ONOSOKKI

Digital Tachometer

TM-3100 Series

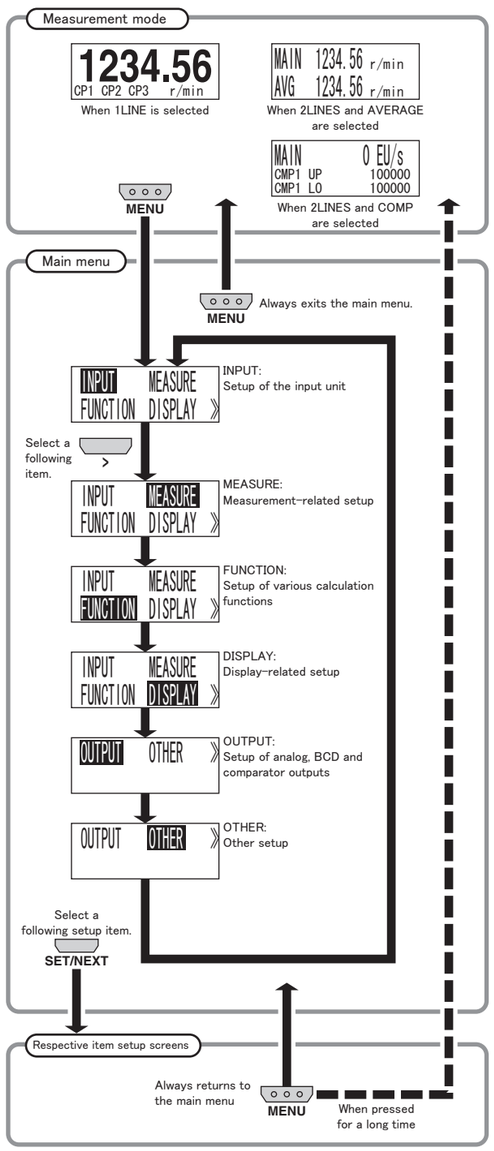
Instruction Manual (Basic Operation)

Thank you for your purchasing the TM-3100 Series Digital Tachometer. This manual describes functions, specifications, setup procedures, precautions, etc. for use of the TM-3100 Series Digital Tachometer.
To ensure proper use of the TM-3100 Series Digital Tachometer, please thoroughly read this manual in advance.
After reading this manual, keep it carefully.

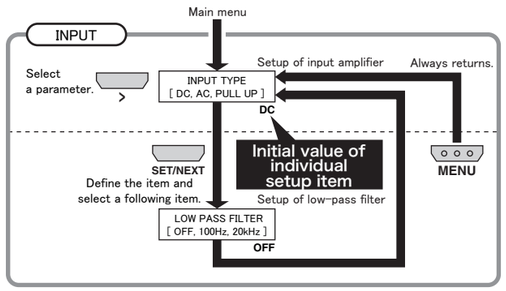
Functions and Operations

Parameter Setup

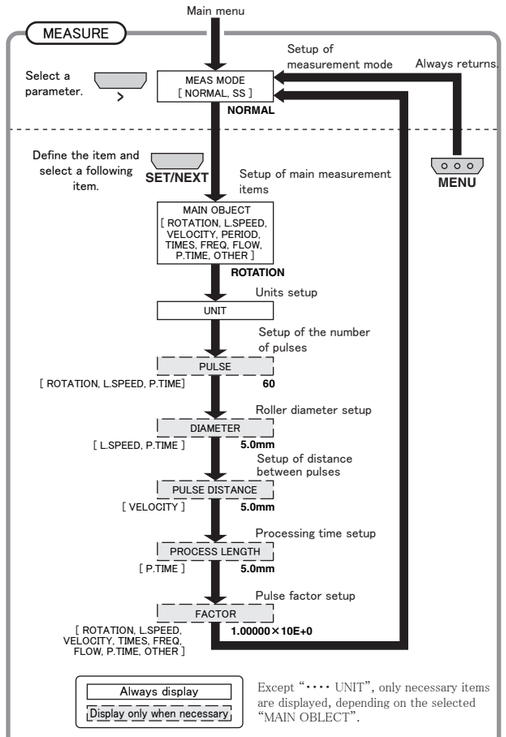
【Main Menu】
When the MENU switch is pressed in the measurement mode, the setup mode main menu is selected. Then, on the respective item setup screens, a parameter is set and the SET/NEXT switch is pressed to define the parameter item and select a following setup item. The operation flow in the setup mode is shown below:



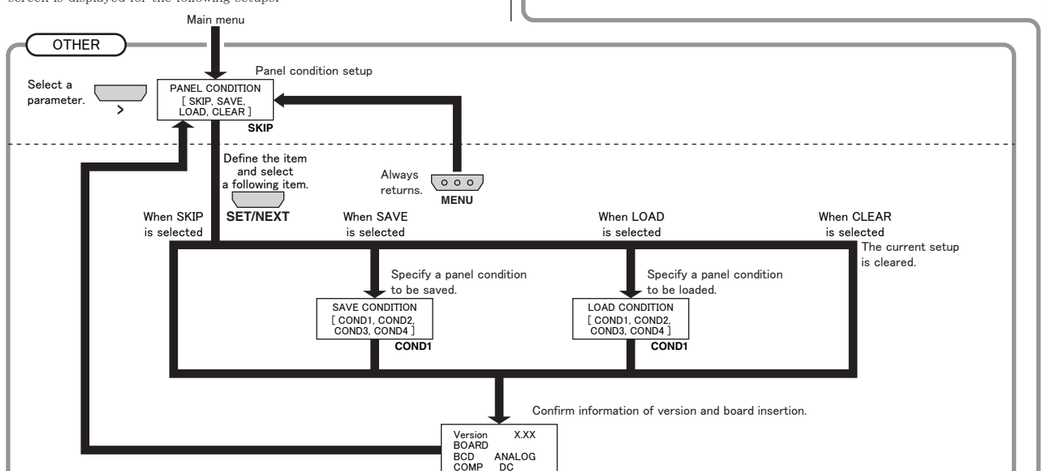
【INPUT】
When "INPUT" is selected from the setup mode main menu, the input unit setup screen is displayed for the following setups.



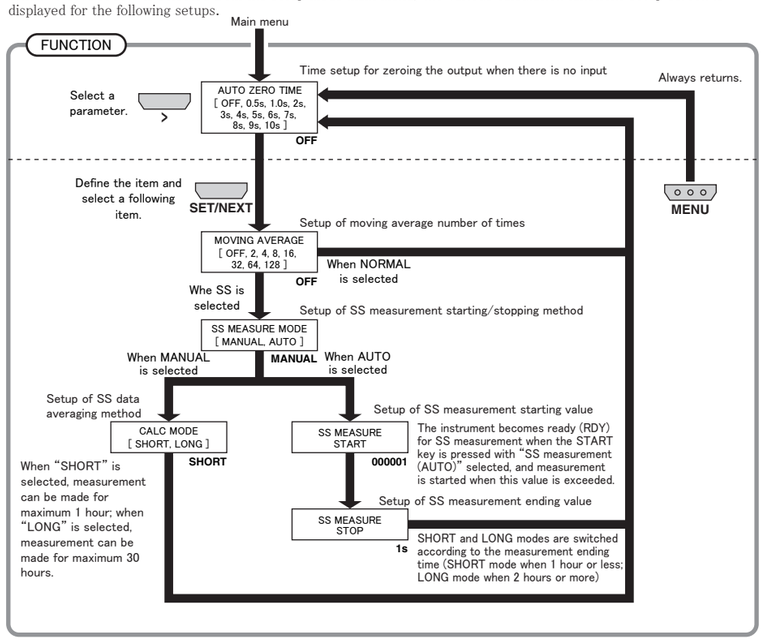
【MEASURE】
When "MEASURE" is selected from the setup mode main menu, the measurement-related setup screen is displayed for the following setups.



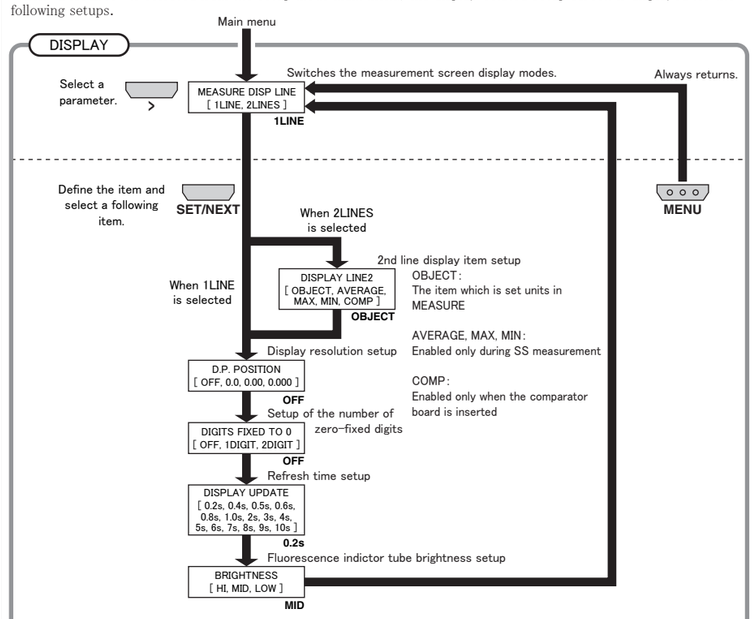
【OTHER】
When "OTHER" is selected from the setup mode main menu, the other setup screen is displayed for the following setups.



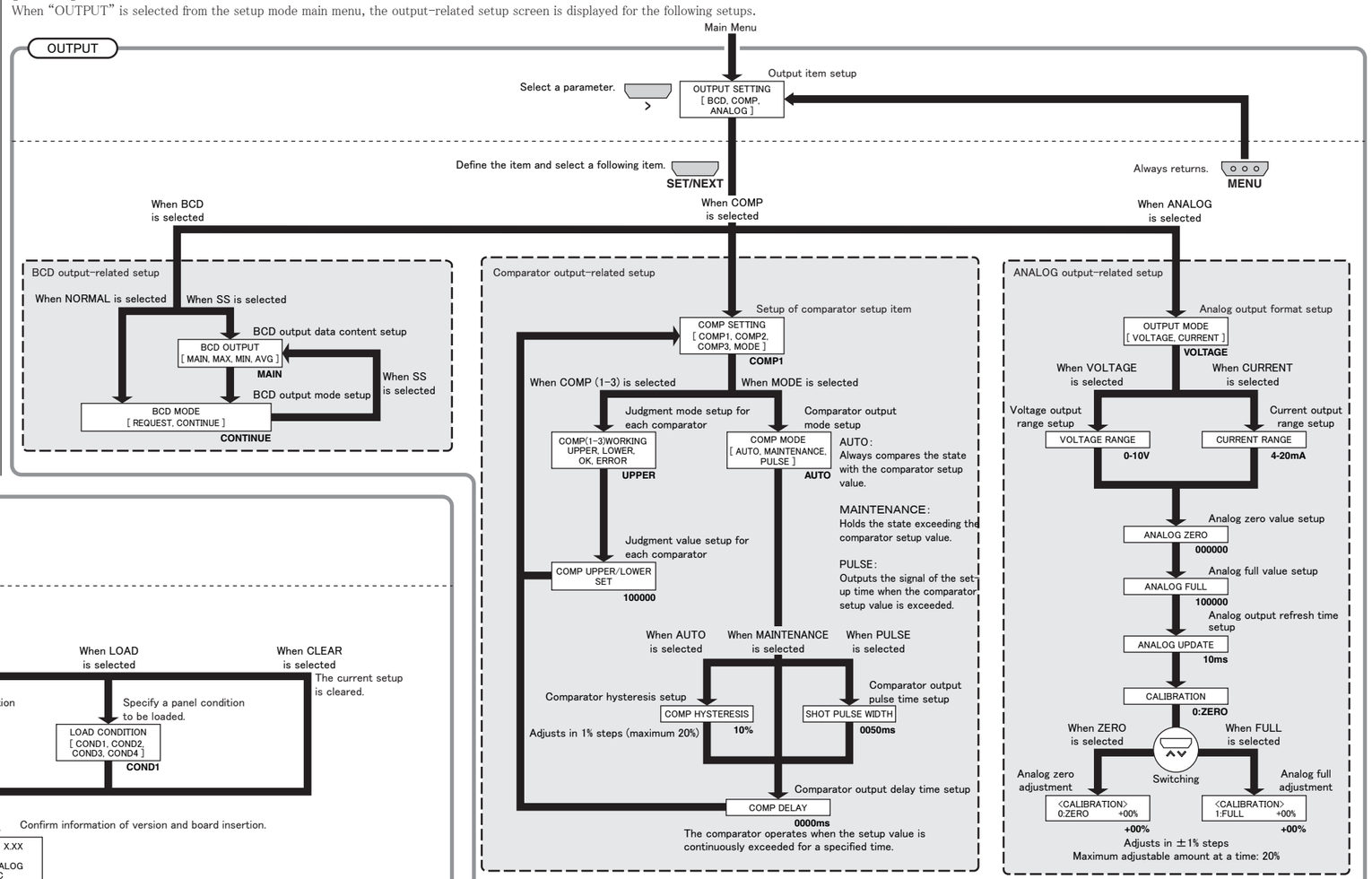
【FUNCTION】
When "FUNCTION" is selected from the setup mode main menu, the various calculation functions setup screen is displayed for the following setups.



【DISPLAY】
When "DISPLAY" is selected from the setup mode main menu, the display-related setup screen is displayed for the following setups.



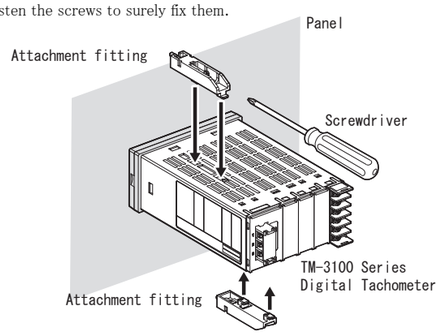
【OUTPUT】
When "OUTPUT" is selected from the setup mode main menu, the output-related setup screen is displayed for the following setups.



Mounting on the Panel

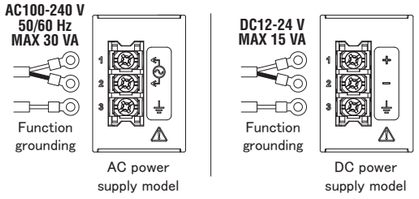
Mount the TM-3100 on the panel, using the following procedures.
The panel must be 2 mm or more and 5 mm or less in board thickness.
For panel cut-dimensions, refer to the outside dimensions.

・Let the TM-3100 through the mounting hole from the panel front side, hook the attachment fittings on the top and bottom faces, and fasten the screws to surely fix them.



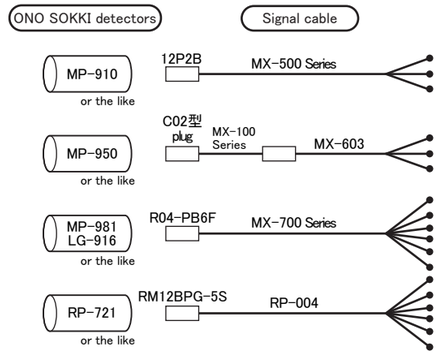
Connecting the Power Cable

Supply power to the TM-3100, using the following procedures.
・When using a solderless terminal, select an M3 terminal (width: 5.8 mm or less) having a coated clamp section and surely connect it to the power supply of rated voltage.
・When anti-noise measures are necessary, perform the function grounding.

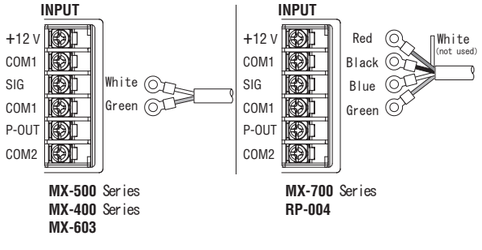


Selecting the Signal Cable

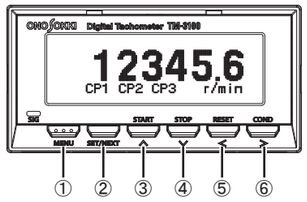
● Selecting the Signal Cable
・The signal cable differs with detector types, as shown below: se the signal cable which matches the detector to be used.



● Connecting the Signal Cable
・The signal cable differs with detector types, as shown below: Use the signal cable which matches the detector to be used.

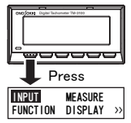


Description of the Panel Switches



①MENU　This switch selects the measurement mode or the setup mode.When pressed for 2 seconds or longer in the setup mode, the measurement mode is selected.
②SET/NEXT　This switch is used to apply a setup item or select a following setup item during parameter setup.
③START/∧　This switch performs addition during parameter setup.
④STOP/∨　This switch performs subtraction during parameter setup.
⑤RESET/≪　This switch moves the cursor to the left during parameter setup.
⑥COND/≫　This switch moves the cursor to the right during parameter setup.

● How to Activate the Main Menu



When the MENU switch is pressed in the measurement mode, the setup mode main menu is selected.

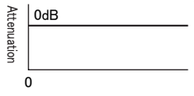
Input-related Setup

● Input Amplification Format Setup (Selection of AC/DC/PULL UP)
According to the following table, select an input amplifier which matches the detector type to be used.

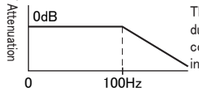
Input format	Detector	Signal waveform
AC amplifier	Electromagnetic detector (MP-810B/9100, etc.)	
DC amplifier	Magnetoelectric detector (MP-981) Rotary encoder Photoelectric detector (LG-916/930)	
PULL UP	Proximity switch	

● Low-pass Filter Setup (Selection of OFF/100 Hz/20 kHz)
To prevent the occurrence of mis-count due to influences of chattering or noise, the low-pass filter is set.

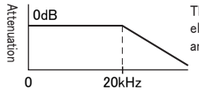
Low-pass filter：OFF　OFF：No filter



Low-pass filter：100 Hz　100Hz：100Hz LPF
This filter is effective for preventing mis-count due to chattering of the proximity switch or contact signal (non-voltage input) used by the input amplifier in DC coupling mode.



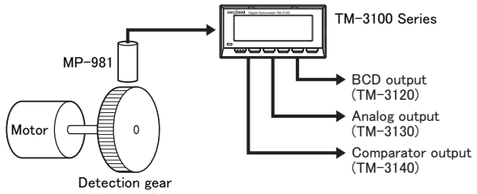
Low-pass filter：20 kHz　20kHz：20kHz LPF
This filter is effective when noise rides on the electromagnetic detector used by the input amplifier in AC coupling mode.



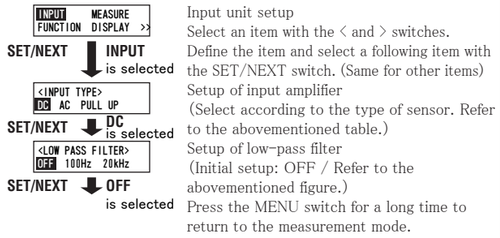
Setup Methods

The following are representative setup methods for various models under the conditions shown in the figure below.

Measurement conditions　・Maximum rotational speed: 3000 r/min
・Number of pulses per rotation: 120 (P/R)

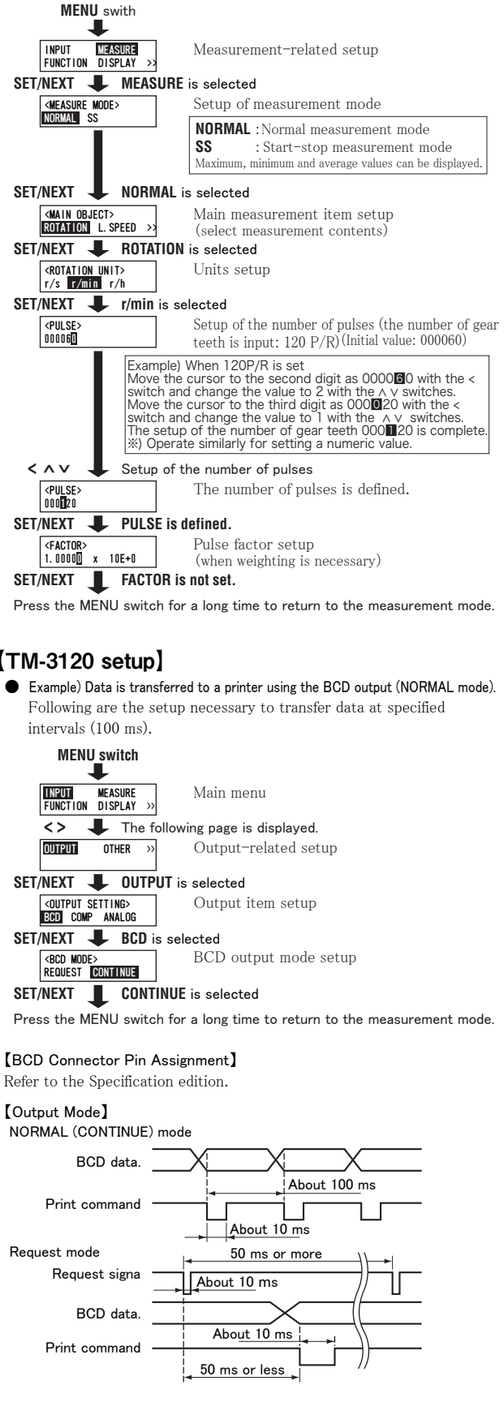


● Example) Measurement is performed with the MP-981



【TM-3110 setup】

● Example) Rotational speed is displayed.
Following are the basic setup necessary to display rotational speed.



【TM-3120 setup】

● Example) Data is transferred to a printer using the BCD output (NORMAL mode).
Following are the setup necessary to transfer data at specified intervals (100 ms).

【BCD Connector Pin Assignment】
Refer to the Specification edition.

【Output Mode】
NORMAL (CONTINUE) mode

【TM-3130 setup】

● Example) Data is recorded in the recorder using the analog output.
In this example, analog output conditions are set.
Following are the method for setting the voltage range to 0–10 V and the maximum rotational speed to 3000 r/min.
※ For analog voltage adjustment, use a digital voltmeter.

【TM-3140 setup】

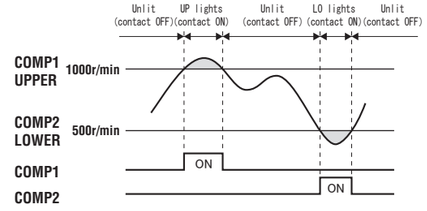
● Example) Judgment is made using the comparator output.
Following are the method for outputting NG if the rotational speed exceeds 2500 r/min.
(UPPER is output from COMP1.)

【Relay Output】
The relay is set ON when the setup values of UPPER and LOWER come in the following relationship:
UPPER (comparator output upper limit) value ≦ Display value
LOWER (comparator output lower limit) value ＞ Display value

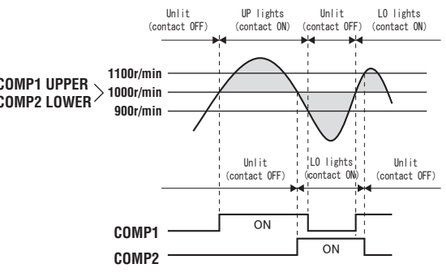
Comparator Output Timing Chart

The timing chart for comparator output is shown below. Select the output mode which matches your purpose of use.

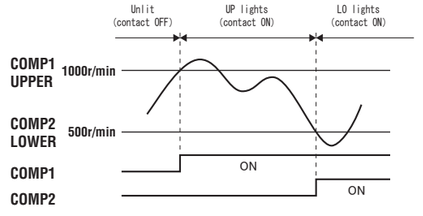
● AUTO
Always compares the state with the comparator setup value.



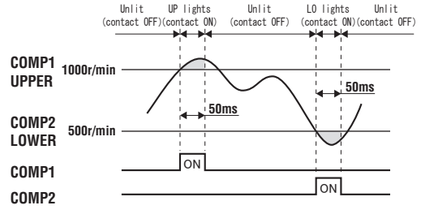
When there is COMP HYSTERESIS
Hysteresis is added to the setup value when the comparator recovers (enabled only in the AUTO mode).
Example) When COMP HYSTERESIS is 10%
【UPPER】
The comparator recovers when the state falls below the hysteresis value added to the UPPER setup value.
(A value 10% lower than 1000 r/min: 900 r/min)
【LOWER】
The comparator recovers when the state exceeds the hysteresis value added to the LOWER setup value.
(A value 10% greater than 1000 r/min: 1100 r/min)。



● MAINTENANCE
Holds the state when the comparator setup value is exceeded.
The state is held till reset.



● PULSE
Holds the output state for the setup time when the comparator setup value is exceeded. Example) When SHOT PULSE WIDTH is 50 ms



● COMP DELAY
Performs comparator output when the comparator setup value is continuously exceeded for specified time. Example) When COMP DELAY is 50 ms
Comparator output is performed when the UPPER setup value is continuously exceeded for 50 ms.