

TOSHIBA

Integrated Controller V series

model 2000 I/O Module

4ch Analog Output Module

DA664

■ USER'S GUIDE ■

Thank you for purchasing the TOSHIBA product.

Check the package contents, and use this product according to the instructions described in this guide.

- Before using this product, carefully read "Safety Precautions" included in the package.
- This guide is prepared for DA664's specifications and safety precautions. Please refer the following manuals.
 - Integrated Controller V series User's Manual : 6F8C0905
 - Sequence Controller S2 User's Manual : 6F8C0836
 - Sequence Controller S2T User's Manual : 6F8C0926
 - Intelligent Analog Module User's Manual : 6F8C0860
- TOSHIBA reserves the right to make changes to this guide and/or related products at any time without notice.

6F8C0863
2001-9(2)

■ Precautions

1. Do not connect the load of the output impedance specifications. This can cause fire, failure and malfunction.
2. Turn on the external power to this module at the same time as the main unit power or firstly. If there is no voltage, the module will be error as external power supply voltage drop.
3. Confirm the voltage poles and supply the voltage to the external power connection terminals. The reverse or over voltage can cause fire, failure and malfunction.
4. Set up the output type to fit the load conditions. A mismatch can cause fire, failure and malfunction.
5. Use shielded twisted-pair cable for analog output signals. And normally use the load side for cable shield ground. Otherwise use the DA664 side for cable shield ground and so on. Please change the grounding in case of the malfunction.
6. Separate the analog output cables from other I/O and high-power cables by at least 200mm. The electro-magnetic noise can cause malfunction.
7. Take measures to meet the noise environment (example the line filter) for the external power supply wiring. If excess noise is applied, this can cause malfunction.
8. When the external power turns on to this module, the DA664 output the about 1V and a few milliseconds voltage. If there are problem causes of system malfunction, turn on the external power to this module at the first time as the load unit power.

■ Overview

The 4-channels analog output module DA664 converts the digital data processed by the analog signals. The DA664 has the following features.

- 4 channels per module are mounted
- 16-bit high-resolution per channel is available
- 1ms conversion time per channel
- Offset adjust by channel is available
- Ether voltage or current output per channel is available

■ Specifications

Item	Specification		
Output type	Voltage output		
	Current output		
	Bipolar	-5 to +5V	
		-10 to +10V	
Unipolar	0 to +5V	0 to 20mA	
	0 to +10V		
Output impedance	+1 to +5V	4 to 20mA	
	1kΩ or more	600Ω or less	
Number of output channels	4 channels per module (N-side is common)		
Resolution	16-bit		
Overall accuracy	±0.2% / FS(25°C), ±0.5% / FS (0~55°C) (FS : ±10V)		
Temperature drift	±100ppm / °C or less		
Conversion cycle	Approx. 1ms / channel (4ms / 4channels)		
Instruction resistance	10MΩ or more		
Withstand voltage	1500Vac - 1 minute: between internal and external		
	500Vac - 1 minute: between analog input and external power supply		
Status indication	1 green LED (normal : lit , failure : not lit)		
Special functions	Offset adjust		
	Output hold / clear mode		
	External 24Vdc power supply voltage drop error detection		
I/O type	4-word type output module		
Internal logic current consumption	5Vdc - 230mA or less		
External power supply	24Vdc ± 10% - 240mA or less		
External connection	20-point removable terminal block		
Weight	Approx. 300g		

NOTE To select the output type, set the type into the buffer memory corresponding with the analog input signal-type.

■ I/O register

There is the following I/O registers' address.

S2T	S2	Item	Channel	R/W
YWn	%OWn	Analog output conversion data	1	Write
YWn+1	%OWn + 1		2	
YWn+2	%OWn + 2		3	
YWn+3	%OWn + 3		4	

■ Buffer memory

There are the following registers in buffer memory for to set up and refer.

Item	Address	Note	R/W
Offset volume adjust	0~3	Channel 1~4	Write
Output type setting	4~7	Channel 1~4	Write
Analog output readback value	8~11	Channel 1~4	Read
I/O status	12~15	Channel 1~4	Read

The principal data are follows.

Please refer the Intelligent Analog USER'S MANUAL for the other register and detail

Output type setting

Set up the output type setting data from bit2 to bit0. And set up the output hold function setting data bit7 to bits.

bit	Output hold mode selection	
7	6	5
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

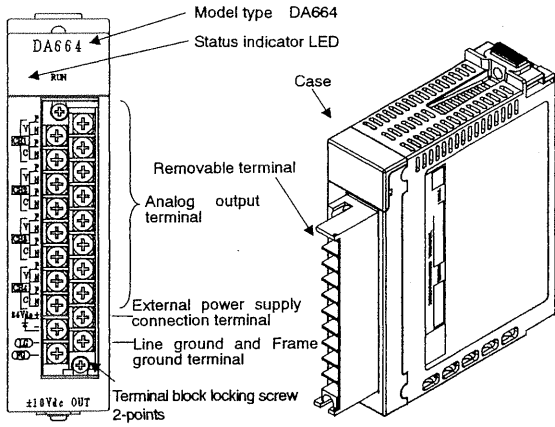
Initial value

bit	Output type	
2	1	0
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

Initial value

Oblique line area : no setting
Incorrect input setting in the oblique line area will cause an output type setting error.

External appearance



Data format

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0

Bipolar mode (-10 to +10V)

	Digital data			Analog output value		Resolution
	Hexadecimal	Integer	Positive	-10 to +10V		
Upper limit	7FFFH	32767	32767	+10.2396V		0.3125mV/bit
Full scale (positive)	7D00H	32000	32000	+10V		
0	0000H	0	0	+0V		
Full scale (negative)	8300H	-32000	32767	-10V		
Lower limit	8000H	-32768	32768	-10.24V		

Bipolar mode (5 to +5V)

	Digital data			Analog output value		Resolution
	Hexadecimal	Integer	Positive	±5V		
Upper limit	3FFFH	16383	16383	+5.1196 V		0.3125mV/bit
Full scale (positive)	3E80H	16000	16000	+5V		
0	0000H	0	0	+1V		
Full scale (negative)	C180H	-16000	49536	-5V		
Lower limit	C000H	-16384	49152	-5.12 V		

Unipolar mode (0 to +10V)

	Digital data			Analog output value		Resolution
	Hexadecimal	Integer	Positive	0~10V		
Upper limit	7FFFH	32767	32767	+10.2396V		0.3125mV/bit
Full scale (positive)	7D00H	32000	32000	+10V		
0	0000H	0	0	0V		

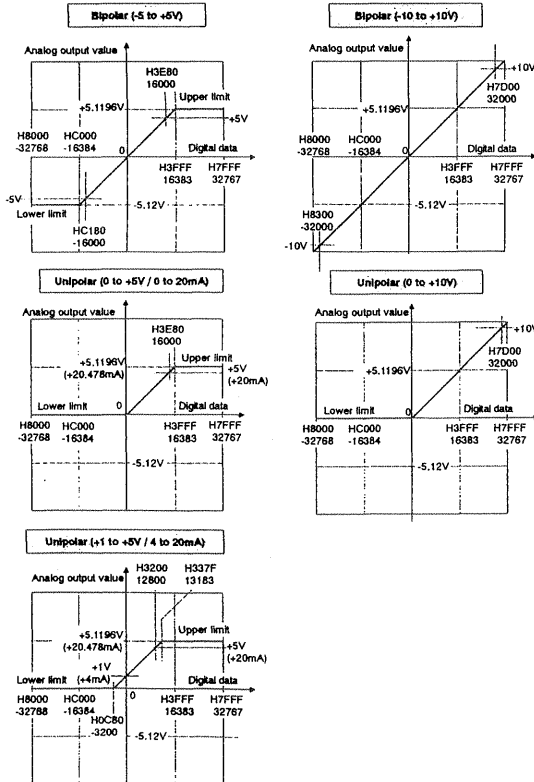
Unipolar mode(0 to +5V / 0 to 20mA)

	Digital data			Analog output value		Resolution
	Hexadecimal	Integer	Positive	0~5V	0~20mA	
Upper limit	3FFFH	16383	16383	+5.1196V	+20.478mA	0.3125mV/bit 1.25 μA/bit
Full scale (positive)	3E80H	16000	16000	+5V	+20mA	
0	0000H	0	0	0V	0mA	

Unipolar mode(+1 to +5V / 4 to 20mA)

	Digital data			Analog output value		Resolution
	Hexadecimal	Integer	Positive	1~5V	4~20mA	
Upper limit	337FH	13183	13183	+5.1196V	+20.478mA	0.3125mV/bit 1.25 μA/bit
Full scale (positive)	3200H	12800	12800	+5V	+20mA	
0	0000H	0	0	+1V	+4mA	

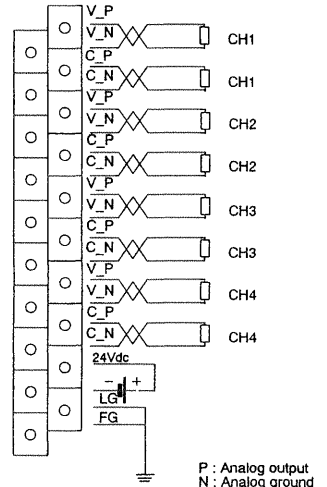
D/A conversion



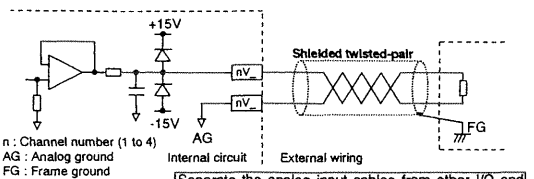
Terminal Assignment

Terminal function

- Analog voltage output channel 1
- Analog current output channel 1
- Analog voltage output channel 2
- Analog current output channel 2
- Analog voltage output channel 3
- Analog current output channel 3
- Analog voltage output channel 4
- Analog current output channel 4
- External power supply connection terminal (+)/(-)
- Line ground for external power supply
- Frame ground



Analog output wiring (Voltage output)



Separate the analog input cables from other I/O and high-power cables by at least 200mm. The electro-magnetic noise can cause malfunction.