OPERATING INSTRUCTIONS & PARTS MANUAL

HIGH PRESSURE DIRECT-DRIVE BLOWERS

MODELS 2C940, 2C820, 4C108, 4C329 AND 4C330

FORM 5S2052
06820
0390/073/5M

READ CAREFULLY BEFORE ATTEMPTING TO ASSEMBLE, INSTALL, OPERATE OR MAINTAIN THE PRODUCT DESCRIBED. PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE! RETAIN INSTRUCTIONS FOR FUTURE REFERENCE.

Description

Dayton direct-drive high pressure blowers are used for small exhaust systems where air is laden with dust or where dust-collection bags are necessary. Applications include handling long stringy material, paper trim, fiberous material such as textile scrap, wool and ensilage. Not suitable for coarse material. Heavy or abrasive dust. Dynamically balanced self-cleaning cast aluminum wheels. 16 GA housing and motor base. Maximum operating temperature 180°F (82°C). Finished in baked-on gray enamel. Blower can be assembled for CW or CCW rotation and any one of eight standard discharge positions. See Figure 2. Dayton motors packed separately when blowers are ordered complete.

General Safety Information

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).
2. Blower must be securely and adequately grounded. This can be accomplished by wiring with a grounded, metal-clad raceway system by using a separate ground wire connected to the bare metal of blower frame, or other suitable means.
3. Always disconnect power source before working on or near a motor or its connected load. If the power disconnect point is out-of-sight, lock it in the open position and tag to prevent unexpected application of power.
4. Be careful when touching the exterior of an operating motor — it may be hot enough to be painful or cause injury. With modern motors this condition is normal when operated at rated load and voltage — modern motors are built to operate at higher temperatures.
5. Protect the power cable from coming in contact with sharp objects.
6. Do not kink power cable and never allow the cable to come in contact with oil, grease, hot surfaces, or chemicals.
7. Make certain that the power source conforms to the requirements of your equipment.
8. When cleaning electrical or electronic equipment, always use an approved cleaning agent such as dry cleaning solvent.
9. Not recommended as an explosion proof blower. Do not use where explosive fumes or gases are present.
10. If blower is operated without an inlet or outlet duct, guard openings in accordance with OSHA regulations to prevent contact with rotating blower wheel.

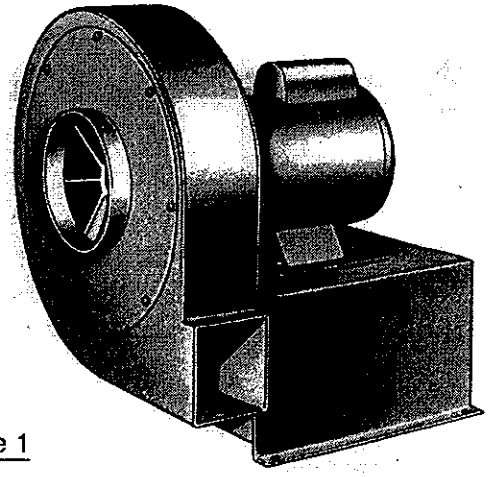


Figure 1

⚠ WARNING ⚠

KEEP HANDS AWAY FROM INLET WHILE BLOWER IS IN OPERATION.

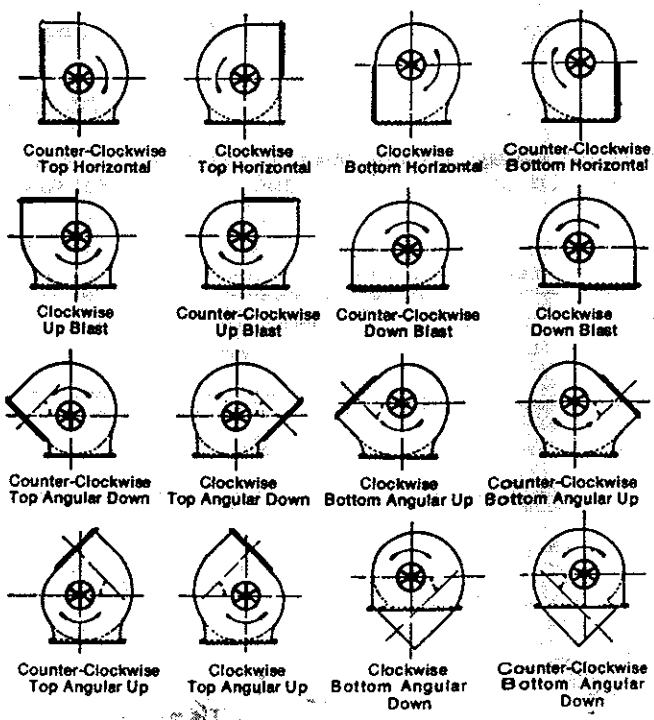


Figure 2

Specifications

MODEL	WHEEL			HIGH-PRESSURE BLOWER DIMENSIONS																X ADJ. MIN.	X ADJ. MAX.
	DIA.	W	BORE	A	B	C	D	E	F	G	H	J	K	L	O	P	R	S	V		
2C940	7¾"	2 5/16"	½"	11"	8"	3"	3"	5"	7"	½"	5⅜"	4⅞"	5⅞"	5⅞"	12¼"	4"	6⅝"	5½"	—	8¼"	9¾"
2C820	9	2 13/16	½	12⅛	8	3½	3½	5⅝	7	½	6⅜	5¾	6⅞	6¾	12¾	5	7½	6⅜	—	9⅛	10⅝
4C108	10 9/16	3	⅝	14¾	9	4	3½	6⅞	7½	¾	7¼	6½	8	7⅝	14	6	8⅝	8¼	—	11⅜	12⅞
4C329	12½	3	⅞	17	11¼	5	4	8	9¾	¾	8¼	7½	9	9⅝	17	7	10	7⅛	—	10⅝	10⅝
4C330	13½	4⅜	1⅛	17½	11¼	7⅛	5¾	8	9½	1	10½	9⅝	11⅜	11	18⅞	8	11½	8⅛	7¼	12⅝	12⅝

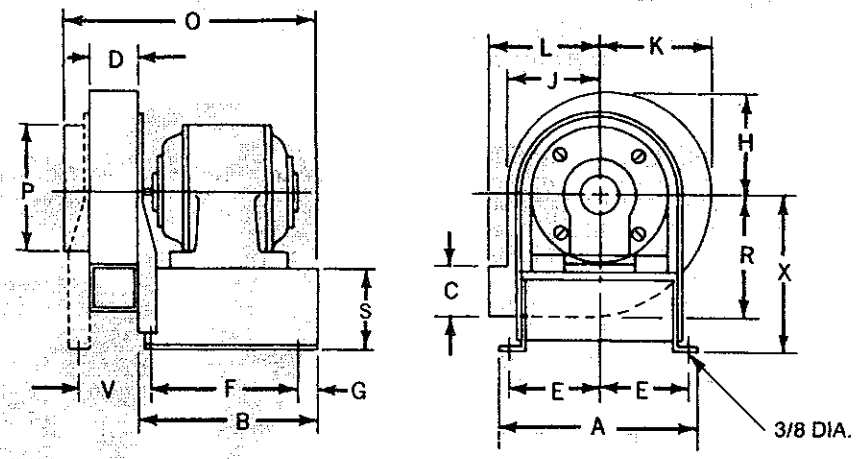


Figure 3

Performance

MODEL	HP REQ'D.	MOTOR FRAME	VOLTS	MOTOR TYPE	CFM AIR DELIVERY AT 3450 RPM								SHPG. WT.
					1" SP	2" SP	3" SP	4" SP	5" SP	6" SP	7" SP	8" SP	
2C940	1/3	48	115	Split	290	230	160	—	—	—	—	—	13
2C820	1/3	48	115	Split	530	470	415	335	165	—	—	—	17
4C108	1	56	115/230	Cap. (†)	800	745	680	610	510	375	225	—	25
4C329	3	145T	230/460	3-Ph.	1200	1140	1070	1010	940	870	790	695	37
4C330	5	182T	230/460	3-Ph.	2140	2030	1930	1820	1710	1615	1500	1375	64

(†) Also available in 208-230/460, 60Hz, 3-Phase.

Based on standard test codes of (AMCA) Air Moving and Conditioning Association

⚠ CAUTION

Must not be used where static pressure is less than shown in table. Severe motor overload will result. Motor overload protection, closely matched to motor full-load current, is highly recommended.

LIMITED WARRANTY

DAYTON ONE-YEAR LIMITED WARRANTY. High pressure direct drive blowers, Models 2C940, 2C820, 4C108, 4C329, & 4C330, are warranted by Dayton Electric Mfg. Co. (Dayton) to the original user against defects in workmanship or materials under normal use for one year after date of purchase. Any part which is determined by Dayton to be defective in material or workmanship and returned to an authorized service location, as Dayton designates, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at Dayton's option. For limited warranty claim procedures, see PROMPT DISPOSITION below. This limited warranty gives purchasers specified legal rights which vary from state to state.

LIMITATION OF LIABILITY. To the extent allowable under applicable law, Dayton's liability for consequential and incidental damages is expressly disclaimed. Dayton's liability in all events is limited to, and shall not exceed, the purchase price paid.

WARRANTY DISCLAIMER. Dayton has made a diligent effort to illustrate and describe the products in this literature accurately; however, such illustrations and descriptions are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustrations or descriptions.

Except as provided below, no warranty or affirmation of fact, expressed or implied, other than as stated in "LIMITED WARRANTY" above is made or authorized by Dayton.

PRODUCT SUITABILITY. Many states and localities have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Dayton attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, please review the product application, and national and local codes and regulations, and be sure that the product, installation, and use will comply with them.

Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some states do not allow limitations on how long an implied warranty lasts, consequently the above limitation may not apply to you; and (c) by law, during the period of the Limited Warranty, any implied warranties of merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

PROMPT DISPOSITION. Dayton will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.

Manufactured for Dayton Electric Mfg. Co., 5959 W. Howard St., Chicago, IL 60648

Assembly

1. Attach base upright to the motor mounting base as shown in the exploded view. Hand tighten (4) 1/4-20 x 1/2" bolts, washers, and nuts through slotted holes in base upright. Place motor on motor base and align the center hole of the base upright with the motor shaft. Secure the four 1/4-20 bolts. Models 4C329 and 4C330 have a welded motor base assembly.

2. Bolt the housing to the base upright in the desired discharge position using #10 x 3/8 or 5/16-18 x 3/4" self tapping bolts. Blower is clockwise rotation. Refer to exploded view showing clockwise bottom horizontal discharge.

3. With the motor shaft through the center hole of the base upright, align the mounting holes of the motor to the pre-drilled holes in the motor base. Install two bolts to retain proper motor alignment but do not tighten. Mount the wheel to the motor shaft. Refer to exploded view drawing.

4. Mount the inlet ring to the housing and secure with #10 x 3/8" or 5/16-18 x 3/4" self tapping bolts.

5. Slide the wheel toward the inlet ring so there is at least 1/4" clearance between the wheel and cone. The motor shaft should extend through the hub of the wheel so when the setscrews are securely tightened, they will make contact with the motor shafts.

6. Install the remaining nuts, bolts, and washers (not provided) to the motor mounting holes of the motor and secure to the blower motor base.

Installation

1. Make sure all bolts and screws are tightened before mounting on a rigid, flat, level foundation. Bolt the blower securely into position.

2. Check the interior of the fan housing to be sure it is free of debris. Rotate the wheel to insure that it is not rubbing or binding. Check the clearance of the wheel and the inlet ring, If rubbing exists, loosen the bolts on the ring and shift the ring until clearance is obtained. If still rubbing, loosen the set screw on the wheel and shift the wheel rearward to obtain clearance. Retighten the set screw.

Operation

1. Before connecting the motor to the electric supply, check the electrical characteristics as indicated on the motor nameplate to insure proper voltage and phase.

⚠ CAUTION

A ground wire must run from the blower motor housing to a suitable electrical ground such as a properly grounded metallic raceway or a ground wire system.

2. After electrical connections are completed, apply just enough power to start the unit. Be sure that the rotation of the wheel is correct as indicated by directional arrows on the unit. If proper rotation, apply full electrical power.
3. With the air system in full operation and all ducts attached, measure current input to the motor and compare with the nameplate rating to determine if the motor is operating under safe load conditions.

Maintenance

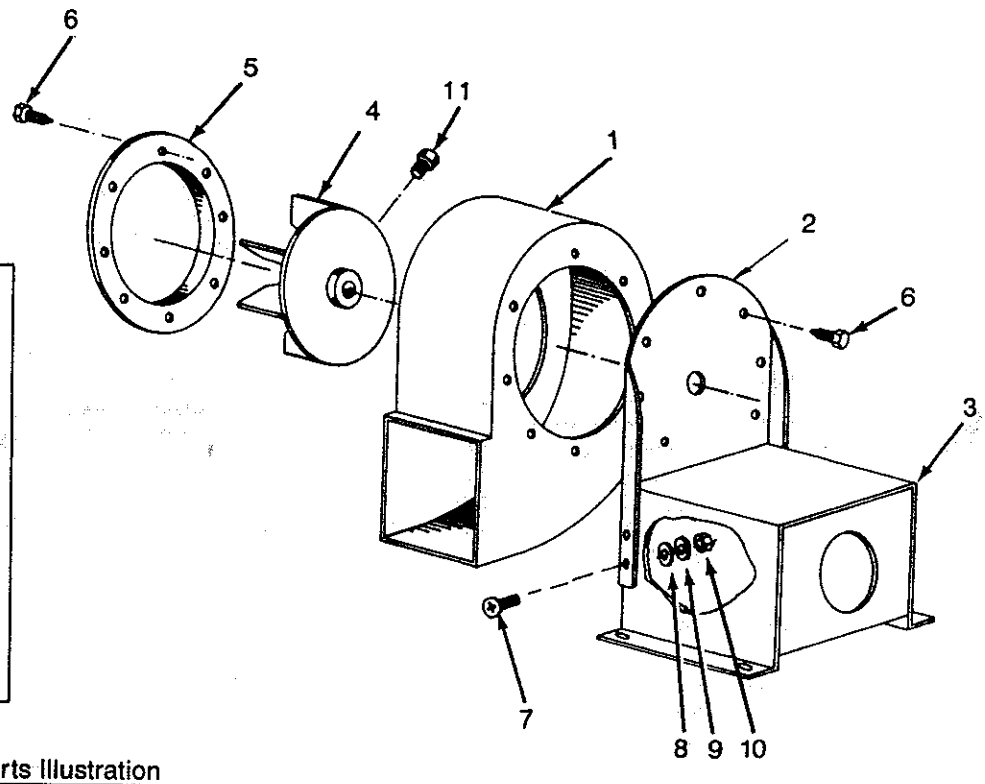
⚠ CAUTION

Before attempting any repair work, be certain that all power to the motor and electrical accessories are turned off and locked in the off position.

A. Periodically remove dirt from blower wheel and housing.
B. Check tightness of wheel setscrews.
C. After disconnecting the power source, check the wiring to see if insulation is damaged or frayed.
D. Relubricate motor per manufacturer's instructions. Remove any excess lubricants.

Troubleshooting Chart

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Noise.	1. Foreign objects in housing. 2. Loose setscrew on wheel. 3. Incorrect wheel rotation.	1. Remove. 2. Tighten. 3. Reverse rotation.
Motor bearing noise.	Lack of bearing lubrication.	Lubricate.
Excessive vibration.	1. Loose wheel on shaft. 2. Loose mounting bolts. 3. Motor out of balance. 4. Wheel out of balance. 5. Accumulation of material on wheel.	1. Tighten setscrews. 2. Tighten. 3. Replace. 4. Replace or rebalance. 5. Clean.
Motor overloaded.	System static pressure less than 1" water column.	Increase system static pressure.



ORDER REPLACEMENT PARTS BY CALLING TOLL FREE

1-800-323-0620

Please provide the following information:

- Model Number
- Serial Number (if any)
- Parts Description and Number as shown in Parts List

Address parts correspondence to:

Parts Company of America
1657 Shermer Road
Northbrook, IL 60062-5362

Figure 4 — Replacement Parts Illustration

Replacement Parts List

REF. NO.	DESCRIPTION	PART NO. FOR MODEL:				
		2C940	2C820	4C108	4C329	4C330 (‡)
1	Housing scroll	201-08-4005-5	201-09-4003-5	201-11-4005-5	201-12-4004-5	201-14-4005-5
2	Base upright	618-08-7001-5	618-09-7001-5	618-11-7002-5	—	—
3	Motor base assembly	203-08-7001-5	203-09-7001-5	203-11-7005-5	203-12-4016-5	203-14-4011-5
4	Wheel	602-08-4001-5	602-09-4001-5	602-11-4002-5	602-12-4004-5	602-14-4003-5
5	Inlet ring	609-08-4002-5	609-09-4001-5	609-11-4003-5	602-12-4003-5	609-14-4001-5
6	Hex hd. screw	#10 x 3/8" 8 Req'd.	#10 x 3/8" 14 Req'd.	#10 x 3/8" 14 Req'd.	5/16-18 x 3/4" 16 Req'd.	5/16-18 x 3/4" 16 Req'd.
7	Slotted machine screw*	1/4-20 x 1/2" 4 Req'd.	1/4-20 x 1/2" 4 Req'd.	1/4-20 x 1/2" 4 Req'd.	—	—
8	Flat washer*	1/4 4 Req'd.	1/4 4 Req'd.	1/4 4 Req'd.	—	—
9	Split washer*	1/4 4 Req'd.	1/4 4 Req'd.	1/4 4 Req'd.	5/16 16 Req'd.	5/16 16 Req'd.
10	Hex nut*	1/4"-20 4 Req'd.	1/4"-20 4 Req'd.	1/4"-20 4 Req'd.	—	—
11	Setscrew	†	†	†	†	†

NOTE — Models 4C329 and 4C330 have welded 1 piece motor base & upright assembly.
(‡) Model 4C330 has inlet upright supports (not shown) to support housing. Order by P/N 617-13-7002-5.
(*) Standard hardware item, available locally.
(†) Available with wheel.

OMRON

Digital Temperature Controller

E5CN

Compact and Intelligent Temperature Controller

- Auto-tuning and self-tuning available. Can auto-tune even during execution of self-tuning
- Heating or heating/cooling control is available
- Event input allows multiple SP selection and run/stop function
- Water-resistant construction: NEMA4 (equivalent to IP66)
- Various temperature inputs: thermocouple, platinum resistance thermometer, non-contact temperature sensor, and analog inputs
- Conforms to UL, CSA, IEC, and CE

Ordering Information

■ E5CN STANDARD MODELS

Description				Part number	
Size	Power supply voltage	No. of alarm points	Output	**Thermocouple model**	**Platinum resistance thermometer model**
1/16 DIN 48(W) x 48(H) x 78(D) mm	100 to 240 VAC	---	Relay	**E5CN-RMTC-500 AC100-240**	**E5CN-RMP-500 AC100-240**
			Voltage output (for driving SSR)	**E5CN-QMTC-500 AC100-240**	**E5CN-QMP-500 AC100-240**
		2	Relay	**E5CN-R2MTC-500 AC100-240**	**E5CN-R2MP-500 AC100-240**
			Voltage output (for driving SSR)	**E5CN-Q2MTC-500 AC100-240**	**E5CN-Q2MP-500 AC100-240**
	24 VAC/VDC	---	Relay	**E5CN-RMTC-500 AC/DC24**	**E5CN-RMP-500 AC/DC24**
			Voltage output (for driving SSR)	**E5CN-QMTC-500 AC/DC24**	**E5CN-QMP-500 AC/DC24**
		2	Relay	**E5CN-R2MTC-500 AC/DC24**	**E5CN-R2MP-500 AC/DC24**
			Voltage output (for driving SSR)	**E5CN-Q2MTC-500 AC/DC24**	**E5CN-Q2MP-500 AC/DC24**

Note: 1. The suffix “500” is added to the part number of each Controller provided with a E53-COV10 Terminal Cover.
2. The heating and cooling function is available for models with two alarm points.

■ E5CN OPTION BOARDS

The E5CN provides communications or event input functionality when mounted with one of the following Option Boards.

Item	Function	**Part number**
Communications Board	RS-485 communication	**E53-CNH03**
Event Input Board	Event input	**E53-CNHB**

Note: The heater burnout alarm is available by mounting the E53-CNH03 or E53-CNHB Option Unit on the E5CN.

■ ACCESSORIES

Terminal Cover (Sold Separately)

Applicable Controller	**Part number**
E5CN	**E53-COV10**

Current Transformer (Sold Separately)

Item	Hole diameter	**Part number**
Current Transformer	5.8 dia.	**E54-CT1**
	12.0 dia.	**E54-CT3**

■ INPUT RANGES

Platinum Resistance Thermometer Input

Shaded ranges indicate default settings.

	Platinum resistance thermometer input				
Input type	Platinum resistance thermometer				
Name	Pt100			JPt100	
Temperature range	850 / −200	500.0 / −199.9	100.0 / 0.0	500.0 / −199.9	100.0 / 0.0
Set value	0	1	2	3	4

Thermocouple Input

Shaded ranges indicate default settings.

	Thermocouple input																
Input type	Thermocouple												ES1A Non-contact Temperature Sensor				Analog input
Name	K		J		T	E	L	U	N	R	S	B	K10 to 70°C	K60 to 120°C	K115 to 165°C	K160 to 260°C	0 to 50 mV
Temperature range	1300 / −200	500.0 / −20.0	850 / −100	400.0 / −20.0	400 / −200	600 / 0	850 / −100	400 / −200	1300 / −200	1700 / 0	1700 / 0	1800 / 100	70 / 0	120 / 0	165 / 0	260 / 0	Usable in the following ranges by scaling: −19999 to 9999 or −199.9 to 999.9
Set value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Applicable standards by input type are as follows:

K, J, T, E, N, R, S, B: JIS C1602-1995
L: Fe-CuNi, DIN 43710-1985
U: Cu-CuNi, DIN 43710-1985
JPt100: JIS C1604-1989, JIS C1606-1989
Pt100: JIS C1604-1997, IEC751

Note: The ES1A Non-contact Temperature Sensor will be available soon.

Specifications

■ RATINGS

Supply voltage		100 to 240 VAC, 50/60 Hz	24 VAC, 50/60 Hz/24 VDC
Operating voltage range		85% to 110% of rated supply voltage	
Power consumption	E5CN	7 VA	4 VA/3 W
Sensor input		Thermocouple: K, J, T, E, L, U, N, R, S, B Platinum resistance thermometer: Pt100, JPt100 Non-contact temperature sensor: K10 to 70°C, K60 to 120°C, K115 to 165°C, K160 to 260°C Voltage input: 0 to 50 mV	
Control output	Relay output	SPST-NO, 250 VAC, 3A (resistive load), electrical life: 100,000 operations	
	Voltage output	12 VDC (PNP), max. load current: 21 mA, with short-circuit protection	
Alarm output		SPST-NO, 250 VAC, 1 A (resistive load), electrical life: 100,000 operations	
Control method		PID or ON/OFF control	
Setting method		Digital setting using front panel keys	
Indication method		7-segment digital display and single-lighting indicator	
Other functions		According to Controller model	
Ambient temperature		-10°C to 55°C (14°F to 131°F) with no condensation or icing	
Ambient humidity		25% to 85% relative humidity	
Storage temperature		-25°C to 65°C (-13°F to 149°F) with no condensation or icing	

■ CHARACTERISTICS

Indication accuracy		Thermocouple: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. (See Note.) Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. Analog input: ±0.5% FS±1 digit max. CT input: ±5% FS±1 digit max.	
Hysteresis		0.1 to 999.9 EU (in units of 0.1 EU)	
Proportional band (P)		0.1 to 999.9 EU (in units of 0.1 EU)	
Integral time (I)		0 to 3999 s (in units of 1 s)	
Derivative time (D)		0 to 3999 s (in units of 1 s)	
Control period		1 to 99 s (in units of 1 s)	
Manual reset value		0.0% to 100.0% (in units of 0.1%)	
Alarm setting range		-1999 to 9999 (decimal point position depends on input type)	
Sampling period		500 ms	
Insulation resistance		20 MΩ min. (at 500 VDC)	
Dielectric strength		2000 VAC, 50 or 60 Hz for 1min (between different charging terminals)	
Vibration resistance		10 to 55 Hz, 10 m/s^2 for 2 hours each in X, Y and Z directions	
Shock resistance		300 m/s^2, 3 times each in 3 axes, 6 directions (relay: 100 m/s^2)	
Weight		Approx. 150 g	Mounting bracket: Approx. 10g
Protective structure	Front panel	NEMA4 for indoor use (equivalent to IP66)	
	Rear case	IP20	
	Terminals	IP00	
Memory protection		EEPROM (non-volatile memory) (number of writes: 100,000)	
EMC		Emission Enclosure: EN55011 Group 1 class A Emission AC Mains: EN55011 Group 1 class A Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference: ENV50140: 10 V/m (amplitude modulated, 80 MHz to 1 GHz) (level 3) 10 V/m (pulse modulated, 900 MHz) Immunity Conducted Disturbance: ENV50141: 10 V (0.15 to 80 MHz) (level 3) Immunity Burst: EN61000-4-4: 2 kV power-line (level 3) 2 kV I/O signal-line (level 4)	
Approval standards		UL3121-1, CSA22.2 No. 14, E.B.1402C Conforms to EN50081-2, EN50082-2, EN61010-1 (IEC1010-1) Conforms to VDE0106/part 100 (Finger Protection), when the terminal cover is mounted.	

Note: The indication of K thermocouples in the -200 to 1300°C range, and T and N thermocouples at a temperature of -100°C or less, and U and L thermocouples at any temperature is ±2°C±1 digit maximum. The indication of B thermocouples at a temperature of 400°C or less is unrestricted.
The indication of R and S thermocouples at a temperature of 200°C or less is ±3°C±1 digit maximum.

■ COMMUNICATIONS SPECIFICATIONS

Transmission path connection	Multiple points
Communications method	RS-485 (two-wire, half duplex)
Synchronization method	Start-stop synchronization
Baud rate	1,200/2,400/4,800/9,600/19,200 bps
Transmission code	ASCII
Data bit length	7 or 8 bits
Stop bit length	1 or 2 bits
Error detection	Vertical parity (none, even, odd) Frame check sequence (FCS): with SYSMAC WAY Block check character (BCC): with CompoWay/F
Flow control	Not available
Interface	RS-485
Retry function	Not available
Communications buffer	40 bytes

Note: The baud rate, data bit length, stop bit length, or vertical parity can be individually set using the communications setting level.

■ CURRENT TRANSFORMER (SOLD SEPARATELY) RATINGS

Dielectric strength		1,000 VAC (1 min)
Vibration resistance		50 Hz 98 m/s^2
Weight	E54-CT1	Approx. 11.5 g
	E54-CT3	Approx. 50 g
Accessories (E54-CT3 only)	Armature	2
	Plug	2

■ HEATER BURNOUT ALARM SPECIFICATIONS

Max. heater current	Single-phase AC: 50 A (See Note 1.)
Input current readout accuracy	±5%FS±1 digit max.
Heater burnout alarm setting range	0.0 to 50.0 A (0.1 A units) (See Note 2.)
Min. detection ON time	190 ms (See Note 3.)

Note: 1. When heater burnout is detected on a 3-phase heater, use the K2CU-F□□A-□GS (with gate input terminal).
2. When the set value is “00 A,” the heater burnout alarm will always be OFF. When the set value is “50.0 A,” the heater burnout alarm will always be ON.
3. When the control output ON time is less than 190 ms, heater burnout detection and heater current measurement will not be carried out.

Nomenclature

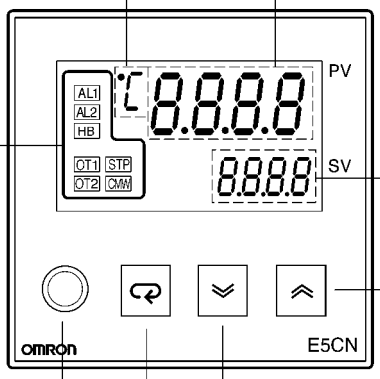
E5CN

Operation Indicators

1. AL1 (alarm 1)
   Lights when alarm 1 output is ON.
   AL2 (alarm 2)
   Lights when alarm 2 output is ON.
2. HB (heater burnout alarm display)
   Lights when a heater burnout is detected.
   The heater burnout alarm remains ON by setting the heater burnout latch. To reset, turn the power supply OFF and then ON or set the heater burnout alarm value to "0.0A."
3. OT1, OT2 (control output 1, control output 2)
   Lights when control output 1 and/or control output 2 (cool) are ON.
4. STP (stop)
   Lights when control of the E5CN has been stopped. During control, this indicator lights when an event or the run/stop function has stopped, or this indicator is out.
5. CMW (communications writing control)
   Lights when communications writing is enabled and is out when it is disabled.

Temperature Unit

The temperature unit is displayed when the display unit parameter is set to a temperature. Indication is determined by the currently selected "temperature unit" parameter set value. When this parameter is set to "°C," "C" is displayed, and when set to "°F," "F" is displayed.



No. 1 Display

Displays the process value or parameter type.

No. 2 Display

Displays the set point, manipulated variable, or set value (setup) of the parameter.

Up Key

Each press of this key increases values displayed on the No.2 display. Holding down this key continuously increases values.

Down Key

Each press of this key decreases values displayed on the No.2 display. Holding down this key continuously decreases values.

Level + Mode Keys

This key combination sets the E5CN to the "protect level."

Level Key

Press this key to select the setup level. The setup level is selected in this order: "operation level" ←→ "adjustment level," "initial setting level" ←→ "communications setting level."

Mode Key

Press this key to select parameters within each level.

Operation

■ INITIAL SETUP

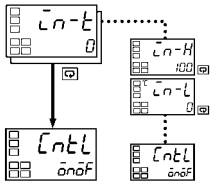
On previous Controllers, sensor input type, alarm type and control period were set on DIP switches. These hardware settings are now set in parameters in setup menus. The ◎ and ⮌ keys are used to switch between setup menus, and the amount of time that you hold the keys down determines which setup menu you move to. This section describes two typical examples.

Note: On the E5GN, the ◎ Key is the ▭ Key.

1. ON/OFF Control

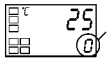
Typical Application Examples

- Changing Parameters



indicates that there is a parameter. Keep on pressing the mode key until the desired parameter is selected.

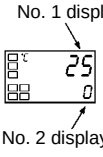
- Changing Set Values



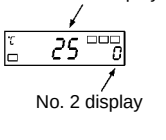
Use the ⮟ or ⮝ keys to change the set value displayed in the setup menu.

Display

E5CN



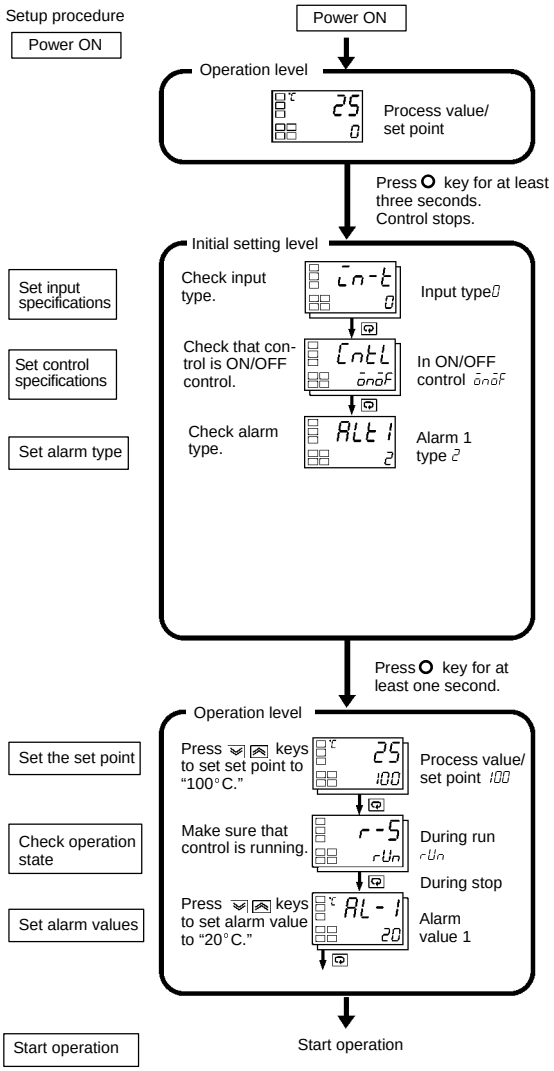
E5GN



Typical Example

Input type:	0 K thermocouple -200 to 1300°C
Control method:	ON/OFF control
Alarm type:	2 upper limit
Alarm value 1:	20°C (For setting deviation)
Set point:	100°C

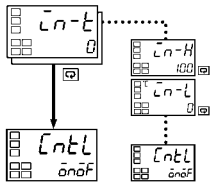
Change only the alarm value 1 and set point.
The rest must be left as default settings.



2. PID Control Using Auto-tuning

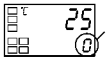
Typical Application Example

- Changing Parameters



indicates that there is a parameter. Keep on pressing the mode key until the desired parameter is selected.

- Changing Set Values



Use the ▼ or ▲ keys to change the set value displayed in the setup menu.

Display

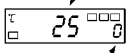
E5CN

No. 1 display

No. 2 display

E5GN

No. 1 display



No. 2 display

Typical Example

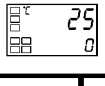
Input type:	4 T thermocouple -200 to 400°C
Control method:	PID control
ST (self-tuning):	OFF
Calculate PID constants by AT (auto-tuning).	
Alarm type:	2 upper limit
Alarm value 1:	30°C (For setting deviation)
Set point:	150°C

Setup procedure

Power ON

Power ON

Operation level



Process value/ set point

Press O key for at least three seconds. Control stops.

Initial setting level

Set input specifications

Press ▼▲ keys to select input type.

Input type 4

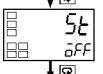
Set control specifications

Press ▼▲ keys to select PID control.

In PID control

Self-tuning

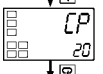
Press ▼▲ keys to set ST to OFF.



To cancel ST

Check control period

Check the control period.



Control period (heat) (unit: seconds)

When set to ON, self-tuning operates. Recommended settings: 20 seconds for the relay output and 2 seconds for the SSR output.

Check alarm type

Check alarm type.

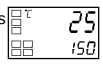
Alarm 1 type 2 (upper-limit alarm)

Press O key for at least one second.

Operation level

Set the set point

Press ▼▲ keys to set set point to "150°C."



Process value/ set point 150

Press O key for less than one second.

Adjustment level

AT execution

Execute AT (auto-tuning).

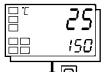
To execute AT

Set to on for executing AT and to oFF for stopping AT.

Press O key for less than one second.

Operation level

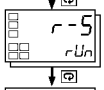
Make sure that set point is "150°C."



Process value/ set point 150

Set operation status

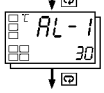
Make sure that control is running.



During run

Set alarm values

Press ▼▲ keys to set alarm value to "30°C."



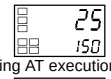
Alarm value 1 30

Start operation

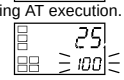
Start program execution

PV/SP

After AT execution.



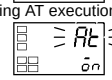
During AT execution.



While AT is being executed, SP will flash.

After AT execution.

During AT execution.

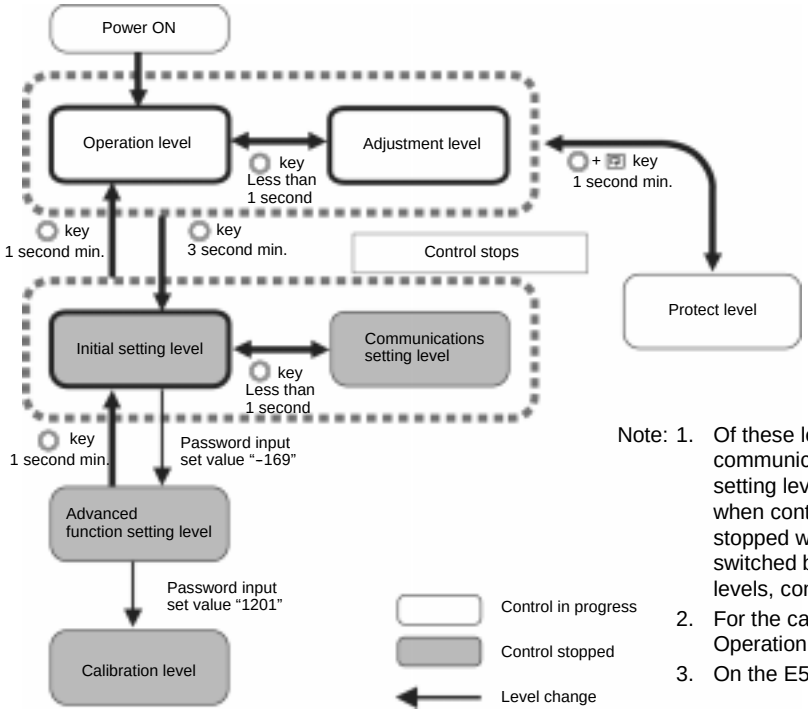


Specification Setting After Turning ON Power

■ OUTLINE OF OPERATION PROCEDURES

Key Operation

In the following descriptions, all the parameters are introduced in the display sequence. Some parameters may not be displayed depending on the protect settings and operation conditions.



Note: 1. Of these levels, the initial setting level, communications setting level, advanced function setting level and calibration level can be used only when control has stopped. Note that control is stopped when these four levels are selected. When switched back to the operation level from one of these levels, control will start.
2. For the calibration mode, refer to the relevant Operation Manual (H100 or H101).
3. On the E5GN, the ◎ Key is the ⬭ Key.

■ DESCRIPTION OF EACH LEVEL

Operation Level

This level is displayed when you turn the power ON. You can move to the protect level, initial setting level and adjustment level from this level.

Normally, select this level during operation. During operation, the process value, set point and manipulated variable can be monitored, and the alarm value and upper- and lower-limit alarms can be monitored and modified.

Adjustment Level

To select this level, press the ◎ key once for less than one second.

This level is for entering set values and offset values for control. This level contains parameters for setting the set values, AT (auto-tuning), communications writing enable/disable, hysteresis, multi-SP, input shift values, heater burnout alarm (HBA) and PID constants. You can move to the top parameter of the operation level or initial setting level from here.

Initial Setting Level

To select this level, press the ◎ key for at least three seconds in the operation level. This level is for specifying the input type, selecting the control method, control period, setting direct/reverse action and alarm type. You can move to the advanced function setting level or communications setting level from this initial setting level. To return to the operation level, press the ◎ key for at least one second. To move to the communications setting level, press the ◎ key once for less than one second.

Protect Level

To select this level, simultaneously press the ◎ and ⬭ keys for at least one second. This level is to prevent unwanted or accidental modification of parameters. Protected levels will not be displayed, and so the parameters in that level cannot be modified.

Communications Setting Level

To select this level, press the ◎ key once for less than one second in the initial setting level. When the communications function is used, set the communications conditions in this level. Communicating with a personal computer (host computer) allows set points to be read and written, and manipulated variables to be monitored.

Advanced Function Setting Level

To select this level, you must enter the password (“-169”) in the initial setting level.

You can move only to the calibration level from this level.

This level is for setting the automatic return of display mode, MV limiter, event input assignment, standby sequence, alarm hysteresis, ST (self-tune) and to move to the user calibration level.

Calibration Level

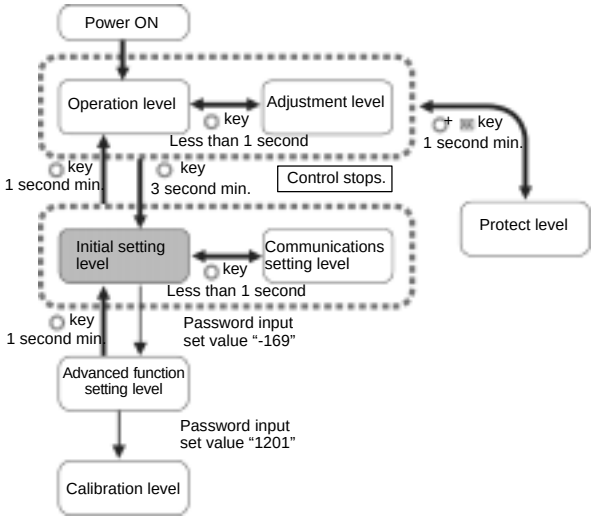
To select this level, you must enter the password (“1201”) in the advanced function setting level. This level is for offsetting deviation in the input circuit.

You cannot move to other levels by operating the keys on the front panel from the calibration level. To cancel this level, turn the power OFF then back ON again.

■ SPECIFICATION SETTING (AFTER TURNING ON POWER)

Initial Setting Level

This level is used for setting basic specifications of the Temperature Controller. Using this level, set the input type for selecting the input to be connected such as the thermocouple or platinum resistance thermometer and set the range of set point and the alarm mode.

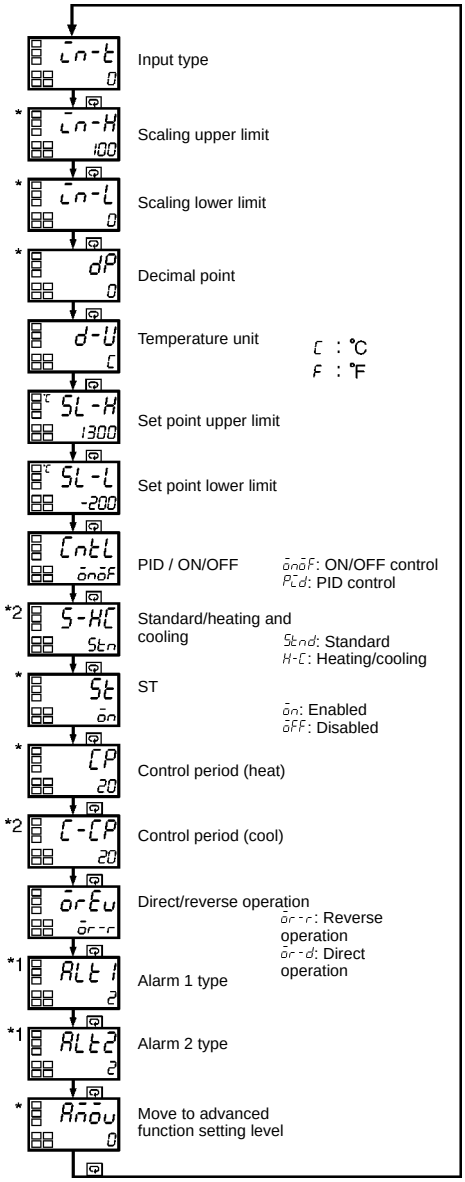


The move from the operation level to the initial setting level, press ◎ key for three seconds or more.

The initial setting level is not displayed when "initial/communications protection" is set to "2." This initial setting level can be used when "initial setting/communications protection" is set to "0" or "1."

The "scaling upper limit," "scaling lower limit," and "decimal point" parameters are displayed when an analog voltage input is selected as the input type.

Initial setting level



To return to the operation level, press the ◎ key for longer than one second

*Not displayed as default setting.

Note: 1. Displayed only with models provided with an alarm function.
2. Displayed only with the E5CN provided with a two-point alarm function.

■ INPUT TYPE

Using a Thermocouple Input Type

When using a thermocouple input type, follow the specifications listed in the following table.

Input type	Specifications	Set Value	Input Temperature Range
Thermocouple	K	0	−200 to 1300 (°C) /−300 to 2300 (°F)
		1	−20.0 to 500.0 (°C) /0.0 to 900.0 (°F)
	J	2	−100 to 850 (°C) /−100 to 1500 (°F)
		3	−20.0 to 400.0 (°C) /0.0 to 750.0 (°F)
	T	4	−200 to 400 (°C) /−300 to 700 (°F)
	E	5	0 to 600 (°C) /0 to 1100 (°F)
	L	6	−100 to 850 (°C) /−100 to 1500 (°F)
	U	7	−200 to 400 (°C) /−300 to 700 (°F)
	N	8	−200 to 1300 (°C) /−300 to 2300 (°F)
	R	9	0 to 1700 (°C) /0 to 3000 (°F)
	S	10	0 to 1700 (°C) /0 to 3000 (°F)
	B	11	100 to 1800 (°C) /300 to 3200 (°F)
Non-contact temperature sensor ES1A	K10 to 70°C	12	0 to 90 (°C) /0 to 190 (°F)
	K60 to 120°C	13	0 to 120 (°C) /0 to 240 (°F)
	K115 to 165°C	14	0 to 165 (°C) /0 to 320 (°F)
	K160 to 260°C	15	0 to 260 (°C) /0 to 500 (°F)
Analog input	0 to 50mV	16	One of following ranges depending on the results of scaling: 1999 to 9999, 199.9 to 999.9

Note: The initial settings are: 0: −200 to 1300°C/−300 to 2300°F.

Using a Platinum Resistance Thermometer Input Type

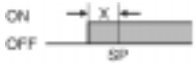
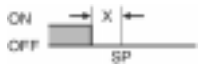
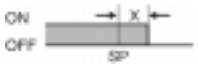
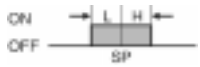
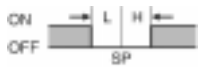
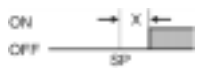
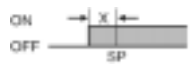
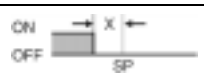
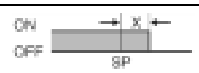
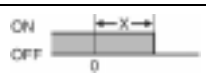
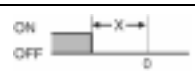
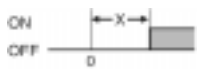
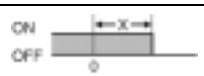
When using the platinum resistance thermometer input type, follow the specifications listed in the following table.

Input type	Specifications	Set Value	Input Temperature Range
Platinum resistance thermometer	Pt100	0	−200 to 850 (°C) /−300 to 1500 (°F)
		1	−199.9 to 500.0 (°C)/−199.9 to 900.0 (°F)
		2	0.0 to 100.0 (°C) /0.0 to 210.0 (°F)
	JPt100	3	−199.9 to 500.0 (°C)/−199.9 to 900.0 (°F)
		4	0.0 to 100.0 (°C) /0.0 to 210.0 (°F)

Note: 1. The initial settings are: 0: Pt100 −200 to 850°C/−300 to 1500°F.
2. The ES1A Non-contact Temperature Sensor will be available soon.

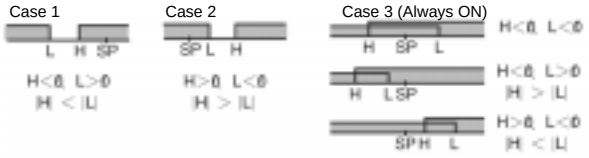
■ ALARM 1 AND ALARM 2

For the alarm 1 and alarm 2, select alarm types out of the 12 alarm types listed in the following table.

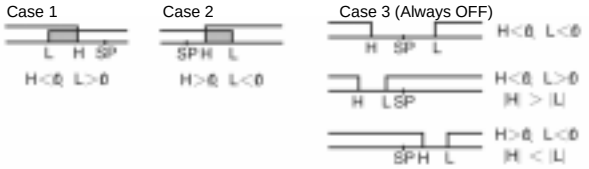
Set Value	Alarm Type	Alarm Output Operation	
		When X is positive	When X is negative
0	Alarm function OFF	Output OFF	
1*1	Upper- and lower-limit (deviation)		*2
2	Upper-limit (deviation)		
3	Lower-limit (deviation)		
4*1	Upper- and lower-limit range (deviation)		*3
5*1	Upper- and lower-limit with standby sequence (deviation)		*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		

*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.”
Following operations are for cases when an alarm set point is “X” or negative.

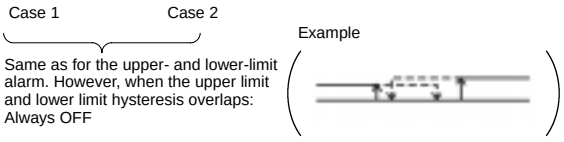
*2: Set value: 1, upper- and lower-limit alarm



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



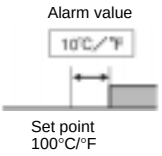
*4: Set value: 5, upper- and lower-limit with standby sequence



Example: When the alarm is set ON at 110°C/°F or higher.

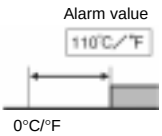
- **When an alarm type other than the absolute-value alarm is selected**

(For alarm types 1 to 7)
The alarm value is set as a deviation from the set point.



- **When the absolute-value alarm is selected**

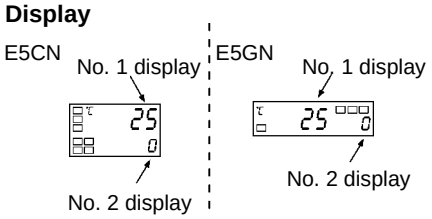
(For alarm types 8 to 11)
The alarm value is set as an absolute value from the alarm value of 0°C/F.

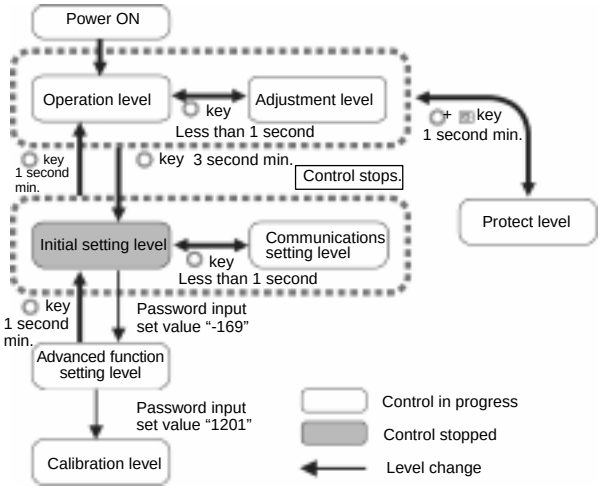


■ PARAMETERS

Parameters related to setting items for each level are marked in boxes in the flowcharts and brief descriptions are given as required. At the end of each setting item, press the mode key to return to the beginning of each level.

Display





Operation Level