Burner Controller

Model AUR255_1/_2

Overview

The AUR255 burner controller is a combustion safety controller specifically designed for batch operation (for systems that start and stop at least once in a 24-hour period). It automatically and safely ignites gas and oil burners using the correct ignition sequence. This device is to be used with the AUD100/110/120 advanced ultraviolet flame detector or with a flame rod.
The front of the unit provides a 7-segment LED display to show the flame voltage and the current sequence stage. Also from the front panel users can access a communication function that is convenient for maintenance and troubleshooting and an event function.
The 7-segment LED display shows not only the normal operating sequence and flame voltage, but also the sequence code and alarm code alternately in the event of an alarm, allowing users to easily view alarm details.
The communication function can be used to read out basic information such as the status of input/output and the operating history, alarm history, and other internal information, which is useful for troubleshooting and preventive maintenance.
Various kinds of data recorded in the AUR255, including the flame voltage, ignition delay time, combustion count, and combustion time of each sequence stage, are useful for troubleshooting and preventive maintenance. Also, to ensure timely replacement of the ultraviolet flame detector, the event function outputs a reminder after 25,000 hours of combustion time.

Features

- Safety standard certification
  CE/FM/UL
- Ignition sequence
  The ignition trial time can be selected from 2.5 s, 4.5 s, 9.0 s, and 13.5 s.

- Ease of instrumentation and handling
  Designed for compactness, so little installation space is needed.
  Wires connect to the sub-base, so the unit is easy to install/remove.
  The flame monitor output and alarm output contacts are available as semiconductor output and relay output, respectively.
  External reset input provides the ability to reset from a control panel.

- Multifunction display
  The 7-segment LED display is useful for maintenance and troubleshooting, helping to identify operation progress, alarm codes, and event codes. In addition, flame detection and alarm activation can be checked visually with LED indicators.

Note:

The use of this device is strictly restricted by safety guidelines and other standards. For safety, use this device only with compatible equipment.

■ Precautions for instrumentation

Facilities that use a flame safeguard system must be designed in compliance with relevant laws, standards, safety guidelines, and the like.

- Main safety policies in Japan
  - Technical Policy on Safety Standards for Combustion Equipment in Industrial Furnaces, by the Ministry of Health, Labour and Welfare
  - General Safety Code for Industrial Combustion Furnaces - JIS B 8415
  - The Index of Safety Technology of Industrial Gas Combustion Equipment, by the Japan Gas Association
  - The Index of Safety Technology of Gas Boiler Combustion Facilities, by the Japan Gas Association
- U.S.A.
  - Combustion Safety Guidelines (NFPA 86), by the National Fire Protection Association
- Europe
  - Industrial Thermoprocessing Equipment (EN 746)
  - Appliances Burning Gaseous Fuels, amended by CE Marking Directive (93/68/EEC)
- For use of this product abroad, create a design that reflects the laws and standards of the relevant country.

● Important points for ensuring safety

1. Connect loads directly to this device.
2. Design the interlock so that it can directly cut off power to the load.
3. Be sure to use a safe startup circuit at startup.
4. Do not add a bypass circuit that allows manual operation of any load.
5. Both the main valve and pilot valve must have redundant shutoff.

● Precautions for system design

This device does not have a purge function. It must be provided externally.

Specification

<table>
<tr><th colspan="2">Item</th><th colspan="4">Description</th></tr>
<tr><td colspan="2">Application</td><td colspan="4">Gas- or oil-burning combustion equipment</td></tr>
<tr><td colspan="2">Compatible flame detector</td><td colspan="4">Model AUD100/110/120 ultraviolet flame detector, or a flame rod</td></tr>
<tr><td rowspan="10">Sequence</td><td rowspan="2">Sequence timing</td><td>Ignition trial</td><td colspan="2">Hi solenoid valve ignition standby</td><td>Hi solenoid valve ignition</td></tr>
<tr><td>Selectable by model No.</td><td colspan="2">7.0 ± 1.0 s</td><td>4.5 ± 0.5 s</td></tr>
<tr><td rowspan="2">Flame failure response time</td><td colspan="4">Model AUD100/110/120 ultraviolet flame detector</td></tr>
<tr><td colspan="4">1, 2, or 4 s max.
(at a flame voltage of 4.2 V in the AUR255C and 2.0 V in the AUR255B)</td></tr>
<tr><td>Reset time</td><td colspan="4">1 s or longer (main unit reset switch or contact reset input*2)</td></tr>
<tr><td rowspan="2">Alarm detection time</td><td>False flame error</td><td>Interlock error</td><td>POC error
(MV/Hi proof of closure)</td><td>POC error
(PV/Lo proof of closure)</td></tr>
<tr><td>5.0 ± 1.0 s</td><td>1 s or shorter</td><td>3.0 ± 1.0 s</td><td>3.0 ± 1.0 s</td></tr>
<tr><td>Lockout</td><td colspan="4">Lockout requiring manual reset</td></tr>
<tr><td>Operation upon ignition failure</td><td colspan="4">Lockout</td></tr>
<tr><td>Operation upon flame failure</td><td colspan="4">Lockout</td></tr>
</table>

Item		Description
Electrical specifications	Supply power rating	100/120/200/220 V AC, 50/60 Hz
	Allowable supply voltage	85–110 % of rated voltage
	Power consumption	10 W max.
	Dielectric strength	1500 V AC for 1 min or 1800 V AC for 1 s Between each terminal and ground, except for flame detector connection terminals (terminals 14, 15)
	Insulation resistance	50 MΩ min. with a 500 V DC megger Between each terminal and ground, except for flame detector connection terminals (terminals 14, 15)
	Input	Start, call for heat, interlock, contact reset, POC (MV/Hi), POC (PV/Lo) Each input is a non-voltage (dry) contact input, with allowable contact resistance up to 500 Ω
	Feedback input	Ignition transformer feedback, main valve feedback Voltage contact input and detection voltage of 65 V or lower (initial value) for each input
	Output (contact rating)	Ignition transformer: 300 VA Interrupted pilot valve: 200 VA Lo solenoid valve: 200 VA Hi solenoid valve: 200 VA POC error output: 0.2 A 30 V DC or 75 VA Alarm: 75 VA External IG relay output: 30 mA 30 V DC External MV relay output: 30 mA 30 V DC
	Event output*1 Flame output*1 SSR-MV*1 SSR-IG*1	30 mA 30 V DC max.
	Flame voltage output	0–5 V Flameout detection: AUR255C 0.4 V min., AUR255B 0.2 V min. Ignition detection: AUR255C 1.0 V max., AUR255B 1.0 V max. Recommended flame voltage: AUR255C Stable 2.0 V min.
	Product life	AUR255_1 10 years or 100,000 relay operations AUR255_2 10 years or 2,500,000 relay operations
Operating conditions	Ambient temperature	Separately mounted unit: −20 to +60 °C Gang mounted units: −20 to +45 °C
	Ambient humidity	90 % RH at 40 °C
	Vibration resistance	0–3.2 m/s^2 (10–150 Hz, 1 octave/minute, 10 cycles, in each of the XYZ directions)
	Shock	0–9.8 m/s^2 (10–150 Hz, 1 octave/minute, 10 cycles, in each of the XYZ directions)
General specifications	Protective structure	IP40: if sideboards (81447515-001) are attached to the sub-base (model BC-R05) IP10: sub-base (model BC-R05) only
	Pollution degree	PD2
	Case color	Black
	Structure	Sub-base and main unit
	Mounting orientation	Mount so that the front panel is vertical, with the loader jack at the bottom.
	Standards compliance	JIS C 9730-2-5:2010 (*Automatic Electrical Controls for Household and Similar Use - Part 2-5: Particular Requirements for Automatic Electrical Burner Control Systems*)*3 Certifications CE*4 • Gas Appliances Regulation (2016/426/EU) based on EN 298:2012 • Low Voltage Directive (2014/35/EU) based on EN 60730-2-5:2015 • Electromagnetic Compatibility Directive (2014/30/EU) based on EN 61000-3-2:2014, EN 61000-3-3:2013, EN 55011:2016+A1:2017+A11:2020, EN 60730-1:2011 • RoHS Directive (2011/65/EU) based on EN IEC 63000:2018 FM Approved in FM7610*4 UL Listed in UL 60730-2-5 (certified models: AUR255_ _ _ _ _ 1_ , AUR255_ _ _ _ _ 3_)*4
	Dimensions	W95 × H105 × D110 mm (incl. sub-base)
	Weight	Approximately 600 g (incl. sub-base)

Item	Description			
	Signal	Wiring type	Recommended length	Max. length
Wiring types and max. wiring length	Startup input (START)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	20 m max.	100 m*1
	Contact reset input (RESET)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	–	10 m*2
	Interlock (IL)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	20 m max.	100 m*1
	POC input (VC1, VC2)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	20 m max.	100 m*1
	Call for heat (TD)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	20 m max.	100 m*1
	Event output (EV)	0.75 mm^2 (diameter: 0.18, strand count: 30) or larger, in compliance with JIS C 3306.	–	–
	Flame monitor output (FR-FL)	0.75 mm^2 (diameter: 0.18, strand count: 30) or larger, in compliance with JIS C 3306.	–	–
	External IG relay (EX-IG)	0.75 mm^2 (diameter: 0.18, strand count: 30) or larger, in compliance with JIS C 3306.	–	–
	External MV relay (EX-MV)	0.75 mm^2 (diameter: 0.18, strand count: 30) or larger, in compliance with JIS C 3306.	–	–
	Relay output (PV, MV, IG, LO, COM-G)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	–	–
	Alarm output (AL)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	–	–
	POC error output (S0)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2	–	–
	AUD15 + AUD1_0 (F, G)	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2 or larger	–	200 m
	Flame rod (F, G)	RG-11/U (JAN standard: US DoD-compliant specification) Alternatively, the equivalent 5C2V or 7C2V (JIS standard)	20 m max.	30 m
	RS-485 communications (3-wire system)	Twisted-pair shielded cable Recommended: JCS 4364 cable for low-power instruments, 4 cores (2 pairs)	100 m max.	500 m
	Flame voltage output	Copper 600 V PVC-insulated cable (IEC 60227-3), 1.25 mm^2 or larger	–	10 m

***1. If an inductive load is connected, connect a protective circuit such as an RC snubber in parallel with the load.**

***2. For details on the contact reset input specification, see *Burner Controller Model AUR255 User's Manual*, No. CP-SP-1466 (in Japanese)**

***3. There is no certifying body for JIS standards. By obtaining third-party certification for the equivalent European (CE) or North American (UL/FM, etc.) standards, the product can be considered to be compliant with JIS C 9730-2-5:2010.**

***4. The AUR255C and AUR255R are certified if they are used in combination with the AUD100/110/120.**

Model selection

● Burner controller: model AUR255_1

Ex.: AUR255C153310

Basic model No.	Flame detector	Pilot sequence	Ignition trial	Main trial	Flame failure response time	Power	Other*1	Description	Note
AUR255								Batch operation	
	B							Flame rod	
	C							AUD100/110/120	
	R							AUD100/110/120 (high amplification)	
		1						Direct ignition / pilot ignition	
			3					2.5 ± 0.5 s	*2
			5					4.5 ± 0.5 s	
			A					9.0 ± 1.0 s	
			F					13.5 ± 1.5 s	NFPA-compliant time
				3				4.5 ± 0.5 s	
					3			4 s max.	Nominal (printed on label): 3 s
					2			2 s max.	Nominal (printed on label): 1.5 s
					1			1 s max.	Nominal (printed on label): 1 s*3
						1		100 V AC	
						2		200 V AC	
						3		120 V AC	
						4		220 V AC	
							0	None	
							D	With inspection data	

***1. The printed circuit boards of all models are varnished, so tropicalization treatment is not offered as an additional function.**

***2. Cannot be used with a maximum flame failure response of 4 seconds.**

***3. Cannot be used with AUD100/110/120 flame detectors.**

● Burner controller for pulse combustion: model AUR255_2

Ex.: AUR255C250310

Basic model No.	Flame detector	Pilot sequence	Ignition trial	Main trial	Flame failure response time	Power	Other*1	Description	Note
AUR255								Batch operation	
	B							Flame rod	
	C							AUD100/110/120	
	R							AUD100/110/120 (high amplification)	
		2						Direct ignition	
			3					2.5 ± 0.5 s	*2
			5					4.5 ± 0.5 s	
			A					9.0 ± 1.0 s	
			F					13.5 ± 1.5 s	NFPA-compliant time
				0				None	
					3			4 s max.	Nominal (printed on label): 3 s
					2			2 s max.	Nominal (printed on label): 1.5 s
					1			1 s max.	Nominal (printed on label): 1 s*3
						1		100 V AC	
						2		200 V AC	
						3		120 V AC	
						4		220 V AC	
							0	None	
							D	With inspection data	

***1. The printed circuit boards of all models are varnished, so tropicalization treatment is not offered as an additional function.**

***2. Cannot be used with a maximum flame failure response of 4 seconds.**

***3. Cannot be used with AUD100/110/120 flame detectors.**

Related devices

● Compatible ultraviolet flame detector (sold separately)

Model No.	Name	Note
AUD15C1000	Advanced ultraviolet flame detector tube unit	Use the AUD100/110/120 as the dedicated socket for the tube unit.
AUD100C100_	Dedicated socket for the AUD15 Lead wire type	AUD15C1000 not included
AUD100C1000-A15		AUD15C1000 included
AUD110C100_	Dedicated socket for the AUD15 Terminal block type	AUD15C1000 not included
AUD110C1000-A15		AUD15C1000 included
AUD120C120_	Dedicated socket for the AUD15 ½-inch mounting type	Without G½ adapter, AUD15C1000 not included
AUD120C121_		With G½ adapter, AUD15C1000 not included

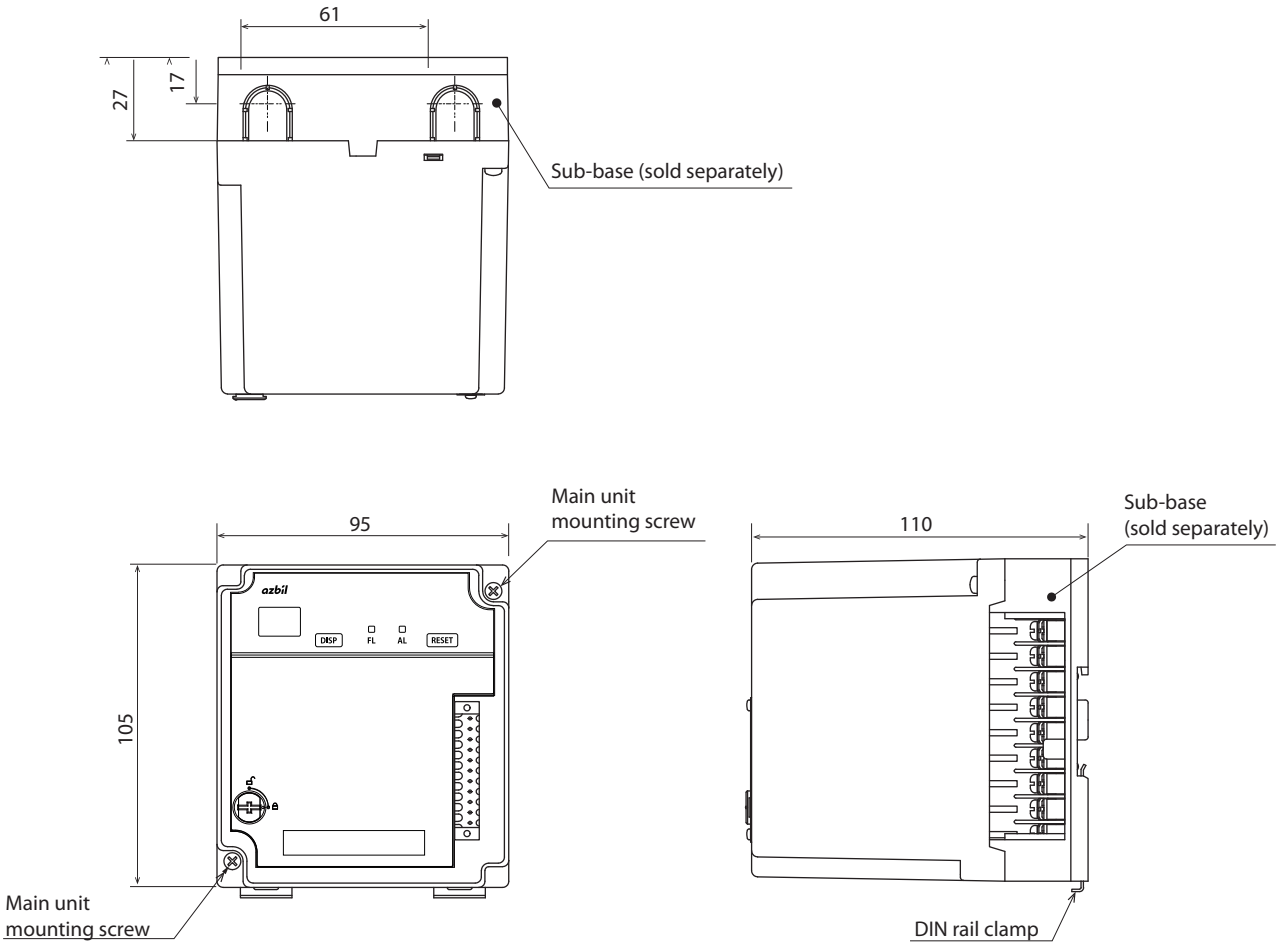
_: 0: standard product, D: with inspection record (with data), T: tropicalization (AUD110C only), B: with inspection record (with data) + tropicalization (AUD110C only)

● Optional parts (sold separately)

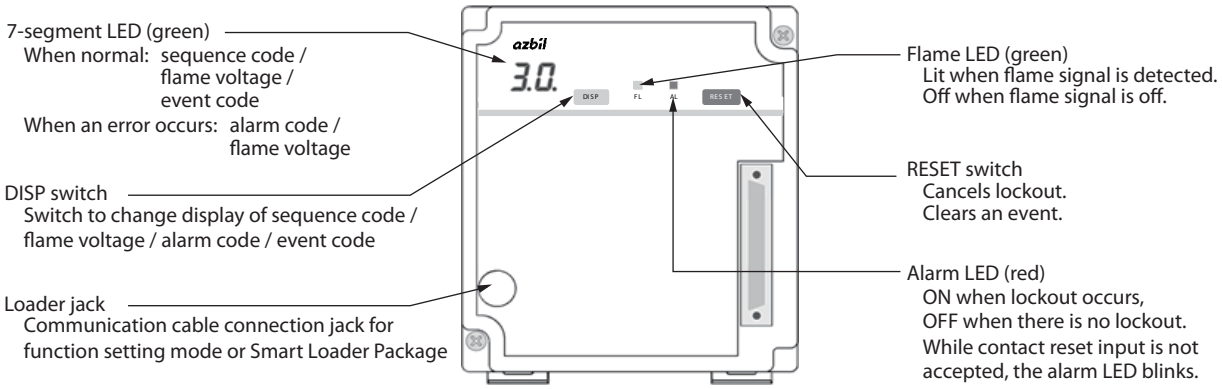
Model No.	Name
BC-R05A100	Sub-base
81447515-001	Sideboard
83968019-001	Lightning-induced surge absorber
81441177-001	USB loader cable
SLP-A55J91	Smart Loader Package
81447514-001	Connector for front wiring
81447514-002	Connector for front wiring (for right-side wiring)
81447531-001	Front connector cover (includes mounting screw)
FSP136A100	Analog flame meter
FSP300BC100	Flame simulator

Dimensions

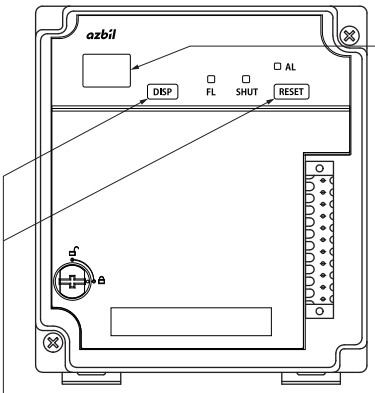
Unit: mm



Part names



7-segment display



DISP switch:
Switches the display between the sequence code and flame voltage

RESET switch:
Resets the alarm for lockout

● Sequence code

In normal operation, the sequence code corresponding to each operating status is displayed.
The table below shows the code and the operating status.
AUR255_1 sequence codes

Display	Status
P1	Start check
P4	Ignition trial
P5	Pilot stabilization / Hi solenoid valve ignition standby
P6	Main trial / Hi solenoid valve ignition
P8	RUN (normal combustion)
--	Standby

AUR255_2 sequence codes

Display	Status
P1	Start check
P4	Ignition trial
P8	RUN (normal combustion)
--	Standby

● Alarm code

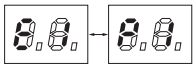
If lockout occurs, an alarm code is displayed automatically.
The alarm code and the code for the sequence step where the lockout occurred are displayed alternately.

Display	Name	Description
E0	Interlock error	Interlock activated.
E1	False flame error	Flame signal was detected for 5 s during start check.
E6	Ignition failure	Ignition could not be detected during the ignition trial.
E7	Flame failure	The flame signal was lost in the sequence after the ignition trial.
E801	POC error (MV/Hi proof of closure)	POC input open was detected while the main valve or Hi solenoid valve was off.
E802	POC error (PV/Lo proof of closure)	POC input open was detected while the pilot valve or Lo solenoid valve was off.
E9 + Sub-code (2 digits)*	Device error	Abnormal voltage detected in the output from the ignition transformer, Lo solenoid valve, Hi solenoid valve, etc.

***For details, refer to CP-SP-1466 (in Japanese).**

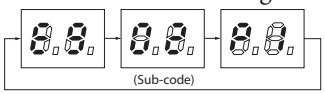
Examples of alarm and sequence code display

- Alarm code: E0–E8



The item displayed changes every 0.8 s.

- Alarm code: E9 + 2-digit sub-code



The item displayed changes every 0.8 s.

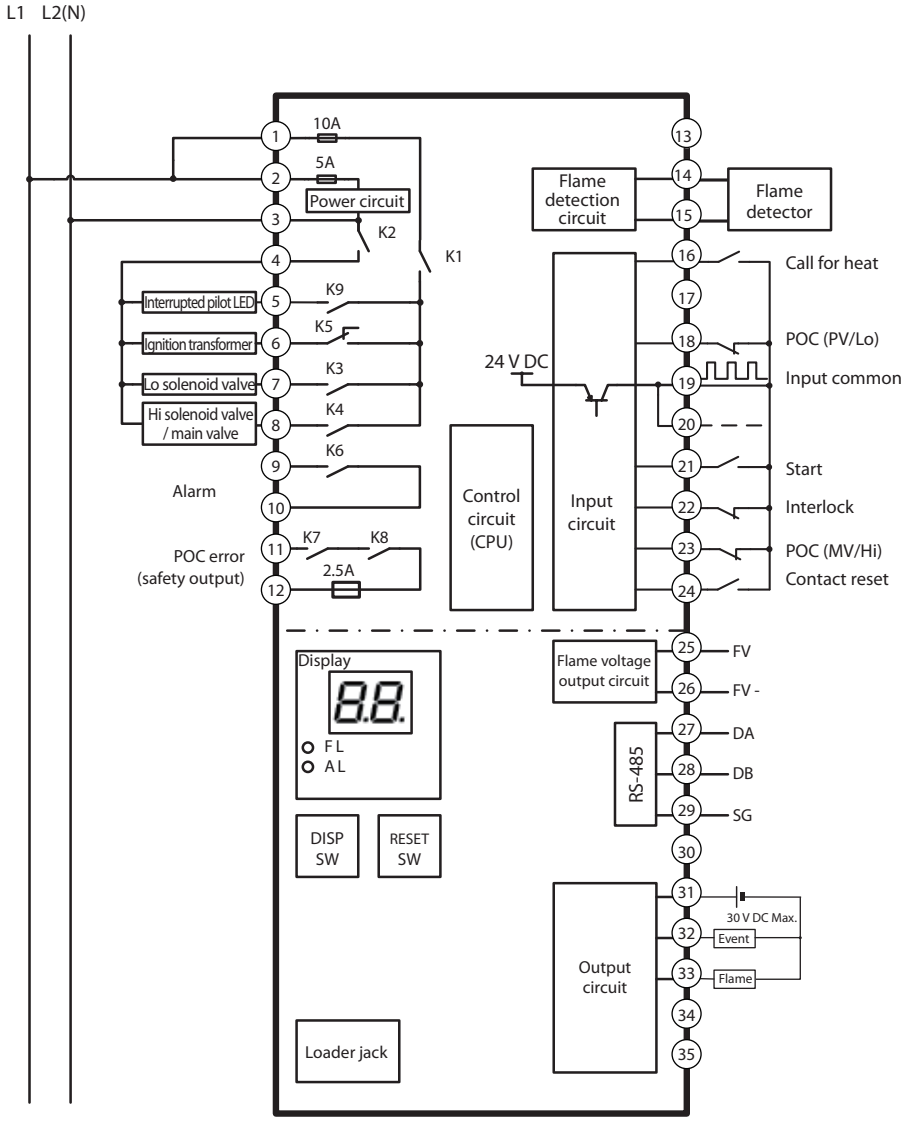
● Event code

If an event specified in advance occurs, the event output turns on.

Event code	Event name	Condition for event
A1	UV flame detector check (combustion time)	Turns on if the combustion time exceeds the value set for “UV flame detector check (combustion time).”
A2	Product service life check (total operating time)	Turns on if the total operating time exceeds the value set for “Product service life check (total operating time).”
A3	Product service life check (total combustion count)	Turns on if the total combustion count exceeds the value set for “Product service life check (total combustion count).”
A7	POC error (PV/Lo opening confirmation)	Turns ON if POC input (VC1) is open while the pilot valve or Lo solenoid valve output is on
A8	POC error (MV/Hi opening confirmation)	Turns ON if POC input (VC2) is open while the main valve or Hi solenoid valve output is on
Ab	Instantaneous interruption	Turns ON if a momentary interruption of the power occurs during startup.

Wiring and internal block diagrams

● AUR255_1



Note: • *The contact reset must be used independently (by a single AUR255 device only). Do not use the terminal for contact reset of other AUR255 devices.*

• *Do not share the output common (terminal 4) and the input common (terminals 19, 20) with other AUR255 devices.*

Terminals and characteristics

● Terminal layout (sub-base): model AUR255_1

No.	Code	Name	I/O	Function
1	–	Load power	–	Power for the igniter and fuel valve
2	AC-H	Power (H)	–	Power to drive this device
3	AC-G	Power (G)	–	Power to drive this device
4	COM-G	Output common	–	Connection common for the igniter and solenoid valve
5	PV	Interrupted pilot	O	Terminal for driving the interrupted pilot valve
6	IG	Igniter	O	Current-carrying terminal for igniter
7	LO	LO solenoid valve	O	Terminal for driving the LO solenoid valve for direct ignition
8	MV	Main valve / HI solenoid valve	O	Terminal for driving the main valve
9	AL-NO	Alarm output	O	Output ON upon lockout
10	AL-COM	Alarm output	O	Output OFF if no lockout
11	SO-NO	POC error output	O	Output OFF upon POC error
12	SO-COM	POC error output	O	Output ON if no POC error*1
13	–	Not used	–	–
14	F	Flame detector (F)	I	Connects the flame detector.
15	G	Flame detector (G)	I	
16	TD	Call for heat	I	Monitors the external call-for-heat signal.*2
17	–	Not used	–	–
18	VC1	POC (pilot)	I	POC monitor input for the interrupted pilot valve (terminal 5) or LO solenoid valve (terminal 7)
19	COM1	Input common 1	–	–
20	COM2	Input common 2	–	–
21	START	Start input	I	Startup input of this device
22	IL	Interlock input	I	Interlock monitoring input for this device.
23	VC2	POC (main)	I	POC monitor input for the LO solenoid valve (terminal 7) or main valve (terminal 8)
24	RESET	Contact reset input	I	Reset input of this device

***1. OFF for 8 to 10 seconds at power-on.**

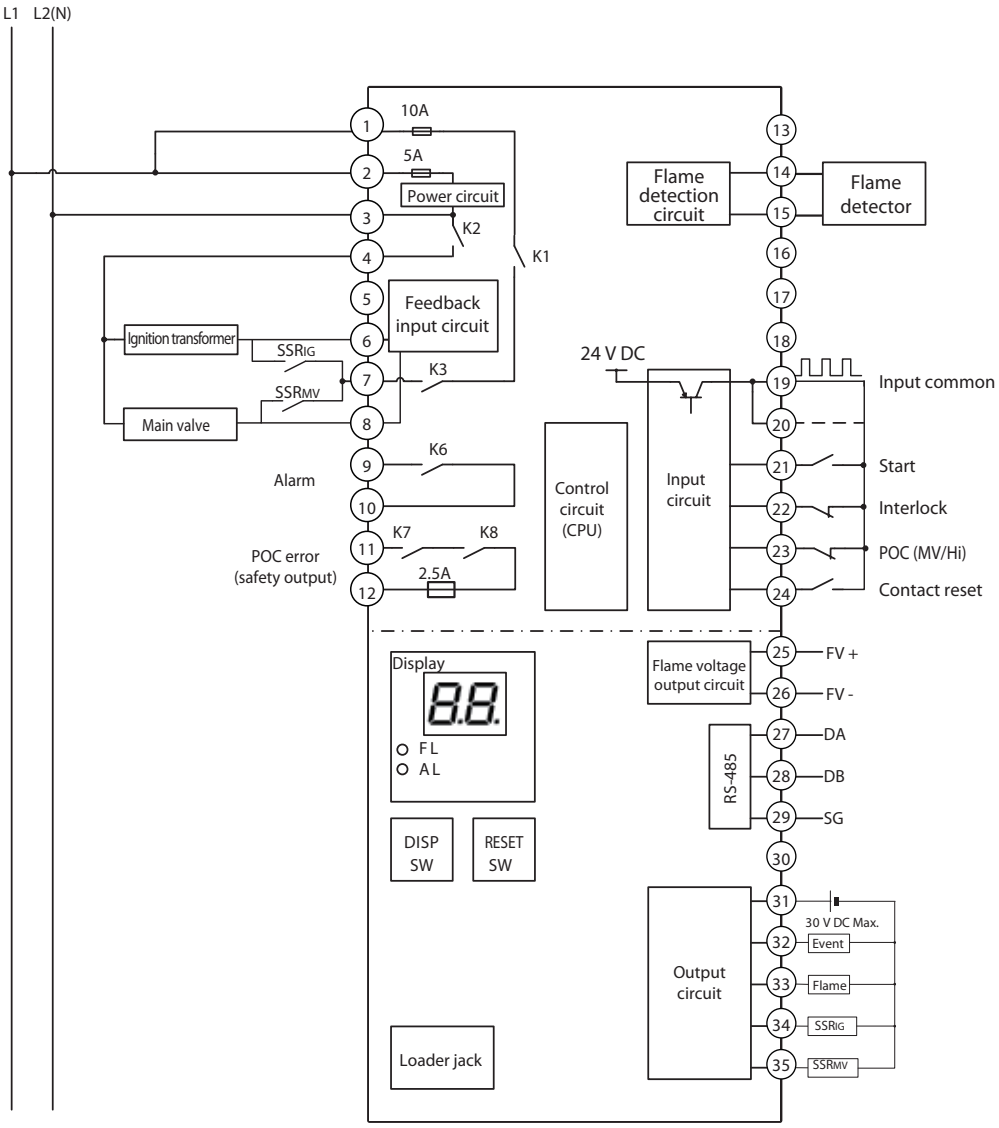
***2. Used only if direct Lo/Hi is set for POC (not set by default).**

● Terminal layout (front connector terminals): model AUR255_1

No.	Code	Function
25	FV+	Flame voltage output (+)
26	FV–	Flame voltage output (–)
27	DA	RS-485 (DA)
28	DB	RS-485 (DB)
29	SG	RS-485 (SG)
30	–	Not used

No.	Code	Function
31	FR-COM	Common of terminals 32–35
32	EV	ON when an event occurs
33	FR-FL	ON when flame is detected
34	–	Not used
35	–	Not used

Wiring and internal block diagram (model AUR255_2)



Note: • *The contact reset must be used independently (by a single AUR255 device only). Do not use the terminal for contact reset of other AUR255 devices.*

• *Do not share the output common (terminal 4) and the input common (terminals 19, 20) with other AUR255 devices.*

Terminals and characteristics

● Terminal layout (sub-base): model AUR255_2

No.	Code	Name	I/O	Function
1	–	Load power	–	Power for the igniter and fuel valve
2	AC-H	Power (H)	–	Power to drive this device
3	AC-G	Power (G)	–	Power to drive this device
4	COM-G	Output common	–	Connection common for the igniter and solenoid valve
5	–	Not used	–	–
6	IG	Igniter	I	Feedback input terminal for igniter
7	LO	Load power output	O	Power output for the igniter and main valve
8	MV	Main valve	I	Feedback input terminal for main valve
9	AL-NO	Alarm output	O	Output ON upon lockout
10	AL-COM	Alarm output	O	Output OFF if no lockout
11	SO-NO	POC error output	O	Output OFF upon POC error
12	SO-COM	POC error output	O	Output ON if no POC error*1
13	–	Not used	–	–
14	F	Flame detector (F)	I	Connects the flame detector.
15	G	Flame detector (G)	I	
16	–	Not used	–	–
17	–	Not used	–	–
18	–	Not used	–	–
19	COM1	Input common 1	–	–
20	COM2	Input common 2	–	–
21	START	Start input	I	Startup input of this device
22	IL	Interlock input	I	Interlock monitoring input for this device.
23	VC2	POC (main)	I	POC monitor input for the main valve
24	RESET	Contact reset input	I	Reset input of this device

***1. OFF for 8 to 10 seconds at power-on.**

● Terminal layout (front connector terminals): model AUR255_2

No.	Code	Function
25	FV+	Flame voltage output (+)
26	FV–	Flame voltage output (–)
27	DA	RS-485 (DA)
28	DB	RS-485 (DB)
29	SG	RS-485 (SG)
30	–	Not used

No.	Code	Function
31	FR-COM	Common of terminals 32–35
32	EV	ON when an event occurs
33	FR-FL	ON when flame is detected
34	EX-IG	Controls the igniter.
35	EX-MV	Controls the main valve.

Please read “Terms and Conditions” from the following URL before ordering and use.
https://www.azbil.com/products/factory/order.html

Specifications are subject to change without notice.

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