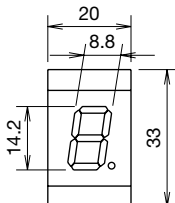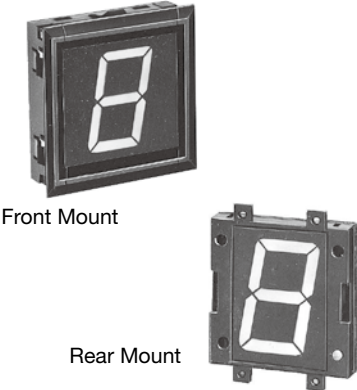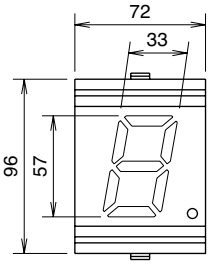| Series	DD3S	
Shape		
Unit Type	Decimal/Hexadecimal/Extra Decimal	
Display Part (mm)	7-segment Red LED, Green LED	
Display Character	Decimal display unit: 0 to 9, decimal point Hexadecimal display unit: 0 to F, decimal point Extra decimal display unit: 0 to 9, –, –, –, =, =, decimal point	
Function	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: 40 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	2 to 14	

	DD96
	 Front Mount Rear Mount
	Decimal
	 7-segment Red LED
	0 to 9 Decimal point
	—
	Binary Latch DP BI
	BO
	Negative
	L: 0 to 2V H: 12 to 30V
	24V DC ±10%
	80 mA
	8 digits max. (1 digit/unit)
	Front mount: Snap fit Rear mounting: Screw mounting
	Black
	Solder terminal (supplied)
	Front mount: 96H × 72W × 42.5D mm/unit Rear mount: 90H × 72W × 41D mm/unit
	Front mount: 130g Rear mount: 100g End plates: 26g (pair)
	15 to 19

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 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.
3. Make sure to attach an endplate at the end of a connected unit and a connector or a motherboard to the terminal part.

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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
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

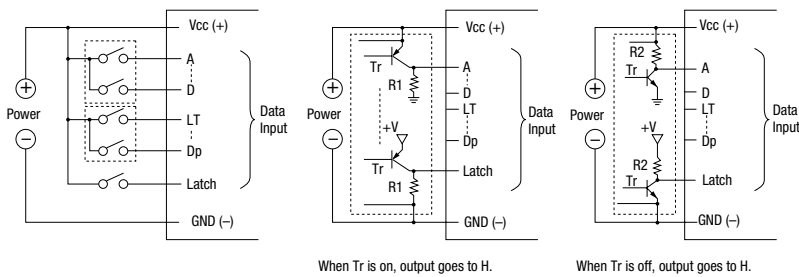|		
Power Voltage		12 to 24V DC ±10%
Current Draw	Decimal/ Hex/ Extra decimal	40 mA max. (red) 40 mA max. (green)
Data Input Level		L: 0 to 2V H: 9 to 30V
Display Character (see Function Tables)		Decimal display unit 7-segment 1-color (red or green) LED: 0 to 9, decimal point Extra decimal display unit 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: 14.2 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. 0.3A (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)

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), DP (2) → Input Circuit → Decoder → Display

Standard (Terminal Arrangement)

Power 12 to 24V DC (−, +)

(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

Positive Logic (Internal Input Circuit)

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)

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), DP (2), RBO (11) → Input Circuit → Decoder → Display

Zero-suppress (Terminal Arrangement)

Power 12 to 24V DC (−, +)

(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

External Wiring

Decimal/Hexadecimal/Extra Decimal Display Units

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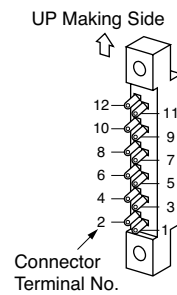
[Contact Input (Digital Switch)]   [Transistor Input]

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

[Transistor Input] Tr, R1, +V, Tr, R1 — When Tr is on, output goes to H.

[Transistor Input] R2, Tr, +V, R2, Tr — When Tr is off, output goes to H.

Connector Terminal No. (DMC-1)

UP Making Side

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

Connector Terminal No.

Negative Logic

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

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

[Transistor Input] R1, Tr, +V, R1, Tr — When Tr is on, output goes to L.

[Transistor Input] Tr, R3, +V, Tr, R3 — When Tr is off, output goes to L.
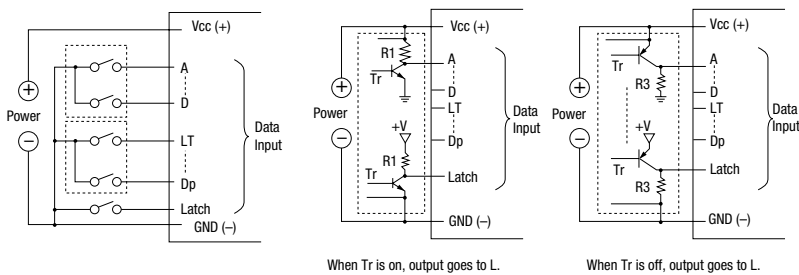
Note: When connecting pull-up or pull-down resistors to the external circuit, refer to the resistor values shown below:
R1: 2.2 kΩ (1/2W) to 10 kΩ (1/4W)
R2: 1 kΩ (1W) to 2.2 kΩ (1/2W)
R3: 1 kΩ (1W)

Note: When the connected device has transistor output, use of products that have NPN output with negative logic or PNP output with positive logic are recommended.

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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.

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.

(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													LED Display
Data Input													
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	H	L	L	blank
H	L	L	L	L	H	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 = A · B · C · D   *: Any display
Y: Y = A · B · C · D   #: # = DP · RBI · X
×: Either H or L   &: & = DP · RBI · Y
Note: RBI and RBO operate in the negative logic mode on both positive and negative logic units.

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.

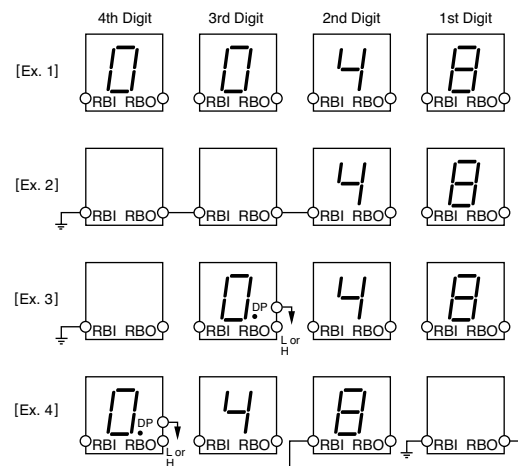---

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.
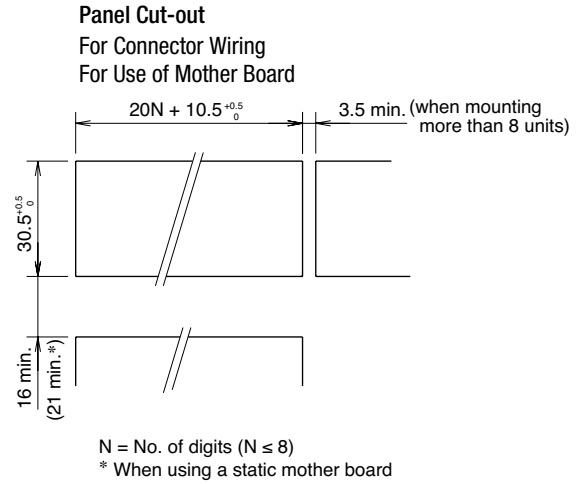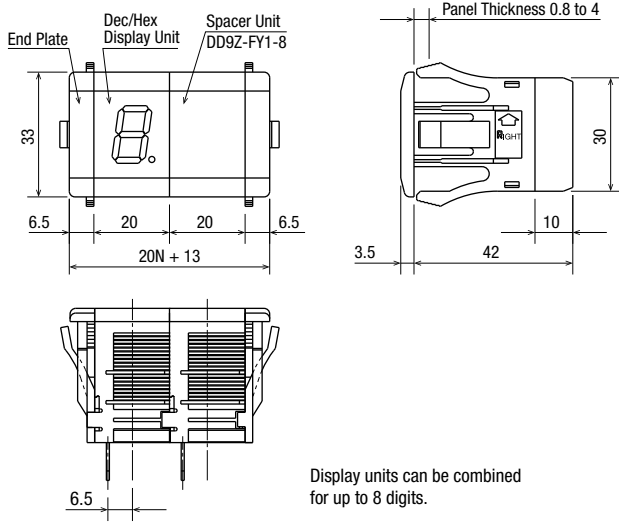
[Ex.4] Trailing zeros on the 2nd and 1st digits are suppressed. When the data on the 1st and 4th digits are zero, and the decimal point on the 4th digit is on, 0.0 is displayed with zeros on the 2nd and 1st digits suppressed.

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

## Dimensions & Panel Cut-out

All dimensions in mm.

Panel Thickness 0.8 to 4

Panel Cut-out
For Connector Wiring
For Use of 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

Display units can be combined for up to 8 digits.

Accessories (Optional)

Connector

Solder Terminal Connector (DMC-1)
Applicable Wire: ø0.8mm maximum
AWG #22 maximum
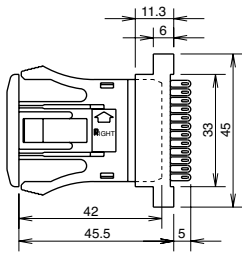
PC Board Terminal Connector (DMC-2)
Applicable PC board thickness: 1.6

12-ø1 Holes
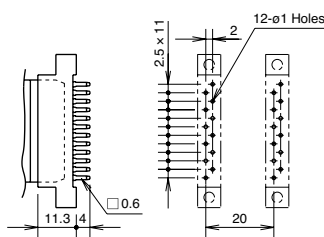
Retentive/One-way Insertion Connector (DD9Z-CN1)
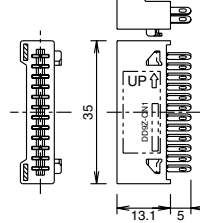
Connector Stopper (DD9Z-ST1)
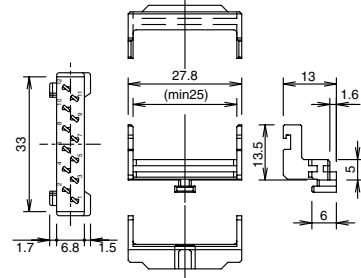
• Note: Use DD9Z-CN1 in combination with DD9Z-ST1 connector stopper.

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

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 for Data Input XG4A-2031(Omron)

Screw (Note)

Spacer

Nut

DD3S Housing

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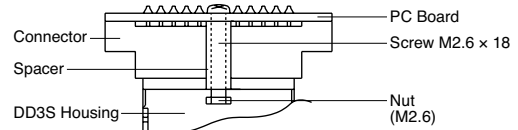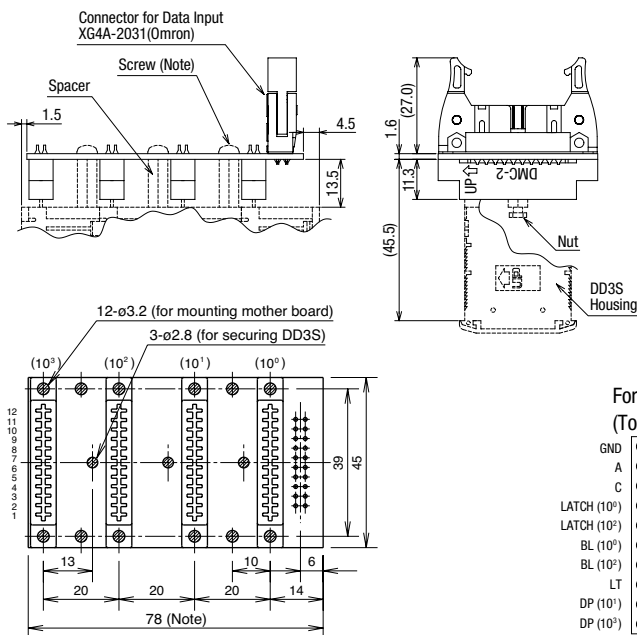
Screws (M2.6 × 18), M2.6-3 nuts, and spacers are supplied with the mother board.

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

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	
C	⑤ ⑥	D	
LATCH (10⁰)	⑦ ⑧	LATCH (10¹)	
LATCH (10²)	⑨ ⑩	LATCH (10³)	
BL (10⁰)	⑪ ⑫	BL (10¹)	
BL (10²)	⑬ ⑭	BL (10³)	
LT	⑮ ⑯	Dp (10⁰)	
DP (10¹)	⑰ ⑱	Dp (10²)	
DP (10³)	⑲ ⑳	Vcc	

For 2-digit (Top View)

GND	① ②	NC	
A	③ ④	B	
C	⑤ ⑥	D	
LATCH (10⁰)	⑦ ⑧	LATCH (10¹)	
NC	⑨ ⑩	NC	
BL (10⁰)	⑪ ⑫	BL (10¹)	
NC	⑬ ⑭	NC	
LT	⑮ ⑯	DP (10⁰)	
DP (10¹)	⑰ ⑱	NC	
NC	⑲ ⑳	Vcc	

Numbers marked with * are the DD3S terminal numbers.
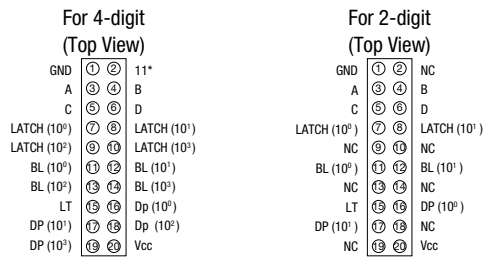
Terminal Arrangement by Models

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

Static Mother Board (not applicable to zero-suppress)
4-digit: DD9Z-MB2-4
3-digit: DD9Z-MB2-3
2-digit: DD9Z-MB2-2

Connector for Data Input
XG4A-2031(Omron)

Terminal Block for Data Input

Screw (Note)

1.5   4.5

(27.0)
1.6
11.3
13.5
(45.5)

DMC-2

UP

Nut

DD3S Housing

Spacer
Decimal Point Jumper Pin
Decimal Point Jumper Socket

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.

Connector
Spacer
DD3S Housing

PC Board
Screw M2.6 × 18
Nut (M2.6)
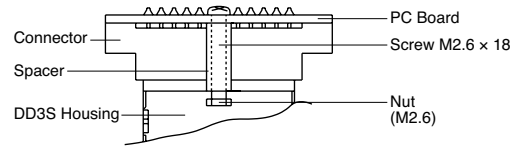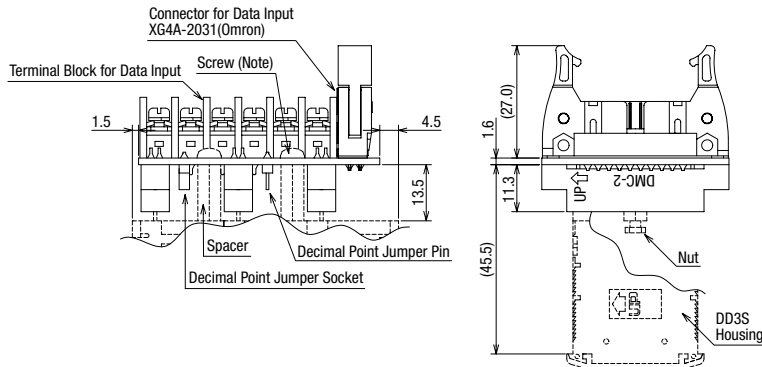
Screws (M2.6 × 18), M2.6 nuts, and spacers are supplied with the mother board.

4-digit

4-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

DP(10^3) DP(10^2) DP(10^1)

22.5   39   50

7   13   5.8
20   20   20   14
78
2.8

Input Terminal Arrangement

10^0 { A B C D A B C D GND Vcc } 10^2
10^1 { A B C D GND Vcc } 10^3

20 19
18 17
16 15
14 13
22 21
10 9
8 7
6 5
4 3
2 1

A B C D

(TOP VIEW)

GND Vcc Latch BL LT NC
① ② ③ ④ ⑤ ⑥
(For all 4 digits)

Decimal Point Jumper

Negative Logic − Positive Logic +

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
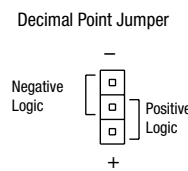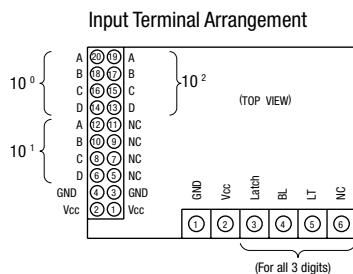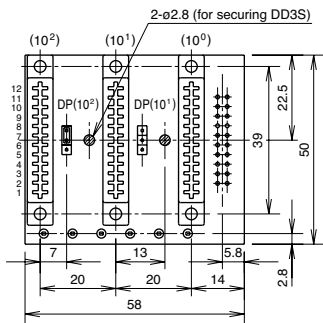
2-ø2.8 (for securing DD3S)

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

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

DP(10^2) DP(10^1)

22.5   39   50

7   13   5.8
20   20   14
58
2.8

Input Terminal Arrangement

10^0 { A B C D } 10^2
10^1 { A B C D GND Vcc }

20 19
18 17
16 15
14 13
22 21
10 9
8 7
6 5
4 3
2 1

A B C D NC NC NC NC GND Vcc

(TOP VIEW)

GND Vcc Latch BL LT NC
① ② ③ ④ ⑤ ⑥
(For all 3 digits)

Decimal Point Jumper

Negative Logic − Positive Logic +

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
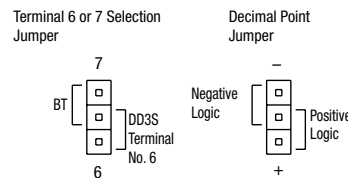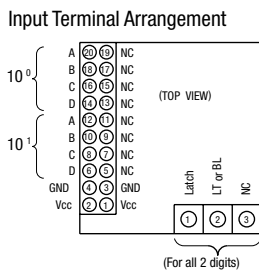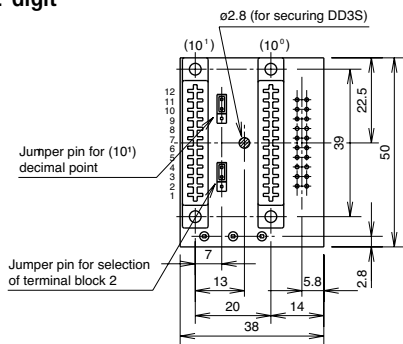
ø2.8 (for securing DD3S)

(10^1) (10^0)

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

Jumper pin for (10^1) decimal point

Jumper pin for selection of terminal block 2

22.5   39   50

7   13   5.8
20   14
38
2.8

Input Terminal Arrangement

10^0 { A B C D }
10^1 { A B C D GND Vcc }

20 19
18 17
16 15
14 13
22 21
10 9
8 7
6 5
4 3
2 1

A B C D NC NC NC NC NC NC NC NC GND Vcc

(TOP VIEW)

Latch LT or BL NC
① ② ③
(For all 2 digits)

Terminal 6 or 7 Selection Jumper

7
BT
6

DD3S Terminal No. 6

Decimal Point Jumper

Negative Logic − Positive Logic +

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.

• 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.
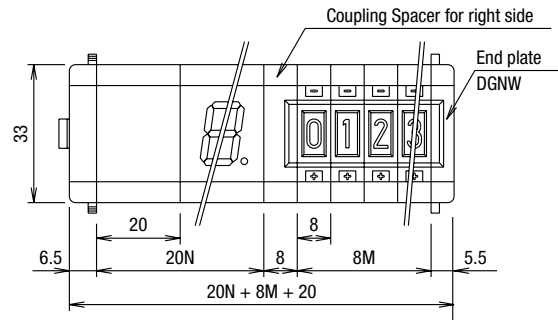
Coupling Spacer

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.
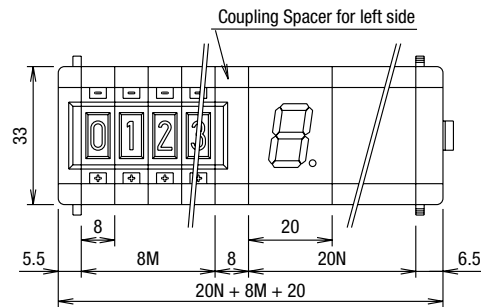
DD3S series Display Units

DG series
Digital Switches
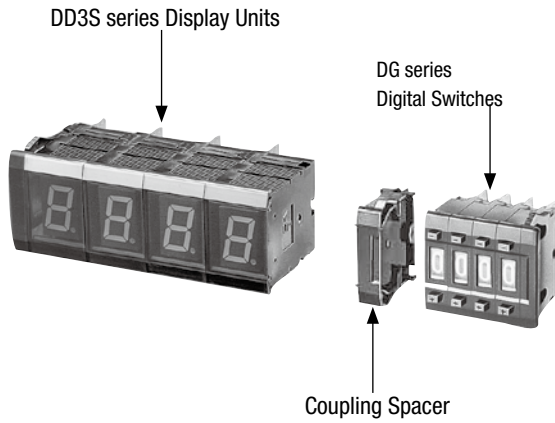
Coupling Spacer

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

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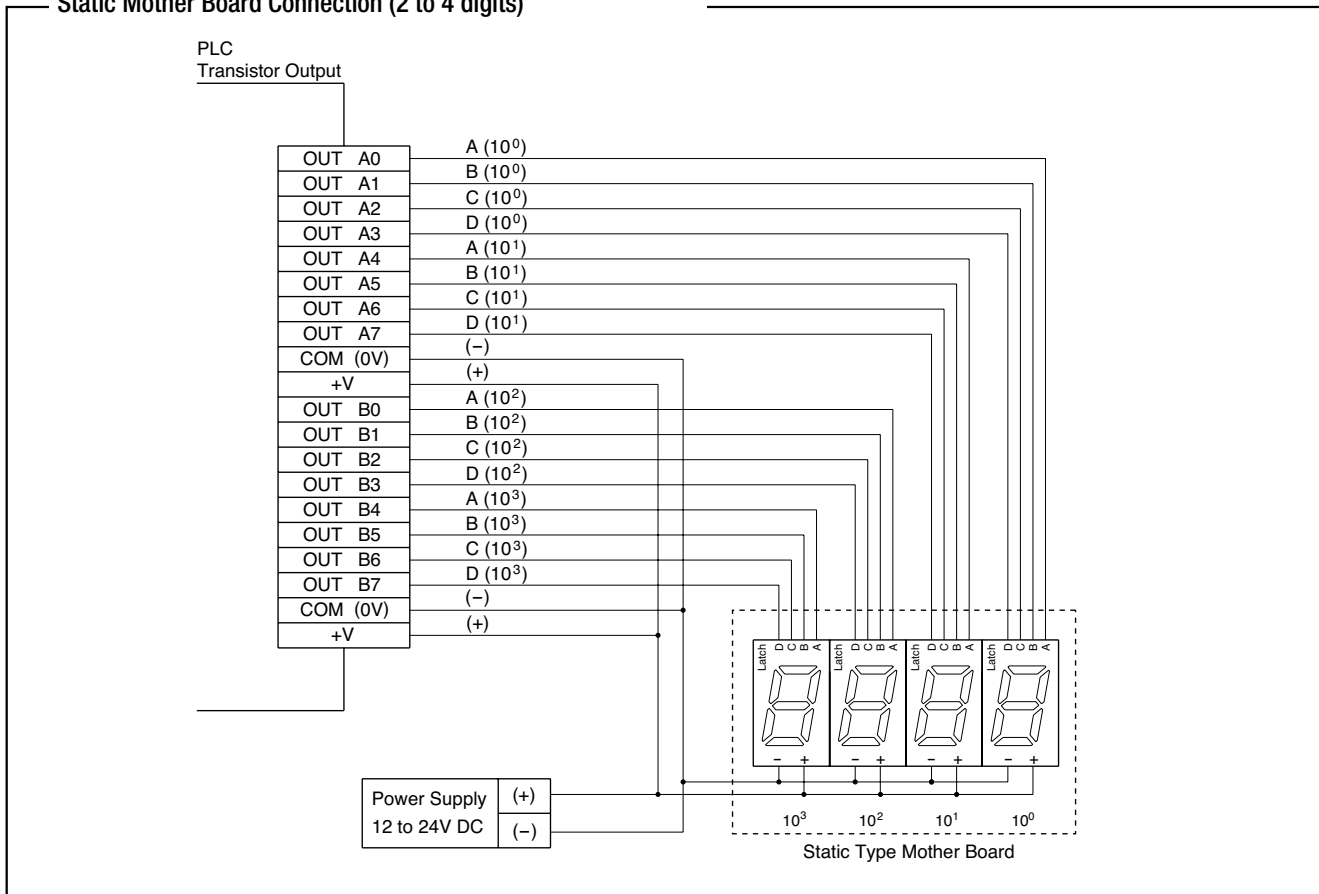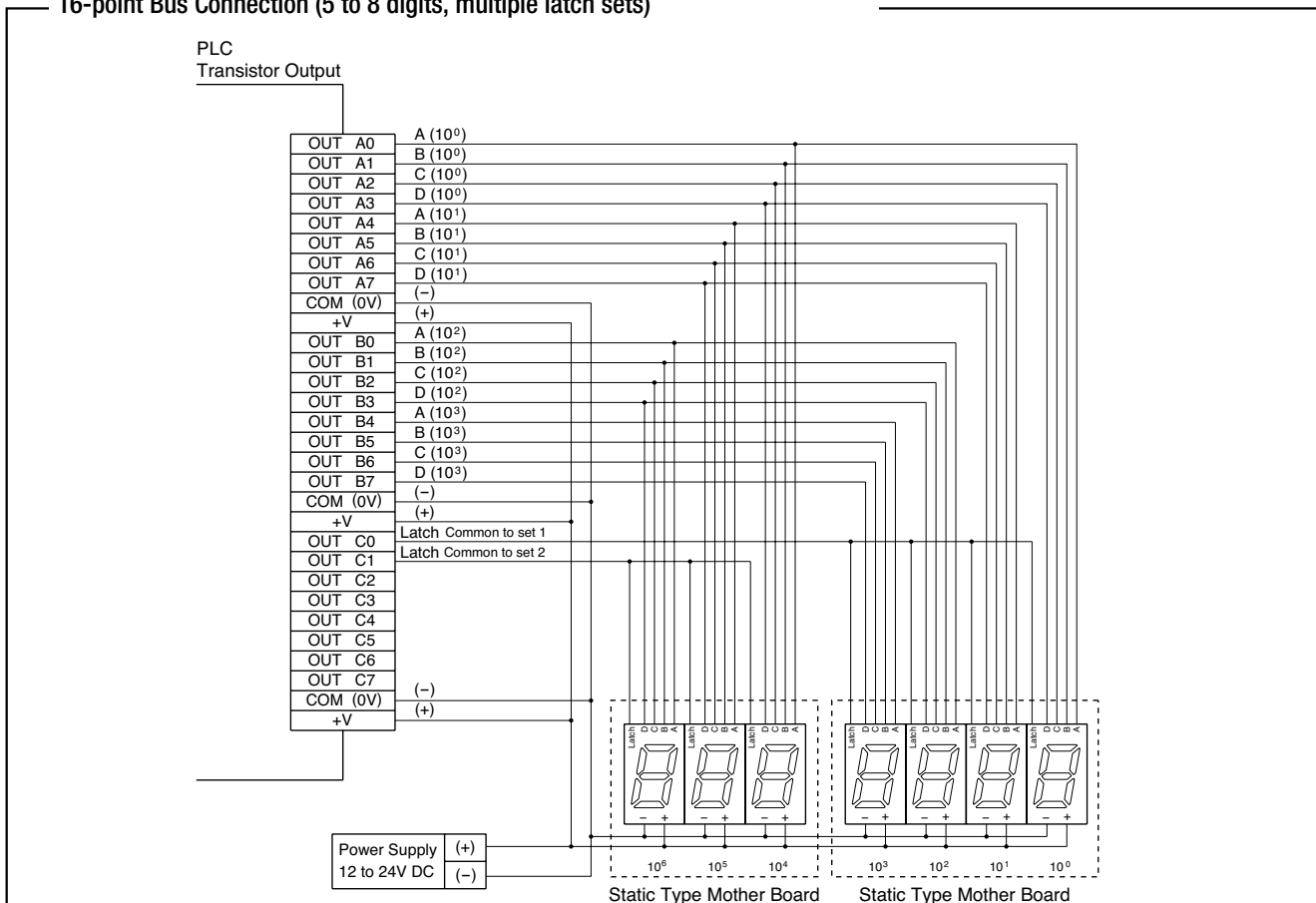
Coupling Spacer for right side

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)
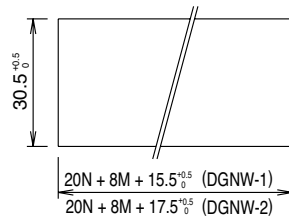
N: Number of display units mounted
M: Number of digital switches mounted
$(N + M \leq 8)$

IDEC

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

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

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
(+)
(−)

Latch D C B A

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

Dynamic Type Mother Board

Latch Input

[Binary/Decimal/Hex/Extra Decimal Display Units]

Latch Operation (Positive Logic)

Latch Input Timing Chart

T1 ≥ 0 ms
T2 ≥ 1 ms
T3 ≥ 1 ms
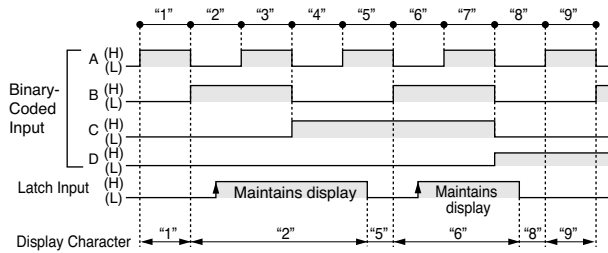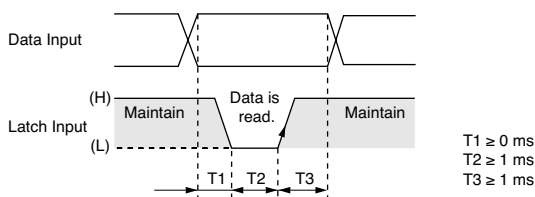
Application of Latch Function
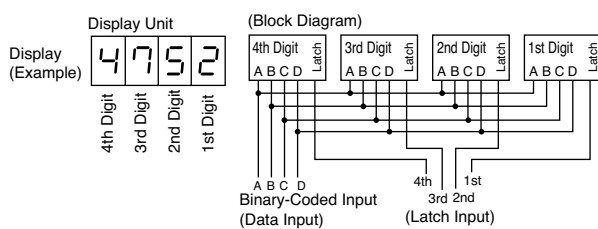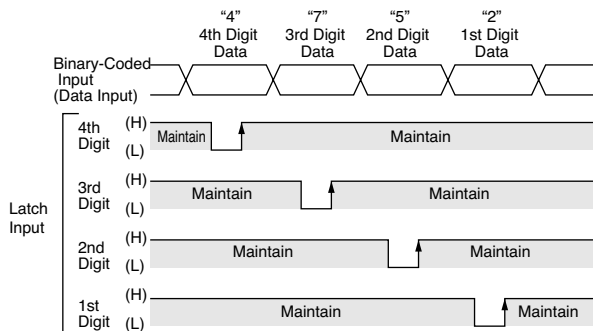
Note 1: The above chart represents positive logic units. Negative logic units have characteristics with (H) and (L) reserved.

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.
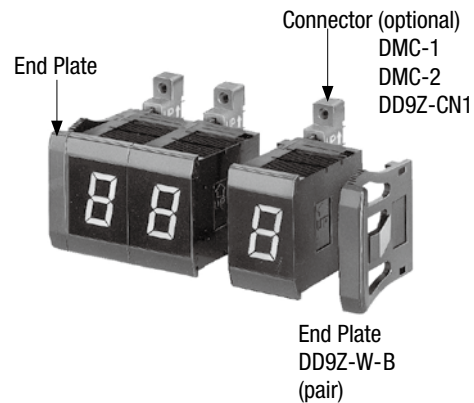
Panel Mounting

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.
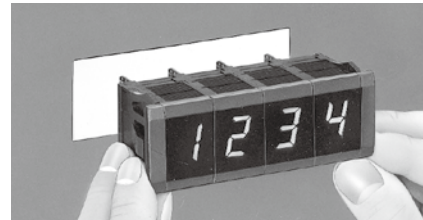
Mother Board (for 4-digit display)

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.

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.
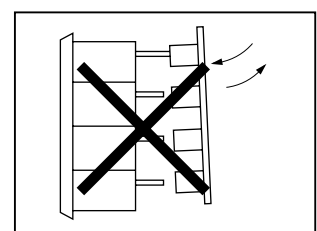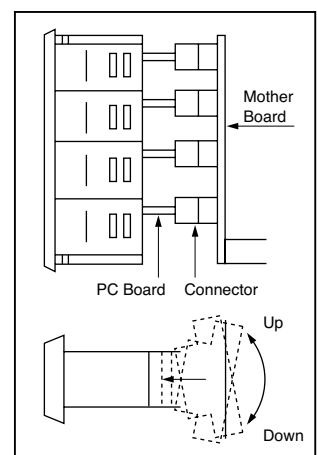
Instructions

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 0.3A (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.

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
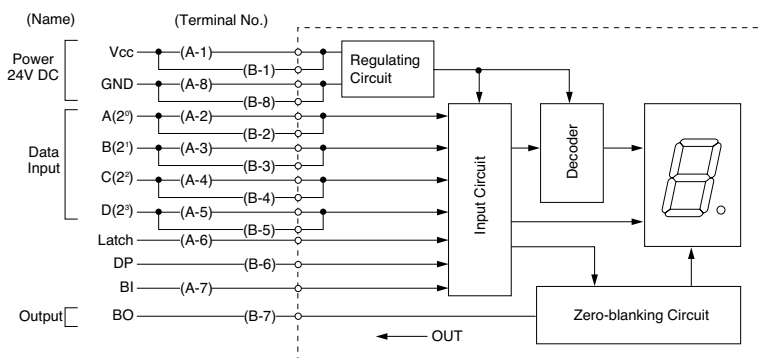
Internal Input Circuit
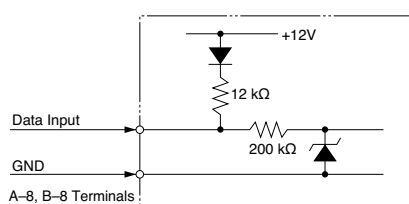
Terminal Arrangement (Connector) Bottom View
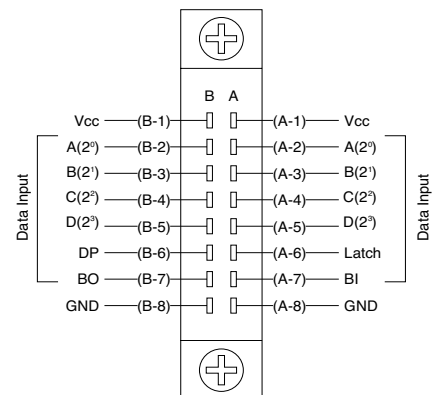
Note: Since power supply terminals and terminals A(2^0), B(2^1), C(2^2) and D(2^3) on sides A and B are internally connected to each other, connection is sufficient to only one side, but use terminals on the same side for jumper wiring.
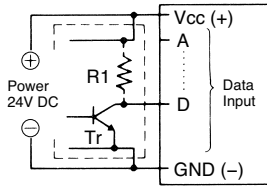
Applicable Wire: Solid ø0.6 maximum
Stranded AWG28 to 30
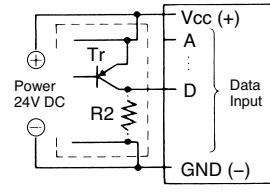
External Wiring

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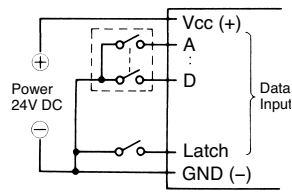
[Transistor Input]

When Tr is on, output goes to L.

When Tr is off, output goes to L.

Note: When connecting 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	Δ	1	L
H	H	L	H	H	H	Δ	2	L
H	H	L	L	H	H	Δ	3	L
H	L	H	H	H	H	Δ	4	L
H	L	H	L	H	H	Δ	5	L
H	L	L	H	H	H	Δ	6	L
H	L	L	L	H	H	Δ	7	L
L	H	H	H	H	H	Δ	8	L
L	H	H	L	H	H	Δ	9	L
L	H	L	H	H	H	Δ	blank	L
L	H	L	L	H	H	Δ	blank	L
L	L	H	H	H	H	Δ	blank	L
L	L	H	L	H	H	Δ	blank	L
L	L	L	H	H	H	Δ	blank	L
L	L	L	L	H	H	Δ	blank	L
×	×	×	×	L	H	Δ	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.

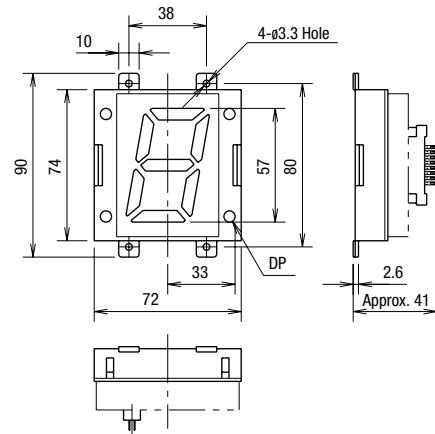Δ indicates the display is not affected by voltage level of H or L.

DP (decimal point) turns on when the DP input signal is in level L.
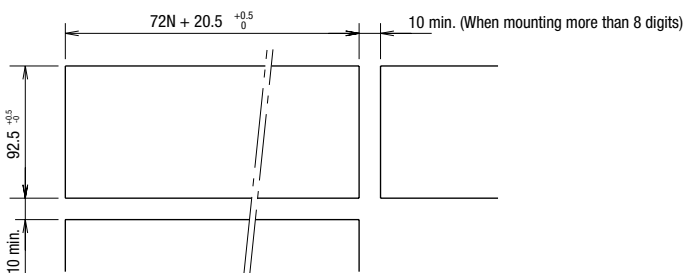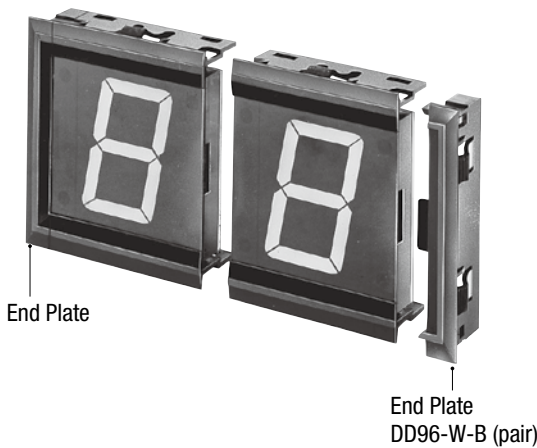
Dimensions & Panel Cut-out

Front Mount

N: No. of digits (8 digits maximum)
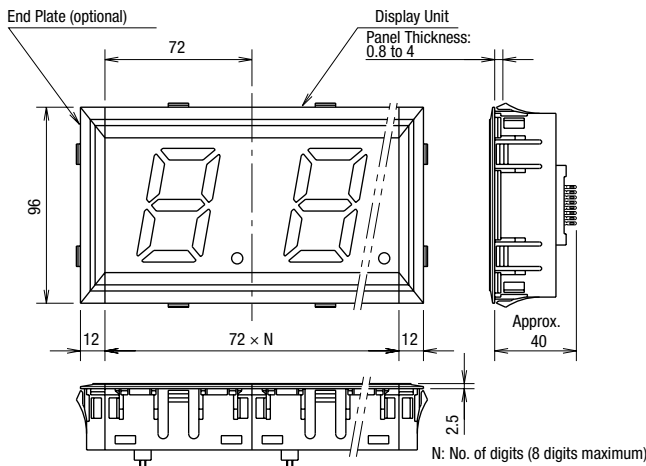
(Panel Cut-out)

Rear Mount

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.
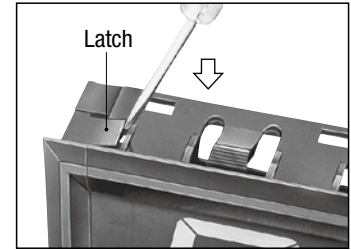

Recess   Latch
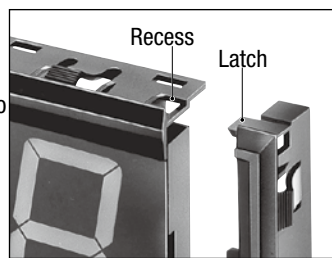
### [Installing End Plates]
Press the end plate onto the side of the display unit.

[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.
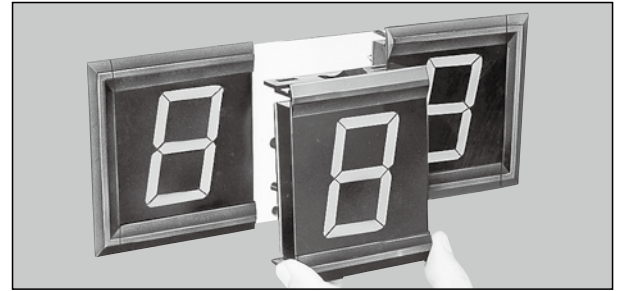
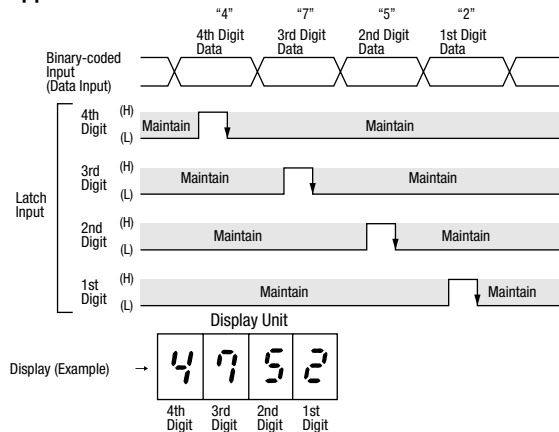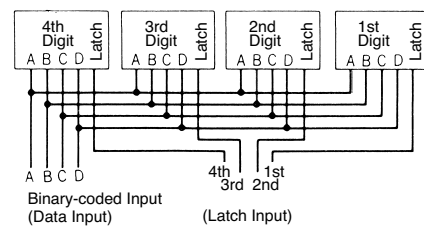

Latch Input

Latch Operation

Latch Input Timing Chart

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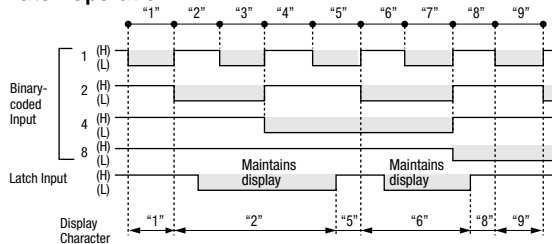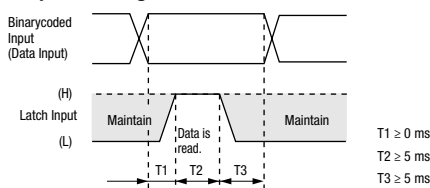
Note: If the data input is changed in the period of T2, the display will change.

Application of Latch Function

Block Diagram
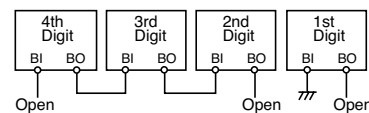

Binary-coded Input
(Data Input)   (Latch Input)
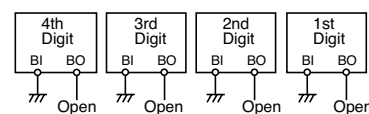
Connection to Terminals BI and BO

[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.

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.