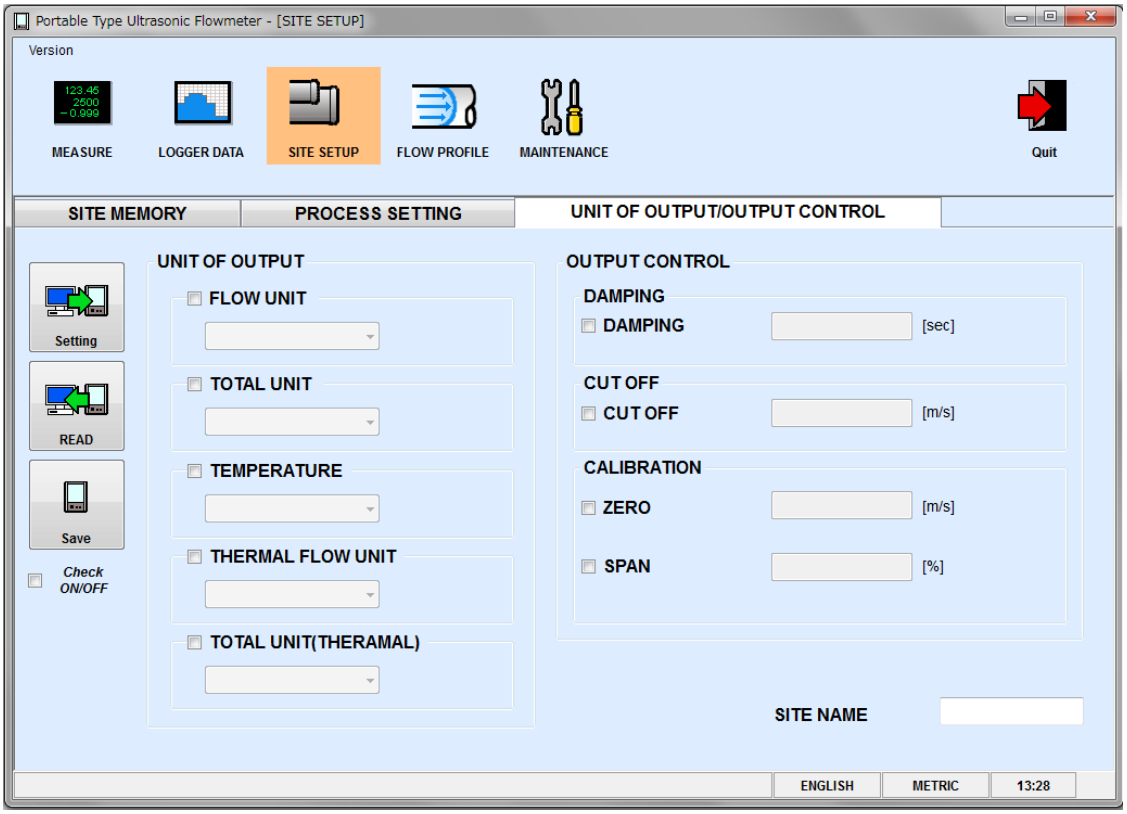


Fig. 8-6 UNIT OF OUTPUT/OUTPUT CONTROL

Table 8－5 Output unit specifications

Item	Contents
System Unit	Metric or inch
FLOW UNIT	Select from L/s, L/min, L/h, L/d, kL/d, ML/d, m3/s, m3/min, m3/h, m3/d, km3/d, Mm3/d, BBL/s, BBL/min, BBL/h, BBL/d, kBBL/d, MBBL/d [gal/s, gal/min, gal/h, gal/d, kgal/d, Mgal/d, ft3/s, ft3/min, ft3/h, ft3/d, kft3/d, Mft3/d, BBL/s, BBL/min, BBL/h, BBL/d, kBBL/d and MBBL/d]
TOTAL UNIT	Select from mL, L, m3, km3, Mm3, mBBL, BBL, kBBL [gal, kgal, ft3, kft3, Mft3, mBBL, BBL, kBBL, ACRf]
TEMPERATURE	Select either °C or K. [F or K]
THERMAL FLOW UNIT	Select either MJ/h or GJ/h, BTU/h, KBTU/h, MBTU/h, kW, MW.
TOTAL UNIT(THERMAL)	Select either MJ or GJ, BTU, KBTU, MBTU, kWh, MWh.

Table 8－6 Output control specifications

Item	Contents
DAMPING	Enter in the range of 0.0 to 100.0sec.
CUT OFF	Enter in the range of 0,000 to 5,000m/s [0.000 to 16.405ft/s] .
CALIBRATION ZERO	Enter in the range of -5,000 to 5,000m/s [-16.405 to 16.405ft/s].
CALIBRATION SPAN	Enter in the range of 10 to 200.00%.

- The site name which belongs to reading/writing information is displayed in the SITE NAME.

9. MAINTENANCE

Click the “MAINTENANCE” button on the Menu screen, and the following screen appears.

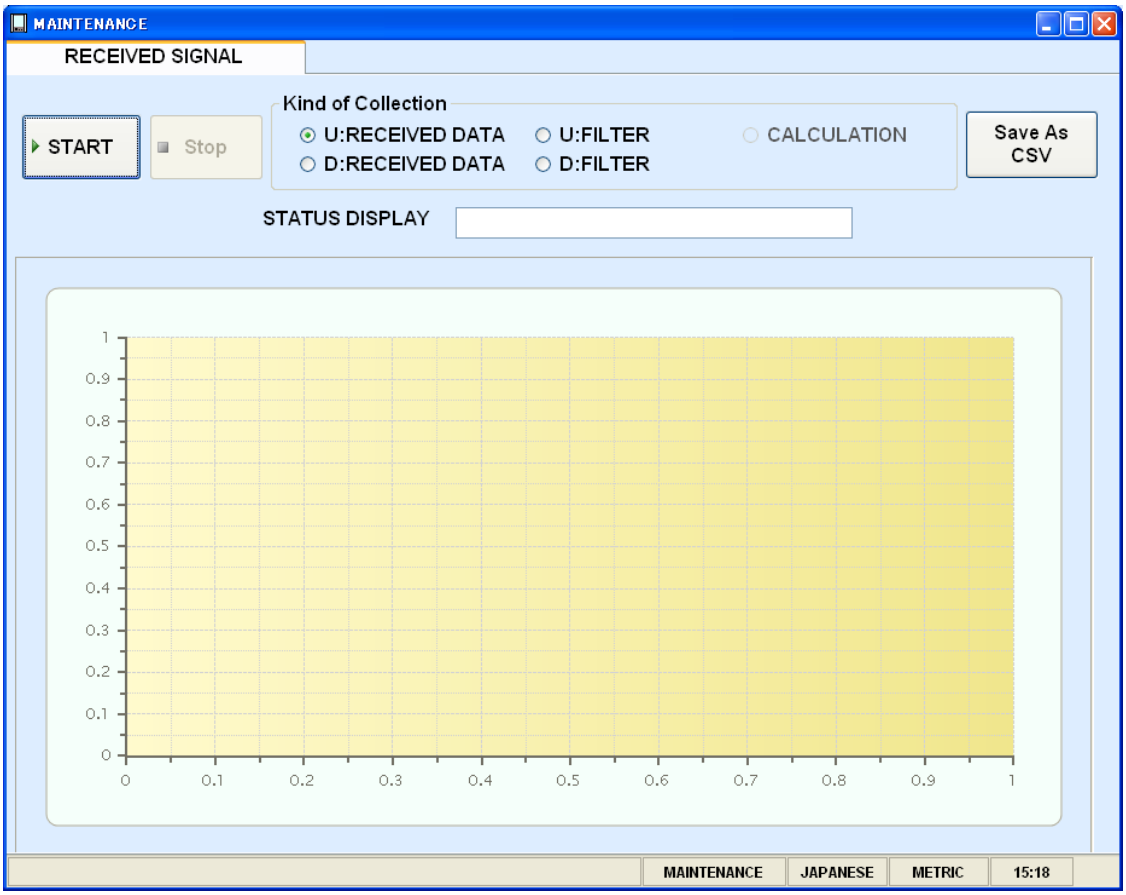


Fig. 9-1 RECEIVED SIGNAL screen

9.1. Received signal

Select Tab Page 2 on the MAINTE screen and the following screen appears.

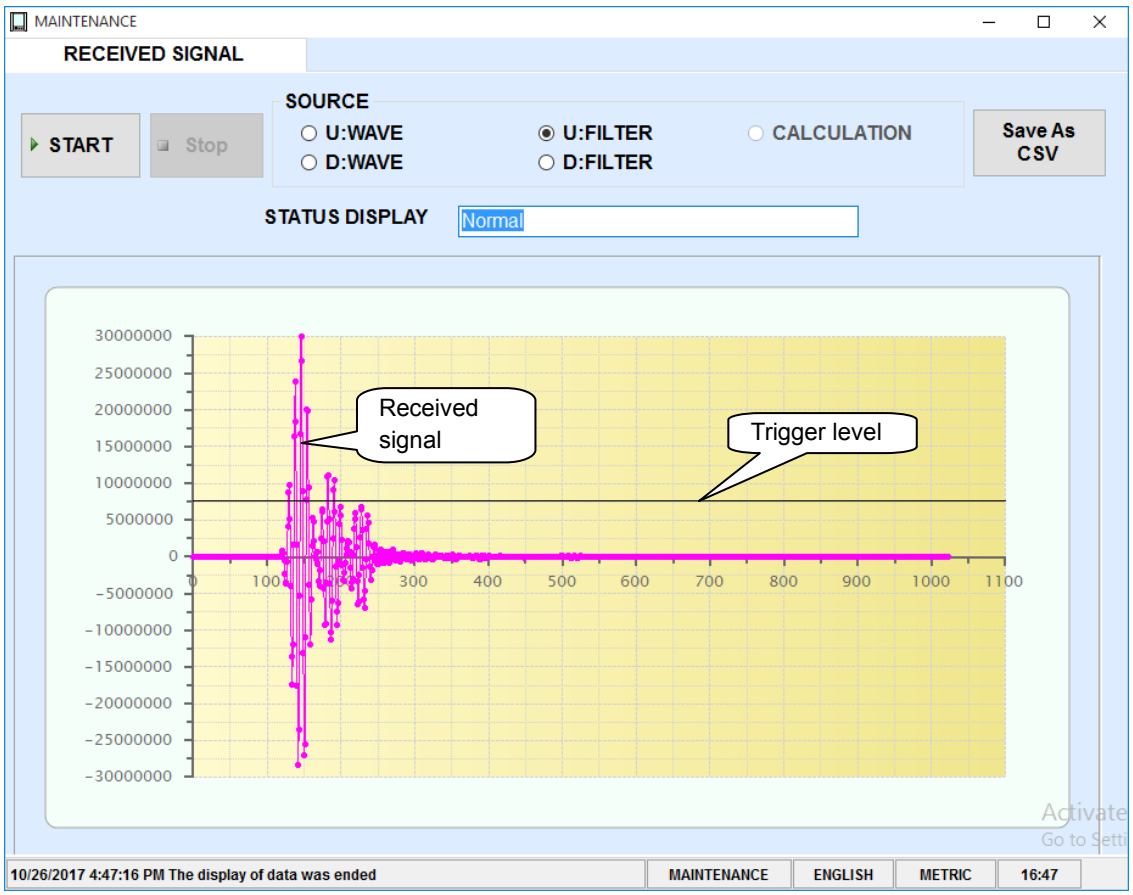


Fig. 9-2 RECEIVED SIGNAL screen

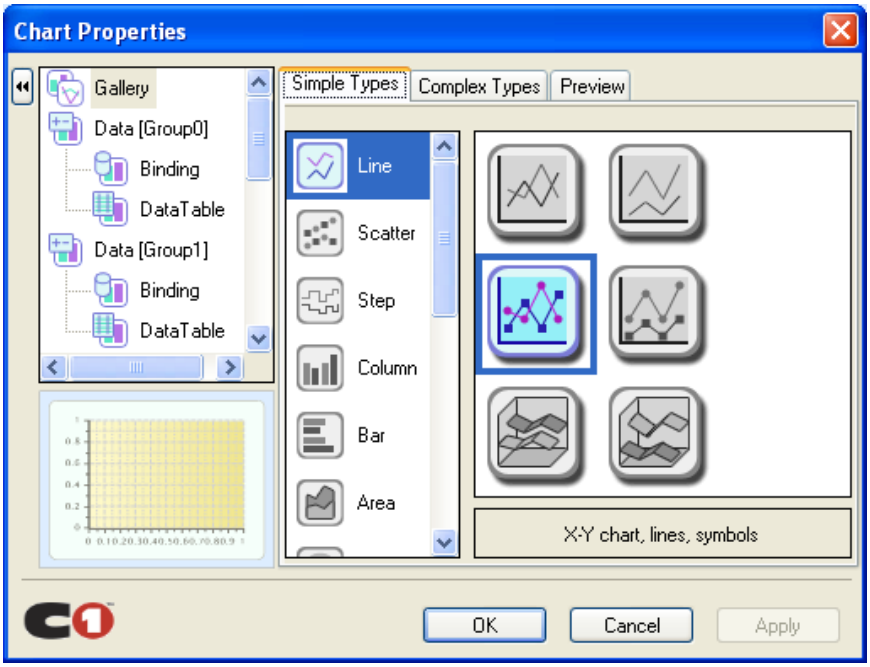
- Select one from forward direction received wave, reverse direction received wave, forward direction filter, reverse direction filter and calculation waveform.
- Click the [START] button to read in the specified cycle and click the [Stop] button to cancel the operation. Display is updated with each read.
- Save the received waveform in the specified file by [SAVE As CSV] button. Trigger level is also displayed.
- Display the RAS information in the STATUS DISPLAY.

Point

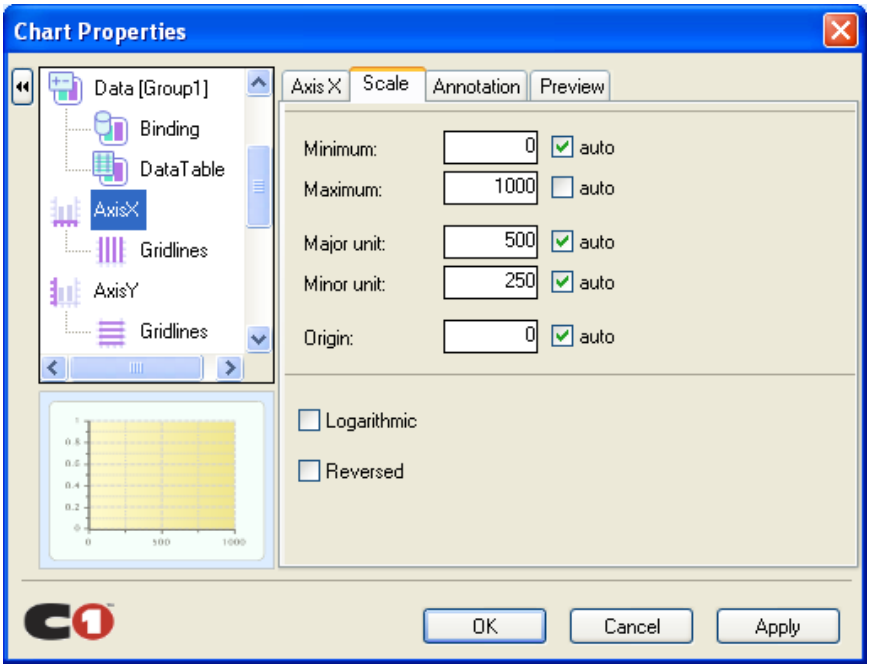
1. Startup is completed within 3 to 6 waves.
2. No peak (amplitude) fluctuation should be observed.
   Otherwise air is mixed in.

9.2. Adjustment of graph scale

※ For adjusting scale, right-click on “Measurement”, “Waves” or “Velocity Profile” screen.



Example) For adjusting the scale of X axis, select X axis, input “Max.” and “Min.” on the scale tab. Click [OK] button.



10. FLOW VELOCITY PROFILE

When 6th digit of the type of main unit is 1(Velocity profile measurement opton), this function should be available.
Click the “Velocity Profile” button on the Menu screen and the following screen appears.

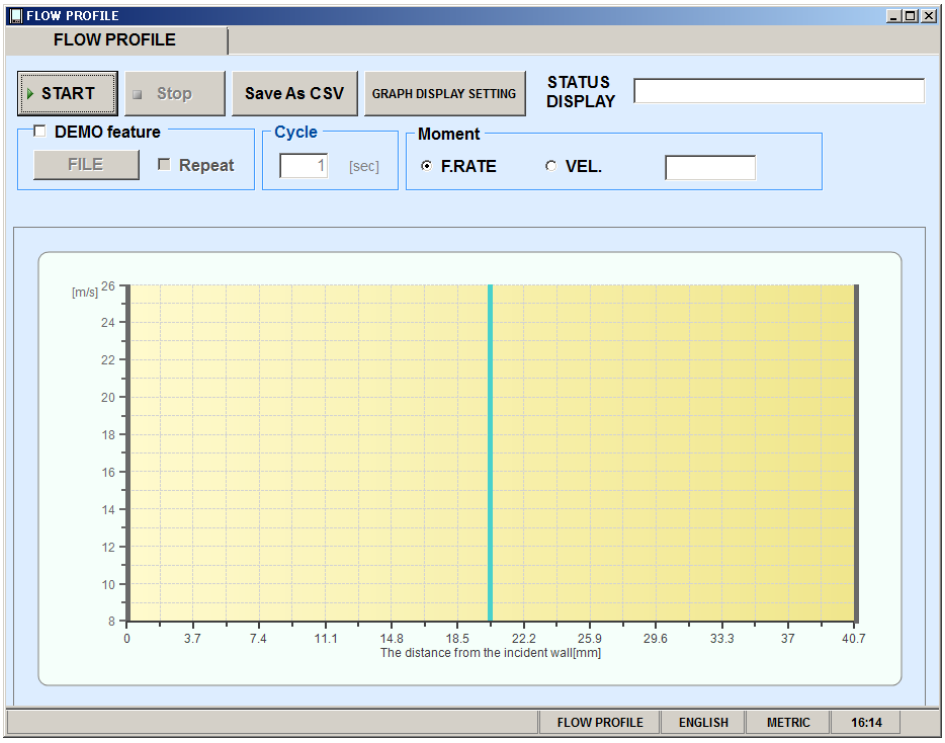


Fig. 10-1　Velocity Profile screen

10.1. Flow velocity profile

First, press the “GRAPH DISPLAY SETTING” button, and select either from VELOCITY / STANDARD DEVIATION/ POWER or Moment / Moving Average in the following screen. In case of Moving Average, set the number of times and select one from SENSOR-U/ SENSOUR-D/ SENSOUR-U/D on the graph display.

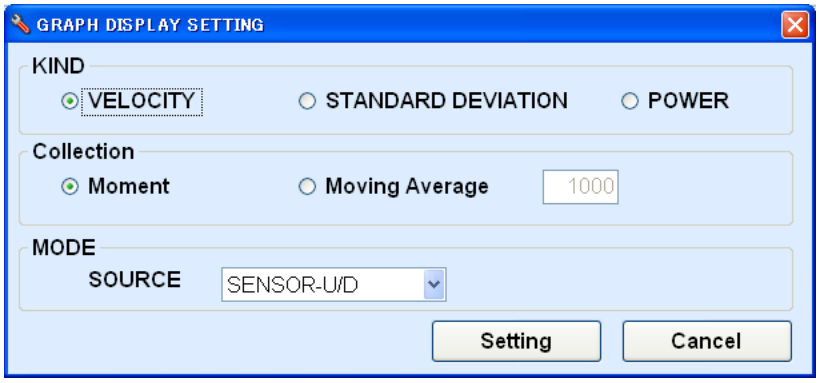


Fig. 10-2 Graph display setting screen

[KIND]
[VELOCITY]
[Collection]
Moment ：Displays data by each read.
Moving Average ：Displays data in moving average with the number of times set by channel in each read data.
[MODE]
SENSOR-U ：Displays only upstream sensor that connected cable with the upstream side.
SENSOR-D ：Displays only downstream sensor that connected cable with the upstream side.
SENSOR-U/D ：Displays both upstream/downstream sensor above.

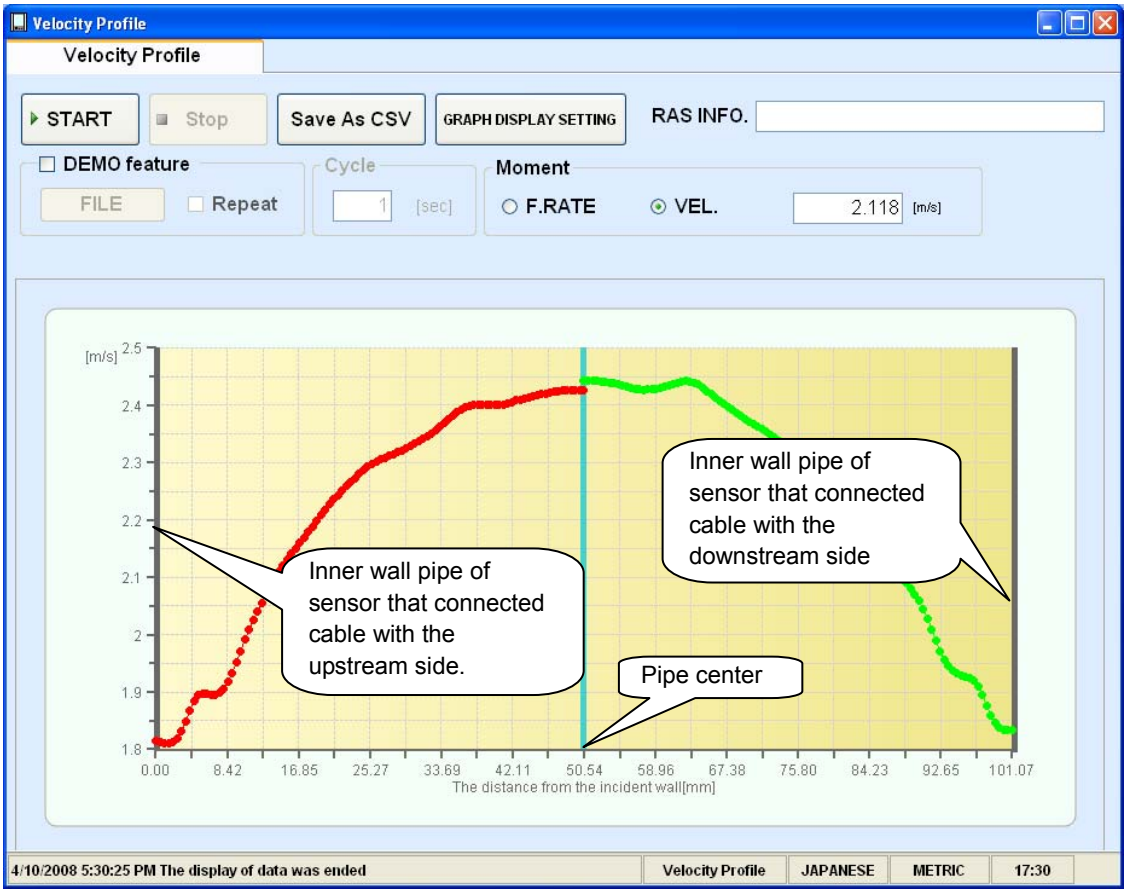


Fig. 10-3 Velocity Profile screen

[Moment]
VEL. / F.RATE ：Displays flow velocity or flow rate with each read.
[RAS]
RAS...Displaying RAS with each read.
[DEMO feature]
Reads the file logged by flow rate or [SAVE As CSV], displays the flow velocity profile.
[Check Box]
Displays repeatedly by setting check box to ON (“☑”).
[OFFSET Calculation]
Displays flow velocity profile detected by the sensor on the upper stream side and that on the lower stream side overlapped at the center of the piping.

- Click the [START] button to read in the specified cycle and click the [Stop] button to cancel the operation.
- Click the [SAVE As CSV] button to save the data in the CSV file.

For saving format, refer to “16.5.3 Flow Velocity Profile” in the manual.

11. QUIT

Click the Quit on the main menu screen or [☒].

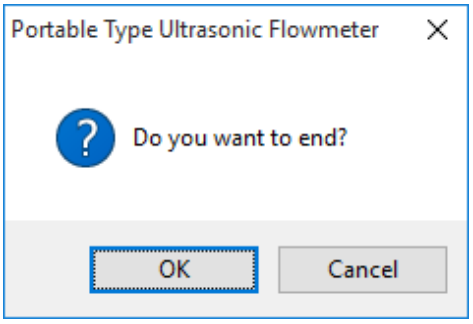


Fig. 11-1　Quit popup screen

12. UNINSTALLING SOFTWARE

For uninstalling, selects “control pannel” – “add/ deleate application” from Windows, click Alter and Delete button.

Fuji Electric Co., Ltd.

www.fujielectric.com

Instrumentation & Sensors Planning Dept.
Gate City Ohsaki, East Tower, 11-2, Osaki 1-chome, Shinagawa-ku, Tokyo 141-0032, japan
Phone: +81-3-5435-7021 Fax: +81-3-5435-7475
www.fujielectric.com/products/instruments/