DB600 SERIES

DIGITAL INDICATING CONTROLLER

PERFORMANCE SPECIFICATION
CHINO

The DB600 series is a digital indicating controller with the indicating accuracy of ±0.1% and the control cycle of approximately 0.1 seconds.
Various functions including universal input and multiple setting values (8 types) are provided as standard.
There are three types of size.
DB670 --- 96 x 96mm, DB650 --- 48 x 96mm,
DB630 --- 48 x 48mm

FEATURES

Excellent control performance
PID control algorithm and Z control algorithm are selectable according to the application.
PID control algorithm: Conventional control method
Z control algorithm: Our new algorithm (patent with Iwate Univ.) which has evolved the PID control method. Especially, the effect can be expected such as overshoot suppression and speedy recovery in the event of disturbance control (during opening and closing of the electric furnace).

Large easy-to-view 5-digit 11 segments display
Process value (PV) and set value (SV) are displayed by large easy-to-view 5-digit display indicators. The resolution of 0.1°C is enabled for more than 1000°C.

Highly-functional operation screen and settings screen
The controller inherits the operation screen and the settings screen adopting the LCD (liquid-crystal-display) which has been familiarized for long time. Furthermore, the screens have become high-definition and highly sophisticated.

Operability inheriting previous models
The controller inherits the settings screen which has been familiarized for long time. You can set up it with operation which is not different from previous models. The performance of touching-keys has been improved and the outstanding operability has been realized.

24V power supply voltage type available
The power supply voltage 24V (AC/DC) type, which is advantageous in respect of safety, is available.

Various operating status in one glance
Operating condition
Setting value ramp (option for program model)
Analog bar output

Universal input
Various measurement ranges of DC voltage (up to maximum 10V) inputs, DC current input, thermocouple inputs and resistance thermometer inputs have been built-in.

Program Operation (option)
Set 4 patterns, 12 steps. Patterns are repeatable and linkable.

Conforming to international safety standards and European directives (CE)
The controller is in conformity with European directives (CE), and is UL and c-UL approved.

Easy parameter setting
Parameters can be easily setup by using exclusive engineering cable (RZ-EC4) (sold separately) and setting software (downloadable from web site)

Easy to connect with Mitsubishi PLC, MELSEC-Q Series by using FB (function block) library
Please download the FB library from Mitsubishi Electric Corporation homepage.

What is Z control?

Z Control is applied from control algorithm of skunk cabbage (white arum).
Skunk cabbage is a plant that generates heat to maintain body temperature at about 20 ℃ in spite of changes in the outside temperature.
Incorporating system of heating control by minimum energy to the controller.

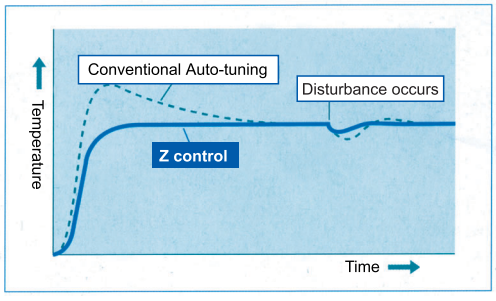
Excellent control

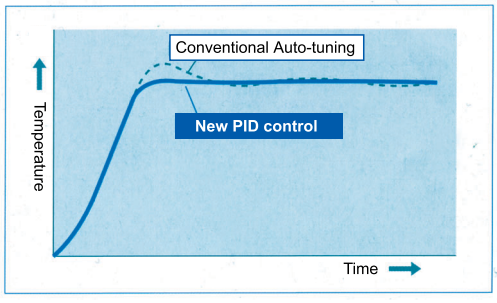
Control algorithm (PID control, Z control)
You can choose the control algorithm PID control and Z control depending on the controlled object or application.

PID control
Conventional control algorithm

Z control
It is our original control algorithm which we evolved from general PID control.
Especailly during heating control, it can suppress overshoot effect, shortening stabilzaiton time, speed up of returing speed from distrubance (ex. the opening and closing of the oven door).

Achieve better control condition by new auto-tuning
Improved conventional auto-tuning and determine more appropriate control parameter setting.
Compared to the conventional method, it can suppress overshooting and reduce of the settling time.





MODELS

DB670

DB67□□□□□□□□□□

Control algorithm
1 : PID control
2 : Z control

Control output 1
1 : ON-OFF pulse output type
2 : ON-OFF servo output type
3 : Current output type
5 : SSR drive pulse output type
6 : Voltage output type

Control output 2 (Option)
0 : None
1 : ON-OFF pulse output type *1
3 : Current output type *1
6 : Voltage output type *1

Communications interface + 5 External signal input points / 5 Status output points (Open collector output) (Option)
0 : None
A : RS422A + 5 External signal input points [DI 1 to 5]
S : RS485 + 5 External signal input points [DI 1 to 5]
B : RS422A + 5 Event output points [EV 5 to 9]*2
C : RS485 + 5 Event output points [EV 5 to 9]*2

Transmission signal output + 2 Event event output points (Mechanical relay output)(Option)*5
4 : 4 to 20mA + 2 Event output points [EV3,4] *2
6 : 0 to 10V + 2 Event output points [EV3,4] *2
7 : 2 Event output points [EV3,4]*2

Remote signal input + 2 External signal input points (Option)
0 : None
5 : 4 to 20mA
7 : 0 to 10V
8 : 4 to 20mA + 2 External signal input points [DI6,7] *3
A : 0 to 1V + 2 External signal input points [DI6,7] *3
B : 2 External signal input points [DI6,7] *3

Programming function (Option)
- : None
P : Available

2 Alarm event output points (Mechanical relay output)+ Heater disconnection detection(Option)
0 : None
1 : 2 Event output points [EV1,2] *2,*4
2 : 2 Event output points [EV1,2] *2,*4 + Heater disconnection detection *5

Additional Function (Option)
0 : None
1 : Waterproof
A : Output scaling *6
B : Lower limit burnout
C : Square root calculation
D : Open loop system ON-OFF servo
E : Waterproof + Output scaling
F : Waterproof + Lower limit burnout *6
G : Waterproof + Square root calculation
H : Water proof + open loop system ON-OFF servo

Power voltage
A : 100 to 240V AC
D : 24V AC/DC

*1 It can be specified when Control output 1 is "1" , "3", "5" or "6".
*2 Alarm event only functions on mechanical output so please confirm the event function.
*3 It can be specified when 2 Event output points + Heater disconnection detection is "0" or "1".
*4 When specification with Control output 2, number of event output points is only 1 point [EV2]
*5 It can be specified when Control output 1 and Control output 2 are "1" or "5" and Remote signal input + 2 External signal input points is "0", "5", "6" or "7". However, if Control output 1 and Control output 2 are both "1" or "5", it can be operated with Control output 1.
*6 Only PID control can be specified.

DB650

DB65□□□□□□□□□□

Control algorithm
1 : PID control
2 : Z control

Control output 1
1 : ON-OFF pulse output type
2 : ON-OFF servo output type
3 : Current output type
5 : SSR drive pulse output type
6 : Voltage output type

Control output 2 (Option)
0 : None
3 : Current output type *1
6 : Voltage output type *1

Communications interface + 5 External signal input points / 5 Status output points (Open collector output (Option)
0 : None
A : RS422A + 5 External signal input points [DI 1 to 5]
S : RS485 + 5 External signal input points [DI 1 to 5]
B : RS422A + 5 Event output points [EV 5 to 9]*2
C : RS485 + 5 Event output points [EV 5 to 9]*2

Transmission signal output + 2 Event event output points (Mechanical relay output)(Option)*5
0 : None
4 : 4 to 20mA + 2 Event output points [EV3,4] *1,*2
6 : 0 to 10V + 2 Event output points [EV3,4] *1,*2
7 : 2 Event output points [EV3,4] *1,*2

Remote signal input + 2 External signal input points (Option)
0 : None
5 : 4 to 20mA
7 : 0 to 10V
8 : 4 to 20mA + 2 External signal input points [DI6,7] *1,*3
A : 0 to 1V + 2 External signal input points [DI6,7] *1,*3
B : 2 External signal input points [DI6,7] *1,*3

Programming function (Option)
- : None
P : Available

2 Alarm event output points (Mechanical relay output)+ Heater disconnection detection(Option)
0 : None
1 : 2 Event output points [EV1,2] *2,*4
2 : 2 Event output points [EV1,2] *2,*4 + Heater disconnection detection *5

Additional Function (Option)
0 : None
1 : Waterproof
A : Output scaling
B : Lower limit burnout *6
C : Square root calculation
D : Open loop system ON-OFF servo
E : Waterproof + Output scaling
F : Waterproof + Lower limit burnout *6
G : Waterproof + Square root calculation
H : Water proof + open loop system ON-OFF servo

Power voltage
A : 100 to 240V AC
D : 24V AC/DC

*1 It can be specified when Control output 1 is "1" , "3", "5" or "6".
*2 Alarm event only functions on mechanical output so please confirm the event function.
*3 It can be specified when 2 Event output points + Heater disconnection detection is "0" or "1".
*4 When specification with Control output 2, number of event output points is only 1 point [EV2]
*5 It can be specified when Control output 1 and Control output 2 are "1" or "5" and Remote signal input + 2 External signal input points is "0", "5", "6" or "7". However, if Control output 1 and Control output 2 are both "1" or "5", it can be operated with Control output 1.
*6 Only PID control can be specified.

●DB630

DB63□□0□00□□□□

Control algorithm
1 : PID control
2 : Z control

Control output 1
1 : ON-OFF pulse output type
3 : Current output type
5 : SSR drive pulse output type
6 : Voltage output type

Communications interface + 1 External signal input point / 5 External signal input points (Option)
0 : None
S : RS485 + 1 External signal input points [DI 1]
D : 5 External signal input points [DI 1 to 5]

Programming function (Option)
– : None
P : Available

2 Alarm event output points (Option)
0 : None
1 : 2 Event output points (mechanical relay output) [EV1,2] *1

Additional Function (Option)
0 : None
1 : Waterproof
A : Output scaling*2
B : Lower limit burnout
C : Square root calculation
E : Waterproof + Output scaling*2
F : Waterproof + Lower limit burnout
G : Waterproof + Square root calculation

Power voltage
A : 100 to 240V AC
D : 24V AC/DC

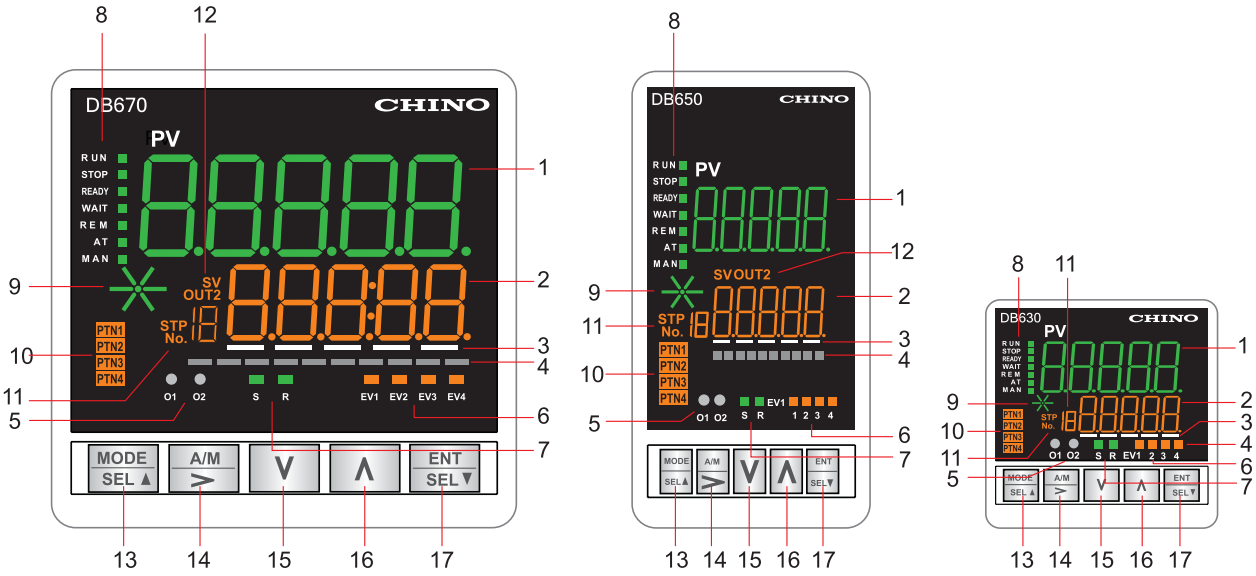
*1 Alarm event only functions on mechanical output so please confirm the event function.
*2 Only PID control can be specified.

■MEASURING RANGES

Input type		Measuring ranges	Measuring accuracy	
Thermocouple	B	0.0 to 1820.0°C	±0.1% of FS ±1digit For below 0°C, ±0.2% of FS ±1digit	Below 400°C: Out of specifications 400 to 800°C: ±0.2%FS±1digit
	R	0.0 to 1760.0°C		Bellow 400°C: ±0.2%±FS1digit
	S	0.0 to 1760.0°C		
	N	0.0 to 1760.0°C		
	K1	-200.0 to 1370.0°C		
	K2	-200.0 to 500.0°C		
	E	-200.0 to 900.0°C		
	J	-200.0 to 1200.0°C		
	T	-200.0 to 400.0°C		
	U	-200.0 to 400.0°C		
	L	-200.0 to 900.0°C		
	WRe5-WRe26	0.0 to 2310.0°C		
	W-WRe26	0.0 to 2310.0°C		Below 400°C: ±0.4%FS±1digit
	Platinel Ⅱ	0.0 to 1390.0°C		
	PtRh40-PtRh20	0.0 to 1880.0°C	±0.3% of FS ±1digit	Below 400°C: out of specification 400 to 800°C: ±0.8%FS±1digit
	Au-Pt	0.0 to 1000°C	±0.1% of FS ±1digit	
RTD	Pt100	-200.0 to 850.0°C	±0.1% of FS ±1digit	
		-200.0 to 200.0°C		
	JPt100	-200.0 to 649.0°C		
		-200.0 to 200.0°C		
	Pt50	-200.0 to 649.0°C		
DC voltage	20mV	-20.00 to 20.00mV	±0.1% of FS ±1digit	
	100mV	-100.00 to100.00mV		
	5V	-5.000 to 5.000mV		
	10V	-10.00 to 10.00mV		

* Accuracy indicates the performance under reference operating condition.
* For thermocouple, the reference junction compensation accuracy is added to the above measured accuracy.
*To measure DC current, ranges is converted to DC voltage by optional current input reciving resistor [250 Ω]

NAMES OF VARIOUS PARTS



Display

1. Measured value (PV)/ Parameter setting title
2. Setting value (SV)/ operating condition/ parameter setting value
   - Displays SV, operating status (output value, occurred event, auto tuning, etc.) and parameters.
3. Cursor for setting parameter
4. Analog bar
   - Displays Output value, CT measured value, feedback measured value, step time.
5. Output
   - O1: Displays output value status of output 1.
   - O2: Displays output value status of output 2.*
   *ON-OFF servo output type O1 and O2 both displays output 1 status.
   Always OFF when it is current output type / voltage output type
6. Event
7. Communication status display
   *Option model only
8. Operating status display
   - Constant value operation (program operation OFF)
   - Program operation (program operation ON)
   *Option model only
9. Setting value ramp display
   - Constant value operation (program operation OFF)
   - Program operation (program operation ON)
   *Option model only
10. Pattern No. (program operation ON)
    *Option model only
11. Execution No./ Step No.
    - Constant value operation (program operation OFF)
    - Program operation (program operation ON)
    *Option model only
12. Operation screen display
    Lights when displaying [PV/SV], [PV/OUT], [PV/OUT2]

Function keys

13. [MODE] key : Depending on the screen of which key is pressed at, following screen is displayed.
    - Displays operation initial screen, when displaying operation screen expect for operation initial screen.
    - Displays initial screen of MODE0, when displaying operation initial screen of operation screen.
    - Displays operation initial screen, when displaying initial screen of setting screen.
    - Displays initial screen of setting screen, when displaying setting screen expect for initial screen.

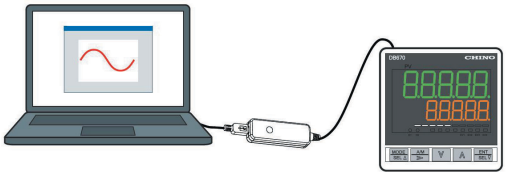
    [SELECT] key (REVERSE) : Switches operation screen or MODE screen in reverse direction
    [CANCEL] key : While setting/changing of parameter (dot at first digit of setting value blinks), setting/changing can be canceled. After the cancelation, dot blinking of setting value turns OFF.
14. [A/M] key : Switches AUTO/MAN of output 1/output 2. Operates while displaying operation screen. It cannot be operated while displaying setting screen.
    [>] key : Moves cursor for setting parameter to the right when setting numeric value on the parameter setting screen. It cannot be operated while displaying operation screen.
15. [∨] key : Decreases (decrement/changing of parameter) setting parameter and initial screen of each setting screen.
16. [∧] key : Increases (increment/changing of parameter) setting parameter and initial screen of each setting screen.
17. [ENTER] key : Registers setting / changing parameter. After the registration , dot blinking of setting value of setting/ changing parameter turns OFF.
    [SELECT] key: Switches operation screen and MODE screen to the forward direction.

EASY PARAMETER SETTTING

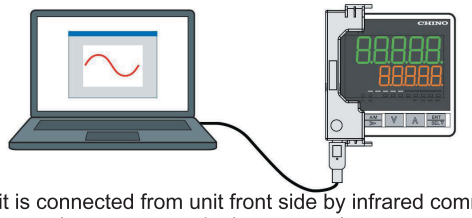
Parameters can be set easily using exclusive engineering cable (sold separately) and DB setting software (download from our homepage).

Engineering cable

USB engineering cable (RZ-EC4)



Infrared communication engineering cable (RZ-EC5)*



Since it is connected from unit front side by infrared communication, you can set the parameters in the mounted state.

*Applicable to DB650, DB670

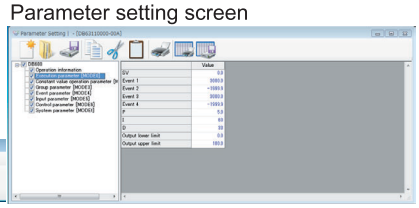
DB600 setting software

DB600 setting software is a software that enables reading and editing the parameters directly from the unit or parameters edited and saved beforehand can be applied to the unit. Simple data acquisition is also possible.

Compatible OS	Windows 7 (32bit/64bit) Japanese/English Windows 8.1 (32bit/64bit) Japanese/English Windows 10 (32bit/64bit) Japanese/English

NET Framework 4 or later has to be installed on the above OS

Parameter setting screen

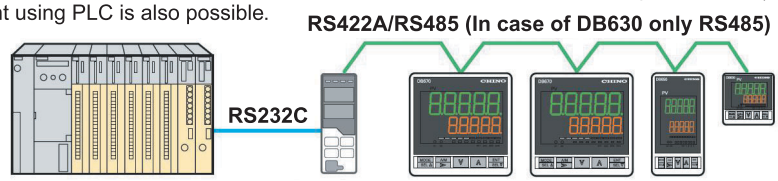


Launch screen

USEFUL COMMUNICATION INTERFACE FOR BUILDING INSTRUMENTATION SYSTEM

Communication interface (RS422A, RS485)

Able to connect to PLC via communication controller SC7D and able to load the data or set the parameters. (Option). Remote operations and parameter management using PLC is also possible.

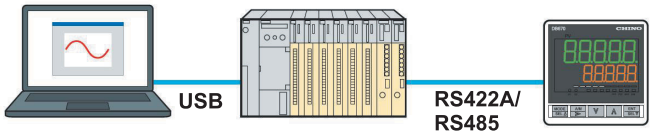


FUNCTION BLOCK PREPARED FOR EASY CONNECTION WITH PLC

DB600 series related circuit block is prepared as parts under Mistubishi Electric PLC sequence program. Supports efficiency and standardization in the development field.

Function details

Reading from DB600	PV,SV and other various setting parameters
Writing from DB600	SV and various other setting parameters



Applicable models

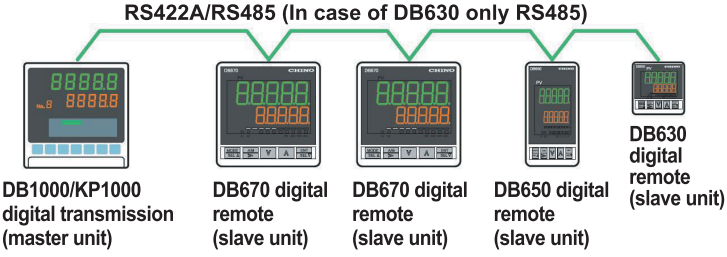
Mistubishi PLC MELSEC-Q series	Sequencer CPU unit (high performance model, universal model)
	Serial communication unit (QJ71C24N (CH2 only)), QJ71C24N-R4)
	Software: GX Works2 (Ver. 1.09K or later)

Usage example

Writing execution parameters
Reading various setting parameters from multiple DB600
Writing program pattern/ selection of patterns
Indication of running operation

DIGITAL TRANSMISSION/ DIGITAL REMOTE FUNCTION

Master unit digitally transmits the SV and slave unit receives it as remote SV. Realization of no transmission error remote operation.
Can be combined with conventional unit (DB1000, KP1000) also.

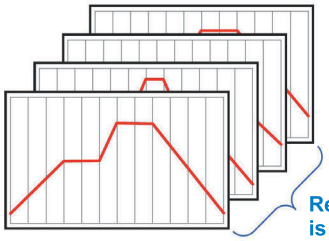


Digital remote function

MODBUS	RUN/READY, PID No., SV (no decimal point)
Private	SV (with decimal point)

USEFUL FUNCTIONS

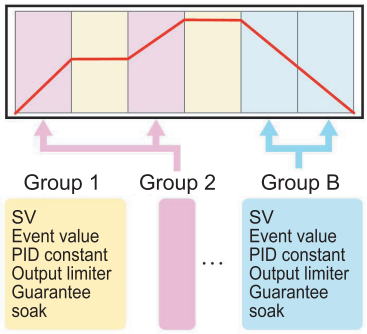
PROGRAM FUNCTION (OPTION)



Control is performed by the preset value and required time. 1pattern max. 12 steps. Max. 4 kinds of pattern can be set.

Repetitions and linking is also possible

GROUP SETTING FUNCTION (OPTION)



Maximum of 8 groups can be registered combining main control parameter to one. Selecting the group No. at the time of running and setting the parameters in a batch is possible.

Group No. can be allocated for each step when program is running.

MULTI OUTPUT SWITCHING (OPTION*1)

Calculation result of output1 can be output to either SSR drive pulse output, current output/voltage output or ON-OFF pulse output (EV2).

*1 This function can be set when the model is as below. (Inside the ☐ is arbitrary)

DB65☐53☐☐☐☐1☐☐
DB65☐53☐☐☐☐2☐☐
DB65☐56☐☐☐☐1☐☐
DB65☐56☐☐☐☐2☐☐
DB67☐53☐☐☐☐1☐☐
DB67☐53☐☐☐☐2☐☐
DB67☐56☐☐☐☐1☐☐
DB67☐56☐☐☐☐2☐☐

- Output 1: SSR drive pulse output type
- Output 2: Current output or voltage output type
- Mechanical relay output: 2 Alarm event output points [EV2] (+ heater disconnection detection)

Terminal output when multi output switching is set

	Setting values of multi output switching			
	Normal output setting	SSR drive pulse output setting	Current output/ Voltage output setting	ON-OFF pulse output setting*2
Control output 1 terminal output	Control output 1 calculation result [MV 1]	Control output 1 calculation result [MV 1]	0% output	0% output
Control output 2 terminal output	Control output 2 calculation result [MV 2]	0% output	Control output 1 calculation result [MV 1]	0% output
EV2 terminal output	EV2 event judgement result	EV2 event judgement result	EV2 event judgement result	Output control output 1 calculation result [MV 1] is output by ON-OFFpulse signal

*2 If it is ON-OFF pulse output type setting, then EV2 event judgment result (including heater alarm) will not be output from EV2 terminal.
If using ON-OFF pulse output setting and alarm event output (including heater alarm) by DB650/DB670, please select alarm event output [EV3, EV4].

INPUT SPECIFICATIONS

Input type: Thermocouple
B, R, S, N, K, E, J, T, U, L, WRe5-WRe26, W-WRe26, Platinel II, PtRh40-PtRh20, Au-Pt
DC voltage
±20mV, ±100mV, ±5V, ±10V
Resistance thermometer
Pt100, JPt100, Pt50

Measuring range: Thermocouple 16 ranges, DC voltage 4 ranges, Resistance thermometer 5 ranges

Temperature unit: °C

Accuracy rating: ±0.1% of FS ± 1 digit of measuring range
For details, refer to "measuring ranges and accuracy ratings"

Reference junction compensation accuracy:
±1.0°C (ambient temperature 23°C ± 10°C)
±2.0°C (temperatures other than above)

Sampling rate: Approx. 0.1 seconds

Burnout: Upper limit burnout is provided as standard for thermocouple, resistance thermometer and DC voltage (20mA) .
Output 1 produces PV abnormal output and output 2 is fixed to 0% when burnout occurs.
Upper limit alarm event is output.

Input impedance: Thermocouple 1MΩ or more
DC voltage Approx. 1MΩ

Allowable signal source resistance:
Thermocouple 100Ω or less
DC voltage (mV) 100Ω or less
DC voltage (V) 300Ω or less

Allowable wire resistance:
Resistance thermometer 10Ω/1 wire or less (resistance of 3 wires should be equal to one another)

Resistance thermometer measurement current:
Approx. 1mA

Maximum allowable input:
Thermocouple ±10VDC
DC Voltage (mV) ±10V DC
DC Voltage (V) ±20V DC
Resistance thermometer ±5V DC

Maximum common mode voltage:
30VAC

Common mode rejection ratio:
130dB or more (50/60Hz)

Series mode rejection ratio:
50dB or more (50/60Hz)

CONTROL SPECIFICATIONS

Control interval: Approx. 0.1 seconds

Output type: ON-OFF pulse output, ON-OFF servo output (DB650 and DB670 only), Current output, SSR drive pulse output, Voltage output

ON-OFF pulse type:
Contact type 1a contact
Pulse cycle Approx. 1 to 180 seconds
Contact capacity Resistive load 240VAC 3A
30VDC 3A
Inductive load 240VAC 1.5A
30VDC 1.5A
Minimum load 5VDC 10mA

ON-OFF servo output type:
- Contact type: 1a contact
- Feedback resistance: 100Ω to 2KΩ
- Contact capacity: Resistive load: 240VAC 3A, 30VDC 3A
  Inductive load: 240VAC 1.5A, 30VDC 1.5A
  Minimum load: 5VDC 10mA

Current output type:
- Output specification: 4 to 20mA DC
- Load resistance: 600Ω or less

SSR drive pulse output type:
- Pulse cycle: Approx. 1 to 180 seconds
- Output specification: ON 12V DC ±20% (load current 21mA or less)
  OFF 0.8V DC or less

Voltage output type:
- Output specification: 0 to 10V DC
- Output resistance: Approx. 10Ω
- Load resistance: 50KΩ or more

SETTING SPECIFICATIONS

SV related: SV 8 types for constant operation (Max. 5 digits display), SV rate-of-change

Control relations: PID 8 kinds: P 0.0 to 999.9%, I ∞ 1 to 9999 seconds, D 0 to 9999 seconds

Output related: Output dead band, output reset, output limiter 8 kinds, and output rate of amount limiter

DISPLAY SPECIFICATIONS

Display: Segment type LCD (LED backlight)

GENERAL SPECIFICATIONS

Rated power voltage:
100 to 240V AC
24V AC/DC

Rated power supply frequency:
50/60Hz

Maximum power consumption:

100 to 240V AC (without option)	DB630	100V AC 4VA 240V AC 5VA
	DB650	100V AC 4VA 240V AC 6VA
	DB670	100V AC 4VA 240V AC 6VA
100 to 240V AC (with option)	DB630	100V AC 5VA 240V AC 7VA
	DB650	100V AC 7VA 240V AC 10VA
	DB670	100V AC 9VA 240V AC 12VA
24V AC/DC (without option)	DB630	24V AC 3VA 24V DC 2W
	DB650	24V AC 4VA 24V DC 3W
	DB670	24V AC 4VA 24V DC 3W
24V AC/DC (with option)	DB630	24V AC 4VA 24V DC 3W
	DB650	24V AC 7VA 24V DC 5W
	DB670	24V AC 8VA 24V DC 6W

Countermeasure against power failure:
Store setting contents in non-volatile memory. (Rewrite: 1 million times)

Insulation resistance:
Between the primary and secondary terminals 20MΩ or more (500V DC)
*Primary terminal: Power terminal (100 to 240V AC) EV1 to 4 output terminals (relay output), ON-OFF pulse output terminal (relay output), ON-OFF servo output terminal (M3,M2,M1)
Secondary terminal: Power terminal (24V AC/DC), all terminals expect primary terminals

Withstand voltage: Between the primary and secondary terminals 1500V AC (1 minute)

Casing: Fire-retardant polycarbonate (UL94V-2)

Color: Gray

Mounting: Panel mounting type

External dimensions:

DB630	48(W) x 48(H) x 88(D)mm Depth from panel surface is 80mm
DB650	48(W) x 96(H) x 73(D)mm Depth from panel surface is 65mm
DB670	96(W) x 96(H) x 73(D)mm Depth from panel surface is 65mm

Weight:

DB630	(Without option) Approx. 120g (With option) Approx. 135g
DB650	(Without option) Approx. 150g (With option) Approx. 230g
DB670	(Without option) Approx. 240g (With option) Approx. 330g

Terminal screw: M3.0

Engineering port:
- DB630: At the bottom of the case
- DB650: At the top of the case
- DB670: At the top of the case

Infrared engineering port (DB650 and DB670): Front

REFERENCE OPERATING CONDITIONS

Ambient temperature: 23°C ± 2°C

Ambient humidity: 55%RH ± 5% (no condensation)

Power voltage: 100VAC ± 1%, 24V DC ± 1%

Power supply frequency: 50/60Hz ± 0.5%

Mounting orientation: Backward / forward ±3°, laterally ±3°

Installation height: 2000m or below

Vibration: 0m/s²

Shock: 0m/s²

Installation condition: Single panel mounting (space required around)

Wind: None

External noise: None

Warm up time: At least 30 minutes

NORMAL OPERATING CONDITIONS

Ambient temperature: -10°C to 50°C (-10°C to 40°C for close installation)

Maximum ambient humidity (ambient temperature -10 to 31°C): 90%RH (no condensation)

Maximum ambient humidity (ambient temperature 31 to 50°C): 90 to 50%RH (no condensation)
*Decreases linearly from 90% RH at 31°C, or to 50% RH at 50°C.

Minimum ambient humidity: 20%RH

Power voltage: 100 to 240V AC 90 to 264V AC; 24V AC/DC 21.6 to 26.4V AC/DC

Power supply frequency: 50/60Hz ± 2%

Mounting orientation: Backward/forward ±10°, laterally ±10°

Installation height: 2000m or below

Vibration: 0m/s²

Shock: 0m/s²

Installation condition: Panel mounting (space above and below)

External noise: None

Ambient temperature variation ratio: 10°C/hour or less

TRANSPORT CONDITIONS

Ambient temperature: -20°C to 60°C

Ambient humidity: 5 to 95%RH (no condensation)

Vibration: 4.9m/s² or less (10 to 60Hz)

Shock: 392m/s² or less (under factory packing condition)

STORAGE CONDITIONS

Ambient temperature:
-20°C to 60°C
*10 to 30°C for long-term storage

Ambient humidity: 5 to 95%RH (no condensation)

Vibration: 0m/s²

Shock: 0m/s² (under factory packing condition)

STANDARD

Safety: EN61010-1, EN61020-030 (CE marking)
UL61010-1, UL61010-2030 (UL)
CAN/CSA C22.2 No.61010-1(c-UL)
Setup category: CAT.II, pollution degree: 2

EMC compliant:
CE marking: EN61326-1 ClassA Table2
*Indication or output value varies by the amount equivalent to ±10% of FS or ±2mV, whichever is larger, during testing.

Enviroment regulation: RoHS directive

■OPTIONS

●Programing function

Patterns: 4 patterns (Max. 9,999 times repeatable)
Steps: 12 steps /1pattern
Step setup range: Target value --- Input scale range
Ramp rate --- -99.999 to 99.999
Time --- 0 to 999 hours 59 minutes or 0 to 999 minutes 59 seconds
Start temperature: Select either PV start or SV start (arbitrary value settable)
End output: Select either constant value control (setting: -5 to 105%)

●Event function

No. of events	EV1 to 4 (Mechanical relay)	EV5 to 9 (Open collector)
Event that can be allotted	Alarm event Status event	Status event
Output points	Max. 4 points	Max. 5 points
Contact capacity (Mechanical relay output) Output capacity (open collector output)	Resistance load: 240V AC3A/ 300 VDC 3A Inductive load: 240V AC 1.5A/ 30V DC 1.5A Minimum load: 5V DC 10mA	24V DC 50mA

Alarm event: Absolute value alarm, deviation alarm, absolute value deviation alarm, set point alarm, output value alarm, heater disconnection alarm (only when control output 1 or 2 is ON-OFF pulse output or SSR drive pulse output), Timer1, Timer2, FAIL
Status event: Constant value operation RUN, preset manual, remote input, SV rising, SV falling, program operation (step switching, step 1 to 12, RUN, STOP, ADVANCE, RESET, END, SV hold)

●Transmission signal output

Output point: 1 point
Output signal: 4 to 20mA DC (load resistance 400Ω or less)
0 to 10V DC (load resistance 50kΩ or more)
Accuracy: ±0.3% of full scale
Output updating interval:
Approx. 0.1 seconds
Insulation: Non-isolated between the adjustment output 1 and 2
(ON-OFF pulse output type excluded)

●External signal input

Input point: DB630 5 points maximum, COM shared
DB650 7 points maximum, COM shared
DB670 7 points maximum, COM shared
Input signal: Non voltage contact
External contact capacity:
5V DC 2mA
Function: Constant value operation RUN/READY switch, AUTO/MAN switch, preset manual, timer 1, timer 2, alarm event reset, execution No. selection, program/constant value operation switch, program operation RUN/STOP switch, program operation ADVANCE, program operation RESET, program pattern selection

●Remote signal input

Input point: 1 point
Input signal: 4 to 20mA DC (Input impedance Approx. 50Ω)
0 to10V DC (Input impedance Approx.100kΩ)
Maximum allowable input:
DC current ±30mA or less
±1.5V DC or less
DC voltage ±20V DC or less
Accuracy: ±0.3% of full scale ± 1digit
Sampling rate: Approx. 0.1 seconds
External signal switch:
R/L (Remote/Local)

●Communications interface

com.point: 1 port
Type: DB630 RS485
DB650 } RS422A,RS485
DB670 }
Protocol: MODBUS-RTU, MODBUS-ASCII, Private (used for digital transmission/digital remote input)
Function: Host communication/digital transmission/ digital remote input

●Z control algorithm

Our original control algorithm. Compatible of both suppressing overshoot effect and response time of returning back from disturbance. Parameter setting is same as conventional PID setting.

●2 output specification

Output type: ON-OFF pulse output type, current output type, and voltage output type. Any combination is possible.
Insulation: Not insulated between the 2 outputs (except ON-OFF pulse type)
Control method: PID type, split type

●Heater disconnection detection

Measures heater current using an external current transformer (CT) to detect disconnection.
Input points: 1 point
CT Input range: 0.0 to 65.0mA AC (50/60Hz)
Heater current measuring range:
5.0 To 50.0A AC
Input signal: 5.0 To 50.0A (50 / 60Hz)
Accuracy: ±5.0% of FS ±1digit
*Designated CT: Manufactured by U.R.D.Co, LTD. “CTL-6-S-H” LTA-P207 (800 turns, hole diameter 5.8mm), sold separately

●Open loop type ON-OFF servo output

Time control without using control motor feedback resistor when it is ON-Off servo output.

●Output scaling (Only PID control can be specified)

Scales the control output.

●Lower limit burnout

When it is burnout, PV display will off scale to lower limit and lower limit alarm will be output

●Square root calculation

Calculates square root for liner input

●Damp proof coating

Damp proofing coating to the internal PCB

●Water proofing

Attach to panel to have “IP54 equivalent” water proofing

●ºF value calculation

Calculates the PV and SV in ºF

■Accessories (sold separately)

●Terminal cover (model DB630/RZ-TC2, DB650/RZ-TC3, DB670/RZ-TC3)

Attach to the back side to protect the terminals

●Front protection cover (model DB630/RZ-PC2, DB650/RZ-PC3, DB670/RZ-PC4)

Attach to the front side to prevent incorrect operations

●Current input receiving resistors 250Ω (model EZ-RX250)

Used at the time of direct current input (4 To 20mA)

●Contact protection element (model CX-CR1 for light load, CX-CR2 for heavy load)

Attach to relay output terminal of ON-OFF output pulse and ON-OFF servo output type to protect the relay contact from noise.

●USB engineering cable (model RZ-EC4)

For connecting to PC and setting parameters using DB600 software

●Infrared communication engineering cable (model RZ-EC5, DB650/670 only)

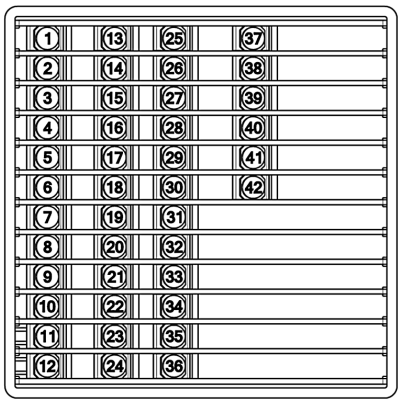
Cable for infrared communication from the front side of the unit to PC. Parameters can be set by using DB600 software

●Current transformer dia. 5.8 mm (for 50A) (model LTA-P207)

Designated current transformer used for heater disconnection detection. Manufactured by U.R.D.Co, LTD. “CTL-6-S-H”

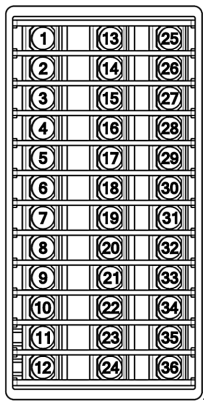
TERMINAL ARRANGEMENT

DB670



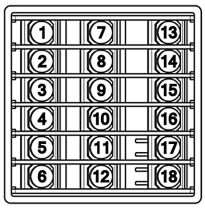
1	Measuring input +		13	Communication RDA	SA	25	EV3	37	Servo M3
2	Measuring input A+		14	Communication RDB	SB	26	EV3 COM	38	Servo M2
3	Measuring input B+		15	Communication SDA		27	EV4	39	Servo M1
4	Measuring input b		16	Communication SDB		28	EV4 COM	40	Servo R1
5	Control output 1+		17	Communication SG	SG	29	Transmission output +	41	Servo RC
6	Control output 1-		18	R/L(digital)DI		30	Transmission output -	42	Servo R2
7	Control output 2+	EV1	19	DI1	EV5	31	Remote input +		
8	Control output 2-	EV1 COM	20	DI2	EV6	32	Remote input -		
9	EV2		21	DI3	EV7	33	R/L(analog)DI		
10	EV2 COM		22	DI4	EV8	34	CT	DI6	
11	Power L		23	DI5	EV9	35	CT	DI7	
12	Power N/-		24	R/L & DI COM	R/L & EV COM	36	R/L & DI COM		

DB650



1	Measuring input +		13	Communication RDA	SA	25	EV3		Servo M3
2	Measuring input A+		14	Communication RDB	SB	26	EV3 COM		Servo M2
3	Measuring input B+		15	Communication SDA		27	EV4		Servo M1
4	Measuring input b		16	Communication SDB		28	EV4 COM		Servo R1
5	Control output 1+		17	Communication SG	SG	29	Transmission output +		Servo RC
6	Control output 1-		18	R/L(digital)DI		30	Transmission output -		Servo R2
7	Control output 2+	EV1	19	DI1	EV5	31	Remote input +		Transmission output +
8	Control output 2-	EV1 COM	20	DI2	EV6	32	Remote input -		Transmission output -
9	EV2		21	DI3	EV7	33	R/L(analog)DI		Remote input +
10	EV2 COM		22	DI4	EV8	34	CT	DI6	Remote input +
11	Power L/-		23	DI5	EV9	35	CT	DI7	R/L(analog)DI
12	Power N/-		24	R/L & DI COM	R/L & EV COM	36	R/L & DI COM		R/L COM

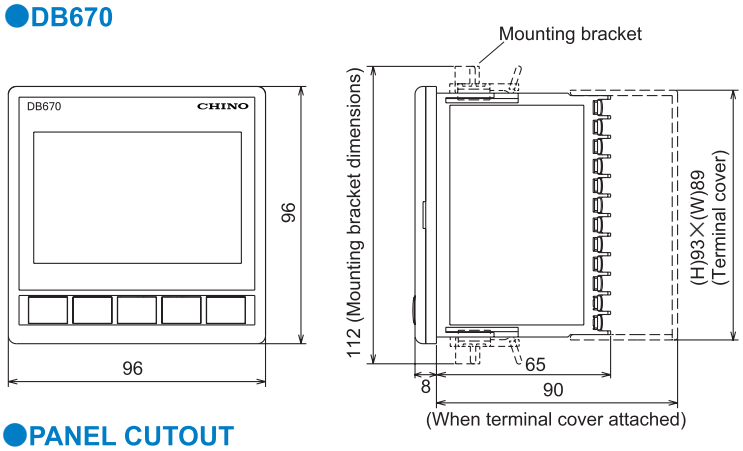
DB630



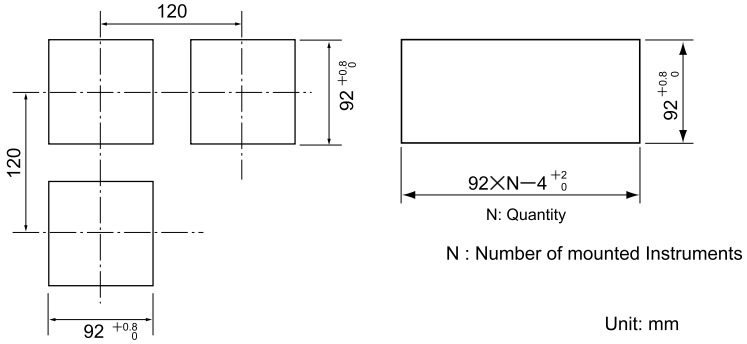
1	Control output 1+	7	Communication SA	DI1	EV5	13	Control output 2+ EV1
2	Control output 1-	8	Communication SB	DI2	EV6	14	Control output 2- EV1 COM
3	Measuring input +	9	Communication SG	DI3	EV7	15	EV2
4	Measuring input A+	10	R/L(digital)	DI4	EV8	16	EV2 COM
5	Measuring input B+	11	DI1	DI5	EV9	17	Power L/-
6	Measuring input b	12	R/L & DI COM	DI COM	EV COM	18	Power N/-

■EXTENAL DIMENSIONS

●DB670



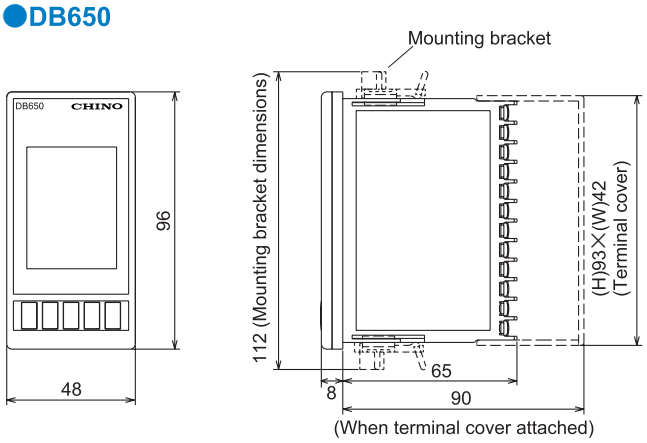
●PANEL CUTOUT



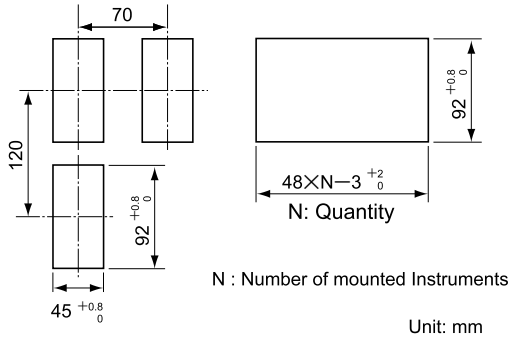
N : Number of mounted Instruments

Unit: mm

●DB650



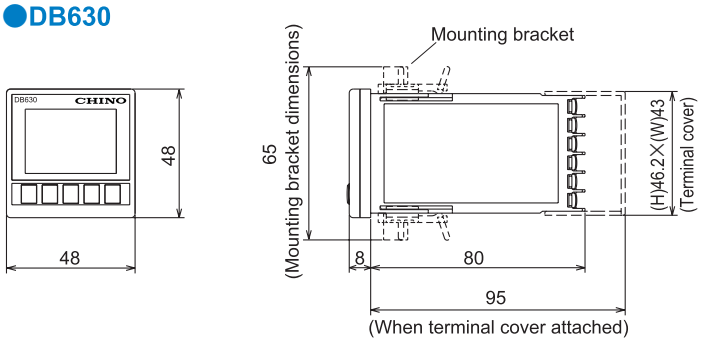
●PANEL CUTOUT



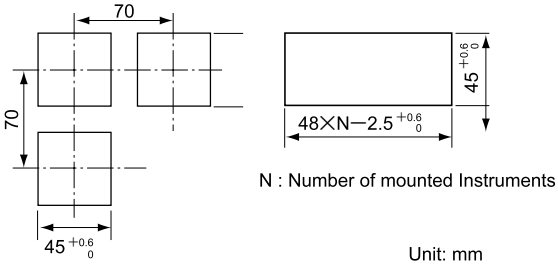
N : Number of mounted Instruments

Unit: mm

●DB630



●PANEL CUTOUT



N : Number of mounted Instruments

Unit: mm

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