ISO 9001
KEMA
CERT. No.60033
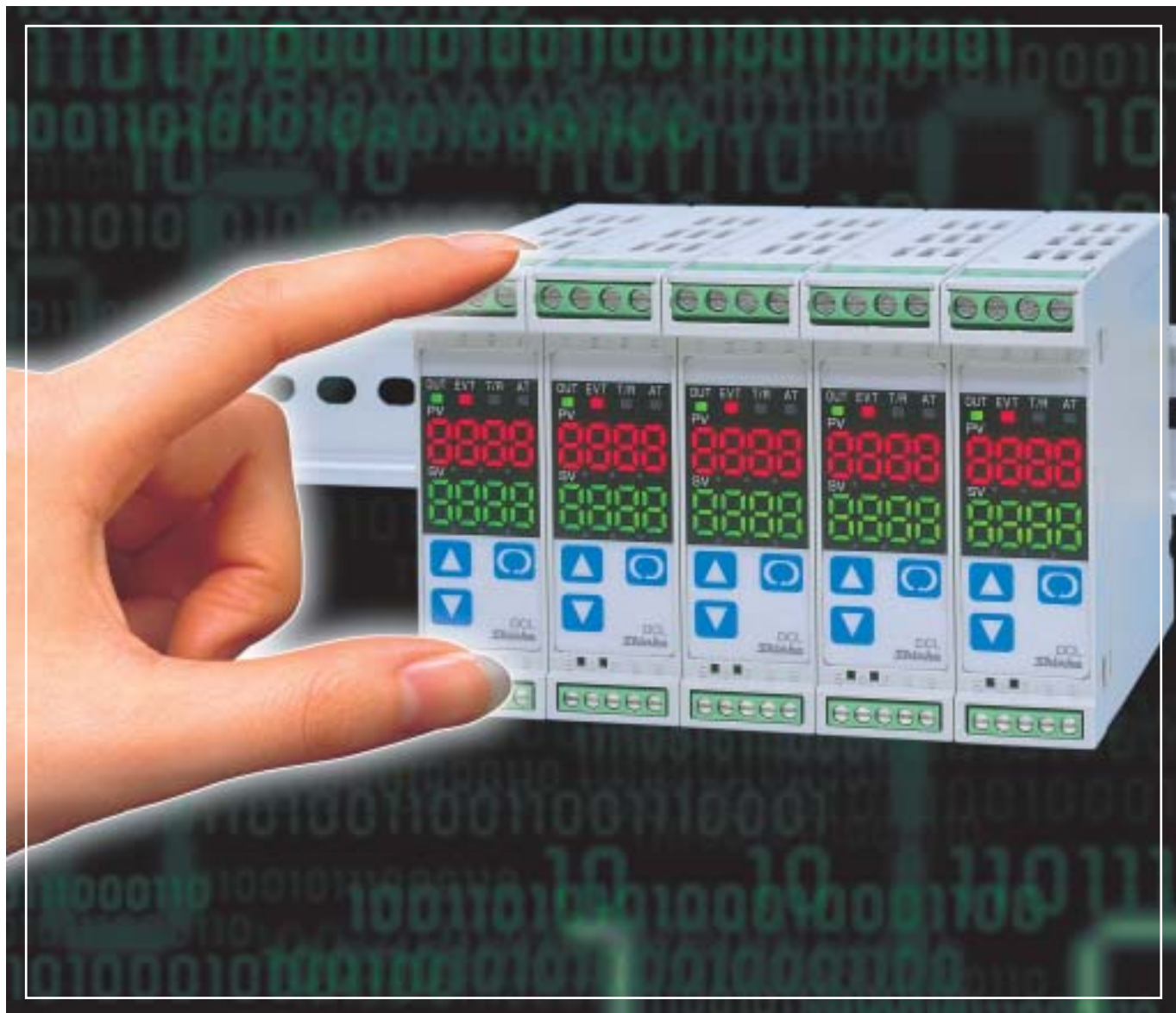DUTCH COUNCIL
FOR ACCREDITATION

CE

c UL US

Indicating Controller

DCL-33A SERIES

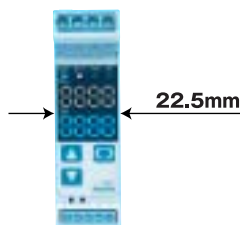## *A compact, versatile controller and converter rolled into one !*

Shinko

Compact and expandable controller and converter in one

Compact controller

The DCL-33A can be installed in narrow spaces.(Width: 22.5mm, Height: 75mm, Depth: 100mm)

22.5mm

Multi-input

Total 18 input types [thermocouple (10 types) RTD (2 types), DC current (2 types) and DC voltage (4 types)] allow you to deal with various processes.

Both a controller and converter are available

For DC current output type, the DCL-33A can be used as a controller or converter by simple keypad operation. If the DCL-33A is used as a converter, thermocouple input, RTD input and DC input signals are converted to isolated 4 to 20mA DC output.
It is also possible to change the scale freely.

Possible to expand control points

From one to max. 31 spots of measurement control can be carried out through serial communication (RS-485).
It is very easy to connect DCL-33A units by using the exclusive communication cable (CDD) between them.
(When connecting more than 31 units of DCL-33A, please consult us)

Conforms to Modbus protocol

Shinko protocol and Modbus protocol are provided as a serial communication (C5) protocol (For Modbus protocol, RTU mode and ASCII mode are available).
Therefore, the DCL-33A can be connected to Modbus compatible instruments without using a communication converter.

## Can be used as a setting value digital receiver

By using Shinko programmable controller (with option SVTC) as a program setter in combination with DCL-33A (with option C5), the DCL-33A can also be used as a programmable controller for multiple positions.
(A maximum of 31 units of DCL-33A can be connected.)

Easy mounting and removal

Hook the upper part of the DCL-33A to the DIN rail and fit the lower part of it to the DIN rail.
Fixed DCL-33A is resistant to vibration, and easy to maintain.
To remove the DCL-33A from the DIN rail, release the hook at the lower part of the DCL-33A by sliding it downward with a flat bladed screwdriver.
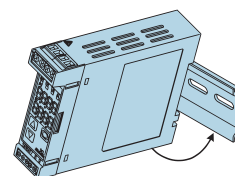
Safety standard

UL/CSA and CE marking

Specifications

■Model name

| D C L－3 3 A－□／M, □, □□□			Series name: DCL-33A (W22.5 x H75 x D100mm)
Control output (OUT)	R		Relay contact: 1a
	S		Non-contact voltage (for SSR drive): 12^{+2}_{0} V DC
	A		DC current: 4 to 20mA DC
Input	M		Multi-input
Supply voltage		1	24V AC/DC (*1)
Options		W（ 5A）	Rated current: 5A
		W（10A）	Rated current: 10A Heater burnout alarm
		W（20A）	Rated current: 20A (*2)
		W（50A）	Rated current: 50A
		C5	Serial communication (Based on EIA RS-485)

Please designate the specification from the □, □□□ columns.
When adding an option, enter it punctuated by a comma.
(*1): For the power supply, 100 to 240V AC is standard. However, when ordering 24V AC/DC, enter "1" after the input.
(*2): For DC current output type, the option W cannot be applied.

■Name and functions of the sections
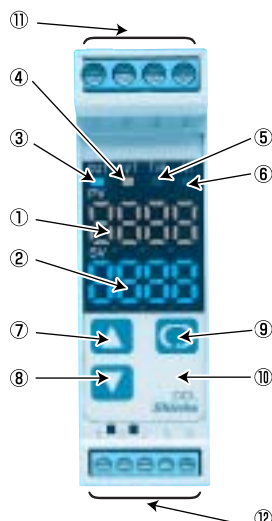
⑪PV display: Indicates the input value (PV). Indicates characters during setup.
②SV display: Indicates the setting value. Indicates the setting value of each setting item during setup.
③OUT indicator: Lights when control output (OUT) is ON. (For DC current output type, this blinks in a 0.25 second cycle corresponding to the output manipulated variable.)
④EVT indicator : Lights when Alarm, Loop break alarm or Heater burnout alarm (option) is ON.
⑤T/R indicator: Blinks when responding to the command from the host computer during serial communication.
⑥AT indicator: Blinks while PID auto-tuning or PD auto-reset is being performed.
⑦Increase key : Sets or selects each setting item value (Increases the numeric value).
⑧Decrease key: Sets or selects each setting item value (Decreases the numeric value).
⑨Mode key: Changes the setting mode or registers the setting value.
⑩Sub-mode key: Brings up setting item in combination with a Increase or Decrease key.
⑪Power terminals, control output (OUT) terminals
⑫Input terminals, EVT output terminals

■Rated scale

Input types		Scale	
Thermo-couple	K	－200 to 1370 ℃	－320 to 2500 ˚F
		－199.9 to 400.0℃	－199.9 to 750.0 ˚F
	J	－200 to 1000 ℃	－320 to 1800 ˚F
	R	0 to 1760 ℃	0 to 3200 ˚F
	S	0 to 1760 ℃	0 to 3200 ˚F
	B	0 to 1820 ℃	0 to 3300 ˚F
	E	－200 to 800　℃	－320 to 1500 ˚F
	T	－199.9 to 400.0℃	－199.9 to 750.0 ˚F
	N	－200 to 1300 ℃	－320 to 2300 ˚F
	PL-Ⅱ	0 to 1390 ℃	0 to 2500 ˚F
	C（W/Re5-26）	0 to 2315 ℃	0 to 4200 ˚F
RTD	Pt100	－200 to 850　℃	－300 to 1500 ˚F
		－199.9 to 850.0℃	－199.9 to 999.9 ˚F
	JPt100	－200 to 500　℃	－300 to 900　˚F
		－199.9 to 500.0℃	－199.9 to 900.0 ˚F
DC current	4 to 20mA	－1999 to 9999	
	0 to 20mA		
DC voltage	0 to 1V	－199.9 to 999.9	
	0 to 5V	－19.99 to 99.99	
	1 to 5V	－1.999 to 9.999	
	0 to 10V		

・ For DC current and DC voltage inputs, scaling and decimal point place change are possible.
・ For DC current input, 50Ω shunt resistor (sold separately) has to be externally installed.

■Standard specifications

Display	PV: Red 4-digit, character size; 7.5 x 4.1mm (H x W) SV: Green 4-digit, character size; 7.5 x 4.1mm (H x W)
Input	Thermocouple ---- K, J, R, S, B, E, T, N, PL-Ⅱ, C(W/Re5-26) 　　　　　　　　　External resistance: 100Ω or less (For B input: 40Ω or less) RTD ----------------- Pt100, JPt100 3-wire system (Allowable input lead wire resistance, 10Ω or less per wire) DC current --------- 0 to 20mA DC, 4 to 20mA DC 50Ω shunt resistor (50Ω shunt resistor must be connected between input terminals) 　　　　　　　　　Allowable input current: 100mA or less DC voltage ------- 0 to 1V DC Input impedance: 1MΩ or greater, Allowable input voltage: 5V or less, Allowable signal source resistance: 　　　　　　　　　2kΩ or less 　　　　　　　　　0 to 5V DC, 1 to 5V DC, 0 to 10V DC Input impedance: 100kΩ or greater, Allowable input voltage: 15V or less 　　　　　　　　　Allowable signal source resistance: 100Ω or less
Accuracy (Setting, Indication)	Thermocouple ----------- Within ±0.2% of input span ±1digit, or within ±2℃(4°F), whichever is greater 　　　　　　　　　　However, for R or S input, 0 to 200℃(0 to 400°F): Within ±6℃(12°F) 　　　　　　　　　　B input, 0 to 300℃(0 to 600°F): Accuracy is not guaranteed. 　　　　　　　　　　K, J, E, N, T inputs, less than 0℃(32°F): Within ±0.4% of input span ±1digit RTD ----------------------- Within ±0.1% of input span ±1digit, or within ±1℃(2°F), whichever is greater DC current, voltage ---- Within ±0.2% of input span ±1digit
Input sampling period	0.25 seconds
Control output (OUT)	Must be designated ・Relay contact ---------- 1a 3A 250V AC(resistive load), 1A 250V AC (inductive load cos φ =0.4), Electric life: 100,000 times ・Non-contact voltage -- 12$^{+2}_{-6}$ V DC Max. 40mA DC (short-circuit protected) ・DC current--------------- 4 to 20mA DC Load resistance: Max. 550Ω 　　　　　　　　　　　Output accuracy: Within ±0.3% of Output span (Within ±0.048mA) 　　　　　　　　　　　Resolution: 12000
Control action	The following action can be selected by keypad operation [Default: PID] PID (with AT), PI action, PD action (with manual reset), P action (with manual reset), ON/OFF action 　Proportional band (P) : 0.0 to 110.0% (ON/OFF action when set to 0.0) [Default: 2.5%] 　Integral time (I)　　　: 0 to 1000s (Off when set to 0) [Default: 200s] 　Derivative time (D)　 : 0 to 300s (Off when set to 0) [Default: 50s] 　Proportional cycle　　: 1 to 120s (Not available for DC current output type)[Default: 30s for relay contact, 3s for non-contact voltage] 　ARW　　　　　　　　: 0 to 100% [Default: 50%] 　Manual reset　　　　 : ±Proportional band converted value [Default: 0.0] 　Hysteresis　　　　　 : 0.1 to 100.0℃(°F) [Default: 1.0℃] 　　　　　　　　　　　For DC input, 1 to 1000 (The placement of the decimal point follows the selection.) 　Output limit　　　　　: 0 to 100% (for DC current output type, ─5 to 105%)
Event output (EVT)	**Alarm** Alarm action types and status Energized/Deenergized can be selected by keypad operation. 　・No alarm action 　・High limit alarm　　　　　　　　　(Deviation setting) Setting range: ─Scaling span to scaling span 　・Low limit alarm　　　　　　　　　(Deviation setting) Setting range: ─Scaling span to scaling span 　・High/Low limits alarm　　　　　　(Deviation setting) Setting range: 0 to scaling span 　・High/Low limit range alarm　　　　(Deviation setting) Setting range: 0 to scaling span 　・Process high alarm　　　　　　　　　　　　　　　　Setting range: Scaling low limit value to scaling high limit value 　・Process low alarm　　　　　　　　　　　　　　　　Setting range: Scaling low limit value to scaling high limit value 　・High limit alarm with standby　　(Deviation setting) Setting range: ─Scaling span to scaling span 　・Low limit alarm with standby　　(Deviation setting) Setting range: ─Scaling span to scaling span 　・High/Low limits alarm w/standby (Deviation setting) Setting range: 0 to scaling span 　Negative minimum value: ─199.9, ─1999 Positive maximum value: 999.9, 9999 Setting accuracy -- The same as the indicating accuracy Action ---------------- ON/OFF action Hysteresis ---------- Thermocouple, RTD: 0.1 to 100.0℃(°F) 　　　　　　　　　　 DC current, voltage input: 1 to 1000 (The placement of the decimal point follows the selection.) Output ---------------- Open collector Control capacity: 24V DC 0.1A (Max.) **Loop break alarm** Detects heater burnout, sensor burnout and actuator trouble. Loop break alarm time ----- 0 to 200 minutes Loop break alarm span ---- Thermocouple and RTD input: 0 to 150℃(°F) or 0.0 to 150.0℃(°F) 　　　　　　　　　　　　 DC current, voltage input: 0 to 1500 Output -------------------------- Open collector Control capacity: 24V DC 0.1A (Max.) **Heater burnout alarm (option)** Watches heater current with current transformer (CT) and detects Heater burnout. Heater rated current must be designated from 5A, 10A, 20A, 50A. Setting range --------- Rated current 5A: 0.0 to 5.0A,　Rated current 10A: 0.0 to 10.0A 　　　　　　　　　　　Rated current 20A: 0.0 to 20.0A, Rated current 50A: 0.0 to 50.0A Setting accuracy ----- Within ±5% of heater rated current Output ------------------ Open collector Control capacity: 24V DC 0.1A (Max.) Output self holding -- Not available Accessories ---------- CT [CTL-6-S (for 5A,10A, 20A), or CTL-12-S36-10L1 (for 50A)] (1piece), Wire harness (3m)
Supply voltage	Must be designated. 100 to 240V AC 50/60Hz, 24V AC/DC 50/60Hz For the supply voltage, 100 to 240V AC is standard. When ordering 24V AC/DC, enter "1" after the input code. Allowable voltage fluctuation range: 85 to 264V AC, 20 to 28V AC/DC
Power consumption	Approx. 6VA
Isolation resistance	For non-contact voltage output type (SSR drive) or DC current output type, insulation test must not be performed because output terminals and communication terminals are not isolated from one another. Other combination except above: 10MΩ or greater at 500V DC
Dielectric strength	1.5kV AC for 1 minute between input terminals and power terminals, between output terminals and power terminals
Environment	Ambient temperature: 0 to 50℃, Ambient humidity: 35 to 85%RH (Non-condensing)
Material・Color	Material: Flame resistant resin Color: Light gray
External dimension	22.5 x 75 x 100mm (W x H x D)
Mounting method	DIN rail mounting
Setting method	Sheet key input
Weight	Approx. 150g
Attached functions	Sensor correction, Setting value lock, Power failure countermeasure, Self-diagnosis, Automatic cold junction temperature compensation (thermocouple only), Sensor burnout alarm, Input burnout

■Options

| Heater burnout alarm (W)	Refer to Heater burnout alarm (option) of Event output.
Serial communication (C5)	Reading and setting of the various setting values or various setting status changes of the DCL-33A can be operated from the external computer. The main setting value of the programmable controller (with option SVTC) can be transmitted to the DCL-33A (with option C5) digitally in combination with programmable controller(with option SVTC) and DCL-33A (with option C5). 　Communication interface --- Based on EIA RS-485 　Communication method ----- Half-duplex communication start-stop synchronous 　Communication speed ------ 2400/4800/9600/19200bps (Selectable by keypad operation) 　Parity --------------------------- Even/Odd/No parity (Selectable by keypad operation) (only for Modbus protocol) 　Stop bit -------------------------- 1 or 2 (Selectable by keypad operation) (only for Modbus protocol) 　Communication protocol ---- Shinko protocol/Modbus protocol (Selectable by keypad operation) 　Data format

Protocol	Shinko	Modbus RTU	Modbus ASCII
Start bit	1	1	1
Data bit	7	8	7
Parity	Even	Selected value	Selected value
Stop bit	1	Selected value	Selected value

Number of connectable units ------ A maximum of 31 units per host computer
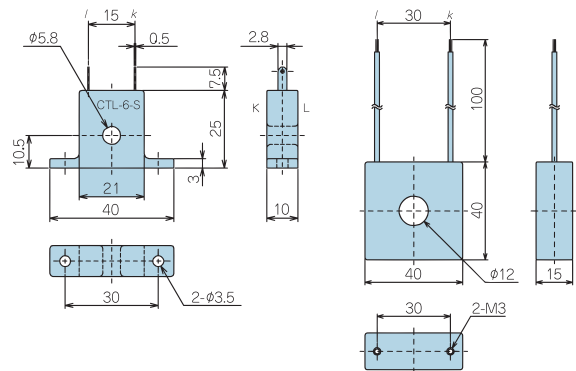Communication error detection --- Double detection by the parity and checksum
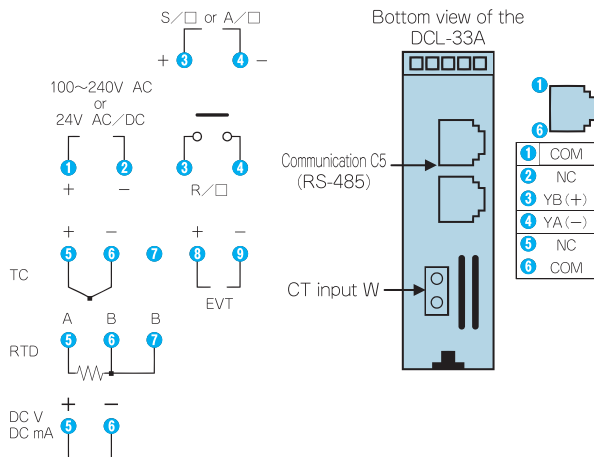
■External dimension
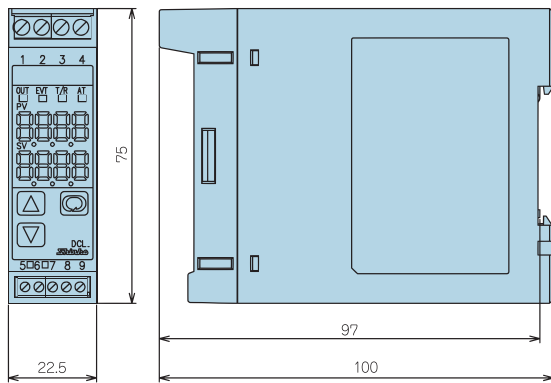
■CT dimension

CTL-6-S (for 5A, 10A, 20A)　　　CTL-12-S36-10L1(for 50A)

■Terminal arrangement

Bottom view of the DCL-33A

❶	COM
❷	NC
❸	YB（＋）
❹	YA（－）
❺	NC
❻	COM

・R/□: Relay contact output
・S/□: Non-contact voltage output
・A/□: DC current output
・RS-485: Serial communication (C5)
・EVT: Event output (Alarm output, Loop break alarm, Heater burnout alarm output)

■Terminal screw fastening torque

Terminals 1 to 4: Tightening torque is max. 0.5N・m.
Terminals 5 to 9: Tightening torque is max. 0.25N・m.

Accessories sold separately

■Communication cable

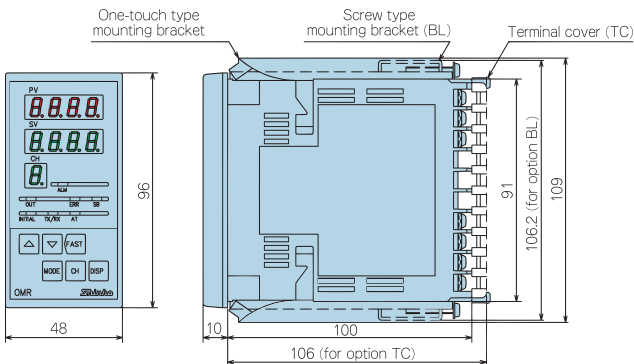| Model name	CDD : Communication cable to connect the DCL-33As 　　Cable length: Approx. 60mm CDH : Communication cable to connect the DCL-33A and Hakko touch panel unit 　　Cable length: Approx. 0.5m (standard) (Can be extended by 0.5m each time.) CDM : Communication cable to connect the DCL-33A and OMR-100, or connect the DCL-33A and touch panel unit or programmable controller 　　Cable length: Approx. 3m (standard) (Can be extended by 1m each time.)

■External dimension
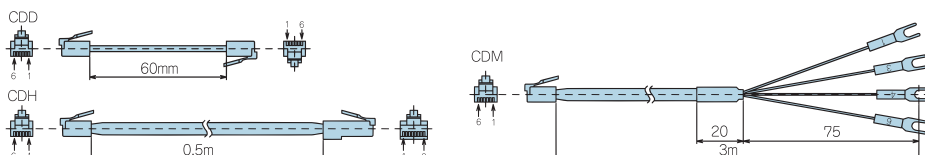
Console unit for DCL-33A OMR-100

One OMR-100 installed on the control panel can perform settings for up to 10 DCL-33A units with the communication function in the control panel and monitor their control.
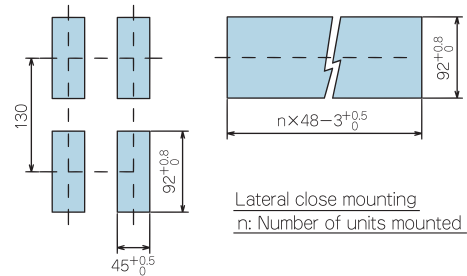
■Standard specifications

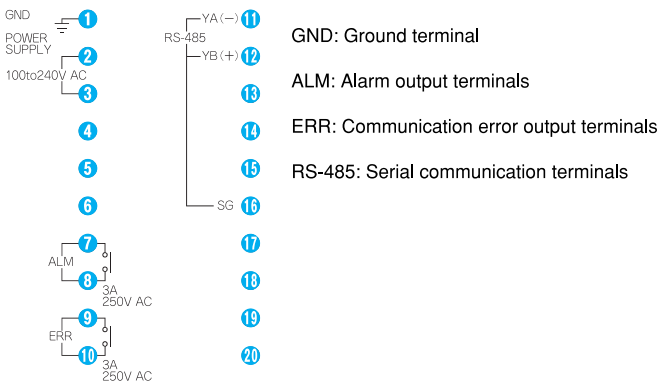|	
Display	PV display: Red LED 4 digits, character size 8 x 4mm (H x W) SV display: Green LED 4 digits, character size 8 x 4mm (H x W) CH display: Yellow LED 1 digit, character size 8 x 4mm (H x W)
Indicator	ALM: Red LED lights when the Alarm is activated. OUT: Green LED lights when the control output is ON. ERR: Blinks at intervals of 2 seconds when serial communication errors occur. SB: Red LED lights when sensor is burnt out. INITIAL: Yellow LED lights while setting values are being read. TX/RX: Yellow LED lights during serial communication TX output. AT: Yellow LED lights during auto-tuning.
Alarm output	The output is turned on when the alarm is activated. (Common to all channels) Output: Relay contact, 1a, Control capacity, 3A 250V AC(resistive load), 1A 250V AC(Inductive load cos ϕ =0.4)

Serial communication	Communication line : Based on EIA RS-485
	Communication method : Half-duplex communication start-stop synchronous
	Communication speed : 19200bps
	Data format : Start bit (1), Data bit (7), Parity(Even), Stop bit (1)
	Transmitted contents : SV, Alarm setting value, OUT proportional cycle value, OUT proportional band value, Integral time value,
	                Derivative time value, ARW value, Manual reset value, AT setting, Setting value lock selection
	Received contents : Transmitted contents above, Control input value, Status flag (Output status, Overscale, Underscale, During AT)
	Communication error output: Turns ON when communication errors occur.
	Output : Relay contact, 1a
	                Control capacity, 3A 250V AC (resistive load)
	                         1A 250V AC (inductive load cos ϕ =0.4)

Supply voltage	Must be designated. 100 to 240V AC 50/60Hz, 24V AC/DC 50/60Hz (For supply voltage, 100 to 240V AC is standard. However, when ordering 24V AC/DC, enter "1" after model name OMR-100.) Allowable fluctuation range: 85 to 264V AC, 20 to 28V AC/DC
Power consumption	Approx. 5VA
Isolation resistance	10MΩ or greater at 500V DC
Dielectric strength	1.5kV AC for 1minute between power terminals and ground terminal, between power terminals and communication terminals, between communication terminals and ground terminal:
Environment	Ambient temperature: 0 to 50℃, Ambient humidity: 35 to 85%RH (Non-condensing)
Weight	Approx. 320g
External dimension	48 x 96 x 100mm(W x H x D)
Attached functions	Self diagnosis, Warm-up indication, Error indication when changing setting value, Indicated value when communication errors occur
Options	Mounting bracket [BL]: Mountable panel thickness, Within 1 to 15mm Dust-proof/Drip-proof [IP]: IP54 Terminal cover [TC]: Electric shock protection terminal cover

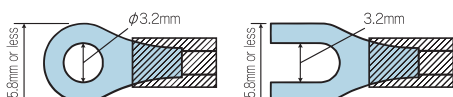## ■External dimension

■Panel cutout

Lateral close mounting
n: Number of units mounted

■Terminal arrangement

GND: Ground terminal

ALM: Alarm output terminals

ERR: Communication error output terminals

RS-485: Serial communication terminals

■Wiring

A maximum of 10 DCL-33A units
(with communication) can be connected.
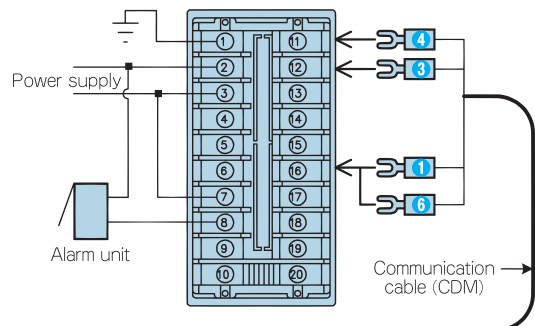
Communication
cable (CDD)

■Solderless terminal

Use a solderless terminal with an isolation sleeve that fits in the M3 screw as shown below.
The tightening torque should be 0.6N・m to 1.0N・m.

When a PC monitors multiple DCL-33A units

By connecting to the PC, up to 40 points of temperature control can be monitored using a communication converter.
(If PC's communication specification is RS-485, it is not necessary to use a communication converter.)
As a communication converter, Shinko IF-300-C5 is provided.
SWM-JC001M is also available as monitoring software.

Communication converter IF-300-C5
Personal computer
RS-232C
RS-485
Communication cable (model: CDD)
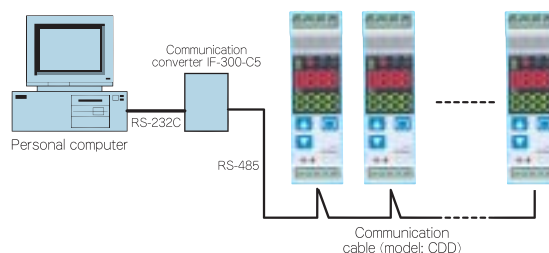
### When a touch panel unit monitors plural DCL-33A units

A maximum of 31 points of temperature control and monitoring can be carried out by connecting DCL-33A to the touch panel unit.
The following touch panel units are available.
Digital Electronics Corp.: GLC series, GP series
Hakko Electronics CO., LTD.: V7 series, V6 series
(For the communication cable, use Shinko's exclusive cable.)

Touch panel unit
Communication cable
Communication cable (model: CDD)
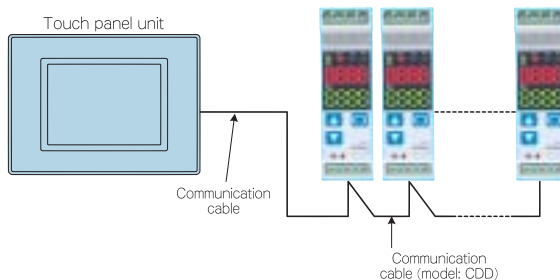
When using DCL-33A units as a programmable controller

By using Shinko programmable controller PCD-33A or PC-935 (with option SVTC) as a program setter in combination with DCL-33A (with option C5), DCL-33A can also be used as a programmable controller for a maximum of 31 positions.

Progammable controller
Communication cable (model: CDM)
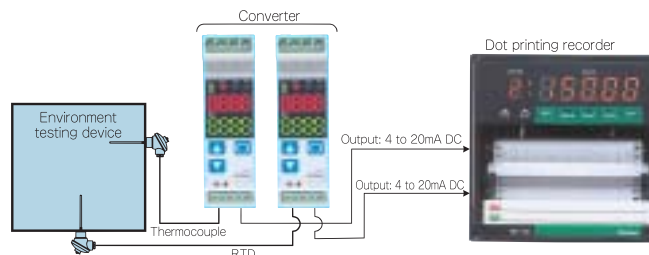Communication cable (model: CDD)
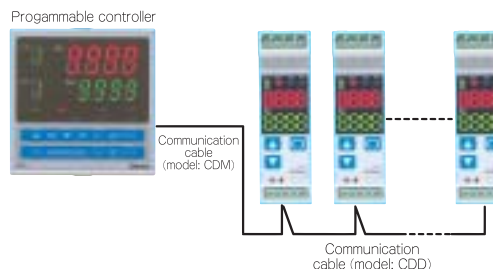
When using DCL-33A units as a converter

Various process signal inputs are converted to 4 to 20mA DC output. The input of process signal, the output of 4 to 20mA DC and power source for DCL-33A are isolated from one another.
By connecting 4 to 20mA DC output to multi-point indicating recorder, process variable at multiple positions can be monitored.
(Use DC current output type DCL-33A.)

Converter
Dot printing recorder
Environment testing device
Output: 4 to 20mA DC
Output: 4 to 20mA DC
Thermocouple
RTD

When using max. 50 DCL-33A units with the PLC

By connecting to the PLC via PLC interface unit SIF-200-GCS, a maximum of 50 DCL-33A units can be connected.
Please make inquiries concerning the PLC compatible with SIF-200-GCS to us or our agency.

P L C
SIF-200-GCS
RS-232C or RS-422 (RS-485)
Communication cable (model: CDM)
Communication cable (model: CDD)

· This catalog is as of August. 2003 and its contents are subject to change without notice.
· If you have any inquiries, please consult us or our agency.