



**FX-2AD-PT  
SPECIAL FUNCTION BLOCK  
USER'S GUIDE**

JY992D55701A

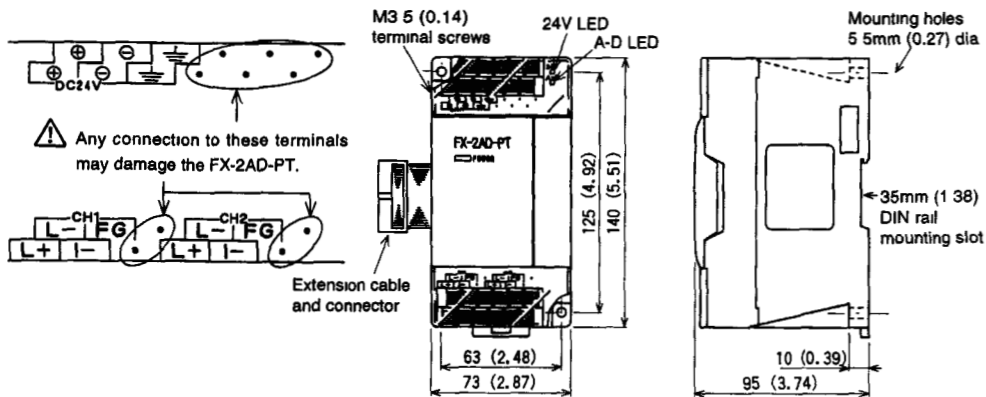
This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX-2AD-PT special function block and should be read and understood before attempting to install or use the unit.  
Further information can be found in the FX PROGRAMMING MANUAL and FX/FX2c SERIES HARDWARE MANUAL.

**1 INTRODUCTION**

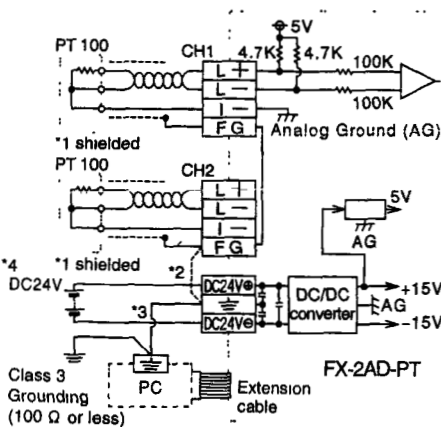
- The FX-2AD-PT analog block amplifies the input from two platinum temperature sensors (PT 100, 3 wire, 100 Ω) and converts the data into 12 bit reading's stored in the Main Processing Unit (MPU). Both Centigrade (°C) and Fahrenheit (°F) can be read. Reading resolution is 0.2°C/0.36°F.
- All data transfers and parameter setups are adjusted through software control of the FX-2AD-PT; by use of the TO/FROM applied instructions in the FX PC.  
Note : FX programmable controllers versions 2.0 or later (those with serial number 13XXXX or larger) are required as these units have the TO/FROM applied instructions in their instruction set. All FX2c Models may be used.
- The FX-2AD-PT occupies 8 points of I/O on the FX expansion bus. The 8 points can be allocated from either inputs or outputs. The FX-2AD-PT draws 30mA from the 5V rail of the MPU or powered extension unit.

**1.1 External dimensions**

Weight : Approx. 0.5kg (1.1 lbs) Dimensions : mm (inches)



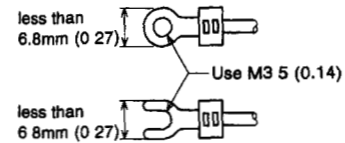
**2 TERMINAL LAYOUTS**



- The cable of the PT 100 sensor or a twisted shielded cable should be used for the analog input cable. This analog input cable should be wired separately from power lines or any other lines which may induce noise. The three wire method improves the accuracy of the sensors by compensating voltage drops.
- If there is electrical noise, connect the frame ground terminal (FG) with the ground terminal.
- Connect the ground terminal on the FX-2AD-PT unit with the grounded terminal on the base unit. Use class 3 grounding on the base unit, if grounding is possible.
- Either an external or the 24V built-in supply in the programmable controller may be used.

For additional data regarding EMC considerations please see section 7.0.

**2.1 Using crimp terminations**



- Use crimp terminations of the type indicated on the left.
- Secure the termination using a tightening torque of between 5 and 8 kg · cm.
- Wire only to the module terminals discussed in this manual. Leave all others vacant.

**3 INSTALLATION NOTES AND USAGE**

**3.1 General specification**

Item	Specification
General specifications	Same as those for the FX base unit

**3.2 Power supply specification**

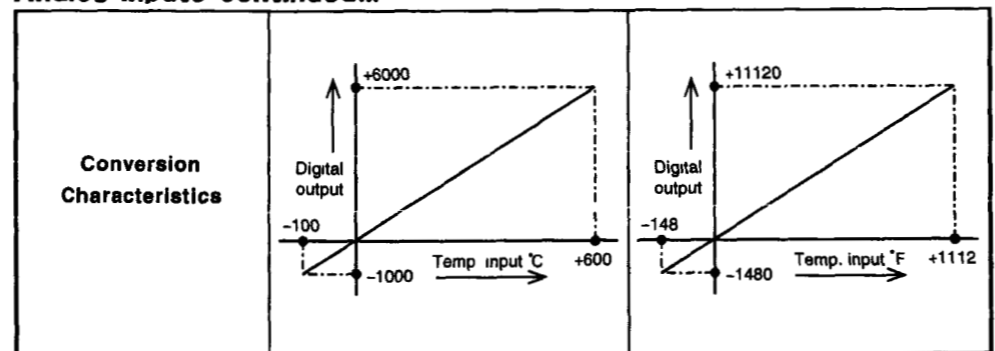
Item	Specification
Analog circuits	24V DC ± 10%, 50mA
Digital circuits	5V DC, 30mA (internal power supply from base unit)

**3.3 Performance specifications**

**Analog Inputs**

Item	Centigrade	Fahrenheit
	Both °C and °F readings are available by reading the appropriate buffer memory area.	
Analog input signal	Platinum temperature PT 100 sensors (100 Ω), 3-wire, 2-channel (CH1,CH2), 3850 PPM/°C (DIN 43760, JIS C1604-1989)	
Current to sensor	1mA, sensor : 100 Ω PT 100	
Compensated range	-100°C to +600°C	-148°F to +1112°F
Digital output	-1000 to +6000	-1480 to +11120
Minimum resolvable temp.	0.2°C	0.36°F
Overall accuracy	± 1% full scale (compensated range) -see section 7.0 for special EMC considerations	
Conversion speed	15 ms for 2 channels	

**Analog Inputs continued...**



**Miscellaneous**

Item	Specification
Isolation	Photo-coupler isolation between analog and digital circuits. DC/DC converter isolation of power from FX MPU. No isolation between analog channels
Number of occupied I/O points	8 points taken from the FX expansion bus (can be either inputs or outputs)

**3.4 Buffer memory assignment**

BFM	Item	Specification
*# 1	CH1	Number of samples for averaging
*# 2	CH2	Default = 8 Range = 1 to 4096
# 5	CH1	Averaged temperature
# 6	CH2	in units of 0.1°C
# 9	CH1	Present/Current temperature
# 10	CH2	in units of 0.1°C
# 13	CH1	Averaged temperature
# 14	CH2	in units of 0.1°F
# 17	CH1	Present/Current temperature
# 18	CH2	in units of 0.1°F
# 29	Error status	-see section 3.5
# 30	FX-2AD-PT ID CODE, K2020	-see section 3.5

The FX-2AD-PT communicates with the programmable controller through use of buffer memories.

BFMs #0, #3, #4, #7, #8, #11, #12, #15, #16, #19 to #28 and #31 are reserved. For BFMs without the "\*" mark, data can be read by the programmable controller using the FROM command.

BFMs (buffer memories) marked with an "\*" can be written to from the programmable controller using the TO command.

- BFMs #9, #10 and #17, #18 store the current value of the input data. This value is in units of 0.1°C or 0.1°F, but the resolution is only 0.2°C or 0.36°F.
- A number of recently converted readings are averaged to give a smoother read out. The averaged data is stored in BFMs #5, #6 and #13, #14.
- The number of samples to be averaged are assigned in BFMs #1 and #2. Only the range 1 to 4096 is valid. Values outside this range are ignored. The default value of 8 is used.

**3.5 Status Information**

**(1) Identification Code Buffer Memory BFM #30**

The identification code or ID number for a Special Block is read from buffer memory BFM #30 using the FROM command.

This number for the FX-2AD-PT unit is K2020.

The programmable controller can use this facility in its program to identify the special block before commencing data transfer from and to the special block.

**(2) Status information Buffer Memory BFM #29**

Bit devices of BFM #29	ON	OFF
b 0 : Error	When any of b1 to b3 is ON A/D conversion is stopped for the error channel	No error
b 1 : Reserved	Reserved	Reserved
b 2 : Power source	DC 24V power supply failure	power supply normal
b 3 : Hardware error	A/D converter or other hardware failure	Hardware normal
b 4 to b 9 : Reserved	Reserved	Reserved
b10 : Digital range error	Digital output/analog input value is outside the specified range.	Digital output value is normal.
b11 : Averaging error	Selected number of averaged results is outside the available range -see BFM #1 and #2.	Averaging is normal. (between 1 and 4096)
b12 to b15 : Reserved	Reserved	Reserved

