

Instruction Manual

D/A Transducer with Scaling Function Model 7592

I-01334

We thank you for your purchase of this product. Please take care that this instruction manual is certainly delivered to the person in charge of operating it. For safety use of this product, please observe the following caution and also read the instructions to follow before the initial operation for proper operation of this transducer.

⚠ CAUTION

- To prevent electric shock, observe the following cautions:**
- ◆ Never make power line connections with active lines.
 - ◆ Ensure firm and tight connections to the terminals.
 - ◆ Do not touch the power source terminals while the product is powered on.
- To avoid electric shock, failure or abnormal heat-up of the product, do not use it in such places where:**
- ◆ exposed to rain, water drops or direct sunlight.
 - ◆ high temperature or humidity, much dust or corrosive gas.
 - ◆ affected by external noise, radio waves or static electricity.

● Check at Delivery

When the 7592 is delivered to you, please check that its specifications conform to your requirement and that there is no damage in transit. This transducer is carefully inspected before delivery from factory under our strict quality control program, but if you find any defect or inconvenience, please inform us of the model name, serial number etc. of the product.

● Cautions for Use

- ① This product is a precision instrument, so please take utmost care for its transportation, installation or any other handling of it.
- ② No power on-off switch is provided on this product, so it immediately starts to work when connected to the power source.
The rated data of this instrument is, however, defined with the pre-heating for 15 minutes or more.
- ③ In case of fear that the noise or surge is frequently generated on the power source line, a noise preventive solution must be taken.
- ④ Use this product within the range of its specifications and rates.

■ Standard Specifications

- Model Name 7592 -□-□-□
 1 2 3

【1】Input Code

Code	Type of Input	Maximum Resolution
1	14 bit with polarity	1/16384
2	4 digits BCD with polarity	1/10000
3	Gray binary	1/360

【2】Output Specifications

No.	Output	Output Impedance	Tolerable Resistive Load
01	DC0~10mV	Approx. 10 Ω	10k Ω or more
02	DC0~100mV	Approx. 100 Ω	100k Ω or more
03	DC0~1V	0.1 Ω or less	100 Ω or more
04	DC0~5V		500 Ω or more
05	DC0~10V		1k Ω or more
09	DC1~5V		500 Ω or more
00	Other DC voltage output (In between 10mV and 10V)		
13	DC±1V	0.1 Ω or less	500 Ω or more
14	DC±5V		2.5k Ω or more
10	Other DC voltage output (In between ±10mV and ±10V) ※		
23	DC0~1mA	5 Ω or more	0~15k Ω (Note-1)
29	DC4~20mA		0~750 Ω (Note-2)
20	Other DC current output (In between 100 μA and 20mA)		

※In between ±10mV and ±5V for DC power source.

Note-1: 0~10 k Ω for DC power source.

Note-2: 0~500 Ω for DC power source.

【3】Power Source Voltage

Code	Specifications
3	AC100V (90~132V)
5	AC200V (180~264V)
9	DC24V±10%

■General Specifications

Tolerable Error	: $\pm 0.15\%$ of span at 23°C.
Response Time	: Approx. 20ms (0→90%). 0.2s or less in case of internal synchronization.
Temperature Characteristic	: $\pm 150\text{ppm}/^\circ\text{C}$.
Insulation Resistance	: In between Input – Output – Power Source DC500V 100M Ω or more
Withstanding Voltage	: In between Input – Output – Power Source AC1500V for 1 minute (Note-1) Terminals – Case AC1500V for 1 minute
	Note-1: AC1000V in case of DC power source.
Power Source Voltage	: AC90~132V (50/60Hz) 6VA or less AC180~264V (50/60Hz) 6VA or less DC24V $\pm 10\%$ 100mA or less
Operating Temperature	: -5~55°C
Storage Temperature	: -20~55°C
Weight (transducer)	: AC power source models ... approx. 370g DC power source models ... approx. 210g
Accessories	: Input connection 1 pair Socket 1 piece

■Installation

1) Mounting

Mount the attached socket on to the DIN rail or fix with M4 screws.

When two or more transducers are installed in series, keep a clearance in between the transducers as **Fig.1** shows.

2) Location

Install the transducer in the place of ambient temperature -5~55°C, humidity 90%RH or less and no dew condensation.

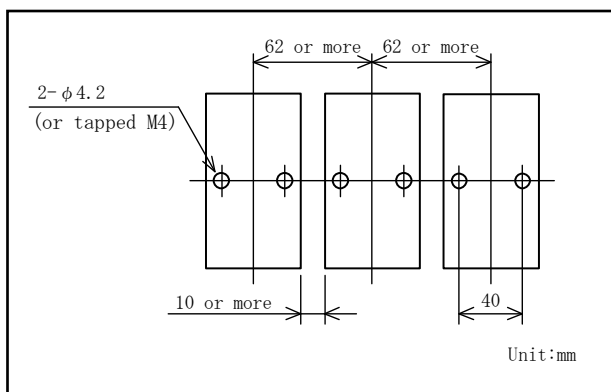


Fig.1

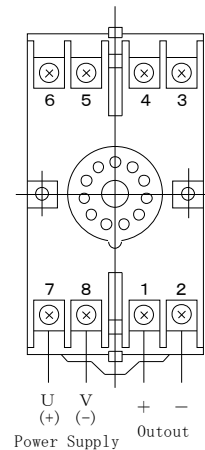


Fig.2

■Connection

- 1) Terminal screws of this transducer are M3.5. Make firm and correct connections by using crimp type terminal or equivalent.
- 2) Make the connections as per the connection diagram **Fig.2**. Use the cables to meet the rated capacity of circuit.
- 3) Before powering on the transducer, confirm that the rated value and cabling of input, output and power supply voltage.

■ Explanation of Input Connector

● Input Specifications

Input level : No voltage contact or open collector, TTL level
 $I_{in} \leq 1.6\text{mA}$, “L”=0~1.0V, “H”=3.5~5V

● Arrangement of Input Connector

○ 14 Bit with Polarity

Signal	B	A	Signal
COM	12	12	COM
COM	11	11	COM
SYNC	10	10	HOLD
POL	9	9	OVER
NC	8	8	B11
NC	7	7	B10
B13	6	6	B9
B12	5	5	B8
B7	4	4	B3
B6	3	3	B2
B5	2	2	B1
B4	1	1	B0

○ 4 Digits BCD with Polarity

Signal		B	A	Signal	
COM		12	12	COM	
COM		11	11	COM	
SYNC		10	10	HOLD	
POL		9	9	OVER	
8	$\times 10^3$	8	8	$\times 10^2$	8
4		7	7		4
2		6	6		2
1		5	5		1
8	$\times 10^1$	4	4	$\times 10^0$	8
4		3	3		4
2		2	2		2
1		1	1		1

○ Gray Binary

Signal	B	A	Signal
COM	12	12	COM
COM	11	11	COM
SYNC	10	10	HOLD
NC	9	9	OVER
NC	8	8	NC
NC	7	7	NC
NC	6	6	NC
NC	5	5	B8
B7	4	4	B3
B6	3	3	B2
B5	2	2	B1
B4	1	1	B0

1) Data input:

14 bit with polarity : B0~B13 B0 is the lowest bit.
 4 digits BCD with polarity : $\times 10^0 \sim \times 10^3$ $\times 10^0$ is the lowest digit.
 Input of code (A~F) other than those of BCD is recognized as 9 and outputs as analog.
 Gray binary : B0~B8 B0 is the lowest bit.

Caution!:

All the data input pins are pulled up with 3.3k Ω , so when the input pins are opened, they become “H” level.
 The pins not in use must be made to “L” level if they are of positive logic or to “H” level when they are of negative logic, connecting with COM.

2) Polarity input: POL

It is not provided for the gray binary.
 Make an input to [B9] pin with the following input level.

Polarity	Input level	
	Polarity logic is positive	Polarity logic is negative
+ polarity	H	L
- polarity	L	H

Caution!:

POL pin is pulled up with 3.3k Ω , so when the input pins are opened, it becomes “H” level.
 In case that the input signal has no polarity and is - polarity by positive logic input or + polarity by negative logic input, make the POL pin to “L” level connecting it with COM.
 When the input signal has polarity, use the POL pin controlling it to “H” or “L” level.

3) Over-range: OVER

When the over-range signal is input to [A9] pin, the monitoring display blinks and over-range value is output as analog output.

Over-range input	Input level	
	Polarity logic is positive	Polarity logic is negative
	H	L

Caution!:

OVER pin is pulled up with 3.3k Ω , so when the input pins are opened, it becomes “H” level.
 In case that the input signal has no OVER and is of positive logic input, make the pin to “L” level connecting it with COM, or to “H” level opening the pin.
 When the input signal has OVER, use the OVER pin controlling it to “H” or “L” level.

4) Hold input: HOLD

The output is held by connecting [A10] pin with COM and making it “L” level.

5) **Synchronization signal: SYNC**

- When the remote synchronization signal is selected:
Make an input of "L" pulse, which has the width of 1ms or more and synchronized with the input, to [B10] pin.
The data is taken in at the rising point of pulse.
- When the internal synchronization is selected:
Open [B10] pin.

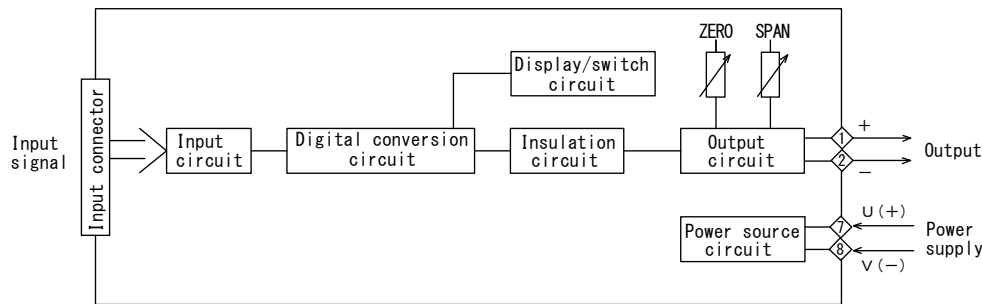
6) **Common: COM**

COM pin is common for the input of data, polarity, hold and synchronization signal.

7) **Vacant pins: NC**

These pins are internally connected to the circuit, so they must not be used as relay terminal.

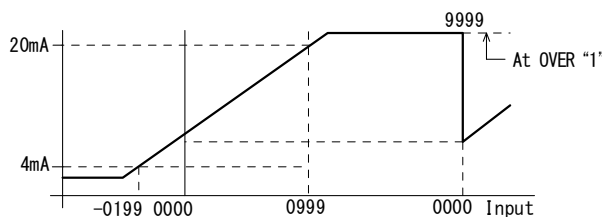
■ **Block Diagram**



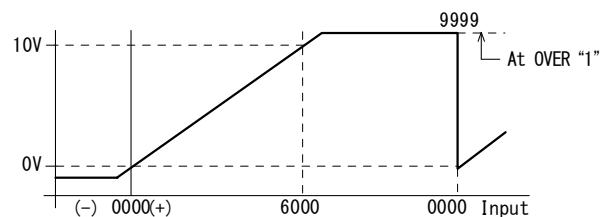
■ **Examples of Scaling**

- Scaling is not allowed for the gray code input.

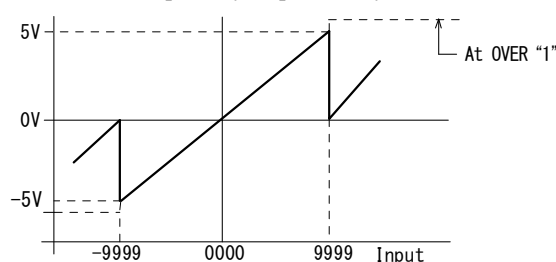
Example 1: 4 digits BCD with pol. input and 4~20mA output
When set to min. value -199 and max. 999.



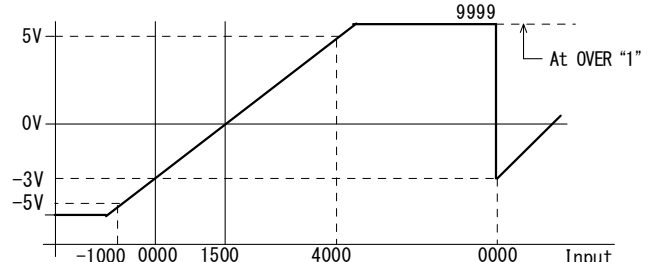
Example 2: 4 digits BCD with pol. input and 0~10V output
When set to min. value 0 and max. 6000.



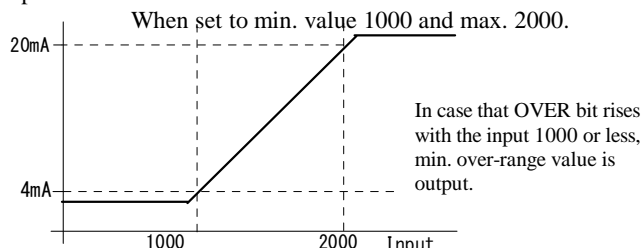
Example 3: 4 digits BCD with pol. input and $\pm 5V$ output
When set to min. value -9999 and max. value 9999.
(Output may skip to every second one.)



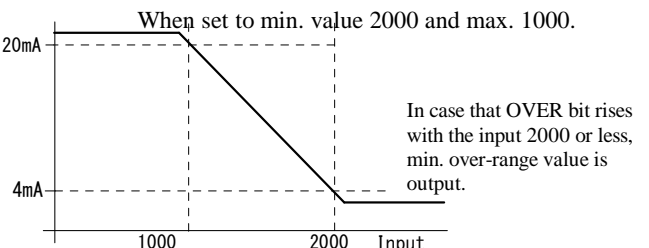
Example 4: 4 digits BCD with pol. input and $\pm 5V$ output
When set to min. value -1000 and max. 4000.



Example 5: 4 digits BCD with pol. input and 4~20mA output
When set to min. value 1000 and max. 2000.

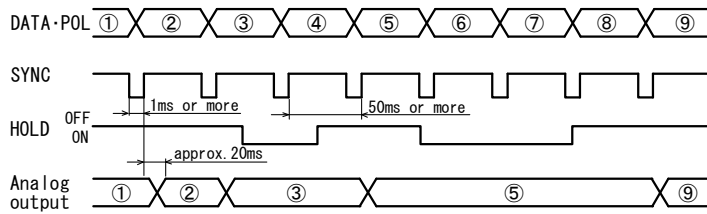


Example 6: 4 digits BCD with pol. input and 4~20mA output
When set to min. value 2000 and max. 1000.

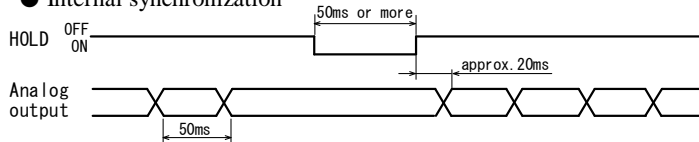


■ Timing Chart

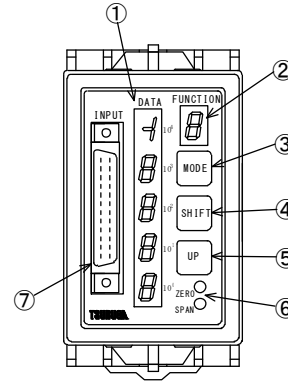
● Remote synchronization



● Internal synchronization



■ Name of Parts



- ① DATA display
- ② FUNCTION No. display
- ③ MODE key
- ④ SHIFT key
- ⑤ UP key
- ⑥ Adjustment trimmer for analog output
- ⑦ Input connector

■ Setting Procedures

FUNC-TION	DATA	Function / Item		Factory Setting
0	Monitors the input with decimal system figures	D/A conversion output mode		-
A	Displays simulated input value	Simulation output mode.		-
1	0	Data read-out mode	Change of setting mode	0
	1	Data setting mode		
2	-16383~16383	14 bit with polarity input	Setting of ZERO scaling	0
	-9999~9999	4 digits BCD with polarity input	Sets min. input value to output	0
	Nil	Gray binary	Function not provided.	--
3	-16383~16383	14 bit with polarity input	Setting of MAX scaling	16383
	-9999~9999	4 digits BCD with polarity input	Sets min. input value to output	9999
	Nil	Gray binary	Function not provided.	--
4	P	Positive logic 1=H	Change of logic of input data	P
	N	Negative logic 1=L		
5	P	Positive logic +=H -=L	Change of logic of polarity data	P
	N	Negative logic +=L -=H		
6	P	Positive logic OVER=H	Change of logic of OVER data	P
	N	Negative logic OVER=L		
7	0	Internal synchronization	Setting of Synchronization signal input	0
	1	Remote synchronization		
8	0	Light-up mode	Change of turn-off mode	0
	1	Turn-off mode		
9	0	D/A conversion output mode	Change of simulated output mode	0
	1	Simulated output mode		

- ① Press MODE key for about 3 seconds to enter the setting mode.
Get "1" displayed on the FUNCTION No. display.
Display of DATA 106 digit 0: Read-out of data
1: Setting of data
Press SHIFT key and select "0" or "1" with UP key.
- ② Select a FUNCTION No. with MODE key.
- ③ Select a digit of DATA display with SHIFT key and make an increment of character or numeral.
※Polarity setting ● 14 bit with polarity : 0→1→-1→--→0
● 4 digits BCD with polarity : 0→1→2→.....→9→-9→-8→.....-1→-0→0
- ④ Repeat ② and ③.
- ⑤ Press MODE key for about 3 seconds, then the set data is memorized and returns from setting mode to output mode.
At this moment, keep the DATA display of FUNCTION No. at "1".

Note 1): When no key is pressed for 5 min. or more in setting mode, the data being set is abandoned and returns to output mode.

Note 2): In the operation ⑤, if returned to the output mode with the DATA display of FUNCTION No. "0" instead of "1", the data modified becomes invalid.

■ Explanation of Each Mode

● D/A Conversion Output Mode

Data input and polarity are displayed on the DATA display in decimal system, and the analog signal is output.

● Simulation Output Mode

In the simulation output mode, the output is made with the value set on the DATA display.

Range of scaling is set by decimal system.

- Procedures to change D/A conversion output mode to the simulation output mode.
 - ① Press MODE key for about 3 seconds to get the FUNCTION No. "1" displayed.
 - ② Press SHIFT key, and change the DATA display from "0" to "1" with UP key.
 - ③ Press MODE key for 8 times to get the FUNCTION No. "9".
 - ④ Press SHIFT key, and change the DATA display from "0" to "1" with UP key.
 - ⑤ Press MODE key for about 3 seconds, then the FUNCTION No. "A" is displayed and enters the simulation output mode, giving output.
- Procedures to change the simulation output value.
 - ⑥ At the status ⑤ above, set the arbitral value with SHIFT and UP keys.
The selected digit blinks, and the analog output is held.
 - ⑦ Press MODE key, then the set value is updated and output. (It is memorized in EEPROM.)
- Procedures to return from the simulation output mode to D/A conversion output mode.
 - ⑧ At the status ⑦ above, press MODE key for about 3 seconds to get the FUNCTION No. "1" displayed.
 - ⑨ After pressing SHIFT key, change the DATA display to "1" with UP key.
 - ⑩ Select the FUNCTION No. "9" with MODE key, and change the DATA display from "1" to "0" with UP key.
 - ⑪ Press MODE key for about 3 seconds, then it returns to the D/A conversion output mode.

Note 1): When no key is pressed for 5 min. or more in setting mode, it returns to output mode.

Note 2): Simulation output functions even during the HOLD.

Note 3): When the power is turned off in the simulation output mode and turned on again, the transducer starts to work in the simulation output mode and outputs the previous data.

● Turn-off Mode

- The display during the D/A conversion output mode is turned off.
- During the setting mode and simulation output mode, the display is not turned off.
- The display is not turned off either at the powering on.
- During the display turned off, it can be lit up by pressing either key, MODE, SHIFT or UP.
Then, any key is pressed for about 30 seconds, the display is automatically turned off.

■ Adjustment

At the time of delivery from factory, the product is adjusted within tolerable error.

When the calibration becomes necessary, make an adjustment with ZERO and SPAN trimmers provided on the front of the product. The adjustable range is approximately $\pm 3\%$ for ZERO and approximately $\pm 5\%$ for SPAN.

Perform the calibration in the environmental condition of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$, 75%RH or less.

■ External Dimension

