F805AT-BC *BELT SCALE CONTROLLER*

OPERATION MANUAL

UNIPULSE

01 Aug. 2020
Rev. 1.04

Introduction

Thank you very much for purchasing our F805AT-BC (Belt scale type).
For good performance, and proper and safe use of the F805AT-BC, be sure to read this instruction manual and properly understand the contents of it before use. Also, carefully keep this instruction manual so that it can be referred to at any time.

Safety Precautions

For safety reasons, please read the following safety precautions thoroughly.

In order to have an F805AT-BC used safely, notes we would like you to surely follow divide into "⚠ WARNING" and "⚠ CAUTION", and are indicated by the following documents. Notes indicated here are the serious contents related to safely. Please use F805AT-BC after understanding the contents well.

⚠ WARNING

This sign forewarns the presence of hazards that could result in serious injury or fatality when incorrectly handled.

⚠ CAUTION

This sign forewarns the presence of hazards that could result in personnel injury or property damage when incorrectly handled.

⚠ WARNING

This sign forewarns the presence of hazards that could result in serious injury or fatality when incorrectly handled.

Warning on design

- For the entire system to function safely when the F805AT-BC becomes faulty or malfunctions, provide a safety circuit outside the F805AT-BC.
- Before using the F805AT-BC as described below, make sure to consult with our sales personnel.
  - Use in environments not described in the operation manual.
  - Use greatly impacting human lives and assets, such as medical devices, transport devices entertainment devices, and safety devices.

Warning on installation

- Do not disassemble, repair, or modify the F805AT-BC. Doing so may cause a fire or an electric shock.
- Do not install in the following environments.
  - Places containing corrosive gas or flammable gas.
  - Where the product may be splashed with water, oil or chemicals.

Warning on wiring

- Do not connect a commercial power source directly to the signal input/output terminals.
- Be sure to ground the protective ground terminal.
- The attached AC cable is designed for domestic use in Japan, and its rating is 125V AC, 7A. For use at voltages exceeding the rating and for overseas use, have a separate AC cable prepared.
- Before performing the following, make sure that no power is applied.
  - Attachment/detachment of connectors of options, etc.
  - Wiring/connection of cables to the signal input/output terminals.
  - Connection to the ground terminal.
- For connection to the signal input/output terminals, check the signal names and pin assignment numbers, and then carry out wiring properly.
- The connection to the RS-485 terminal block must use the crimp contacts.
  Do not connect it the open-wire line.
- After wiring, be sure to mount the attached terminal block cover. Otherwise, it may cause an electric shock. (at the DC spec.)
- To take measures against lightning surge, install a lightning surge protector (optionally available).
- Do not connect anything to unused terminal(s).
- Before applying power, carefully check the wiring, etc.

⚠ WARNING

This sign forewarns the presence of hazards that could result in serious injury or fatality when incorrectly handled.

Warning during startup and maintenance

- Use a power supply voltage and load within the specified and rated ranges.
- Do not damage the power cord. Doing so may cause fire or electric shocks.
- Do not touch any signal input/output terminal while applying power. Doing so may cause electric shocks or malfunctions.
- If the cover of the main body is opened, it may cause an electric shock internally. Even if the power is off, the internal capacitor is charged. Contact us for internal inspection or repair.
- In the case of smoke, an abnormal smell or strange sound, immediately turn off the power, and disconnect the power cable.
- Lithium battery use in the F805AT-BC unit.
  type: CR14250SE manufactured by Sanyo Electric, or equivalent
  Voltage: 3 volts
  Capacity: 850 mAh

⚠ CAUTION

This sign forewarns the presence of hazards that could result in personnel injury or property damage when incorrectly handled.

Caution on installation

- Use the F805AT-BC as it is incorporated in a control panel, etc.
- Do not install in the following environments:
  - Locations where temperature or humidity exceeds specifications;
  - Locations subjected to drastic temperature fluctuations or icing and condensing;
  - Outdoors or locations above 2,000m;
  - Locations exposed to direct sunlight;
  - Locations subject to dust accumulation;
  - Locations with poor ventilation;
  - Locations with a lot of salt and metal powder;
  - Locations where the main unit is subject to direct vibration and shock.
- Take adequate shielding measures when using at the following locations.
  - Near a power line.
  - Where a strong electric field or magnetic field is formed.
  - Where static electricity, relay noise or the like is generated.
- Install the F805AT-BC as far away from devices generating high frequency, high voltage, large current, surge, etc., as possible. Also, carry out wiring separately from their power lines. Do not carry out parallel wiring and common wiring.
- Do not use it, broken down.

⚠ CAUTION

This sign forewarns the presence of hazards that could result in personnel injury or property damage when incorrectly handled.

Caution on wiring

- Tighten the screws for the signal input/output terminals at the specified torque.
  If they are loose, shorts, fire or malfunctions may occur.
  Tightening torque: 0.5N•m (at the DC spec.)
- For sensors, external inputs/outputs and options, use shielded cables.
- The temporary overvoltage applied to the power should not exceed 1500V.

Caution during startup and maintenance

- For turning on/off the power, be sure to keep intervals of 5 seconds or more.
- After power-on, make sure to warm up the F805AT-BC for at least 30 minutes or more before use.
- If the F805AT-BC is not used by the specified method, its protective performance may be impaired.
- Maintenance
  - When performing maintenance, disconnect the power.
  - Do not wipe with a wet rag, or with benzine, thinner, alcohol, etc. Doing so may cause discoloration or deformation of the F805AT-BC. In the case of heavy contamination, wipe off the contamination with a cloth after dipping it into a diluted neutral detergent and wringing it well, and then wipe with a soft, dry cloth.

Caution during transportation

- When the F805AT-BC is shipped, spacers made of corrugated cardboard are used as cushioning materials.
  Though it is factory-designed so that shocks can sufficiently be absorbed, breakage may result if shocks are applied when the spacers are reused for transportation. If you send the F805AT-BC to us for repair, etc., take adequate measures against shocks by using polyurethane materials, etc., separately.

Caution during disposal

- If you dispose of the product, handle it as industrial waste.

About the power cable

⚠ CAUTION

This sign forewarns the presence of hazards that could result in personnel injury or property damage when incorrectly handled.

- The power cable attached is an object for checking of operations.
  Please use the power cable authorized in the country for employment.

Product Compliant to RoHS2 Directive

The parts and attachments (including the instruction manual, packaging box, etc.) used for this unit are compliant with the RoHS2 Directive, restricting the use of hazardous substances with regard to adverse effects on the environment and human body.

Please inquire of our sales person about the RoHS2 Directive of the option.

RoHS2 Directive

It is based on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE). The Directive restricts the use of specific substances in electrical and electronic equipments that could harm environment and human body. The substances are lead, mercury, cadium, hexavalent chromium, PBB (polybrominated biphenyls), PBDE (polybrominated diphenyl ethers), DEHP (bis(2-ethylhexyl) phthalate), BBP (benzyl butyl phthalate), DBP (dibutyl phthalate), and DIBP (diisobutyl phthalate).

CONTENTS

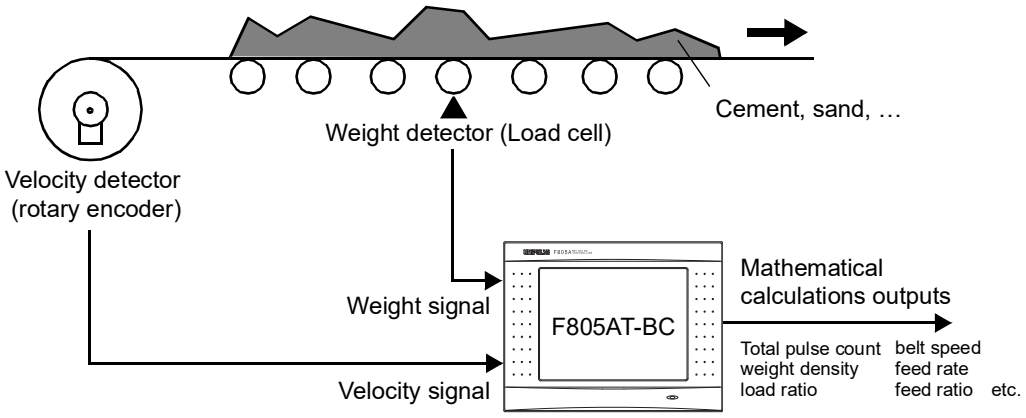
M E M O

1. FEATURES OF F805AT-BC (BELT SCALE TYPE)

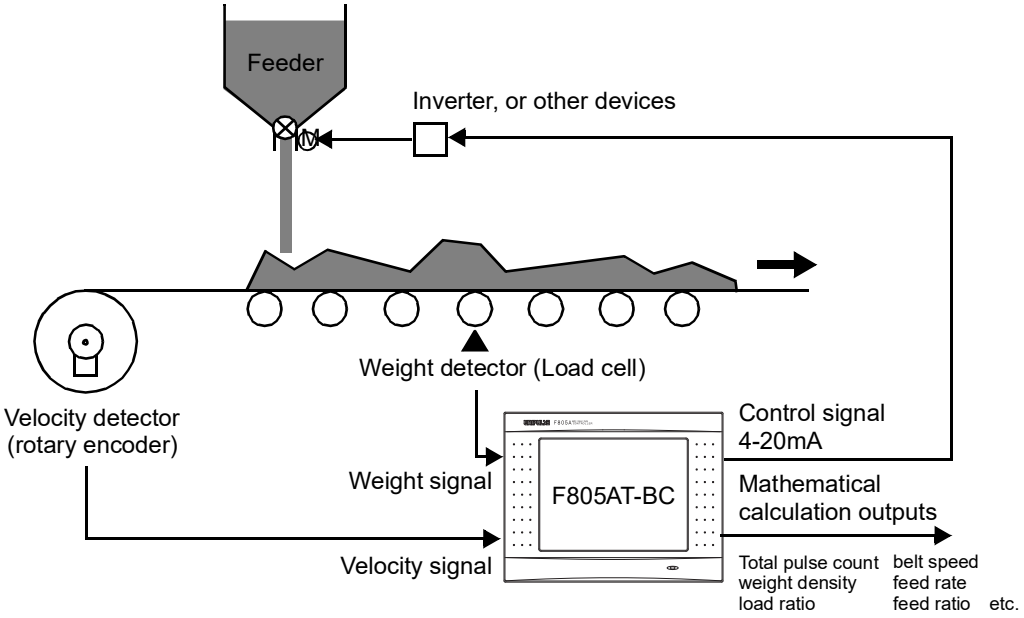
1-1. Basic Functions

F805AT-BC (Belt scale type) provides accurate metering of materials while they are being conveyed on the belt conveyer. Using weight signal from the load cell and velocity signal from the speed sensor installed on the conveyer system, the following data items can be obtained through mathematical calculations:

① belt speed ② weight density ③ feed rate ④ load ratio
⑤ feed ratio ⑥ total

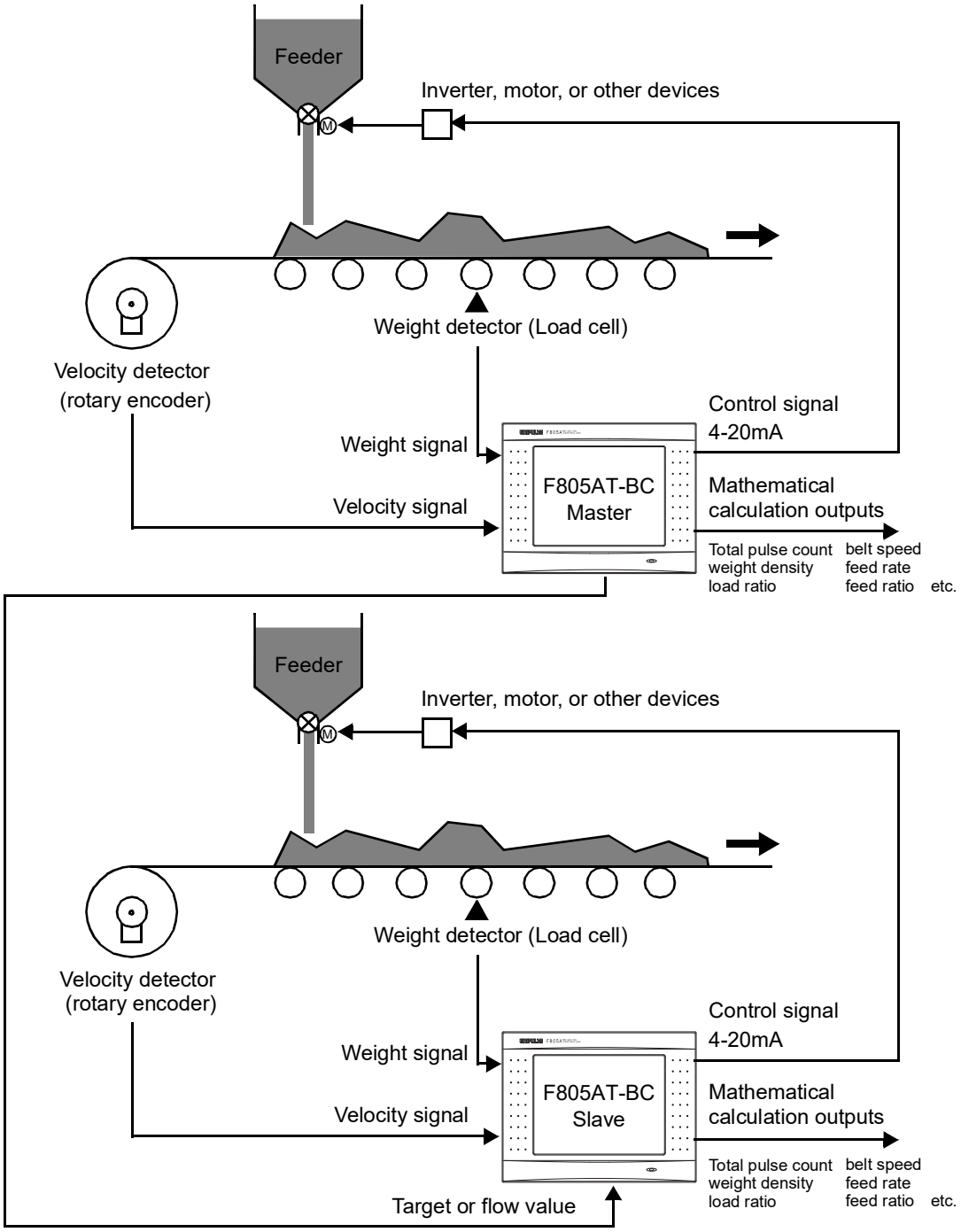


1-2. Control Functions



Using the speed signal from the rotary encoder and the weight signal from the load cell as shown in the figures, the feeder can be controlled to maintain a constant flow, or feed rate (continuous feed rate operation). Another possible control method is to operate the feeder so that the total increases linearly with time (continuous total operation).

1-3. Master-Slave Functions



As shown in the figures, two or more of F805AT-BCs can be configured to operate in a master-slave mode, in which one F805AT-BC functions as a master and others as slaves. The slaves operate following the target values and flow set by the master device.

Up to eight F805AT-BCs can be connected to the same network, and they can be grouped into four based on their IDs.

1-4. RS-232C, RS-485 (RS-485 optional)

Most of the set values, and most of the calculation results and device status information can be read/written using the serial communication.

1-5. Current Outputs (2 channels) and Pulse Input (DAC)

The output mode for two current output channels can be separately selected from fixed span mode (4mA or 20mA), or mathematical calculation dependent mode (belt speed, weight density, feed rate, load ratio, feed ratio, control rate).
Pulse signal from the velocity detector can be used as the belt speed signal in calculations.

1-6. Analog Inputs (2 channels) and Current Outputs (3 channels) (ANA optional)

The output mode for three current output channels can be separately selected from fixed span mode (4mA or 20mA), or mathematical calculation dependent mode (belt speed, weight density, feed rate, load ratio, feed ratio, control rate).
Analog signal from the velocity detector (current, or voltage) can be used as the belt speed signal in calculations.
Pulse signal from the velocity detector can be used as the belt speed signal in calculations.

1-7. BCD Input/Output (BCI and BCO optional)

Alarm upper/lower limits, rated belt speed, and moisture ratio can be configured using the BCD input.
BCD output can be used to send out following values: belt speed, weight density, feed rate, load ratio, feed ratio, and total.

1-8. Upper/Lower Limit Comparison

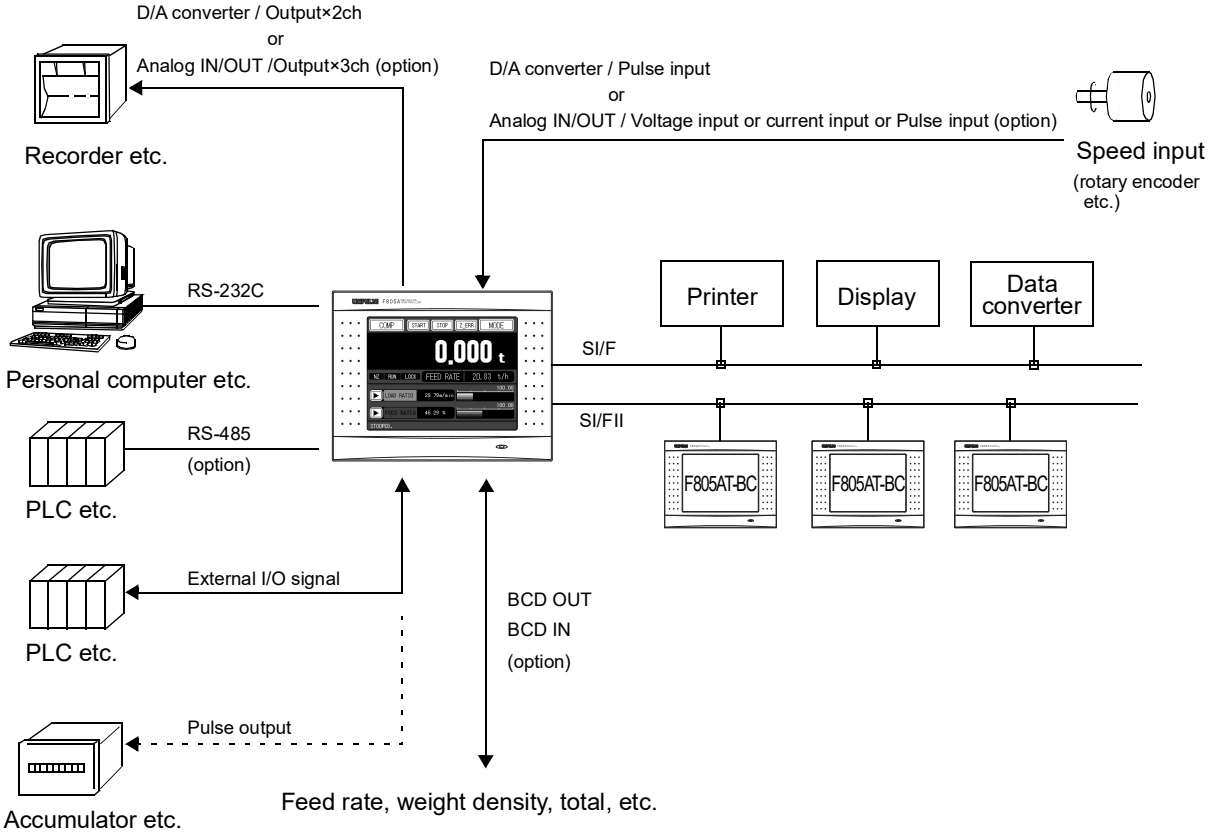
Either load ratio or feed ratio is compared with its upper/lower limit, and the current status is displayed and sent to the external output.

1-9. Total Pulse Output (2 channels)

One of two types of Total pulse outputs can be selected depending on the feed pulse (W/P) and the pulse width settings.

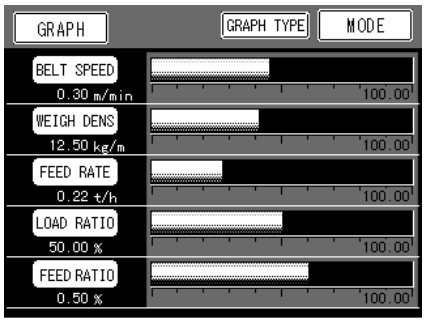
1-10. Interface

F805AT-BC provides variety of interfaces to communicate with external devices.

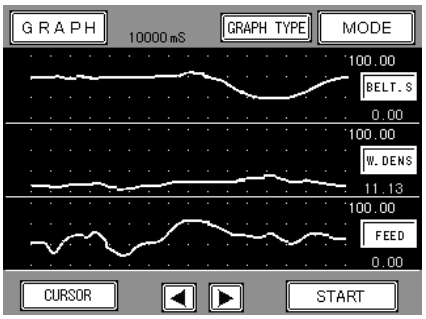


1-11. Graphics Display

F805AT-BC provides two selectable display modes: bar graph and wave display.



Bar graph display



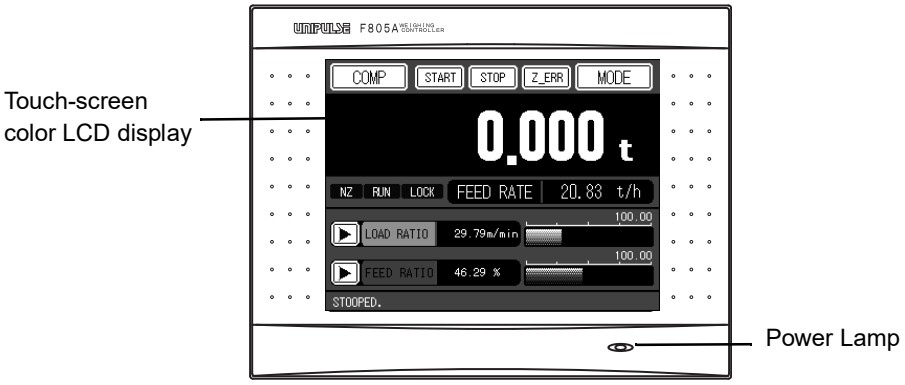
Input waveform display

Belt speed, weight density, feed rate, load ratio, and feed ratio can be displayed simultaneously in a bar-graph display. The user can configure full-scale values for each item.

F805AT-BC also provides a waveform display, in which input signals waveforms are shown graphically. This mode can display belt speed, weight density, feed rate, load ratio, feed ratio, and control rate.

2. FRONT PANEL AND REAR PANEL

2-1. Front Panel



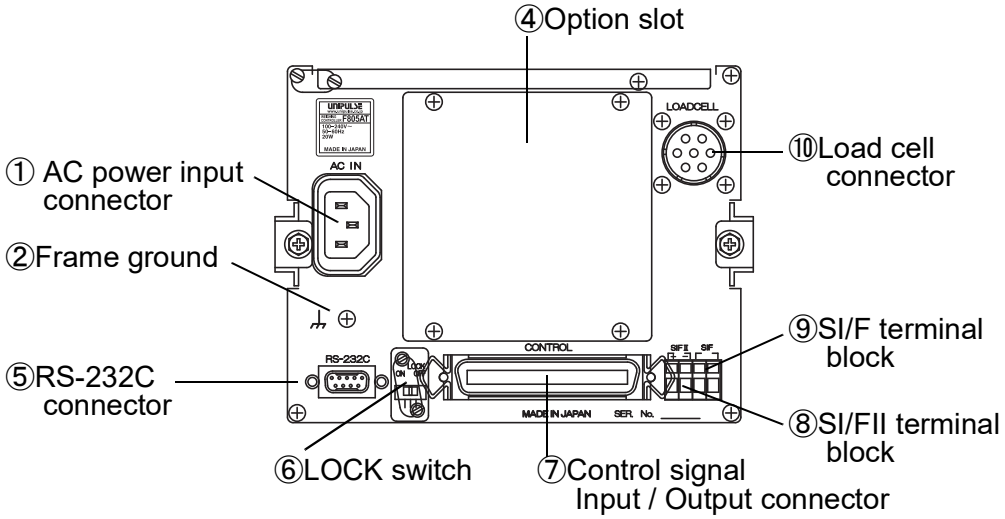
Touch-screen color LCD display

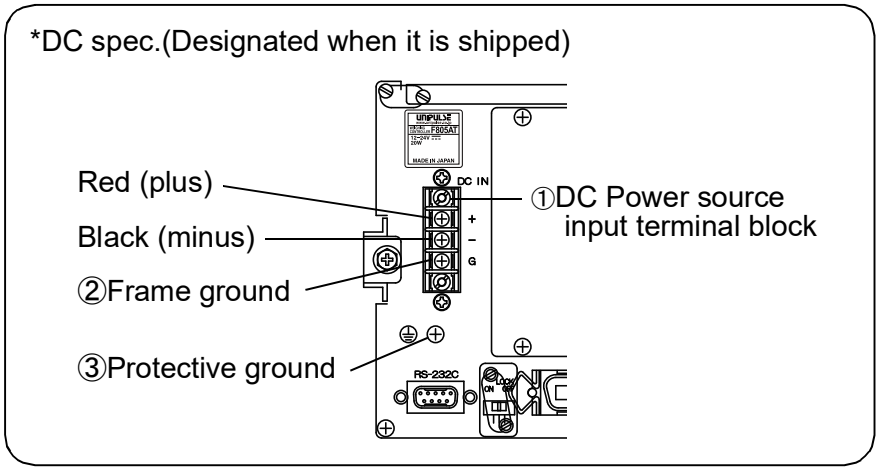
This touch-screen display is used for dual purposes: display of readings/graphs, and to input/edit configuration parameters.

Power lamp

The light is on, when the F805AT-BC is turned on.
It remains on even if the device is in sleep mode (display blacks out).

2-2. Rear Panel





1. AC power source input connector/ DC power source input terminal block

AC spec.

Connect with AC power source cable supplied.

Input voltage is AC100V~240V (+10% -15%), and frequency is 50/60Hz.

DC spec. (Designated when it is shipped.)

Connect DC power source. Voltage input is DC12~24V (±15%).

2. Frame ground ⏚

Please ground the frame ground terminal to prevent failures due to static electricity.

It may be better to remove depending on the environment of the installation location.

3. Protective ground ⏚ (DC spec. only)

Be sure to ground the protective ground terminal to prevent electric shocks.

4. Option slot

Three option slots are available for additional functions listed below:

- BCD parallel output
- BCD parallel input
- Analog IN/OUT
- RS-485

Note that only one RS-485 can be used.

5. RS-232C connector

Serial communication connector for sending or receiving arithmetic data and status information. Compatible connector is OMRON XM3D-0921 (cover: XM2S-0913, with inch size screw #4-40) or its equivalent.

6. LOCK switch

This switch locks the instrument and protects it from unauthorized modification. When this is turned ON, the instrument is locked. See "SETTING ITEMS LIST" , on page 177 “ for details of the items that are locked.

7. External I/O connector

External I/O signals, such as control signal and display item selection, are wired to this connector. Compatible connector is DDK 57-30500 (supplied) or its equivalent.

8. SI/FII terminal block

The terminals for high-speed bi-directional serial interface (SI/FII) connection for master/slave operation using multiple of F805AT-BCs.

9. SI/F terminal block

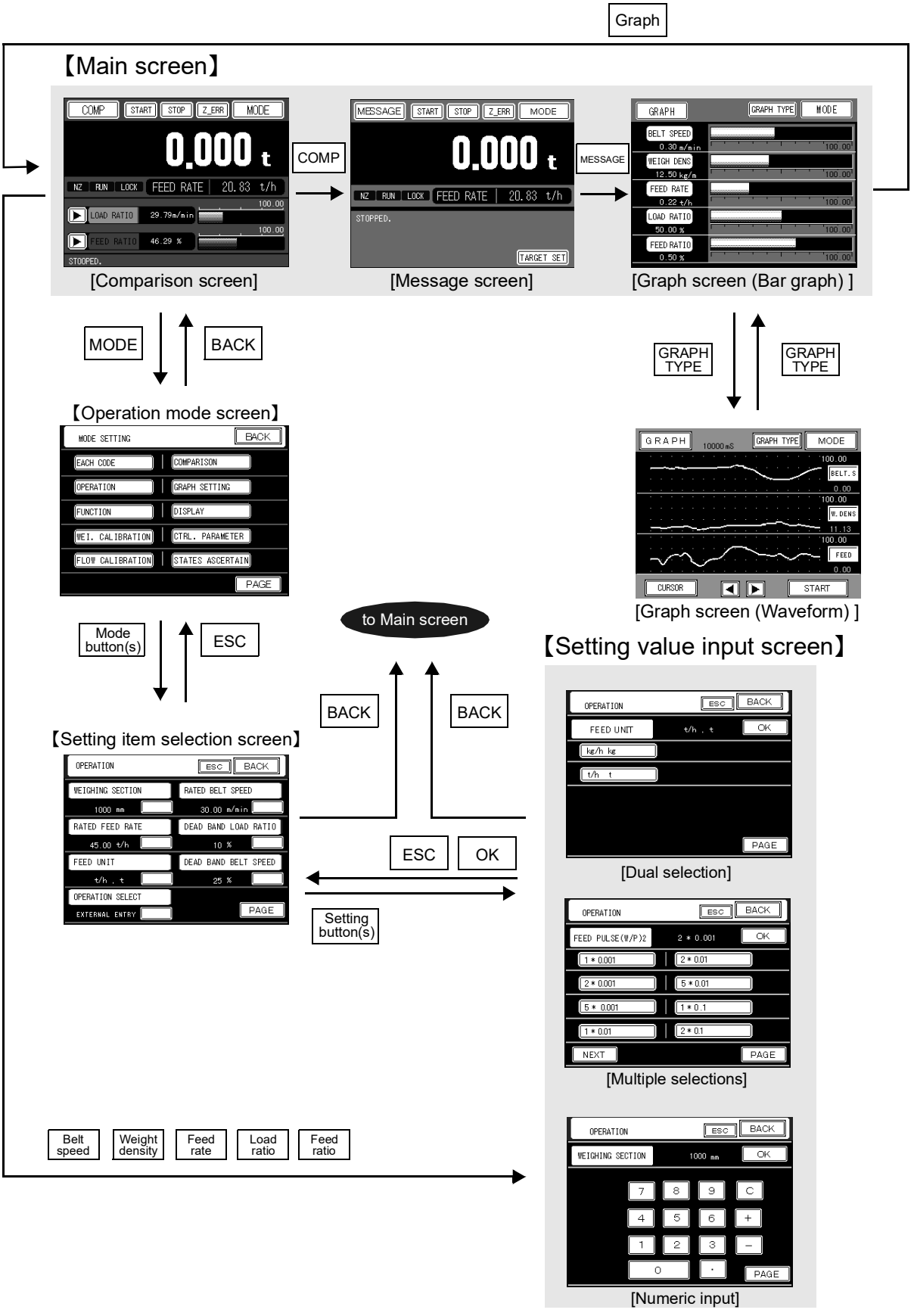
Serial interface (SI/F) terminal block used for connecting external devices such as the dedicated UNIPULSE printer, external display, and data converter.

10. Load cell connector

Plug the supplied load cell connector. Compatible plug is HIROSE JR16PN-7S (supplied) or its equivalent.

3. SCREEN LAYOUTS AND SETTINGS

3-1. Screen Configuration Flow Chart



3-2. Settings

3-2-1. Item selection

In this manual, the steps required to select an item is shown in the following format.

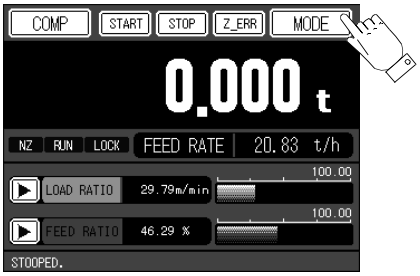
(Example) To specify a setting item associating the X (time)-axis end point.

MODE → GRAPH SETTING → PAGE×2 → X END POINT

Step by step procedures are as follows:

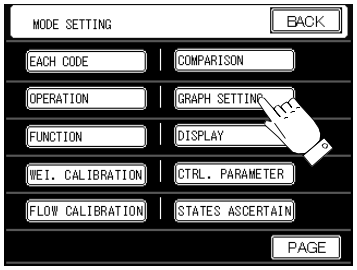
1) Press MODE from the main screen.

Comparison screen

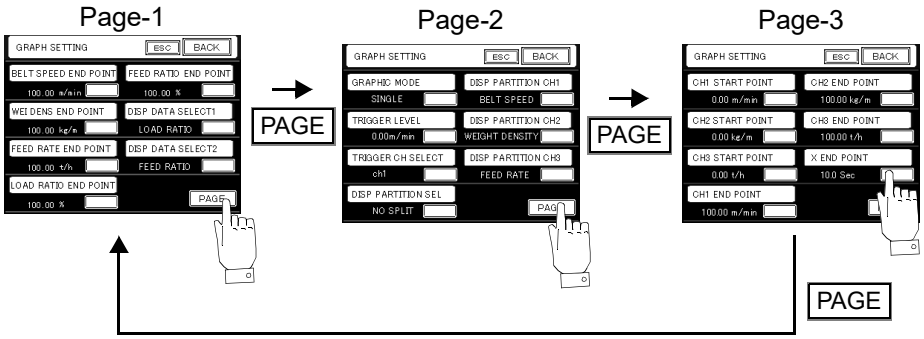


2) After entering into the Operation mode screen, press GRAPH SETTING

Operation mode screen

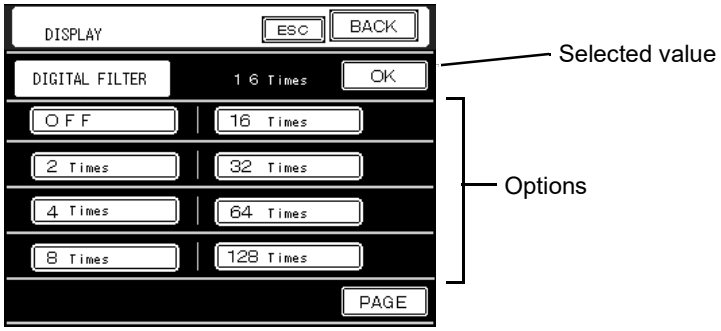


3) After entering into the Graph setting screen, press PAGE twice to move to the third page and press [X END POINT].



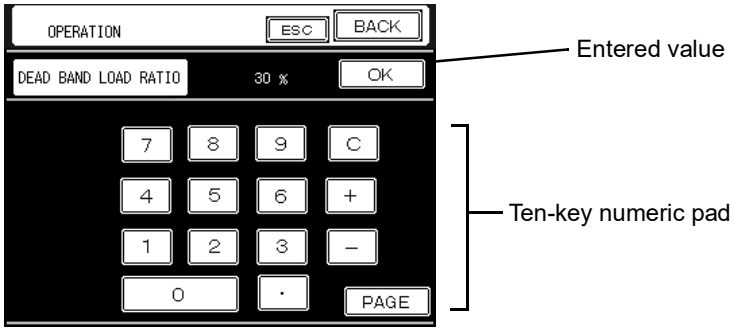
3-2-2. Parameter setting

(Example 1) Setting by selecting displayed items:
To select "16 times" for digital filter.



1) Press one of the option buttons (16 Times in this case)
2) Check that the selected value appears on the top line.
3) Press OK to confirm.

(Example 2) Setting by using numerical keypad:
To set DEAD BAND LOAD RATIO to 30%



1) Press [3 and then 0] in the ten-key pad.
2) Check that the correct value appears on the top line.
3) Press OK to confirm.

Pressing C clears all the input.

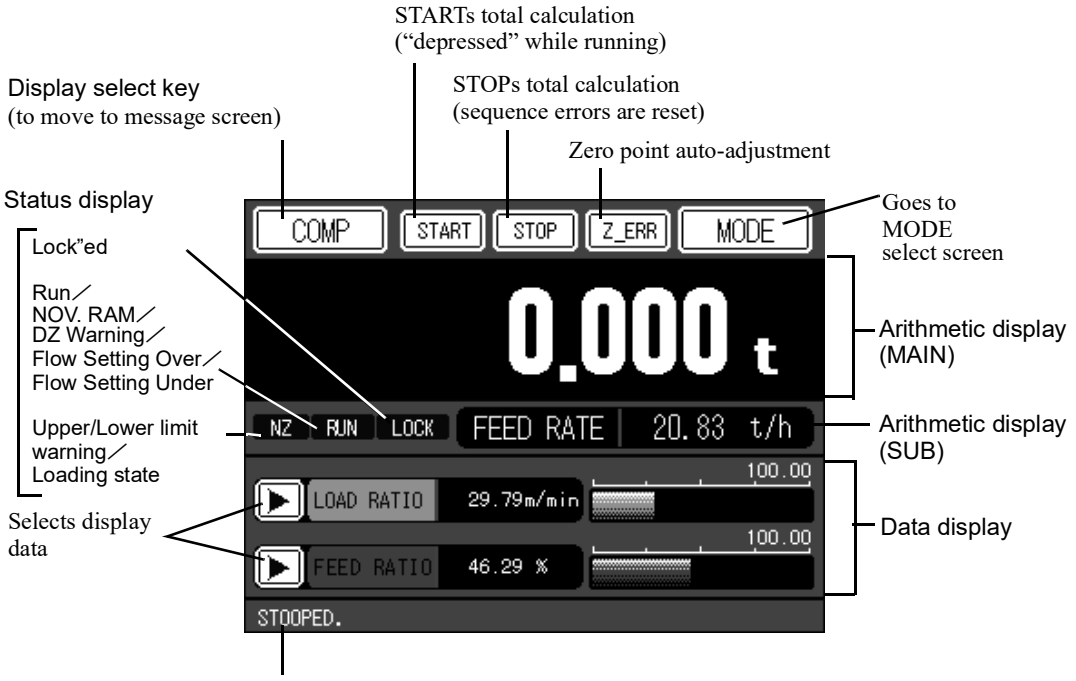
+ or − toggles the polarity of the number (effective only when the number allows negative range).

Pressing · enters decimal point (effective only when the number allows arbitrary decimal point position).

3-3. Screens

3-3-1. Comparison screen

One of the two important arithmetic values (Total and Feed rate) is displayed in large digits for easy monitoring, and the other one of the two is displayed in smaller digits beneath it accompanied with status lamps. In the lower part of the screen, two arithmetic items are displayed in numeric and as a bar-graph: these two items can be selected from belt speed, weight density, feed rate, load ratio, feed ratio, gross weight, control rate, and control deviation.



Arithmetic display (MAIN)

Either TOTAL or FEED RATE value is displayed (user selectable). Display unit is also selectable from kg and kg/h or t and t/h. When an error occurs, it appears above the numeric display.
TOTAL display can use up to 9 digits (zero cleared if it overflows).
FEED RATE can use up to 5 digits ("99999" is displayed if it overflows).

Arithmetic display (SUB)

Either TOTAL or FEED RATE, the one that is not selected in MAIN, is displayed. Display unit is kg and kg/h or t and t/h.

Status display

Lock

This lamp turns on when settings are locked:

・LOCK (hard) is ON: [LOCK] is displayed in reversed red.

・LOCK (soft) is ON: [LOCK] is displayed in reversed orange.

LOCK (hard) has the priority over LOCK (soft)

Run/NOV.RAM/DZ Warning/Flow Setting Over/Flow Setting Under

[RUN] is displayed in reversed light blue while TOTAL measurement is being performed.

[NOV] is displayed in reversed light blue while the system is writing information to NOV.RAM. Do not turn off power while [NOV] is being displayed: this may results in lost data.

・[ZALM] is displayed in reversed red when abnormal zero occurs, that is, [DIGITAL ZERO] operation is done while the total weight is in excess of the value specified in [DZ REGUALTION VALUE].

・[OVER] s displayed in reversed red when flow setting over occurs, that is, the relation below holds (only while RUNNING):
Feed Rate > Target Value + Fault Detect Value

・[UNDER] is displayed in reversed red when flow setting under occurs, that is, the relation below holds (only while RUNNING):
Feed Rate < Target Value - Fault Detect Value

Display priority of the alarms is as follows:

[NOV] > [ZALM] > [OVER] , [UNDER] > [RUN]

Upper/Lower limit, loading state

This item displays upper/lower limit, or loading state.

・[HI] is displayed (in reversed red while RUNNING) when load ratio or feed ratio exceeds its upper limit.

・[LO] is displayed (in reversed light blue while RUNNING) when load ratio or feed ratio falls below its lower limit.

・[GO] is displayed when neither of the two states described above apply (in reversed green while RUNNING). [OFF] is displayed when [ALARM MODE] is set to COMPARISON OFF.

・[NZ] is displayed (in reversed red while RUNNING) when Load Ratio [%] is lower than Dead Band Load Ratio [%].

Loading state has higher display priority than upper/lower limit.

Data display

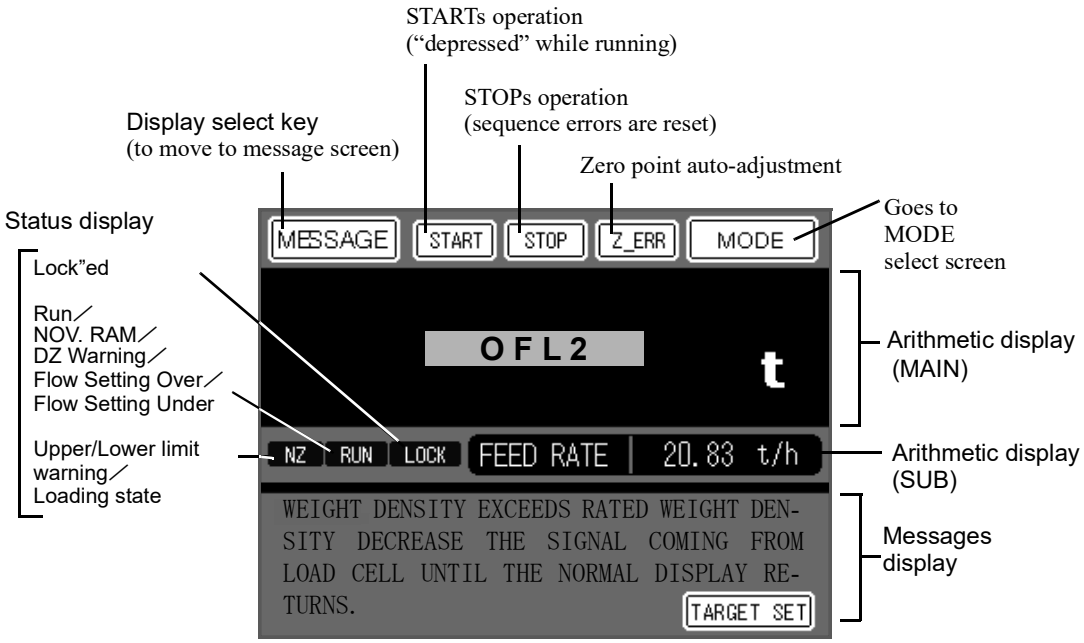
This field displays selected two items in numerical and bar graph format. Selectable data items are: belt speed, weight density, feed rate, load ratio, feed ratio, gross weight, control rate, and control deviation. Simply push button to switch the display item, or use external signal to change data.

Message bar

This field shows messages that inform you with the current status of TOTAL calculation and control.

3-3-2. Message screen

One of the most important arithmetic values (TOTAL and FEED RATE) is selected and displayed in large digits for easy viewing, and the other one of the two is shown below in smaller digits. Current error state and its detailed information are shown in the lower part of the screen.



- Arithmetic display (MAIN) .....
- Arithmetic display (SUB) .....
- Status display..... .....

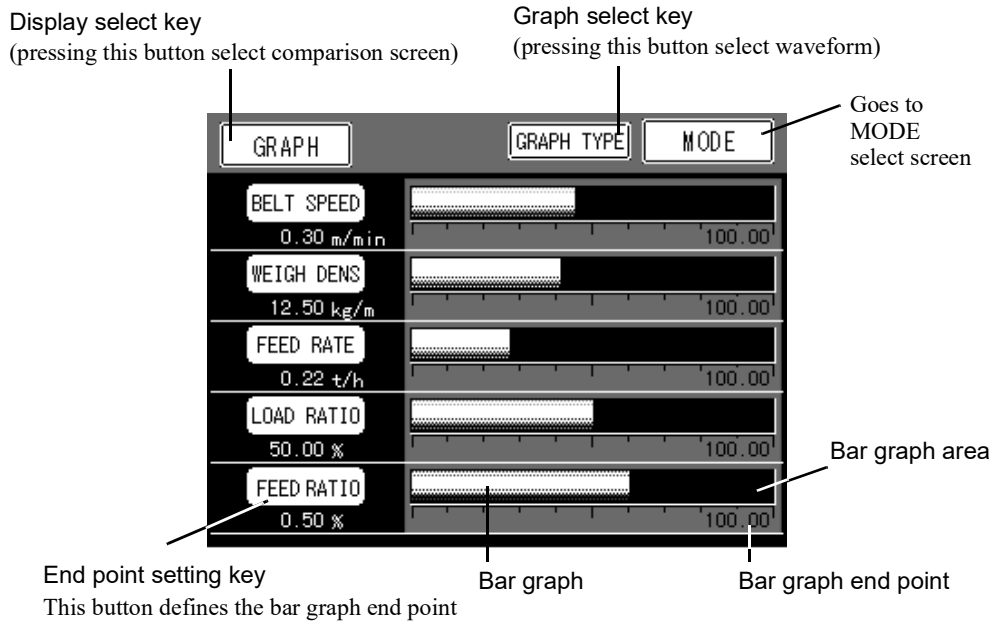
These are the same as those shown in the comparison screen: see the previous page.

- Message display ..... Displays the current error and its detailed information.

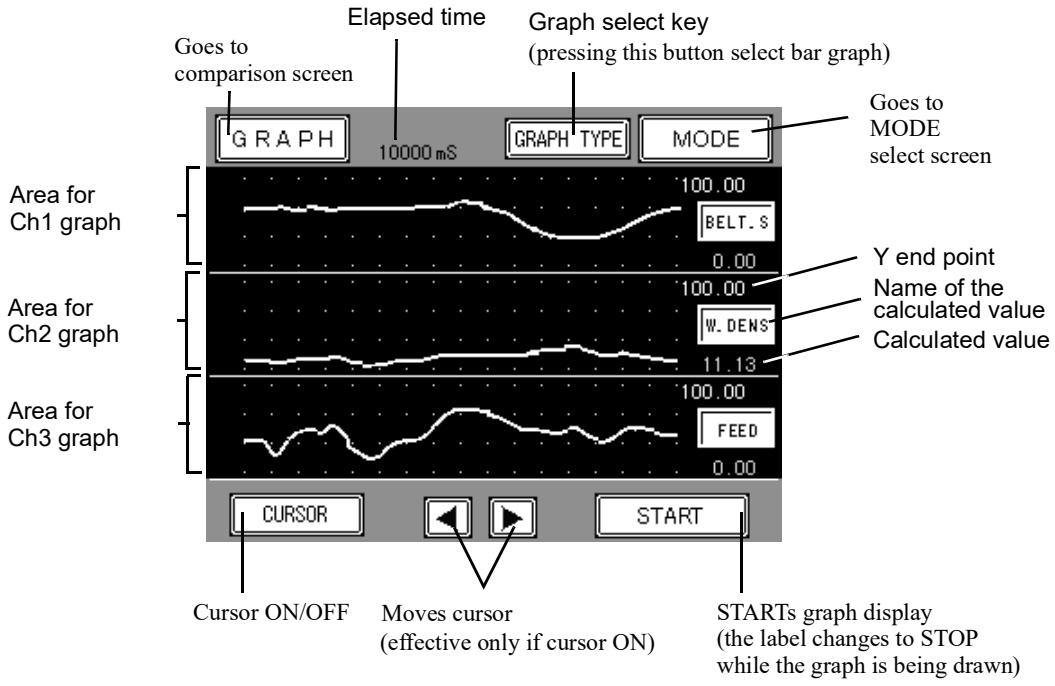
3-3-3. Graph screen

Arithmetic values selected from belt speed, weight density, feed rate, load ratio, feed ratio, and control rate are displayed either in bar graph or analog waveform. One of the two graph formats is arbitrary chosen by pressing GRAPH TYPE . Note that control rate can only be displayed in waveform.

【Bar graph】



【Waveform】



4. SIGNAL CONNECTION

Precautions about connection to the signal input/output terminal block are given below.
The precautions described here are important for safety.
Please properly understand the descriptions before connection.

⚠ WARNING

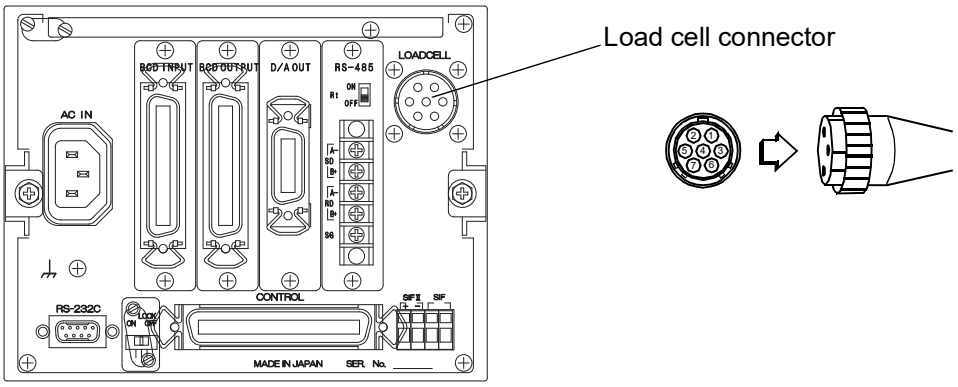
- Do not connect a commercial power source directly to the signal input/output terminals.
- Connect to the signal input/output terminals with no power applied because it may cause an electric shock.
- For connection to the signal input/output terminals, check the signal names and pin assignment numbers, and then carry out wiring properly.
- After wiring, be sure to mount the attached terminal block cover. Otherwise, it may cause an electric shock.(Power input terminal at the DC Spec. or RS-485 terminal block.)
- Before applying power, carefully check the wiring, etc.
- Do not touch any signal input/output terminal while applying power. Doing so may cause electric shocks or malfunctions.

⚠ CAUTION

- Tighten the terminal screws at the specified torque.
  If they are loose, shorts, fire or malfunctions may occur.
  Tightening torque: 0.5N•m(Power input terminal at the DC Spec. or RS-485 terminal block.)
- Use shielded cables.

4-1. Load Cell Connection

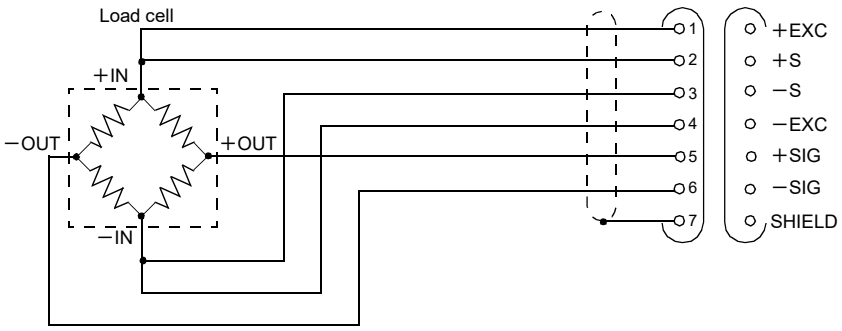
The load cell connector used by F805AT-BC is HIROSE JR16PN-7S (supplied) or its equivalent. Voltage value used to excite the load cell is either 5 or 10 volts (selectable), and max. current is 120mA.



Pin NO.	Signal (6-wire)	Signal (4-wire)
1	+ EXC	+ EXC (short across 1 and 2)
2	+ S	
3	− S	− EXC (short across 3 and 4)
4	− EXC	
5	+ SIG	+ SIG
6	− SIG	− SIG
7	SHIELD	SHIELD

4-1-1. 6-wire load cell connection

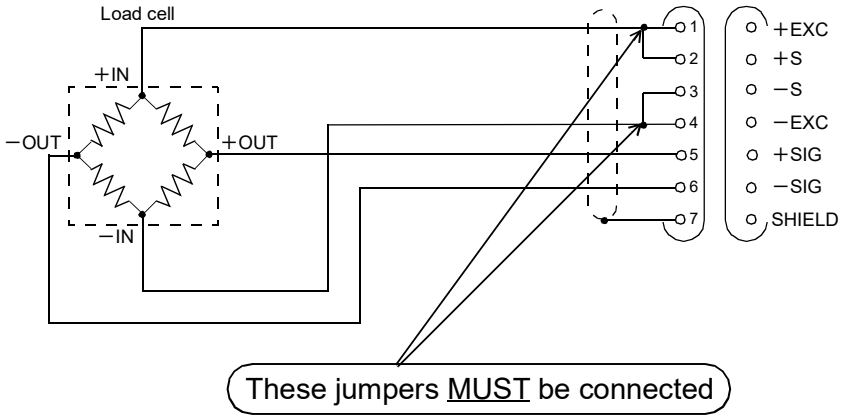
F805AT-BC uses a 6-wire load cell connector (remote sensing capable). Always use a shielded 6-wire cable to connect the load cell, and avoid running them close to noisy lines (power drive lines, or digital equipment cables) and AC lines.



"Remote sensing" method controls excitation voltage near the load cell to avoid excitation voltage fluctuation due to the change in wire resistance caused by temperature change.

4-1-2. 4-wire load cell connection

For use with 4-wire connection, make two short-circuits inside the connector shell (between pins 1-2, 4-3). Using 4-wire connection with these terminals open will create a significant measuring error, even if the system may appear to functioning properly.

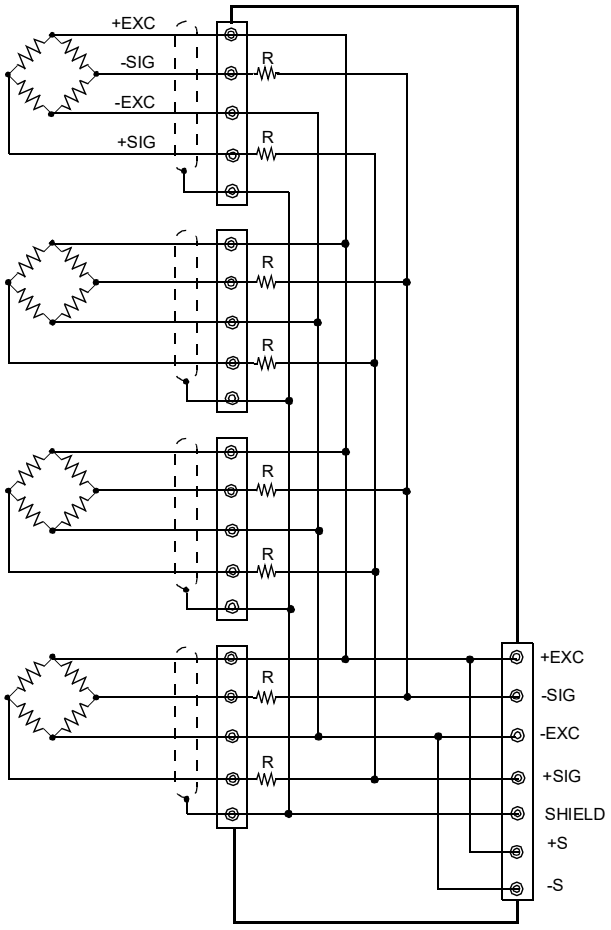


⚠ CAUTION

- The F805AT-BC can be used only in category II specified by EN61010.
  The overvoltage applied to the signal input/output terminals should not exceed the value defined in category II.
- The F805AT-BC conforms to the EMC Directive as an industrial environment product (class A). If it is used in a housing environment, interference may be caused. In that case, take appropriate measures.
- The load cell excitation voltage of the F805AT-BC is 5V or 10V. Heating or breakage may occur unless the load cells maximum excitation voltage is the load cell excitation voltage of the F805AT-BC or more.
- When using the F805AT-BC with the four-wire load cell connected, be sure to connect +EXC and +S, and -EXC and -S. Even if +S and -S are not connected, normal operation is performed apparently, but heating or breakage may occur because excessive voltage is applied to the load cell.

4-1-3. Connecting load cells in parallel

Some industrial measurement application use multiple of load cells connected in parallel. An example of parallel connection is shown below:



As seen from the instrument, n load cells connected in parallel behave as if they constitute a single load cell with the same sensitivity. Acceptable results can only be obtained using load cells that have average resistance of 300-500Ω with uniform relative ratio, and low temperature coefficient. Averaging resistors are not required for the load cells originally designed for parallel connection applications.

Note

When connecting several load cells in parallel, select load cells with sufficiently high capacity so that shock or eccentric loading may not result in overloading condition in any one of the load cells.

4-1-4. Sensor cable

Cable colors of sensors may differ from one manufacturer to another (it may even differ from one model to another for some products). Refer to the sensor manual (or data sheet) and check signal names and colors in order to connect the cables correctly.

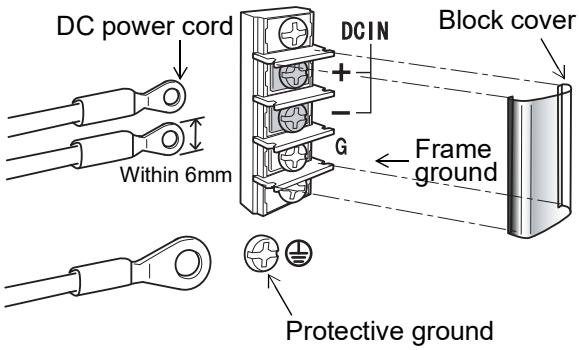
4-2. Connecting power input terminal at the DC Spec.

Connect the DC power cord. The input voltage is 12V to 24V DC.

1) Make sure that no power is applied.

2) Remove the terminal block

3) Remove the two screws(M3) at the lower left of the terminal block, align the crimp contacts with the screw holes, and then tighten the screws.



4) Mount the terminal block cover.

5) Remove the screws(M4) of the protective ground, align the crimp contacts with the screw holes, and then tighten the screws.

4-3. Connection of the protective ground

The grounding terminal is for prevention of electric shocks.
Use an approx. 0.75mm^2 thick wire, and be sure to ground.

⚠ WARNING

- Connect with no power applied because it may cause an electric shock.
- The attached AC cable is designed for domestic use in Japan, and its rating is 125V. For use at voltages exceeding the rating and for overseas use, have a separate AC cable prepared.
- Since the F805AT-BC has no power switch, install a breaker.
- Be sure to ground the protective ground terminal to prevent electric shocks. Do not use other screws than that attached to the main body .
- To take measures against lightning surge, install a lightning surge protector (optionally available).

4-4. Connecting SI/F

SI/F is a non-polar interface capable of connecting up to three external devices. Simple two-wire parallel cable or cabtire cable can be used for this connection.
SI/F interface uses a cage clamp terminal block. Step by step connection procedures are described below (use a mini-driver that comes standard with F805AT-BC).

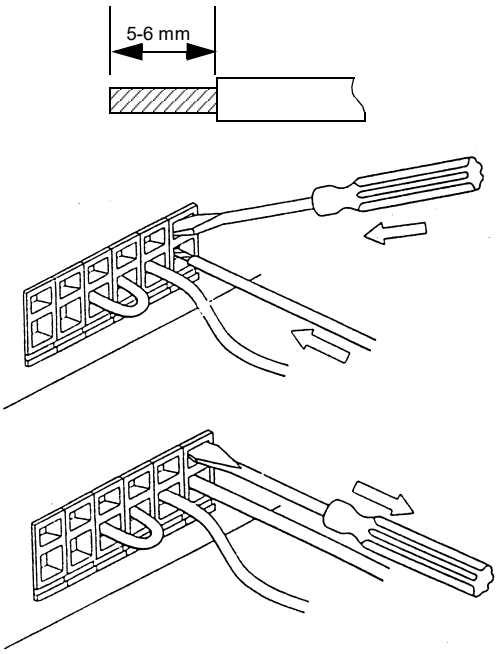
1) Strip cable sheath by 5-6mm off the top of the cable. If it is a stranded wire, give a slight twist to the tip of the wire so that it does not become loose.

2) Insert the screwdriver into one of the upper array of holes and push it strongly upward.

3) Insert the wire into one of the lower array of holes, making sure that the wire tip does not become loose.

4) Withdraw the screwdriver.

5) Pull the wire slightly to make sure that the wire is clamped securely.



Note

- Acceptable cable sizes are from 0.2-2.5mm^2.
- Do not solder the cable tip, and do not affix a crimp terminal.
- If more than one cables are to be connected to the same terminal, twist these cables together before they are inserted into the hole.

4-5. Connecting SI/FII

SI/FII also uses a cage clamp terminal block. Follow the steps described in the previous section (“Connecting SI/F”) to connect the cables. SI/FII is a polar interface: make sure not to confuse polarity.
Up to eight F805AT-BCs can be connected in one network, enabling them to operate in master/slave mode.

* IDs in one network must be unique: a duplicate ID in one network disables proper communication.

4-6. External I/O Connector

F805AT-BC uses a 50-pin amphenol connector for the external I/O connector. Compatible plug is DKK 57-30500 (supplied) or its equivalent. For more information, "CONTROL SIGNAL (External I/O Connector)" , on page 95.

4-6-1. Pin assignment

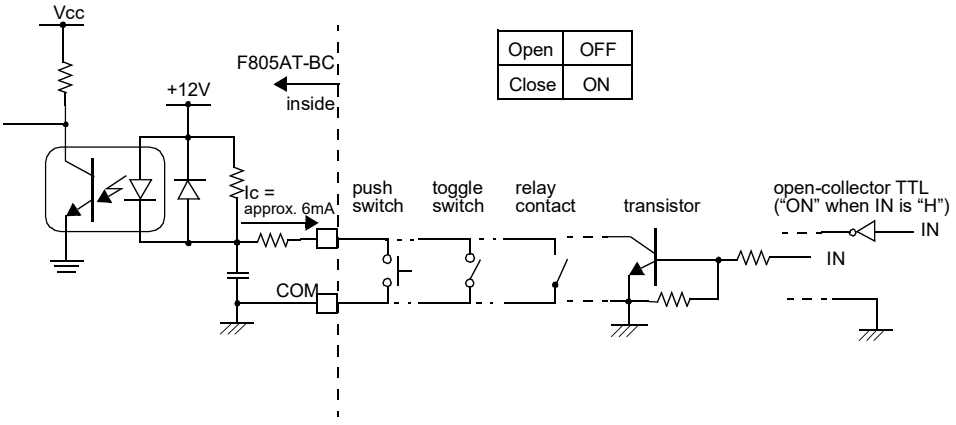
1	⁎	COM	26	⁎	COM
2	IN	RUNNING	27	IN	DZ
3	IN	DISP1 CHANGE1	28	IN	ZERO POINT AUTO ADJUSTMENT
4	IN	DISP1 CHANGE2	29	IN	TEST MODE SPAN MEASUREMENT
5	IN	DISP1 CHANGE4	30	IN	PULSE COUNT START
6	IN	DISP2 CHANGE1	31	IN	PULSE COUNT STOP
7	IN	DISP2 CHANGE2	32	IN	OPERATION MODE 1
8	IN	DISP2 CHANGE4	33	IN	OPERATION MODE 2
9	IN	T.WT.CLEAR	34	IN	GRAPH DRAWING
10	⁎	COM	35	⁎	COM
11	IN	CODE# DESIGNATION1	36	IN	CODE# DESIGNATION10
12	IN	CODE# DESIGNATION2	37	IN	CODE# DESIGNATION20
13	IN	CODE# DESIGNATION4	38	IN	CODE# DESIGNATION40
14	IN	CODE# DESIGNATION8	39	IN	CODE# DESIGNATION80
15	⁎	COM	40	⁎	COM
16	⁎	COM	41	⁎	COM
17	OUT	PULSE OUTPUT1	42	OUT	RUNNING
18	OUT	PULSE OUTPUT2	43	OUT	NZ
19	OUT	UPPER LIMIT(HI)	44	OUT	TOTAL FINAL OVER
20	OUT	GO	45	OUT	ZERO ERR. MEASURING
21	OUT	LOWER LIMIT(LO)	46	OUT	ZERO ERR. MEAS. OK
22	OUT	WEIGHT ERROR	47	OUT	ZERO ERR. MEAS. NG
23	OUT	BELT MOVING	48	OUT	FEED RATE OVER
24	OUT	POWER ON	49	OUT	FEED RATE UNDER
25	⁎	COM	50	⁎	COM

* COM: following pins are connected together inside the instrument: 1, 10, 15, 16, 25, 26, 35, 40, 41, and 50.

* Supply voltage is not available from this terminal.

4-6-2. Equivalent circuit (input)

Signal input is performed by closing and opening the input terminals, namely between the input terminal and COM. Contact devices (such as relay and switch) and non-contact devices (such as transistor, open-collector TTL) can be used for this purpose.

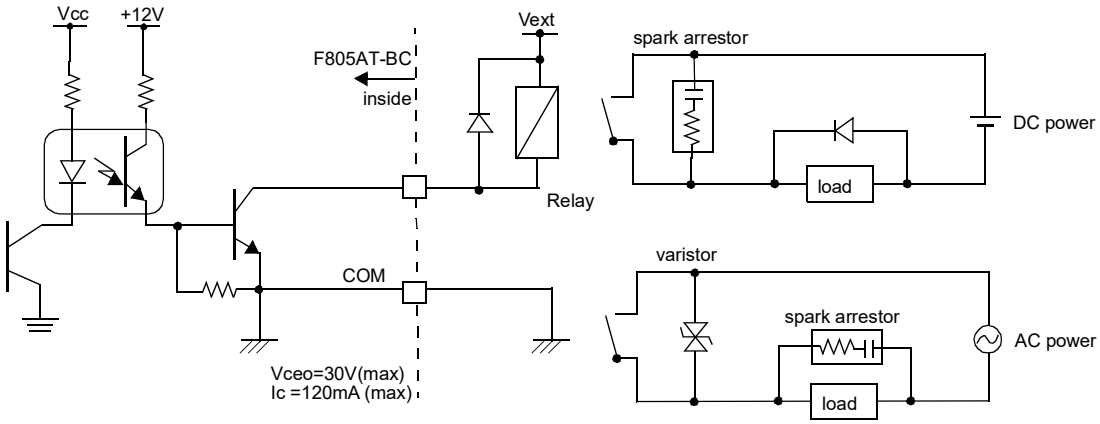


Open	OFF
Close	ON

- Use external devices that allow more than 10mA of Ic to flow.
- Leak current from the external device should be less than 100μA.

4-6-3. Equivalent circuit (output)

An open-collector transistor constitutes the signal output circuit.



Output data	Tr
0	OFF
1	ON

Use a customer supplied external power source (Vext) to drive the relay. Do not short-circuit the load (e.g. relay coil); this may damage the output transistor.
Connect a surge absorber or spark arrestor across the relay circuit (both coil and contact sides), as shown in the figure, to suppress surge voltage.

4-7. RS-232C Connector

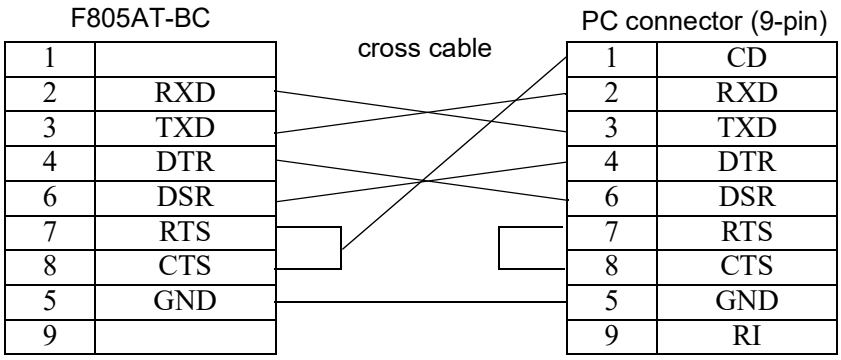
RS-232C interface uses a D-Subminiature, 9-pin, connector. See "RS-232C Interface" , on page 105 for further details.

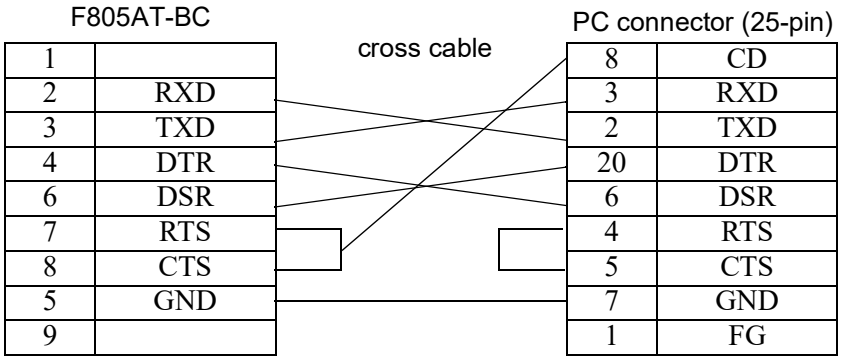
4-7-1. Pin assignment

Compatible plug: 9-pin D-Sub connector
* OMRON XM3D-0921
(shell: XM2S-0913, with inch-size screw #4-40) or its equivalent.

1			6	IN	DSR
2	IN	RXD	7	OUT	RTS
3	OUT	TXD	8	IN	CTS
4	OUT	DTR	9		
5	*	GND			

4-7-2. Cable connection





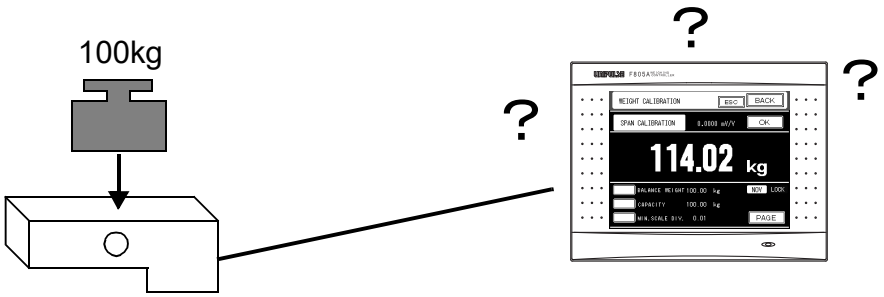
The wiring diagram shown above is used for connecting the F805AT-BC to a DTE (data terminal device). Usually a PC functions as a DTE. If you connect it to a DCE (data circuit terminating equipment) such as a modem, use a straight cable.
Be sure to check the connector type and signal layout of the device before assembling the cable.

5. CALIBRATION

5-1. What is calibration?

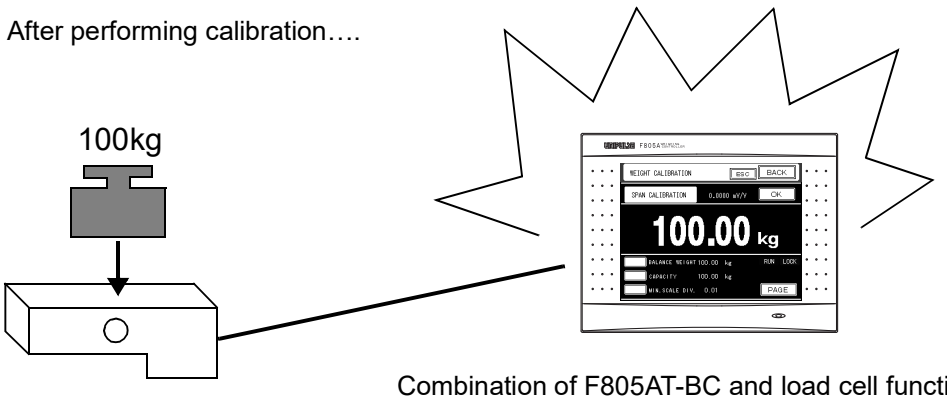
Calibration represents a set of procedure to verify that the F805AT-BC is correctly adjusted so that it can receive information from the load cell properly. When 100kg of real load is applied to the weighing part (load cell) of a metering device, the indicator connected to the weighing device, if it is properly calibrated, should recognize the data as accurate as possible (e.g. 100.00kg).
This method is called real load calibration.

Connecting the load cell to an F805AT-BC that has not been calibrated yet….



F805AT-BC displays random values

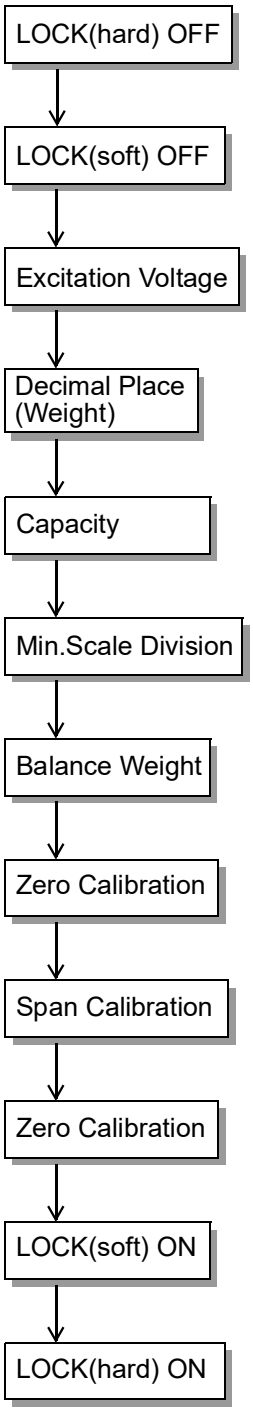
After performing calibration….



Combination of F805AT-BC and load cell functions as a precise metering device

5-2. Actual Load Calibration (Weight Calibration)

Step by step procedures for actual load calibration are as follows:



Toggle the LOCK switch on the rear panel to OFF position to enable calibration.

Remove software LOCK to enable calibration.

Select load cell excitation voltage (5 or 10V).

Select the position of decimal point.

Specify the maximum capacity of the scale.

Specify the minimum scale division of the scale.

Specify the load value (balance weight) placed on the load cell.

Enter initial zero point.

With the weight loaded on the load cell, enter span value (gain).

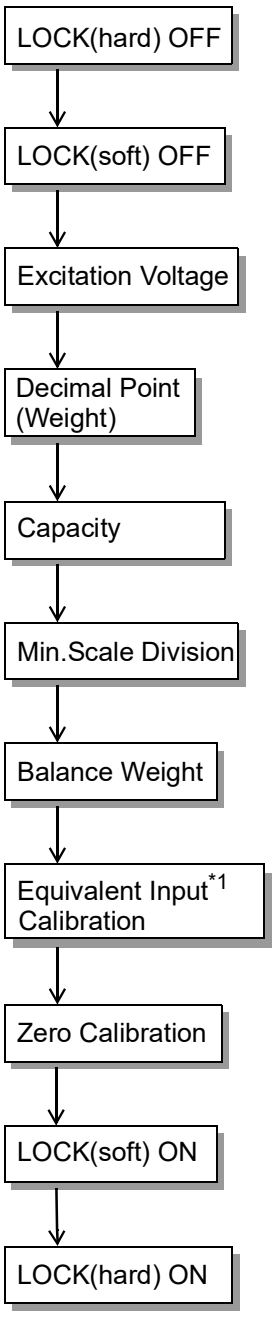
If necessary, enter the initial zero point again.

Disable calibration to prevent unauthorized modification

Toggle the LOCK switch to ON position to disable calibration, preventing unauthorized modification.

5-3. Secondary Calibration (Calibration using equivalent input) [Weight calibration]

Calibration can be carried out using key input, without actual measurement of the load cell's rated output (mV/V) and rated capacity (e.g. the value you want to display).
This method enables calibration without balance weight, and is useful if the instrument is replaced due to failure, or incorrect span calibration is found.
Note, however, that calibration using equivalent input is a temporary measure. Normal calibration using real balance weight should be done at an earliest possible occasion.
Steps for equivalent input calibration are as follows:



Toggle the LOCK switch on the rear panel to OFF position to enable calibration.

Remove software LOCK to enable calibration.

Select load cell excitation voltage (5 or 10V).

Select the position of decimal point.

Specify the maximum capacity of the scale.

Specify the minimum scale division of the scale.

Specify a weight value that exactly corresponds the output defined in *1

Define the load cell's rated output (mV/V)

If necessary, enter the initial zero point again.

Disable calibration to prevent unauthorized modification

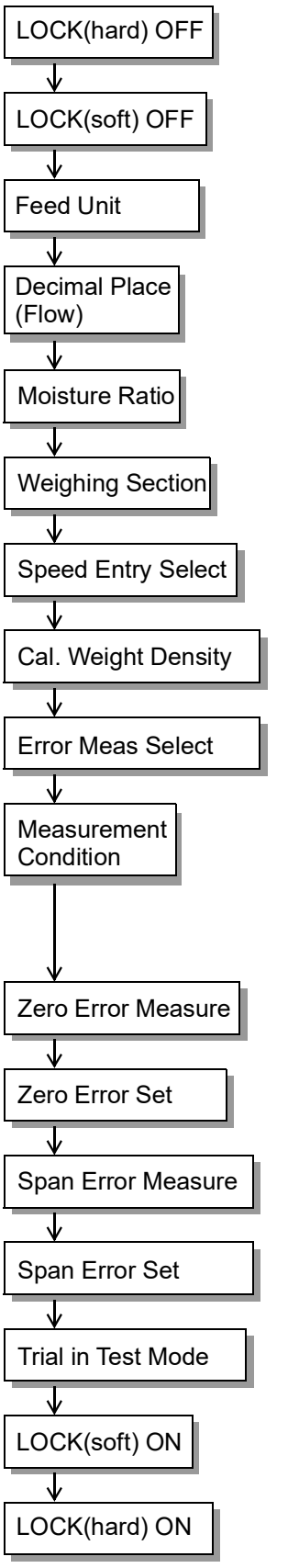
Toggle the LOCK switch to ON position to disable calibration, preventing unauthorized modification.

Note

The value of balance weight should be less than the instruments capacity.
If you use rated value written in the load cell's specification sheet, use the load cell's rated value for capacity setting.
Parallel connection of multiple load cells can, depending on connection scheme, cause small voltage drop due to lead wires. Because of this, actual input from the load cells may show some difference from the specification value. If this is the case, actual input value must be registered for accurate calibration.

5-4. Flow Calibration

Steps for flow calibration are as follows:



Toggle the LOCK switch on the rear panel to OFF position to enable calibration.

Remove software LOCK to enable calibration.

Select the unit for feed calculation

Select decimal place (same setting is used for flow).

Specify moisture ratio for the material to be carried. Total calculation uses water-excluded data

Specify weighing section length in millimeter.

Set [Speed Entry Select] parameter

Enter weight density of test chain

Select a data type to be used for error measurement

Set ending condition for the data selected in “Error Meas Select”.

Belt Length: specify belt length (m/mm)
Speed Input Count: Total pulse count to end measurement (or rotations of rotary encoder)

Carry out [Zero Error Measure] procedure

Carry out [Zero Error Set] procedure

Carry out [Span Error Measure] procedure

Carry out [Span Error Set] procedure

Verify calibration by checking measurement results in test mode

Disable calibration to protect data from inadvertent data modification

Toggle the LOCK switch on the rear panel to ON position, inhibiting data modification.

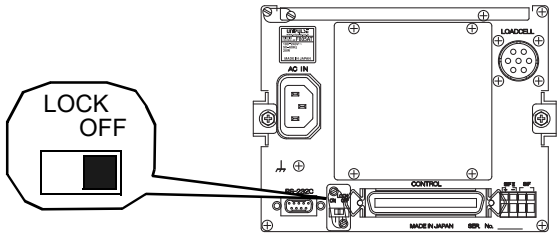
5-5. Preparation for Calibration

5-5-1. Releasing the LOCK

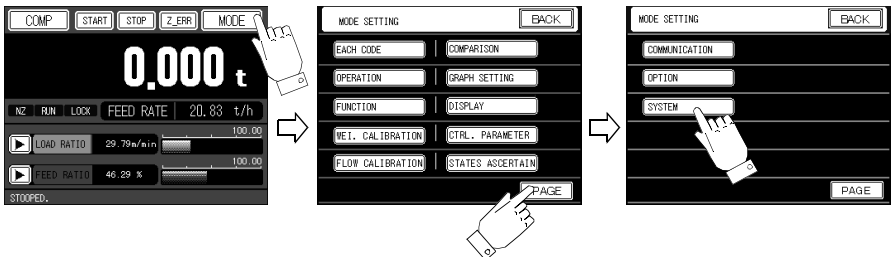
F805AT-BC provides two types of lock capabilities to prevent unauthorized or accidental alteration of calibration or set data: you can either lock the instrument by front panel operation ([LOCK (soft)]), or by toggling a rear panel switch ([LOCK (hard)]). Both of the locks must be released before performing calibration.

Operation

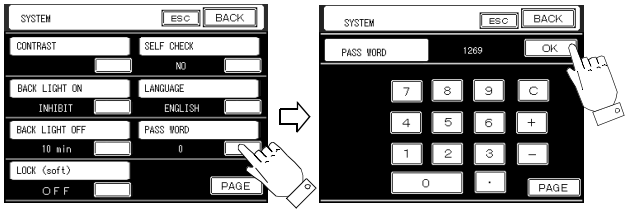
1) Toggle the LOCK switch on the rear panel to OFF position.



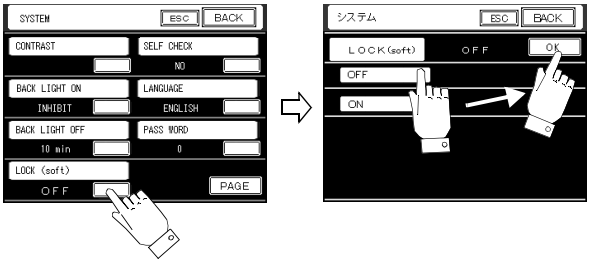
2) From the front panel (normal screen), press [MODE] [PAGE] [SYSTEM] to enter into system mode.



3) Enter the password. Key in '1269' and press [OK].



4) If current lock status is ON, then change it to OFF and confirm by pressing [OK]. If current status is OFF, simply press [BACK] to return to the normal screen.



After calibration has been completed, be sure to lock the instrument again to protect calibration information.

Note

See "SETTING ITEMS LIST" , on page 177 for the parameters protected by the LOCK function.

5-6. Weight Calibration

5-6-1. Zero calibration

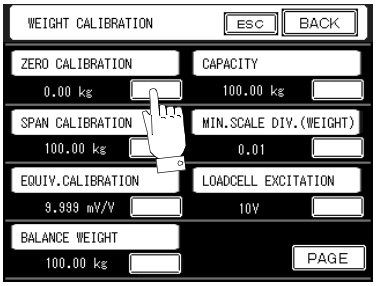
Zero calibration tunes the instrument's zero point.
Check the weighing device (load cell) and make sure no load is applied to the sensor.
A foreign matter placed on the load cell or contact to a foreign object can interfere the calibration.
Make sure that RUN indicator is off and reading is stabilized. Good calibration cannot be obtained while readings are fluctuating.

* While the instrument is running, RUN indicator becomes reversed display (light blue). The user must either stop the instrument or enter a password (see page 32 for the password).

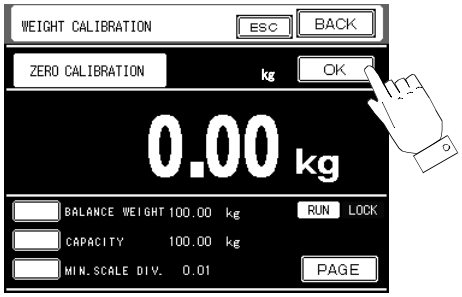
Operation

MODE → WEI.CALIBRATION → ZERO CALIBRATION

1) Press [ZERO CALIBRATION].

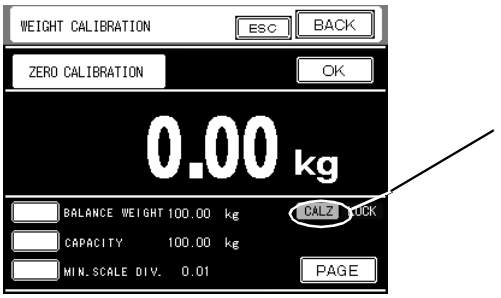


2) Press OK to perform zero tuning and register parameter values.



Pressing BALANCE WEIGHT, CAPACITY, or MIN.SCALE DIVISION key will switch the screen to the corresponding setting screens.

3) When zero calibration is finished, the instrument will beep and CALZ indicator changes to RUN .



4) Calibration data is stored in non-volatile RAM: allow about 30 seconds before you can turn off the instrument

NOV indicator comes on in reversed display while writing data to RAM, then the indicator changes to RUN

See "TROUBLESHOOTING" , on page 157 for the details of calibration errors.

Password that enables calibration while the instrument is in operation

Operation

MODE → PAGE → SYSTEM → PASS WORD → 1269 → OK → PASS WORD → 3000 → OK

After calibration, perform the following sequence to protect the calibration data from unauthorized/accidental alteration.

Password that disables calibration while the instrument is in operation

Operation

MODE → PAGE → SYSTEM → PASS WORD → 1269 → OK → PASS WORD → 3300 → OK

See "SETTING ITEMS LIST" , on page 177 for the parameter items that allow modification while the instrument is in operation.

5-6-2. Span calibration

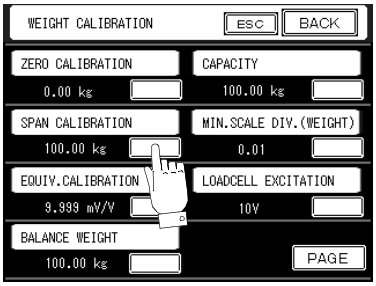
Span calibration adjusts the instrument's span (gain) parameters by placing a known weight on the load cell.
Enter the known weight value to BALANCE WEIGHT field. To obtain a good linearity, use of a weight heavier than 50% Capacity is recommended.
Before performing calibration, make sure unwanted load is applied to the load cell (See "Zero calibration").

Make sure that RUN indicator is off and reading is stabilized. Good calibration cannot be obtained while readings are fluctuating.

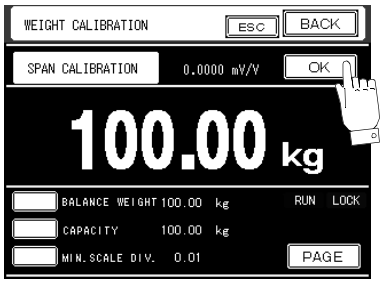
* While the instrument is running, RUN indicator becomes reversed display (light blue). The user must either stop the instrument or enter a password (see page 32 for the password).

Operation

1) Press [SPAN CALIBRATION].

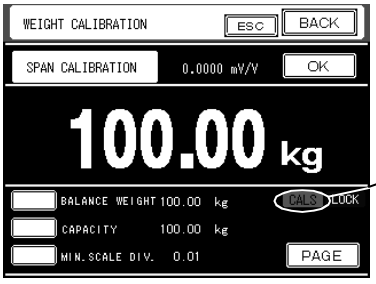


2) Press OK to perform span tuning and register parameter values.



Pressing BALANCE WEIGHT, CAPACITY, or MIN.SCALE DIVISION key will switch the screen to the corresponding setting screens.

3) When span calibration is finished, the instrument will beep and CALS indicator changes to RUN .



CALS flickers while span calibration is running

4） Calibration data is stored in non-volatile RAM: allow about 30 seconds before you can turn off the instrument

NOV indicator comes on in reversed display while writing data to RAM, then the indicator changes to RUN.

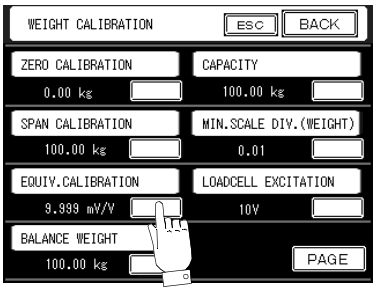
See "TROUBLESHOOTING" , on page 157 for the details of calibration errors.

5-6-3. Equivalent calibration

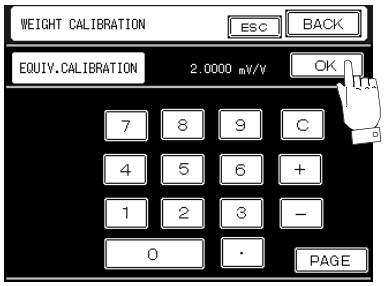
Enter and store the load cell's rated output (mV/V) and the rated capacity value (e.g. the value you want to be displayed).
Enter the rated capacity vale to [BALANCE WEIGHT] field.
Enter the rated output (mV/V) for the load cell.
Make sure that RUN indicator is off.

Operation

1) Press [EQUIVALENT CALIBRATION].



2) Enter the expected load cell output (This is the value the load cell should output when the load you entered in BALANCE WEIGHT is place on it), and press OK .



3) The display changes to COMPARISON screen and CALS starts to flicker.
When equivalent calibration is finished, the instrument will beep and CALS indicator will change to RUN .
If an error message appears on the screen, take an appropriate measure to remove the error and retry the calibration.

4) Calibration data is stored in non-volatile RAM. Wait until "NOV" indication changes to "RUN" before you can turn off the instrument.

See "TROUBLESHOOTING" , on page 157 for the details of calibration errors.

5-6-4. Balance weight

Enter the value of balance weight that is used (actually applied to the load cell) in span calibration.

Operation

MODE → WEI.CALIBRATION → BALANCE WEIGHT

Input range: 0 – 99999 (5 digits, decimal point is automatically set)

5-6-5. Capacity

Defines the maximum weight that can be applied to the instrument.

Operation

MODE → WEI.CALIBRATION → CAPACITY

Input range: 0 – 99999 (5 digits, decimal point is automatically set according to the weight)

5-6-6. Minimum scale division (weight)

Defines the minimum unit value (resolution) to gross weight, weight density, and load ratio measurements.

Operation

MODE → WEI.CALIBRATION → MIN.SCALE DIV.(WEIGHT)

Input range: 1 – 100 (3 digits, decimal point is automatically set according to the weight)

5-6-7. Excitation voltage

Defines the excitation voltage applied across the bridge circuit of the load cell. For better measurements, select a larger value within the allowable range of the load cell.

Operation

MODE → WEI.CALIBRATION → LOADCELL EXCITATION

Allowable value: 5V, 10V

5-6-8. Decimal place (weight)

Define the data representation format (decimal point place) for the measurement items that are defined as variable digits. See "SETTING ITEMS LIST" , on page 177 for further information.

Operation

MODE → WEI.CALIBRATION → PAGE → DECIMAL PLACE(WEIGHT)

Selectable format: 0, 0.0, 0.00, 0.000

5-6-9. Gravitational acceleration

When the load cell is used in a remote location from where it was calibrated, a factor is required to compensate the difference in gravitational acceleration between the two locations. This compensation is not required if the distance between these locations is not large.

In the table below, search the region number (01-16) of the location where weight calibration takes place, and enter the number into the instrument when you perform weight calibration.

Next, search the region number where the instrument is actually used, and enter the number into the instrument.

This guarantees that the regional difference of gravitational acceleration is automatically compensated.

Operation

MODE → WEI.CALIBRATION → PAGE → GRAV.ACCELERATION

Allowable range: 01 – 16 (2 digits)

01	9.806	02	9.805	03	9.804	04	9.803
05	9.802	06	9.801	07	9.800	08	9.799
09	9.798	10	9.797	11	9.796	12	9.795
13	9.794	14	9.793	15	9.792	16	9.791

5-6-10. Initial dead load

Enter and store the initial zero point by value.
Register the load cell's initial dead load (mV/V).
Make sure that RUN indicator is off and follow the same steps described in "Equivalent calibration".

Operation

1) Press [INITIAL DEAD LOAD]
2) Enter the load cell output value corresponding to the initial dead load, and press OK .
3) Pressing OK changes the screen to the comparison display, and CALZ starts to flicker.

   When the settings are finished, the instrument will beep and CALZ indicator will change to RUN .

   If an error message appears on the screen, take an appropriate measure to remove the error and retry the calibration.
4) Calibration data is stored in non-volatile RAM. Wait until NOV indication changes to RUN before you can turn off the instrument.

See"TROUBLESHOOTING" , on page 157 for the details of calibration errors.

Initial load setting should be considered as a simplified version of zero adjustment.
Use the procedure described in "Zero calibration" , on page 31 for better accuracy.

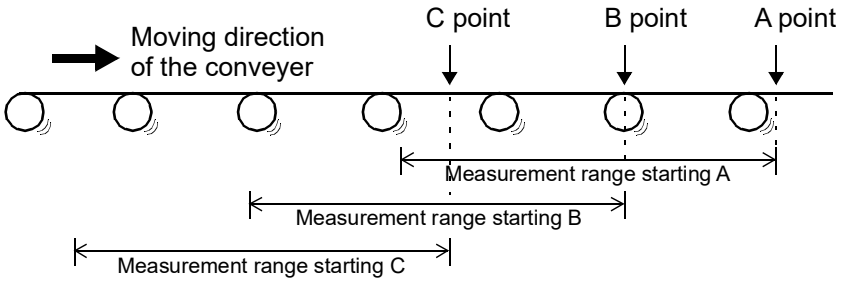
5-7. Settings for Flow Calibration

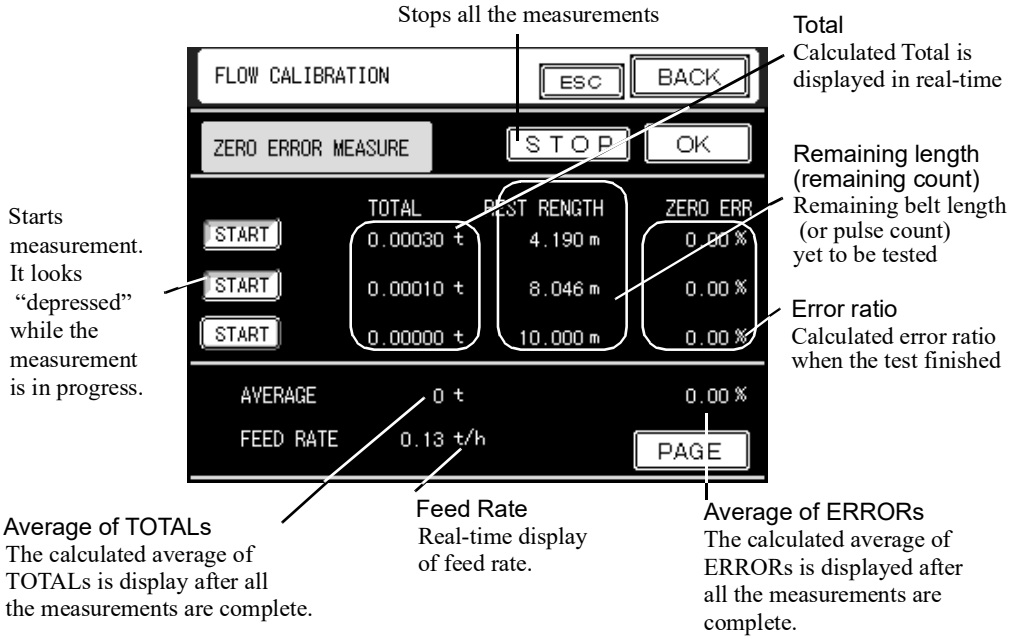
5-7-1. Zero error measure

This function measures the Zero-error point. This function takes measurements disregarding the current [ZERO ERROR SET] setting (e.g. assuming that it is set to 0%).

You can define multiple, up to three, starting points on the conveyer (see the figure below) and take measurements simultaneously and independently to each other. Each measurement can be started independently by pressing the corresponding start-key, and averages of TOTAL and ERROR are calculated after all the measurements have been completed.

Pressing [OK] will register the average error in your system (current [ZERO ERROR SET] settings will be overwritten).





Operation

MODE → FLOW CALIBRATION → ZERO ERROR MEASURE

Note

Using this function during operation ignores the current [ZERO ERROR MEASUREMENT] setting in TOTAL calculation.

5-7-2. Span error measure

A function to measure span error point. This function takes measurements disregarding the current [SPAN ERROR SET] setting (e.g. assuming that it is set to 0%). As in the case with "Zero error measurement", up to three independent reference points can be defined on the conveyer and allows simultaneous measurements.

Pressing OK will register the average error in your system (current [SPAN ERROR SET] settings will be overwritten).

Operation

MODE → FLOW CALIBRATION → SPAN ERROR MEASURE

Note

Using this function during operation ignores the current [SPAN ERROR MEASUREMENT] setting in TOTAL accumulation.

5-7-3. Zero error set

This function set the value to zero error point.

Operation

MODE → FLOW CALIBRATION → ZERO ERROR SET

:Range: -999.99 – +999.99% (5 digits, fixed decimal point)

5-7-4. Span error set

This function set the value to span error point.

Operation

MODE → FLOW CALIBRATION → SPAN ERROR SET

Range: -999.99 – +999.99% (5 digits, fixed decimal point)

5-7-5. Test mode

This function performs error measurement using the set values from [ZERO ERROR SET] and [SPAN ERROR SET].
From the current (old) error value and newly obtained error value, the error value is calculated and updated using the following equation.
New error value = old error value + newly obtained error value

Press [OK] to register the new value to your instrument.

Operation

MODE → FLOW CALIBRATION → TEST MODE

Options: NO, ZERO MEASURE, SPAN MEASURE

5-7-6. Belt length

When you select BELT LENGTH option in [ERROR MEAS.SELECT], this value will be used as a termination reference value to exit error measurement.

Pressing [UNIT] toggles units between meter and millimeter.
Measurement stops when the belt travels the distance defined by this value. It is also used for belt speed calculation when “NORMAL MODE A”, “NORMAL MODE B”, “NORMAL A SLOW”, “PHASE MEASURE”, “ANA. NORMAL A”, or “ANA. A SLOW” is selected for [SPEED ENTRY SELECT].

Operation

MODE → FLOW CALIBRATION → BELT LENGTH

Range: 0.0001 – 99999 (5 digits, arbitrary decimal point)

5-7-7. Cal weight density

This function specifies the weight density (kg/m) of the test chain used for error measurements.

Operation

MODE → FLOW CALIBRATION → CAL WEIGHT DENSITY

Range: 0.001 – 9999 kg/m (4 digits, arbitrary decimal point)

5-7-8. Rated weight density

This function specifies the rated weight density [kg/m] of the belt scale.

Operation

MODE → FLOW CALIBRATION → PAGE → RATED WEIGHT DENSITY

Range: 0.001 – 9999 kg/m (4 digits, arbitrary decimal point)

5-7-9. Decimal place (FLOW)

This function specifies decimal point places for those set values and calculated values whose decimal place changes in according with the flow value.
(See "SETTING ITEMS LIST" , on page 177 for further information.)

Operation

MODE → FLOW CALIBRATION → PAGE → DECIMAL PLACE (FLOW)

Options: 0, 0.0, 0.00, 0.000

5-7-10. Speed input count meas (DAC required)

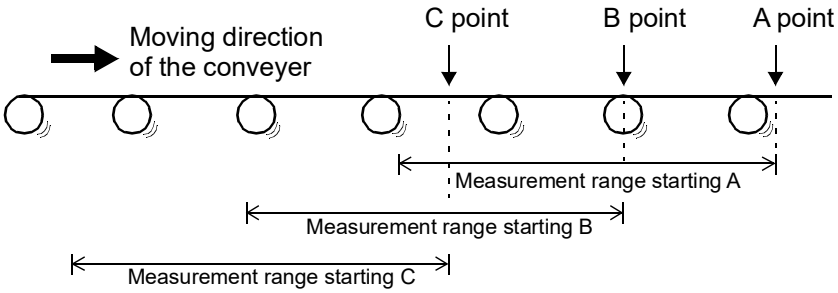
This function either counts pulses from the velocity detector (NORMAL MODE) or measures rotations of the rotary encoder (PHASE MEASURE). Using this function, you can determine the numerical relationship between belt's travel and the pulse count (distance of belt progress per a pulse), or rotations of the rotary encoder (distance of belt progress per a rotation).

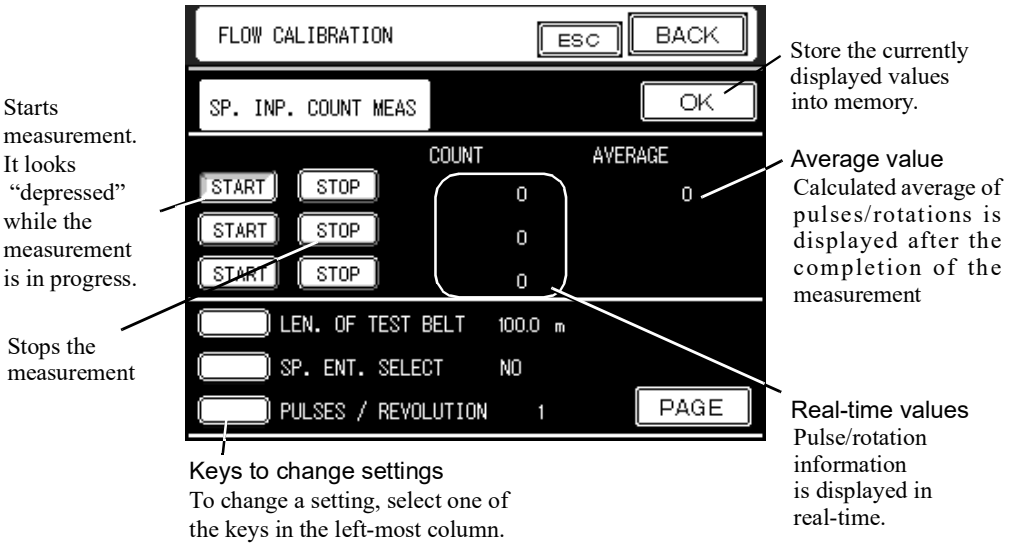
You can define up to three starting points on the conveyer (see the figure below) and take measurements simultaneously and independently to each other. Each measurement can be started by pressing the correspondent START key, and stopped by pressing STOP key.

Average value is calculated after all the measurements are finished.

Pressing OK overwrites the [SPEED INPUT COUNT] setting by the newly obtained (displayed) value.

* PHASE MEASURE mode requires pre-setting of pulse/rotation ratio (PULSE COUNT/ROTATION).





Operation

MODE → FLOW CALIBRATION → PAGE → SPPE INPUT COUNT MEAS

5-7-11. Speed input count

When “NORMAL MODE A”, “NORMAL MODE B”, “NORMAL A SLOW”, “ANA. NORMAL A”, or “ANA. A SLOW” is selected in [SPEED ENTRY SELECT], specify a pulse count (9-digit integer) that represents the travel length of the belt (BELT LENGTH).
For example, if the [BELT LENGTH] is set to 10m, and the rotary encoder generates 25 pulses during a travel of 10m, enter “25” in this field.

When PHASE MEASURE is selected in [SPEED ENTRY SELECT], specify a count of rotation (9-digit integer, decimal place is fixed to 2nd digit) that corresponds to the travel length (BELT LENGTH).
For example, if the [BELT LENGTH] is set to 10m, and the rotary encoder rotates 3.70 times per 10m, enter “3.70” in this field.

Operation

MODE → FLOW CALIBRATION → PAGE → SPPED INPUT COUNT

Range: 1 – 999999999 (9 digits)
0.01 – 9999999.99 (9 digits, decimal place fixed)

5-7-12. Error meas.select

You can select a reference value used to stop the zero or span error measurements (ZERO ERROR MEASURE/SPAN ERROR MEASURE).
If you select “BELT LENGTH”, the measurement stops when the travel length of the belt, from the start of error measurement, exceeds the value specified by [BELT LENGTH].
If you select “SPEED INPUT COUNT”, the measurement stops when the speed pulse count from the start of error measurement exceeds the value specified by [SPEED INPUT COUNT].

Operation

MODE → FLOW CALIBRATION → PAGE → ERROR MEAS.SELECT

Options: TESTING BELT, SPEED COUNT

5-7-13. Min.scale div.(FLOW)

This function specifies the minimum measurement division (scale interval) for belt speed, feed rate, and feed ratio.

Operation

MODE → FLOW CALIBRATION → PAGE → MIN.SCALE DIV.(FLOW)

Range: 1 – 100 (3 digits, decimal point moveable)

5-7-14. Z_error upper limit

This is the set value with which to monitor load ratio while performing automatic zero-point adjustment using Z_ERR key or control signal input.
Measurements cannot start while load ratio exceeds the set value. Also, measurements will be aborted when the measured value exceed it during operation, generating a ZERO ERR. MEAS. NG control message.

Operation

MODE → FLOW CALIBRATION → PAGE → Z_ERR UPPER LIMIT

Range: 0 – 999.99% (5 digits, decimal place fixed)

5-7-15. Zero point auto adjustment

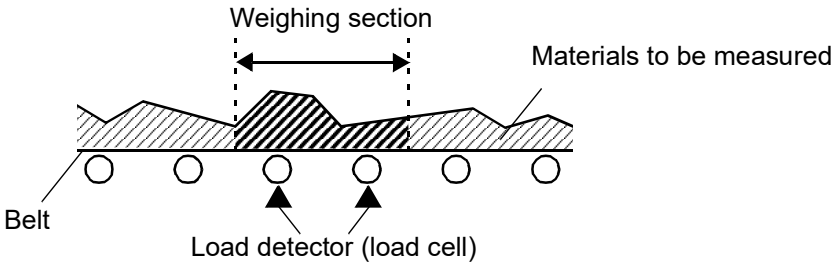
Zero point auto-adjustment are triggered either by Z_ERR key or control signal (rising edge on the 28 pin). The zero point adjustment is performed in test mode, and ZERO ERROR SET value is automatically updated.
Note that the measurement cannot start while load ratio exceeds Z_ERR upper limit. Also, measurements will be aborted when the measured value exceed it during operation. Exits from measurement caused by pressing STOP key or the arrival of falling edge on 28-pin are also considered as abnormal exits, generating the ZERO ERR. MEAS. NG control message. Abnormal ends do not update the ZERO ERROR SET value: the value before automatic zero adjustment is retained.
Abnormal ends generate a ZERO ERR. MEAS. NG control message.

6. SETTING AND ADJUSTMENT OF READING

6-1. Operation

6-1-1. Weighing section

This function specifies the weighing section length in millimeter. The weighing section represents the effective length of the portion of the belt that carries measured materials whose weight is detected by the weighing sensor.



Operation

MODE → OPERATION → WEIGHING SECTION

Range: 0.0001 – 99999mm (5 digits, decimal place arbitrary)

6-1-2. Rated feed rate (FS)

This parameter specifies the full-scale value to the feed rate. The value should be set so that FEED RATIO indicates 100% when LOAD RATIO is 100%.

Operation

MODE → OPERATION → RATED FEED RATE

Range: 0.0001 – 99999 (5 digits, decimal place arbitrary)

6-1-3. Feed unit

This parameter specifies the unit for FEED RATE and TOTAL measurement.

Operation

MODE → OPERATION → FFED UNIT

Options: kg/h,kg t/h,t

6-1-4. Operation select

Depending on the option selected in this field, the system's STAR/STOP is controlled either by internal (touch-panel key) or external input. Auto-resume function (restore states and resume operation after a power failure) can only be enabled when internal input is selected. If "EXTERNAL ENTRY" is selected in this field, the RUNNING control signal is used to start/stop the operation: touch panel is disabled. If "KEY POW.C. ON" or "KEY POW.C. OFF" is selected, START and STOP key on the upper pane of the comparison and message screen controls start/stop of the operation (control signal RUNNING is ignored).

Operation

MODE → OPERATION → OPERATION SELECT

Options: EXTERNAL ENTRY, KEY POW.C. ON, KEY POW.C. OFF

6-1-5. Rated belt speed

This parameter specifies the rated value of the belt speed. If "Analog 1Ch. mode" or "Analog 2 Ch. mode" is selected in [SPEED ENTRY SELECT], the rated belt speed is set to the full-span value of the analog input. If "No" is selected in [SPEED ENTRY SELECT], the value specified in this field defines the rated belt speed.

Operation

MODE → OPERATION → RATED BELT SPEED

Input Range: 0.01 – 999.99 m/min (5 digits, arbitrary decimal place)

6-1-6. Dead band

PID control is performed only when the absolute value of CTRL.DEVIATION is greater than dead band. If this is not the case, the CONTROL RATE of the previous instance will be maintained. If frequent ON/OFF transitions are expected while controlling the system, proper dead band setting is effective to prevent output chattering and noise interferences.
If the value for the dead band is set to 0.0, PID control is performed at all times.

Operation

MODE → OPERATION → PAGE → DEAD BAND

Input Range: 0.0 – 999.9% (4 digits, decimal place fixed to 1st position)

6-1-7. Dead band load ratio

While the value of DEAD BAND LOAD RATIO (%) is greater than LOAD RATIO (%), F805AT-BC turns on “NZ” status indicator and set the NZ external signal to “ON”. Accumulation is not performed in this state. Setting DEAD BAND LOAD RATIO to zero disables accumulation calculation.

Operation

MODE → OPERATION → DEAD BAND LOAD RATIO

Input Range: 0 – 99 % (2 digits)

6-1-8. Dead band belt speed

F805AT-BC performs arithmetic calculations assuming the belt speed to be 0.00 m/min if:
Belt speed [m/min] < Rated belt speed [m/min] × Dead band [%]/100

Operation

MODE → OPERATION → DEAD BAND BELT SPEED

Input Range: 0 – 99 % (2 digits)

6-1-9. Moisture ratio

This parameter specifies the moisture content (%) of the material to be conveyed. Moisture is excluded from accumulation calculation. This value does not affect weight density, feed rate, load rate, and feed ratio measurements.

Operation

MODE → OPERATION → PAGE → MOISTURE RATIO

Input Range: 0 – 99 % (2 digits)

6-1-10. Feed pulse (W/P) 1

This parameter defines weight value per one pulse of PULSE OUTPUT1.

Operation

MODE → OPERATION → PAGE → FEED PULSE (W/P)1

Options: 100g, 1kg, 10kg, 100kg, 1t

6-1-11. Feed pulse (W/P) 2

This parameter defines weight value per one pulse of PULSE OUTPUT2. The unit is defined by the setting of [FEED UNIT].

Operation

MODE → OPERATION → PAGE → FEED PULSE (W/P)2

Options: 1*0.001, 2*0.001, 5*0.001, 1*0.01, 2*0.01, 5*0.01,
1*0.1, 2*0.1, 5*0.1, 1*1, 2*1, 5*1

6-1-12. Pulse width 1

This parameter defines the pulse width (millisecond) for the PULSE OUTPUT1.

Operation

MODE → OPERATION → PAGE → PULSE WIDTH 1

Options: 25 ms, 50 ms, 100 ms, 200 ms, 500 ms

6-1-13. Pulse width 2

This parameter defines the pulse width (millisecond) for the PULSE OUTPUT2.

Operation

MODE → OPERATION → PAGE → PULSE WIDTH 2

Options: 25 ms, 50 ms, 100 ms, 200 ms, 500 ms

6-1-14. Total W. disp. digit

This parameter defines the unit for TOTAL W.DISP.DIGIT.

Operation

MODE → OPERATION → PAGE → TOTAL W DISP.DIGIT

Options: 1g or 1kg, 10g or 10kg, 100g or 100kg, 1kg or 1t

6-1-15. Alarm time

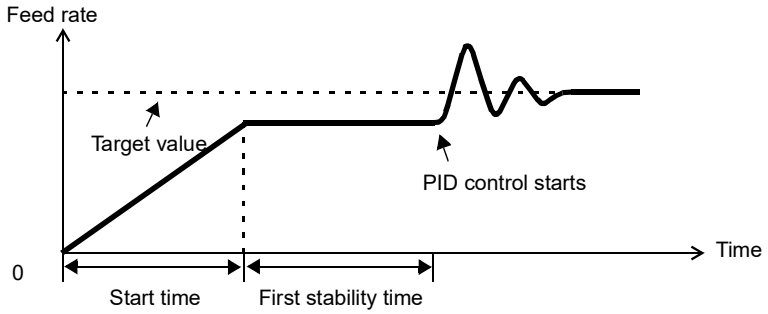
Modifying the target value during operation can, depending the situation, bring about large deviation and introduces variety of alarms (CONTROL DEVIAION over/under, FLOW SETTING over/under, CONTROL LIMIT over). In this situation, ALARM TIME can be used to specify the length of time during which these alarms are ignored. After a target value modification, normal comparison operations will resume after the ALARM TIME expires.

Operation

MODE → OPERATION → PAGE×2 → ALARM TIME

Input Range: 0 – 999 sec (3 digits, no decimal place)

6-1-16. Start time, First stability time



When the operation starts, control rate linearly increases up to its initial set value until the start time expires. Following this, the system enters into idling mode until the first stability time expires (During idling mode operation, control rate is LOCKed and weight data are not sampled. Thus, the delay elements of the whole system during these periods, waiting for the system to stabilize, are not reflected in the later control outputs). Normal PID control starts when the first stability time expires.

* Start time and First Stability Time do not take effect in FIXED and AUTO COORDINATE mode.
* PID control takes effect only in CONT.FEED RATE and CONT.TOTAL mode: LOCK operation is performed in other modes using a fixed control rate.
* If START COORDIN.VALUE is set to zero, the initial control value (Initial value when the system is turned on) is calculated automatically using AT COORDINATE 1 – 4. If the user desires to offset mechanical variations, he can tune the initial control value manually.

Operation

MODE → OPERATION → PAGE×2 → START TIME

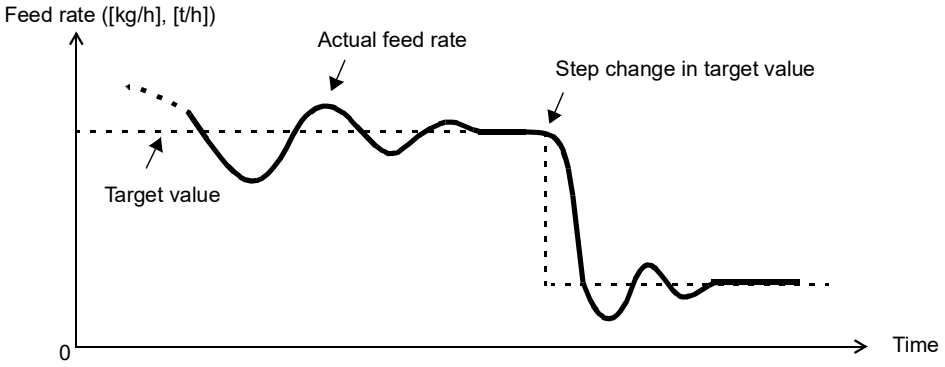
MODE → OPERATION → PAGE×2 → FIRST STABILITY TIME

Input Range: 0 – 99 sec (2 digits, no decimal place)

6-1-17. Operation mode

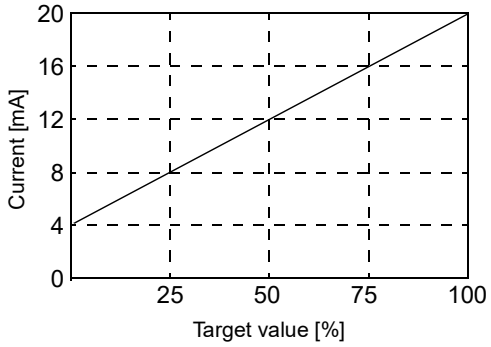
● Continued feed rate

This mode controls the system so as to maintain constant flow (Feed Rate). Target feed rate value is specified using t/h or kg/h unit depending on the [FEED UNIT] setting.



● Fixed

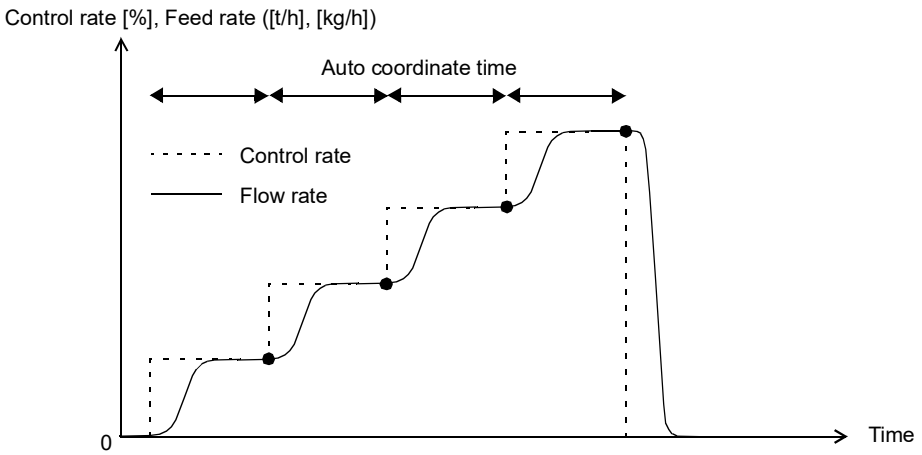
This mode outputs fixed control rate irrespective of the feed rate. The fixed control rate can be specified in percent, and corresponding current output is produced.



Target-Current output relation in Fixed mode operation

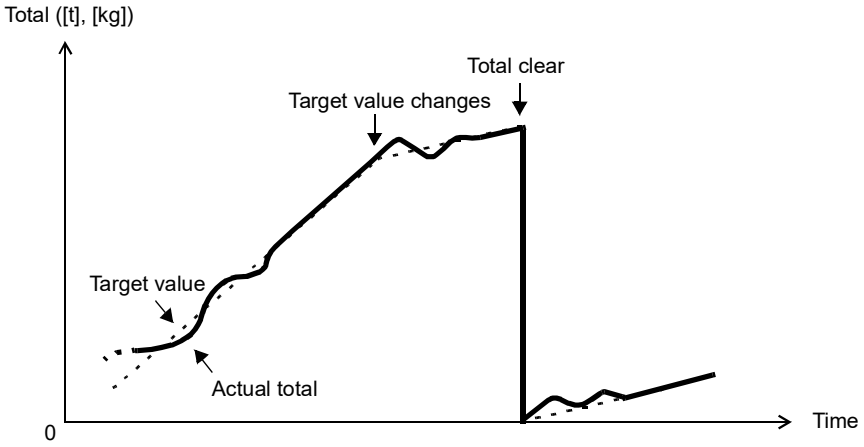
● Auto coordinate

This mode automatically checks and registers the relationship between control rate and feed rate. See "AT coordin time, AT coordinate 1 –4, AT coordin out 1 -4" , on page 85 for details.



● Cont. total

This mode controls the system so that the ratio of following two parameter values maintains a constant value: 1) total amount of material conveyed from the start of operation, 2) elapsed time from the start of operation. Depending on the setting in [FEED UNIT], specify the target feed rate value in t/h or kg/h.
If you change the target value or clear the TOTAL, F805AT-BC starts from that point in time to control the system so that the ratio is kept constant.



● External entry

Use this function to specify Operation mode using external inputs (32 - 33 pins of control connector).

Operation mode 2 1

0 – 3

(0: CONT. FEED RATE, 1: FIXED,
2: AUTO COORDINATE, 3: CONT. TOTAL)

Operation

MODE → OPERATION → PAGE×2 → OPERATION MODE

Options: CONT. FEED RATE, FIXED, AUTO COORDINATE,
CONT. TOTAL, EXTERNAL ENTRY

6-2. Function

6-2-1. Total weight clear

This function clears the Total Weight (this function is disabled while the system is running).

Operation

MODE → FUNCTION → TOTAL WEIGHT CLEAR

Options: NO, YES

6-2-2. Start/Stop key

This function enables/disables START and STOP keys to start/stop the operation. These keys appear on the upper pane of comparison and message screen. Note that these keys are activated only when KEY POW.C. ON or KEY POW.C.OFF has been selected in [OPERATION SELECT].

Operation

MODE → FUNCTION → START/STOP KEY

Options: INVALID, VALID

6-2-3. Digital zero (DZ)

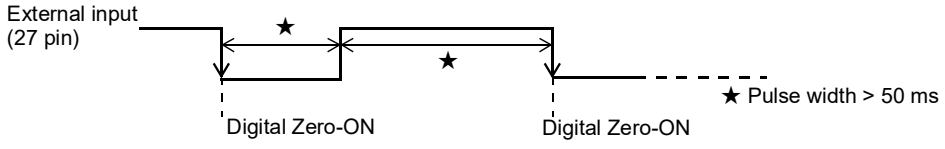
This function reset GROSS WEIGHT value to zero. Performing Digital Zero while the gross weight exceeds the value specified by [DZ REGULATION VALUE] gives rise to an alarm (ZALM is displayed in red reverse mode).
When this alarm appears, the value set to [DZ REGULATION VALUE] will be automatically subtracted from the gross weight.

Operation

MODE → FUNCTION → DIGITAL ZERO

Options: NO, YES

DZ function can be controlled using one of the external signals connected to the rear panel I/O connector (27 pin).



6-2-4. Digital zero clear

This function clears the value set to Digital Zero. Performing this function while ZALM is in reverse-display (red), the Digital Zero value is cleared and ZALM goes off.

Operation

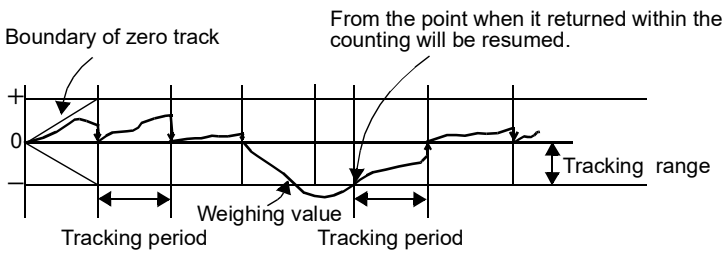
MODE → PAGE → SYSTEM → PASS WORD

Enter two numbers in the PASS WORD field: 1269, and then 1111

6-2-5. Zero tracking (ZT)

This function is used to correct/compensate slow zero-point drift or small zero-point shift caused by residual materials such as mud, dirt, and snow.
[ZERO TRACKING (PERIOD)] specifies the Zero-tracking period, and [ZERO TRACKING (RANGE)] specifies the Zero-tracking width.
Like Digital Zero, performing Zero-tracking while the gross weight exceeds the value specified by [DZ REGULATION VALUE] gives rise to an alarm (ZALM is displayed in red reverse mode).

- Zero tracking is the function to reset gross weight to zero automatically when the state remaining the zero point drift within the zero tracking range continues more than set period.
- Zero tracking period must be set between 0.1 ~ 9.9 second and its range must be set between 1 ~ 99 using 1/4 resolution interval of weight display.
  For instance, 02 corresponds to 0.5 and 12 corresponds to 3 of weight display.
  Zero tracking range is not proportional to the Minimum scale division regardless of the setting state of Minimum scale division.
  Zero tracking does not work if you set the period to 0.0 sec. and range to 00.



Operation

MODE → FUNCTION → ZERO TRACKING (PERIOD)

MODE → FUNCTION → ZERO TRACKING (RANGE)

6-2-6. DZ regulation value

This value specifies the allowable range of zero-point correction (deviation from zero-calibration), which is referenced by [DIGITAL ZERO] and Zero Tracking function. Performing Digital Zero operation or Zero tracking outside the range, ZALM comes on in reverse-display (red) to notify the abnormal condition.

Operation

MODE → FUNCTION → DZ REGULATION VALUE

Input range: 0 – 99.99 kg (4 digits, decimal place fixed)

6-2-7. Z_ERR key

This function enables/disables the Z_ERR key, which is used to perform ZERO POINT AUTO ADJUSTMENT in the comparison and message screens.

Operation

MODE → FUNCTION → ZERO ERROR KEY

Options: INVALID, VALID

6-2-8. Weighing code selection

This function selects the method (KEY INPUT, or EXTERNAL ENTRY) to specify the CODE. If you select KEY INPUT, the CODE can be selected using ▲ , ▼ and OK keys in EACH CODE screen.

If you select EXTERNAL ENTRY, CODE is specified by external signals (11 – 14 and 36-39 pins in the control connector).

* Currently selected CODE number is displayed (blue) in the upper pane of the EACH CODE screen.

Operation

MODE → FUNCTION → PAGE → WEIGHING CODE SELECTION

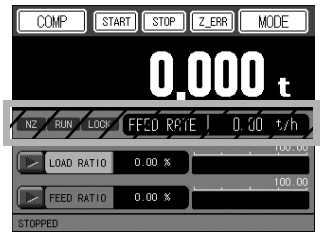
Options: KEY INPUT, EXTERNAL ENTRY

6-2-9. I/O monitor display

The view as popup which can monitor the operation state of an external I/O signal by pushing a specific domain is performed. Select Effect or inhibit.

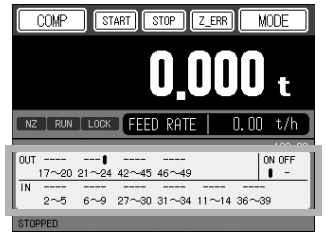
- INHIBIT..... A view as popup is not performed.
- EFFECT ..... If a specific domain is pushed in a comparison screen, a pop-up screen will be displayed.
  In order to close a pop-up screen, please push the inside of a pop-up screen.

A push on a specific domain will display a pop-up screen.



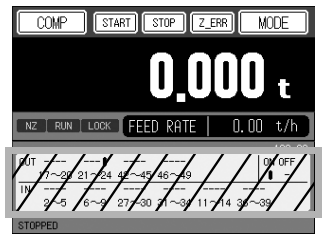
specific domain

The inside of a pop-up display becomes the display interlocked with the operation state of the output pin (17-24 and 42-49 pin) / input pin (2-9, 11-14, 27-34, and 36-39 pin) of control I/O.
It is displayed by "●" at the time of ON, and is displayed by "-" at the time of OFF.



pop-up display

A screen will be closed if a specific domain is pushed into a pop-up display.



specific domain

* In the state where the pop-up screen is displayed, if this setup is repealed with a communication command etc., a pop-up screen will be closed.

Operation

MODE → FUNCTION → PAGE → I/O MONITOR DISPLAY

Options: INHIBIT, EFFECT

6-3. Communication (RS-232C, SI/F, SI/FII)

6-3-1. Baud rate

Use this menu item to select baud rate (signal transmission velocity) for RS-232C port.

Operation

MODE → PAGE → COMMUNICATION → BAUD RATE

Options: 1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps

6-3-2. Character length

Use this menu item to select the character length for RS-232C port.

Operation

MODE → PAGE → COMMUNICATION → CHARACTER LENGTH

Options: 7bit, 8bit

6-3-3. Parity bit

Use this menu item to select the parity bit for RS-232C port.

Operation

MODE → PAGE → COMMUNICATION → PARITY BIT

Options: NONE, ODD, EVEN

6-3-4. Stop bit

Use this menu item to select the stop bit for RS-232C port.

Operation

MODE → PAGE → COMMUNICATION → STOP BIT

Options: 1bit, 2bit

6-3-5. Terminator

Use this menu item to select which terminator to use with RS-232C.

Operation

MODE → PAGE → COMMUNICATION → TERMINATOR

Options: CR, CR+LF

6-3-6. SI/F output1 select

Use this menu item to select the data 1 to send out via SI/F.

Operation

MODE → PAGE → COMMUNICATION → SIF OUTPUT1 SELECT

Options: BELT SPEED, WEIGHT DENSITY, FEED RATE, LOAD RATIO,
FEED RATIO, GROSS WEIGHT, TOTAL (UP. 4 DIG.),
TOTAL (LO. 5 DIG.)

6-3-7. SI/F output2 select

Use this menu item to select the data 2 to send out via SI/F.

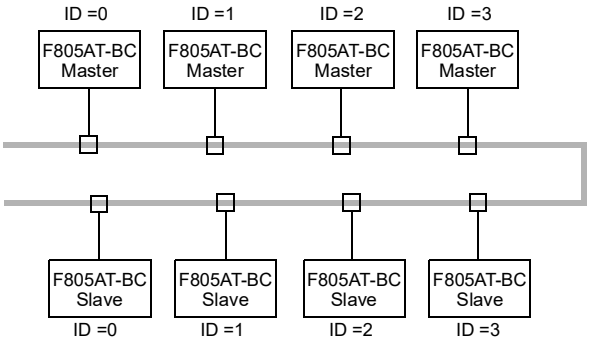
Operation

MODE → PAGE → COMMUNICATION → SIF OUTPUT2 SELECT

Options: BELT SPEED, WEIGHT DENSITY, FEED RATE, LOAD RATIO,
FEED RATIO, GROSS WEIGHT, TOTAL (UP. 4 DIG.),
TOTAL (LO. 5 DIG.)

6-3-8. SI/FII ID

Use this menu item to set an ID to each of the F805AT-BCs linked to SI/FII network. Up to eight F805AT-BCs can be connected in SI/FII network, up to four of them can be operate as masters. They are grouped together using the ID (see the figure below) to form up to four groups.



This scheme allows F805AT-BCs with different ID number to be linked in the same network, contributing to reduce wiring cost and simplify maintenance.

Operation

MODE → PAGE → COMMUNICATION → PAGE → SI/FII ID

Range: 0 – 3 (1 digit)

6-4. Comparison

6-4-1. Alarm upper limit

HI alarm lamp comes on if the item set in [ALARM MODE] exceeds this set value (HI is displayed in reversed red while RUNNING), and the external output HI turns ON.
This value is ignored if "COMPARISON OFF" is selected in [ALARM MODE].

Operation

MODE → COMPARISON → ALARM UPPER LIMIT

Range: 0 – 999.99% (5 digits, decimal place fixed)

6-4-2. Alarm lower limit

LO alarm lamp comes on if the item set in [ALARM MODE] falls short of this set value (LO is displayed in reversed red while RUNNING), and the external output LO turns ON.
This value is ignored if "COMPARISON OFF" is selected in [ALARM MODE].

Operation

MODE → COMPARISON → ALARM LOWER LIMIT

Range: 0 – 999.99% (5 digits, decimal place fixed)

6-4-3. Alarm mode

Use this menu item to specify which parameter (Feed Ratio or Load Ratio) is to be compared with the upper and lower limit.
OFF is displayed if "COMPARISON OFF" is selected.

Operation

MODE → COMPARISON → ALARM MODE

Options: COMPARISON OFF, FEED RATIO, LOAD RATIO

6-4-4. Total final

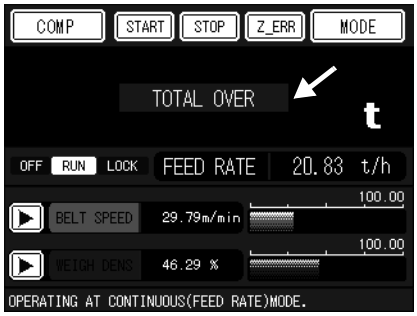
Total final over occurs when TOTAL becomes greater than TOTAL FINAL and the external output signal TOTAL FINAL OVER (pin 44) turns on accordingly. If the main arithmetic field is selected to display TOTAL, the message TOTAL OVER is displayed (reversed red) in the field. If feed rate is selected for the main arithmetic field, TOTAL OVER is displayed in the sub-arithmetic field in reversed red.
This message goes out when [TOTAL WEIGHT CLEAR] is executed, and the output signal is reset to its original state.
This message and output signal are also reset if "ALARM&CONTINUE" is selected in [TOTAL FINAL MODE] and the total final value overflows beyond nine digits and zero-cleared.

Operation

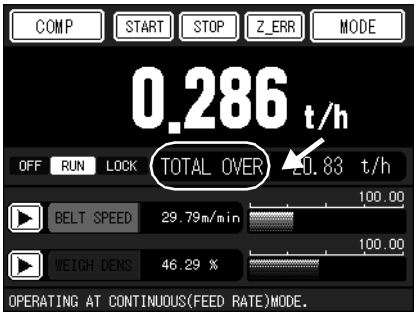
MODE → COMPARISON → TOTAL FINAL

Range: 0 – 999999999 (9 digits, decimal place floating)

[Main arithmetic display: TOTAL]



[Main arithmetic display: FEED RATE]



6-4-5. Total final mode

Use this menu item to select if the Total Final value is to be compared with the set values.

COMPARISON OFF:	comparison with [TOTAL FINAL] set value is disabled.
ALARM&CONTINUE:	the run continues if TOTAL FINAL OVER occurs.
ALARM&STOP:	the run stops if TOTAL FINAL OVER occurs. Total pulse output continues if TOTAL calculation comes to a halt.

Operation

MODE → COMPARISON → TOTAL FINAL MODE

Options: COMPARISON OFF, ALARM&CONTINUE, ALARM&STOP

6-4-6. Belt speed over

Over scale alarm “OFL1” is activated when the belt speed becomes greater than BELT SPEED OVER set value. Comparison is disabled if the value is set to 999.99. Also, the comparison is disabled if [BELT SPEED OVER ASC.] is set to zero second.

Operation

MODE → COMPARISON → BELT SPEED OVER

Range: 0 – 999.99 m/min (5 digits, decimal place fixed)

6-4-7. Weight density over

Over scale alarm “OFL2” is activated when weight density becomes greater than WEIGHT DENSITY OVER set value. Comparison is disabled if the value is set to 99999. Also, the comparison is disabled if [WEIGHT DENSITY OVER OVER ASC.] is set to zero second.

Operation

MODE → COMPARISON → WEIGHT DENSITY OVER

Range: 0 – 99999 kg/m (5 digits, decimal place floating)

6-4-8. Feed rate over

Over scale alarm “OFL3” is activated when the feed rate becomes greater than FEED RATE OVER set value. The unit for this value is either kg/h or t/h depending on the selection in [FEED UNIT]. Comparison is disabled if the value is set to 99999. Also, the comparison is disabled if [FEED RATE OVER ASC.] is set to zero second.

Operation

MODE → COMPARISON → PAGE → FEED RATE OVER

Range: 0 – 99999 (5 digits, decimal place floating)

6-4-9. Load ratio over

Over scale alarm “OFL4” is activated when the load ratio becomes greater than LOAD RATIO OVER set value. Comparison is disabled if the value is set to 999.99. Also, the comparison is disabled if [LOAD RATIO OVER ASC.] is set to zero second.

Operation

MODE → COMPARISON → PAGE → LOAD RATIO OVER

Range: 0 – 999.99 % (5 digits, decimal place fixed)

6-4-10. Feed ratio over

Over scale alarm “OFL5” is activated when the feed ratio becomes greater than FEED RATIO OVER set value. Comparison is disabled if the value is set to 999.99. Also, the comparison is disabled if [FEED RATIO OVER ASC.] is set to zero second.

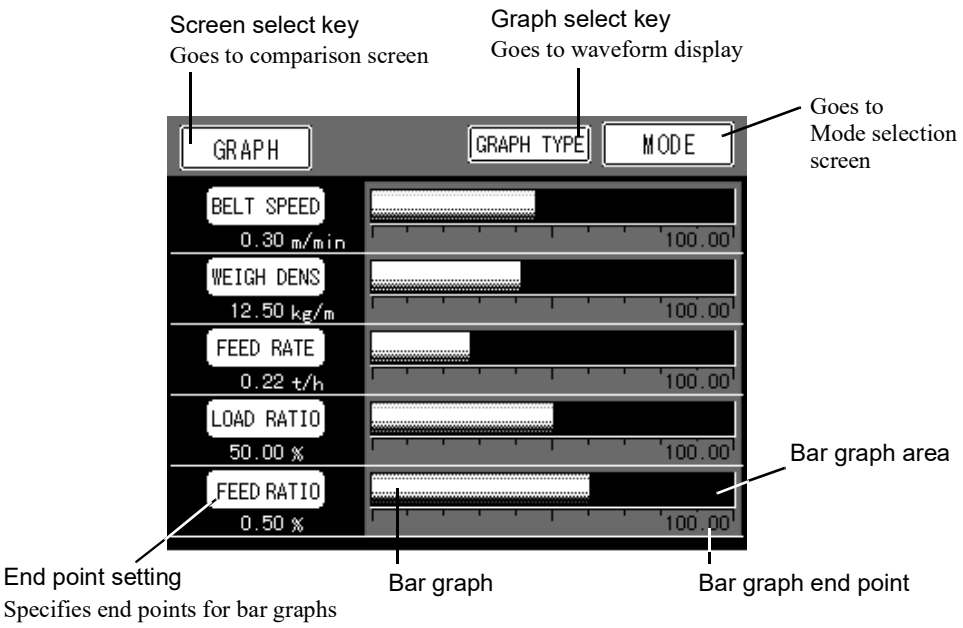
Operation

MODE → COMPARISON → PAGE → FEED RATIO OVER

Range: 0 – 999.99 % (5 digits, decimal place fixed)

6-5. Graph Setting

6-5-1. Bar graph screen



6-5-2. Belt speed end point

Use this item to specify the full-scale value for belt speed bar graph.

Operation

MODE → GRAPH SETTING → BELT SPPED END POINT

Range: 0.01 – 999.99 m/min (5 digits, decimal place fixed)

6-5-3. Weight density end point

Use this item to specify the full-scale value for weight density bar graph.

Operation

MODE → GRAPH SETTING → WEI DENS END POINT

Range: 1 – 99999 kg/m (5 digits, decimal place floating)

6-5-4. Feed rate end point

Use this item to specify the full-scale value for feed rate bar graph. The unit for this value is either kg/h or t/h depending on the selection in [FEED UNIT].

Operation

MODE → GRAPH SETTING → FEED RATE END POINT

Range: 1 – 99999 (5 digits, decimal place floating)

6-5-5. Load ratio end point

Use this item to specify the full-scale value for load ratio bar graph.

Operation

MODE → GRAPH SETTING → LOAD RATIO END POINT

Range: 0.01 – 999.99 % (5 digits, decimal place fixed)

6-5-6. Feed ratio end point

Use this item to specify the full-scale value for feed ratio bar graph.

Operation

MODE → GRAPH SETTING → FEED RATIO END POINT

Range: 0.01 – 999.99 % (5 digits, decimal place fixed)

6-5-7. Disp. data select 1

Use this menu item to select data to be displayed in the upper part of comparison screen. Selecting “EXTERNAL ENTRY” in this menu enable an external signal to select data. (3-5 pins of external I/O connector).

Operation

MODE → GRAPH SETTING → DISP DATA SELECT 1

Options: BELT SPEED, WEIGHT DENSITY, FEED RATE, LOAD RATIO,
FEED RATIO, GROSS WEIGHT, CONTROL RATE *1,
CTRL. DEVIATION *2, EXTERNAL ENTRY

*1 Bar graph end point is fixed to 100.0%

*2 Bar graph end point is fixed to 100.0%.
The bar graph represents absolute value.

6-5-8. Disp. data select 2

Use this menu item to select data to be displayed in the lower part of comparison screen. Selecting “EXTERNAL ENTRY” in this menu enable an external signal to select data. (6-8 pins of external I/O connector).

Operation

MODE → GRAPH SETTING → DISP DATA SELECT 2

Options: BELT SPEED, WEIGHT DENSITY, FEED RATE, LOAD RATIO,
FEED RATIO, GROSS WEIGHT, CONTROL RATE *1,
CTRL. DEVIATION *2, EXTERNAL ENTRY

*1 Bar graph end point is fixed to 100.0%

*2 Bar graph end point is fixed to 100.0%.
The bar graph represents absolute value.

6-5-9. Points in waveform graphic display

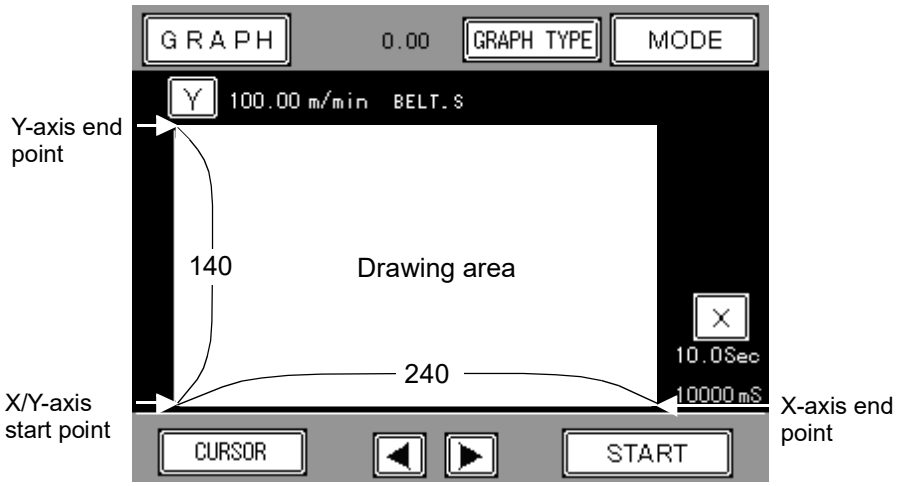
X-axis: X-axis represents time.

Time span starting from START input to X-axis end point is displayed in one screen. The graph consists of 240 points (excluding zero) in x-direction, each of which represents the representative value during the time-split.

Y-axis: X-axis represents weight.

The screen spans from Y START POINT to Y END POINT.

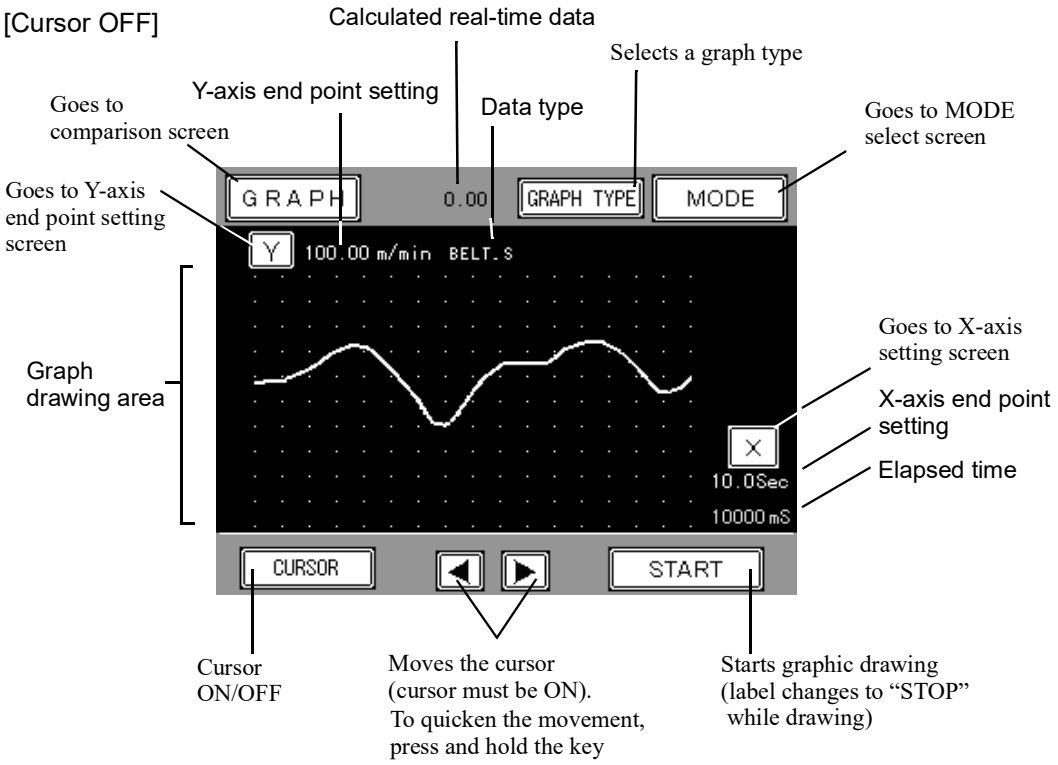
The graph consists of 140 points in y-direction.



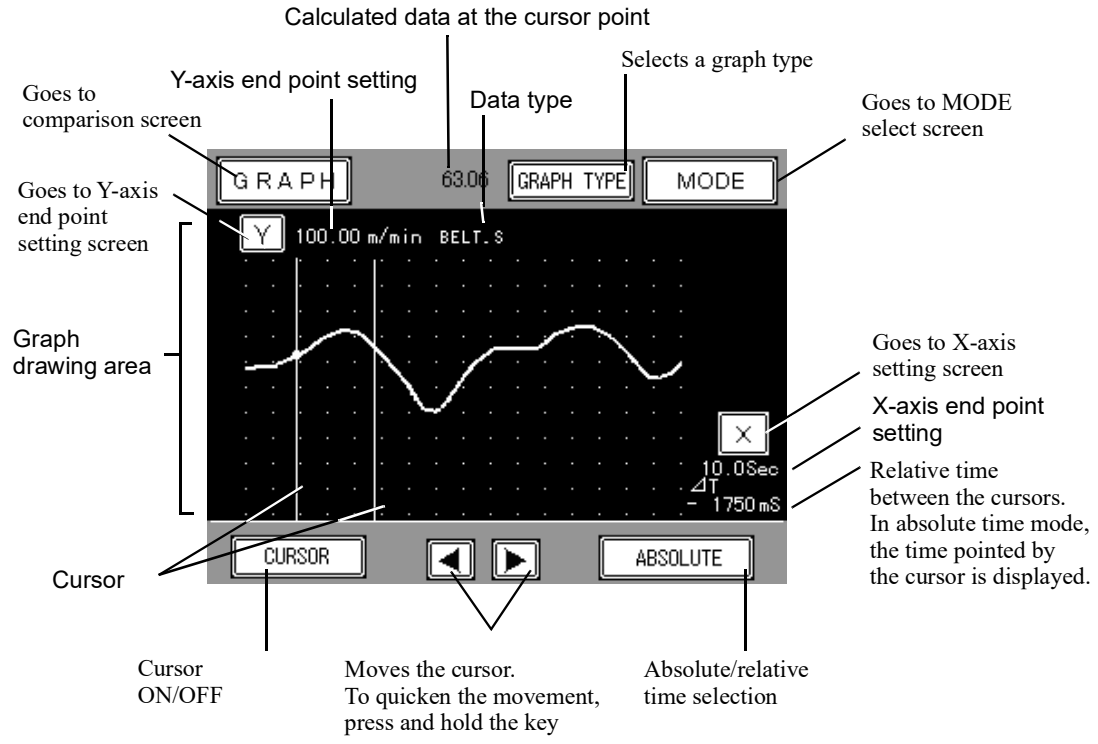
6-5-10. Details of waveform display

● **No split**

[Cursor OFF]

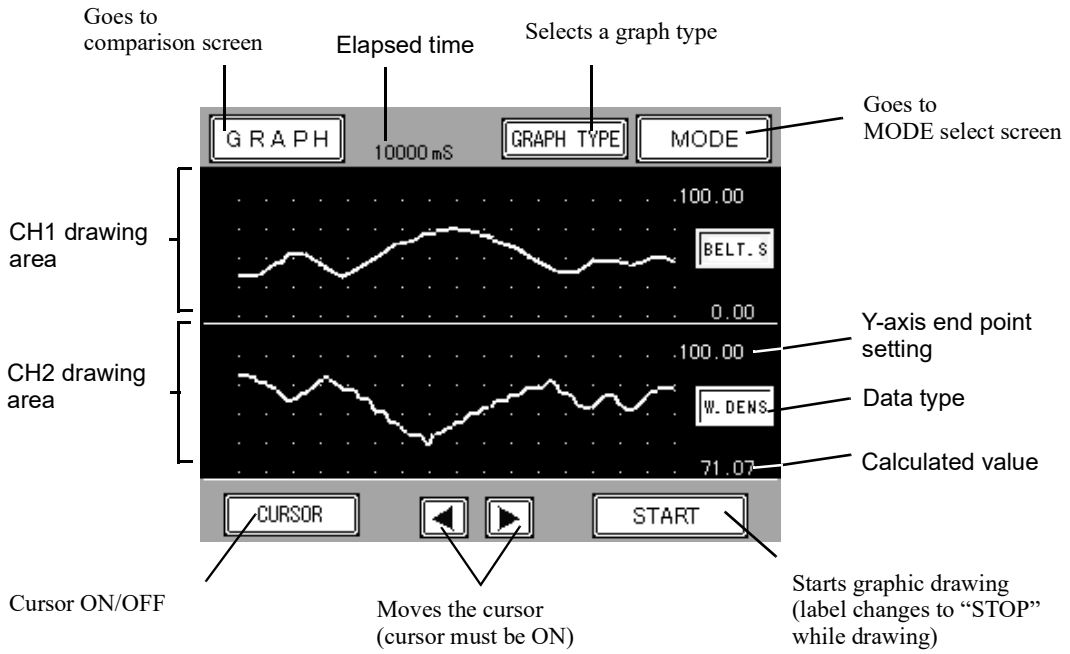


[Cursor ON]

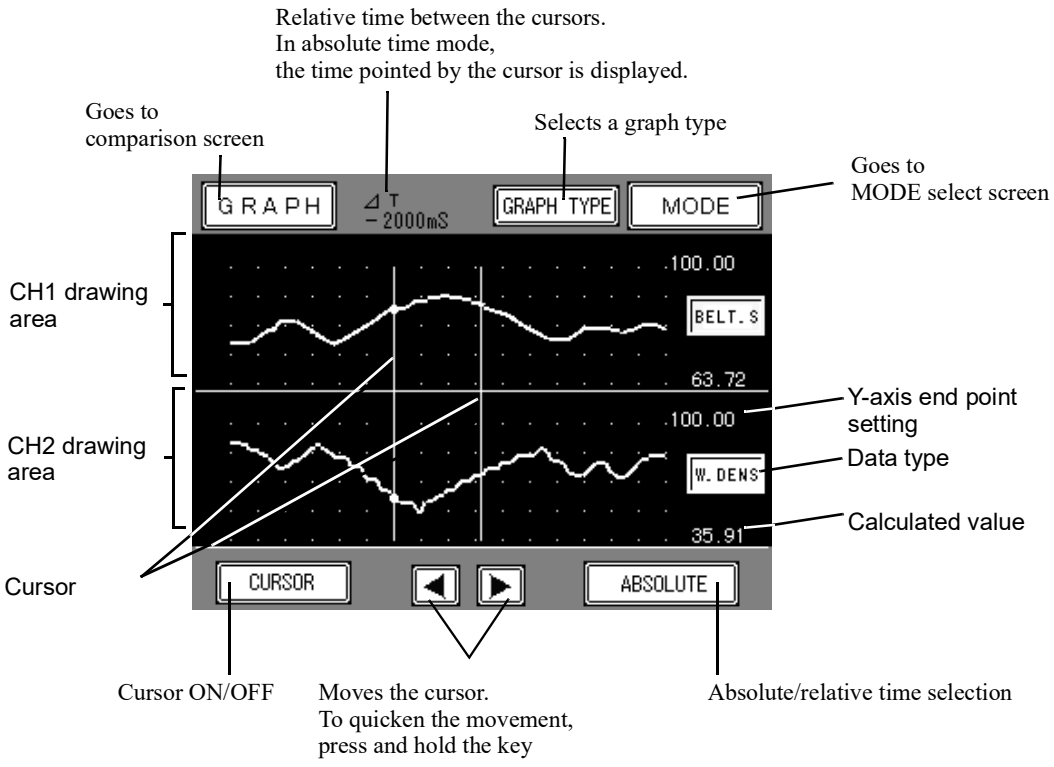


● **2 split**

[Cursor OFF]

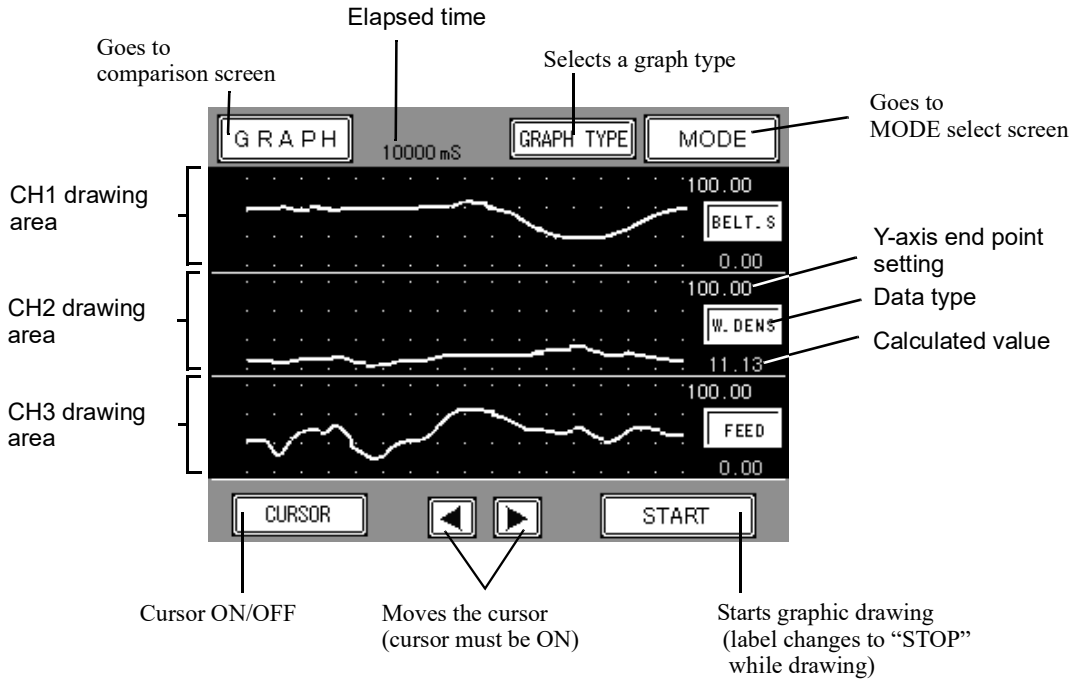


[Cursor ON]

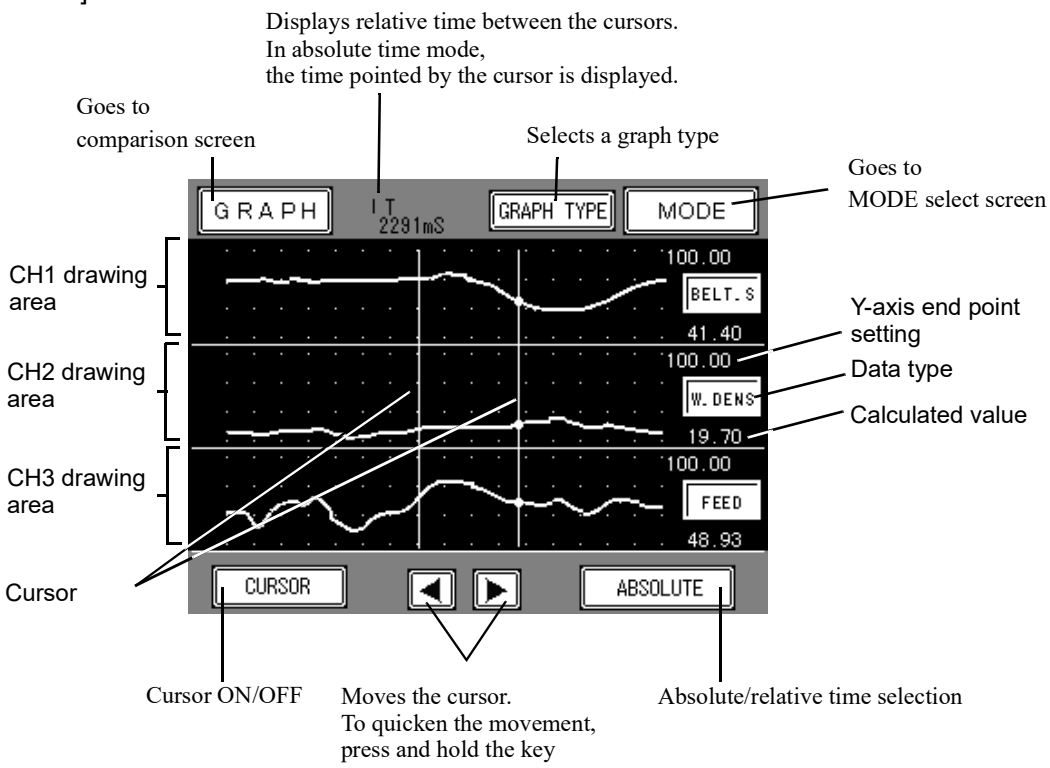


● **3 split**

[Cursor OFF]



[Cursor ON]



6-5-11. Graphic mode

Use this menu item to select a graph drawing mode.

Single: Triggered by START key or control signal (GRAPH DRAW, pin 34), a graph is drawn once to the X-axis end point.

Continuous: Triggered by START key or control signal (GRAPH DRAW, pin 34), graphs are drawn repeatedly until STOP is pressed or the control signal resets.

Level (↑)+Ext: Level detection is started by pressing START or control signal. One-time drawing to the X-axis end point starts when the reading exceeds the threshold defined by [TRIGGER LEVEL].

Level(↑↓)+Ext: Level detection is started by pressing START or control signal. One-time drawing to the X-axis end point starts when the reading exceeds the threshold defined by [TRIGGER LEVEL].

Level (↑) One-time drawing to the X-axis end point starts when the reading exceeds the threshold defined by [TRIGGER LEVEL].

Level (↑↓) One-time drawing to the X-axis end point starts when the reading traverses the threshold defined by [TRIGGER LEVEL].

Operation

MODE → GRAPH SETTING → PAGE → GRAPHIC MODE

Options: SINGLE, CONTINUOUS, LEVEL (↑)+EXT
LEVEL (↑↓)+EXT, LEVEL (↑), LEVEL (↑↓)

6-5-12. Trigger level

Use this menu item to define the trigger level when LEVEL is selected in [GRAPHIC MODE].

Operation

MODE → GRAPH SETTING → PAGE → TRIGGER LEVEL

Range: 0 – 99999 (5 digits, decimal place floating)

6-5-13. Trigger CH select

Use this menu item to select trigger source channel when LEVEL is selected in [GRAPHIC MODE].
The calculated data specified in SPLIT SELECTION in the selected channel is used for triggering.

Operation

MODE → GRAPH SETTING → PAGE → TRIGGER CH SELECT

Options: ch1, ch2, ch3

6-5-14. Split selection

Use this menu item to define the number of channels to be displayed.

Operation

MODE → GRAPH SETTING → PAGE → DISP PARTITION SEL

Options: NO SPLIT, 2 SPLIT, 3 SPLIT

6-5-15. Disp. partition Ch1/Ch2/Ch3

Use this menu item to select the data to be displayed graphically.
Ch1 data is displayed in the top pane of the divided graph screen. If “NO SPLIT” is selected in [SPLIT SELECTION], ch1 data is displayed in the whole graphic screen.
Ch2 data is displayed in the second pane of the divided graph screen. This item is ignored if “NO SPLIT” is selected in [SPLIT SELECTION].
Ch3 data is displayed in the bottom pane of the divided graph screen. This data is displayed only when “3 SPLIT” is selected in [SPLIT SELECTION].

Operation

MODE → GRAPH SETTING → PAGE → DISP PARTITION CH1

MODE → GRAPH SETTING → PAGE → DISP PARTITION CH2

MODE → GRAPH SETTING → PAGE → DISP PARTITION CH3

Options: BELT SPEED, WEIGHT DENSITY, FEED RATE,
LOAD RATIO, FEED RATIO, CONTROL RATE

6-5-16. Ch1/Ch2/Ch3 start point

Use this menu item to define Y-axis starting points for graphic display of each channel. Note that the value for Ch1 is also used for the single screen display (e.g. “NO SPLIT” is selected in [SPLIT SELECTION]).

Operation

MODE → GRAPH SETTING → PAGE×2 → CH1 START POINT

MODE → GRAPH SETTING → PAGE×2 → CH2 START POINT

MODE → GRAPH SETTING → PAGE×2 → CH3 START POINT

Range: 0 – 99998 (5 digits, decimal place floating)

6-5-17. Ch1/Ch2/Ch3 end point

Use this menu item to define Y-axis end points for graphic display of each channel. The value for Ch1 is also used for non-split display.

Operation

MODE → GRAPH SETTING → PAGE×2 → CH1 END POINT

MODE → GRAPH SETTING → PAGE×2 → CH2 END POINT

MODE → GRAPH SETTING → PAGE×2 → CH3 END POINT

Range: 1 – 99999 (5 digits, decimal place floating)

6-5-18. X end point

Use this menu item to define the X-axis full-scale for graphic display.

* Setting X End Point to 1.2 second, for example, a dot in x-direction represents a time span of 5 msec, enabling a graph corresponding to about 200 A/D conversions per second.

Operation

MODE → GRAPH SETTING → PAGE×2 → X END POINT

Range: 1.2– 99.9 sec (3 digits, decimal place fixed)

6-6. Display

6-6-1. Display frequency

Use this menu item to define the update frequency of reading display. Note that this value controls only the display frequency, and does not affect the velocity of A/D converter and CPU.
Normally recommended setting is around 25 times per second.
Slower frequency may be selected if you want to avoid flickering of display.

Operation

MODE → DISPLAY → DISPLAY FREQUENCY

Options: 1 Times/Sec, 3 Times/Sec, 6 Times/Sec, 13 Times/Sec, 25 Times/Sec

6-6-2. Digital filter

The digital filter calculates moving average of A/D converter outputs and reduces the fluctuation of readings. You can obtain smoother reading as the number of averaging increases, but with slower response. Reducing the averaging number provides quicker response, but with more reading fluctuation. Use appropriate values for each of the data type.

Operation

MODE → DISPLAY → DIGITAL FILTER

Options: OFF, 2 Times, 4 Times, 8 Times, 16 Times,
32 Times, 64 Times, 128 Times

6-6-3. Analog filter

This analog filter represents a low-pass filter for canceling noise components out of the source signal from the load cell. Higher cut-off frequency is effective for quicker response, but with heavier noise effect. Select an appropriate cut-off frequency suited for your measurement.

Operation

MODE → DISPLAY → ANALOG FILTER

Options: 2 Hz, 4 Hz, 6 Hz, 8 Hz

6-6-4. Average count

Use this menu item to specify the length (number) of moving average to reduce reading fluctuation. You can obtain smoother reading as the number of averaging increases, but with slower response. Reducing the averaging number provides quicker response, but with more reading fluctuation. Use appropriate values for each of the data type.

Operation

MODE → DISPLAY → AVERAGE COUNTS

Options: OFF, 2 Times, 4 Times, 8 Times, 16 Times,
32 Times, 64 Times, 128 Times

6-6-5. Error display control

Use this menu item to select the mode of error display.

Normal Display: All error display is suppressed.

Error Display: When error occurs, error messages replaces arithmetic results display.

Alternate Disp.: When error occurs, error messages and arithmetic results are displayed alternately.

Operation

MODE → DISPLAY → ERROR DISPLAY CONTROL

Options: NORMAL DISPLAY, ERROR DISPLAY, ALTERNAT. DISP.

6-6-6. Data select key

Use this menu item to enable/disable the data select key of the bar graphs on the top screen.

Invalid: Keys are disabled (data does not change)

Valid: Pressing the key changes the display data.
(disabled if EXTERNAL ENTRY is selected in [DISP.DATA SELECT])

Operation

MODE → DISPLAY → DATA SELECT KEY

Options: INVALID, VALID

6-6-7. Disp data selection

Use this menu item to select data to be displayed in the main/sub-arithmetic field of comparison and message screen.
The selection item is displayed in the main/sub.
The item that can be displayed in the main-arithmetic field is Total or Feed rate.
The item that can be displayed in the sub-arithmetic field is Total or Feed rate or Target.

Operation

MODE → DISPLAY → DISP DATA SELECTION

Options: TOTAL/FEED FEED/TOTAL TOTAL/TARGET FEED/TARGET

6-7. Control Parameter

6-7-1. Target set

・Cont.feed rate、Cont.total mode

Specify target flow in t/h or kg/h (the unit depends on the [FEED UNIT] setting)

・Fixed mode

Specify control rate to output in %.

・Auto coordinate mode

Auto adjustment is performed using AT COORDINATE OUT 1 – 4 (Target Set value is ignored)

・The instrument functions as a slave

Specify the target value as a percentage to the master's flow/target. If you select 100%, the instrument try to control aiming at the same value as the master.

Operation

MODE → CTRL. PARAMETER → TARGET SET

Range: 0.0 – 99999 (5 digits, decimal place floating with flow)
0.0 – 99.99% (4 digits, decimal place fixed)

6-7-2. Control limit

Use this menu item to specify the control limit: an alarm message appears when absolute value of control deviation exceeds this limit value, and control rate is automatically fixed to the initial control rate. PID control resumes when absolute value of control deviation returns within the range defined by this limit value and stabilization time elapsed.
The use of control limit is useful to reduce hunting of the control system due to external disturbances. Control limit has no effect on the system if it is set to 0.0%.

Operation

MODE → CTRL. PARAMETER → CNTRL.DEVIATION LIMIT

Range: 0.0 – 500.0% (4 digits, decimal place fixed to the first place)

6-7-3. Allowable control dev.

Use this menu item to set a limit value by which to determine if the system is over/ under the control deviation limit (effective only while RUNNING).

- Control deviation over: control deviation > control deviation limit
- Control deviation under: control deviation < - control deviation limit

Over scale alarm is displayed when either one of above conditions occurs. This alarm function is disabled if the value is set to zero. Also, the function is disabled if [DEVIATION LIM OVER ASC.] is set to zero.

Operation

MODE → CTRL. PARAMETER → ALLOWABLE CONTROL DEV.

Range: 0.0 – 99.9% (3 digits, decimal place fixed to the first place)

6-7-4. Rate limit

Use this menu item to define a rate limit value, which control the next increment/ decrement value in control rate within a certain range. This method is effective to reduce flow fluctuation caused by noise and external disturbances. Avoid unprepared change of the rate limit: too small rate limit gives rise to slow tracking characteristics to external disturbance. This parameter does not function if set to 0.0%.

Operation

MODE → CTRL. PARAMETER → RATE LIMIT

Range: 0.0 – 99.9% (3 digits, decimal place fixed to the first place)

6-7-5. Fault detect value

Fault detect value is the reference value by which flow setting over/under is determined.

The two states are defined as (only while RUNNING):

・Flow setting over : Flow rate > Target value + Fault detect value

・Flow setting under: Flow rate < Target value – Fault detect value

If one of these two states occurs, an over-scale message is displayed and external signal (48, 49 pins of the control connector) is generated. These alarms are disabled if fault detect value is set to zero.

Operation

MODE → CTRL. PARAMETER → FAULT DETECT VALUE

Range: 0.0 – 9999 (4 digits, decimal place floating with flow)

6-7-6. Master/Slave select

When linked using SI/FII interface, F805AT-BC is capable of master-slave operation and it can be assigned its role in the network either as a master or a slave. Use this menu item to define the instrument as a master or slave.

* Select SINGLE if master-slave operation is not used.

Operation

MODE → CTRL. PARAMETER → MASTER/SLAVE SELECT

Options: SINGLE, MASTER, SLAVE

6-7-7. Slave mode select

This parameter is used only in slave mode. Depending on this selection, the slave operates following either master's target (see [1] below) below) or flow value (see [2] below).

[1] Equivalent target = Target value [%]×master's target [kg/h,..]

[2] Equivalent target = Target value [%]×master's flow [kg/h,..]

In "&OP." mode operation, the slave also synchronizes with RUN/STOP states of the master.

Operation

MODE → CONTROL PARAMETER → SLAVE MODE SELECT

Options: FEED RATE FOLLOW (FR FOLLOW), FR&OP. FOLLOW,
TARGET FOLLOW, TARGET&OP.FOLLOW(TRGT&OP.FOLLOW)

6-7-8. Start/Error display

You can force the flow value to be displayed as the target while in LOCK operation (due to, for example, target change or abnormal flow) or during start time (while PID control is not performed).
If you select “REAL TIME”, current feed rate value is always displayed irrespective of the control state.
See the section of [First Stability Time] for conditions that force the system into LOCK operation.

* If you select “TARGET” in this menu, signal feedback will never use the relation FEED RATE = TARGET. However, target value will be output if feed rate has been selected in BCD output, D/A output, or SI/F data output.

Operation

MODE → CONTROL PARAMETER → PAGE → START/ERROR DISPLAY

Options: REAL TIME DISPLAY, TARGET DISPLAY

6-7-9. Flow stability time

Alteration of the target value during control operation will often give rise to a large control deviation, affecting adversely later control performance. In such cases, LOCK mode operation for a certain period of time (First stability time) can increase response accuracy.
If a non-zero value is defined to first stability time, LOCK (fixed control) operation can be performed during this period.

Optimum tuning of first stability time is important. If too short, the control system tends to suffer from hunting phenomena, and if too long, very slow response.

Operation

MODE → CONTROL PARAMETER → PAGE → FLOW STABILITY TIME

Range: 0 – 99 sec (2 digits, no decimal place)

Note: when to use LOCK operation

In CONT.FEED RATE and CONT.TOTAL mode, LOCK operation using the initial control rate is performed when:

System startup (when Start Time expired)	* during first stability time
Target alteration	* during flow stability time
Abnormal flow	* until normal flow state is restored
When restored from abnormal flow	* during flow stability time
Control limit over	* until normal condition is restored
When restored from control limit over	* during flow stability time

6-7-10. Start coordin. value

You can directly specify the initial control rate using this menu item (4-20 mA output is assigned to 0.0 – 100%).

If this parameter is set to non-zero value, control rate of start-up and fixed control rate operation is calculated using this value, ignoring AT COORDINATE 1-4 and AT COORDIN OUT 1-4.

* If Start Coordin. Value is modified while control operation, control rate is changed to the set output, then move to PID control.

$$\left(\text{Control rate after modification}\right) = \left(\text{Start Coordin. Value at the time of target modification}\right) \times \left(\frac{\text{target after change}}{\text{target before change}}\right)$$

* The system tracks external target input in real time.

To use initial control rate calculated from AT COORDINATE 1-4 or AT COORDIN OUT 1-4, Start Coordin. Value must be set to zero.

Operation

MODE → CTRL. PARAMETER → PAGE → START COORDIN.VALUE

Range: 0.0 – 100.0 % (4 digits, decimal place fixed to 1st position)

6-7-11. Control frequency

Use this menu item to define control frequency. With this value set to zero, no control operation is performed: control rate output is fixed to 0% (4 mA).
Unless required to save unexpectedly bad system performance, it is not recommended to modify this parameter (initial value: 1 sec). Modification of control frequency may affect response and accuracy of the whole system.

Operation

MODE → CTRL. PARAMETER → PAGE → CONTROL FREQUENCY

Range: 0 – 99 sec (2 digits, no decimal place)

6-8. Each Code

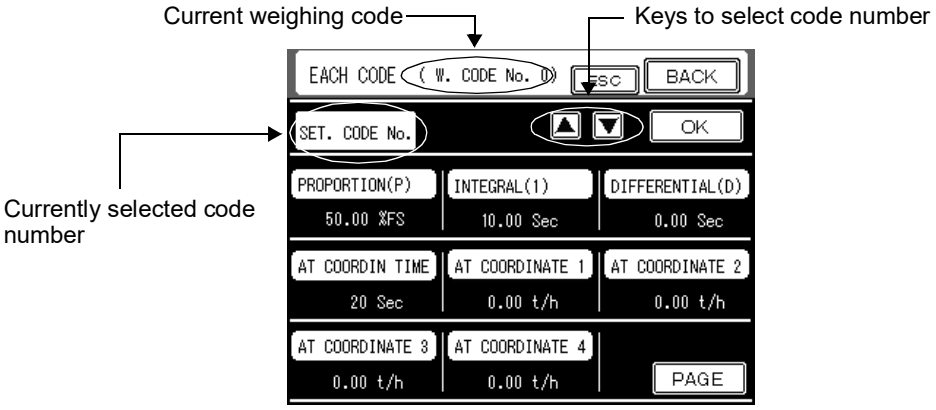
You can assign a code number to each of setting values, and also specify setting values to each code number to control. Up to 100 setting values can be assigned to each code number and stored in memory.

<Example>

Code No.	Propo-rtion (P)	Integr-al (I)	Differ-ential (D)	AT Coordin Time	AT Coordinate				AT Coordin. Out			
					1	2	3	4	1	2	3	4
00	40.00	5.00	10.00	20	55.2	113.6	190.0	260.0	15.0	30.0	53.0	75.0
01	50.00	10.00	0.00	10	55.5	113.9	185.6	258.6	13.3	35.0	55.0	80.0
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
99	60.0	20.0	20.0	15	50.6	120.0	190.3	270.6	20.0	30.0	60.0	90.0

* Any setting can be modified by calling a desired code No.

6-8-1. How to assign code



Operation

MODE → EACH CODE

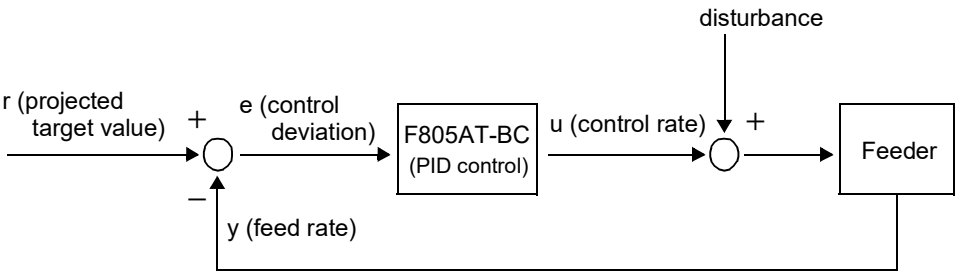
F805AT-BC uses two types of codes: one for weighing (Weighing Code) and the other for settings (Setting Code).

6-8-2. PID control

F805AT-BC uses feedback control to control instantaneous feed rate. In this scheme, calculated target value is compared with actual feed rate and the deviation between them is returned to nullify the difference (see the schematic diagram below).

For implementing feedback control, F805AT-BC uses PID control method, which is a combination of proportional (P), integral (I) and differential (D) action.

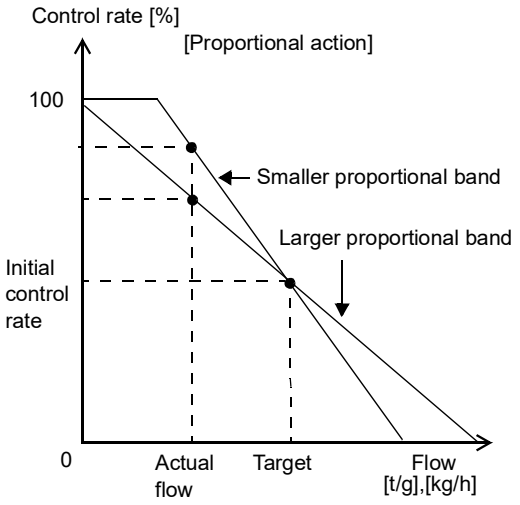
PID is well known for superb performance when applied to controlling systems with dead time, or delay element. Proportional action (P) calculates proper control rate taking all necessary elements (target value and environmental factors) into consideration. Integral action (I) compensates the offset between target and actual value. Differential action (D) accelerates system response against external disturbances. Optimum feedback control is realized by proper tuning of P, I, D parameters.



Control Diagram

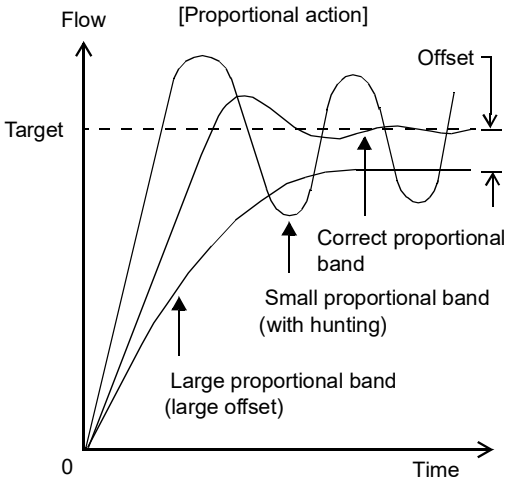
Proportion (P)

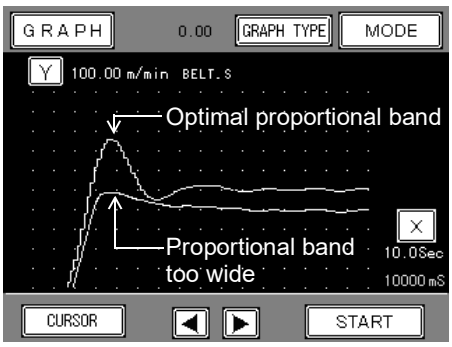
Wide proportional band (P) makes the variation of control rate relatively small (smaller slope in the figure to the right), rendering the time required to attain equilibrium longer. On the other hand, overshoot and hunting becomes less obvious.
Narrow proportional band provides opposite characteristics: larger overshoot and hunting, and shorter time to reach equilibrium.



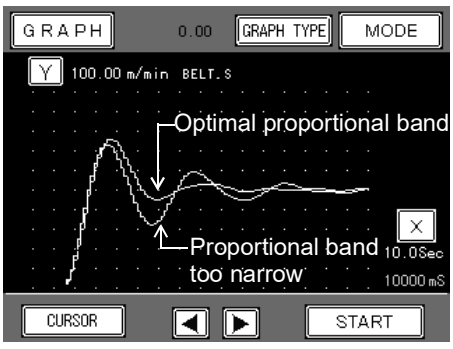
In proportional action, feed rate often attain equilibrium while maintaining residual small deviation from target value, which is called “offset”.
Narrower proportional band (P) is effective to reduce the offset.
Wider proportional band is used to obtain more stable feed rate, with correspondingly large offset.

* Empirically, proportional bandwidth between 50.00 – 200.00 % FS is recommended.





Large proportional band
(with large offset)



Small proportional band
(require longer equilibrium time)

Operation

MODE → EACH CODE → PROPORTION (P)

Range: 0.01 – 999.99% (5 digits, decimal place fixed to 2nd position)

Integral (I)

Integral action, in concert with proportional action, has an effect of diminishing offset with time, resulting in better fit between the flow and target values.
Integral (I) represents the intensity of integral action. Shorter integral time provides stronger integral action, and if it becomes excessive, too strong a corrective action gives rise to system hunting, as in the case of proportional action.
F805AT-BC is shipped with factory-set initial integration time (I): the user can use this value unless additional tuning becomes necessary.
* Empirically, integral (I) bandwidth between 4.00 and 15.00 sec is recommended

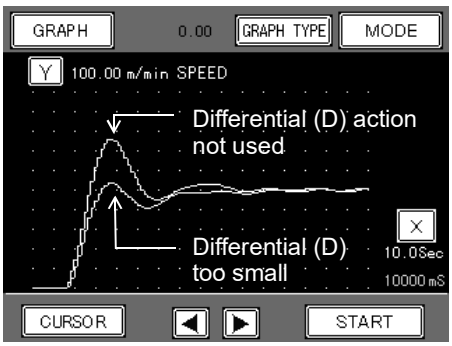
Operation

MODE → EACH CODE → INTEGRAL (I)

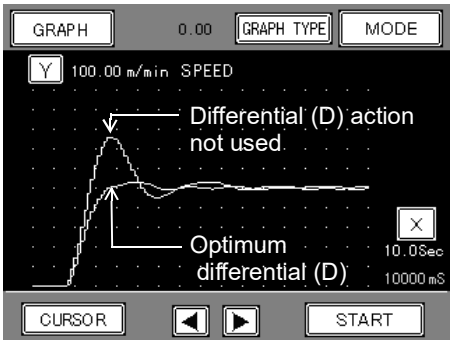
Range: 0.01 – 999.99 sec (5 digits, decimal place fixed to 2nd position)

Differential (D)

Proportional and integral action tends to become slow because they are corrective actions based on the control results. Differential action is a useful addition to enhance system response: it gives rise to corrective action proportional to the magnitude of deviation. Differential action reacts with magnitude proportional to the changing rate of disturbance, providing quicker restoration to previous state.
Differential (D) represents intensity of differential action and it is the time required for differential control rate to achieve the same value as proportional action. Longer differential time provides stronger corrective action, and if it becomes excessive, tends to produce tiny and quick system hunting.
* Empirically, differential (D) bandwidth between 0.00 – 10.00 sec is recommended.
Setting 0.00 second to this parameter disables differential action (PI control).



Control with too small differential action



Control with optimum differential action

Operation

MODE → EACH CODE → DIFFERENTIAL (D)

Range: 0.00 – 99.99 sec (4 digits, decimal place fixed to 2nd position)

Tip for PID parameter adjustment

Do not adjust more than one parameter at a time, since the result of each adjustment may not be obvious. First, set Differential (D) to "0.00" and try to adjust P parameter (note that I parameter is factory-set, use this initial value). Once an appropriate P value is found, check if there is any residual offset. If offset is found, then adjust I parameter. Finally try to adjust D parameter. The effect of D modification may be more visible if the target value is changed rapidly.

6-8-3. AT coordin time, AT coordinate 1 –4, AT coordin out 1 -4

These parameters are used in auto coordination mode.
AT COORDIN OUT and AT COORDINATE parameters play an important role in determining the initial control rate in other operation modes.

* Operation in CONT. FEED RATE and CONT. TOTAL mode may be inhibited unless:
  AT Coordin Out 1 < AT Coordin Out 2 < AT Coordin Out 3 < AT Coordin Out 4
  AND
  AT Coordinate 1 < AT Coordinate 2 < AT Coordinate 3 < AT Coordinate 4

Operation

MODE → EACH CODE → AT COORDIN TIME

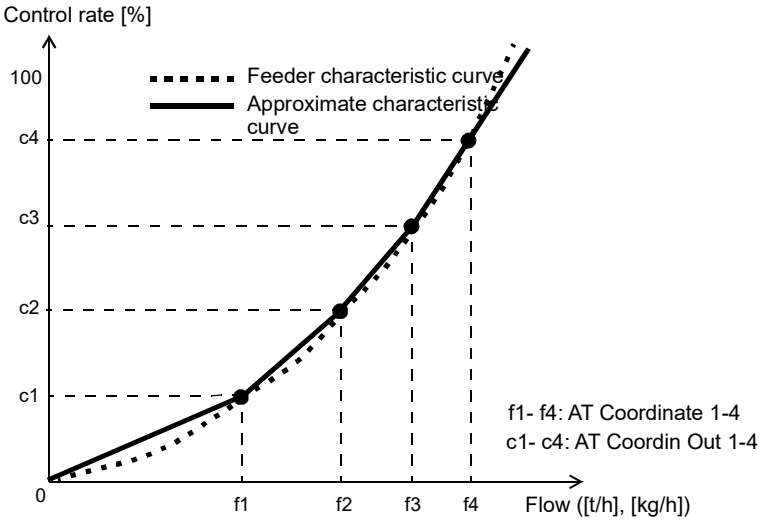
Range: 1 – 99 sec (2 digits, no decimal place)

MODE → EACH CODE → AT COORDINATE 1-4

Range: 0 – 99999 (5 digits, decimal place floating with flow)

MODE → EACH CODE → PAGE → AT COORDIN OUT 1-4

Range: 0.0 – 100.0% (4 digits, decimal place fixed to 1st place)



6-9. States Ascertain

6-9-1. Belt speed over asc.

Use this parameter to stop the belt if it has moved too fast over a period longer than specified by this parameter. If the belt travels faster for a period longer than specified by BELT SPEED OVER ASC., it is forced to come to a halt, indicating “Sequence error 5”.

* Setting this parameter to 999 sec disables auto stop function. Over-scale alarm is displayed.
* Setting this parameter to 0 sec disables auto stop function. Over-scale alarm is not displayed.

Operation

MODE → STATES ASCERTAIN → BELT SPEED OVER ASC.

Range: 0 – 999 sec (3 digits, no decimal place)

6-9-2. Weight density over asc.

Use this parameter to stop the system if has carried excess weight over a period longer than specified by this parameter. If the “weight density over” condition continued longer than the value specified by WEIGHT DENSITY OVER ASC., the system is forced to come to a halt, indicating “Sequence error 6”.

* Setting this parameter to 999 sec disables auto stop function. Over-scale alarm is displayed.
* Setting this parameter to 0 sec disables auto stop function. Over-scale alarm is not displayed.

Operation

MODE → STATES ASCERTAIN → WEIGHT DENSITY OVER ASC.

Range: 0 – 999 sec (3 digits, no decimal place)

6-9-3. Feed rate over asc.

Use this parameter to stop the system if has carried excess feed over a period longer than specified by this parameter. If the “feed rate over” condition continued longer than the value specified by FEED RATE OVER ASC., the system is forced to come to a halt, indicating “Sequence error 7”.

* Setting this parameter to 999 sec disables auto stop function. Over-scale alarm is displayed.
* Setting this parameter to 0 sec disables auto stop function. Over-scale alarm is not displayed.

Operation

MODE → STATES ASCERTAIN → FEED RATE OVER ASC.

Range: 0 – 999 sec (3 digits, no decimal place)

6-9-4. Load ratio over asc.

Use this parameter to stop the system if has carried excess load ratio over a period longer than specified by this parameter. If the “load ratio over” condition continued longer than the value specified by LOAD RATIO OVER ASC., the system is forced to come to a halt, indicating “Sequence error 8”.

* Setting this parameter to 999 sec disables auto stop function. Over-scale alarm is displayed.
* Setting this parameter to 0 sec disables auto stop function. Over-scale alarm is not displayed.

Operation

MODE → STATES ASCERTAIN → LOAD RATE OVER ASC.

Range: 0 – 999 sec (3 digits, no decimal place)

6-9-5. Feed ratio over asc.

Use this parameter to stop the system if has carried excess feed ratio over a period longer than specified by this parameter. If the "feed ratio over" condition continued longer than the value specified by FEED RATIO OVER ASC., the system is forced to come to a halt, indicating "Sequence error 9".

* Setting this parameter to 999 sec disables auto stop function. Over-scale alarm is displayed.
* Setting this parameter to 0 sec disables auto stop function. Over-scale alarm is not displayed.

Operation

MODE → STATES ASCERTAIN → FEED RATIO OVER ASC.

Range: 0 – 999 sec (3 digits, no decimal place)

6-9-6. Deviation lim. over asc.

Use this parameter to stop the system if any one of the conditions shown below continued over a period longer than specified by this parameter:

Deviation limit < |Ctrl. deviation|	(Control limit over)
Allowable control dev. < Ctrl. deviation	(Control deviation over)
Allowable control dev. > Ctrl. deviation	(Control deviation under)

If any of these conditions persists for a period specified by DEVIATION LIM. OVER ASC., a corresponding error message is displayed ("Sequence error 2", "Sequence error 3", and "Sequence error 4") and the system comes to a halt.

* Setting this parameter to 999 sec disables auto stop function. Over-scale alarm is displayed.
* Setting this parameter to 0 sec disables auto stop function. Over-scale alarm is not displayed.

Operation

MODE → STATES ASCERTAIN → DEVIATION LIM.OVER ASC.

Range: 0 – 999 sec (3 digits, no decimal place)

6-10. System

6-10-1. Back light auto. light.

Use this menu item to turn on LCD display's back light when the system accepts the start command. If EFFECT is selected, back light automatically turns on upon receiving the start command.

* Back light always turns on irrespective of this parameter when:

・system is powered on

・user touches the screen

Operation

MODE → PAGE → SYSTEM → BACK LIGHT AUTO. LIGHT.

Options: INHIBIT, EFFECT

6-10-2. Back light low time

The function which the back light of screen is switched between Light and Dark when touch screen has not been used for a certain period of time. Dark lighting will not be carried out if it sets up in 00 minute.

Operation

MODE → PAGE → SYSTEM → BACK LIGHT LOW TIME

Range: 0 – 99 min (2 digits)

6-10-3. Back light ON time

The function which turns off the back light of screen when touch screen has not been used for a certain period of time.

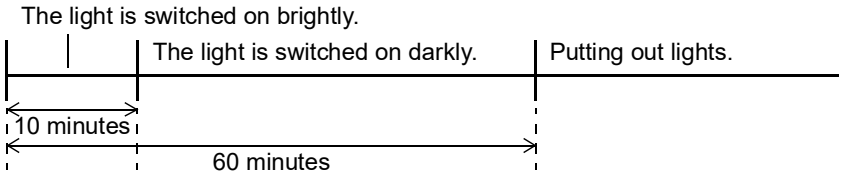
The back light will not turns off if you set 00.

Operation

MODE → PAGE → SYSTEM → BACK LIGHT ON TIME

Range: 0 – 99 min (2 digits)

Example) When the back light low time was set up in 10 minutes and the back light ON time is set up in 60 minutes



6-10-4. LOCK（soft）

Use this menu item to lock the system against operation error. See "SETTING ITEMS LIST" , on page 177, for the items on which this function has an effect.

Operation

MODE → PAGE → SYSTEM → LOCK (soft)

Options: OFF, ON

Note

Password is required to set this parameter to OFF: “1269” must be entered to [PASS WORD] before turning this function off.

6-10-5. Self check

Use this menu item to enable the F805AT-BC to check its functions. If any error is reported, contact UNIPULSE or its representative you purchased the instrument.

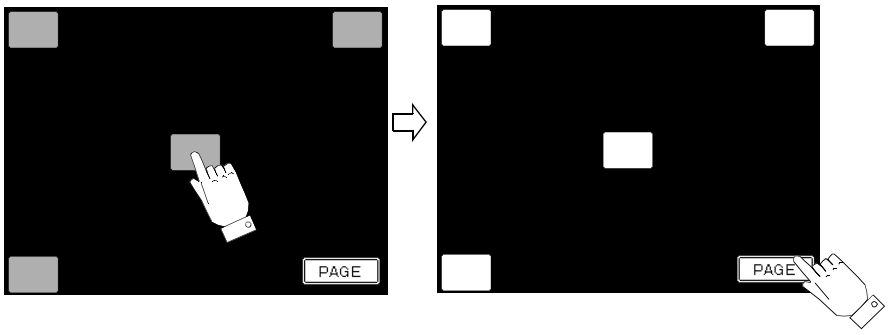
Operation

MODE → PAGE → SYSTEM → SELF CHECK

Options: NO, YES

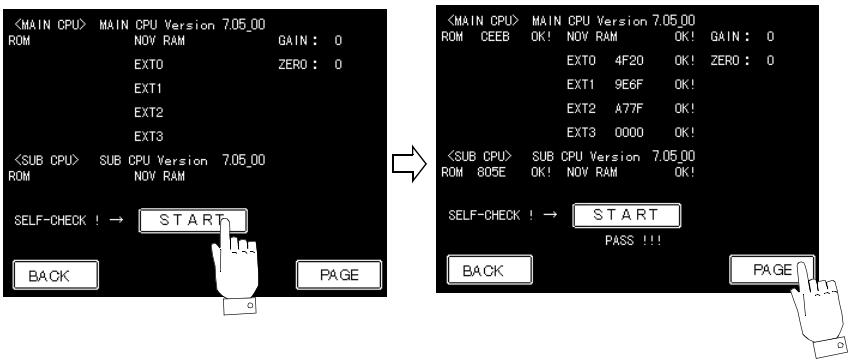
1) Touch panel check

Each blue square turns yellow when you press it. Check if all of them react correctly. Press PAGE to proceed to the next screen.



2) Memory check

Press START to start NOVRAM check. “PASS” is reported if it functions correctly, and “NG” is reported if not.
Press PAGE to proceed to the next screen, or press BACK to return to the previous screen.



3) Display check

Start function check of the display by pressing following keys:

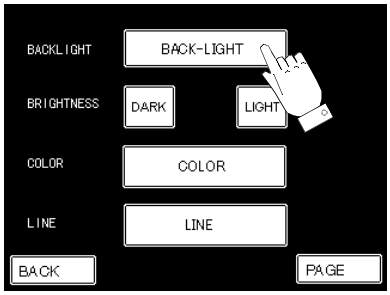
Back light: BACK - LIGHT key toggles ON/OFF of the back light.

Brightness: Brightness of the screen is adjusted by pressing Light and Dark .

Color: Display color changes following the order white->black->red->green->blue

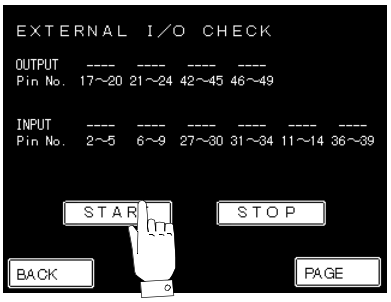
Line: The screen is filled with vertical lines and then horizontal lines.

Press [PAGE] to proceed to the next screen,
or press [BACK] to return to the previous screen.



4) Input/output check

Use this item to check external I/O.
Press [START] to output signal to the output pins (17-24, 42-49) of the control connector located in the rear panel. Output indicator changes from "-" to "0".
Press [STOP] to end the output check.
If you enter external signal to the input pins (2-9, 11-14, 27-34, 36-39), the input indicators change from "-" to "0".



5) BCD output check (BCO)
6) BCD input check (BCI)
7) D/A check (DAC)
8) ANA check (ANA)

These items appears only if the option board is installed

・BCD output board check (BCO)

This function performs I/O check of BCD parallel output interface.

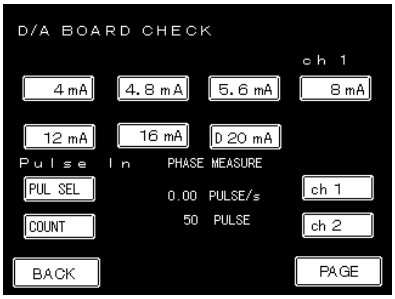
Press [START] to send signal sequentially to the output pins (2-18, 20-26) of the rear panel BCD OUTPUT connector.
Output indicator changes from "-" to "0".
Press [STOP] to end the output check.
If you enter external signal to the input pins (27-34), the input indicators change from "-" to "0".

▪ BCD input board check (BCI)

This function performs I/O check of BCD parallel input interface.
Press **START** to send signal sequentially to the output pins (27-34) of the rear panel BCD INPUT connector.
Output indicator changes from "-" to "0".
Press **STOP** to end the output check.
If you enter external signal to the input pins (2-18, 20-26), the input indicators change from "-" to "0".

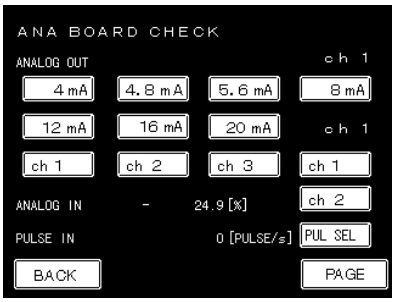
▪ D/A board check (DAC)

This function performs D/A converter output check.
Select an output channel by pressing ch1 or ch2, and start sending out analog signal by selecting its intensity using 4mA – 20mA keys.
If you enter pulse signal, for example from a speed sensor, the number of input pulses is displayed. Rotation of a rotary encoder can also be displayed if "PHASE MEASURE" mode is selected.
Pressing **PUL SEL** changes pulse input mode in the following sequence:
"NORMAL MODE A" -> "NORMAL MODE B" -> "NORMAL A SLOW" -> "PHASE MEASURE".
Pressing **COUNT** can toggle pulse and rotation measurements.



▪ ANA board check (ANA)

This function checks current output.
Select an output channel by pressing **ch1** or **ch2** or **ch3**, and start sending out analog signal by selecting its intensity using "4mA" – "20mA" keys.
If you enter analog signal, for example from a speed sensor, the ratio of input against full-scale setting is displayed.
* Following items must be selected before performing check:
[AI ZERO SET], [AI FULL SCALE SET], and [AI DIGITAL FILTER].
If you enter pulse signal, for example from a speed sensor, its frequency is displayed.
Pressing **PUL SEL** changes pulse input mode in the following sequence:
"ANA. NORMAL A" -> "ANA. A SLOW"



* Self-check screen for SI/F, SI/FII, and RS-485 are not provided.

6-10-6. Language

The language used in the display can be selected from Japanese or English.

Operation

MODE → PAGE → SYSTEM → LANGUAGE

Options: JAPANESE, ENGLISH

6-10-7. PASS WORD

Password entry is required to remove LOCK, or to initialize some functionality.

Operation

MODE → PAGE → SYSTEM → PASS WORD

Range: 0 – 9999 (4 digits)

- Pass word to enable initialization **1269**
- Pass word to execute initialization **6842**

(NOVRAM contents remain intact after initialization)

7. CONTROL SIGNAL (External I/O Connector)

F805AT-BC uses a 50-pin amphenol connector for input/output of external signals. The F805AT-BC compatible plug is DDK 57-30500 (supplied) or its equivalent.

7-1. Pin Assignment

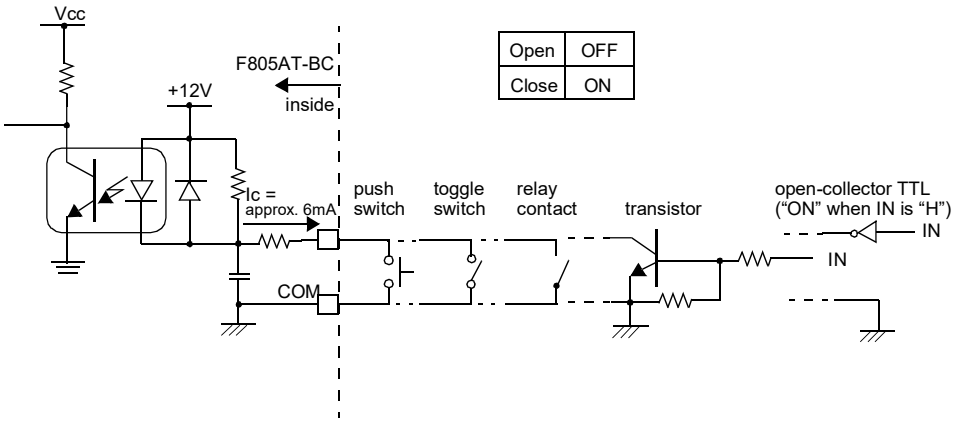
1	⁎	COM	26	⁎	COM
2	IN	RUNNING	27	IN	DZ
3	IN	DISP1 CHANGE1	28	IN	ZERO POINT AUTO ADJUSTMENT
4	IN	DISP1 CHANGE2	29	IN	TEST MODE SPAN MEASUREMENT
5	IN	DISP1 CHANGE4	30	IN	PULSE COUNT START
6	IN	DISP2 CHANGE1	31	IN	PULSE COUNT STOP
7	IN	DISP2 CHANGE2	32	IN	OPERATION MODE 1
8	IN	DISP2 CHANGE4	33	IN	OPERATION MODE 2
9	IN	T.WT.CLEAR	34	IN	GRAPH DRAWING
10	⁎	COM	35	⁎	COM
11	IN	CODE# DESIGNATION1	36	IN	CODE# DESIGNATION10
12	IN	CODE# DESIGNATION2	37	IN	CODE# DESIGNATION20
13	IN	CODE# DESIGNATION4	38	IN	CODE# DESIGNATION40
14	IN	CODE# DESIGNATION8	39	IN	CODE# DESIGNATION80
15	⁎	COM	40	⁎	COM
16	⁎	COM	41	⁎	COM
17	OUT	PULSE OUTPUT1	42	OUT	RUNNING
18	OUT	PULSE OUTPUT2	43	OUT	NZ
19	OUT	UPPER LIMIT(HI)	44	OUT	TOTAL FINAL OVER
20	OUT	GO	45	OUT	ZERO ERR. MEASURING
21	OUT	LOWER LIMIT(LO)	46	OUT	ZERO ERR. MEAS. OK
22	OUT	WEIGHT ERROR	47	OUT	ZERO ERR. MEAS. NG
23	OUT	BELT MOVING	48	OUT	FEED RATE OVER
24	OUT	POWER ON	49	OUT	FEED RATE UNDER
25	⁎	COM	50	⁎	COM

* COM: following pins are connected together inside the instrument: 1, 10, 15, 16, 25, 26, 35, 40, 41, and 50.

* Supply voltage is not available from this terminal.

7-2. Equivalent Circuit (input)

Signal input is performed by closing and opening the input terminals, namely between the input terminal and COM. Contact devices (such as relay and switch) and non-contact devices (such as transistor, open-collector TTL) can be used for this purpose.

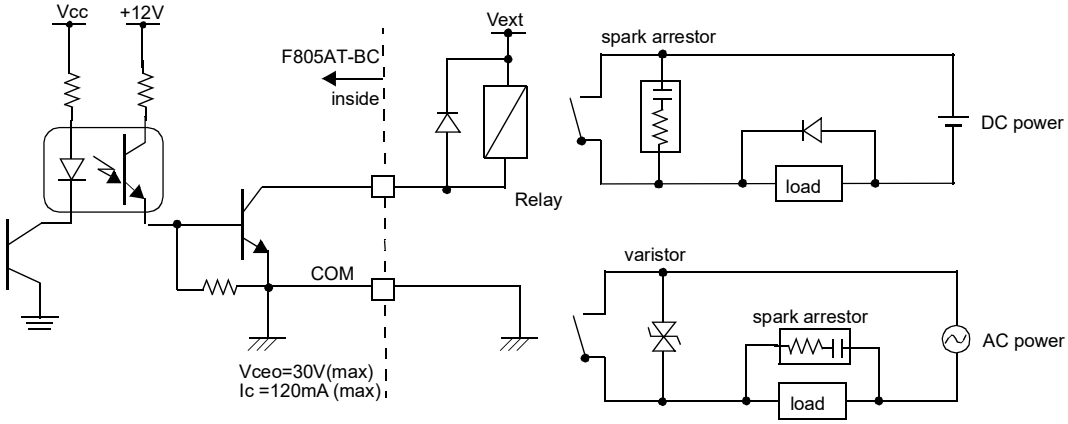


Open	OFF
Close	ON

・Use external devices that allow more than 10mA of Ic to flow.
・Leak current from the external device should be less than 100μA.

7-3. Equivalent Circuit (output)

An open-collector transistor constitutes the signal output circuit.



Output data	Tr
0	OFF
1	ON

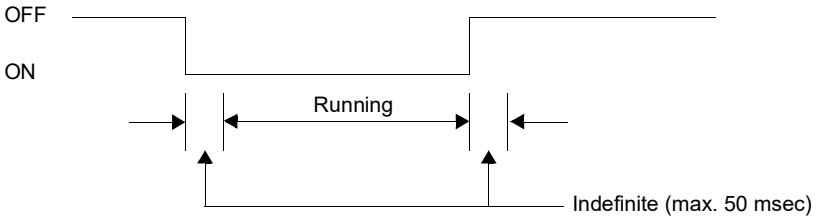
Use a customer supplied external power source (Vext) to drive the relay. Do not short-circuit the load (e.g. relay coil); this may damage the output transistor.
Connect a surge absorber or spark arrestor across the relay circuit (both coil and contact sides), as shown in the figure, to suppress surge voltage.

7-4. External Input Signal

7-4-1. Running (edge input)

Feed is accumulated while the external signal is ON.

RUNNING signal is turned on while accumulation is being performed.



However, it does not operate during ERROR MEASURE and SPEED INPUT COUNT MEASURE

7-4-2. Display 1 change (level input)

Depending on the state of input signal, the data types to be displayed in the upper pane of the comparison screen are selected as indicated in the table below: [DISP DATA SELECT1] must be switched to “EXTERNAL INPUT”.

DISP. CHANGE	4	2	1
BELT SPEED	OFF	OFF	OFF
WEIGHT DENSITY	OFF	OFF	ON
FEED RATE	OFF	ON	OFF
LOAD RATIO	OFF	ON	ON
FEED RATIO	ON	OFF	OFF
GROSS WEIGHT	ON	OFF	ON
CONTROL RATE	ON	ON	OFF
CONTROL DEVIATION	ON	ON	ON

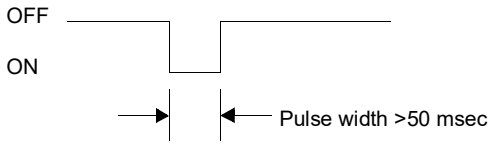
7-4-3. Display 2 change (level input)

Depending on the state of input signal, the data types to be displayed in the lower pane of the comparison screen are selected as indicated in the table below: [DISP DATA SELECT2] must be switched to “EXTERNAL INPUT”.

DISP. CHANGE	4	2	1
BELT SPEED	OFF	OFF	OFF
WEIGHT DENSITY	OFF	OFF	ON
FEED RATE	OFF	ON	OFF
LOAD RATIO	OFF	ON	ON
FEED RATIO	ON	OFF	OFF
GROSS WEIGHT	ON	OFF	ON
CONTROL RATE	ON	ON	OFF
CONTROL DEVIATION	ON	ON	ON

7-4-4. Total weight clear (edge input)

The value of TOTAL is zero-cleared by the falling edge (OFF->ON).



* This input is ignored while RUNNING is on.

7-4-5. Digital Zero (edge input)

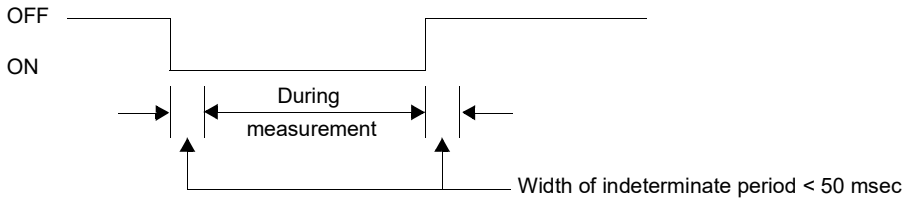
GROSS WEIGHT is cleared to zero by ON edge (OFF->ON).
Note, however, GROSS WEIGHT must be within the range specified by DZ REGULATION VALUE for this function to operate properly. If the value is out of range, it will not be cleared and ZALM will come out (in reversed-red) to report irregularity.
DIGITAL ZERO, used for function settings, also behaves in the same fashion.

7-4-6. Zero point auto adjustment (edge input)

Zero-point automatic adjustment is triggered by a falling edge (OFF->ON).
The zero point measurement is performed in [TEST MODE], and [ZERO ERROR SET] value is automatically updated. ZERO ERROR MEASURING signal (45-pin) turned on while this measurement is in progress. Successful completion of the measurement will output ZERO ERROR MEASUREMENT OK (46 pin).
This procedure is disabled if the system receives a falling edge while load ration exceeds the value dictated by [Z_ERR UPPER LIMIT]. Note also that this process is aborted if the following conditions occur, outputting a ZERO ERROR MEASUREMENT NG (47 pin).

・Load ratio exceeds [Z_ERR UPPER LIMIT] during the process
・ STOP is pressed
・The signal changes from ON to OFF (rising edge) during the process

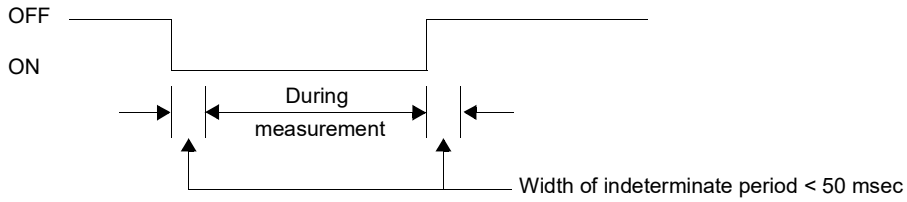
If this process ended abnormally, [ZERO ERROR SET] will not be updated (the value prior to the adjustment process will be retained).



* This input is ignored while RUNNING is on, and when the system is in one of other modes.

7-4-7. Test mode span measurement (edge input)

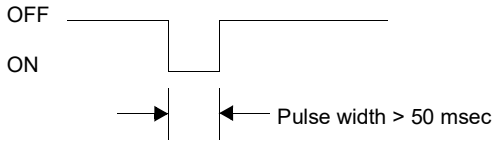
Span measurement in [TEST MODE] is triggered upon receiving a falling edge (OFF->ON) and stopped by a rising edge (ON->OFF).
The measurement automatically finishes when the set value specified by [BELT LENGTH] or [SPEED INPUT COUNT] are satisfied; selection of these depends on the [ERROR MEAS.SELECT] setting.



* This input is ignored while RUNNING is on, or when the system is in one of other modes.

7-4-8. Pulse count start (edge input)

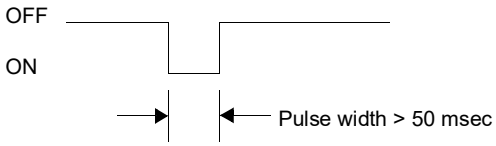
[SPEED INPUT COUNT MEAS] is triggered upon receiving a falling edge (OFF->ON). This measurement continues until the system received a PULSE COUNT STOP signal (31 pin), or STOP key on the display is pressed.



* This input is ignored while RUNNING is on, or when the system is in one of other modes.

7-4-9. Pulse count stop (edge input)

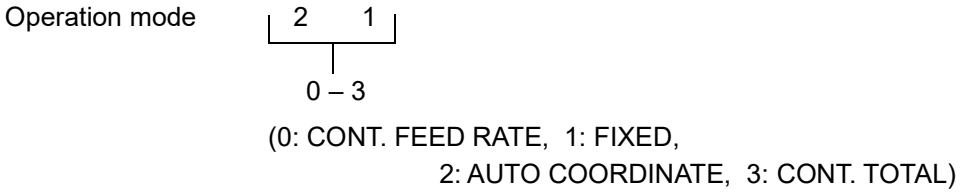
[SPEED INPUT COUNT MEAS] stops upon detecting a falling edge (OFF->ON) in the external input.



* This input is ignored while RUNNING is on, or when the system is in one of other modes.

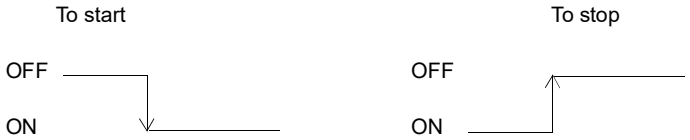
7-4-10. Operation mode (level input)

This function is available only when EXTERNAL ENTRY is specified in OPERATION MODE.



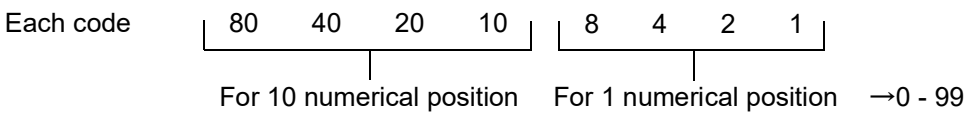
7-4-11. Graph drawing (edge input)

This function is used to start/stop drawing graphics on the screen:
A falling edge (OFF->ON) in the external input STARTs the graphic drawing
A rising edge (ON->OFF) in the external input STOPs the graphic drawing



7-4-12. Code # designation (level input)

This function is available only when EXTERNAL ENTRY is specified in WEIGHING CODE SELECTION.



7-5. External Output Signal

7-5-1. Pulse output 1

Data sent out to PULSE OUTPUT 1 depends on the settings in [FEED PULSE (W/P) 1] and [PULSE WIDTH 1].

7-5-2. Pulse output 2

Data sent out to PULSE OUTPUT 2 depends on the settings in [FEED PULSE (W/P) 2] and [PULSE WIDTH 2].

7-5-3. Upper limit (HI)

HI alarm turns ON (only while RUNNING) if the values of feed ratio [%] or load ratio [%] exceeds the set value of Alarm Upper Limit [%]. Note that “COMPARISON OFF” in [ALARM MODE] suppresses this alarm.

7-5-4. GO

GO output turns ON (only while RUNNING) if neither HI nor LO is activated. Note that “COMPARISON OFF” in [ALARM MODE] suppresses this alarm.

7-5-5. Lower limit (LO)

LO alarm turn ON (only while RUNNING) if the values of feed ratio [%] or load ratio [%] become equal or less than the set value of Alarm Lower Limit [%]. Note that “COMPARISON OFF” in [ALARM MODE] suppresses this alarm.

7-5-6. Weight error

This output turns ON (only while RUNNING) if any one of the following output turns on: LOAD, -LOAD, OFL1-5, or EXC.

7-5-7. Belt moving

This output turns on (only while RUNNING) if belt speed has non-zero value.

7-5-8. Power ON

This output is ON while the system is powered.

7-5-9. Running

This output is ON while the system is operating (measuring).

7-5-10. NZ

This output turns ON (only while RUNNING) when DEAD BAND LOAD RATIO [%] is greater than LOAD RATIO [%]

7-5-11. Total final over

This output turns ON (only while RUNNING) when Total is greater than the set value of Total Final. Note that “COMPARISON OFF” in [ALARM MODE] suppresses this alarm.

7-5-12. Zero error measuring

This output turns ON while zero point auto adjustment is being carried out.

7-5-13. Zero error measure OK

This output turns ON for one second when zero measurement normally ends and the zero error point data is updated. It does not turn on if zero measure failed.

7-5-14. Zero error measure NG

This output turns ON for one second when zero measurement failed or aborted. Zero error point date will not be updated.

8. INTERFACE

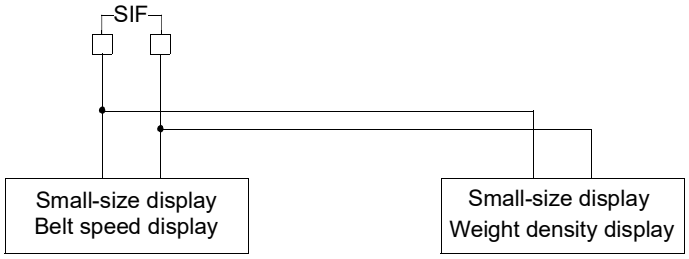
8-1. 2-Wire Serial Interface SI/F

F805AT-BC provides a dedicated serial interface for connecting external devices such as UNIPULSE printer and large displays. This interface uses a 2-wire scheme for economic and simple installation for up to about 300 m data transmission.

Connection

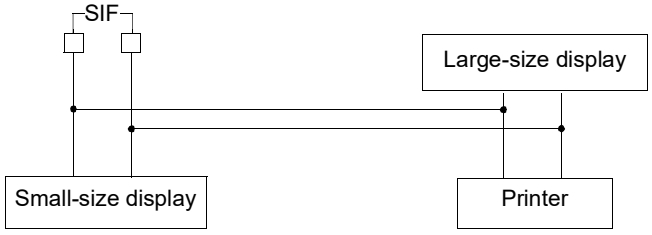
SI/F is a non-polar interface capable of parallel connection of up to three external devices (provided by UNIPULSE).
Simple parallel 2-wire cables or cabtire cables can be used for this interface. Avoid running the interface line along the AC, or high voltage lines.

Example 1



Up to three external displays can be connected.
Different data can be assigned to each of them independently.

Example 2



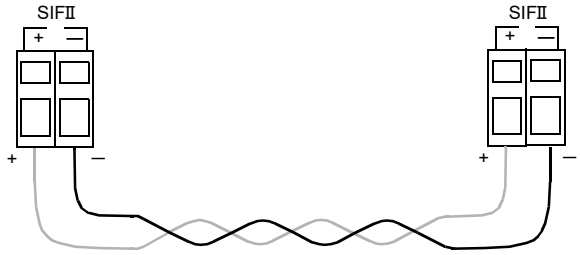
Three different devices are connected in the lower diagram.
Different data can be assigned to each of them independently.

8-2. 2-Wire High-Speed Bi-Directional Serial Interface SI/F II

SI/F II is the 2-wire high-speed bi-directional serial interface for operating multiple of F805AT-BCs in master/slave mode.

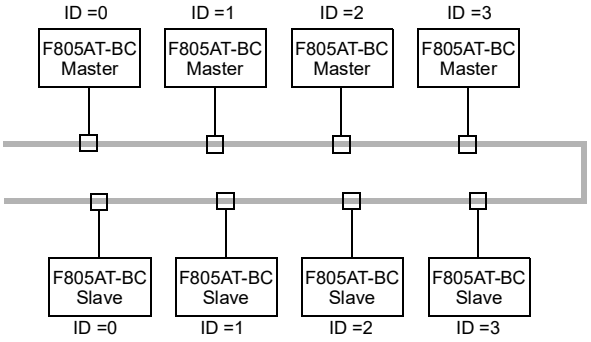
Connection

SI/F II is a 2-wire interface extendable up to about 300 m and capable of networking up to eight F805AT-BCs. It is a polar-interface: terminals with the same polarity must be connected.



ID number

SI/F II is capable of connecting up to eight F805AT-BCs (up to four masters) in the same network. F805AT-BCs can be grouped together (max. four groups) based on the ID number: each group must have a unique ID number.



This scheme allows F805AT-BCs with different ID number to be linked in the same network, contributing to reduce wiring cost and simplify maintenance.

Note

The slave device, if it is not properly connected to its master, may generate “Master error” at a regular interval. This message is automatically removed once it establishes proper communication.

Assigning ID number (SI/F II ID)

This function defines the F805AT-BC's ID number on the SI/F II network. Enter the desired ID number and press OK to confirm.

Operation

MODE → PAGE → COMMUNICATION → PAGE → SI/FII ID

Input Range: 0-3

8-3. RS-232C Interface

8-3-1. Communication specifications

Specifications

Signal Level:	RS-232C compatible	
Transmission Distance:	Approx. 15 m	
Transmission method:	Asynchronous, full-duplex	
Transmission speed:	1200, 2400, 4800, 9600, 19200, or 38400 (selectable)	
Bits configuration:	Start bit:	1
	Character length:	7 or 8 (selectable)
	Stop bit:	1 or 2 (selectable)
	Parity:	none, odd or even (selectable)
Communication code:	ASCII	

Connector pin assignment

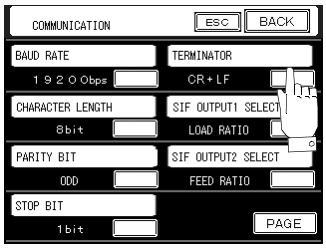
Compatible plug: 9-pin D-type Subminiature
* OMRON XM3D-0921
(Shell: XM2S-0913 <screw: #4-40 (inch)>) or equivalent

1			6	IN	DSR
2	IN	RXD	7	OUT	RTS
3	OUT	TXD	8	IN	CTS
4	OUT	DTR	9		
5	⁎	GND			

8-3-2. Settings for RS-232C

Communication parameters for the devices connected to F805AT-BC, such as a PC or PLC, must be compatible with those for F805AT-BC.

MODE → PAGE → COMMUNICATION →



Specify valued for the following parameters:

- Baud rate
- Character length
- Parity bit
- Stop bit
- Terminator

8-3-3. Cables

F805AT-BC — cross cable — PC connector (9-pin)

F805AT-BC		PC connector (9-pin)	
1		1	CD
2	RXD	2	RXD
3	TXD	3	TXD
4	DTR	4	DTR
6	DSR	6	DSR
7	RTS	7	RTS
8	CTS	8	CTS
5	GND	5	GND
9		9	RI

F805AT-BC — cross cable — PC connector (25-pin)

F805AT-BC		PC connector (25-pin)	
1		8	CD
2	RXD	3	RXD
3	TXD	2	TXD
4	DTR	20	DTR
6	DSR	6	DSR
7	RTS	4	RTS
8	CTS	5	CTS
5	GND	7	GND
9		1	FG

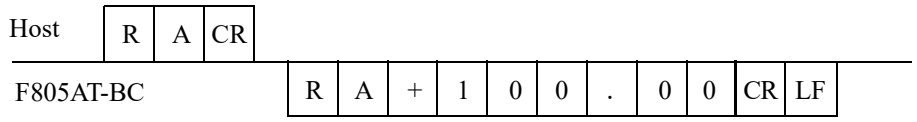
The connection diagram shown above is for the PC that functions as a DTE (Data Terminal Equipment). If it functions as a DCE (Data Circuit-terminating equipment), a straight cable must be used.

Review carefully the signal layout and connector type before you start to assemble the cable.

8-3-4. Communication format

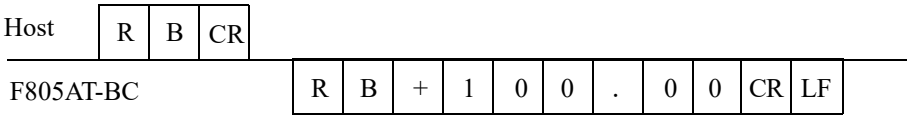
R command (data read-out)

Belt speed



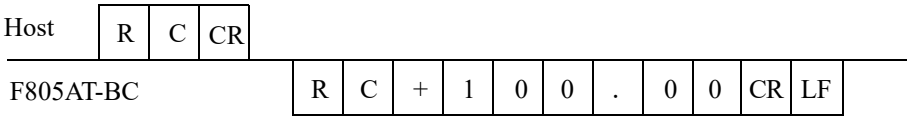
(Decimal places is fixed to 2.)

Weight density



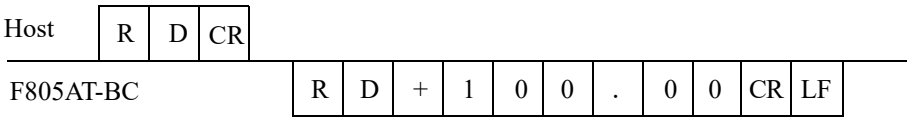
(Decimal place floating with weight.)

Feed rate



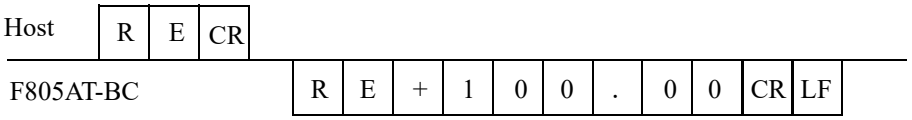
(Decimal place floating with flow.)

Load ratio



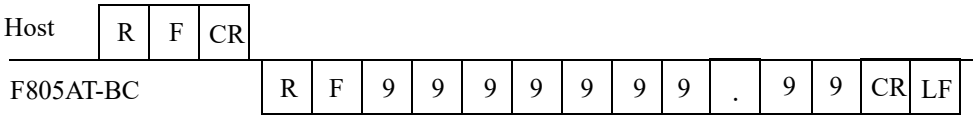
(Decimal places is fixed to 2.)

Feed ratio



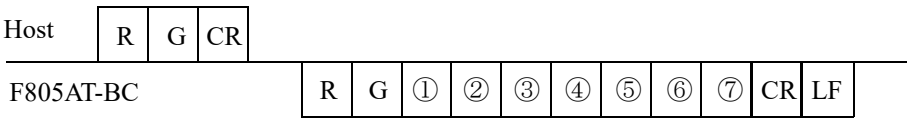
(Decimal places is fixed to 2.)

Total



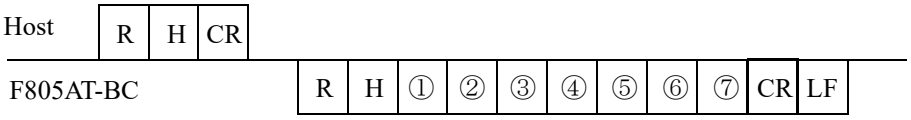
(Decimal place is depending on [TOTAL W. DISP.Digit].)

Status 1



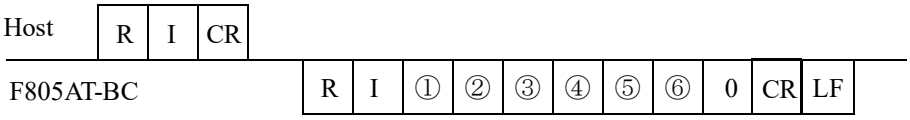
①HI	1 : ON 0 : OFF	⑤EXC (abnormal)	1 : ON 0 : OFF
②LO	1 : ON 0 : OFF	⑥LOCK (hard)	1 : ON 0 : OFF
③RUN	1 : ON 0 : OFF	⑦LOCK (soft)	1 : ON 0 : OFF
④Belt (moving)	1 : ON 0 : OFF		

Status 2



①＋LOAD	1 : ON 0 : OFF	⑤OFL3	1 : ON 0 : OFF
②－LOAD	1 : ON 0 : OFF	⑥OFL4	1 : ON 0 : OFF
③OFL1	1 : ON 0 : OFF	⑦OFL5	1 : ON 0 : OFF
④OFL2	1 : ON 0 : OFF		

Status 3



①State of operation

0 : Non-operation 1 : Operation running 2 : Zero calibration running
3 : SPAN calibration running 4 : Zero error measure running
5 : SPAN error measure running 6 : ZERO error measure test
7 : SPAN error measure test 8 : Speed input count running

②Calibration error

0, or 1-8
* Same as alarm numbers (page 159)

③Sequence error

0, or 1-9
* Same as alarm numbers (page 159)

④Operation mode

0 : Cont. feed rate 1 : Fixed 2 : Auto coordinate 3 : Cont. total

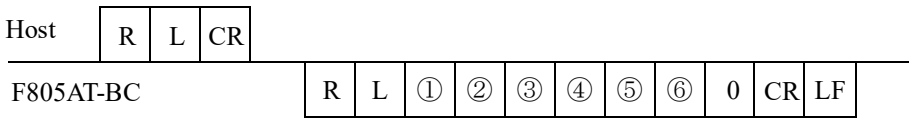
⑤While control is “LOCK”

0 : OFF 1 : Start time 2 : First stability time
3 : Control limit over 4 : Stability time
5 : Target value modification 6 : Abnormal flow

⑥NZ

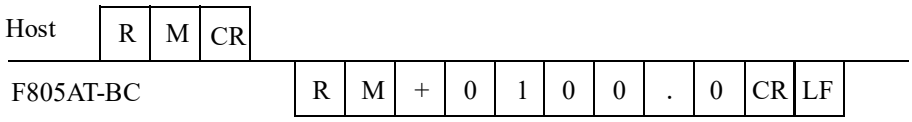
0 : OFF 1 : ON

Status 4



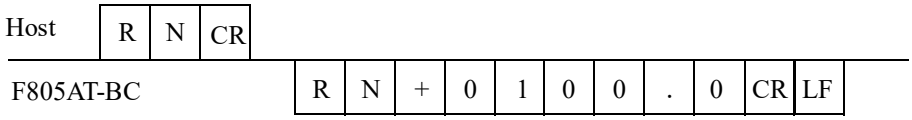
①Abnormal flow	0 : OFF	1 : ON	
②Control limit over	0 : OFF	1 : ON	
③Control deviation over/under	0 : OFF	1 : UNDER	2 : OVER
④Flow setting over/under	0 : OFF	1 : UNDER	2 : OVER
⑤Total final over	0 : OFF	1 : ON	
⑥Master error	0 : OFF	1 : ON	

Control rate



(Decimal places is fixed to 1.)

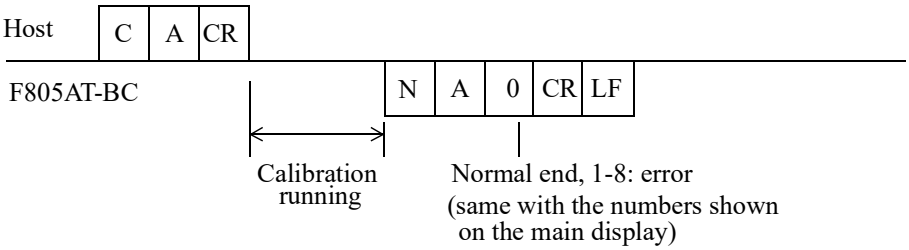
Control deviation



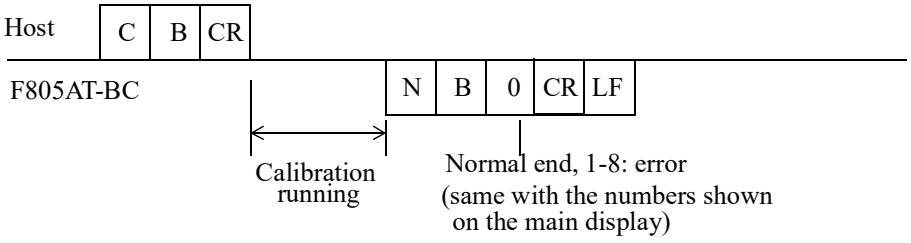
(Decimal places is fixed to 1.)

C command

Zero calibration

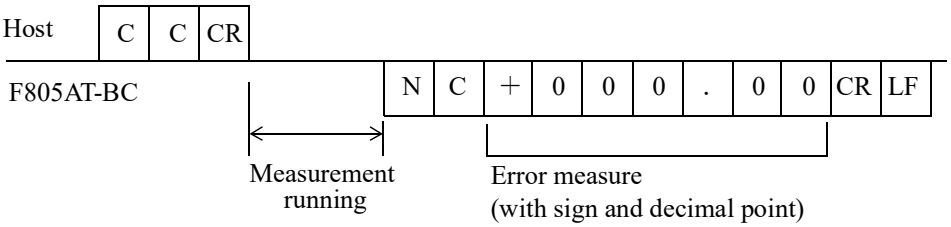


Span calibration

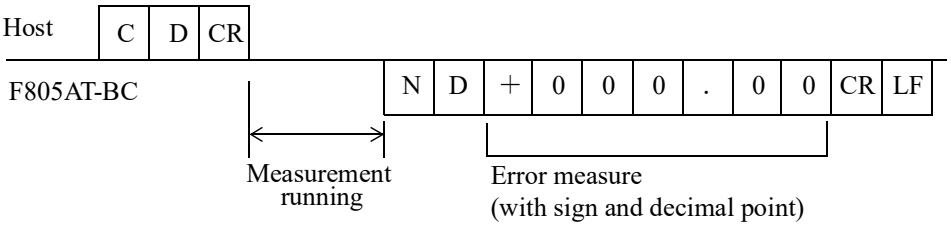


* Note that such parameters as [CAPACITY], [MIN.SCALE DIV. (WEIGHT)] and [BALANCE WEIGHT] must have been entered in advance of sending these two commands.

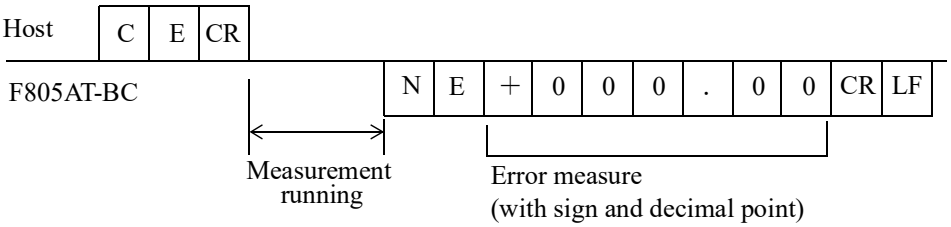
Zero error measure



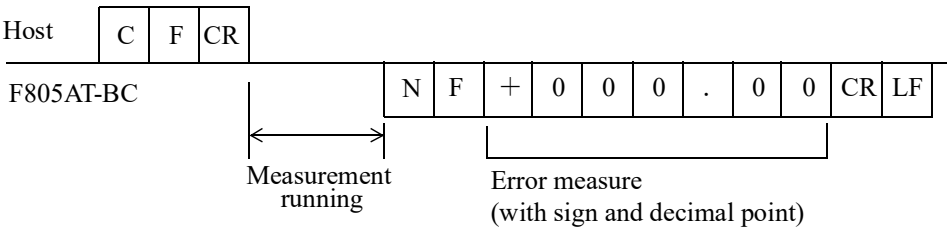
Span error measure



Zero measure in test mode

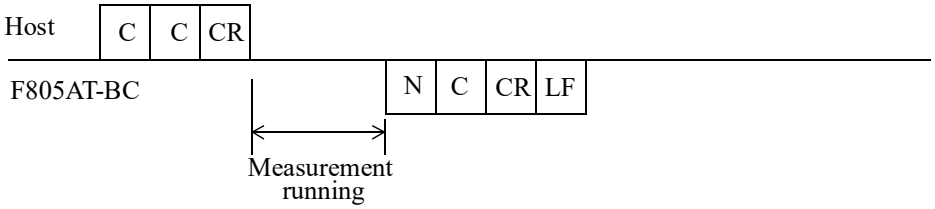


Span measure in test mode

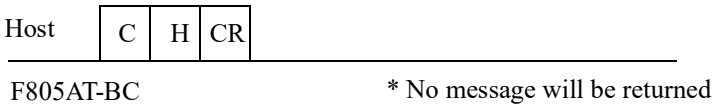


* In case the measurement is aborted, after it has been started using one of the four commands above, by a screen operation or external control signal (rising edge), F805AT-BC responds with he following modified messages.

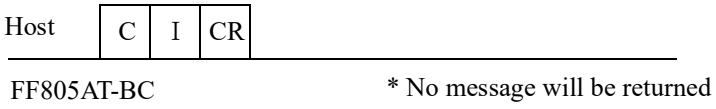
Example: Zero error measure



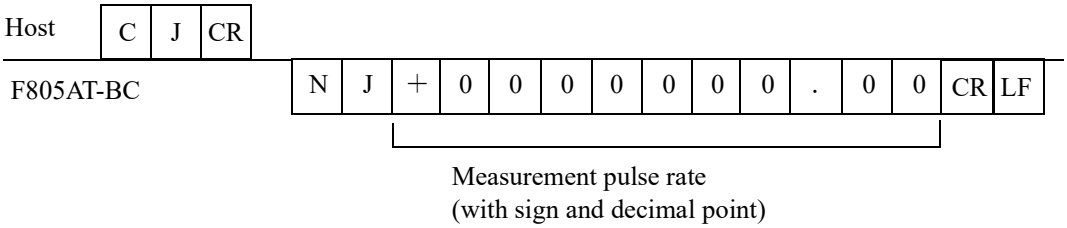
Total clear



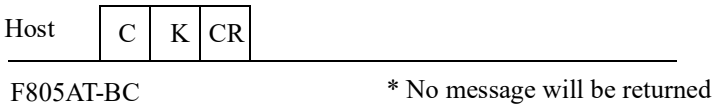
Speed entry counter start



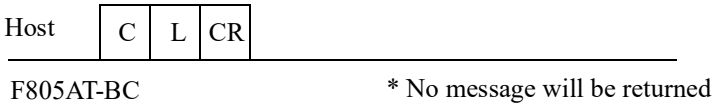
Speed entry counter stop



Operation start



Operation stop



W command (Write)

Each code

Code (for RS-232 communication only)	W	C	0	0	0	0			CR	LF
Proportion (P)	W	C	1						CR	LF
Integral (I)	W	C	2						CR	LF
Differential (D)	W	C	3	0					CR	LF
AT Coordinate Time	W	C	4	0	0	0			CR	LF
AT Coordinate 1	W	C	5						CR	LF
AT Coordinate 2	W	C	6						CR	LF
AT Coordinate 3	W	C	7						CR	LF
AT Coordinate 4	W	C	8						CR	LF
At Coordin Out 1	W	C	9	0					CR	LF
At Coordin Out 2	W	C	A	0					CR	LF
At Coordin Out 3	W	C	B	0					CR	LF
At Coordin Out 4	W	C	C	0					CR	LF
Weighing Code	W	C	D	0	0	0			CR	LF

Operation

Weighing Section	W	0	0						CR	LF	Write inhibited when Locked (soft, hard)
Decimal place of Weighing Section	W	0	1	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Rated Feed Rate (FS)	W	0	2						CR	LF	Write inhibited when Locked (soft, hard)
Decimal place of FS	W	0	3	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Feed Unit	W	0	4	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Operation Select	W	0	5	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Rated Belt Speed	W	0	6						CR	LF	Write inhibited when Locked (soft, hard)
Decimal place of Rated Belt Speed	W	0	7	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Dead Band Load Ratio	W	0	8	0	0	0			CR	LF	Write inhibited when Locked (soft, hard)
Dead Band Belt Speed	W	0	9	0	0	0			CR	LF	Write inhibited when Locked (soft, hard)
Moisture Ratio	W	0	A	0	0	0			CR	LF	Write inhibited when Locked (soft, hard)
Feed Pulse (W/P)1	W	0	B	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Feed Pulse (W/P)2	W	0	C	0	0	0			CR	LF	Write inhibited when Locked (soft)
Pulse Width 1	W	0	D	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Pulse Width 2	W	0	E	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Total W Disp. Digit	W	0	F	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Alarm Time	W	B	2	0	0				CR	LF	Write inhibited when Locked (soft)
Start Time	W	B	3	0	0	0			CR	LF	Write inhibited when Locked (soft)
First Stability Time	W	B	4	0	0	0			CR	LF	Write inhibited when Locked (soft)
Dead Band	W	B	5	0					CR	LF	Write inhibited when Locked (soft)
Operation Mode	W	B	6	0	0	0	0		CR	LF	Write inhibited when Locked (soft)

Function

START/STOP key Z_ERR key	W	2	0	0	0	0	①	②	CR	LF	Write inhibited when Locked (soft)
							①START/STOP key ②Z_ERR key				
ZT(Period)	W	2	1	0	0	0			CR	LF	Write inhibited when Locked (soft)
ZT(Range)	W	2	2	0	0	0			CR	LF	Write inhibited when Locked (soft)
DZ Regulation Value	W	2	3	0					CR	LF	Write inhibited when Locked (soft)
Weighing Code Selection	W	2	4	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
I/O Monitor Display	W	2	5	0	0	0	0		CR	LF	Write inhibited when Locked (soft)

Weight calibration, Flow calibration

Zero Error Set	W	3	0						CR	LF	Write inhibited when Locked (soft, hard)
Span Error Set	W	3	1						CR	LF	Write inhibited when Locked (soft, hard)
Balance Weight	W	3	2						CR	LF	Write inhibited when Locked (soft, hard)
Capacity	W	3	3						CR	LF	Write inhibited when Locked (soft, hard)
Min.Scale Div. (Weight)	W	3	4	0	0				CR	LF	Write inhibited when Locked (soft, hard)
Belt Length	W	3	5						CR	LF	Write inhibited when Locked (soft, hard)
Decimal place of Belt Length	W	3	6	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Rated Weight Density	W	3	7	0					CR	LF	Write inhibited when Locked (soft, hard)
Decimal place of Rated Weight Density	W	3	8	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Cal. Weight Density	W	3	9	0					CR	LF	Write inhibited when Locked (soft, hard)
Decimal place of Cal. Weight Density	W	3	A	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Load Cell Excitation	W	3	B	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Decimal place of Weight/Flow	W	3	C	0	0	0	①	②	CR	LF	Write inhibited when Locked (soft, hard)
							①Weight ②Flow				
Grav. Acceleration	W	3	D	0	0	0			CR	LF	Write inhibited when Locked (soft, hard)
Sign of Zero Error	W	3	E	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Sign of Span Error	W	3	F	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)
Min.Scale Div. (Flow)	W	B	0	0	0				CR	LF	Write inhibited when Locked (soft, hard)
Z_ERR Upper Limit	W	B	1						CR	LF	Write inhibited when Locked (soft, hard)
Belt Length Unit	W	B	7	0	0	0	0		CR	LF	Write inhibited when Locked (soft, hard)

Comparison

Alarm Upper Limit	W	1	0						CR	LF	Write inhibited when Locked (soft)
Alarm Lower Limit	W	1	1						CR	LF	Write inhibited when Locked (soft)
Alarm Mode	W	1	2	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Total Final (upper 4 digits)	W	1	3	0					CR	LF	Write inhibited when Locked (soft)
Total Final (Lower 5 digits)	W	1	4						CR	LF	Write inhibited when Locked (soft)
Total Final Mode	W	1	5	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Belt Speed Over	W	1	6						CR	LF	Write inhibited when Locked (soft)
Weight Density Over	W	1	7						CR	LF	Write inhibited when Locked (soft)
Feed Rate Over	W	1	8						CR	LF	Write inhibited when Locked (soft)
Load Ratio Over	W	1	9						CR	LF	Write inhibited when Locked (soft)
Feed Ratio Over	W	1	A						CR	LF	Write inhibited when Locked (soft)

Graph setting

Belt Speed End Point	W	6	0						CR	LF	Write inhibited when Locked (soft)
Wei. Dens. End Point	W	6	1						CR	LF	Write inhibited when Locked (soft)
Feed Rate End Point	W	6	2						CR	LF	Write inhibited when Locked (soft)
Load Ratio End Point	W	6	3						CR	LF	Write inhibited when Locked (soft)
Feed Ratio End Point	W	6	4						CR	LF	Write inhibited when Locked (soft)
Disp. Data Select 1	W	6	5	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Disp. Data Select 2	W	6	6	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Graphic Mode	W	7	0	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Trigger Level	W	7	1						CR	LF	Write inhibited when Locked (soft)
Trigger CH Select	W	7	2	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Split Selection	W	7	3	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Disp. Partition CH1	W	7	4	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Disp. Partition CH2	W	7	5	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Disp. Partition CH3	W	7	6	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
CH1 Start Point	W	7	7						CR	LF	Write inhibited when Locked (soft)
CH2 Start Point	W	7	8						CR	LF	Write inhibited when Locked (soft)
CH3 Start Point	W	7	9						CR	LF	Write inhibited when Locked (soft)
CH1 End Point	W	7	A						CR	LF	Write inhibited when Locked (soft)
CH2 End Point	W	7	B						CR	LF	Write inhibited when Locked (soft)
CH3 End Point	W	7	C						CR	LF	Write inhibited when Locked (soft)
X End Point	W	7	D	0	0				CR	LF	Write inhibited when Locked (soft)

Display

Display Frequency	W	4	0	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Digital Filter	W	4	1	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Analog Filter	W	4	2	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Average Count	W	4	3	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Error display control	W	4	4	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Data Select Key	W	4	5	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Disp.Data Selection	W	4	6	0	0	0	0		CR	LF	Write inhibited when Locked (soft)

Control parameter

Target Set	W	D	0						CR	LF	Write inhibited when Locked (soft)
Control Limit	W	D	1	0					CR	LF	Write inhibited when Locked (soft)
Allowable Control Dev.	W	D	2	0	0				CR	LF	Write inhibited when Locked (soft)
Rate Limit	W	D	3	0	0				CR	LF	Write inhibited when Locked (soft)
Fault Detect Value	W	D	4	0					CR	LF	Write inhibited when Locked (soft)
Master/Slave Select	W	D	5	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Slave Mode Select	W	D	6	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Start/Error Display	W	D	7	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Flow Stability Time	W	D	8	0	0	0			CR	LF	Write inhibited when Locked (soft)
Start Coordin. Value	W	D	9	0					CR	LF	Write inhibited when Locked (soft)
Control Frequency	W	D	A	0	0	0			CR	LF	Write inhibited when Locked (soft)
Target Set (4-digit %)	W	D	B	0					CR	LF	Write inhibited when Locked (soft)

States ascertain

Belt Speed Over Asc.	W	E	0	0	0				CR	LF	Write inhibited when Locked (soft)
Weight Density Over Asc.	W	E	1	0	0				CR	LF	Write inhibited when Locked (soft)
Feed Rate Over Asc.	W	E	2	0	0				CR	LF	Write inhibited when Locked (soft)
Load Ratio Over Asc.	W	E	3	0	0				CR	LF	Write inhibited when Locked (soft)
Feed Ratio Over Asc.	W	E	4	0	0				CR	LF	Write inhibited when Locked (soft)
Deviation Lim. Over Asc.	W	E	5	0	0				CR	LF	Write inhibited when Locked (soft)

Communication

SIF Output1 Select	W	5	0	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
SIF Output2 Select	W	5	1	0	0	0	0		CR	LF	Write inhibited when Locked (soft)

System

LOCK (soft)	W	9	0	0	0	0	0		CR	LF	
LANGUAGE	W	9	1	0	0	0	0		CR	LF	Write inhibited when Locked (soft)

DAC

D/A Output Channel	W	8	0	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
D/A Output Mode	W	8	1	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
D/A Zero Output Weight	W	8	2						CR	LF	Write inhibited when Locked (soft)
D/A Full Scale Value	W	8	3						CR	LF	Write inhibited when Locked (soft)
Speed Entry Select	W	8	4	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
Pulse Count/ Rotation	W	8	5						CR	LF	Write inhibited when Locked (soft)
Speed Input Count (Upper 4 digits)	W	8	7	0					CR	LF	Write inhibited when Locked (soft)
Speed Input Count (Lower 5 digits)	W	8	8						CR	LF	Write inhibited when Locked (soft)
Error Measure Select	W	8	9	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
D/A Lower Limit	W	8	A						CR	LF	Write inhibited when Locked (soft)
D/A Upper Limit	W	8	B						CR	LF	Write inhibited when Locked (soft)
D/A Output Compensation	W	8	C	0					CR	LF	Write inhibited when Locked (soft)

* Before trying to write in the data items W81 – W83 and W8A – W8C, the output channel must have been defined using W80 and minimum of 500 msec must be inserted before the write operation.

Option (ANA)

AO Outoput Channel	W	A	0	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
AO Output Mode	W	A	1	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
AO Zero Output Weight	W	A	2						CR	LF	Write inhibited when Locked (soft)
AO Full Scale Value	W	A	3						CR	LF	Write inhibited when Locked (soft)
AI Input Channel	W	A	6	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
AI Digital Filter	W	A	7	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
AO Lower Limit	W	A	8						CR	LF	Write inhibited when Locked (soft)
AO Upper Limit	W	A	9						CR	LF	Write inhibited when Locked (soft)
AO Output Compensation	W	A	A	0					CR	LF	Write inhibited when Locked (soft)
Target Entry Select	W	A	B	0	0	0	0		CR	LF	Write inhibited when Locked (soft)
AI Target Value	W	A	C						CR	LF	Write inhibited when Locked (soft)
AI Min. Scale Div.	W	A	D	0	0				CR	LF	Write inhibited when Locked (soft)

* Before trying to write in the data items WA1 – WA3 and WA8 – WAA, the output channel must have been defined using WA0. In the same token, use WA6 before trying to write WA7 and WAD. In all cases, minimum of 500 msec must be inserted before the write operation.

Operation

・Decimal place of weighing section

0 : 0	1 : 0.0	2 : 0.00
3 : 0.000	4 : 0.0000	

・Decimal place of FS

0 : 0	1 : 0.0	2 : 0.00
3 : 0.000	4 : 0.0000	

・Feed unit

0 : kg/h, kg	1 : t/h, t

・Operation select

0 : EXTERNAL ENTRY	1 : KEY POW.C. ON	2 : KEY POW.C. OFF

・Decimal place of rated belt speed

0 : 0	1 : 0.0	2 : 0.00
3 : 0.000	4 : 0.0000	

・Feed pulse (W/P) 1

0 : 100g	1 : 1kg	2 : 10kg
3 : 100kg	4 : 1t	

・Feed pulse (W/P) 2

00 : 1*0.001	01 : 2*0.001	02 : 5*0.001
03 : 1*0.01	04 : 2*0.01	05 : 5*0.01
06 : 1*0.1	07 : 2*0.1	08 : 5*0.1
09 : 1*1	10 : 2*1	11 : 5*1

・ Pulse width 1, Pulse width 2

0 : 25	1 : 50	2 : 100
3 : 200	4 : 500	

・Total W. disp. digit

0 : 1g or 1kg	1 : 10g or 10kg	2 : 100g or 100kg
3 : 1kg or 1t		

・Operation mode

0 : CONT. FEED RATE	1 : FIXED	2 : AUTO COORDINATE
3 : CONT. TOTAL	4 : EXTERNAL ENTRY	

Function

・START/STOP key, Z_ERR key

0 : INVALID	1 : VALID

・Weighing code selection

0 : KEY INPUT	1 : EXTERNAL ENTRY

・I/O monitor display

0 : INHIBIT	1 : EFFECT

Calibration

- Decimal place of belt length
  0 : 0 1 : 0.0 2 : 0.00
  3 : 0.000 4 : 0.0000

- Decimal place of rated weight density
  0 : 0 1 : 0.0 2 : 0.00
  3 : 0.000

- Decimal place of cal. weight density
  0 : 0 1 : 0.0 2 : 0.00
  3 : 0.000

- Excitation voltage
  0 : 5V 1 : 10V

- Decimal place (Weight), (Flow)
  0 : 0 1 : 0.0 2 : 0.00
  3 : 0.000

- Sign of zero error
  0 : plus 1 : minus

- Sign of span error
  0 : plus 1 : minus

- Belt length unit
  0 : mm 1 : m

Comparison

- Alarm mode
  0 : COMPARISON OFF 1 : FEED RATIO 2 : LOAD RATIO

- Total final mode
  0 : COMPARISON OFF 1 : ALARM&CONTINUE 2 : ALARM&STOP

Graph setting

・Disp.data select 1, Disp.data select 2

0 : BELT SPEED	1 : WEIGHT DENSITY	2 : FEED RATE
3 : LOAD RATIO	4 : FEED RATIO	5 : GROSS WEIGHT
6 : CONTROL RATE	7 : CTRL. DEVIATION	8 : EXTERNAL ENTRY

・Graphic mode

0 : SINGLE	1 : CONTINUOUS	2 : LEVEL (↥)+EXT
3 : LEVEL(⇅)+EXT	4 : LEVEL (↥)	5 : LEVEL (⇅)

・Trigger ch select

0 : ch1	1 : ch2	2 : ch3

・Split selection

0 : NO SPLIT	1 : 2 SPLIT	2 : 3 SPLIT

・Disp. partition ch1/ch2/ch3

0 : BELT SPEED	1 : WEIGHT DENSITY	2 : FEED RATE
3 : LOAD RATIO	4 : FEED RATIO	5 : CONTROL RATE

Display

・Display frequency

0 : 1 Times/Sec	1 : 3 Times/Sec	2 : 6 Times/Sec
3 : 13 Times/Sec	4 : 25 Times/Sec	

・Digital filter

0 : OFF	1 : 2 Times	2 : 4 Times
3 : 8 Times	4 : 16 Times	5 : 32 Times
6 : 64 Times	7 : 128 Times	

・Analog filter

0 : 2Hz	1 : 4Hz	2 : 6Hz
3 : 8Hz		

・Average count

0 : OFF	1 : 2 Times	2 : 4 Times
3 : 8 Times	4 : 16 Times	5 : 32 Times
6 : 64 Times	7 : 128 Times	

・Error display control

0 : NORMAL DISPLAY	1 : ERROR DISPLAY	2 : ALTERNAT. DISP.

・Data select key

0 : INVALID	1 : VALID

・Disp. data selection

0 : TOTAL	1 : FEED RATE

Control parameter

・Master/slave select
0：SINGLE　1：MASTER　2：SLAVE

・Slave mode select
0：FEED RATE FOLLOW (FR FOLLOW)
1：FR&OP.FOLLOW
2：TARGET FOLLOW
3：TARGET&OP.FOLLOW (TRGT&OP. FOLLOW)

・Start/error display
0：REAL TIME DISPLAY (REAL TIME DISP.)　1：TARGET DISPLAY

Communication

・SI/F output1 select, SI/F output2 select
0：BELT SPEED　1：WEIGHT DENSITY　2：FEED RATE
3：LOAD RATIO　4：FEED RATIO　5：GROSS WEIGHT
6：TOTAL (UP.4DIG)　7：TOTAL (LO. 5DIG)

System

・LOCK(soft)
0：OFF　1：ON

・LANGUAGE
0：JAPANESE　1：ENGLISH

DAC

・D/A output channel
0：ch1　1：ch2

・D/A output mode
0：4mA FIXED OUT　1：20mA FIXED OUT　2：BELT SPEED
3：WEIGHT DENSITY　4：FEED RATE　5：LOAD RATIO
6：FEED RATIO　7：CONTROL RATE

・Speed entry select
0：NO　1：NORMAL MODE A　2：NORMAL MODE B
3：NORMAL A SLOW　4：PHASE MEASURE　5：ANALOG CH1 MODE
6：ANALOG CH2 MODE　7：ANA. NORMAL A　8：ANA. A SLOW

・Error meas. select
0：BELT LENGTH　1：SPEED INPUT COUNT

Option (ANA)

・AO output channel

0：ch1	1：ch2	2：ch3

・AO output mode

0：4mA FIXED OUT	1：20mA FIXED OUT	2：BELT SPEED
3：WEIGHT DENSITY	4：FEED RATE	5：LOAD RATIO
6：FEED RATIO	7：CONTROL RATE	

・AI input channel

0：ch1	2：ch2

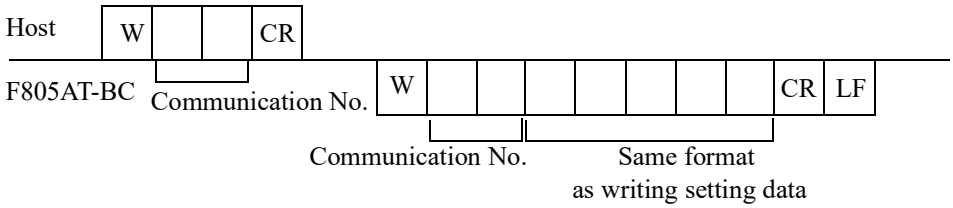
・AI digital filter

0：OFF	1：2 Times	2：4 Times
3：8 Times	4：16 Times	5：32 Times
6：64 Times		

・Target entry select

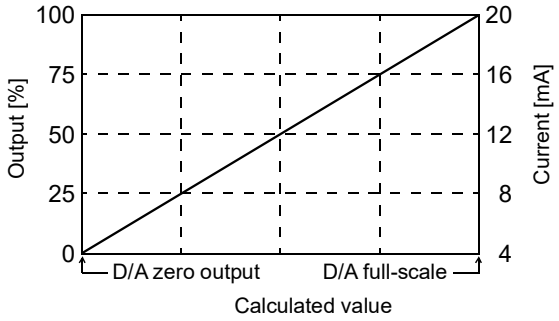
0：NONE	1：ANALOG CH1	2：ANALOG CH2

W command (reading setting data)

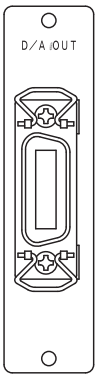


8-4. D/A Converter [DAC]

The D/A converter provides F805AT-BC with the capability of sending internal arithmetic data to the external devices using 4-20mA analog signal.
This analog signal ranges from zero (4mA) to full scale (20mA) as specified by two parameters [D/A ZERO OUTPUT WEIGHT] and [D/A FULL SCALE VALUE].
Output terminal is electrically isolated from the internal circuit using a photo-coupler.
The D/A converter has 16-bit resolution and capable of 200 conversions per second.
This output is capable of over-range output (approx. ±10% FS).
Using the D/A converter, external pulse train is representing the belt speed which is used as parameters for types of comparisons and readings.



8-4-1. External output port



Pin assignment

1	+ (ch1)	8	+ (ch2)
2	− (ch1)	9	− (ch2)
3		10	
4	COM	11	COM
5	COM	12	COM
6	+12V	13	B-phase
7	Z-phase	14	A-phase

Source supply for external device

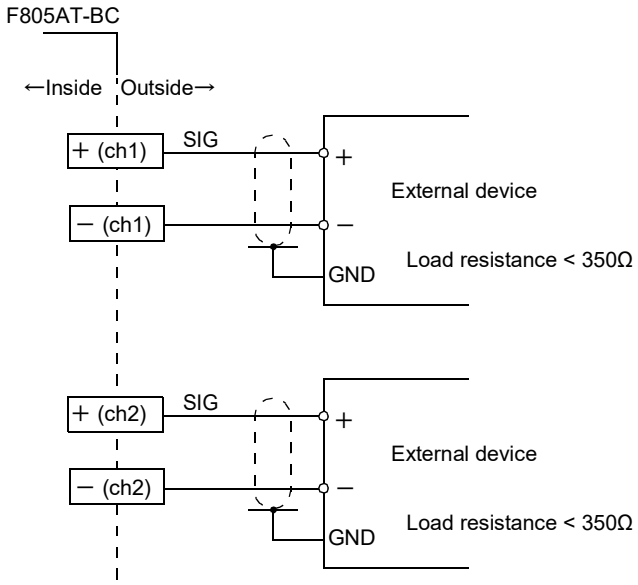
This output port provides power voltage for speed detecting devices such as a rotary encoder. Power voltage is +12V, and capable of sourcing up to 160mA (6-pin).

Note:

When used with F805AT-BC, pin No. 3 and 10 is not used and should remain open. Applying external voltage to, or shorting these terminals may result in failure/damage in the external device or F805AT-BC.

Outputting current signal

Connect an external device (max. load resistance: 350Ω) between +(ch1) and –(ch1), or between +(ch2) and –(ch2) terminals of F805AT-BC.

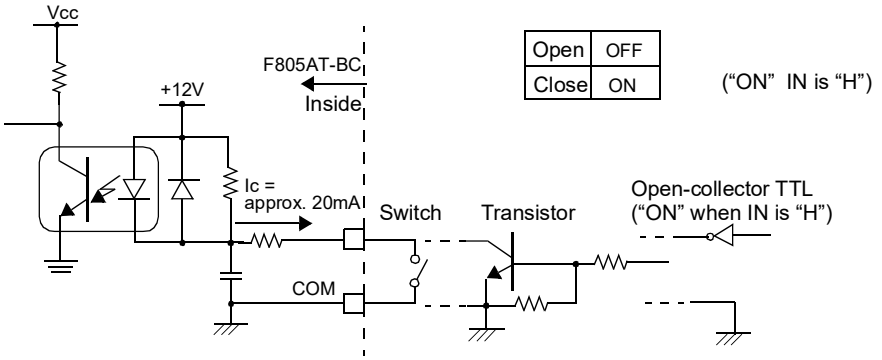


Note:

- Applying external voltage to the terminals may result in D/A converter damages.
- Connecting capacitive load may give rise to oscillation in the output signal.

Pulse input equivalent circuit

Two states of input signal (High and Low) are produced by opening input from, or closing to the COM terminal. Opening/closing of the input can be realized either by using contact devices (relay, switch) or non-contact devices (transistor, open-collector TTL).



External devices must be capable of sinking more than 30mA (Ic).
Leak current in the external device should be less than 100μA.

8-4-2. D/A output channel

This menu item selects a channel for which the following parameters are specified: [D/A OUTPUT MODE], [D/A ZERO OUTPUT WEIGHT], [D/A FULL SCALE VALUE], [D/A OUTPUT CONPENSATION], [D/A LOWER LIMIT], and [D/A UPPER LIMIT].

* You can specify separate settings for the two channels (ch1, ch2). Do not fail to select the correct channel for parameter settings.

Operation

MODE → PAGE → OPTION → D/A OUTPUT CHANNEL

Options: ch1, ch2

8-4-3. D/A output mode

This menu item selects, for each channel, the type of data to be output from the D/A converter.

Operation

MODE → PAGE → OPTION → D/A OUTPUT MODE

Options: 4mA FIXED OUT, 20mA FIXED OUT, BELT SPEED,
WEIGHT DENSITY, FEED RATE, LOAD RATIO,
FEED RATIO, CONTROL RATE

8-4-4. D/A zero output weight

This menu item specifies, for each channel, physical values corresponding to 4mA current output. The units for these values are determined automatically with the selection in 9-3-3. If “CONTROL RATE” is selected in [D/A OUTPUT MODE], allowable input range is from 0.0 to 100%.

Operation

MODE → PAGE → OPTION → D/A ZERO OUTPUT WEIGHT

Input range: 0-99998 (5 digits, decimal place automatically determined)
0.0– 100.0% (4 digits, decimal place fixed)

8-4-5. D/A full scale

This menu item specifies, for each channel, physical values corresponding to 20mA current output. The units for these values is determined automatically with the selection in 9-3-3. If "CONTROL RATE" is selected in [D/A OUTPUT MODE], allowable input ranges from 0.0 to 100%.

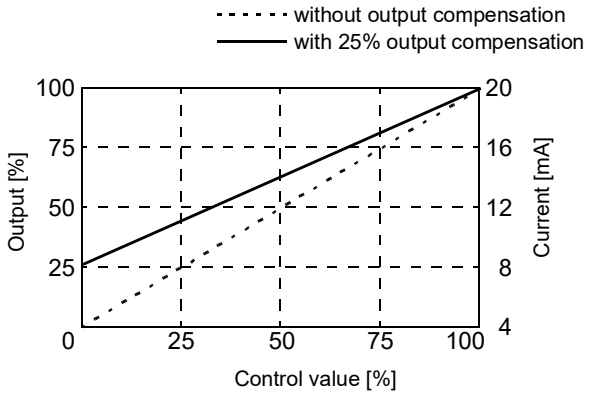
Operation

MODE → PAGE → OPTION → D/A FULL SCALE VALUE

Input range: 1-99999 (5 digits, decimal place automatically determined)
0.0– 100.0% (4 digits, decimal place fixed)

8-4-6. D/A output compensation

If you use a vibration feeder for the receiver of control value, the feeder output does not change in right proportion with the control value. This menu input is used to compensate the discrepancy: zero point is lifted by the amount specified in this menu (only for "CONTROL RATE"). This value can be specified separately for each channel.



Operation

MODE → PAGE → OPTION → D/A OUTPUT CONPENSATION

Input range: 0.0– 100.0% (4 digits, decimal place fixed to 1)

8-4-7. D/A lower limit

This menu item specifies the lower limit value for D/A output. If floating decimal place modes (e.g. other than “4mA OUTPUT” and “20mA OUTPUT”) are selected in [D/A OUTPUT MODE], the zero and full-scale range is set to 0 – 100%, and any value below zero is fixed to 4mA. D/A lower limit values are set separately for each channel. This function is disabled if you enter 0.00%. [D/A LOWER LIMIT] cannot be greater than [D/A UPPER LIMIT].

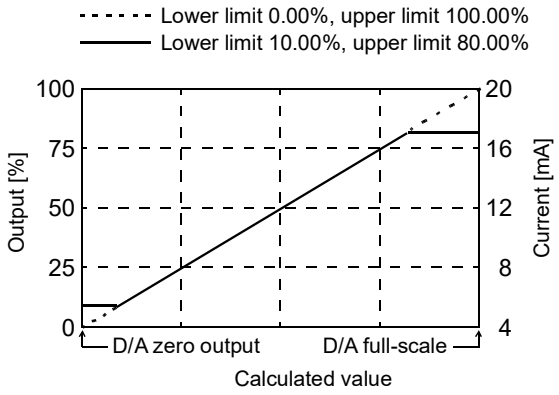
Operation

MODE → PAGE → OPTION → D/A LOWER LIMIT

Input range: 0.0– 100.00% (5 digits, decimal place fixed)

8-4-8. D/A upper limit

This menu item specifies the upper limit value for D/A output. If floating decimal place modes (e.g. other than “4mA OUTPUT” and “20mA OUTPUT”) are selected in [D/A OUTPUT MODE], the zero and full-scale range is set to 0 – 100%, and any value above the full-scale is fixed to 20mA. D/A upper limits are set separately for each channel.
This function is disabled if 100.00% is set. [D/A LOWER LIMIT] cannot be greater than [D/A UPPER LIMIT].



Operation

MODE → PAGE → OPTION → D/A UPPER LIMIT

Input range: 0.0– 100.00% (5 digits, decimal place fixed)

8-4-9. Speed entry select

This menu item specifies the type of speed data entry.
For further information, see "8-4-12.Pulse input entry procedure" and "10-1.Belt Speed [m/min]".

Operation

MODE → PAGE → OPTION → PAGE → SPPED ENTRY SELECT

Options: NO, NORMAL MODE A, NORMAL MODE B, NORMAL A SLOW, PHASE MEASURE, ANALOG CH1 MODE*, ANALOG CH2 MODE*, ANA. NORMAL A*, ANA. A SLOW*.

* Selectable only when DAC and ANA options are installed.

8-4-10. Pulse count/rotation

This menu item is effective only when “PHASE MEASURE” is selected in [SPEED ENTRY SELECT], and specifies the number of pulses generated per a rotation of the rotary encoder.

Operation

MODE → PAGE → OPTION → PAGE → PULSES / REVOLUTION

Input range: 1 – 99999 (5 digits, no decimal point)

8-4-11. Fine-adjustment of D/A converter

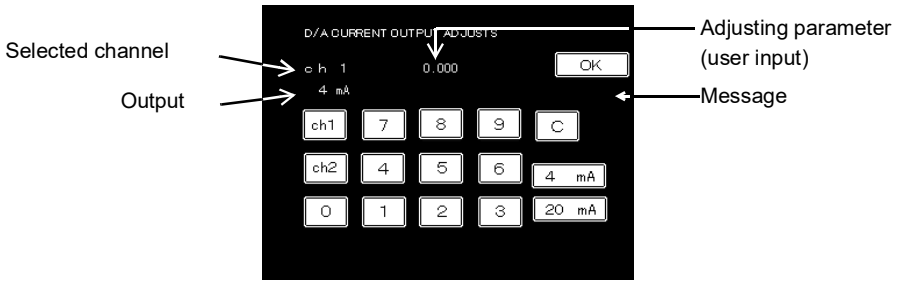
The output level of the D/A converter can be adjusted by entering numbers from the front display keypad. (This tuning procedure requires an external current meter: connect the meter as the “external device” in the figure shown in page 125).

Operation

・Password is required to enter the register screen

MODE → PAGE → SYSTEM → PASS WORD → 1269 → OK → PASS WORD → 1234 → OK

・D/A zero and span adjustment



Note:

Do not try to fine-adjust the D/A converter unless a reliable measuring device (e.g. current meter) is at hand. Once improper parameter modifications have been done, the F805AT-BC may not be able to be restored to its factory-configured state.

（1）Zero (4mA) adjustment

- Press ch1 or ch2 to select a channel.
- Press 4mA. Current output (approx. 4mA) starts to flow.
- Enter the reading of the external current meter using the keypad, and press OK.
- F805AT-BC automatically adjust the deviation between the nominal (4mA) and actual values.
  "Registered" message appears when the procedure is complete.

（2）Span (20mA) adjustment

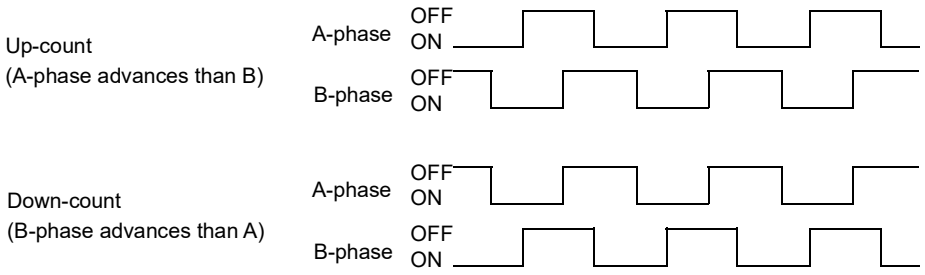
- Press ch1 or ch2 to select a channel.
- Press 20mA. Current output (approx. 20mA) starts to flow.
- Enter the reading of the external current meter using the keypad, and press OK.
- F805AT-BC automatically adjust the deviation between the nominal (20mA) and actual values.
  "Registered" message appears when the procedure is complete.

* Span (20mA) adjustment may give rise to a slight shift in zero (4mA) output level, and vice versa. Press 4mA to verify the accuracy of zero adjustment. If a slight shift in zero output is observed, repeat the zero adjustment procedure again. Check also the integrity of the span after the zero adjustment. A few times of repeated adjustment may be required until a well converged zero and span adjustment will be obtained.

* After both parameters are successfully registered, turn off the F805AT-BC and turn on again to return to the normal screen.

8-4-12. Pulse input entry procedure

① Select “NORMAL MODE A”, “NORMAL MODE B”, “NORMAL A SLOW”, “PHASE MEASURE”, “ANA. NORMAL A”, or “ANA. A SLOW” in [SPEED ENTRY SELECT] field. (Two “ANA. NORMAL A” and “ANA. A SLOW” can be set only at time equipped with the ANA option.) If you select except “PHASE MEASURE”, only the up-counter functions is applied and digital filter (moving average for 1 second) is also applied. If you select “PHASE MEASURE”, the counter functions in the fashion described in the following figure.



② If you have selected “PHASE MEASURE” into [SPEED ENTRY SELECT], enter a value to [PULSE COUNT/ROTATION].

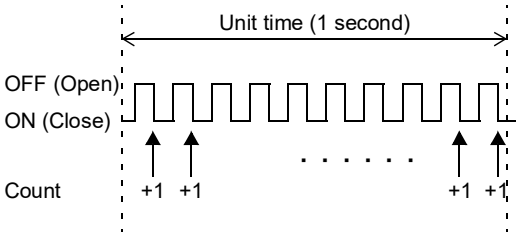
③ Enter a value to [BELT LENGTH]

④ Enter a value to [SPEED INPUT COUNT]

A “NORMAL MODE A”, “NORMAL A SLOW”, “ANA. NORMAL A”, and “ANA. A SLOW” are modes measuring pulse frequency of A phase, but processing contents are different as follows. Please use “NORMAL A SLOW” and “ANA. A SLOW” when the number of input pulses is below 100 [PULSE/s].

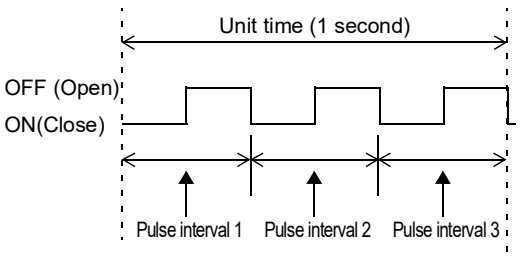
Example of NORMAL MODE A

Pulse is counted up at ON edge of A phase. The input pulse samples each 100msec, and processes worth of a digital filter ten times. Please select a “NORMAL MODE A” when the number of input pulse is 100 [PULSE/s] or more.



Example of NORMAL A SLOW

The pulse interval of A phase is measured. The number of pulses a second is operated. Worth of a digital filter is processed to this operation result ten times.
Stable measuring result can be obtained when the number of input pulses is little.



9. OPTION (Option card required)

9-1. BCD Parallel Output Interface [BCO]

BCO (BCD Parallel Output) is the optional interface for sending arithmetic data in binary coded decimal (BCD) parallel format. This is a useful additional interface to connect such peripherals as PC, process controller and PLC for such purposes as control, statistics and data storage.
I/O terminals and internal circuits are electrically isolated by photo-couplers.

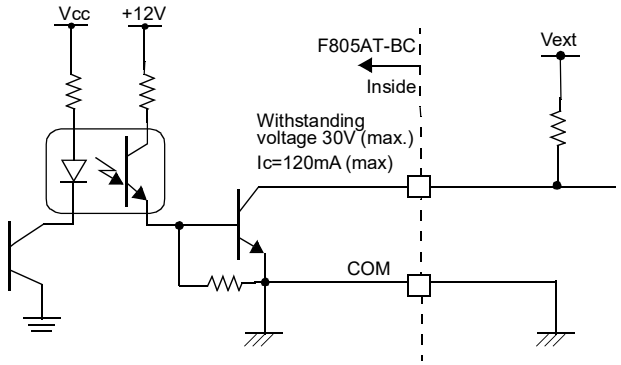
9-1-1. Connector pin assignments

1	*	COM	19	*	COM
2	OUT	1	20	OUT	20000
3	OUT	2	21	OUT	40000
4	OUT	4	22	OUT	80000
5	OUT	8	23	OUT	MINUS
6	OUT	10	24	OUT	OVER
7	OUT	20	25	OUT	
8	OUT	40	26	OUT	STROBE
9	OUT	80	27	IN	Data Hold
10	OUT	100	28	IN	Logic Switch
11	OUT	200	29	IN	Output Select 1
12	OUT	400	30	IN	Output Select 2
13	OUT	800	31	IN	Output Select 4
14	OUT	1000	32	IN	
15	OUT	2000	33	IN	
16	OUT	4000	34	IN	
17	OUT	8000	35		
18	OUT	10000	36		

* Common terminals (COM: 1 and 19) are connected internally.
* Common terminals and the “COM” of the external output signals are internally connected.
* Source voltage is not available from this connector.

9-1-2. Equivalent circuit (output)

Output comprises open-collector circuit.



●State of Transistor

Output data	Negative logic	Positive logic
0	OFF	ON
1	ON	OFF

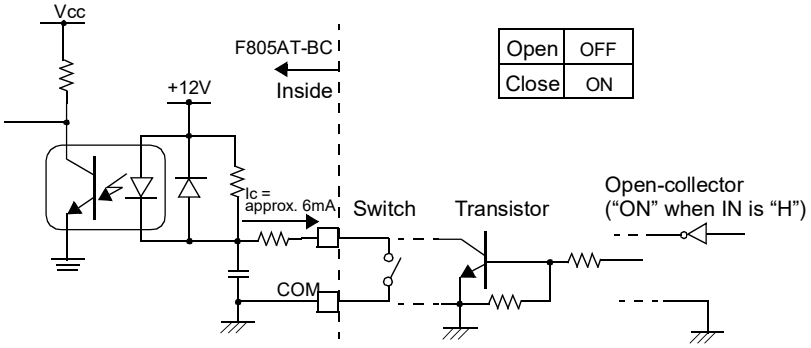
Positive/negative logic is toggled by Login Toggling (28-pin).

●level of output pin

Output data	Negative logic	Positive logic
0	H	L
1	L	H

9-1-3. Equivalent circuit (input)

Two states of input signal (High and Low) are produced by opening input from, or closing to the COM terminal. Opening/closing of the input can be realized either by using contact devices (relay, switch) or non-contact devices (transistor, open-collector TTL).



Open	OFF
Close	ON

External devices must be capable of sinking more than 10mA of Ic.
Leak current in the external device should be less than 100μA.

9-1-4. BCD data output

Measured data is sent out in 5-digit BCD format: each digit comprises of 4 binary bits (0 or 1) weighted by 8, 4, 2, 1.

digit data	8	4	2	1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

9-1-5. Polarity output (MUNUS)

This signal indicates the polarity of the BCD data.
0: positive (+), 1: minus (-)

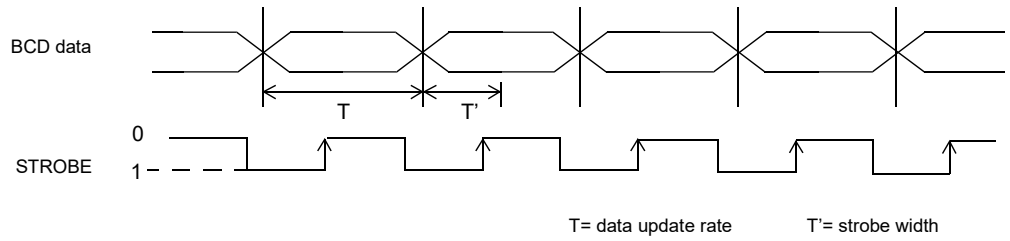
9-1-6. Over status output (OVER)

This signal outputs 1 when one of the following conditions occurs in the BCD data.

Weighing value	Condition	Display
Belt speed	Belt Speed Over set value< belt speed	**OFL1**
Weight density	Weight Density Over set value< Weight density	**OFL2**
Feed rate	Feed Rate Over set value<feed rate	**OFL3**
Load ratio	Load Ratio Over set value< load ratio	**OFL4**
Feed ratio	Feed Ratio Over set value< feed ratio	**OFL5**
Gross weight	A/D converter input over	**LOAD, — LOAD**
Total (upper 4 digits)	Total Final Over set value< total	**TOTAL FINAL OVER**
Total (lower 5 digits)		

9-1-7. Data strobe (STROBE)

BCD data is updated every time an A/D conversion takes place, and a strobe pulse is output in synchronization with the conversion. Use rising edges to read in the BCD data.



9-1-8. Hold input

Shorting this input to COM terminal holds the BCD output. The strobe pulses are also suppressed.

9-1-9. Logic toggling input

This input toggles the signal logic between positive and negative.
Open: negative logic Close: positive logic

9-1-10. Output selection input

This input specifies the type of BCD data.

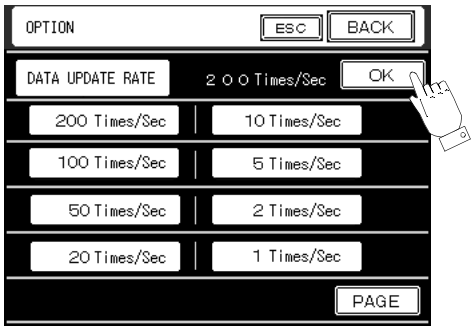
Selection 4	Selection 2	Selection 1	Weighing value
Open	Open	Open	Belt speed
Open	Open	Close	Weight density
Open	Close	Open	Feed rate
Open	Close	Close	Load ratio
Close	Open	Open	Feed ratio
Close	Open	Close	Gross weight
Close	Close	Open	Total (upper 4 digits)
Close	Close	Close	Total (lower 5 digits)

9-1-11. BCD out setting

Operation

1) MODE → PAGE → OPTION → BCD DATA UPDATE RATE

2) Select a desired data update rate and press “OK” to confirm.



Data update rate and strobe width:

200 times/sec	STROBEwidth	approx. 2.5mSec
100times/sec	STROBEwidth	approx. 5mSec
50times/sec	STROBEwidth	approx. 10mSec
20times/sec	STROBEwidth	approx. 25mSec
10times/sec	STROBEwidth	approx. 50mSec
5times/sec	STROBEwidth	approx. 100mSec
2times/sec	STROBEwidth	approx. 250mSec
1time/sec	STROBEwidth	approx. 500mSec

9-2. BCD Parallel Data Input Interface [BCI]

BCI is an optional interface for reading setting data in BCD (binary coded decimal) format. Devices with a parallel output (computers, PLCs), as well as an array of digital switches can be connected to this interface. Input signal and the internal circuitry are electrically isolated using photo-couplers.

9-2-1. Connector pin assignment (BCD INPUT)

Compatible plug: DDK 57-30360 (supplied) or its equivalent

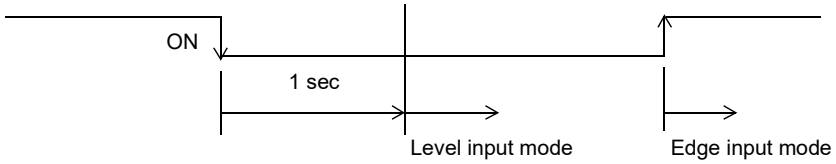
1	⁎	COM	19	⁎	COM
2	IN	1	20	IN	20000
3	IN	2	21	IN	40000
4	IN	4	22	IN	80000
5	IN	8	23	IN	DATA CODE 1
6	IN	10	24	IN	DATA CODE 2
7	IN	20	25	IN	DATA CODE 4
8	IN	40	26	IN	STROBE
9	IN	80	27	OUT	ACK (acknowledge)
10	IN	100	28	OUT	NAK (setting error)
11	IN	200	29	OUT	
12	IN	400	30	OUT	
13	IN	800	31	OUT	
14	IN	1000	32	OUT	
15	IN	2000	33	OUT	
16	IN	4000	34	OUT	
17	IN	8000	35		
18	IN	10000	36		

* Common terminals (COM: 1 and 19) are connected internally.
* Common terminals and the “COM” of the external output signals are internally connected.
* Source voltage is not available from this connector.

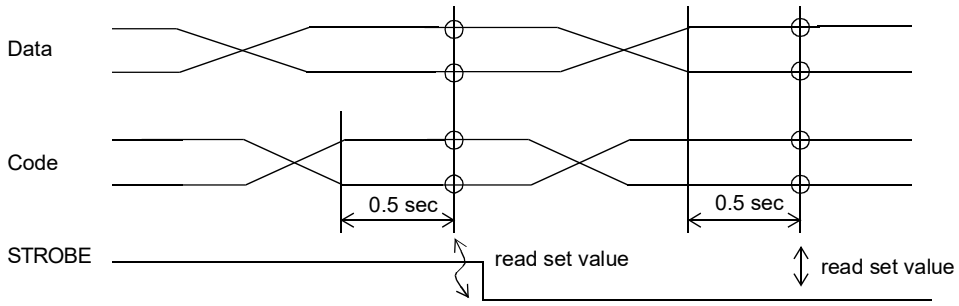
9-2-2. Equivalent circuit

Input circuit: see "Equivalent circuit (input)" section
Output circuit: see "Equivalent circuit (output)" section

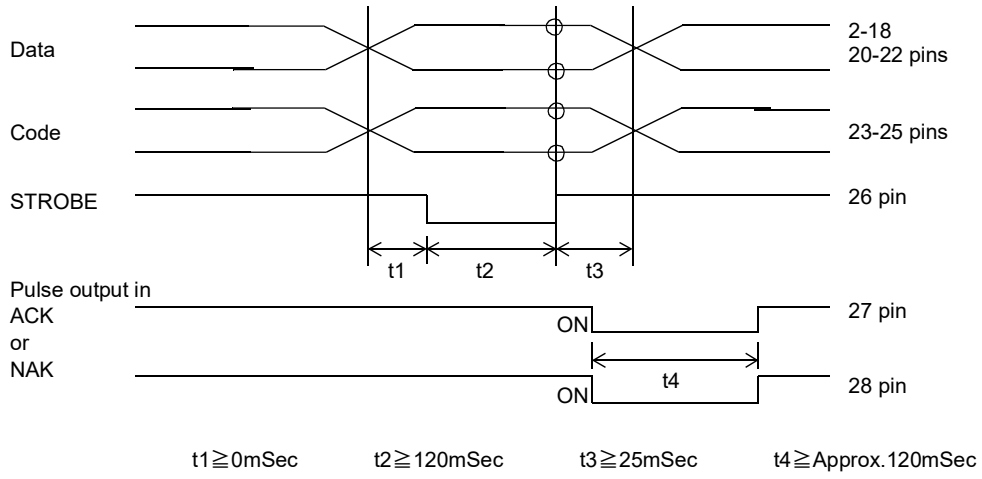
9-2-3. Two reading modes



9-2-4. Level input mode (STROBE short-circuited)



9-2-5. Edge input mode



- Data/code input: Close: 1, Open:0
- STROBE is an edge trigger signal: data/code is read in at the rising edges (e.g. Transition from Close to Open).
- ACK pulse is returned if the data is successfully read.
- NACK pulse is returned if any abnormal Hex code (A to F) is detected: the set value is not updated.

9-2-6. Data code (23, 24, 25 pin)

4	2	1	Setting Value
Open	Open	Open	Upper limit
Open	Open	Close	Lower limit
Open	Close	Open	Rated belt speed
Open	Close	Close	Moisture ratio
Open	Open	Open	Target value
Open	Open	Close	Start coordin. value
Open	Close	Open	Not used
Open	Close	Close	Not used

9-3. Analog IN/OUT [ANA]

ANA is an optional converter board with two channels of analog input (current or voltage), three channels of analog output (current), and one channel of pulse input.

▪ Analog input function

This option converts the analog external signal to belt speed and target value, and the converted signal is used for comparison and as a parameter for measurement values.

Input range: 4-20 mA (current input)
0-10 V (voltage input)

Each channel can be independently configured.

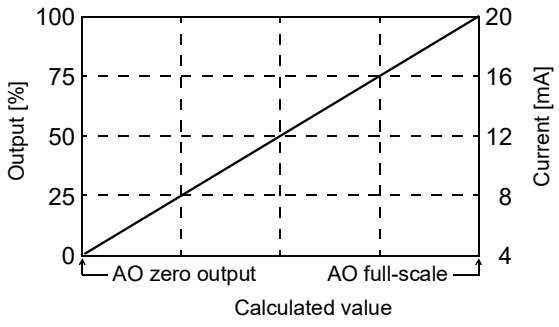
Analog input data is calibrated using [AI ZERO SET] and [AI FULL SCALE SET] parameters. Analog input terminals are electrically isolated form the internal circuit using photo-coupler. It has 16-bit resolution and each channel is capable of 30 conversions per second. This input is capable of accepting over-range input (approx. ±5% FS).

* Signal type for each channel (current/voltage) is factory-configured (indicated in the label attached near the connector).

▪ Analog output function

This converter option outputs analog signal (4-20 mA) corresponding to the F805AT-BC reading. Zero (4mA) and full-span (20mA) of this signal is defined using [AO ZERO OUTPUT WEIGHT] and [AO FULL SCALE VALUE] parameters, and arbitrary digital value between them can be obtained as an analog signal.

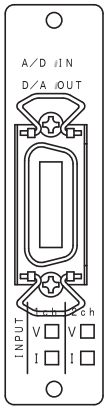
Output terminals and internal circuit are electrically isolated using photo-couplers. It has 16-bit resolution and each channel is capable of 50 conversions per second. This option is capable of over-range output up to approx. ±5% of FS.



▪ Pulse input function

Using this option, external pulse train is representing the belt speed which is used as parameters for types of comparisons and readings.

9-3-1. External output port



* For connecting external devices, use shielded twisted pairs.

Pin assignment

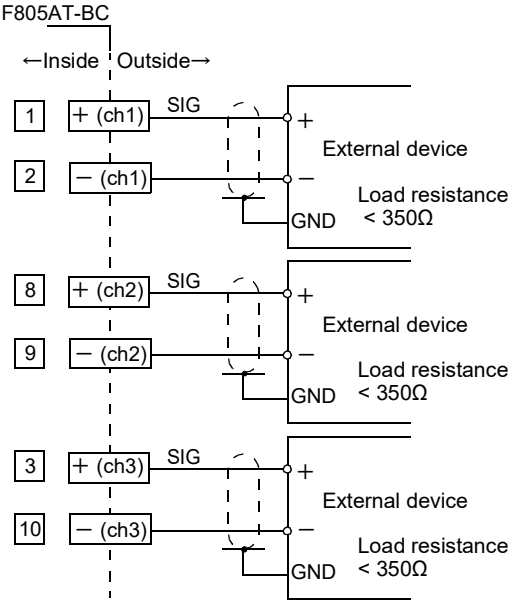
Compatible connector:
DDK 57-30140 (supplied) or its equivalent

1	Output 1ch+	8	Output 2ch+
2	Output 1ch-	9	Output 2ch-
3	Output 3ch+	10	Output 3ch-
4	A-phase	11	RSV
5	COM	12	COM
6	Input 1ch+	13	Input 2ch+
7	Input 1ch-	14	Input 2ch-

* Following pins are internally connected: 5 and 12
* 11 pins (RSV) are unnecessary in this specifications. Please do not connect it.

・How to obtain the current output:

Connect the external device (load resistance < 350Ω) between the (+) and (-) terminals of each channel.

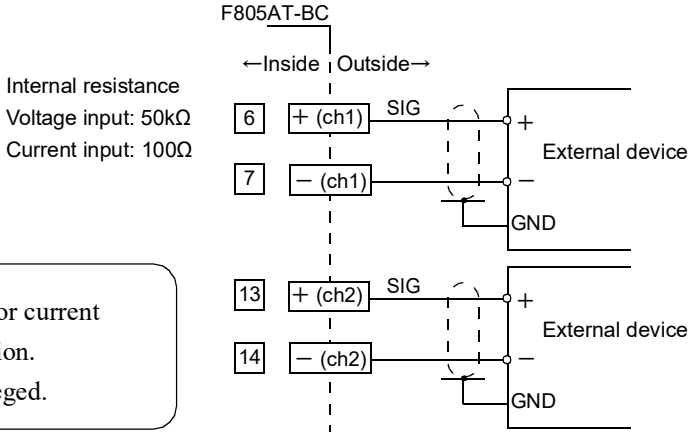


Note:

・Never apply external voltage/ current to the pins 1, 2, 8, 9, 3, and 10: this may cause damages in the circuit.

・Connecting capacitive load may give rise to oscillation in the output signal.

・Analog input connection

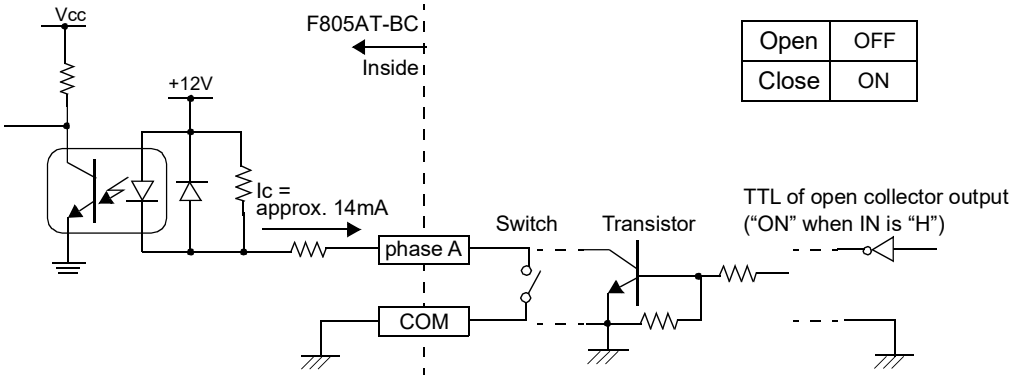


Note:

Do not input voltage or current beyond the specification.
The unit will be dameged.

· Pulse input equivalent circuit:

Two states of input signal (High and Low) are produced by opening input from, or closing to the COM terminal. Opening/closing of the input can be realized either by using contact devices (relay, switch) or non-contact devices (transistor, open-collector TTL).



Open	OFF
Close	ON

- External devices must be capable of sinking more than 15mA (Ic).
- Leak current in the external device should be less than 100μA.

9-3-2. AO channel select

This menu item specifies an AO channel that will be configured using [AO OUTPUT MODE], [AO ZERO OUTPUT WEIGHT], [AO FULL SCALE VALUE], [AO OUTPUT COMPENSATION], [AO LOWER LIMIT], and [AO UPPER LIMIT] parameters.

* Parameters for the three analog output channels (ch1, ch2, ch3) can be configured independently to each other. Select a correct channel before modifying parameters.

Operation

MODE → PAGE → OPTION → AO OUTPUT CHANNL

Options: ch1, ch2, ch3

9-3-3. AO output mode

This menu item select, for each channel, the type of data sent out from the AO channel.

Operation

MODE → PAGE → OPTION → AO OUTPUT MODE

Options: 4mA FIXED OUT, 20mA FIXED OUT, BELT SPEED, WEIGHT DENSITY, FEED RATE, LOAD RATIO, FEED RATIO, CONTROL RATE

9-3-4. AO zero output weight

This menu item specifies, for each channel, physical values (e.g. F805AT-BC reading) corresponding to 4mA current output. The units for these values are determined automatically with the selection in [AO OUTPUT MODE]. If “CONTROL RATE” is selected, allowable input range is from 0.0 to 100.0%.

Operation

MODE → PAGE → OPTION → AO ZERO OUTPUT WEIGHT

Input range: 0-99999 (5 digits, decimal place automatically determined)
0.0– 100.0% (4 digits, decimal place fixed to 1st place)

9-3-5. AO full scale value

This menu item specifies, for each channel, physical values corresponding to 20mA current output. The units for these values are determined automatically with the selection in [AO OUTPUT MODE]. If “CONTROL RATE” is selected in [AO OUTPUT MODE], allowable input ranges from 0.0 to 100.0%.

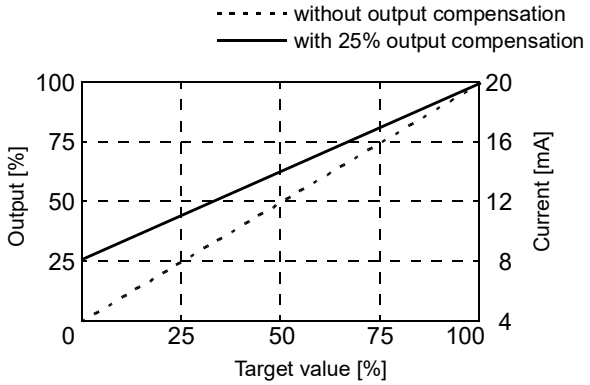
Operation

MODE → PAGE → OPTION → AO FULL SCALE VALUE

Input range: 0-99999 (5 digits, decimal place automatically determined)
0.0– 100.0% (4 digits, decimal place fixed to 1st place)

9-3-6. AO output compensation

If you use a vibration feeder for the receiver of control value, the feeder output does not change in right proportion with the control value. This menu input is used to compensate the discrepancy: zero point is lifted by the amount specified in this menu (only for “CONTROL RATE”). This value can be specified separately for each channel.



Operation

MODE → PAGE → OPTION → AO OUTPUT COMPENSATION

Input range: 0.0– 100.0% (4 digits, decimal place fixed to 1st place)

9-3-7. AO lower limit

This menu item specifies the lower limit value for AO output. If floating decimal place modes (e.g. other than “4mA OUTPUT” and “20mA OUTPUT”) are selected in [AO OUTPUT MODE], the zero and full-scale range is set to 0 – 100%, and any value below zero is fixed to 4mA. AO lower limit values are set separately for each channel.
This function is disabled if you enter 0.00%. [AO LOWER LIMIT] cannot be greater than [AO UPPER LIMIT].

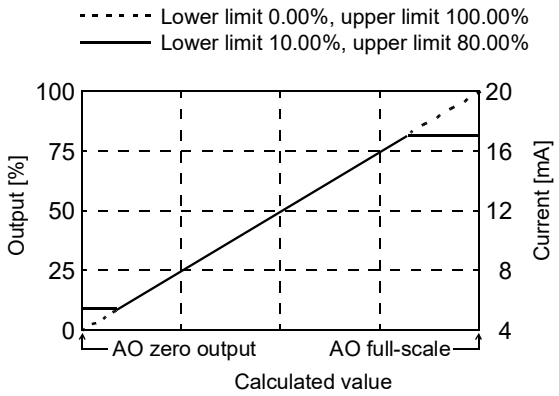
Operation

MODE → PAGE → OPTION → AO LOWER LIMIT

Input range: 0– 100.00% (5 digits, decimal place fixed)

9-3-8. AO upper limit

This menu item specifies the upper limit value for AO output. If floating decimal place modes (e.g. other than “4mA OUTPUT” and “20mA OUTPUT”) are selected in [AO OUTPUT MODE], the zero and full-scale range is set to 0 – 100%, and any value above the full-scale is fixed to 20mA. AO upper limit values can be set separately for each channel.
This function is disabled if you enter 100.00%. [AO LOWER LIMIT] cannot be greater than [AO UPPER LIMIT].



Operation

MODE → PAGE → OPTION → AO UPPER LIMIT

Input range: 0– 100.00% (5 digits, decimal place fixed)

9-3-9. Fine adjustment of current output

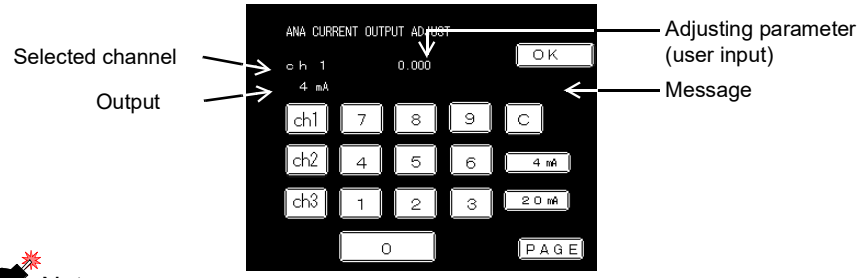
The level of the current output can be adjusted by entering numbers from the front display keypad. (This tuning procedure requires an external current meter: connect the meter as the "external device" in the figure shown in page 139). Tuning can be performed for each channel independently.

Operation

・Password is required to enter the register screen

MODE → PAGE → SYSTEM → PASS WORD → 1269 → OK → PASS WORD → 4321 → OK

・ANA zero and span adjustment



Note:

Do not try to fine-adjust the analog input/output (ANA) unless a reliable measuring device (e.g. current meter) is at hand. Once improper parameter modifications have been done, the F805AT-BC may not be able to be restored to its factory-configured state.

1) Zero (4mA) adjustment

・Press one of the channel select keys (ch1 , ch2 , or ch3) to select a channel.
・Press 4mA .Current output (approx. 4mA) starts to flow.
・Enter the reading of the external current meter using the keypad, and press OK .
・F805AT-BC automatically adjust the deviation between the nominal (4mA) and actual values.
"Registered" message appears when the procedure is complete.

2) Span (20mA) adjustment

・Press one of the channel select keys (ch1 , ch2 , or ch3) to select a channel.
・Press 20mA .Current output (approx. 20mA) starts to flow.
・Enter the reading of the external current meter using the keypad, and press OK .
・F805AT-BC automatically adjust the deviation between the nominal (4mA) and actual values.
"Registered" message appears when the procedure is complete.

* Span (20mA) adjustment may give rise to a slight shift in zero (4mA) output level, and vice versa. Press "4mA" to verify the accuracy of zero adjustment. If a slight shift in zero output is observed, repeat the zero adjustment procedure again. Check also the integrity of the span after the zero adjustment. A few times of repeated adjustment may be required until a well converged zero and span adjustment will be obtained.

* After both parameters are successfully registered, turn off the F805AT-BC and turn on again to return to the normal screen.

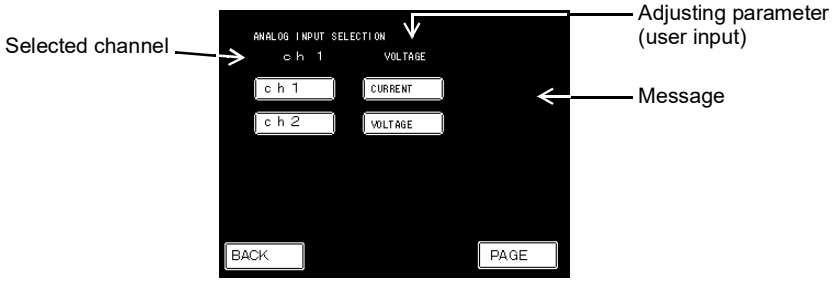
9-3-10. Current input select

Operation

・Password is required to enter the register screen

MODE → PAGE → SYSTEM → PASS WORD →
1269 → OK → PASS WORD → 4321 → OK

・Selection



Select the target channel by pressing either **ch1** or **ch2**.
Press **CURRENT** / **VOLTAGE** to select current/voltage input. Once you start the modification procedures, a "Registration start" message appears in the screen: DO NOT turn off the system while this message is displayed. Wait until "Registration end" message appears.

* After modification is successfully registered, turn off the F805AT-BC and turn on again to return to the normal screen.

Note:
Input selection for each channel may require modification of hardware settings: please contact UNIPULSE for technical assistance.

9-3-11. AI input channel

This menu item specifies an AI channel that will be configured using [AI ZERO SET], [AI FULL SCALE SET], and [AI DIGITAL FILTER] parameters.
* Analog inputs can be configured for each channel (ch1, ch2) independently.
Select a correct channel before modifying parameters.

Operation

MODE → PAGE → OPTION → PAGE → AI INPUT CHANNEL

Options: ch1, ch2

9-3-12. AI zero set

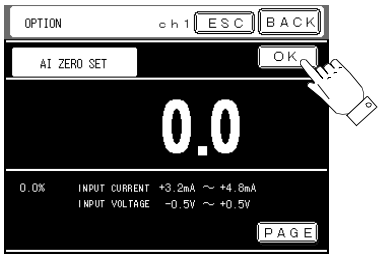
This menu item defines the current/voltage value that corresponds 0.0%. Each channel can be configured separately. This value has been preset in the factory so that 4.0mA (0V) input produces 0.0% output. AI zero adjustment should only be carried out when it is really required.

* Once modified, this parameter cannot be restored to the factory-configured state.

Operation

MODE → PAGE → OPTION → PAGE → AI ZERO SET

Enter desired current/voltage value, and press OK to confirm.



9-3-13. AI full scale set

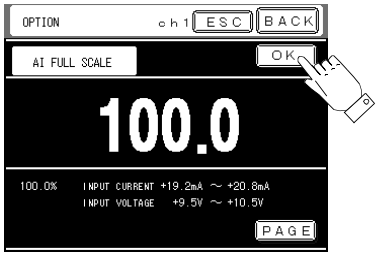
This menu item defines the current/voltage value that corresponds 100.0%. Each channel can be configured separately. This value has been preset in the factory so that 20.0mA (10V) input produces 100.0% output. AI full scale adjustment should only be carried out when it is really required.

* Once modified, this parameter cannot be restored to the factory-configured state.

Operation

MODE → PAGE → OPTION → PAGE → AI FULL SCALE SET

Enter desired current/voltage value, and press OK to confirm.



9-3-14. AI digital filter

The digital filter calculates moving average of A/D converter outputs and reduces the fluctuation of readings. Moving average length, or the number of data to be averaged, can be selected from 0 (averaging OFF) to 64 (specified as the number of power to 2). It can be specified for each channel independently.
You can obtain smoother reading as the number of averaging increases, but with slower response. Reducing the averaging number provides quicker response, but with more reading fluctuation.

Operation

MODE → PAGE → OPTION → PAGE → AI DIGITAL FILTER

Options: OFF, 2 Times, 4 Times, 8 Times, 16 Times, 32 Times, 64 Times

9-3-15. Target entry select

Target can be modified by using external signals (4-20 mA, or 0-10V analog input) on condition that:

Target = (AI target value ×(External input value %)/100) (Cont. feed rate, Cont. total)

Target = External input value % (Fixed)

Also when the system is in slave-mode operation, target modification through external analog inputs is available only when the operation mode is fixed.

* Inside the F805AT-BC, the sequence of operations required to update CONTROL RATE after a target modification input will take place once in every second. The target modification input must be locked for longer than two seconds: the system commences the sequence of operations after confirming that the input is stable for more than two (fixed) seconds.

Three steps are required for target modification: select either Analog 1ch or Analog 2ch in [Target entry select], specify analog input reference value in [AI Target Value], and, current (voltage) settings in [AI zero set] and [AI full-scale set].

Operation

MODE → PAGE → OPTION → PAGE → TARGET ENTRY SELECT

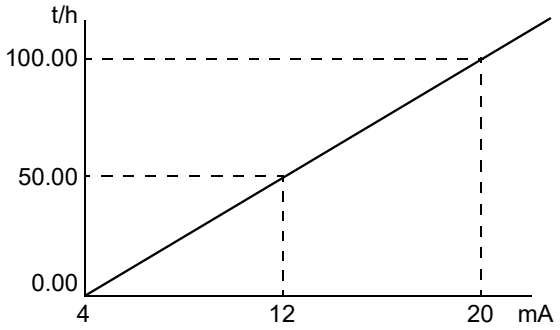
Options: NONE, ANALOG CH1, ANALOG CH2

9-3-16. AI target value

When you modify Target by external analog signal input, the target is set at the maximum value (20mA or 10V (value registered by AI full scale set)) of analog signal inputted.

Example:

If you specify 100.00 t/h for Rated feed rate at 20 mA current input,
the target value at 12 mA input becomes 50.00 t/h.



Operation

MODE → PAGE → OPTION → PAGE → AI TARGET VALUE

Input range: 0– 99999 (5 digits, decimal place automatically determined)

9-3-17. AI Min. Scale Div.

The minimum unit (scale interval) assumed to be effective of the AI input value is set.

Operation

MODE → PAGE → OPTION → PAGE → AI MIN. SCALE DIV.

Input range: 1– 100 (3 digits, decimal place fixed to 1st place)

9-3-18. Speed entry select

Using this function, you can accept a 4-20mA/0-10V analog input and the pulse input of the single phase pulse and interpret it as a belt speed (0-100%). For “AI INPUT CHANNEL CH1” or “AI INPUT CHANNEL CH2”, you must register current/voltage range using [AI ZERO SET] and [AI FULL SCALE SET] parameters.
At the pulse input, see "8-4-12.Pulse input entry procedure" and "10-1.Belt Speed [m/min]".

Operation

MODE → PAGE → OPTION → PAGE×2 → SPEED ENTRY SELECT

Options: NONE, ANALOG CH1 MODE, ANALOG CH2 MODE
ANA. NORMAL A, ANA. A SLOW

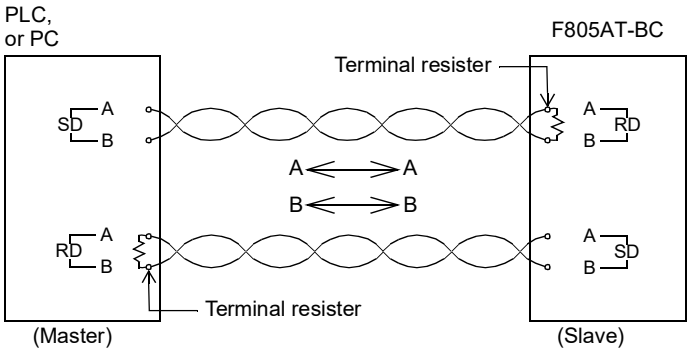
* If a DAC is installed in F805AT-BC, these settings are done in the DAC “Speed Entry Select” screen (configuration screen for AI “Speed Entry Select” does not appear).

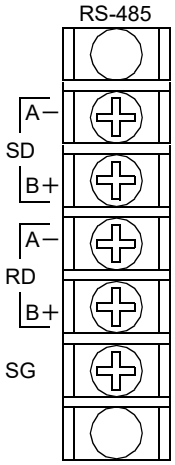
9-4. RS-485 Interface [485]

9-4-1. Communication specifications

Signal Level:	RS-485 compatible	
Transmission Distance:	Approx. 1km	
Transmission method:	Asynchronous, full-duplex	
Transmission speed:	1200, 2400, 4800, 9600, 19200, or 38400 (selectable)	
Bits configuration:	Start bit:	1
	Character length:	7 or 8 (selectable)
	Stop bit:	1 or 2 (selectable)
	Parity:	none, odd or even (selectable)
Terminator:	CR+LF, or CR (selectable)	
Communication code:	ASCII	

9-4-2. One to One connection





・Mark (OFF)
V_A-V_B<-0.2V

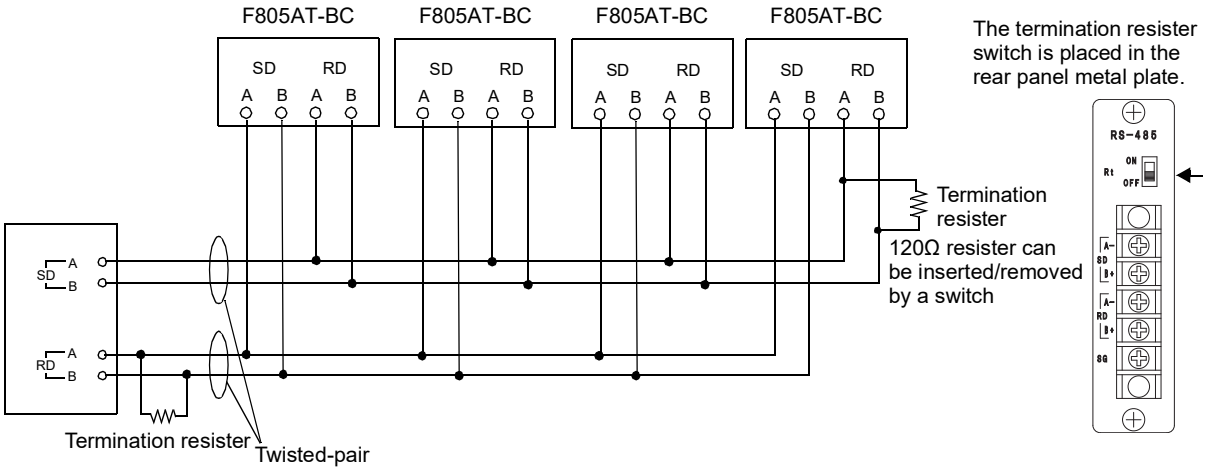
・Space (ON)
V_A-V_B> 0.2V

・Simple two parallel wires cable can be used for minimum distance connection, but the use of twisted-pair cables is recommended for better noise tolerance.

・The communication cable should end with an approx. 120Ω terminal resister on the receiver side.

・The terminal SG is a grand terminal used on the circuit for protecting the circuit.
When the main body of F805AT-BC and the device connected to F805AT-BC are grounded by D type ground, there is usually no need to use the terminal SG.
However, confirm the specifications of the devise connected before connecting the terminal SG, when it is necessary to connect it according to the situation of the site.

9-4-3. One to Multi connection

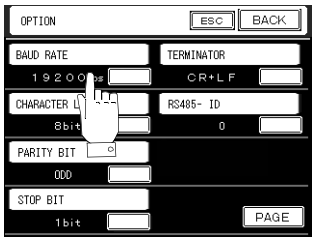


9-4-4. Settings for RS-485

RS-485 communication parameters for the devices connected to F805AT-BC, such as a PC or PLC, must be compatible with those for F805AT-BC.

Operation

MODE → PAGE → OPTION



Specify valued for the following parameters:

- Baud rate
- Character length
- Parity bit
- Stop bit
- Terminator
- RS-485 ID (0-99)

9-4-5. How to communicate

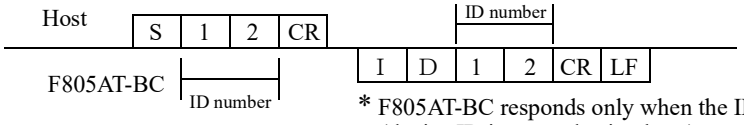
1. If you connect multiple of F805AT-BCs, assign a unique ID to each of F805AT-BCs.
2. START command from the host includes an ID, and activates communication with the F805AT-BC that has the specified ID number. Thus, communication using R-, W-, C-command is enabled.
3. END command must be issued before trying to communicate with other F805AT-BCs.

* START and END commands control tri-state logic of the communication line. Issuing START commands to multiple of F805AT-BCs will give rise to conflicts, interfering proper communication.

* Do not use ID=0 in multi-F805AT-BC configuration: F805AT-BC with ID=0 is automatically enabled to communicate when the device is turned on (without START command).

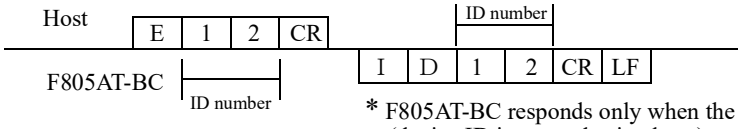
* F805AT-BC with non-zero ID will not be enabled for communication until it will receive a START command (see below). Unless enabled, other command formats (R..,W.., C.. etc.,) are ignored.

4. START command



* F805AT-BC responds only when the ID coincides (device ID is entered using keys)

5. End command



* F805AT-BC responds only when the ID coincides (device ID is entered using keys)

9-4-6. Communication format

Communication formats are identical with those for RS-232C: See the descriptions starting page 107 .

* When performing communication, make sure that START and END command always appears in correct order in the communication sequence.

10. ARITHMETICS

10-1. Belt Speed [m/min]

This item shows the velocity of the belt. When either one of the three phase modes (“NORMAL MODE A”, “NORMAL MODE B”, “NORMAL A SLOW”, “PHASE MEASURE”, “ANA. NORMAL A”, or “ANA. A SLOW”) is selected in [SPEED ENTRY SELECT], the belt velocity is calculated based on the pulse input from the velocity detector. If the belt travels in reverse direction in PHASE MEASURE mode, belt speed is displayed as “-0”.
If an ANA option is installed in the system, and “ANALOG 1CH MODE” or “ANALOG 2CH MODE” is selected for the option, belt speed is calculated using the analog input [%].
If “NONE” is selected, the value specified for [RATED BELT SPEED] is used as the belt speed.
Decimal place for belt speed is fixed to 2 (e.g. 000.00).

Belt speed [m/min] (NORMAL mode)

$$= \frac{\text{Belt length [m]}}{\text{Speed input count [p]}} \times \text{Pulse count [p/s]} \times 60$$

Belt speed [m/min] (PHASE MEASURE mode)

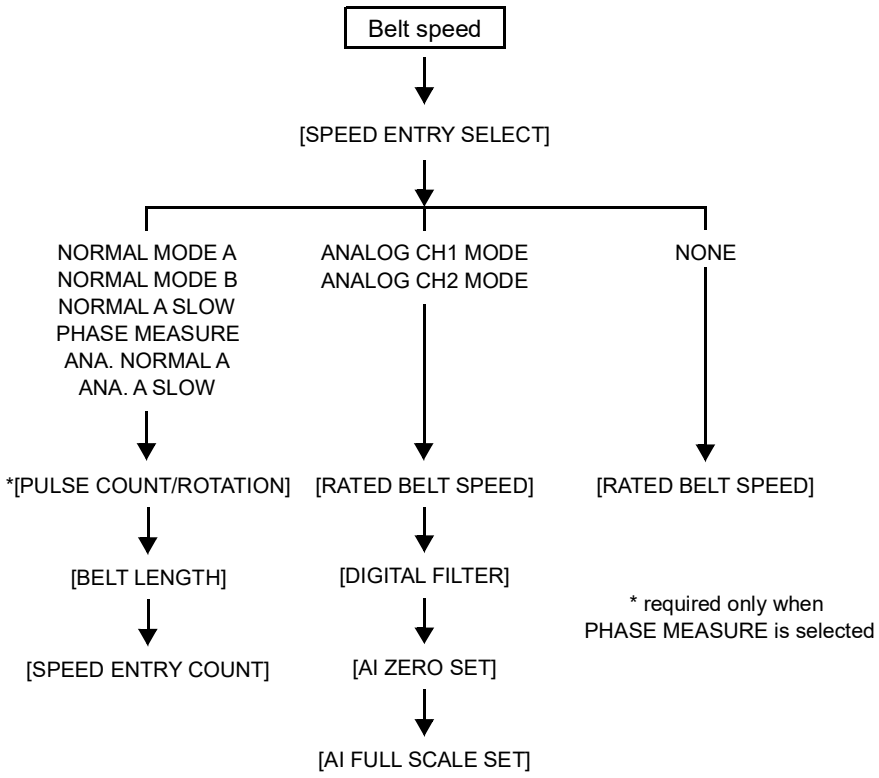
$$= \frac{\text{Belt length [m]}}{\text{Speed input count [r]}} \times \frac{\text{Pulse count [p/s]}}{\text{(Pulse count/rotation [r/p])}} \times 60$$

[p] : (pulse(s)) [r] : (revolution(s))

Belt speed [m/min] (Analog input)

$$= \text{Rated belt speed [m/min]} \times \frac{\text{Analog input [\%]}}{100}$$

The items which require setting differ depending on the use of the analog input.

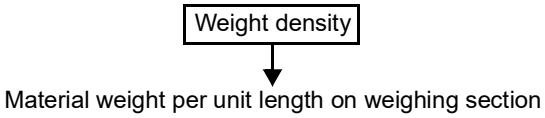


10-2. Weight Density [kg/m]

This item represents the mass loaded on the weighing section (per unit length at one instance) while the system is in operation.

$$\text{Weight density [kg/m]} = \frac{\text{Gross weight [kg]} \ / \ \text{Weighing section [m]} - \text{Zero compensation factor}}{\frac{\text{Span compensation factor}}{100}}$$

Gross weight: weight of the material loaded on the weighing section at one instance.
Weighing section: effective length of the part of the belt whose weight is detected by the load detector.
Decimal place of weight density is determined by the setting of [DECIMAL PLACE (WEIGHT)].



10-3. Feed Rate ([kg/h], [t/h])

Feed rate represents the weight of material per unit time being carried on the conveyer.

Feed Rate [kg/h]

= Weight density [kg/m] × Belt speed [m/min] × 60

Decimal place of feed rate is determined by the setting of [Decimal Place (Flow)].

Feed Rate

↓

Determined by weight density and the current value of belt speed.

10-4. Load Ratio [%]

Load ratio represents the ratio of weight density (including moisture) over [RATED WEIGHT DENSITY], shown in percentage. Thus the value is no affected by [MOISTURE RATIO].

Load Ratio [%]

$$= \frac{\text{Weight density [kg/m]}}{\text{Rated weight density [kg/m]}} \times 100$$

Load Ratio

↓

Weight density over [Rated Weight Density], represented in percentage.

10-5. Feed Ratio [%]

Feed ratio represents the ratio of the current feed rate over [RATED FEED RATE], shown in percentage.

Feed ratio [%]

$$= \frac{\text{Feed rate [kg/h]}}{\text{Rated feed rate [kg/h]}} \times 100$$

Feed ratio depends on the belt speed, in contrast to load ratio, which is determined solely by weight density. Note that feed ratio becomes null if the belt speed becomes zero, reducing the feed rate to zero.

Feed Ratio

↓

Feed rate over [RATED FEED RATE], represented in percentage.

10-6. Total ([kg/h], [t/h])

Accumulated weight of material carried by the belt.

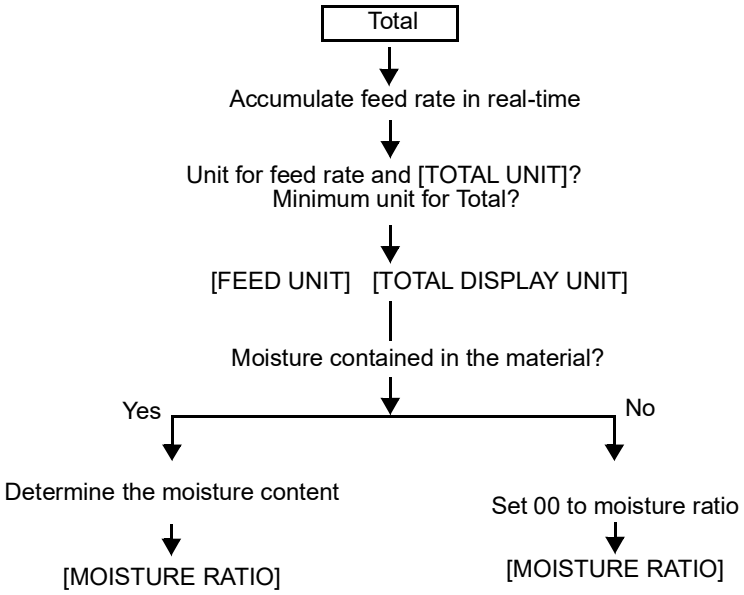
Total weight ([kg], [t])

$$= \text{Total weight ([kg], [t])} + \frac{\text{Feed rate } \begin{matrix}[\text{kg/h}],\\ [\text{t/h}]\end{matrix}}{(3600\times 10)} \times \left(1 - \frac{\text{Moisture ratio [\%]}}{100}\right)$$

Moisture ratio: Water content (%) in the material

Total is updated in every 0.1 second.

Accumulation is allowed only while RUNNING. This calculation is disabled when external input is selected in [OPERATION SELECT] and external signal is absent. If internal input is selected, the calculation is performed when RUNNING is selected by internal key.



10-7. Standard Feed weight [kg]

Standard Feed Zero [kg]

$$= \frac{\text{Capacity [kg]}}{\text{Weighing section [m]}} \times \text{Belt length [m]} \times \left(1 - \frac{\text{Moisture ratio [\%]}}{100}\right)$$

Standard Feed Span [kg]

$$= \text{Cal weight density [kg/m]} \times \text{Belt length [m]} \times \left(1 - \frac{\text{Moisture ratio [\%]}}{100}\right)$$

Belt length represent the length of the belt on which error measurement took place.

10-8. Error Measure

Zero Error Measure

$$= \frac{\text{Total [kg]}}{\text{Standard Feed zero [kg]}} \times 100$$

Span Error Measure

$$= \frac{\text{Total [kg]} - \text{Standard Feed Span [kg]}}{\text{Standard Feed Span [kg]}} \times 100$$

When you carry out error measurement using [ZERO ERROR MEASURE] screen, set 0.00% to [ZERO ERROR]. when you carry out error measurement using [SPAN ERROR MEASURE] screen, set 0.00% to [SPAN ERROR].

10-9. Compensation

Zero compensation factor

$$= \frac{\text{Capacity [kg]}}{\text{Weighing section [m]}} \times \frac{\text{Zero error measure}}{100}$$

Span compensation factor

$$= 100 + \text{Span error measure}$$

10-10. Equivalent Target ([kg/h], [t/h])

Equivalent target ([kg/h], [t/h]) (CONT. FEED RATE)

$$= \text{Target [kg/h], [t/h]}$$

Equivalent target ([kg/h], [t/h]) (CONT. TOTAL)

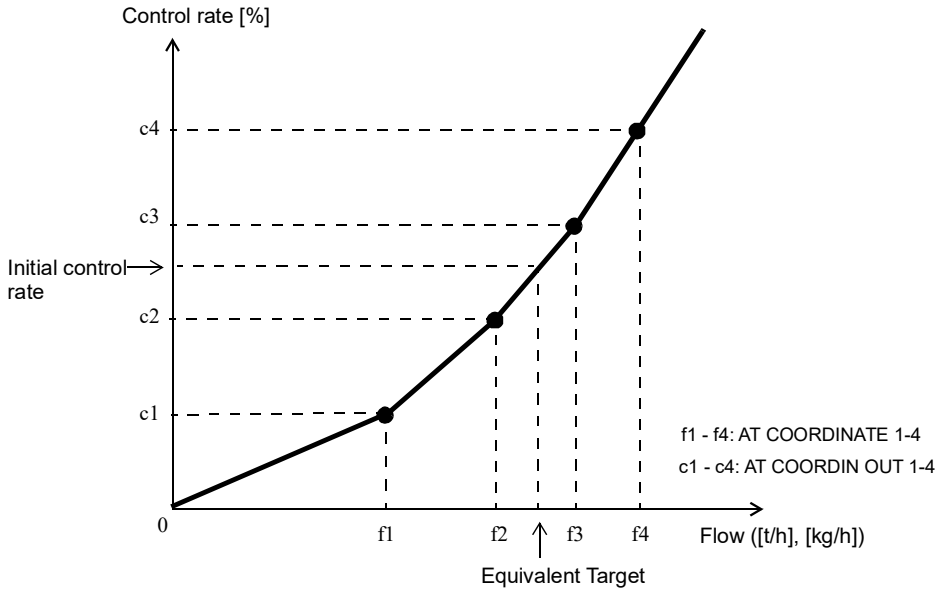
$$= \frac{\text{Target ([kg/h], [t/h])} \times \text{Elapsed time [h]} - \text{Total [t]}}{\text{Update frequency [s]}} \times 3600$$

* If the instrument is operated as a slave, these values are replaced by:

$$\text{Master's flow/target ([kg/h], [t/h])} \times \frac{\text{slave' target [\%]}}{100}$$

10-11. Initial Control Rate ［%］

If [START COORDIN. VALUE] parameter is set to zero, the initial control rate is calculated using set values from AT COORDINATE 1-4 and AT COORDIN OUT 1-4.



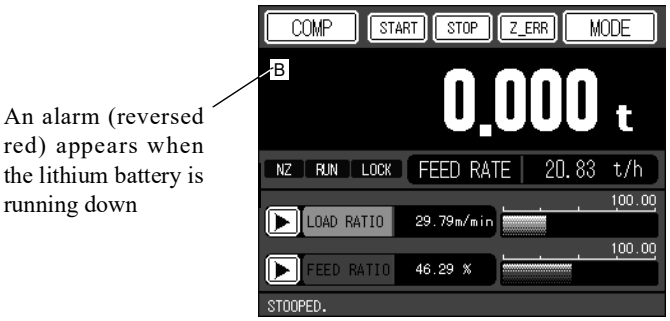
If [START COORDIN. VALUE] is set to non-zero value, the following relation holds:
Initial control rate [%] = start coordin. value [%]

10-12. Control Deviation

$$\text{Ctrl. Deviation} = \frac{\text{Feed rate ([kg/h], [t/h])} - \text{Equivalent target ([kg/h], [t/h])}}{\text{Equivalent target ([kg/h], [t/h])}} \times 100$$

11. TROUBLESHOOTING

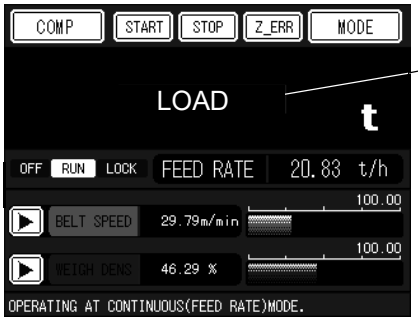
11-1. Running-down Lithium Battery



"B" alarm on the front display indicates that the lithium battery for memory backup is weak and close to its useful life. Prolonged operation of F805AT-BC in this condition may give rise to a sudden loss of setting information when the system is turned off (information stored in NOVRAM will not be lost). Once the "B" alarm turns on, replacement of the battery in earliest possible occasion is recommended (average expected battery life is about 7 years, depending on usage frequency).

The replacement battery is available from UNIPULSE and it should be replaced in our factory: please contact UNIPUSE.

11-2. Over Scale Display



State	Display	Over scale not detected if:
A/D converter input over	**LOAD, −LOAD**	
Belt speed over < Belt speed	**OFL1**	Belt speed over =99999, Belt speed over asc. =0
Weight density over < weight density	**OFL2**	Weight density over = 99999, weight density over asc. =0
Feed rate over < Feed rate	**OFL3**	Feed rate over =99999, feed rate over asc. =0
Load ratio over < Load ratio	**OFL4**	Load ratio over=99999, load ratio over asc. =0
Feed ratio over < Feed ratio	**OFL5**	Feed ratio over =99999, feed ratio over asc.=0
Abnormal flow (Feed rate <0)	**FEED ERROR**	
Control limit over	**DEV.LIM. OVER**	Non-operation, start time, first stability time, alarm time, deviation lim. over. asc.=0, control limit =0
Control Deviation over	**DEVIATION OVER**	Non-operation, start time, first stability time, alarm time, deviation lim. over. asc.=0, control limit =0
Control Deviation under	**DEVIATION UNDER**	
Flow setting over	**DEV.EXC. OVER**	Non-operation, start time, first stability time, alarm time, error detected =0
Flow setting under	**EXC UNDER**	
Total final over	**TOTAL OVER**	Total final mode =”COMPARISON OFF”

11-3. Calibration Error Display

Description	Alarm message	Alarm No.
Re-calibration required	**CAL. ERR 1**	**1**
Initial dead load subtraction exceeds the zero adjustable range	**CAL. ERR 2**	**2**
Initial dead load subtraction produces a minus value	**CAL. ERR 3**	**3**
Span setting exceeds the CAPACITY value	**CAL. ERR 4**	**4**
“00000” is entered for span setting	**CAL. ERR 5**	**5**
Load cell (weighing device) output falls short of span-adjustable range	**CAL. ERR 6**	**6**
Load cell (weighing device) output swings to minus range	**CAL. ERR 7**	**7**
Load cell (weighing device) output exceeds the span-adjustable range	**CAL. ERR 8**	**8**

11-4. Sequence Error Display

Error Description	Alarm message	Alarm No.
Abnormal AT COORDINATE value.	**SEQ. ERR 1**	**1**
System halted due to “control deviation over”	**SEQ. ERR 2**	**2**
System halted due to “control deviation under”	**SEQ. ERR 3**	**3**
System halted due to “control limit over”	**SEQ. ERR 4**	**4**
System halted due to “belt speed over”	**SEQ. ERR 5**	**5**
System halted due to “weight density over”	**SEQ. ERR 6**	**6**
System halted due to “feed rate over”	**SEQ. ERR 7**	**7**
System halted due to “load ratio over”	**SEQ. ERR 8**	**8**
System halted due to “feed ratio over”	**SEQ. ERR 9**	**9**

11-5. ANA Error Display

Error Description	Alarm message
AI zero setting is done when the input is below the minimum value	**ANA ERR 1**
AI zero setting is done when the input is over the maximum value	**ANA ERR 2**
AI full-scale setting is done when the input is below the minimum value	**ANA ERR 3**
AI full-scale setting is done when the input is over the maximum value	**ANA ERR 4**
AI full-scale setting was done for too small input	**ANA ERR 6**
AI full-scale setting was done for minus input	**ANA ERR 7**

* ANA errors are displayed only for the system with an installed analog IN/OUT interface: these messages may appear in the execution screen when [AI ZERO SET] or [AI FULL SCALE SET] setting is performed.

11-6. Priority for Error Display

When plural of errors occur simultaneously, they are reported in the priority order shown below:

Priority	Error/Over scale
High	CAL. ERR
↑	EXC. ERR
	LOAD, -LOAD
	SEQ. ERR
	OFL1
	OFL2
	OFL3
	OFL4
	OFL5
	FEED ERROR
	DEV.LIM OVER
	DEVIATION OVER
	DEVIATION UNDER
	DEV.EXC. OVER
	EXC UNDER
↓	MASTER ERROR
Low	TOTAL OVER

TOTAL FINAL OVER is displayed above the calculated value only when TOTAL is selected in [DISP DATA SELECTION].

11-7. Over Scale Display

EXC. ERR

EXC.ERR turns on when the sensing voltage from the loadcell is too low. Check if the wiring/connection to the sensor is correct.

LOAD

Signal input to F805AT-BC exceeds the span calibration range. Check if the load cell output is greater than the allowable span calibration range, or there is any break/ damage in the wires connecting F805AT-BC and the load cell. Note also, that this error may appear when no device is connected to the load cell connector on the rear panel.

-LOAD

The load cell output has negative voltage. Check if the load is applied to the load cell in normal direction, or the connections (+SIG, -SIG) is reversed.

OFL1

This alarm comes on when the belt speed exceeds the value set to BELT SPEED OVER. Slow down the belt speed until this over-scale alarm goes out, or modify BELT SPEED OVER setting. Also, make sure that settings controlling speed entry are all correct.

OFL2

This alarm comes on when actual weight density exceeds the value set to WEIGHT DENSITY OVER. Reduce the signal magnitude from the load cell until this over-scale alarm goes out, or modify the setting of WEIGHT DENSITY OVER.

OFL3

This alarm comes on when actual feed rate exceeds the value set to FEED RATE OVER. Reduce the magnitude of load cell signal or speed input until this over-scale alarm goes out, or modify the setting of FEED RATE OVER.

OFL4

This alarm comes on when actual load ratio exceeds the value set to LOAD RATIO OVER. Reduce the magnitude of load cell signal until this over-scale alarm goes out, or modify the setting of LOAD RATIO OVER.

OFL5

This alarm comes on when actual feed ratio exceeds the value set to FEED RATIO OVER. Reduce the magnitude of load cell signal or speed input until this over-scale alarm goes out, or modify the setting of FEED RATIO OVER.

DEVIATION OVER

This alarm comes on when, during system operation, control deviation goes to the positive direction beyond the width of ALLOWABLE CONTROL DEV. (control deviation >ALLOWABLE CONTROL DEV.)
This alarm is suppressed if DEVIATION LIM. OVER ASC. is set to zero second.

DEVIATION UNDER

This alarm indicates that, during system operation, control deviation goes to the negative direction beyond the width of ALLOWABLE CONTROL DEV. (control deviation < -ALLOWABLE CONTROL DEV.)
This alarm is suppressed if DEVIATION LIM. OVER ASC. is set to zero second.

DEV.EXC. OVER

This alarm indicates that, during system operation, feed rate goes to the positive direction beyond the width of ERROR DETECTION (feed rate > target value + ERROR DETECTION).
This alarm is suppressed if FEED RATE OVER ASC. is set to zero second.

EXC UNDER

This alarm indicates that, during system operation, feed rate goes to the negative direction beyond the width of ERROR DETECTION (feed rate < target value - ERROR DETECTION).
This alarm is suppressed if FEED RATE OVER ASC. is set to zero second.

DEV.LIM. OVER

This alarm indicates that, during system operation, control deviation is exceeding the value set to CONTROL LIM (|control deviation| > CONTROL LIM.).
This error is suppressed if DEVIATION LIM. OVER ASC. is set to zero second.

MASTER ERROR

When a salve is selected in master/salve operation, the slave cannot regularly receive a format from the master due to the error.
Check the connection with the master and the settings of both master and slave.
If MASTER ERROR is still displayed, the repairing may be required.
Please inquire of our company for coping with the problem.

11-8. Sequence Error

SEQ. ERR 1

The system has come to a halt because values for AT COORDINATE 1-4 and AT COORDIN OUT 1-4 are not correct.
System operation cannot start in CONT.FEED RATE and CONT. TOTAL modes unless these parameters are correctly specified. Run the auto coordinate mode (you can also set these items manually).

SEQ. ERR 2

The system has come to a halt because control deviation over. This occurs if control deviation exceeds, to the positive direction, the width of ALLOWABLE CONTROL DEV. (CTRL. DEVIATION > ALLOWABLE CONTROL DEV.) for a period longer than DEVIATION LIM.OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to DEVIATION LIM. OVER ASC.

SEQ. ERR 3

The system has come to a halt because control deviation under. This occurs if control deviation exceeds, to the negative direction, the width of ALLOWABLE CONTROL DEV.(CTRL. DEVIATION < -ALLOWABLE CONTROL DEV.) for a period longer than DEVIATION LIM.OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to DEVIATION LIM. OVER ASC.

SEQ. ERR 4

The system has come to a halt because control limit over.
This occurs if control deviation exceeds the control limit (|control deviation| > |control limit|) for a period longer than DEVIATION LIM.OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to DEVIATION LIM. OVER ASC.

SEQ. ERR 5 (System Halt due to Belt speed over)

The system has come to a halt because during operation, OFL1 (Belt speed over) state continued for a period longer than BELT SPEED OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to BELT SPEED OVER ASC.

SEQ. ERR 6 (System Halt due to Weight density over)

The system has come to a halt because during operation, OFL2 (Weight density over) state continued for a period longer than WEIGHT DENSITY OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to WEIGHT DENSITY OVER ASC.

SEQ. ERR 7 (System Halt due to Feed rate over)

The system has come to a halt because during operation, OFL3 (Feed rate over) state continued for a period longer than FEED RATE OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to FEED RATE OVER ASC.

SEQ. ERR 8 (System Halt due to Load ratio over)

The system has come to a halt because during operation, OFL4 (Load ratio over) state continued for a period longer than LOAD RATIO OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to LOAD RATIO OVER ASC.

SEQ. ERR 9 (System Halt due to Feed ratio over)

The system has come to a halt because during operation, OFL5 (Feed ratio over) state continued for a period longer than FEED RATIO OVER ASC.
* This error is suppressed if either 0.0 or 999 seconds is set to FEED RATIO OVER ASC.

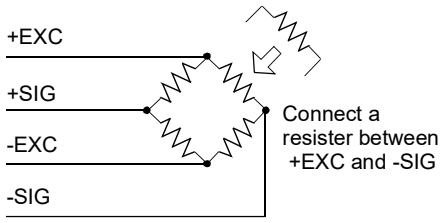
11-9. Calibration Error

CAL. ERR 1

Re-calibration of zero point is required.
Normally, a zero calibration is followed by a span calibration. If the span calibration produces unsatisfactory results, F805AT-BC shows the error message (CAL.ERR.1), indicating that a re-calibration of zero is necessary. Satisfactory re-calibration of zero will remove the error message.

CAL. ERR 2

Subtracted value for initial dead load exceeds the F805AT-BC's allowable zero-calibration range. Check if an unwanted load is being applied to the load cell. If the error message still appears in normal measuring conditions, zero point re-calibration must be done after shifting zero point by connecting a resister across the load cell's +EXC and –SIG terminals.



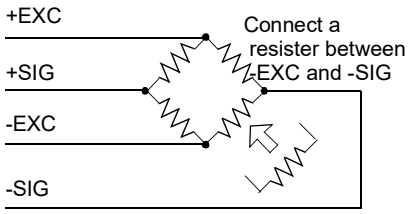
The table below summarizes the relation between the resister value and input signal.

Resistance		Equivalent strain at input	
Calculated	Approx.	μ-STRAIN	mV/V
875 KΩ	866 KΩ	200	0.1
437 KΩ	442 KΩ	400	0.2
291 KΩ	294 KΩ	600	0.3
219 KΩ	221 KΩ	800	0.4
175 KΩ	174 KΩ	1000	0.5
146 KΩ	147 KΩ	1200	0.6
125 KΩ	124 KΩ	1400	0.7
109 KΩ	110 KΩ	1600	0.8
97 KΩ	97.6 KΩ	1800	0.9
87.3 KΩ	86.6 KΩ	2000	1.0
79.4 KΩ	78.7 KΩ	2200	1.1
72.7 KΩ	73.2 KΩ	2400	1.2
67.1 KΩ	66.5 KΩ	2600	1.3
62.3 KΩ	61.9 KΩ	2800	1.4
58.2 KΩ	57.6 KΩ	3000	1.5
54.5 KΩ	54.9 KΩ	3200	1.6
51.3 KΩ	51.1 KΩ	3400	1.7
48.4 KΩ	48.7 KΩ	3600	1.8
45.9 KΩ	46.4 KΩ	3800	1.9
43.6 KΩ	43.2 KΩ	4000	2.0
41.5 KΩ	41.2 KΩ	4200	2.1
39.6 KΩ	39.2 KΩ	4400	2.2
37.9 KΩ	38.3 KΩ	4600	2.3
36.3 KΩ	36.5 KΩ	4800	2.4
34.8 KΩ	34.8 KΩ	5000	2.5

The values shown in the table apply to a 350Ω load cell. Parallel connection of four load cells reduce sensitivity to one-fourth of that of single load cell: the resister value should be reduced accordingly (to 1/4).
Temperature coefficient of the resister directly affects the reading accuracy. Use resisters with temperature coefficient less than 50ppm/℃ (5ppm/℃ recommended).

CAL. ERR 3

Subtracted value for initial dead load shows a negative value. Check if the cell is loaded in correct direction and connections for +SIG and –SIG are not reversed.



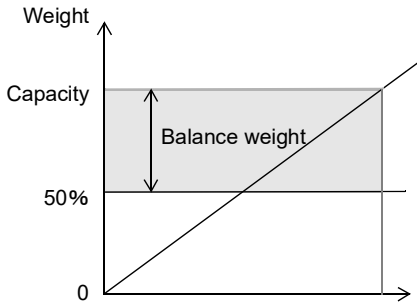
If the error message (CAL.ERR.3) persists even if loading direction and sensor connections are correct, re-calibration is required after shifting zero point by connecting a resister across the load cell's –EXC and –SIG terminals. Use the resister-input relations shown in the table in "Calibration Error 2".

CAL. ERR 4

A larger than [CAPACITY] value is specified for [BALANCE WEIGHT] or span calibration value.

Adjust [BALANCE WEIGHT] or [CAPACITY] value and try span calibration again.

For accurate span calibration, it is recommended to set [BALANCE WEIGHT] value between 50-100% of [CAPACITY].



CAL. ERR 5

[BALANCE WEIGHT] or span calibration value is set to zero. Modify [BALANCE WEIGHT] to an appropriate value.

CAL. ERR 6

The load cell output is too low for the F805AT-BC to perform proper span adjustment. Check if the cell is properly loaded and capable of outputting sufficient magnitude of signal for calibration, and try zero calibration again.

Span adjustable range for F805AT-BC is from 0.3 to 2.0mV/V.
F805AT-BC cannot be span-adjusted if the loaded load cell output does not reach this range.

CAL. ERR 7

The load cell output has negative voltage. Check if the load is applied to the load cell in normal direction or the connections (+SIG, -SIG) are reversed, then try span adjustment again.

CAL. ERR 8

The load cell output goes beyond the span-adjustable range of F805AT-BC. Check if the cell is properly loaded and its rated output range falls in the F805AT-BC's span-adjustable range, and try span adjustment again.

11-10. ANA Error (Analog IN/OUT interface required)

ANA ERR 1

Input signal was below the minimum value when AI Zero Set was defined. Make sure the input signal falls in the allowable range and try to set zero again.

ANA ERR 2

Input signal was above the maximum value when AI Zero Set was defined. Make sure the input signal falls in the allowable range and try to set zero again.

ANA ERR 3

Input signal was below the minimum value when AI Full Scale Set was defined. Make sure the input signal falls in the allowable range and try to set full scale again.

ANA ERR 4

Input signal was above the maximum value when AI Full Scale Set was defined. Make sure the input signal falls in the allowable range and try to set full scale again.

ANA ERR 6

Input signal was too small to secure 1/1000 resolution when AI Full Scale Set was defined (stable scale graduation is impossible). Make sure that the magnitude of input signal is correct, and try to set full scale again.

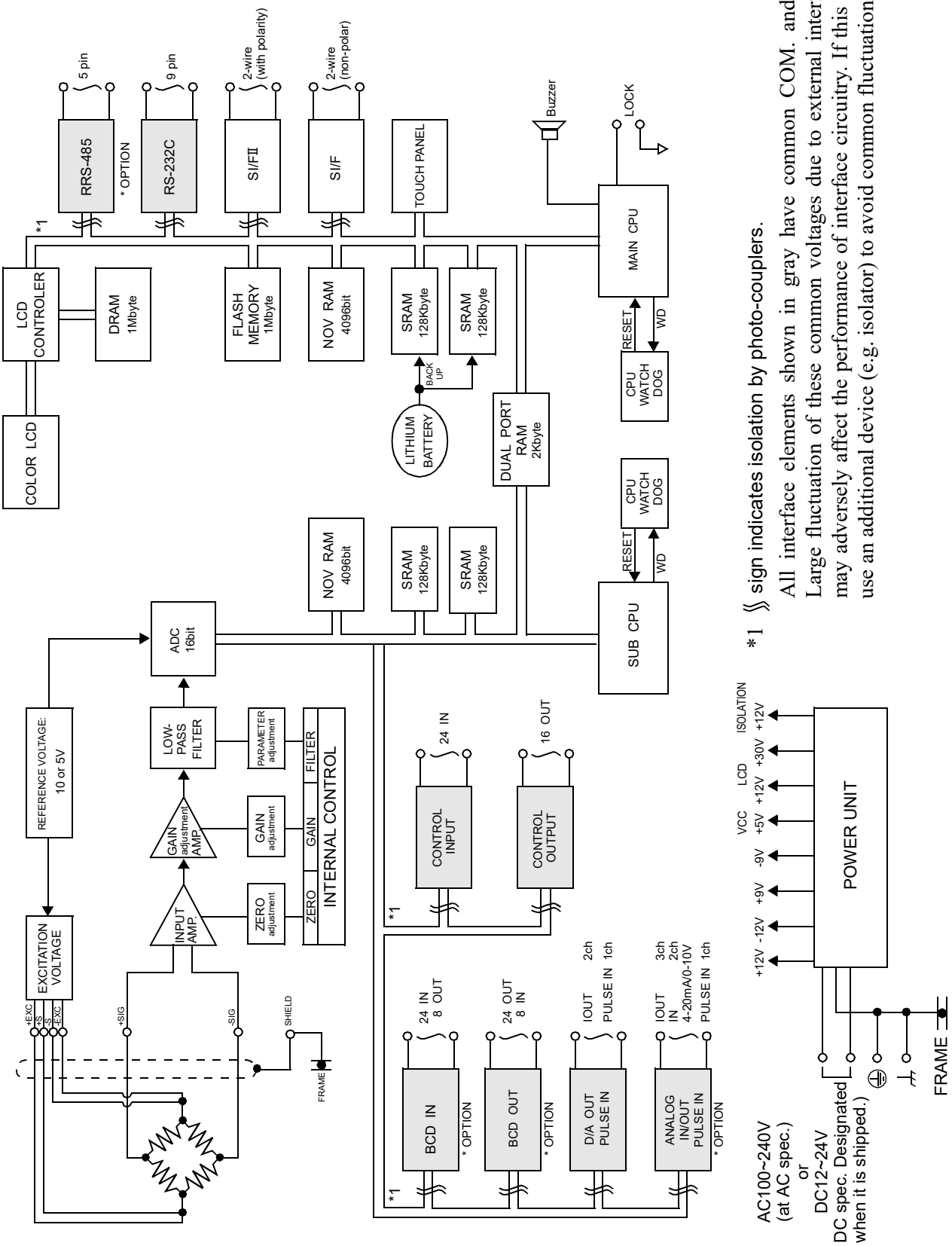
ANA ERR 7

When AI Full Scale was defined, the input signal had shifted to negative direction than that used for AI Zero Set. Make sure that the magnitude of input signal is correct, and try to set full scale again.

Note:

AI Zero Set input range:	Current: +3.2 mA - +4.8mA Voltage: -0.5V - +0.5V
AI Full Scale Set input range:	Current: +19.2mA - +20.8mA Voltage: +9.5V - +10.5V

12. BLOCK DIAGRAM

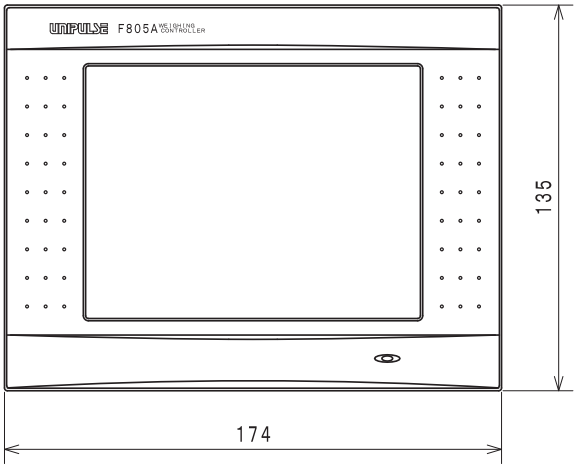


*1 ⟪ sign indicates isolation by photo-couplers.

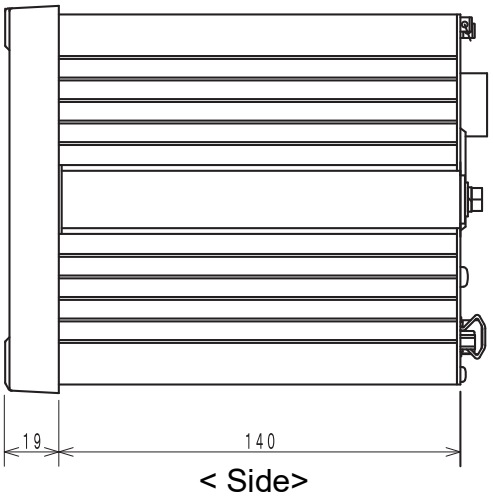
All interface elements shown in gray have common COM. and GND. Large fluctuation of these common voltages due to external interference may adversely affect the performance of interface circuitry. If this occurs, use an additional device (e.g. isolator) to avoid common fluctuation.

13. DIMENSIONS

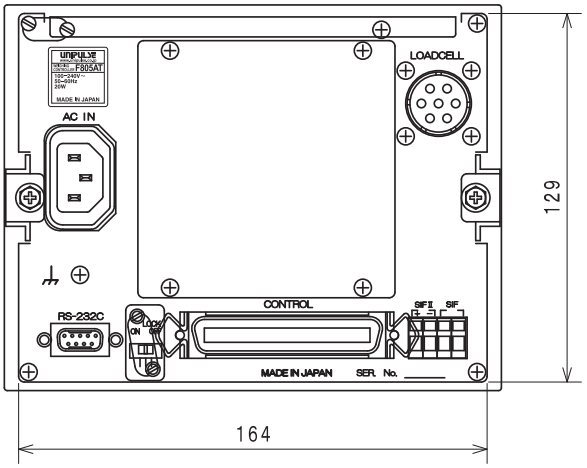
Unit: mm



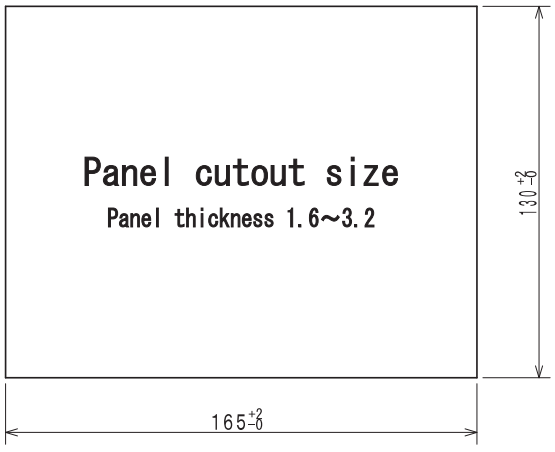
< Front >



< Side>



< Rear >



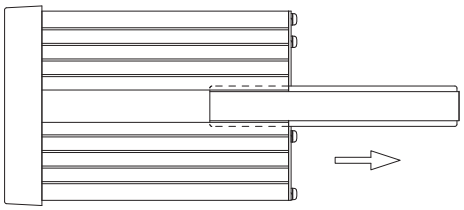
* Projections excluded

* Dimensions of F805AT-BC with AC spec. and with DC spec. are the same.

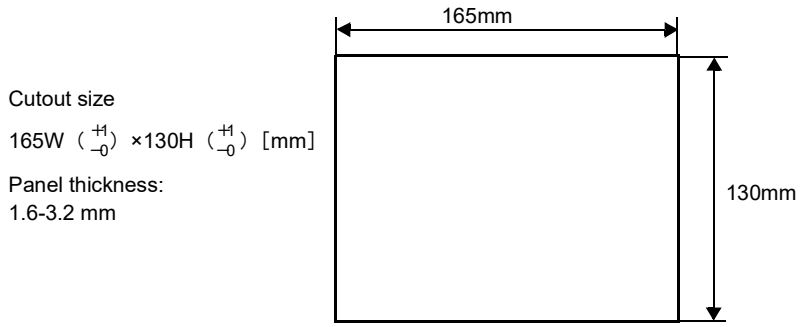
14. MOUNTING ON A PANEL

Follow the following steps to mount an F805AT-BC on a panel.

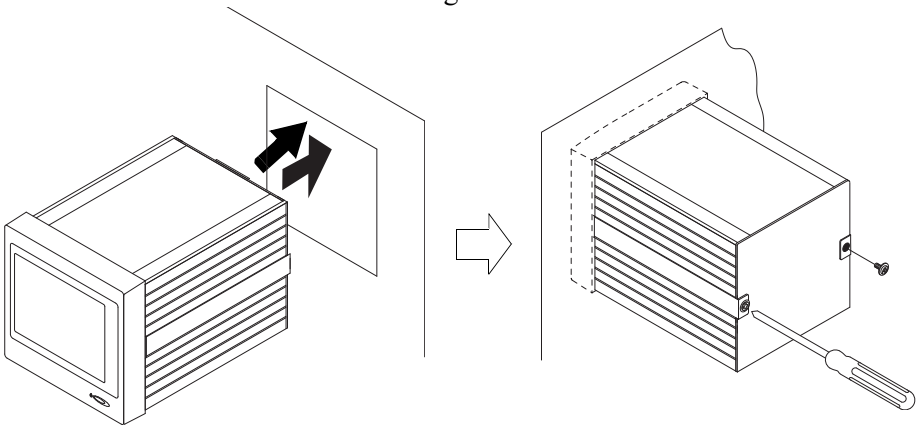
1. Remove the two rails from both sides of the instrument.



2. Make a panel cutout of the following dimensions.



3. Mount F805AT-BC and secure it using two side rails.



15. SPECIFICATIONS

15-1. Analog

Load cell excitation:	DC 10V±5% (5V or 10V selectable) Source current < 120mA Remote sensing (Up to four 350Ω load cells can be connected in parallel)	
Zero/span adjustment:	Zero adjustable range: Span adjustable range:	0 – approx.2mV/V 0.3 – 2.0 mV/V
Min.input resolution:	0.3μV/count	
Accuracy:	Linearity error: Zero drift: Gain drift: Noise	<0.01% FS (Typ. 0.005% FS, room temperature) <0.1μV/℃ RT1 （Typ. 0.08μV/℃） <15ppm/℃ (Typ. 5 ppm/℃) <0.1μVp-pRTI（0.1Hz - 10Hz）
Analog filter:	Bessel type low-pass filter (-12dB/oct) selectable from 2, 4, 6, 8 Hz	
A/D converter	conversion rate: resolution:	200times/sec. 16 bit (binary)
Min. display resolution	1/10000	
Secondary calibration	Equivalent input resolution: 1/1000 (room temperature)	

15-2. Display

Display	TFT color LCD area: dot configuration: dot pitch:	 116.8 (W)×88.0 (H) mm 320×240 0.12 (W)×0.36 (H) mm
Arithmetic display	5/9 digits sign:	 : '-' is displayed on the leading digit.
Display update rate	Selectable from 1, 3, 6, 13, 25 times/sec (A/D conversion rate fixed)	
Weighing capacity	up to 5 digits	
Min. scale division	1 – 100 selectable	
Dicimal point	selectable (zero blanking at the decimal point)	

Over scale display	A/D converter input over:	LOAD, -LOAD
	Belt speed over:	OFL1
	Weight density over:	OFL2
	Feed rate over:	OFL3
	Load ratio over:	OFL4
	Feed ratio over:	OFL5
	Abnormal flow:	FEED ERROR
	Flow setting over	DEV.EXC OVER
	Flow setting under	EXC UNDER
	Control deviation over	DEVIATION OVER
	Control deviation under	DEVIATION UNDER
	Control limit over	DEV.LIM. OVER
	Total final over:	TOTAL OVER
Status display	HI/GO/LO/OFF/NZ, OVER/UNDER, RUN, NOV, ZALM, CALZ, CALS, LOCK	
Total display	Total (9 digits)	

15-3. Setting

Setting method	Touch panel keys, or remote setting from a computer using RS-232C communication.
Parameter storage	Initial settings: NOVRAM (non-volatile RAM) Others: C-MOS RAM (lithium battery backup)

15-4. External I/O

24 inputs	'ON' when input signal is shorted to COM terminal. Contact device (relay, switch) or non-contact device (transistor, open-collector) can be used.
16 outputs	Open-collector transistor ('ON' when the transistor whose emitter is connected to COM turns on) * Each output is provided with a current limiting circuit that protects the device from excessive current flow from the external source).

15-5. Interface

Standard equipment

2-wire serial interface (SI/F)

Serial interface for connecting UNIPULSE printer or external display devices

mode:	asynchronous
rate:	600bps

2-wire high-speed bi-directional serial interface (SI/FII)

High-speed serial interface for master/slave operation of multi-F805AT-BC system

distance:	approx. 300m
number of instruments:	max. eight F805AT-BCs
communication rate:	100 times/sec

RS-232C communication interface

External host (computer) can read/write/modify various type of data and status information using RS-232 interface.

Signal level:	RS-232C compatible
Distance:	approx. 15m
Mode:	asynchronous
Rate:	1200, 2400, 4800, 9600, 19200, or 38400 bps selectable
Bits configuration:	
Start bit:	1
Character length:	7 or 8 (selectable)
Stop bit:	1 or 2 (selectable)
Parity:	none, odd or even (selectable)
Communication code:	ASCII

D/A converter interface (2-ch) [DAC]

Outputs internal digital readings as an analog signal. Tow channels function independently to each other and can be separately configured (e.g. zero and full-scale settings). Pulse input can be used.

Output data:	belt speed, weight density, feed rate, load ratio, feed ratio, control rate
Current output:	4-20mA
D/A conversion rate:	200 times/sec
Resolution:	16 bits
Over range:	±10% FS current 2.4 – 21.6 mA
Max. input frequency:	10kHz (duty ratio 50%)
Count range (internal):	0 – 65535
External power source:	DC12V (160mA MAX)
Speed sensor (rotary encoder)	
Output:	2-phase (A, B) signal (1-phase output can be selected by configuration setting)
Output circuit:	open-collector (NPN type, Vceo >= 15V, Ic >= 30mA)

Option

(F805AT-BC provides four slots: up to two slots can be occupied by selected options from OP1, OP2, or OP8.)

OP1: BCD parallel data output interface [BCO]

Parallel interface for sending data to printer, external display, and data processing instrument. Terminals and internal circuit are electrically isolated by photo-couplers.

Output data:	belt speed, weight density, feed rate, oad ratio, feed ratio
Signal format:	5 digits BCD
Logic:	positive or negative logic selectable
Output circuit:	open-collector
Input:	logic (positive/negative), hold, output data selection
Input circuit:	Contact or open-collector (Ic <= 10mA)

OP2: BCD parallel data input interface [BCI]

Parallel interface for receiving setting data from external devices. Terminals and internal circuit are electrically isolated by photo-couplers.

Input data:	alarm upper/lower limit, or rated belt speed (selectable)
Signal format:	5 digits BCD
Detection mode:	level or edge detection selectable
Input circuit:	Contact or open-collector (Ic <= 10mA)

OP4: RS-485 communication interface [485]

RS-485 is capable of longer distance communication than RS-232C, and multiple of F805AT-BC can be connected in parallel identifying them with unique IDs.

Signal level:	RS-485 compatible
Communication distance:	approx. 1km

OP8: Analog IN/OUT interface [ANA]

Analog IN/OUT interface with two analog input channels and three analog output channels.

Analog input ×2 （separately functionable）

Input data:	belt speed
Current input:	DC4 – 20mA (input resistance 100Ω)
Voltage input:	DC 0 – 10V (input resistance 50kΩ)

* current and voltage input range are factory configured.

A/D conversion rate:	30 times/sec (for each channel)
Over range:	5% FS (3.2 – 20.8 mA, or –0.5 – 10.5 V)
Resolution:	16bit（Calculative resolution is 1/10000 at 100%.）
Accuracy:	±0.1% (operation temperature: 0 – 40 ℃)
Linearity error:	<= 0.05 % FS

Analog output ×3 （separately functionable）

Output data:	Select from: belt speed, weight density, feed rate, load ratio, feed ratio, or control rate
Current output:	DC 4 – 20mA (load resistance <= 350Ω)
D/A conversion rate:	50 times/sec (each channel)
Resolution:	16 bit
Over range:	±10% FS (2.4 – 21.6mA)
Linearity error:	<= 0.05 % FS

Pulse input ×1

Max. input frequency:	10kHz (duty ratio 50%)
Count range (internal):	0 – 65536

Speed sensor (rotary encoder)

Output:	Single-phase (A-phase input used.)
Output circuit:	open-collector (NPN type, Vceo >= 15V, Ic >= 30mA)

* It is not possible to use it at the same time with the pulse input of the DAC.

* Use shielded twist-pair cable for connections.

15-6. General

(AC spec.)

a. Voltage input	AC100V ~ 240V (+10% -15%) Free power supply 50/60Hz.
b. Inrush current (Reference value)	15A, 5mSec : DC12V at the status of average load (room temperature, at cold start) 30A, 5mSec : DC24V at the status of average load (room temperature, at cold start)

(DC spec.: Designated when it is shipped.)

a. Voltage input	DC 12~24V (±15%)
b. Inrush current (Reference value)	10A, 0.5mSec : DC12V at the status of average load (room temperature, at cold start) 35A, 0.4mSec : DC24V at the status of average load (room temperature, at cold start)

(The followings are the same for AC spec. and DC spec.)

Power consumption:	approx. 20W
Operating condition	operating temperature: -10 - +40 ℃ storage temperature: -20 - +60 ℃ humidity: < 85% RH (non-condensing)
Dimensions	174 (W)×159 (D) ×135 (H) mm (protruding part excluded)
Panel cutout	165 $(^{+1}_{-0})$ (W)×130H $(^{+1}_{-0})$ (H) mm
Panel thickness	1.6 – 3.2mm
Weight	approx. 2.3kg

15-7. Accessory and Parts

- Operation manual 1
- Power cable (2m[6.56ft], AC spec. only) 1
- Conversion plug for power cable (AC spec. and CE marking only) 1
- Miniature driver (for securing terminals) 1
- Load cell connector 1
- External I/O connector 1
- D/A converter connector 1
- Ferrite core (CE marking only) 2
- BCD output connector
  (57-30360, used with BCD output option) 1
- Analog IN/OUT connector
  (57-30140, used with Analog IN/OUT option) 1

About the power cable

The power cable attached to this product as standard equipment can be used in the AC100V power supply in Japan. (Official ratings voltage AC125V)

Please use the power cable authorized in the country when you use this product outside Japan.

16. SETTING ITEMS LIST

Initial value ..... F805AT-BC is shipped with these values

NOV.RAM..... Value stored in NOVRAM
(Other values are stored in battery-backed -up RAM)

Lock(soft)..... Modification is inhibited if [Lock (soft)] is ON

Lock(hard)..... Modification is inhibited if Lock switch (rear panel) is ON

PASS WORD..... User can modify these values, during system operation, by entering password

Input method ..... One of the two methods is used for entering parameters
Number: The user can enter arbitrary numeric
Selection: The user can select one from the options presented

Decimal place..... Decimal place settings for each item:
0 : 0 1 : 0.0 2 : 0.00 3 : 0.000 4 : 0.0000
Weight: decimal place (weight)
Flow: decimal place (flow)
Type: depends on the data type selected
Unit: depends on the Total display unit
Input: depends on Speed Entry Select

Each code

MODE → EACH CODE

Setting Item	Initial value	NOV. RAM	Each code	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Weighing code	0						Numeric	None
Proportion (P)	50.00		◎				Numeric	2: fixed
Integral (I)	10.00		◎				Numeric	2: fixed
Differential (D)	0.00		◎				Numeric	2: fixed
At Coordin Time	20		◎				Numeric	None
At Coordinate 1	0		◎				Numeric	Flow
At Coordinate 2	0		◎				Numeric	Flow
At Coordinate 3	0		◎				Numeric	Flow
At Coordinate 4	0		◎				Numeric	Flow
At Coordin Out 1	15.0		◎				Numeric	1: fixed
At Coordin Out 2	35.0		◎				Numeric	1: fixed
At Coordin Out 3	55.0		◎				Numeric	1: fixed
At Coordin Out 4	75.0		◎				Numeric	1: fixed

Operation

MODE → Operation

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal Place
Weighing Section	1000	◎	◎	◎	◎	Numeric	Arbitrary
Rated Feed Rate	45.00	◎	◎	◎	◎	Numeric	Arbitrary
Feed Unit	t/h , t	◎	◎	◎	◎	Selection 2	—
Operation Select	EXTERNAL ENTRY	◎	◎	◎	◎	Selection 3	—
Rated Belt Speed	30.00	◎	◎	◎	◎	Numeric	Arbitrary
Dead Band Load Ratio	10	◎	◎	◎	◎	Numeric	None
Dead Band Belt Speed	10	◎	◎	◎	◎	Numeric	None
Dead Band	0.0	◎		◎		Numeric	1: fixed
Moisture Ratio	25	◎	◎	◎	◎	Numeric	None
Feed Pulse (W/P) 1	1kg	◎		◎	◎	Selection 5	—
Feed Pulse (W/P) 2	2*0.001	◎		◎	◎	Selection 12	—
Pulse Width 1	25	◎		◎	◎	Selection 5	—
Pulse Width 2	25	◎		◎	◎	Selection 5	—
Total W Disp. Digit	1g or 1kg	◎		◎	◎	Selection 4	—
Alarm Time	60	◎		◎		Numeric	None
Start Time	0	◎		◎		Numeric	None
First Stability Time	10	◎		◎		Numeric	None
Operation Mode	CONT. FEED RATE			◎		Selection 5	—

Function

MODE → Function

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Total Weight Clear	NO				◎	Command	—
START/STOP Key	VALID	◎		◎		Selection 2	—
Digital Zero	NO				◎	Command	—
Zero Tracking (Period)	0.0	◎		◎	◎	Numeric	1: fixed
Zero Tracking (Range)	0	◎		◎	◎	Numeric	None
DZ Regulation Value	2.00	◎		◎	◎	Numeric	Weight
Zero Error Key	VALID	◎		◎	◎	Selection 2	—
Weighing Code Selection	KEY INPUT	◎		◎		Selection 2	—
I/O Monitor Display	INHIBIT	◎		◎		Selection 2	—

Weight calibration

MODE → WEIGHT CALIBRATION

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Zero Calibration	0kg	◎	◎	◎	◎	Command	—
Span Calibration	100.00kg	◎	◎	◎	◎	Command	—
Equiv. Calibration	2.0000	◎	◎	◎	*1	Numeric	4: fixed
Balance Weight	100.00	◎	◎	◎	◎	Numeric	Weight
Capacity	100.00	◎	◎	◎	◎	Numeric	Weight
Min. Scale.Div (Weight)	0.01	◎	◎	◎	◎	Numeric	Weight
Load cell Excitation	10V	◎	◎	◎	◎	Selection 2	—
Decimal Place (Weight)	0.00	◎	◎	◎	◎	Selection 4	—
Grav. Acceleration	9	◎	◎	◎	◎	Numeric	None
Initial Dead Load	0.00mV/V	◎	◎	◎	*1	Numeric	2: fixed

*1 Equivalent calibration is inhibited while RUNNING even is the password is entered.

Flow calibration

MODE → FLOW CALIBRATION

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Zero Error Measure	0.00				◎	Command	—
Span Error Measure	0.00				◎	Command	—
Zero Error Set	0.00	◎	◎	◎	◎	Numeric	2: fixed
Span Error Set	0.00	◎	◎	◎	◎	Numeric	2: fixed
Test Mode	No	◎	◎	◎	◎	Selection 3	—
Belt Length	100.0	◎	◎	◎	◎	Numeric	Arbitrary
Cal. Weight Density	10.00	◎	◎	◎	◎	Numeric	Arbitrary
Rated Weight Density	25.00	◎	◎	◎	◎	Numeric	Arbitrary
Decimal Place (Flow)	0.00	◎	◎	◎	◎	Selection 4	—
Speed Input Count Meas.					◎	Command	—
Speed Input Count	10000	◎		◎	◎	Numeric	Input
Error Meas. Select	TESTING BELT	◎		◎	◎	Selection 2	—
Min. Scale Div. (Flow)	0.01	◎	◎	◎	◎	Numeric	Flow
Z_ERR Upper Limit	100.00%	◎	◎	◎	◎	Numeric	2: fixed

Comparison

MODE → COMPARISON

Setting item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Alarm Upper Limit	80.00	◎		◎	◎	Numeric	None
Alarm Lower Limit	20.00	◎		◎	◎	Numeric	None
Alarm Mode	COMPARISON OFF	◎		◎	◎	Selection 3	—
Total Final	999999999	◎		◎	◎	Numeric	depends on the unit
Total Final Mode	COMPARISON OFF	◎		◎	◎	Selection 3	—
Belt Speed Over	100.00	◎		◎	◎	Numeric	2: fixed
Weight Density Over	100.00	◎		◎	◎	Numeric	Flow
Feed Rate Over	100.00	◎		◎	◎	Numeric	Flow
Load Ratio Over	100.00	◎		◎	◎	Numeric	2: fixed
Feed Ratio Over	100.00	◎		◎	◎	Numeric	2: fixed

Graph setting

MODE → GRAPH SETTING

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input Method	Decimal place
Belt Speed End Point	100.00	◎		◎		Numeric	2: fixed
Wei. Dens. End Point	100.00	◎		◎		Numeric	Weight
Feed Rate End Point	100.00	◎		◎		Numeric	Flow
Load Ratio End Point	100.00	◎		◎		Numeric	2: fixed
Feed Ratio End Point	100.00	◎		◎		Numeric	2: fixed
Disp. Data Select 1	LOAD RATIO			◎		Selection 7	—
Disp. Data Select 2	FEED RATIO			◎		Selection 7	—
Graphic Mode	SINGLE			◎		Selection 6	—
Trigger Level	0.00	◎		◎		Numeric	Type
Trigger CH Select	ch1	◎		◎		Selection 3	—
Split Selection	NO SPLIT	◎		◎		Selection 3	—
Disp. Partition Ch 1	BELT SPEED	◎		◎		Selection 5	—
Disp. Partition Ch 2	WEIGHT DENSITY	◎		◎		Selection 5	—
Disp. Partition Ch 3	FEED RATE	◎		◎		Selection 5	—
Ch 1 Start Point	0	◎				Numeric	Type
Ch 2 Start Point	0	◎				Numeric	Type
Ch 3 Start Point	0	◎				Numeric	Type
Ch 1 End Point	100.00	◎				Numeric	Type
Ch 2 End Point	100.00	◎				Numeric	Type
Ch 3 End Point	100.00	◎				Numeric	Type
X End Point	10.0	◎		◎		Numeric	1: fixed

Display

MODE → DISPLAY

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Display Frequency	25 Times/Sec	◎		◎		Selection 5	—
Digital Filter	16 Times	◎		◎	◎	Selection 8	—
Analog Filter	6Hz	◎		◎	◎	Selection 4	—
Average Counts	OFF	◎		◎	◎	Selection 8	—
Error Display Control	ERROR DISPLAY	◎		◎		Selection 3	—
Data Select Key	VALID	◎		◎		Selection 2	—
Disp. Data Selection	TOTAL	◎		◎		Selection 2	—

Control parameter

MODE → CONTROL PARAMETER

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Target Set	0			◎		Numeric	Flow
Target Set (4 digits %)	0			◎		Numeric	1: fixed
Control Limit	100.0	◎		◎		Numeric	1: fixed
Allowable Control Dev.	0.0			◎		Numeric	1: fixed
Rate Limit	50.0	◎		◎		Numeric	1: fixed
Fault Detect Value	0			◎		Numeric	Flow
Master/Slave Select	Single	◎		◎		Selection 3	—
Slave Mode Select	TARGET FOLLOW	◎		◎		Selection 4	—
Start/Error Display	REAL TIME DISP.	◎		◎		Selection 2	—
Flow Stability Time	10	◎		◎		Numeric	None
Start Coordin. Value	0.0			◎		Numeric	1: fixed
Control Frequency	1	◎		◎	◎	Numeric	None

States ascertain

MODE → STATES ASCERTAIN

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Belt Speed Over Asc.	60	◎		◎		Numeric	None
Weight Density Over Asc.	60	◎		◎		Numeric	None
Feed Rate Over Asc.	60	◎		◎		Numeric	None
Load Ratio Over Asc.	60	◎		◎		Numeric	None
Feed Ratio Over Asc.	60	◎		◎		Numeric	None
Deviation Lim. Over Asc.	60	◎		◎		Numeric	None

Communication

MODE → PAGE → COMMUNICATION

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Baud Rate	9600bps	◎		◎		Selection 6	—
Character Length	7bit	◎		◎		Selection 2	—
Parity Bit	Odd	◎		◎		Selection 3	—
Stop Bit	1bit	◎		◎		Selection 2	—
Terminator	CR + LF	◎		◎		Selection 2	—
SI/F Output Select 1	LOAD RATIO	◎		◎		Selection 7	—
SI/F Output Select 2	FEED RATIO	◎		◎		Selection 7	—
SI/FⅡID	0	◎		◎		Numeric	None

System

MODE → PAGE → SYSTEM

Setting Item	Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
Back Light Auto.Light.	EFFECT	◎		◎		Selection 2	—
Back Light Low Time	5 min.	◎		◎		Numeric	None
Back Light ON Time	10 min.	◎		◎		Numeric	None
LOCK(soft)	OFF	◎				Selection 2	—
Self Check	NO			◎		Command	—
LANGUAGE	JAPANESE	◎		◎		Selection 2	—
PASS WORD	0					Numeric	None

D/A converter

MODE → PAGE → OPTION

Setting Item		Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input Method	Decimal place
D/A Output Channel		ch1					Selection 2	—
D/A Output Mode	ch1	BELT SPEED	◎		◎		Selection 8	—
	ch2	BELT SPEED	◎		◎		Selection 8	—
D/A Zero Output Weight	ch1	0.00	◎		◎		Numeric	Type
	ch2	0.00	◎		◎		Numeric	Type
D/A Full Scale Value	ch1	100.00	◎		◎		Numeric	Type
	ch2	100.00	◎		◎		Numeric	Type
D/A Output Compensation	ch1	0.0	◎		◎		Numeric	1: fixed
	ch2	0.0	◎		◎		Numeric	1: fixed
D/A Lower Limit	ch1	0.00	◎		◎		Numeric	2: fixed
	ch2	0.00	◎		◎		Numeric	2: fixed
D/A Upper Limit	ch1	100.00	◎		◎		Numeric	2: fixed
	ch2	100.00	◎		◎		Numeric	2: fixed
Speed Entry Select		NORMAL MODE A	◎		◎	◎	Selection 4 *2	—
Pulse Count/Rotation		1	◎		◎	◎	Numeric	None

*2When two ANA options are installed, this item should be changed to “Selection 8”

Analog IN/OUT (Option)

MODE → PAGE → OPTION

Setting Item		Initial value	NOV. RAM	Lock (hard)	Lock (soft)	PASS WORD	Input method	Decimal place
AO Output Channel		ch1					Selection 3	—
AO Output Mode	ch1	LOAD RATIO	◎		◎		Selection 7	—
	ch2	BELT SPEED	◎		◎		Selection 7	—
	ch3	WEIGHT DENSITY	◎		◎		Selection 7	Type
AO Zero Output Weight	ch1	0.00	◎		◎		Numeric	Type
	ch2	0.00	◎		◎		Numeric	Type
	ch3	0.00	◎		◎		Numeric	Type
AO Full Scale Value	ch1	100.00	◎		◎		Numeric	Type
	ch2	100.00	◎		◎		Numeric	Type
	ch3	100.00	◎		◎		Numeric	Type
AO Output Compensation	ch1	0.0	◎		◎		Numeric	1: fixed
	ch2	0.0	◎		◎		Numeric	1: fixed
	ch3	0.0	◎		◎		Numeric	1: fixed
AO Lower Limit	ch1	0.00	◎		◎		Numeric	2: fixed
	ch2	0.00	◎		◎		Numeric	2: fixed
	ch3	0.00	◎		◎		Numeric	2: fixed
AO Upper Limit	ch1	100.00	◎		◎		Numeric	2: fixed
	ch2	100.00	◎		◎		Numeric	2: fixed
	ch3	100.00	◎		◎		Numeric	2: fixed
AI Input Channel		ch1					Selection 2	—
AI Zero Set	ch1	0.0	◎		◎	◎	Command	—
	ch2	0.0	◎		◎	◎	Command	—
AI Full Scale Set	ch1	100.0	◎		◎	◎	Command	—
	ch2	100.0	◎		◎	◎	Command	—
AI Digital Filter	ch1	64 Times	◎		◎	◎	Selection 7	—
	ch2	64 Times	◎		◎	◎	Selection 7	—
Target Entry Select		NONE	◎		◎		Selection 3	—
AI Target Value		100.00	◎		◎		Numeric	Flow
AI Min. Scale Div.		0.1	◎		◎		Numeric	1: fixed
Speed Entry Select *3		ANALOG CH1 MODE	◎		◎	◎	Selection 5	—

*3 If DAC is installed in the system, SPEED ENTRY SELECT is defined in the corresponding field in DAC menu: this item does not appear in this menu.

17. SETTING MODE TREE CHART

MAIN SCREEN

MODE" SCREEN

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Analog IN/OUT

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18. STATEMENT OF CONFORMATION TO EC DIRECTIVES (Designated when it is shipped)

*** The following notice must be observed only CE marking.**

Unipulse F805AT-BC Belt Scale Controller conforms to The EC Directives (based on Council of the European Communities), and is allowed to affix CE mark on it.

- Low Voltage Directive
  EN61010-1:2010 (Overvoltage category II, Pollution degree 2)
  EN62311:2008 (test distance: 0cm)

- EMC Directive
  EN61326-1:2006
  EN55011:2009, A1:2010 Group1, ClassA
  EN61000-3-2:2006, A1:2009, A2:2009
  EN61000-3-3:2008
  EN61000-4-2:2009
  EN61000-4-3:2006, A1:2008, A2:2010
  EN61000-4-4:2004, A1:2010
  EN61000-4-5:2006
  EN61000-4-6:2009
  EN61000-4-8:2010
  EN61000-4-11:2004

The following notice must be observed when you install F805AT-BC unit.

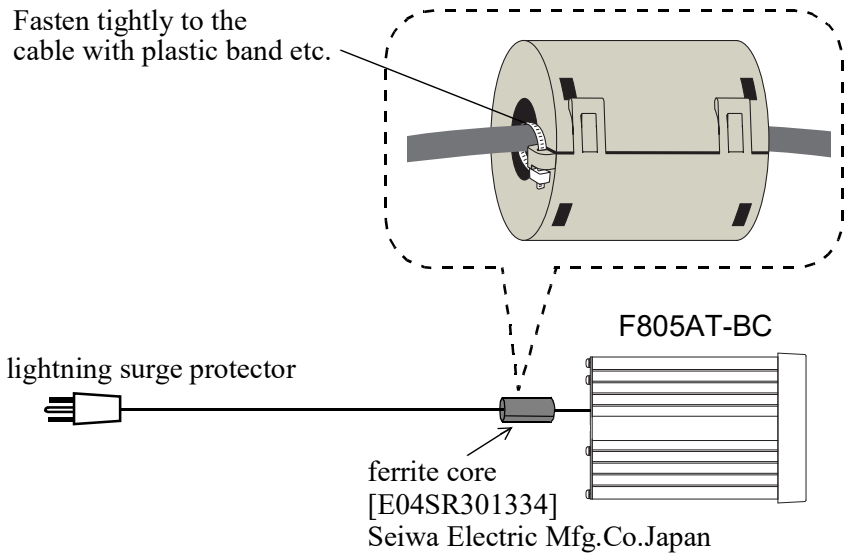
1. Since F805AT-BC is defined as an open type (unit to be fixed or built-in), it must be fixed or bolted to frame or solid board securely.
2. The power cable attached to this product as standard equipment can be used in the AC100V power supply in Japan. (Official ratings voltage AC125V)
   Please use the power cable authorized in the country when you use this product outside Japan.
3. Use shielded cable for connection with components other than power supply, such as load cell, input/output signals and optional device.
4. Attach separate type ferrite core (supplied as standard item with the unit) on terminal box side of power supply cable and also on connecting cable to sensor.

Notice

Lightning surge protector is not included in standard supply for F805AT-BC.
The combination of the main unit of the F805AT-BC and a lightning surge protector conforms to EN61000-4-5 (lightning surge immunity) in the EMC Directives.
Please refer to "Connection of Lightning serge protector" on P.186 for information regarding lightning surge protector connection.

Attachment of a ferrite core (power source cable)

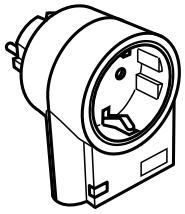
It is necessary to attach the ferrite core to the power source cable.



Connection of Lightning serge protector

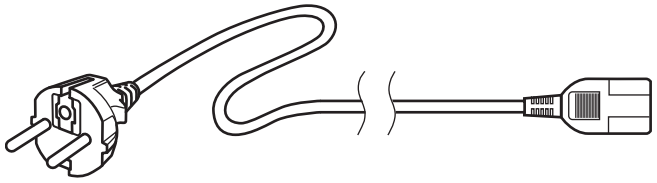
The F805AT-BC main body conforms to EMC directive EN61000-4-5 (lightning surge immunity) in combination with the lightning surge protector.

● AC Spec.



(option to F805AT-BC)

No lightning surge protector is included as a standard.
Please use the power cable authorized in the country when you use this product outside Japan.
Before purchasing it, check the plug shape/voltage, which differs with countries and regions.
It is optionally available (TSU02) in combination with a 250V AC high-voltage cable in EU outlet form (See below: Standard product in Europe). For details, contact our sales department.



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