

# FM Limit Controller

## E5CN-FR

**Protect your operators, minimize scrap, and prevent damage to your equipment by implementing an easy to use limit controller that provides a fail-safe shutoff when the process variable (PV) exceeds or falls below the set point (SP).**

- Connect to either of three options with the same model: Infrared temperature sensor, thermocouple, or platinum resistance thermometer.
- Reset limit outputs using event inputs (models that support event inputs).
- Communications functions are now provided for Modbus (RTU) or CompoWay/F communications protocols (models with communications functions).
- Water-resistant construction (NEMA4X for indoor use, equivalent to IP66).
- Conforms to FM (Factory Mutual) standards (FM3545/3810).
- Conforms to international standards including UL, CSA, and IEC safety standards and EMC.
- Easily see the status from a distance with PV display with two-color switching function.
- On-board power supply option is available for ES1B Infrared Thermosensor.

**Note:** Refer to *Precautions* on page 13.



## Features

### Complete FM Limit Controller Functionality

#### Trace Error Status

Check the maximum temperature during an error and the time lapsed since the error occurred using the "limit over continuation time" and "limit over max./min. value" measuring functions.

#### New Annunciator Output Warning Function

Hazard lights and buzzers on the devices alert the user of errors when limit over errors occur.

#### Reset Limit Outputs Using Event Inputs (Models with Event Inputs)

Limit outputs can be reset using event inputs, enabling multiple limit outputs to be reset altogether from a distance.

#### Input Error Output Function

Alarm signals are output if a sensor disconnection or other input error occurs, enabling application in equipment and facilities requiring safety design.

### Basic Performance and Functionality as Easy as Temperature Controllers

#### Make Settings Easily with 11-segment Displays

The E5CN-FR uses an 11-segment display, the same as the E5CN. The alphabet is clearly displayed, eliminating the need to make parameter settings while having to decipher symbols, which was an inconvenience of previous general-purpose temperature controllers.

#### Multiple Inputs with a Single Controller

A single Controller supports both thermocouple and platinum-resistance thermometer inputs, eliminating the need to select models depending on the input. This contributes toward reducing the number of service parts required as well as decreasing inventory levels.

#### Easily Check Error Status Using the Two-color Switching Display

The PV display switches colors to enable status to be easily checked from a distance.

# Model Number Structure

## Model Number Legend

E5CN-FR□MT-500

1 2 3 4

**1. Output type**

FR: FM Limit output

**2. Number of alarms**

Blank: No alarm  
2: Two alarms

**3. Option Unit**

M: Option Unit can be mounted

**4. Input type**

T: Thermocouple/platinum resistance thermometer (multi-input)

E53-CN-□N

1

**1. Functions**

03: Communications  
B: Two Event inputs  
PB: Power supply and two event inputs

**Note:** Other Option Boards are not supported.

This data sheet is provided as a guideline for selecting products. Be sure to refer to the following user manuals for application precautions and other information required for operation before attempting to use the product.

E5CN-FR Temperature Controller User's Manual (Cat. No. H133)

## Ordering Information

**Stock Note:** Shaded models are normally stocked.

### FM Limit Controllers with Temperature Sensor Inputs

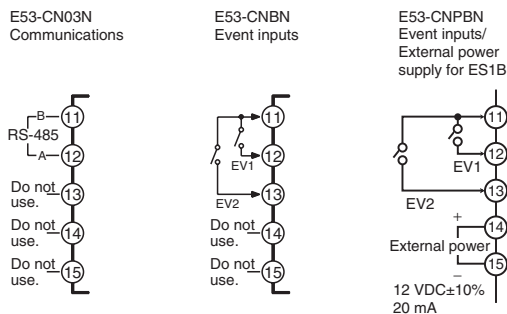
Size	Power supply voltage	Number of alarm points	Control outputs	Model
1/16 DIN 48 × 48 × 78 (W × H × D)	100 to 240 VAC	0	Limit output	E5CN-FRMT-500
		2	Limit output	E5CN-FR2MT-500

### Option Units

The E5CN-FR provides optional functionality when one of the following Option Units is mounted.

Functions	Model
Communications	E53-CN03N
Two event inputs	E53-CNBN
Two event inputs External power supply for ES1B	E53-CNPBN

**Note:** These Option Units can be used for the new E5CN models/E5CN-FR models only.



Attach the appropriate terminal labels.

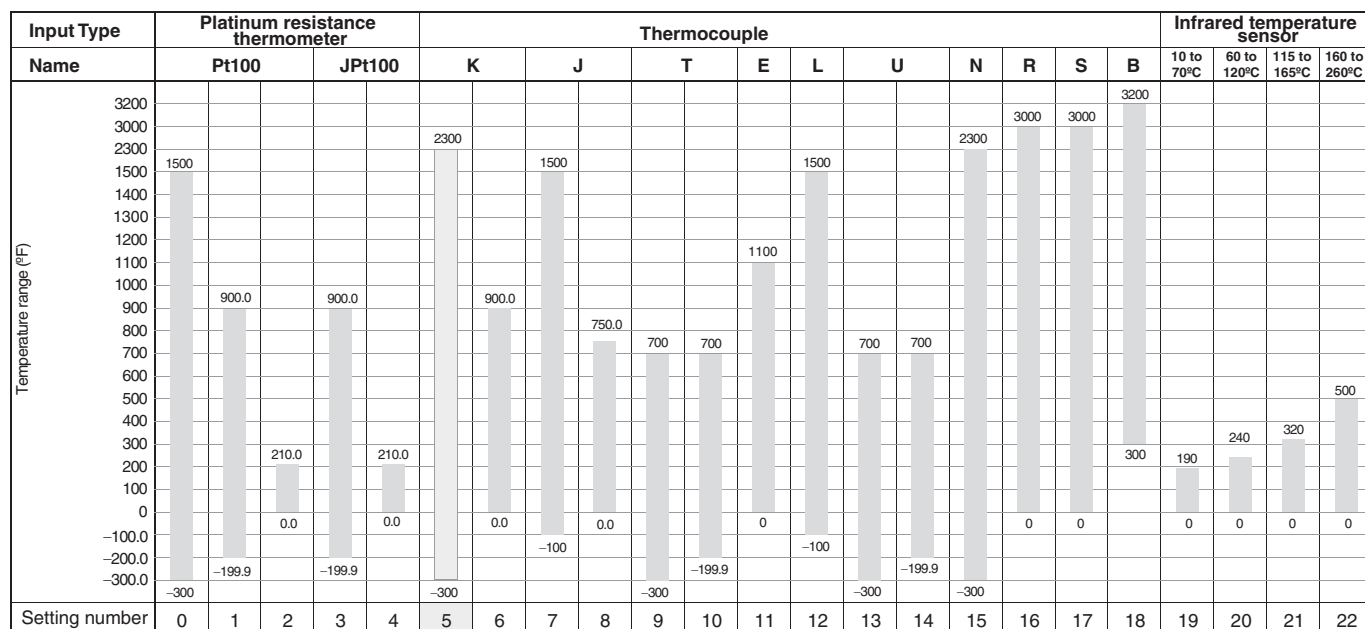
# Specifications

## ■ Ratings

Item	Power supply voltage	100 to 240 VAC, 50/60 Hz
Operating voltage range	85% to 110% of rated supply voltage	
Power consumption	7.5 VA max.	
Sensor input	Models with temperature inputs Thermocouple: K, J, T, E, L, U, N, R, S, or B Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor: 10 to 70°C, 60 to 120°C, 115 to 165°C, or 160 to 260°C	
Control output	FM Limit output relay	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
Alarm output	SPST-NO, 250 VAC, 1 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 1 V, 1 mA	
Event input	Contact input	ON: 1 kΩ max., OFF: 100 kΩ min.
	Non-contact input	ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max.
		Outflow current: Approx. 7 mA per point
External power supply for ES1B	12 VDC ±10%, 20 mA, Short-circuit protection provided.	
Setting method	Digital setting using front panel keys	
Indication method	11-segment digital display and individual indicators Character height: PV: 11 mm, SV: 6.5 mm	
Other functions	<ul style="list-style-type: none"> <li>• Limit over continuation time measurement function</li> <li>• Limit over max./min. value measurement function</li> <li>• Annunciator output</li> <li>• Input error output</li> <li>• PV display two-color switching function</li> <li>• Input digital filter</li> <li>• Input compensation</li> <li>• Protection functions</li> </ul>	
Ambient operating temperature	-10 to 55°C (with no icing or condensation), for 3-year warranty: -10 to 50°C	
Ambient operating humidity	25% to 85%	
Storage temperature	-25 to 65°C (with no icing or condensation)	

## ■ Input Ranges

### Thermocouples/Platinum Resistance Thermometers



The applicable standards for the input types are as follows:  
K, J, T, E, N, R, S, B: IEC584-1  
L: Fe-CuNi, DIN 43710-1985

U: Cu-CuNi, DIN 43710-1985  
Pt100: IEC 751

Shaded settings are the default settings.

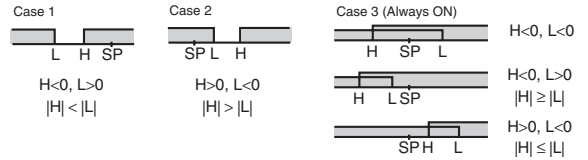
# Alarm Types

Select alarm types out of the 12 alarm types listed in the following table.

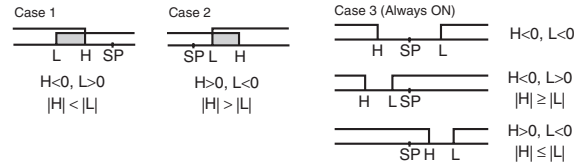
Set value	Alarm type	Alarm output operation	
		When X is positive	When X is negative
0	Alarm function OFF	Output OFF	
1 (See note 1.)	Upper- and lower-limit (deviation)		(See note 2.)
2	Upper limit (deviation)		
3	Lower limit (deviation)		
4 (See note 1.)	Upper- and lower-limit range (deviation)		(See note 3.)
5 (See note 1.)	Upper- and lower-limit with standby sequence (deviation)		(See note 4.)
6	Upper-limit with standby sequence (deviation)		
7	Lower-limit with standby sequence (deviation)		
8	Absolute-value upper-limit		
9	Absolute-value lower-limit		
10	Absolute-value upper-limit with standby sequence		
11	Absolute-value lower-limit with standby sequence		
12 (See note 6.)	Annunciator output	---	

**Note: 1.** With set values 1, 4 and 5, the upper and lower limit values can be set independently for each alarm type, and are expressed as "L" and "H."

**2.** Set value: 1, Upper- and lower-limit alarm



**3.** Set value: 4, Upper- and lower-limit range

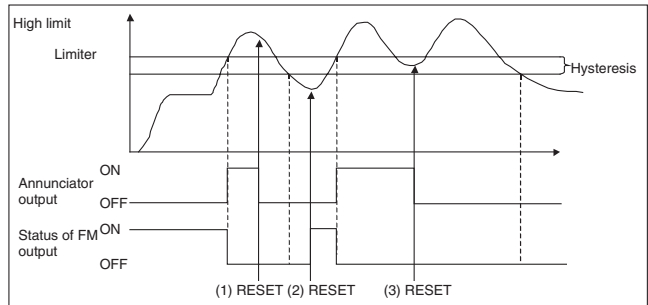


**4.** Set value: 5, Upper- and lower-limit with standby sequence For Upper- and Lower-Limit Alarm Described Above

- Case 1 and 2: Always OFF when the upper-limit and lower-limit hysteresis overlaps.
- Case 3: Always OFF

**5.** Set value: 5, Upper- and lower-limit with standby sequence Always OFF when the upper-limit and lower-limit hysteresis overlaps.

**6.** The annunciator output turns ON to inform users when a limit over occurs. This function is enabled by selecting 12 (annunciator output) for alarm 1 type. The annunciator output turns ON when a limit over occurs, and turns OFF for the RESET operation.



Set the alarm types for alarms 1 and 2 independently in the initial setting level. The default setting is 12 (annunciator) for alarm 1 type and 2 (upper limit) for alarm 2 type.

## ■ Characteristics

<b>Indication accuracy</b>	Thermocouple: (See note 1.) (±0.5% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever is greater) ±1 digit max.	
<b>Hysteresis</b>	0.1°C (°F) to 999.9°C (°F) in units of 0.1°C (°F)	
<b>Alarm setting range</b>	-1999 to 9999 (decimal point position depends on input type)	
<b>Sampling period</b>	250 ms	
<b>Affect of signal source resistance</b>	Thermocouple: 0.1°C/Ω max. (100 Ω max.) (See note 4.) Platinum resistance thermometer: 0.4°C/Ω max. (10 Ω max.)	
<b>Insulation resistance</b>	20 MΩ min. (at 500 VDC)	
<b>Dielectric strength</b>	2,000 VAC, 50 or 60 Hz for 1 min (between terminals with different charge)	
<b>Vibration resistance</b>	<b>Malfunction</b>	10 to 55 Hz, 20 m/s <sup>2</sup> for 10 min each in X, Y, and Z directions
	<b>Destruction</b>	10 to 55 Hz, 0.75-mm single amplitude for 2 hrs each in X, Y, and Z directions
<b>Shock resistance</b>	<b>Malfunction</b>	100 m/s <sup>2</sup> min., 3 times each in X, Y, and Z directions
	<b>Destruction</b>	300 m/s <sup>2</sup> min., 3 times each in X, Y, and Z directions
<b>Weight</b>	Controller: Approx. 150 g, Mounting Bracket: Approx. 10 g	
<b>Degree of protection</b>	Front panel: NEMA4X for indoor use (equivalent to IP66) Rear case: IP20, Terminal section: IP00	
<b>Memory protection</b>	Non-volatile memory (number of writes: 1,000,000 operations)	
<b>EMC</b>	Emission Enclosure: EN55011 Group1 ClassA Emission AC Mains: EN55011 Group1 ClassA Immunity ESD: EN61000-4-2 4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference: EN61000-4-3 10 V/m (80-1000 MHz, 1.4-2.0 GHz amplitude modulated) (level 3) 10 V/m (900 MHz pulse modulated) Immunity Conducted Disturbance: EN61000-4-6 3 V (0.15 to 80 MHz) (level 2) Immunity Burst: EN61000-4-4 2 kV Power-line (level 3) 1 kV I/O signal-line (level 3) Immunity Surge: EN61000-4-5 1kV line to line Power line, output line (relay output) 2 kV line to ground Power line, output line (relay output) 1 kV line to ground Input line (communication) Immunity Voltage Dip/Interrupting: EN61000-4-11 0.5 cycle, 100% (rated voltage)	
<b>Approved standards</b>	FM-3545/3810 UL 61010C-1 CSA C22.2 No.1010.1	
<b>Conformed standards</b>	EN61326, EN61010-1, IEC61010-1 VDE0106 Part 100 (Finger protection), when the terminal cover is mounted.	

**Note: 1.** The indication of K thermocouples in the -200 to 1300°C range, T and N thermocouples at a temperature of -100°C max., and U and L thermocouples at any temperature is ±2°C ±1 digit maximum. The indication accuracy of the B thermocouple at a temperature of 400°C max. is not specified. The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max.

**2.** B, R, and S sensors: 0.2°C/Ω max. (100 Ω max.)

## ■ Communications Specifications

<b>Transmission line connection method</b>	RS-485 multipoint
<b>Communications</b>	RS-485 (two-wire, half duplex)
<b>Synchronization method</b>	Start-stop synchronization
<b>Baud rate</b>	1200, 2400, 4800, 9600, 19200, or 38400 bps
<b>Transmission code</b>	ASCII
<b>Data bit length</b>	7 or 8 bits
<b>Stop bit length</b>	1 or 2 bits
<b>Error detection</b>	Vertical parity (none, even, odd) Block check character (BCC) with CompoWay/F or CRC-16 Modbus
<b>Flow control</b>	None
<b>Interface</b>	RS-485
<b>Retry function</b>	None
<b>Communications buffer</b>	40 bytes
<b>Communications response wait time</b>	0 to 99 ms Default: 20 ms

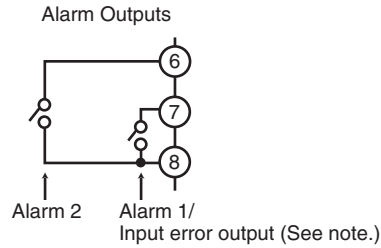
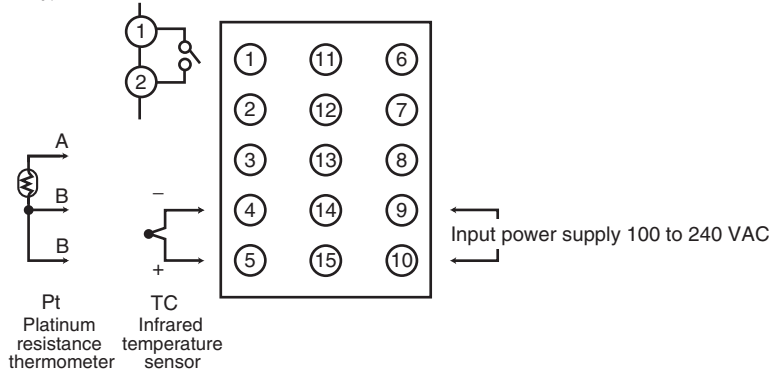
**Note:** The baud rate, data bit length, stop bit length, and vertical parity can be individually set using the Communications Setting Level.

# External Connections

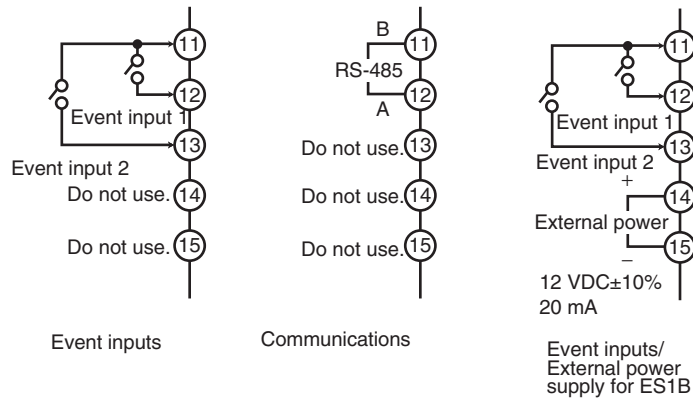
- Standard insulation is applied between any of the following: power supply terminals, input terminals, output terminals, and communications terminals (for models with communications). If reinforced insulation is required, provide additional insulation, such as spacial distance or material insulation, as defined by IEC 60664 suitable for the maximum operating voltage.
- Consult with your OMRON representative before using the external power supply for the ES1B for any other purpose.

## E5CN-FR

Limit Output (Relay)

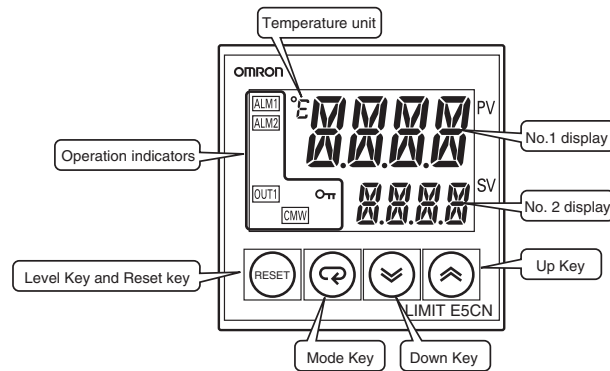


**Note:** Output when an input error output is enabled in the Advance Function Setting Level. If an input error output is enabled, the *ALM* operation indication on the front panel will not light and *5.ERR* will be displayed on the No. 1 display.



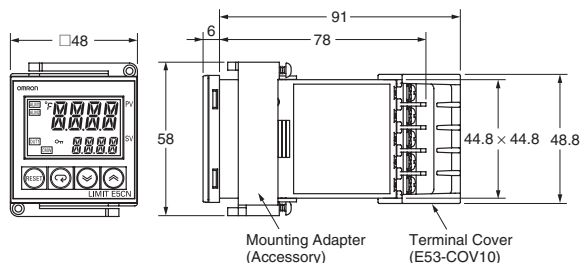
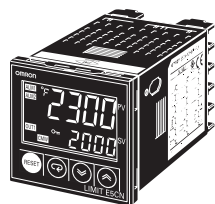
# Nomenclature

## E5CN-FR



# Dimensions

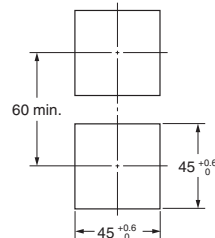
## E5CN -FR Terminal Models



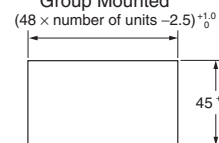
**Note:** The terminal block cannot be removed. The suffix “-500” is added to the model number of each Controller provided with a E53-COV10 Terminal Cover.

### Panel Cutout

Mounted Separately



Group Mounted

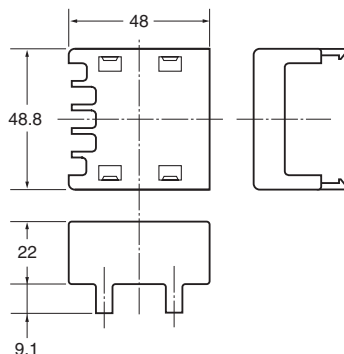
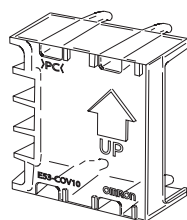


- Group mounting does not allow waterproofing.
- Recommended panel thickness is 1 to 5 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

## Accessories

### Terminal Cover

#### E53-COV10

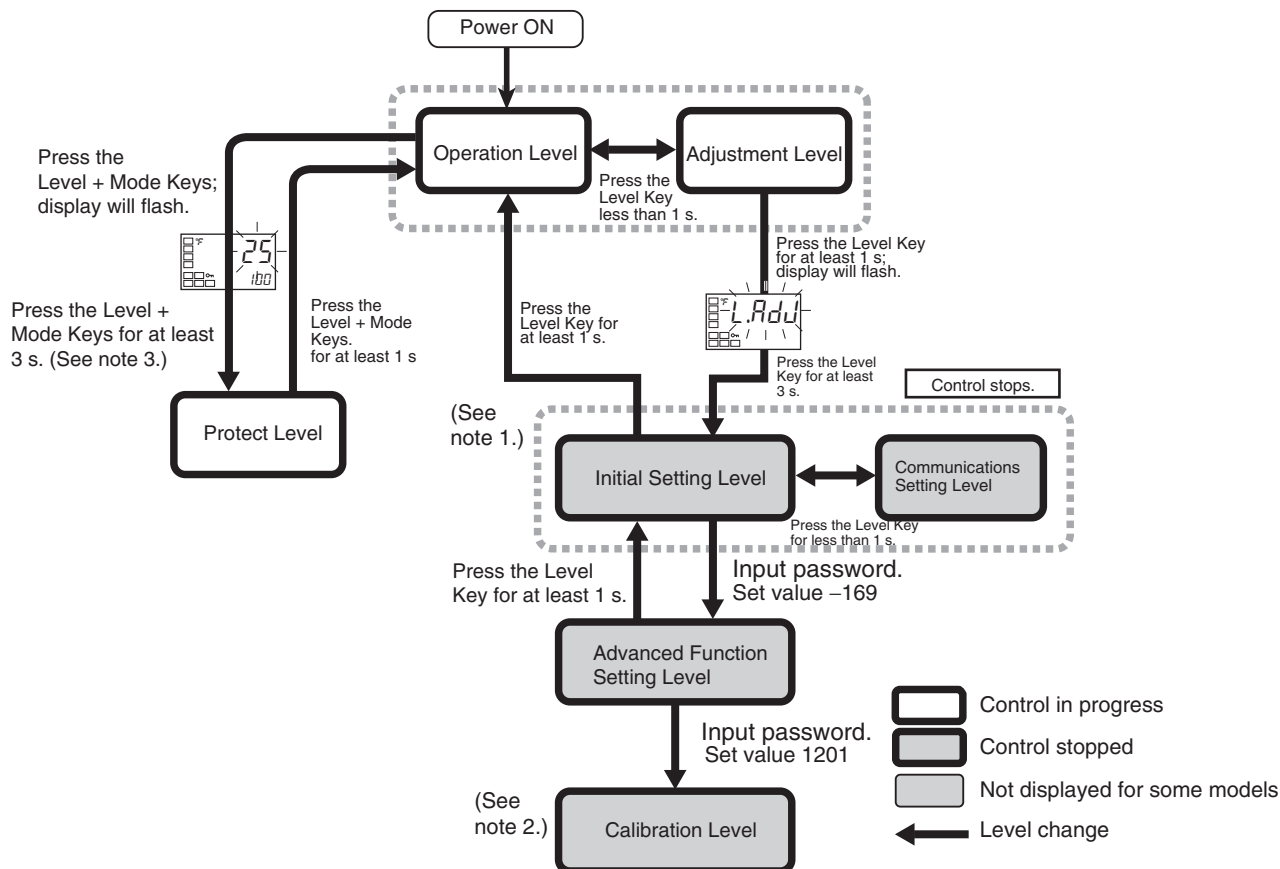


**Note:** The suffix “-500” is added to the model number of each Controller provided with a E53-COV10 Terminal Cover.

# Operating Method

## ■ Outline of Operation Procedures

The following diagram illustrates the entire setting level. A password is required to enter the advance function setting level and the calibration level. Some parameters may not be displayed depending on the protection settings and operation conditions. The control operation will stop when switching from operation level to initial setting level.



- Note:**
1. Operation level entered for software reset.
  2. You cannot move to other levels by operating the keys on the front panel from the calibration level. You must turn OFF the power supply.
  3. The time taken to move to the protect level can be adjusted by changing the “Move to protect level time” setting.

## Troubleshooting

When an error has occurred, the No. 1 display shows the error code. Take necessary measure according to the error code, referring the table below.

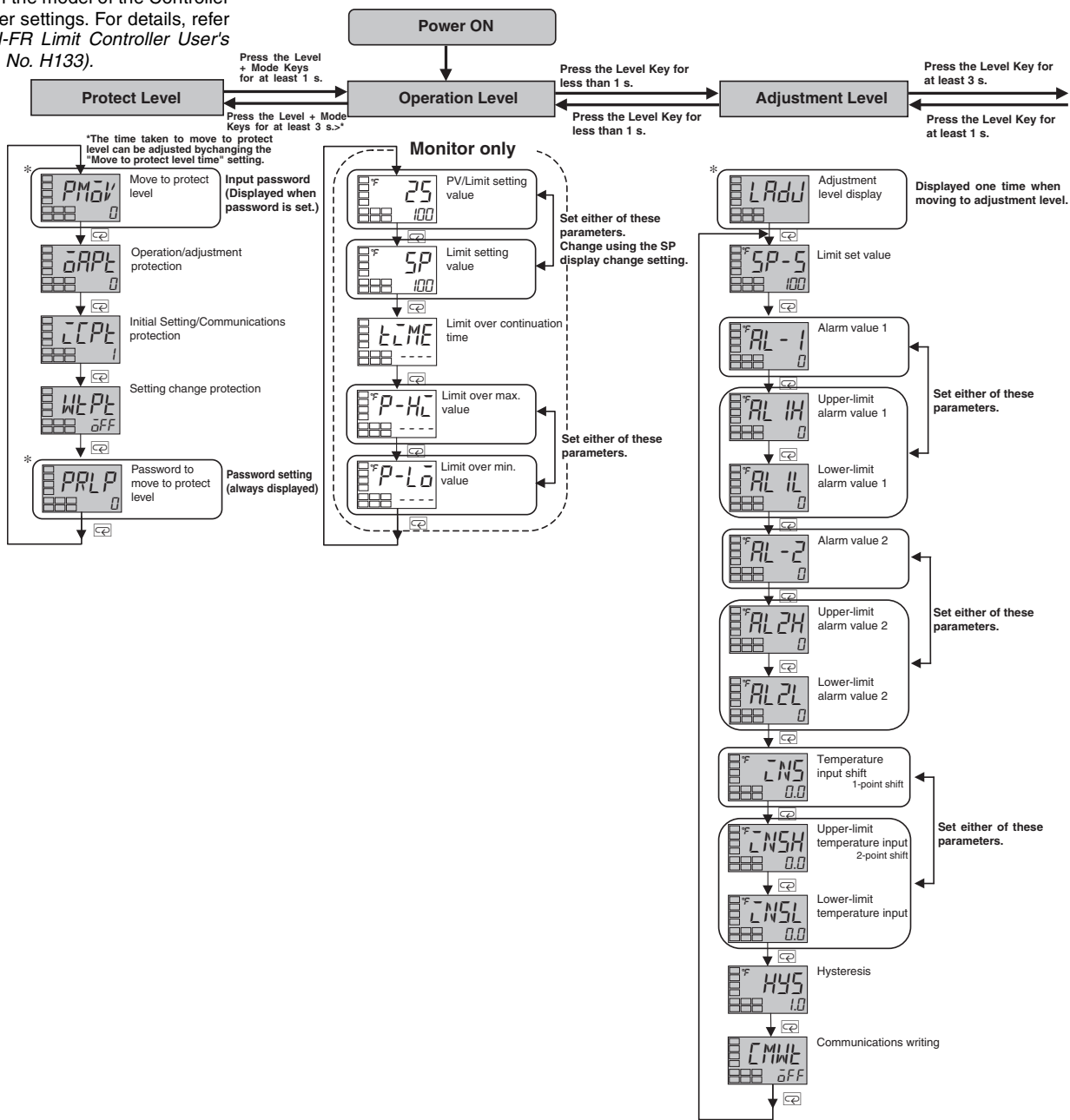
No. 1 display	Meaning	Action	Status at error		
			Limit outputs	Alarm	
5.ERR	Input error (See note 2.) (broken line, A/D converter error)	Check the wiring of inputs, disconnections, shorts and input type. (See note 3.)	OFF		
-L̄-	Over lower-limit indication range (See note 2.)	Input value is smaller than control range. Check the control range.	Upper limiter	Normal operation	Operates as above the lower limit.
			Lower limiter	OFF	
-H̄-	Over upper-limit indication range (See note 2.)	Input value is larger than control range. Check the control range.	Upper limiter	OFF	Operates as above the upper limit.
			Lower limiter	Normal operation	
E111	Memory error	Turn the power OFF then back ON again. If the display remains the same, the controller must be repaired. (See note 3.)	OFF		OFF
cccc	Over display range (lower-limit display range) (See note 2.)	This is not an error. This is displayed when the input value exceeds the display limit but is within the control range.	Normal operation		Normal operation

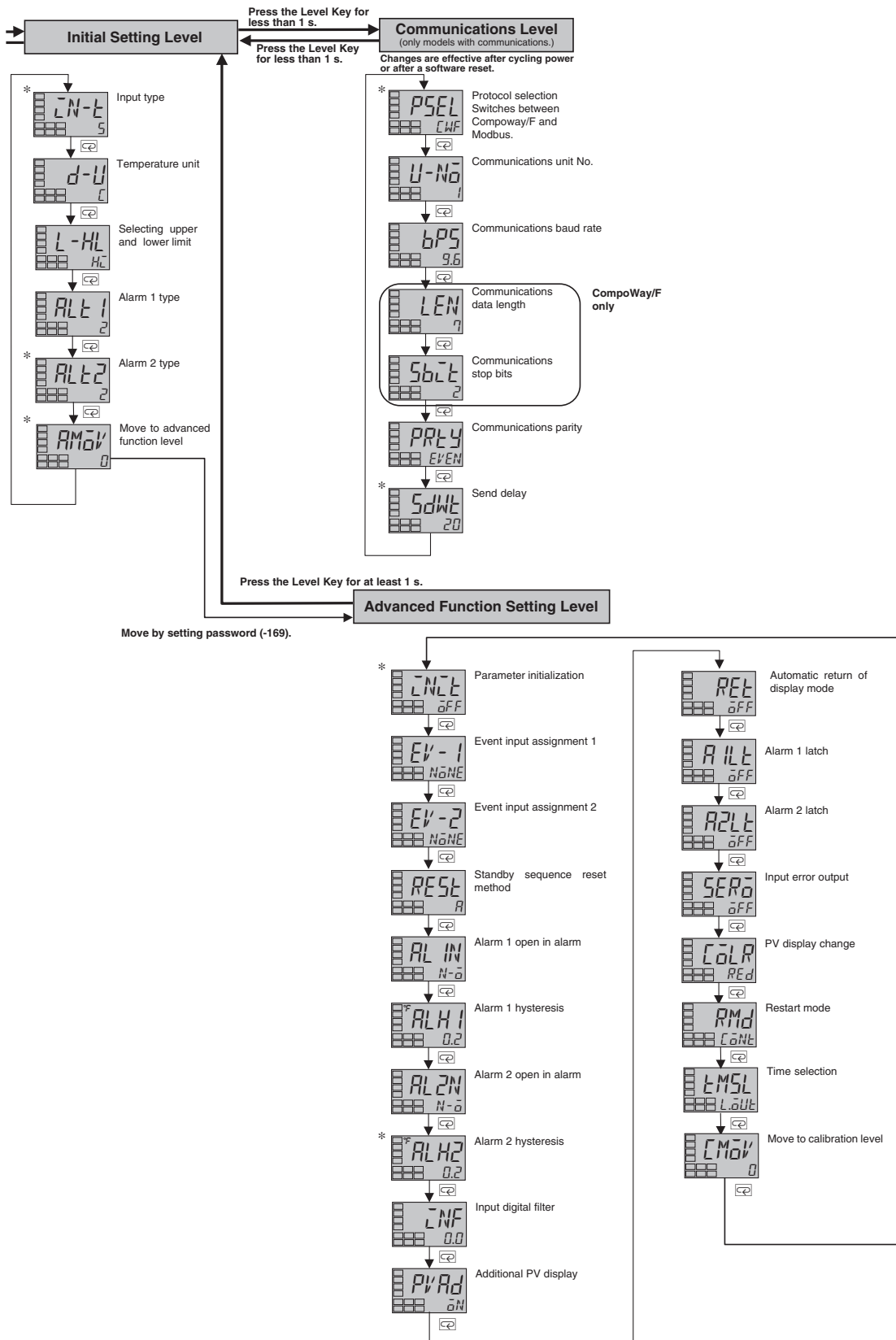
- Note:**
1. Refer to “E5CN-FR Limit Controller User’s Manual” for details of the control range.
  2. These errors are displayed only when the PV/Limit SP is displayed.
  3. If the display is restored to normal after cycling the power supply, the error may have been caused by noise. Check for noise being generated nearby.



# Parameters

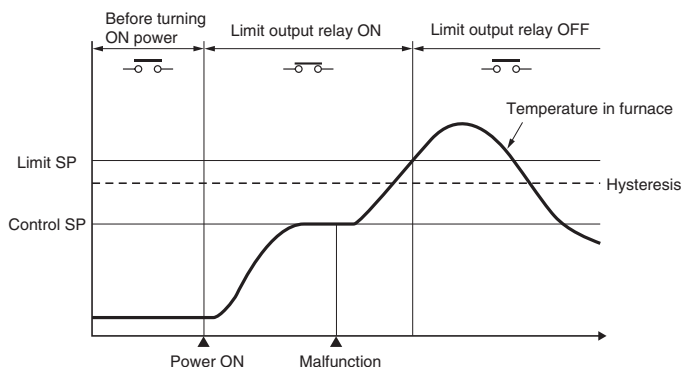
Some parameters are not displayed depending on the model of the Controller and parameter settings. For details, refer to the *E5CN-FR Limit Controller User's Manual (Cat. No. H133)*.





# FM Limit Controller Functions

When the measured temperature (PV) exceeds the limit SP, the limit output relay turns OFF and the OUT1 operation indicator turns ON. If the limit output relay turns OFF (limit alarm is ON), the limit output relay will remain off until the operator manually resets the FM Limit Controller.



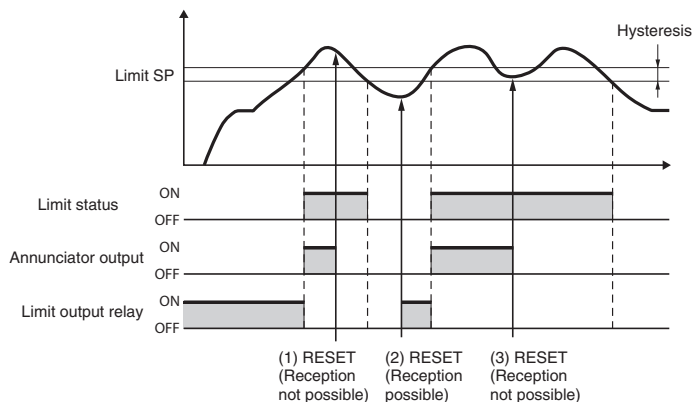
## ■ Selecting Upper/Lower Limit

- The upper/lower limit selection setting enables switching between upper limit and lower limit operation.
- The default setting is for upper limit operation.

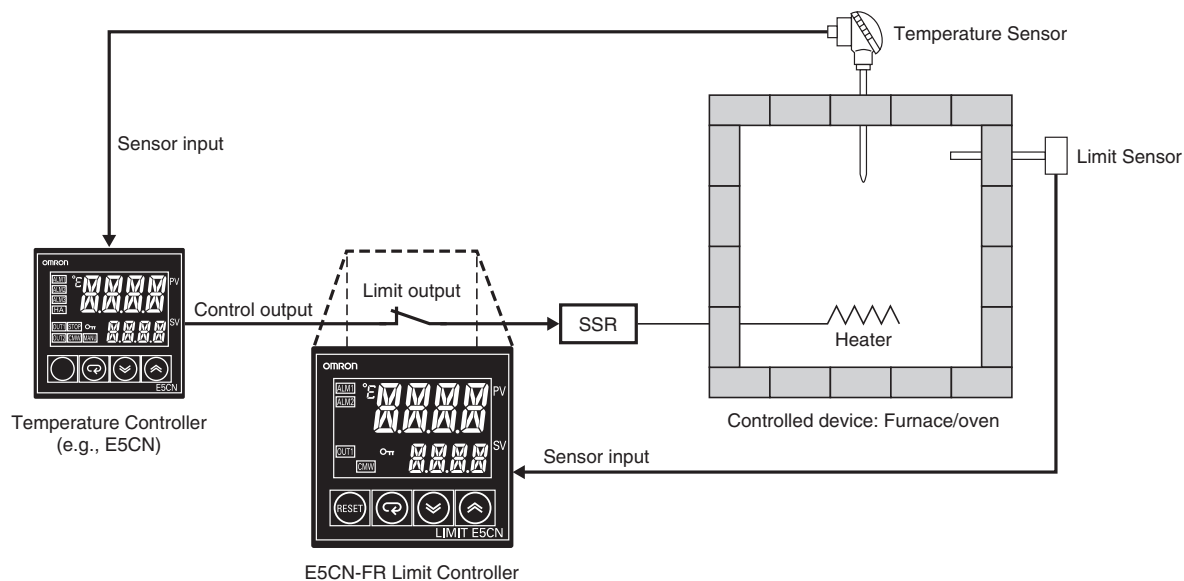
Select either upper limit or lower limit.

## ■ Resetting Limit Outputs

- Limit outputs can be reset by pressing the Level Key/Reset Key for 1 second min. while in the operation level.
- The limit output reset operation can be used to reset limit outputs and annunciator outputs.
- \* When the limit status is OFF, the limit output is cleared and the limit output relay turns ON. When the limit status is ON (limit over status), limit outputs will not be reset.
- \* The annunciator output turns OFF regardless of the limit status.
- \* Event inputs used as reset inputs (for resetting limit outputs) can be received while in the operation level, adjustment level, or protect level.



## ■ Example of Typical Use



Application examples are for reference only. In actual application, confirm the functionality and safety of all equipment in advance. In particular, when considering an application requiring a high degree of safety, take into account all ratings, performance capacities, failsafe measures, and other safety measures required by the application, and consult with your OMRON representative to confirm specifications and capabilities.

# Precautions

## ⚠ CAUTION

Do not touch the terminals while power is being supplied. Doing so may occasionally result in minor injury due to electric shock.



Do not allow pieces of metal, wire clippings, or fine metallic shavings or filings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.



Do not use the product where subject to flammable or explosive gas. Otherwise, minor injury from explosion may occasionally occur.



Never disassemble, modify, or repair the product or touch any of the internal parts. Minor electric shock, fire, or malfunction may occasionally occur.



Caution: Risk of Fire and Electric Shock

- This product is UL listed as Open Type Process Control Equipment. It must be mounted in an enclosure that does not allow fire to escape externally.
- More than one disconnect switch may be required to de-energize the equipment before servicing.
- Signal inputs are SELV, limited energy.
- Caution: To reduce the risk of fire or electric shock, do not interconnect the outputs of different Class 2 circuits.



If the output relays are used past their rated load or life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and the inrush current, and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions.



Tighten the terminal screws to between 0.74 and 0.9 N·m. Loose screws may occasionally result in fire.



Set the parameters of the product so that they are suitable for the system. If they are not suitable, unexpected operation may occasionally result in property damage or accidents.



Warning: To reduce the risk of electric shock or fire, install in a Pollution Degree 2 environment (a controlled environment relatively free of contaminants).



A malfunction in the product may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage to connected equipment and machinery. To maintain safety in the event of malfunction of the product, periodically check the Limit Controller's operation.



## Precautions for Safe Use

- Do not use this product in the following places:
  - Places directly subject to heat radiated from heating equipment.
  - Places subject to splashing liquid or oil atmosphere.
  - Places subject to direct sunlight.
  - Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
  - Places subject to intense temperature change.
  - Places subject to icing and condensation.
  - Places subject to vibration and large shocks.
- Use and store within the rated temperature and humidity ranges. Provide forced-cooling if required.
- To allow heat to escape, do not block the area around the product. Do not block the ventilation holes on the product.
- Be sure to wire properly with correct polarity of terminals.
- Use specified size (M3.5, width 7.2 mm or less) crimped terminals for wiring. Use wires with a gage of AWG24 to AWG14 (equal to cross-sectional areas of 0.205 to 2.081 mm<sup>2</sup>). (The stripping length is 5 to 6 mm.)
- Do not wire the terminals that are not used.
- Allow as much space as possible between the product and devices that generate a powerful high-frequency or surge. Separate the high-voltage or large-current power lines from other lines, and avoid parallel or common wiring with the power lines when you are wiring to the terminals.
- Use this product within the rated load and power supply.
- Make sure that the rated voltage is attained within two seconds of turning the power ON.
- Make sure the product has 30 minutes or more for warm up.
- A switch or circuit breaker must be provided close to the product. The switch or circuit breaker must be within easy reach of the operator, and must be marked as a disconnecting means for this unit.
- Always turn OFF the power supply before pulling out the interior of the product, and never touch nor apply shock to the terminals or electronic components. When inserting the interior of the product, do not allow the electronic components to touch the case.
- Do not use paint thinner or similar chemical to clean with. Use standard grade alcohol.
- Design the system (e.g., control panel) considering the 2 seconds of delay that the product's output to be set after power ON.
- The output may turn OFF when shifting to certain levels. Take this into consideration when performing control.
- Refer to the instruction sheet for installing Option Unit (E53-CN03N/E53-CNBN/E53-CNPBN).

## Precautions for Correct Use

### Service Life

- Use the Limit Controller within the following temperature and humidity ranges:  
 Temperature: -10 to 55°C (with no icing or condensation)  
 Humidity: 25% to 85%  
 If the Controller is installed inside a control board, the ambient temperature must be kept to under 55°C, including the temperature around the Controller.
- The service life of electronic devices like Limit Controllers is determined not only by the number of times the relay is switched but also by the service life of internal electronic components. Component service life is affected by the ambient temperature: the higher the temperature, the shorter the service life and, the lower the temperature, the longer the service life. Therefore, the service life can be extended by lowering the temperature of the Limit Controller.
- When two or more Limit Controllers are mounted horizontally close to each other or vertically next to one another, the internal temperature will increase due to heat radiated by the Limit Controllers and the service life will decrease. In such a case, use forced cooling by fans or other means of air ventilation to cool down the Limit Controllers. When providing forced cooling, however, be careful not to cool down the terminals sections alone to avoid measurement errors.

### Measurement Accuracy

- When extending or connecting the thermocouple lead wire, be sure to use compensating wires that match the thermocouple types.
- When extending or connecting the lead wire of the platinum resistance thermometer, be sure to use wires that have low resistance and keep the resistance of the three lead wires the same.
- Mount the Limit Controller so that it is horizontally level.
- If the measurement accuracy is low, check to see if input shift has been set correctly.

### Waterproofing

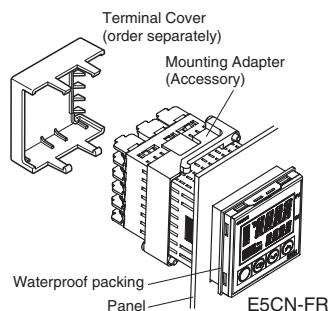
The degree of protection is as shown below. Sections without any specification on their degree of protection or those with IP□□ are not waterproof.

Front panel: NEMA4X for indoor use (equivalent to IP66)  
 Rear case: IP20, Terminal section: IP00

### Operating Precautions

- It takes approximately two seconds for the outputs to turn ON from after the power supply is turned ON. Due consideration must be given to this time when incorporating Limit Controllers in a sequence circuit.
- Avoid using the Controller in places near a radio, television set, or wireless installing. These devices can cause radio disturbances which adversely affect the performance of the Controller.

### Mounting



### Mounting to a Panel

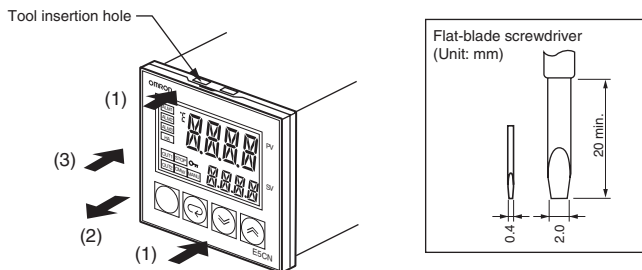
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller. Group mounting does not allow waterproofing. The waterproof packing is not required if waterproof is not necessary.
- Insert the E5CN-FR into the mounting hole in the panel.
- Push the adapter along the Controller body from the terminals up to the panel, and fasten it temporarily.
- Tighten the two fixing screws on the adapter. Alternately tighten the two screws a little at a time to keep them balanced. Tighten them to a torque of 0.29 to 0.39 N·m.

### Attaching the Terminal Cover

Make sure that the "UP" letters on the E5CN-FR are at the top and insert the terminal cover into the holes at the top and bottom of the Controller.

### Removing the Controller from the Case

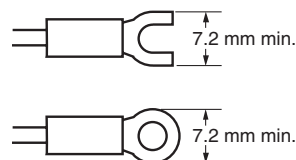
When carrying out maintenance on the Controller, the Controller can be removed from the case leaving the terminal leads attached. The Controller can be removed from the case only with the E5CN-FR.



- Insert the tool into the slots (one on the top and one on the bottom) and release the hooks.
- Insert the tool into the gap between the front panel and rear case and pull out the front panel slightly. Hold both sides of the front panel and draw out the Controller towards you. Do not apply unnecessary force.
- Before inserting the Controller, confirm that the sealing rubber is in place. Insert the Controller into the rear case until you hear a click. Press on the hooks on the top and bottom of the rear case to be sure that the hooks are securely locked in place. Be sure that electronic parts do not come in contact with the case.

### Wiring Precautions

- Separate input leads and power lines to protect the Controller and its lines from external noise.
- Use wires of a thickness of AWG24 (0.205 mm<sup>2</sup>) to AWG14 (2.081 mm<sup>2</sup>). The exposed current-carrying part to be inserted into terminals must be 5 to 6 mm.
- We recommend using crimp terminals when wiring the terminals.
- Tighten terminal screws to a torque of 0.74 to 0.90 N·m.
- Use the following type of crimp terminals for M3.5 screws.



## Related Product Information

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■ Please use these products in combination with the FM Limit Controller.

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