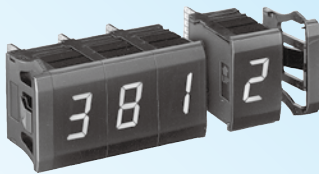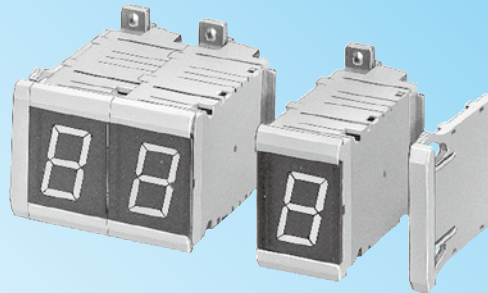# Display Units

DD3S Series
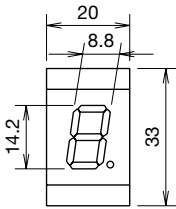
DD48 Series

DD96 Series

IDEC CORPORATION
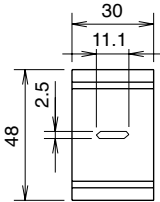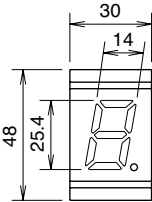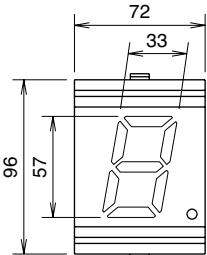
Display Units (Selection Guide)

Series	DD3S	
Shape		
Unit Type	Decimal/Hexadecimal/Extra Decimal	
Display Part (mm)	 7-segment Red LED, Green LED	
Display Character	Decimal display unit: 0 to 9, decimal point Hexadecimal display unit: 0 to F, decimal point Extra decimal display unit: 0 to 9, −, –, _, =, =, decimal point	
Function	Standard	Zero-suppress
Input	Binary Latch BL LT DP	Binary Latch BL LT RBI DP
Output	——	RBO
Input Logic	Positive or negative	
Data Input Level	L: 0 to 2V H: 9 to 30V	
Power Voltage	12 to 24V DC ±10%	
Current Draw (Power Consumption) (approx.)	Red: 40 mA max. Green: 60 mA max.	
No. of Digits	8 digits max. (1 digit/unit)	
Panel Mounting	Front mount, snap fit	
Housing Color	Black (End plate: black)	
Connector	•Solder terminal, PC board terminal, wire-wrap terminal (optional) •Mother board: Dynamic (4- or 2-digit, optional) Static (4-, 3-, or 2-digit, optional) •Mother board: 4 digits (optional)	
Dimensions	33H × 20W × 45.5D mm/unit	
Weight (approx.)	Display unit: 16.0g End plates (pair): 4.5g	
See Page	**4 to 15**	

IDEC

	DD48		DD96
			Front Mount Rear Mount
	Binary	Decimal	Decimal
	  – (minus) Red or green LED	 7-segment Red or green LED	 7-segment Red LED
	– (minus)	0 to 9 Decimal point	0 to 9 Decimal point
	⎯	⎯	⎯
	– Latch BL	Binary Latch DP RBI	Binary Latch DP BI
	⎯	RBO	BO
	Positive or negative		Negative
	L: 0 to 2V H: 12 to 30V		L: 0 to 2V H: 12 to 30V
	24V DC ±10%		24V DC ±10%
	0.9W	2.0W	80 mA
	16 digits max. (1 digit/unit)		8 digits max. (1 digit/unit)
	Front mount, snap fit		Front mount: Snap fit Rear mounting: Screw mounting
	Black or beige		Black
	•Solder terminal, PC board terminal (optional)		•Solder terminal (supplied)
	48H × 30W × 79D mm/unit		Front mount: 96H × 72W × 42.5D mm/unit Rear mount: 90H × 72W × 41D mm/unit
	Display unit: 50g End plates: 20g (pair)		Front mount: 130g Rear mount: 100g End plates: 26g (pair)
	16 to 22		**23 to 26**

DD3S Series Display Units

7-segment digital display
Super bright LED display and short body for up to 8 digits

- Super bright LED for easy reading
- Units can be combined together and installed into a panel cut-out.
- Decimal, hexadecimal, extra decimal, and character display units are available.
- Positive or negative input logic
- Easy wiring and maintenance
- Power voltage 12 through 24V DC.
- Mother boards are available for dynamic and static display modes; substantial saving of wiring.
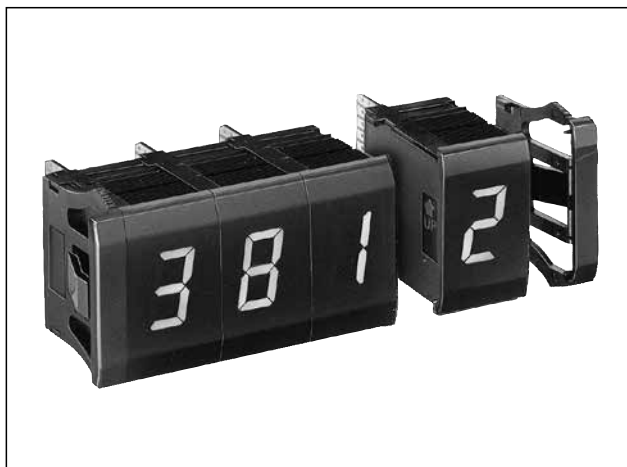
DD3S

Display Units (Housing Color: Black)

Notation	Function	Input Logic	LED Color	Part No.
Decimal	Standard	Positive	Red	DD3S-F31P-R
			Green	DD3S-F31P-G
		Negative	Red	DD3S-F31N-R
			Green	DD3S-F31N-G
	Zero-suppress	Positive	Red	DD3S-F31P-R-S
			Green	DD3S-F31P-G-S
		Negative	Red	DD3S-F31N-R-S
			Green	DD3S-F31N-G-S
Extra Decimal	Standard	Positive	Red	DD3S-F34P-R
			Green	DD3S-F34P-G
		Negative	Red	DD3S-F34N-R
			Green	DD3S-F34N-G
	Zero-suppress	Positive	Red	DD3S-F34P-R-S
			Green	DD3S-F34P-G-S
		Negative	Red	DD3S-F34N-R-S
			Green	DD3S-F34N-G-S
Hexadecimal	Standard	Positive	Red	DD3S-F36P-R
			Green	DD3S-F36P-G
		Negative	Red	DD3S-F36N-R
			Green	DD3S-F36N-G
	Zero-suppress	Positive	Red	DD3S-F36P-R-S
			Green	DD3S-F36P-G-S
		Negative	Red	DD3S-F36N-R-S
			Green	DD3S-F36N-G-S

Ordering Information

1. Specify the Part No. and quantity of the display units and accessories.

(Example) Display Unit DD3S-F31P-R 8 pcs
Accessories
 • Spacer Unit DD9Z-FY1-B 1 pc
 • End Plate DD9Z-W-B 1 set
 • Mother Board DD9Z-MB1-4 2 pcs

2. Order spacer units, end plates, and mother boards separately. See the next page.

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Accessories (Optional)

Name			Part No.
Spacer Unit	Black		**DD9Z-FY1-B**
End Plate (pair)	Black		**DD9Z-W-B**
Connector	Solder Terminal		**DMC-1**
	PC Board Terminal		**DMC-2**
Retentive/One-way Insertion Connector	Solder Terminal		**DD9Z-CN1**
Connector Stopper			**DD9Z-ST1**
Mother Board for decimal/hex/extra decimal display unit	Dynamic	4-digit	**DD9Z-MB1-4**
		2-digit	**DD9Z-MB1-2**
	Static	4-digit	**DD9Z-MB2-4**
		3-digit	**DD9Z-MB2-3**
		2-digit	**DD9Z-MB2-2**
Mother Board Connector	Type B		**DD9Z-JE1B□**
	Type C		**DD9Z-JE1C□**
Coupling Spacer for IDEC DG Series Digital Switches	Right Side	Black	**DD9Z-FG1R-B**
	Left Side	Black	**DD9Z-FG1L-B**

Cable Length Code

Specify a cable length code in place of □ in the Part No. of mother board cable types A, B, and C. These cables can be used for both dynamic and static type mother boards.

Code	01	02	03	05	10
Cable Length (mm)	100	200	300	500	1000
Code	15	20	30	40	50
Cable Length (mm)	1500	2000	3000	4000	5000

Specifications

Power Voltage		12 to 24V DC ±10%
Current Draw	Decimal/ Hex/ Extra decimal	40 mA max. (red) 60 mA max. (green)
Data Input Level		L: 0 to 2V H: 9 to 30V

Display Character (see Function Tables)		• Decimal display unit
		  7-segment 1-color (red or green)
		  LED: 0 to 9, decimal point
		• Extra decimal display unit
		  7-segment 1-color (red or green)
		  LED: 0 to 9, ‾, –, –, =, =, decimal point
		• Hexadecimal display unit
		  7-segment 1-color (red or green)
		  LED: 0 to 9, A to F, decimal point

Character Height		• Decimal/Hex/Extra Decimal display units: 15.2 mm

Input		• Decimal/Hex/Extra Decimal display units:
		  <Standard>
		  Binary, Latch, BL, LT, DP
		  <Zero-suppress>
		  Binary, Latch, BL, LT, DP, RBI

Output		• Decimal/Hex/Extra Decimal display units: <Zero-suppress> RBO output
Input Logic		Positive or negative
No. of Digits		8 digits max.
Unit Combination		Snap fit
Panel Mounting		Snap fit

Dielectric Strength		• Decimal/Hex/Extra decimal display units
		  Between live and dead parts :
		  1500V DC, 1 minute

Insulation Resistance		Between live and dead parts : 100 MΩ min. (500V DC megger)
Vibration Resistance (damage limits)		10 to 55 Hz, amplitude 0.25 mm
Shock Resistance (damage limits)		490 m/s²

Noise Resistance (operating extremes)		• Decimal/Hex/Extra decimal display unit
		  Power terminal (normal/common modes):
		                       ±1000V
		  Input terminal (normal/common modes):
		                       ±1000V
		  Output terminal (normal/common modes):
		                       ±500V
		  (Impulse condition: Pulse width 100 ns,
		                       1 μs)

Operating Temperature		–10 to +55°C (no freezing)
Storage Temperature		–25 to +80°C (no freezing)
Operating Humidity		35 to 85% RH (no condensation)
Power Inrush Current		• Decimal/Hex/Extra decimal display unit Approx. 2.0A (Power voltage: 24V)
Degree of Protection		IP40 (IEC60529)
Weight (Approx.)		• Display unit: 16g • End plates: 4.5g (pair)

Terminal Connection

Connection Diagram	Terminal Arrangement	Internal Input Circuit

Decimal/Hexadecimal/Extra Decimal Display Units

Standard (Connection Diagram)

(Terminal No.)

Power — Vcc (4), GND (12) → Regulating Circuit

Latch (8), A (2^0) (10), B (2^1) (3), C (2^2) (5), D (2^3) (9), BL (7), LT (6) → Input Circuit → Decoder → display

DP (2)

Standard (Terminal Arrangement)

(Terminal No.)
- 12. GND
- 11. NC
- 10. A (2^0)
- 9. D (2^3)
- 8. Latch
- 7. BL
- 6. LT
- 5. C (2^2)
- 4. Vcc
- 3. B (2^1)
- 2. DP
- 1. NC

Power 12 to 24V DC

Internal Input Circuit

Positive Logic

Data Input — 200 kΩ, 12 kΩ, 200 kΩ — GND

Negative Logic

12 to 24V DC, 12 kΩ, 200 kΩ, Data Input, 200 kΩ, GND

Zero-suppress (Connection Diagram)

(Terminal No.)

Power — Vcc (4), GND (12) → Regulating Circuit

Latch (8), A (2^0) (10), B (2^1) (3), C (2^2) (5), D (2^3) (9), BL (7), LT (6), RBI (1) → Input Circuit → Decoder → display

DP (2), RBO (11)

Zero-suppress (Terminal Arrangement)

(Terminal No.)
- 12. GND
- 11. RBO
- 10. A (2^0)
- 9. D (2^3)
- 8. Latch
- 7. BL
- 6. LT
- 5. C (2^2)
- 4. Vcc
- 3. B (2^1)
- 2. DP
- 1. RBI

Power 12 to 24V DC

External Wiring

Decimal/Hexadecimal/Extra Decimal Display Units

Positive Logic

[Contact Input (Digital Switch)]
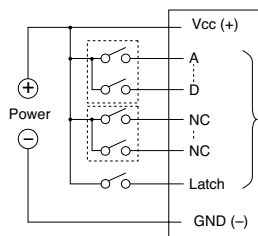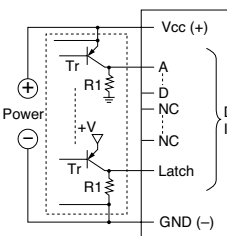
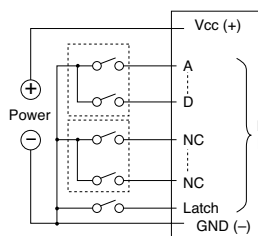Power — Vcc (+), A, D, NC, NC, Latch, GND (−) — Data Input

[Transistor Input]

Tr, R1, +V, Tr, R1 — Vcc (+), A, D, NC, NC, Latch, GND (−) — Data Input

When Tr is on, output goes to H.

R2, Tr, +V, R2, Tr — Vcc (+), A, D, NC, NC, Latch, GND (−) — Data Input

When Tr is off, output goes to H.

Connector Terminal No.
(DMC-1)

UP Making Side

12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1

Connector Terminal No.

Negative Logic

[Contact Input (Digital Switch)]

Power — Vcc (+), A, D, NC, NC, Latch, GND (−) — Data Input

[Transistor Input]

R1, Tr, +V, R1, Tr — Vcc (+), A, D, NC, NC, Latch, GND (−) — Data Input

When Tr is on, output goes to L.

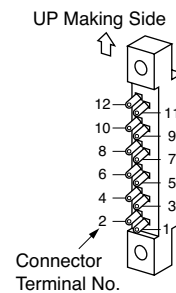Tr, R3, +V, Tr, R3 — Vcc (+), A, D, NC, NC, Latch, GND (−) — Data Input
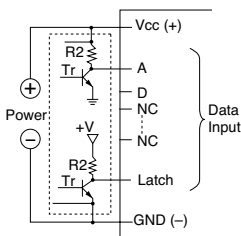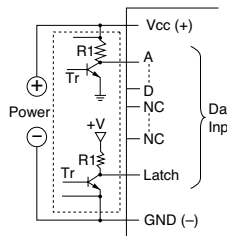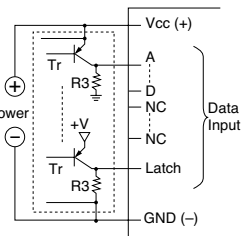
When Tr is off, output goes to L.

Note: When connecting pull-up or pull-down resistors to the external circuit, refer to the resistor values shown below:

R1: 2.2 kΩ (1/2W) to 10 kΩ (1/4W)
R2: 1 kΩ (1W) to 2.2 kΩ (1/2W)
R3: 1 kΩ (1W)

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Function Table
Decimal/Hexadecimal/Extra Decimal Display Units
(Standard and Zero-suppress)

Data Input																LED Display		
Positive Logic								Negative Logic								Dec.	Hex.	Extra Dec.
D	C	B	A	Latch	LT	BL	DP	D	C	B	A	Latch	LT	BL	DP			
×	×	×	×	×	H	×	×	×	×	×	×	×	L	×	×	8.	8.	8.
×	×	×	×	×	L	H	×	×	×	×	×	×	H	L	×	blank	blank	blank
×	×	×	×	×	L	L	H	×	×	×	×	×	H	H	L	*.	*.	*.
L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	0	0	0
L	L	L	H	L	L	L	L	H	H	H	L	H	H	H	H	1	1	1
L	L	H	L	L	L	L	L	H	H	L	H	H	H	H	H	2	2	2
L	L	H	H	L	L	L	L	H	H	L	L	H	H	H	H	3	3	3
L	H	L	L	L	L	L	L	H	L	H	H	H	H	H	H	4	4	4
L	H	L	H	L	L	L	L	H	L	H	L	H	H	H	H	5	5	5
L	H	H	L	L	L	L	L	H	L	L	H	H	H	H	H	6	6	6
L	H	H	H	L	L	L	L	H	L	L	L	H	H	H	H	7	7	7
H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	8	8	8
H	L	L	H	L	L	L	L	L	H	H	L	H	H	H	H	9	9	9
H	L	H	L	L	L	L	L	L	H	L	H	H	H	H	H	blank	A	–
H	L	H	H	L	L	L	L	L	H	L	L	H	H	H	H	blank	b	_
H	H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	blank	C	‾
H	H	L	H	L	L	L	L	L	L	H	L	H	H	H	H	blank	d	=
H	H	H	L	L	L	L	L	L	L	L	H	H	H	H	H	blank	E	=
H	H	H	H	L	L	L	L	L	L	L	L	H	H	H	H	blank	F	blank
×	×	×	×	H	L	L	L	×	×	×	×	L	H	H	H	maintain	maintain	maintain

Note 1: × indicates the display is not affected by voltage level of H or L.
Note 2: ∗ A decimal point is displayed with any character.

(Zero-suppress Unit)
Leading zeros are suppressed using the RBI (No. 1) and RBO (No. 11) terminals. For other inputs, see the lower table on the preceding page.

Decimal/Hexadecimal/Extra Decimal														
Data Input														LED Display
Positive Logic							Negative Logic							
X	Latch	LT	BL	DP	RBI	RBO	Y	Latch	LT	BL	DP	RBI	RBO	
×	×	H	×	×	×	#	×	×	L	×	×	×	&	8.
×	×	L	H	×	×	#	×	×	H	L	×	×	&	blank
H	L	L	L	L	L	L	H	H	H	H	H	L	L	blank
H	L	L	L	L	H	H	H	H	H	H	H	H	H	0
H	L	L	L	H	L	H	H	H	H	H	L	L	H	0.
L	L	L	L	L	L	H	L	H	H	H	H	L	H	∗

X: X = $\overline{A} \cdot \overline{B} \cdot \overline{C} \cdot \overline{D}$ ∗: Any display
Y: Y = A · B · C · D   #: $\# = \overline{DP} \cdot \overline{RBI} \cdot X$
×: Either H or L   &: $\overline{\&} = DP \cdot \overline{RBI} \cdot Y$
Note: RBI and RBO operate in the negative logic mode on both positive and negative logic units.

Input Functions
A, B, C, and D (binary code) Inputs
These inputs are decimal or data corresponding to 1, 2, 4, and 8, respectively.

Latch Input
When the Latch input is set to level H for the positive logic or level L for the negative logic, the display at the time is maintained. (DP input is independent.)

LT (Light Test) Input
When the LT input is set to level H for the positive logic or level L for the negative logic, the entire display turns on.

BL (Blank) Input
When the BL input is set to level H for the positive logic or level L for the negative logic, the entire display turns off regardless of other inputs.

DP (Decimal Point) Input
When the DP input is set to level H for the positive logic or level L for the negative logic, the decimal point turns on.

Input and Output Functions
RBI Input
When 0 is displayed and the decimal point is turned off, the display is blanked by setting the RBI input to level L.
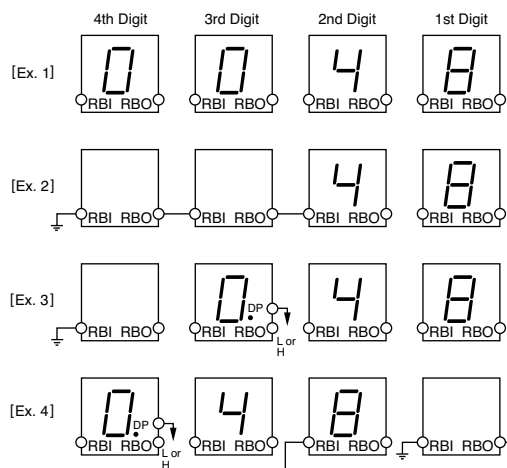
RBO Output
The RBO output remains in level L during zero blanking. Leading zeros can be suppressed by connecting the RBO to the RBI on the lower digits.

The RBO output is an open collector output.

Application Examples of RBI and RBO
[Ex.1] Leading zeros are also displayed. RBI and RBO outputs are disconnected.
[Ex.2] Leading zeros on the upper three digits are suppressed. When the data on the 1st digit is zero, 0 is displayed.
[Ex.3] Zero on the 4th digit is suppressed. Zero and decimal point are displayed on the 3rd digit.
[Ex.4] Trailing zeros on the 2nd and 1st digits are suppressed. When the data on the 1st and 4th digits are zero, and the decimal point on the 4th digit is on, 0.0 is displayed with zeros on the 2nd and 1st digits suppressed.

Note: Use the RBO output only for connection to the RBI input. Do not use the RBO for other connections.
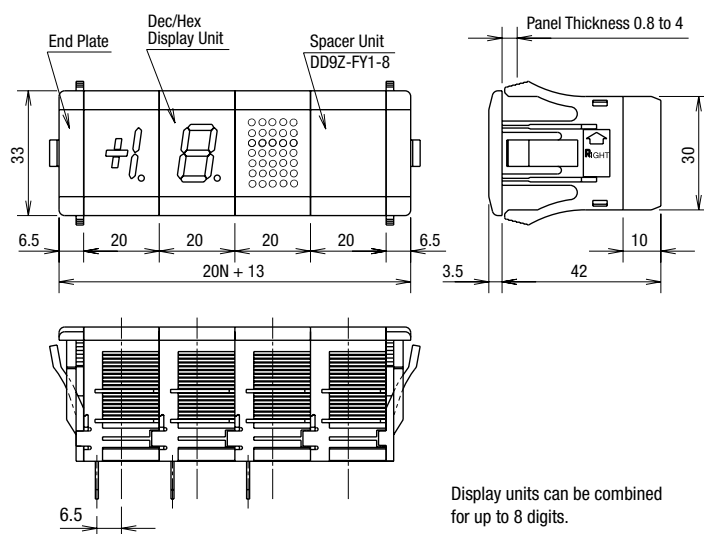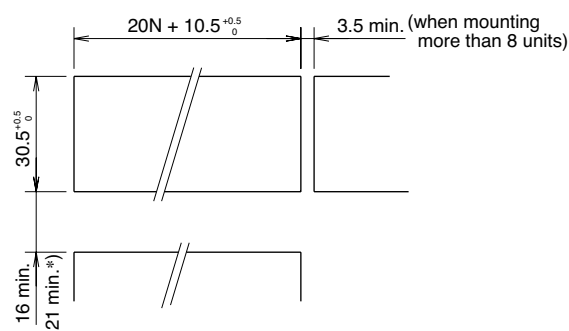
DD3S Series Display Units

Dimensions & Panel Cut-out

All dimensions in mm.

End Plate
Dec/Hex Display Unit
Spacer Unit DD9Z-FY1-8
Panel Thickness 0.8 to 4

33
6.5 20 20 20 20 6.5
20N + 13
3.5 42 10
RIGHT
30

6.5

Display units can be combined for up to 8 digits.

Panel Cut-out

For Connector Wiring
For Use of Dynamic Mother Board

$20N + 10.5^{+0.5}_{0}$ 3.5 min. (when mounting more than 8 units)

$30.5^{+0.5}_{0}$

16 min. (21 min.*)

N = No. of digits (N ≤ 8)
* When using a static mother board

Accessories (Optional)

Connector

Solder Terminal Connector (DMC-1)

Applicable Wire: ø0.8mm maximum
AWG #22 maximum

11.3 6
33 45
RIGHT
42
45.5 5
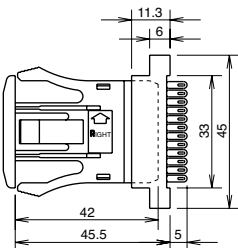
PC Board Terminal Connector (DMC-2)

Applicable PC board thickness: 1.6

2.5 × 11
2
12-ø1 Holes
□0.6
11.3 4
20
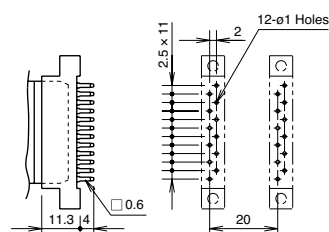
Retentive/One-way Insertion Connector (DD9Z-CN1) (Note)

UP
DD9Z-CN1
35
33
27.8 (min25)
13
1.6
13.5
5
13.1 5 1.7 6.8 1.5
6
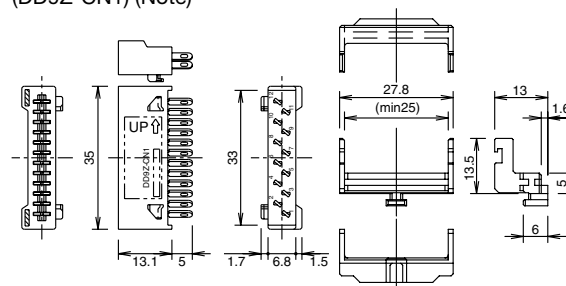
Note: Use DD9Z-CN1 in combination with DD9Z-ST1 connector stopper.

Dynamic Mother Board (not applicable to zero-suppress)

4-digit: DD9Z-MB1-4
2-digit: DD9Z-MB1-2

Substrate: Glass epoxy, 1.6-mm thick
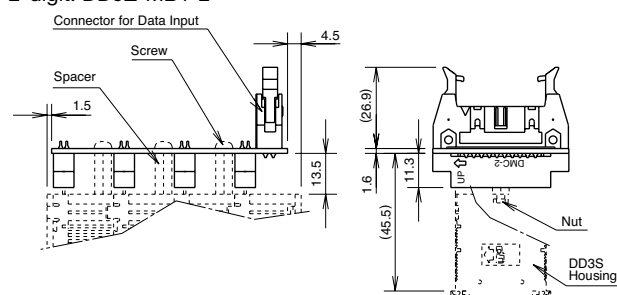
Connector for Data Input
Screw
Spacer
1.5
4.5
(26.9)
13.5
1.6 11.3
(45.5)
Nut
DD3S Housing
DMC-2
UP

Note: The DD3S housing can be secured to the mother board using screws. Recommended tightening torque is 3.5 N·m at the maximum. When no spacer is used, the tightening torque must not exceed 2 N·m.

Connector ——— PC Board
Spacer ——— Screw M2.6 × 18
DD3S Housing ——— Nut (M2.6)
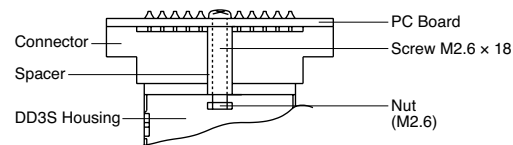
Screws (M2.6 × 18), M2.6-3 nuts, and spacers are supplied with the mother board.

12-ø3.2 (for mounting mother board)
3-ø2.8 (for securing DD3S)

(10^3) (10^2) (10^1) (10^0)

12 11 10 9 8 7 6 5 4 3 2 1

39 45

13 10 6
20 20 20 14
78 (Note)
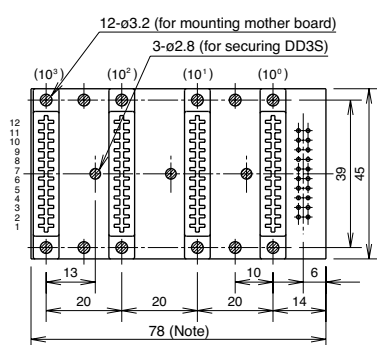
Note: 38 mm for 2-digit mother board DD9Z-MB1-2

Input Terminal Arrangement

For 4-digit (Top View)

GND	① ②	11*
<+> A	③ ④	B
<1> C	⑤ ⑥	D <->
Latch (10^0)	⑦ ⑧	Latch (10^1)
Latch (10^2)	⑨ ⑩	Latch (10^3)
7* (10^0)	⑪ ⑫	7* (10^1)
7* (10^2)	⑬ ⑭	7* (10^3)
6*	⑮ ⑯	DP (10^0)
DP (10^1)	⑰ ⑱	DP (10^2)
DP (10^3)	⑲ ⑳	Vcc

For 2-digit (Top View)

GND	① ②	11*
<+> A	③ ④	B
<1> C	⑤ ⑥	D <->
Latch (10^0)	⑦ ⑧	Latch (10^1)
NC	⑨ ⑩	NC
7* (10^0)	⑪ ⑫	7* (10^1)
NC	⑬ ⑭	NC
6*	⑮ ⑯	DP (10^0)
DP (10^1)	⑰ ⑱	NC
NC	⑲ ⑳	Vcc

Numbers marked with * are the DD3S terminal numbers.

Terminal Arrangement by Models

Standard	No.
F3**	
GND	12
NC	11
A	10
D	9
LAT	8
BL	7
LT	6
C	5
Vcc	4
B	3
DP	2
NC	1

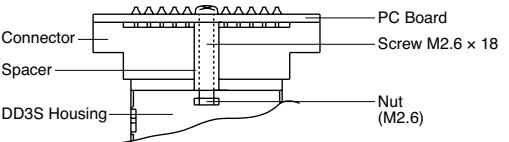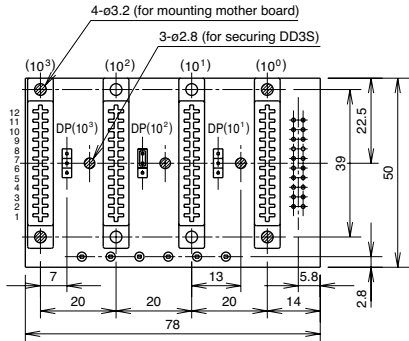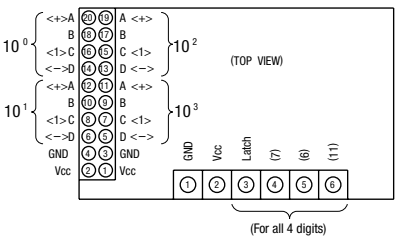IDEC

Static Mother Board (not applicable to zero-suppress)

4-digit: DD9Z-MB2-4
3-digit: DD9Z-MB2-3
2-digit: DD9Z-MB2-2

Note: The DD3S housing can be secured to the mother board using screws. Recommended tightening torque is 0.35 N·m at the maximum. When no spacer is used, the tightening torque must not exceed 0.2 N·m.

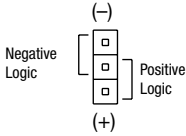Screws (M2.6 × 18), M2.6 nuts, and spacers are supplied with the mother board.
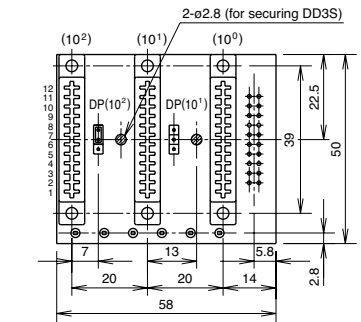
4-digit

Terminal Arrangement by Models

Standard F3**	No.
GND	12
NC	11
A	10
D	9
LAT	8
BL	7
LT	6
C	5
Vcc	4
B	3
DP	2
NC	1

3-digit

Terminal Arrangement by Models

Standard F3**	No.
GND	12
NC	11
A	10
D	9
LAT	8
BL	7
LT	6
C	5
Vcc	4
B	3
DP	2
NC	1

2-digit

Terminal Arrangement by Models

| Standard F3**	No.
GND	12
NC	11
A	10
D	9
LAT	8
BL	7
LT	6
C	5
Vcc	4
B	3
DP	2
NC	1

Note 1: For Terminal No. 2 on the mother board terminal block, select internal connection to terminal No. 6 or 7 on the DD3S using a jumper.
• Numbers shown in ( ) for the input terminals represent the DD3S terminal numbers.
• A decimal point for the 2nd and the upper digits can be turned on using a jumper.
   Note positive and negative logic when using a jumper.
• For terminal No. 2 on terminal block used for 2-digit, select internal connection to terminal No. 6 or 7 on DD3S using a jumper.
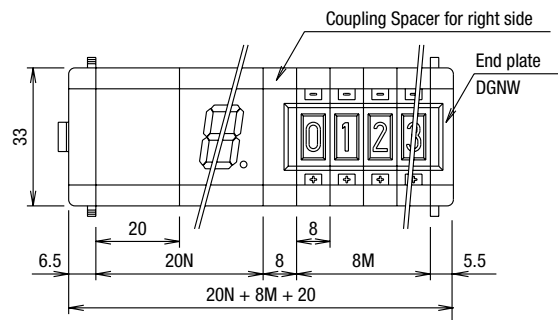
DD3S Series Display Units

Coupling Spacer

For using DD3S series Display Units and the IDEC DGAN/DGBN series Digital Switches in combination, coupling spacers (two types: for right side and left side) are available.
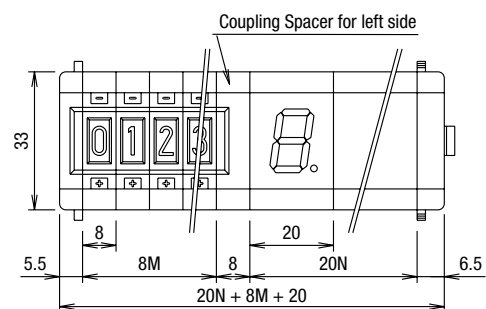
DD3S series Display Units

DG series Digital Switches
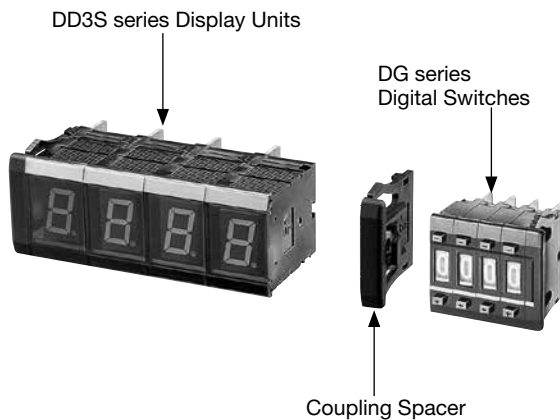
Coupling Spacer

Note: The above photo shows the spacer for right side.

Coupling Spacer for Right Side (DD9Z-FG1R-B)

Coupling Spacer for right side

End plate DGNW

33

6.5 20 20N 8 8 8M 5.5

20N + 8M + 20

Coupling Spacer for Left Side (DD9Z-FG1L-B)

Coupling Spacer for left side

33

5.5 8 8M 8 20 20N 6.5

20N + 8M + 20

Panel Cutout

$30.5^{+0.5}_{0}$

$20N + 8M + 15.5^{+0.5}_{0}$ (DGNW-1)

$20N + 8M + 17.5^{+0.5}_{0}$ (DGNW-2)
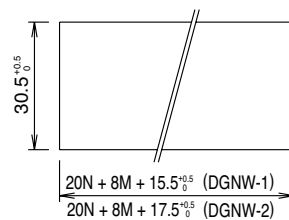
N: Number of display units mounted

M: Number of digital switches mounted (N + M ≤ 8)

Connectors for Mother Board

Two types of connectors (with cable) are available for both dynamic and static mother boards. The connector on the mother board has a strain relief to protect the insulation displacement connection from external force.
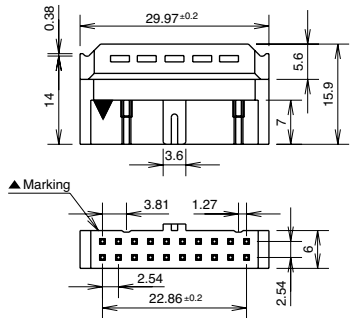
For Connection to Connector Header
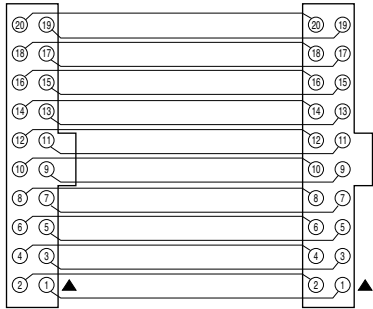
DD9Z-JE1B☐
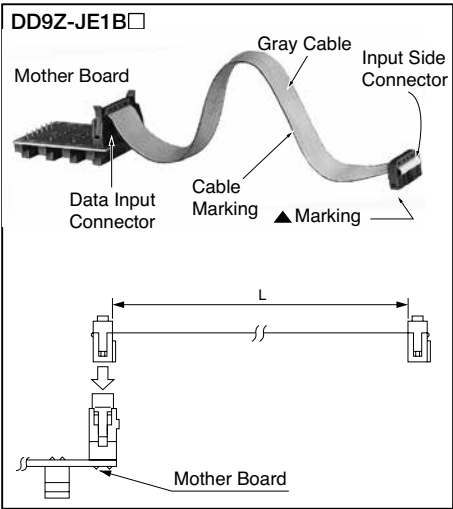
[Input Side Connector]

MIL flat cable connector (with strain relief)
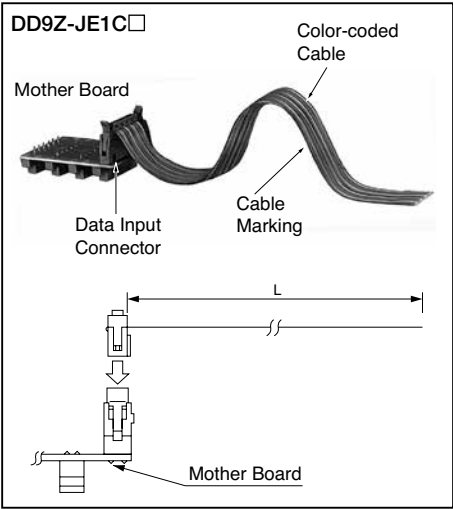IDEC's JE1S-201 (with strain relief)

Dimensions

Applicable Connector Header
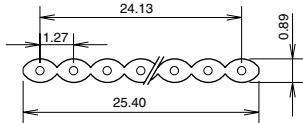
IDEC's JE1H-201 (Right Angle)
IDEC's JE1H-202 (Straight)
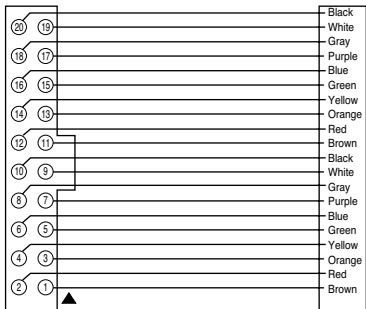

For Soldering Connection to PC Board, or Others

DD9Z-JE1C☐

[Input Side Connector]

Not provided.

Flat Cable

Material

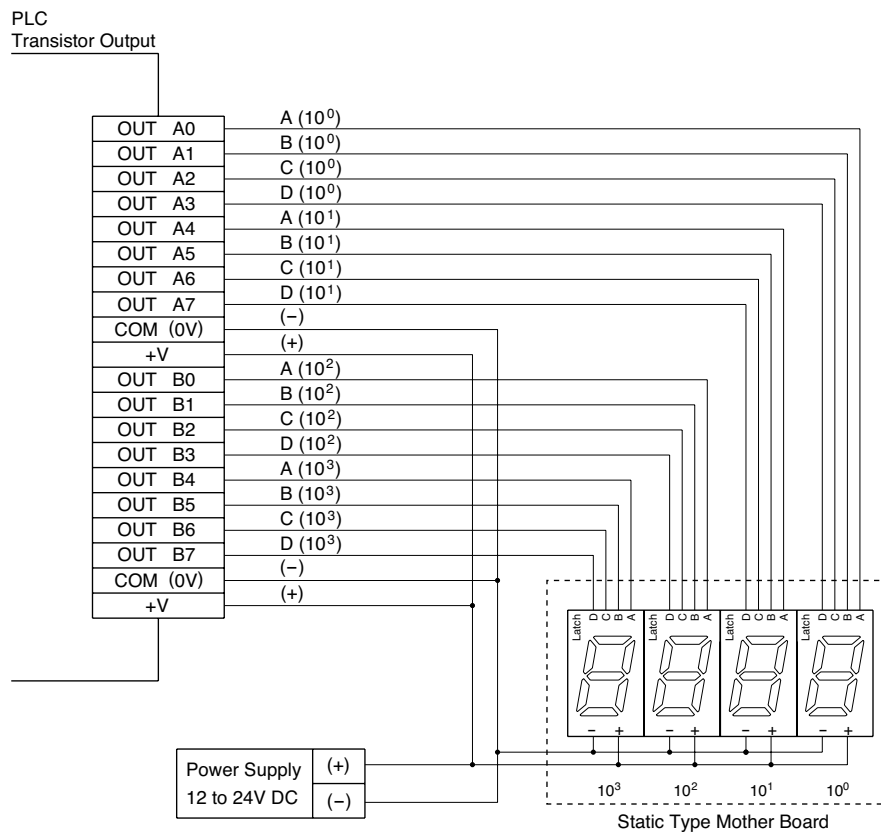| Conductor	AWG28 (7 cores/0.127 mm) Tinned annealed copper wire
Insulator	Heat-resisting vinyl

Note: Specify a cable length code in place of ☐ in the Part No.
(01: 100 mm, 02: 200 mm, 03: 300 mm, 05: 500 mm, 10: 1000 mm, 15: 1500 mm, 20: 2000 mm, 30: 3000 mm, 40: 4000 mm, 50: 5000 mm)
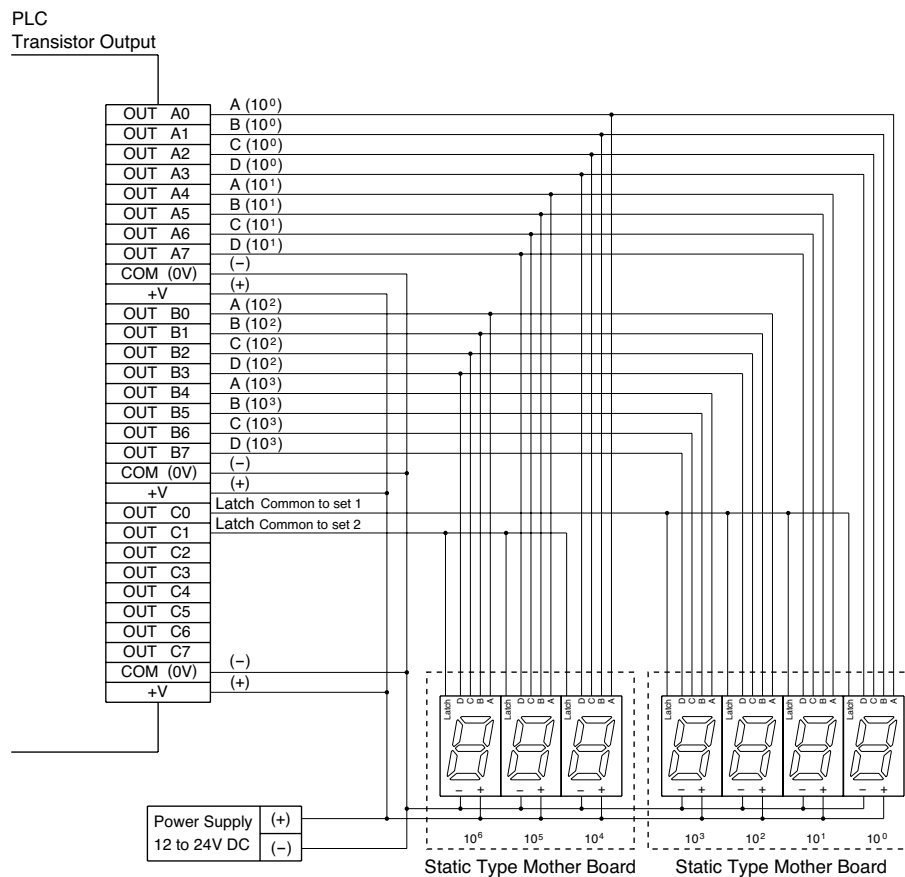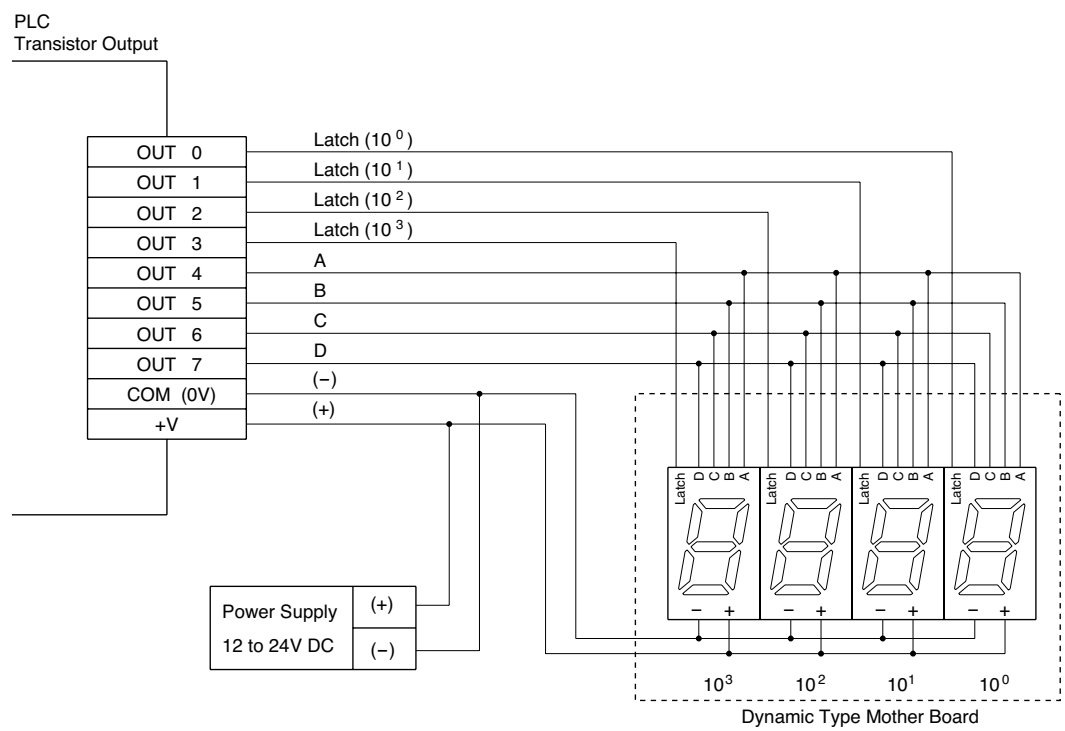
DD3S Series Display Units

Wiring Diagrams

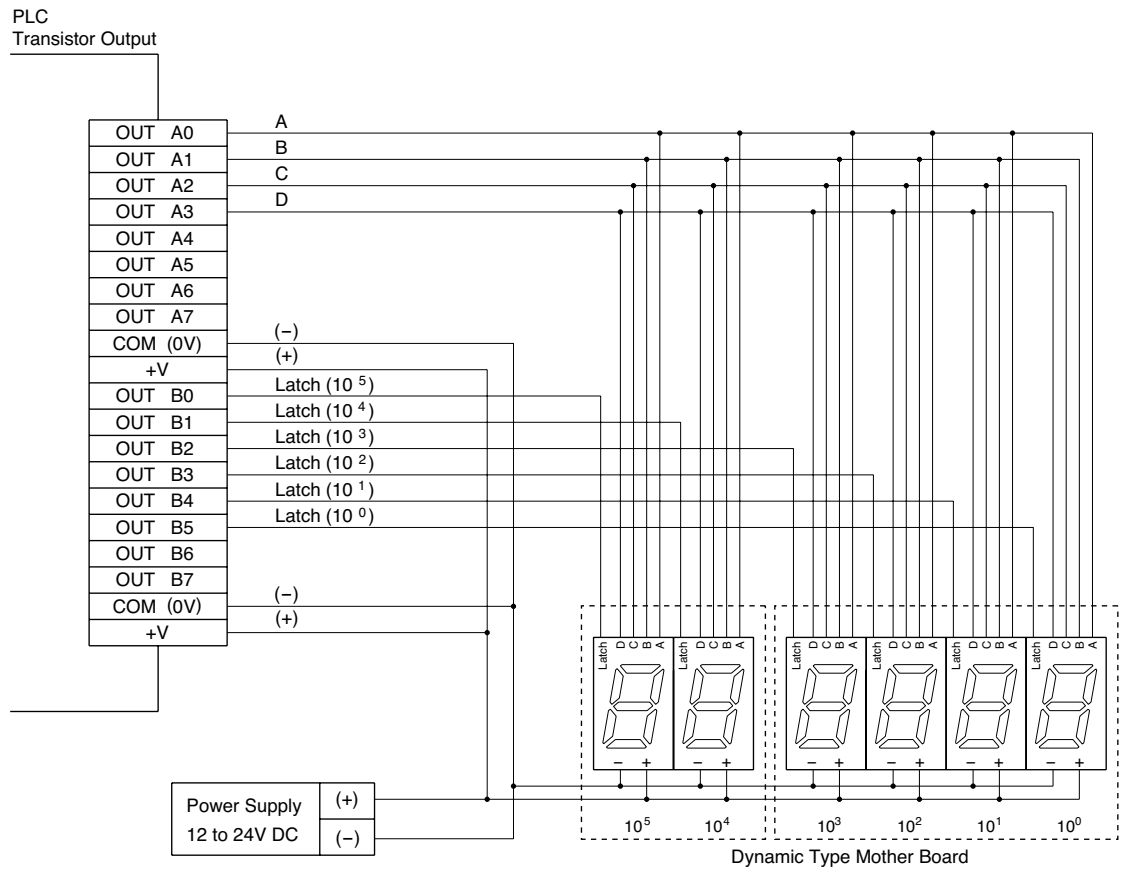### Static Mother Board Connection (2 to 4 digits)

PLC
Transistor Output

OUT A0	A (10^0)
OUT A1	B (10^0)
OUT A2	C (10^0)
OUT A3	D (10^0)
OUT A4	A (10^1)
OUT A5	B (10^1)
OUT A6	C (10^1)
OUT A7	D (10^1)
COM (0V)	(−)
+V	(+)
OUT B0	A (10^2)
OUT B1	B (10^2)
OUT B2	C (10^2)
OUT B3	D (10^2)
OUT B4	A (10^3)
OUT B5	B (10^3)
OUT B6	C (10^3)
OUT B7	D (10^3)
COM (0V)	(−)
+V	(+)

Power Supply
12 to 24V DC (+) (−)

10^3 10^2 10^1 10^0

Static Type Mother Board

16-point Bus Connection (5 to 8 digits, multiple latch sets)

PLC
Transistor Output

OUT A0	A (10^0)
OUT A1	B (10^0)
OUT A2	C (10^0)
OUT A3	D (10^0)
OUT A4	A (10^1)
OUT A5	B (10^1)
OUT A6	C (10^1)
OUT A7	D (10^1)
COM (0V)	(−)
+V	(+)
OUT B0	A (10^2)
OUT B1	B (10^2)
OUT B2	C (10^2)
OUT B3	D (10^2)
OUT B4	A (10^3)
OUT B5	B (10^3)
OUT B6	C (10^3)
OUT B7	D (10^3)
COM (0V)	(−)
+V	(+)
OUT C0	Latch Common to set 1
OUT C1	Latch Common to set 2
OUT C2	
OUT C3	
OUT C4	
OUT C5	
OUT C6	
OUT C7	
COM (0V)	(−)
+V	(+)

Power Supply
12 to 24V DC (+) (−)

10^6 10^5 10^4 10^3 10^2 10^1 10^0

Static Type Mother Board   Static Type Mother Board

IDEC

Dynamic Connection (2 to 4 digits)

PLC
Transistor Output

OUT 0	Latch (10^0)
OUT 1	Latch (10^1)
OUT 2	Latch (10^2)
OUT 3	Latch (10^3)
OUT 4	A
OUT 5	B
OUT 6	C
OUT 7	D
COM (0V)	(−)
+V	(+)

Power Supply
12 to 24V DC
(+)
(−)

Latch D C B A (×4 digits)

10^3 10^2 10^1 10^0

Dynamic Type Mother Board

Dynamic Connection (5 to 8 digits)

PLC
Transistor Output

OUT A0	A
OUT A1	B
OUT A2	C
OUT A3	D
OUT A4	
OUT A5	
OUT A6	
OUT A7	
COM (0V)	(−)
+V	(+)
OUT B0	Latch (10^5)
OUT B1	Latch (10^4)
OUT B2	Latch (10^3)
OUT B3	Latch (10^2)
OUT B4	Latch (10^1)
OUT B5	Latch (10^0)
OUT B6	
OUT B7	
COM (0V)	(−)
+V	(+)

Power Supply
12 to 24V DC
(+)
(−)

10^5 10^4 10^3 10^2 10^1 10^0

Dynamic Type Mother Board

DD3S Series Display Units

Latch Input

[Binary/Decimal/Hex/Extra Decimal Display Units]
**Latch Operation (Positive Logic)**

```
         "1"  "2"  "3"  "4"  "5"  "6"  "7"  "8"  "9"
      A (H)
        (L)
Binary- B (H)
Coded   (L)
Input   C (H)
        (L)
      D (H)
        (L)
Latch Input (H)    Maintains display    Maintains
            (L)                         display
Display Character "1"    "2"      "5"   "6"    "8" "9"
```

Latch Input Timing Chart

```
Data Input

                    Data is
           (H)      read.
Latch  Maintain          Maintain          T1 ≥ 0 ms
Input                                        T2 ≥ 1 ms
           (L)                               T3 ≥ 1 ms
                 T1  T2  T3
```

Application of Latch Function

```
                    "4"        "7"        "5"        "2"
                  4th Digit  3rd Digit  2nd Digit  1st Digit
Binary-Coded        Data       Data       Data       Data
Input
(Data Input)

4th   (H)
Digit   Maintain          Maintain
      (L)

3rd   (H)
Digit     Maintain          Maintain
      (L)

2nd   (H)
Digit       Maintain          Maintain
      (L)

1st   (H)
Digit         Maintain          Maintain
      (L)
```

Display (Example)

```
Display Unit   4 7 5 2
               4th 3rd 2nd 1st
               Digit Digit Digit Digit
```

(Block Diagram)

```
4th Digit   3rd Digit   2nd Digit   1st Digit
A B C D Latch  A B C D Latch  A B C D Latch  A B C D Latch

A B C D        4th    1st
Binary-Coded   3rd 2nd
Input
(Data Input)   (Latch Input)
```

Note 1: The above chart represents positive logic units. Negative logic units have characteristics with (H) and (L) reserved.

Note 2: The rise and fall times of input pulses should be made as short as possible. (0.1 ms maximum)

Note 3: If the data input is changed in the period of T2, the display will change.

Unit Combination

Display units and end plates can be combined together by snap fit. Connection bolts and nuts are not required.

Connector (optional)
DMC-1
DMC-2
DD9Z-CN1

End Plate

End Plate
DD9Z-W-□
(pair)
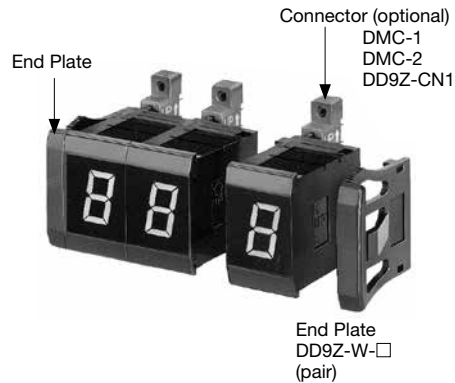
Panel Mounting

Display units can be installed into a panel cut-out by snap fit. Assemble display units and end plates together in advance. Hold the assembly at the end plates and push it into a panel cut-out.

Mother Board (for 4-digit display)

The mother board is intended for 4-digit display and must be connected to four display units at once. Therefore, mount or dismount the mother board properly according to the procedure below.
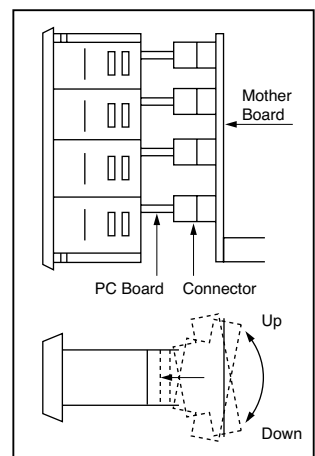
[Installation]
Put the substrates of four display units into the connectors on the mother board. Insert the substrates into the connectors, pushing the display units on upper and lower sides alternately.
Note: Be sure to insert four display units at once.

[Removal]
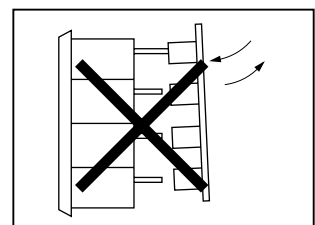Remove the display units, pulling the upper and lower sides alternately. Be sure to remove all the four units at the same time.

Mother Board

PC Board   Connector

Up

Down

CAUTION:
Never insert or remove the display units one by one as shown. The substrate may be damaged.

Note: For installation of the mother board for 2-digit and 3-digit display, perform the same procedure.

IDEC

Instructions

1. When cleaning the surface of the filter and housing, use a soft cloth. Do not use thinner or acid to clean the surface.

2. When the display unit is mounted in a panel cut-out, do not place a metal object or power line within 40 mm from the end of the connector terminals (or PC board terminals) at the rear of the display unit.

3. If the display units are subjected to voltage surges, install a surge suppressor in the power line.

4. Use shielded cable or metal conduit for the input line. Run the input wiring as far away as possible from high-voltage and motor lines. Make the input line as short as possible.

5. When using display units in environments where a large amount of electrostatic noise is generated, such as where molding materials, powders, or fluids are transferred through pipe lines, keep the display units as far away as possible from electrostatic sources.

6. Avoid using the display unit in a place where excessive and frequent vibration or impact may occur.

7. Avoid using the display unit in a place where it is exposed to corrosive gas, water or oil splashes, dust or direct sunlight, or in a place where organic solvents are used.

8. The filter is made of polycarbonate. Make sure that machine oil does not touch the filter.

9. If the Latch input is on when the DD3S is powered up, the data input cannot be read correctly or wrong data may be maintained. Do not turn on the Latch input for 0.5 sec after the DD3S is powered up.

10. When connecting a pull-up or pull-down resistor to the input terminals, ensure compatibility with the input resistor of the DD3S internal circuit.

11. When the DD3S is powered up, an inrush current of 2A (10 ms maximum) flows through the internal power supply circuit. Select an external power supply of sufficient capacity, taking this inrush current into consideration.

12. Solder the terminal at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu is recommended when using lead-free solder. When soldering, do not touch the control unit with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal. Use a non-corrosive rosin flux.

DD48 Series Display Units

Modular units can be combined for up to 16 digits.

- Super bright LED
- Units can be combined together and installed into a panel cut-out by snap fit.
- Binary and decimal display units are available.
- Easy wiring and maintenance
- LED display color: red or green
- Decimal display units are available with zero suppression function.
- Available in positive and negative input logic types.
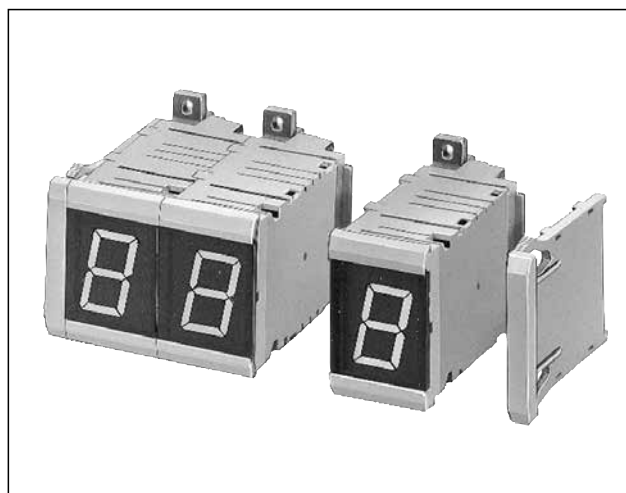
DD48

Unit	Input Logic	Housing Color	Part No.
Binary Display	Positive	Black	**DD48-F01PB** ∗ **DC24**
		Beige	**DD48-F01PZ** ∗ **DC24**
	Negative	Black	**DD48-F01NB** ∗ **DC24**
		Beige	**DD48-F01NZ** ∗ **DC24**
Decimal Display	Positive	Black	**DD48-F31PB** ∗ **DC24**
		Beige	**DD48-F31PZ** ∗ **DC24**
	Negative	Black	**DD48-F31NB** ∗ **DC24**
		Beige	**DD48-F31NZ** ∗ **DC24**

Note: Specify the LED color code in place of ∗ in the Part No.
MR: red, R: red (super bright), G: green

Accessories (Optional)

Name		Part No.
Spacer Unit	Black	**DD48-FY1-B**
End Plate (Pair)	Black	**DD48-W-B**
	Beige	**DD48-W-Z**
Mounting Clip (Note 1)	Black	**DD48-KT1**
Long Filter	For red LED	**DD48-P16R**
	For green LED	**DD48-P16G**
Connector	Solder Terminal	**DMC-4**
Connector for Mother Board	Type A	**DD48-JE1A**□ (Note 2)
	Type B	**DD48-JE1B**□ (Note 2)
	Type C	**DD48-JE1C**□ (Note 2)

Note 1: Used for mounting four units or more.
Note 2: Specify a cable length code in place of □ in the Part No., referring to the table below.

Cable Length Code for Mother Board

Code	0.5	1	2	3	4	5
Cable Length (mm)	500	1000	2000	3000	4000	5000

Note: Input connector types
DD48-JE1B□: Flat cable connector conforming to MIL Standard
DD48-JE1C□: None (soldering, etc)

Specifications

Power Voltage	24V DC ±10%
Power Consumption (Approx.)	Binary: 0.9W Decimal: 2.0W
Operating Temperature	−10 to +55°C (no freezing)
Storage Temperature	−25 to +80°C (no freezing)
Operating Humidity	35 to 85% RH (no condensation)
Data Input	L: 0 to 2V H: 12 to 30V

Display Character	• Binary display unit
	  red or green LED display: –
	• Decimal display unit
	  7-segment red or green LED:
	  0 to 9, decimal point

Character Height (Approx.)	• Binary display unit: 2.5 mm • Decimal display unit: 25.4 mm

Input	• Binary display unit:
	  –, Latch, and Blank inputs
	• Decimal display unit:
	  Binary-coded, Latch, DP, and RBI inputs

Output	• Decimal display unit: RBO output
Input Logic	Positive or negative
No. of Digits	16 digits max.
Unit Combination	Snap fit
Panel Mounting	Snap fit
Degree of Protection	IP40 (IEC 60529)
Weight (Approx.)	Display unit: 50g End plates: 20g (pair)

Note: It is recommended to use a long filter when combining 9 to 16 digits.

Terminal Connection

	Connection Diagram	Terminal Arrangement	Internal Input Circuit

Binary Display Unit

(Name) (Terminal No.)
Power — Vcc (19) — Regulating Circuit
GND (1)
BL (7) → Input Circuit → Decoder
Latch (9)
(−) (11)

Terminal Arrangement:
(Name) (Terminal No.)
Vcc — 19
NC — 17
NC — 15
NC — 13
(−) — 11
Latch — 9
BL — 7
NC — 5
NC — 3
GND — 1
24V DC + −

Internal Input Circuit:
Positive Logic
Data Input — 200 kΩ
12 kΩ   200 kΩ
GND

Decimal Display Unit

(Name) (Terminal No.)
Power — Vcc (19) — Regulating Circuit
GND (1)
Latch (9)
Data Input:
A(2^0) (17)
B(2^1) (15)
C(2^2) (13)
D(2^3) (11)
DP (7)
RBI (5)
RBO (3)
→ Input Circuit → Decoder

Terminal Arrangement:
(Name) (Terminal No.)
Vcc — 19
A (2^3) — 17
B (2^1) — 15
C (2^2) — 13
D (2^3) — 11
Latch — 9
DP — 7
RBI — 5
RBO — 3
GND — 1
24V DC + −

Internal Input Circuit:
Negative Logic
24V DC
12 kΩ
200 kΩ
Data Input — 200 kΩ
GND

External Wiring

Positive Logic

[Contact Input (Digital Switch)]
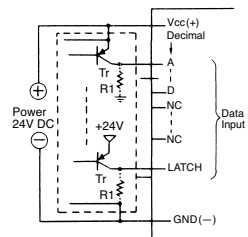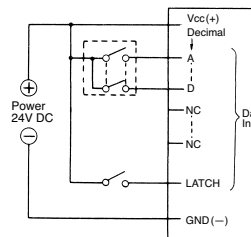
[Transistor Input]

When Tr is on, output goes to H.
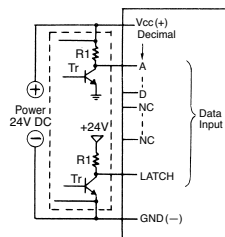
When Tr is off, output goes to H.

Connector Terminal No.
(Binary/Decimal Display Unit Compatible)
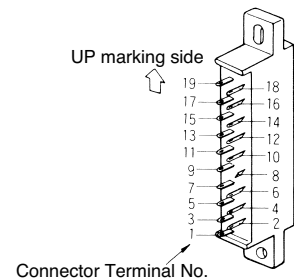
UP marking side

19 — 18
17 — 16
15 — 14
13 — 12
11 — 10
9 — 8
7 — 6
5 — 4
3 — 2
1

Connector Terminal No.

Negative Logic

[Contact Input (Digital Switch)]

[Transistor Input]
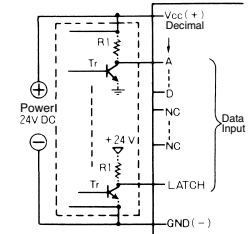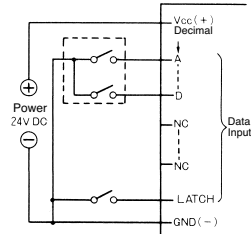
When Tr is on, output goes to L.
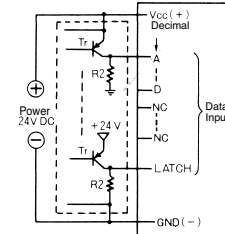
When Tr is off, output goes to L.

Note: When connecting pull-up or pull-down resistors to the external circuit, refer to the following table.

External Power Supply	Type	R1	R2
24V DC	Binary/ Decimal	2.2 kΩ to 8.2 kΩ (1/2W) (1/4W)	1 kΩ (1W)

DD48 Series Display Units

Function Table

Binary Display Unit

| Data Input (H, L: Voltage Level) | | | | | | LED Display |
| Positive Logic | | | Negative Logic | | | |
–	Latch	BL	–	Latch	BL	
L	L	H	H	H	L	blank
H	L	H	L	H	L	—
×	H	H	×	L	L	maintain
×	×	L	×	×	H	blank

Input Functions

– Input
Blank or – display is selected.

Latch Input
When the Latch input is set to level H for the positive logic or level L for the negative logic, the display at the time is maintained.

BL (Blank) Input
When the BL input is set to level L for the positive logic or level H for the negative logic, the display is blanked regardless of other inputs.

Decimal Display Unit

| Data Input (H, L: Voltage Level) | | | | | | | | | | | | | | | | LED Decimal Display Unit |
| Positive Logic | | | | | | | | Negative Logic | | | | | | | | |
D	C	B	A	LATCH	DP	RBI	RBO	D	C	B	A	LATCH	DP	RBI	RBO	
L	L	L	L	L	H	H	*	H	H	H	H	H	L	H	*	0.
H	L	H	L	L	H	L	*	L	H	L	H	H	L	L	*	.
H	L	H	H	L	H	L	*	L	H	L	L	H	L	L	*	.
H	H	L	L	L	H	L	*	L	L	H	H	H	L	L	*	.
H	H	L	H	L	H	L	*	L	L	H	L	H	L	L	*	.
H	H	H	L	L	H	L	*	L	L	L	H	H	L	L	*	.
H	H	H	H	L	H	L	*	L	L	L	L	H	L	L	*	.
L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	blank
L	L	L	L	L	L	H	*	H	H	H	H	H	H	H	*	0
L	L	L	H	L	L	×	Δ	H	H	H	L	H	H	×	Δ	1
L	L	H	L	L	L	×	Δ	H	H	L	H	H	H	×	Δ	2
L	L	H	H	L	L	×	Δ	H	H	L	L	H	H	×	Δ	3
L	H	L	L	L	L	×	Δ	H	L	H	H	H	H	×	Δ	4
L	H	L	H	L	L	×	Δ	H	L	H	L	H	H	×	Δ	5
L	H	H	L	L	L	×	Δ	H	L	L	H	H	H	×	Δ	6
L	H	H	H	L	L	×	Δ	H	L	L	L	H	H	×	Δ	7
H	L	L	L	L	L	×	Δ	L	H	H	H	H	H	×	Δ	8
H	L	L	H	L	L	×	Δ	L	H	H	L	H	H	×	Δ	9
H	L	H	L	L	L	×	Δ	L	H	L	H	H	H	×	Δ	blank
H	L	H	H	L	L	×	Δ	L	H	L	L	H	H	×	Δ	blank
H	H	L	L	L	L	×	Δ	L	L	H	H	H	H	×	Δ	blank
H	H	L	H	L	L	×	Δ	L	L	H	L	H	H	×	Δ	blank
H	H	H	L	L	L	×	Δ	L	L	L	H	H	H	×	Δ	blank
H	H	H	H	L	L	×	Δ	L	L	L	L	H	H	×	Δ	blank
×	×	×	×	×	L	×	Δ	×	×	×	×	L	H	×	Δ	maintain

Input and Output Functions

A, B, C and D (binary code) Input
Decimal data input corresponding to each code of 1, 2, 4 or 8

Latch Input
When the Latch input is set to level H for the positive logic or level L for the negative logic, the display at the time is maintained. (DP input is independent.)

DP (Decimal Point) Input
When DP input is set to level H for the positive logic or level L for the negative logic, the decimal point turns on.

RBI Input
When the RBI input is set to level L with 0 displayed, the display is blanked.

RBO Output
The RBO output goes to level L during zero blanking. Leading zeros can be suppressed by connecting the RBO to the RBI on the lower digits.

- Display is not affected whether × is in level H or L.
- ∗ marking indicates high impedance.
- Δ marking is in level L or high impedance depending on RBI input.
- RBO output is open collector output.

Application Example of RBI and RBO

[Ex. 1]   Leading zeros are also displayed. RBI inputs and RBO outputs are disconnected.
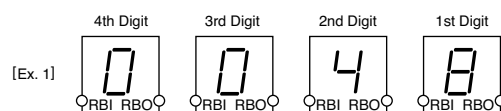
[Ex. 2]   Leading zeros on the upper three digits are suppressed. When the data on the 1st digit on the lower digit is zero, 0 is displayed.
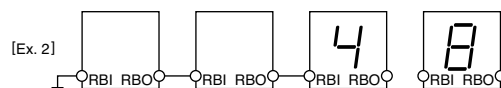
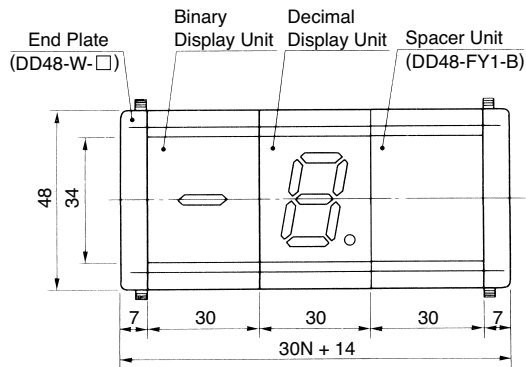[Ex. 3]   Zero in the 4th digit is suppressed. Zero and decimal point are displayed on the 3rd digit.
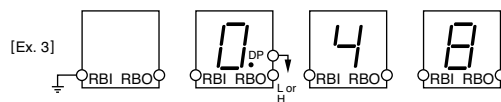
[Ex. 4]   Trailing zeros in the 2nd and 1st digits are suppressed. When the data on the 1st to 4th digits are zero, and the decimal point on the 4th digit is on, 0.0 is displayed.
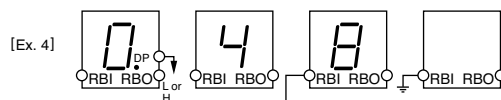
Note: Use the RBO output only for connection to the RBI input. Do not use the RBO for other purposes.

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Dimensions & Panel Cut-out

All dimensions in mm.

End Plate (DD48-W-□)
Binary Display Unit
Decimal Display Unit
Spacer Unit (DD48-FY1-B)
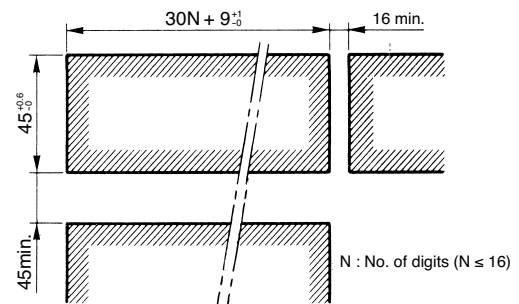
Panel Thickness: 0.8 to 4

Display units can be combined for up to 16 digits.
When combining 9 to 16 digits, it is recommended to use the long filter.
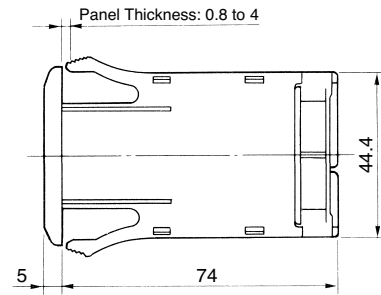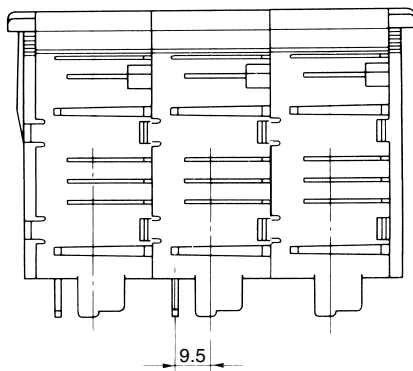
(Panel Cut-out)

Note: When mounting more than 16 units

$30N + 9^{+1}_{-0}$ 16 min.

$45^{+0.6}_{-0}$

45min.

N : No. of digits (N ≤ 16)

Note: The panel cut-out width shown above is the minimum length required. When mounting many display units, determine the panel cut-out width to fit the actual size.

Accessories (Optional)

Spacer

DD48-FY1-B (black)

Weight (approx.) 22g

Characters can be engraved on the filter. Used for adjusting the number of units.
Mounting Method: Same as display units. Refer to Unit Combination on page 21.
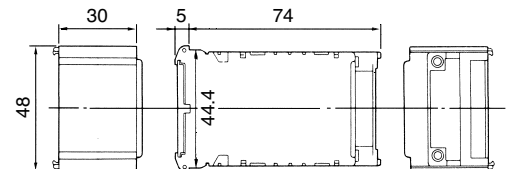
End Plate

DD48-W-□ (B: black, Z: beige)

For left side
For right side

Weight (approx.) 20g (pair)
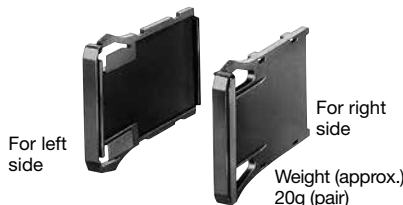
End plates must be installed at both ends of the assembly of the display units.
Mounting Method: Refer to Unit Combination on page 21.

(For left side)   (For right side)
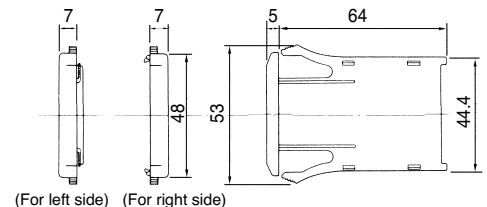
Mounting Clip

DD48-KT1 (black)

Weight (approx.) 7g

Used to fasten the display units to the panel when mounting four units or more.
Mounting Method: Refer to Panel Mounting on page 21.

DD48 Series Display Units

All dimension in mm.
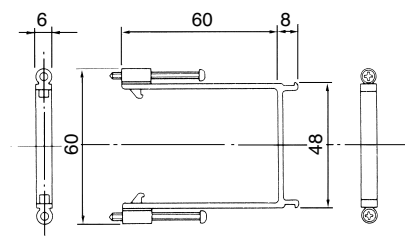
Long Filter

DD48-P16-□ (R: red, G: green)
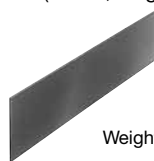
Weight (approx.) 20g

Eliminates the visual separation between units to improve the display face appearance.
For mounting method, refer to How to Use Long Filter on page 21.

Required Length (mm) = $30N + 3^{+1}_{-0}$
(N: No. of units)
Cut the long filter to the required length.

483   1.0

36.5
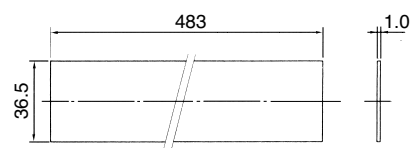
Connector

DMC-4
(Solder Terminal)

Weight (approx.) 9g

Solder Terminal Connector
Applicable Wire: Solid ø0.8 maximum
Stranded AWG22 maximum

74   3.3   4.5

43   58   50 ±0.3

72   10.6   ø3.3   10
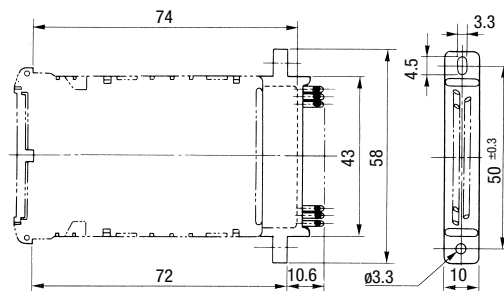
Connector for Mother Board

Two types of connectors (with cable) are available for the mother board. The connector on the mother board has a strain relief to protect the insulation displacement connection from external force.

For Connection to Connector Header

DD48-JE1B□

Cable Marking
Mother Board
Input Side Connector
▲ Marking
Gray Cable
Data Input Connector

L

Mother Board
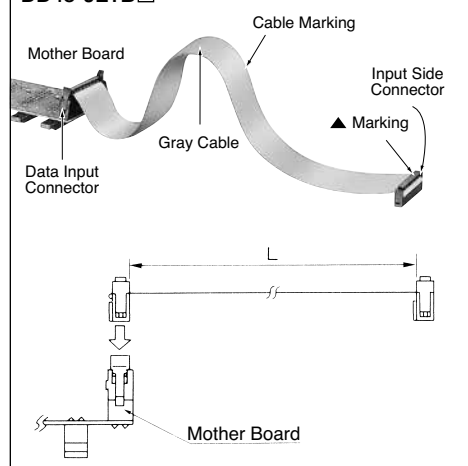
[Input Side Connector]
MIL flat cable connector (with strain relief)
IDEC's JE1S-301 (with strain relief)

Dimensions

0.38   42.67 ±0.2   5.6
7.0   15.9

35.56 ±0.2
2.54   2.54
6.0
1.27   3.81   ▲ Marking
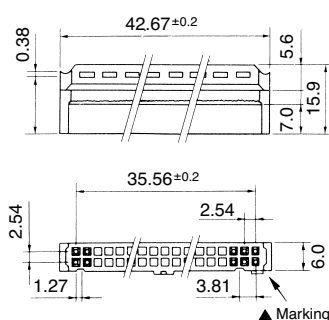
<Applicable Connector Header>
IDEC's JE1H-301 (Right Angle)
IDEC's JE1H-302 (Straight)

Terminal Arrangement (Bottom View)

| Vcc | A | C | NC | NC | NC | NC | L4 | L2 | NC | NC | DP4 | DP2 | NC | NC | GND | ← Decimal |
| Vcc | NC | NC | NC | NC | NC | NC | L4 | L2 | NC | NC | BL4 | BL2 | NC | NC | GND | ← Binary |

30 28 26 24 22 20 18 16 14 12 10 8 6 4 2
29 27 25 23 21 19 17 15 13 11 9 7 5 3 1

| Vcc | NC | (−) | NC | NC | NC | NC | L3 | L1 | NC | NC | BL3 | BL1 | NC | NC | GND | ← Binary |
| Vcc | B | D | NC | NC | NC | NC | L3 | L1 | NC | NC | DP3 | DP1 | NC | NC | GND | ← Decimal |

▲ Marking

For Soldering Connection to PC Board or Others

DD48-JE1C□

Cable Marking
Mother Board
Color-coded Cable
Data Input Connector

L

Mother Board
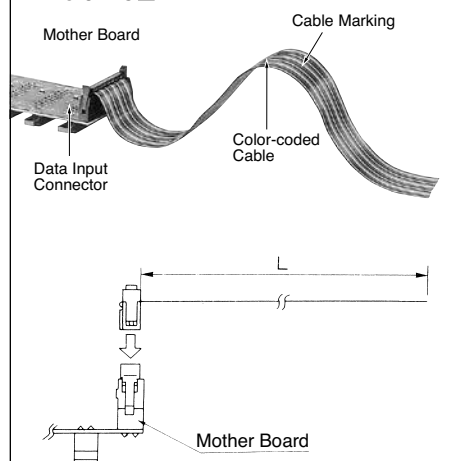
[Input Side Connector]
Not provided (soldering, etc.)

Flat Cable

36.83
1.27   0.89
38.10

Material

Conductor	AWG28 (7 cores/0.127mm) Tinned annealed copper wire
Insulator	Heat-resisting vinyl

(Name) →	Vcc	Vcc	A	B	C	D	NC	NC	NC	NC	NC	NC	NC	L4	L3	L2	L1	NC	NC	NC	NC	DP4	DP3	DP2	DP1	NC	NC	NC	NC	GND	GND	← Decimal
	Vcc	Vcc	NC	NC	NC	(−)	NC	NC	NC	NC	NC	NC	NC	L4	L3	L2	L1	NC	NC	NC	NC	BL4	BL3	BL2	BL1	NC	NC	NC	NC	GND	GND	← Binary
(Terminal No.) →	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

(Color-coded Cable)
(Cable Color)
Black White Gray Purple Blue Green Yellow Orange Red Brown Black White Gray Purple Blue Green Yellow Orange Red Brown Black White Gray Purple Blue Green Yellow Orange Red Brown   Cable Marking

Note: Specify a cable length code (0.5: 500 mm, 1: 1000 mm, 2: 2000 mm, 3: 3000 mm, 4: 4000 mm, 5: 5000 mm) in place of □ in the Part No.

IDEC

Installation

Unit Combination

Display units and end plates can be combined together by snap fit. Connection bolts and nuts are not required.

End Plate

Connector (optional)
DMC-4

End Plate (optional)
DD48-W-□
(pair)
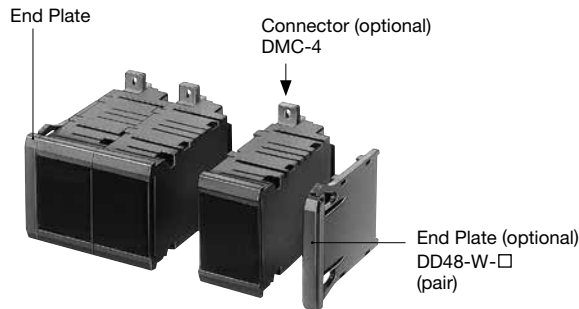
How to Use Long Filter

When using the long filter, refer to the following procedure.

1. Remove the single-digit filter from every display unit, sliding the filter to the right as shown below.
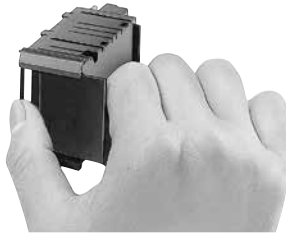
2. Combine the left end plate and a required number of display units. Then insert the long filter from right side into the groove of the display units and set the right end plate.

Left End Plate

Smooth Surface

Right End Plate

Long Filter

N digits

L

Matte Surface
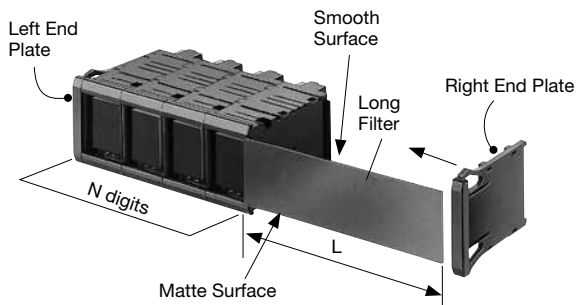
Note 1: The length of the long filter is for 16 digits. Cut the filter to the required length.
Required Length L (mm) $= 30N + 3^{+1}_{0}$
$1 \leq N \leq 16$ (N: No. of digits)

Note 2: When using a long filter, use display units of the same LED color.

Panel Mounting

Display units can be installed into a panel cut-out by snap fit. Assemble display units and end plates together in advance and hold the assembly at the end plates and push into a panel cut-out.

Installation of Mounting Clip

When mounting more than 4-digits, install mounting clips from the behind and tighten them. Refer to the following figures for the number of clips and the mounting positions.

Screwdriver

Hook

Mounting Clip
(Photo: For 4-digit display)
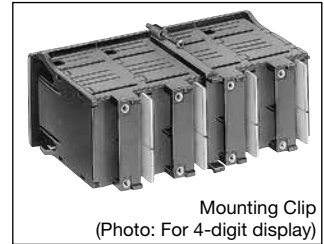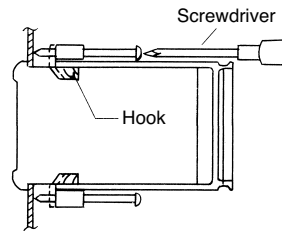
Install the mounting clip to the display unit as illustrated above, and tighten the screw lightly.
Tightening Torque: Approx. 0.15 N·m

[Mounting Position] Rear View

4 digits	5 digits	6 digits	7 digits

8 digits	9 digits	10 digits

11 digits	12 digits

13 digits	14 digits

15 digits	
16 digits	

▨ : Display units at which the mounting clips are installed

▮ : Mounting Clip

Mother Board

The mother board is for mounting four display units. Four display units should be connected to the mother board at the same time. Follow the procedure as below for installation and removal.

[Installation]

Put the substrates of four display units into the four connectors on the mother board. Insert the substrates into the connectors, pushing the display units on upper and lower sides alternately.
Note: Be sure to insert four display units at once.

Mother Board

Substrate

Connector
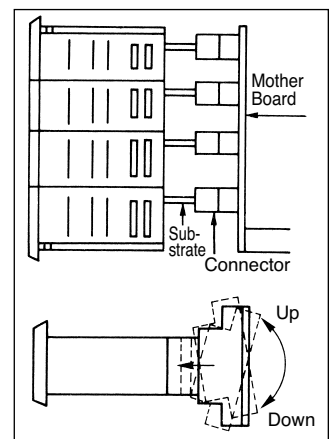
[Removal]

Remove the display units, pulling upper and lower sides alternately. Be sure to remove the four units at the same time.

Up

Down

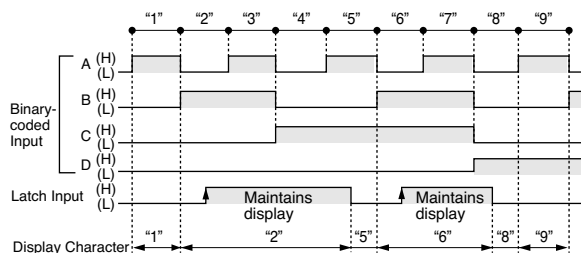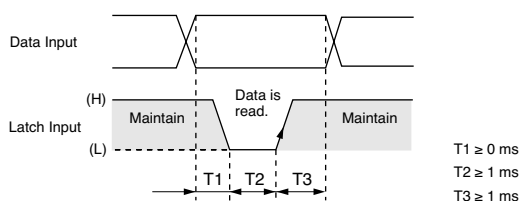Never insert or remove the display units one by one as shown. (The substrate may be damaged.)
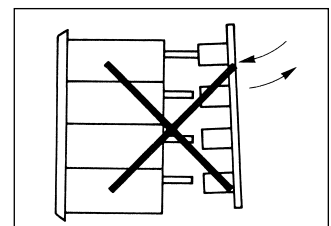
DD48 Series Display Units

Latch Input

Latch Operation

Latch Input Timing Chart

$T1 \geq 0$ ms
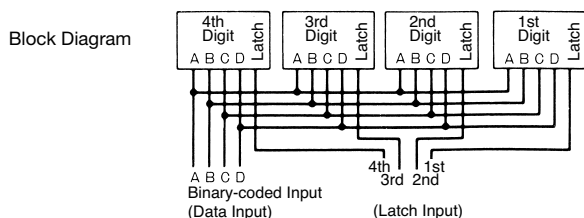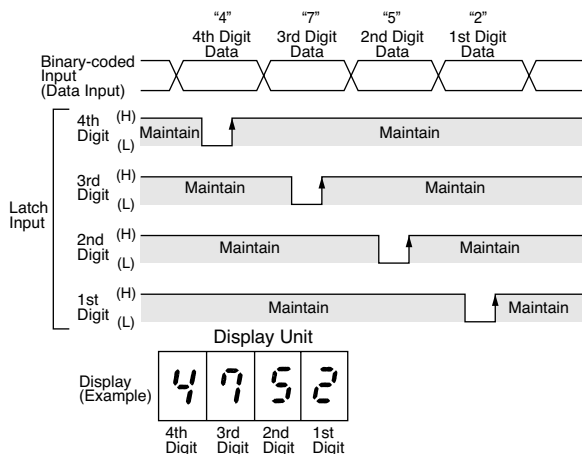$T2 \geq 1$ ms
$T3 \geq 1$ ms

Note 1: The above chart represents positive logic units. Negative logic units have characteristics with (H) and (L) reversed.

Note 2: The rise and fall times of input pulses should be made as short as possible. (0.1 ms maximum)

Note 3: If the data input is changed in the period of T2, the display will change.

Application of Latch Function

Note: The following chart represents positive logic digital display units. Negative logic units have characteristics with (H) and (L) reversed.

Instructions

1. When cleaning the surface of the filter and housing, use a soft cloth. Do not use thinner or acid to clean the surface.

2. When the display unit is mounted in a panel cut-out, do not place a metal object or power line within 40 mm from the end of the connector terminals (or PC board terminals) at the rear of the display unit.

3. If the display units are subjected to voltage surges, install a surge suppressor in the power line.

4. Use a shielded cable or metal conduit for the input line. Run the input wiring as far away as possible from high-voltage and motor lines. Make the input line as short as possible.

5. When using display units in environments where a large amount of electrostatic noise is generated, such as where molding materials, powders, or fluids are transferred through pipe lines, keep the display units as far away as possible from electrostatic sources.

6. Avoid using the display unit in a place where excessive and frequent vibration or impact may occur.

7. Avoid using the display unit in a place where it is exposed to corrosive gas, water or oil splashes, dust or direct sunlight, or in a place where organic solvents are used.

8. The filter is made of acrylic.

9. If the Latch input is on when the DD48 is powered up, the data input cannot be read correctly or wrong data may be maintained. Do not turn on the Latch input until at last 0.5 sec after the DD48 is powered up.

10. When the DD48-F01 is powered up, an inrush current of 0.5A (10 ms maximum) and when the DD48-F31 is powered up, an inrush current of 0.5A (10 ms maximum) flows through the internal power supply circuit. Select an external power supply of sufficient capacity, taking inrush current into consideration.

11. When connecting a pull-up or pull-down resistor to the input terminals, ensure compatibility with the input resistor in the DD48 internal circuit.

IDEC

DD96 Series Display Units

Two mounting styles; front and rear mount. High visible large LEDs; character height 57 mm.

- Modular units can be combined for up to 8-digits.
- Super bright LED
- Units can be combined together and installed into a panel cut-out by snap fit.
- Easy wiring and maintenance
- Display units operate on 24V DC.
- Jumbo size model of 96H × 72W mm (character height 57 mm), high visible from a distance.

DD96

Item		Input Logic	Housing Color	Part No.
Front Mount	Decimal Display Unit	Negative	Black	DD96-F31N-B
	End Plate (pair)		Black	DD96-W-B
Rear Mount	Decimal Display Unit	Negative	Black	DD96-R31N-B

Note: A connector is supplied with each display unit.

Specifications

Power Voltage	24V DC ±10%
Current Draw	Approx. 80 mA
Operating Temperature	–10 to +55°C (no freezing)
Storage Temperature	–25 to +80°C (no freezing)
Operating Humidity	35 to 85% RH (no condensation)
Data Input	L: 0 to 2V H: 12 to 30V
Display Character	7-segment red LED display Decimal display unit: 0 to 9, decimal point
Character Height	57 mm
Input	Binary-coded, Latch, DP and BI inputs
Input Logic	Negative
Output	BO (blanking output)
No. of Digits	8 digits max.
Panel Mounting	Front mount: Snap fit Rear mount: Screw
Degree of Protection	IP40 (IEC 60529)
Weight (Approx.)	Front mount: 130g End plates: 26g (pair)
	Rear mount: 100g

Terminal Connection

Connection Diagram
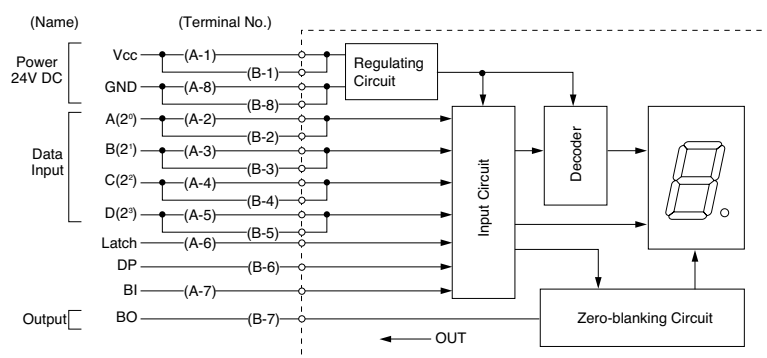
Internal Input Circuit
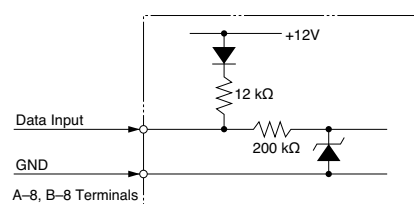
Terminal Arrangement (Connector) Bottom View
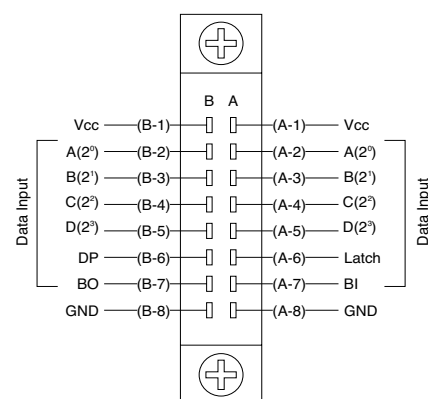
Note: Since power supply terminals and terminals A(2^0), B(2^1), C(2^2) and D(2^3) on sides A and B are internally connected to each other, connection is sufficient to only one side, but use terminals on the same side for jumper wiring.

Applicable Wire: Solid ø0.6 maximum
Stranded AWG28 to 30
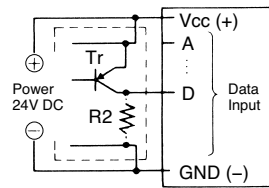
DD96 Series Display Units

External Wiring

[Contact Input (Digital Switch)]
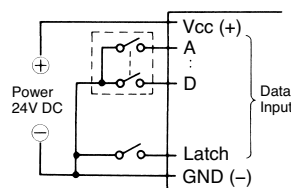
Power 24V DC

Vcc (+)
A
D
Latch
GND (−)

Data Input

[Transistor Input]

Power 24V DC

Vcc (+)
A
R1
D
Tr
GND (−)

Data Input

When Tr is on, output goes to L.

Power 24V DC

Tr
Vcc (+)
A
D
R2
GND (−)
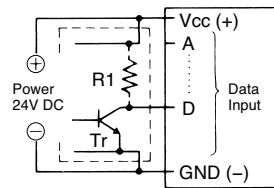
Data Input

When Tr is off, output goes to L.

Note: When connecting a pull-up or pull-down resistor to the external circuit, R1 and R2 should be 2.2 to 10 kΩ (1/2 to 1/4W) and 1 to 2.2 kΩ (1 to 1/2W), respectively.

Function Table

Data Input							LED Display	Output
Negative Logic Type							Decimal Display Unit	BO
D	C	B	A	Latch	DP	BI		
H	H	H	H	H	H	H	blank	H
H	H	H	H	H	H	L	0	L
H	H	H	L	H	H	△	1	L
H	H	L	H	H	H	△	2	L
H	H	L	L	H	H	△	3	L
H	L	H	H	H	H	△	4	L
H	L	H	L	H	H	△	5	L
H	L	L	H	H	H	△	6	L
H	L	L	L	H	H	△	7	L
L	H	H	H	H	H	△	8	L
L	H	H	L	H	H	△	9	L
L	H	L	H	H	H	△	blank	L
L	H	L	L	H	H	△	blank	L
L	L	H	H	H	H	△	blank	L
L	L	H	L	H	H	△	blank	L
L	L	L	H	H	H	△	blank	L
L	L	L	L	H	H	△	blank	L
×	×	×	×	L	H	△	maintain	

Input and Output Function

A, B, C, and D (binary code) Input
A, B, C and D are binary-coded decimal inputs corresponding to 1, 2, 4 or 8.

Latch Input
When the Latch input is set to level L, the display at the time is maintained. (DP and BI inputs are independent.)

DP (Decimal Point)
When the DP input is set to level L, the decimal point turns on.

BI (Zero Blanking Input)
When the BI input is set to level H with 0 displayed, the display is blanked.

BO (Blanking Output)
The BO output goes to level H during zero blanking. Leading zeros can be suppressed by connecting the BO to the BI on the lower digits.

Note:
× indicates the display after inputting the Latch signal is maintained regardless of the voltage level of H or L.
△ indicates the display is not affected by voltage level of H or L.
DP (decimal point) turns on when the DP input signal is in level L.
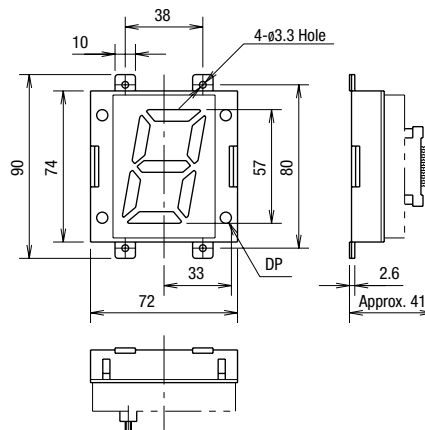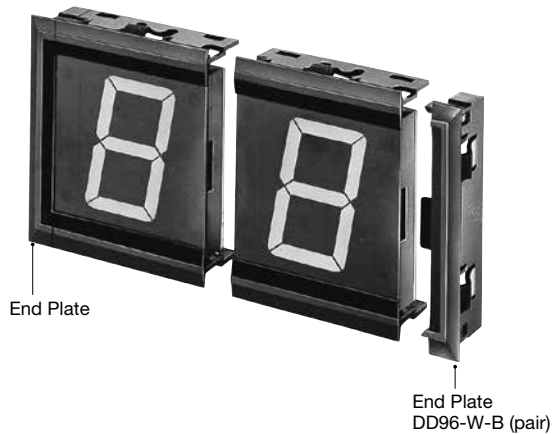
Dimensions & Panel Cut-out

Front Mount

End Plate (optional)
72
96
12
72 × N
12
2.5
Approx. 40

Display Unit
Panel Thickness: 0.8 to 4

N: No. of digits (8 digits maximum)

(Panel Cut-out)

72N + 20.5 $^{+0.5}_{0}$
10 min. (When mounting more than 8 digits)
92.5 $^{+0.5}_{0}$
10 min.

Rear Mount

38
10
4-ø3.3 Hole
90
74
57
80
33
DP
72
2.6
Approx. 41
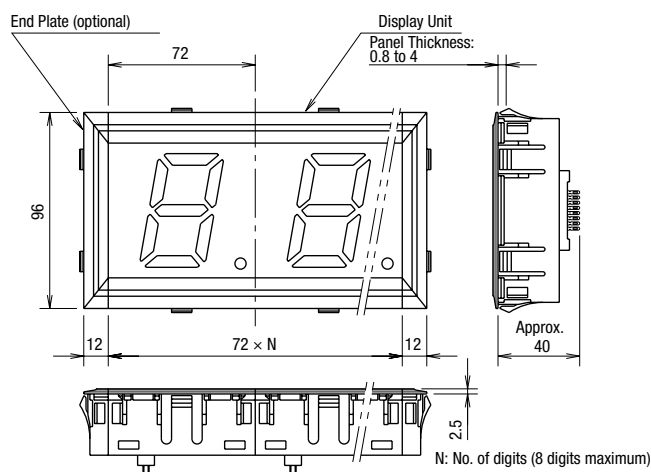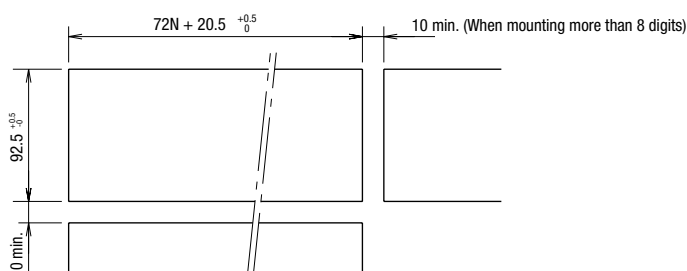
All dimensions in mm.

Instructions
Unit Combination

End Plate

End Plate
DD96-W-B (pair)
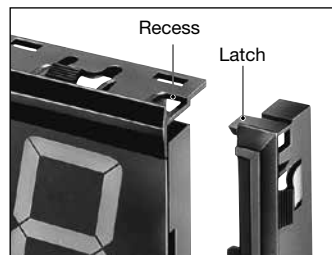
Only end plates snap onto DD96 display units; display units cannot be combined with each other by snap fit. DD96 rear mount units do not require end plate.

Recess

Latch

[Installing End Plates]
Press the end plate onto the side of the display unit.

[Removing End Plates]
Disengage the latches on top and bottom of the end plate using a screwdriver. Do not apply excessive force to the latches, or the latches may be damaged.
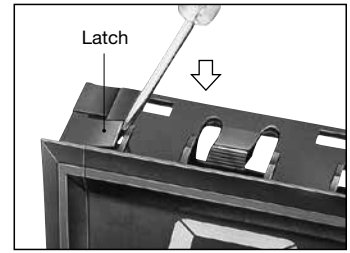
Latch

Panel Mounting

Install end plates onto display units at both ends and install the units into panel cut-out, then install display units in the middle.

Latch Input
Latch Operation

Latch Input Timing Chart

$T1 \geq 0$ ms
$T2 \geq 5$ ms
$T3 \geq 5$ ms
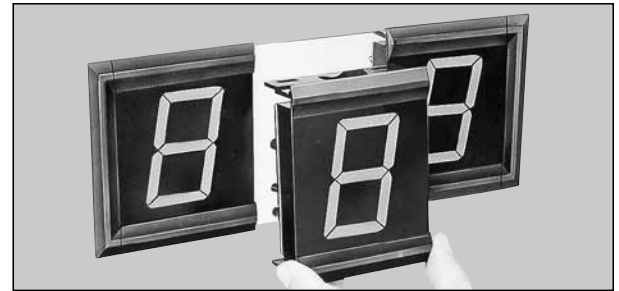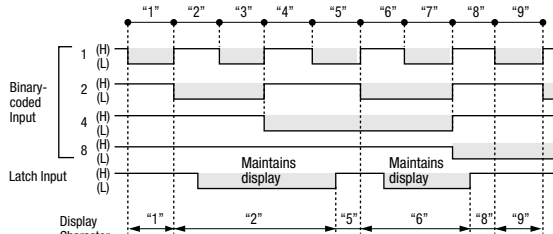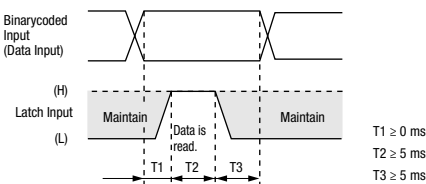
Note: If the data input is changed in the period of T2, the display will change.

Application of Latch Function

Block Diagram

Binary-coded Input
(Data Input)

(Latch Input)
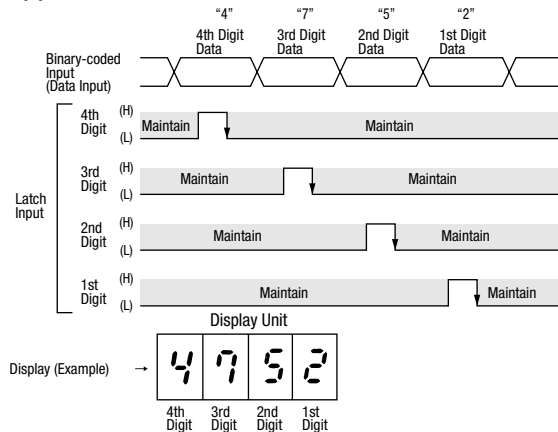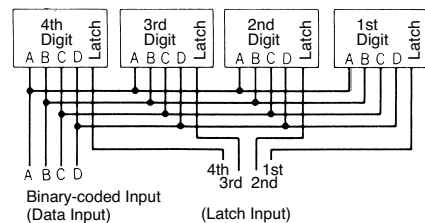
Connection to Terminals BI and BO

[Ex. 1]
By connecting as shown below, 0 is displayed when input is 0000 and 25 is displayed when input is 0025, eliminating unnecessary 0s in upper digits.
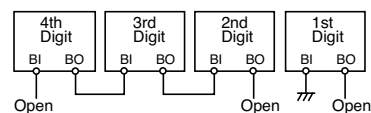
[Ex. 2]
By connecting as shown below, 0000 is displayed when input is 0000 and 0025 is displayed when input is 0025, with all 0s in upper digits displayed.
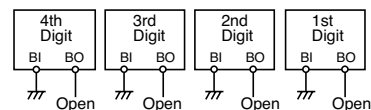
Notes:
1. Use BO output only for connection to BI input in the lower digit as shown in Ex. 1 above. Do not use the BO for other purposes.
2. When zero blanking is not required, maintain BI input in level L.

DD96 Series Display Units

Instructions

1. A red filter is not provided for the front of the DD96 series rear mount display unit.

2. When cleaning the surface of the filter and housing, use a soft cloth. Do not use thinner or acid to clean the surface

3. When the display unit is mounted in a panel cut-out, do not place a metal object or power line within 40 mm from the end of the connector terminals at the rear of the display unit.

4. If the display unit is subjected to voltage surges, install a surge suppressor in the power line.

5. Use shielded cable or metal conduit for the input line. Run the input wiring as far away as possible from high-voltage and motor lines. Make the input line as short as possible.

6. When using display units in environments where a large amount of electrostatic noise is generated, such as where molding materials, powders, or fluids are transferred through pipe lines, keep the display units as far away as possible from electrostatic sources.

7. Avoid using the display unit in a place where excessive and frequent vibration or impact may occur.

8. Avoid using the display unit in a place where it is exposed to corrosive gas, water or oil splashes, dust or direct sunlight, or in a place where organic solvents are used.

9. The filter is made of polycarbonate. Make sure that machine oil does not touch the filter.

10. If the Latch input is on when the DD96 is powered up, the data input cannot be read correctly or wrong data may be maintained. Do not turn on the Latch input for 0.5 sec after the DD96 is powered up.

11. When the DD96 is powered up, an inrush current of 0.4A (10 ms maximum) flows through the internal power supply circuit. Select an external power supply of sufficient capacity, taking inrush current into consideration.

12. When connecting a pull-up or pull-down resistor to the input terminals, ensure compatibility with the input resistor in the DD96 internal circuit.

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