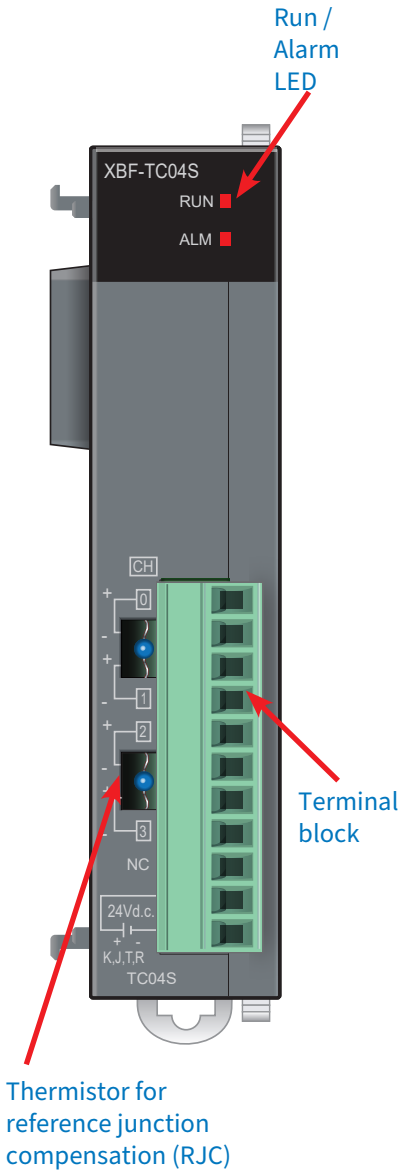
XBF-TC04S Analog Thermocouple Input Module

XBF-TC04S temperature sensing module provides the XGB PLC with the capability to monitor 4 independent thermocouple style temperature sensors.

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-TC04S	$199.00	Thermocouple Input Module	LS Electric XGB temperature input module, thermocouple, 4-channel, 16-bit resolution, input thermocouple type(s): J, K, R, T. Removable terminal block included.	4	PDF

Input Specifications			XBF-TC04S
Input Channels			4
Type of Input Sensor			Thermocouple K / J / T / R type JIS C1602-1995
Range of Input Temperature		K	-200.0 to 1300.0 ℃
		J	-200.0 to 1200.0 ℃
		T	-200.0 to 400.0 ℃
		R	0.0 to 1700.0 ℃
Digital Output		Temperature Display	Displaying down to one decimal place K, J, T type: 0.1 ℃ R type: 0.5 ℃
		Scaling Display	Unsigned scaling (0–65535)
			Signed scaling (-32768 to 32767)
Accuracy		Ambient Temperature (25℃)	Within ± 0.2%
		Temperature Coefficient (range of operating temp)	± 100 ppm/°C
Conversion Time			50ms/channel
Reference Junction Compensation			Auto compensation by RJC sensing (Thermistor) at ± 1.0°C
Warming-up Time			15 minutes or more*
Insulation	Insulation Method	Terminal - inner circuit	Photocoupler insulation
		Terminal - operating power	DC/DC converter insulation
		Between channels	PhotoMos relay insulation
	Dielectric Withstand Voltage		400VAC, 50/60Hz, 1 minute, leaking current 10mA or less
	Insulation Resistance		500VDC, 10MΩ or less
Terminal Block			11-point terminal
I/O Occupied Points			64 points
Max. Number per CPU			7
Additional Function		Filter Process	Digital filter (200–64,000 ms)
		Average Process	Time average (400–64,000 ms)
			Count average (2–64,000 times)
			Moving average (2–100)
		Alarm	Disconnection detection
		Max/Min Display	Display Max/Min
		Scaling Function	Signed scaling / unsigned scaling
Consumption Current		Internal 5VDC	100mA
		External 24VDC	100mA
Weight			63g

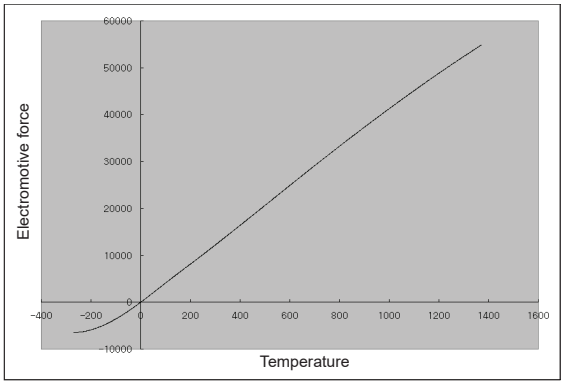
*For stability of measured temperature, 15 minutes warm-up is required after power on.



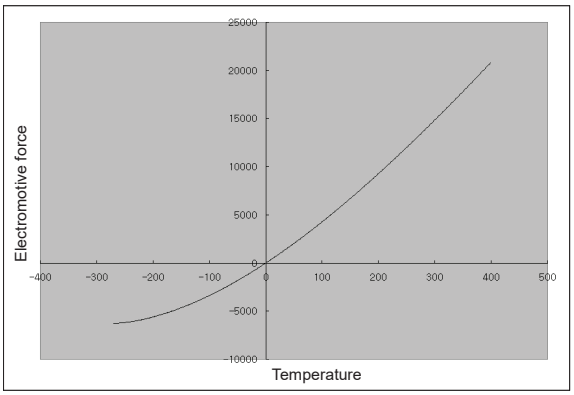
XBF-TC04S Analog Thermocouple Input Module, *continued*

Thermocouple Temperature Conversion

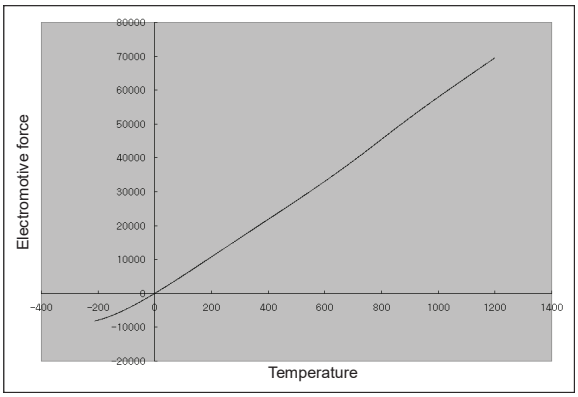
K Type



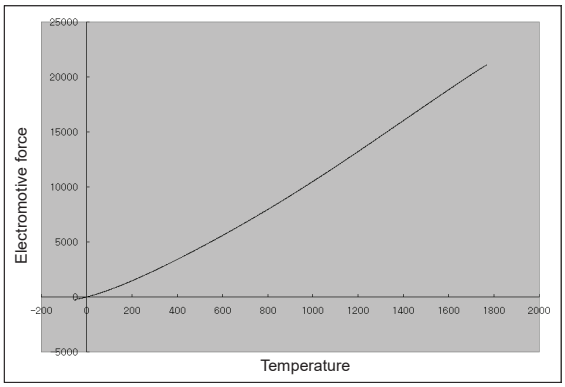
T Type



J Type



R Type



Accuracy/Resolution

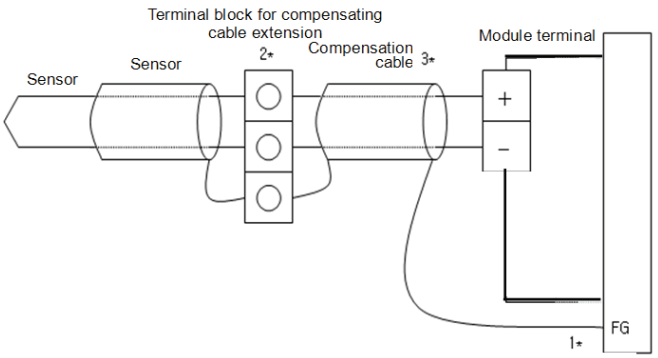
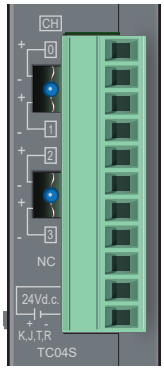
Thermocouple Type	*Measurement Temperature Range*	*Indication Temperature Range*	*Accuracy[1]*		*Resolution*
			Normal temperature (25°C)	*Operating Temperature[2] (0°C to 55°C)*	
K	-200.0 °C to 1300.0 °C	-270.0 to -200.0 °C	n/a[3]		
		-200.0 to 0.0 °C	±3.0 °C	±7.5 °C	0.2 °C
		0.0 to 1300.0 °C	±3.0 °C	±7.5 °C	0.1 °C
		1300.0 to 1372.0 °C	n/a[3]		
J	-200.0 °C to 1200.0 °C	-210.0 to -200.0 °C	n/a[3]		
		-200.0 to -100.0 °C	±2.8 °C	±7.0 °C	0.2 °C
		-100.0 to 1200.0 °C	±2.8 °C	±7.0 °C	0.1 °C
T	-200.0 °C to 400.0 °C	-270.0 to -200.0 °C	n/a[3]		
		-200.0 to 400.0 °C	±1.2 °C	±3.0 °C	0.1 °C
R	00.0 °C to 1700.0 °C	-50.0 to 0.0 °C	n/a[3]		
		0.0 to 1700.0 °C	±3.5 °C	±8.5 °C	0.5 °C
		1700.0 to 1768.0 °C	n/a[3]		

1 - Total accuracy (normal temperature): accuracy (normal temp) + cold junction compensation accuracy = ±(full scale x 0.2% + 1.0 °C)
Cold junction compensation accuracy = ± 1.0 °C
2 - Temperature coefficient is ±100 ppm/°C
3 - Measuring the temperature is possible, but accuracy and resolution are not guaranteed

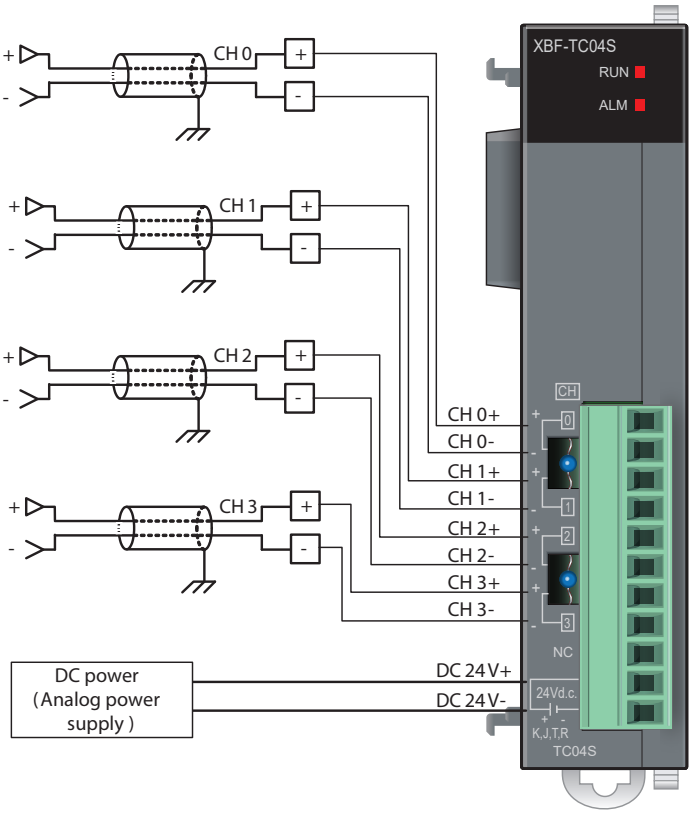
XBF-TC04S Analog Thermocouple Input Module, *continued*

Wiring

XBF-TC04S Circuit Configuration

Circuit Configuration	Terminal	Description	Terminal Block Image
	CH0+	CH0 TC input	
	CH0-		
	CH1+	CH1 TC input	
	CH1-		
	CH2+	CH2 TC input	
	CH2-		
	CH3+	CH3 TC input	
	CH3-		
	NC	Not used	
	24VDC+	24VDC power supply	
	24VDC-		

XBF-TC04S Terminal Wiring



XBF-TC04S Analog Thermocouple Input Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables
All XGB series analog modules are assigned 32 words in the "U" memory area based on the slot number assignment. (%UW0.z.0 - %UW0.z.31 , z= slot number). The actual memory address used within the 32 word block are specific to each module. See the table below for Direct Variable assignments.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Symbolic Variables
Symbolic variables for the analog module can be automatically created in XG5000 software by using the top MENU bar: Edit > Register Module Variable Comments.

Symbolic variables and direct variables for XBF-TC04S are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Temp. Measuring Module : CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_ADJERR	%UX0.z.0	BOOL	Temp. Measuring Module : CH0 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH0_BOUT	%UX0.z.20	BOOL	Temp. Measuring Module : CH0 Disconnection Flag
Tag	GlobalVariable	_0z_CH0_FINDEN	%UX0.z.464	BOOL	Temp. Measuring Module : CH0 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH0_MAX	%UW0.z.13	WORD	Temp. Measuring Module : CH0 Temp. Max. Data
Tag	GlobalVariable	_0z_CH0_MIN	%UW0.z.12	WORD	Temp. Measuring Module : CH0 Temp. Min. Data
Tag	GlobalVariable	_0z_CH0_RJCDS	%UX0.z.472	BOOL	Temp. Measuring Module : CH0 Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH0_SCAL	%UW0.z.8	WORD	Temp. Measuring Module : CH0 Scaling Data
Tag	GlobalVariable	_0z_CH0_SETERR	%UX0.z.24	BOOL	Temp. Measuring Module : CH0 Error Code
Tag	GlobalVariable	_0z_CH0_TEMP	%UW0.z.4	WORD	Temp. Measuring Module : CH0 Temp. Data
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Temp. Measuring Module : CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_ADJERR	%UX0.z.1	BOOL	Temp. Measuring Module : CH1 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH1_BOUT	%UX0.z.21	BOOL	Temp. Measuring Module : CH1 Disconnection Flag
Tag	GlobalVariable	_0z_CH1_FINDEN	%UX0.z.465	BOOL	Temp. Measuring Module : CH1 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH1_MAX	%UW0.z.15	WORD	Temp. Measuring Module : CH1 Temp. Max. Data
Tag	GlobalVariable	_0z_CH1_MIN	%UW0.z.14	WORD	Temp. Measuring Module : CH1 Temp. Min. Data
Tag	GlobalVariable	_0z_CH1_RJCDS	%UX0.z.473	BOOL	Temp. Measuring Module : CH1 Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH1_SCAL	%UW0.z.9	WORD	Temp. Measuring Module : CH1 Scaling Data
Tag	GlobalVariable	_0z_CH1_SETERR	%UX0.z.25	BOOL	Temp. Measuring Module : CH1 Error Code
Tag	GlobalVariable	_0z_CH1_TEMP	%UW0.z.5	WORD	Temp. Measuring Module : CH1 Temp. Data
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Temp. Measuring Module : CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_ADJERR	%UX0.z.2	BOOL	Temp. Measuring Module : CH2 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH2_BOUT	%UX0.z.22	BOOL	Temp. Measuring Module : CH2 Disconnection Flag
Tag	GlobalVariable	_0z_CH2_FINDEN	%UX0.z.466	BOOL	Temp. Measuring Module : CH2 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH2_MAX	%UW0.z.17	WORD	Temp. Measuring Module : CH2 Temp. Max. Data
Tag	GlobalVariable	_0z_CH2_MIN	%UW0.z.16	WORD	Temp. Measuring Module : CH2 Temp. Min. Data
Tag	GlobalVariable	_0z_CH2_RJCDS	%UX0.z.474	BOOL	Temp. Measuring Module : CH2 Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH2_SCAL	%UW0.z.10	WORD	Temp. Measuring Module : CH2 Scaling Data
Tag	GlobalVariable	_0z_CH2_SETERR	%UX0.z.26	BOOL	Temp. Measuring Module : CH2 Error Code
Tag	GlobalVariable	_0z_CH2_TEMP	%UW0.z.6	WORD	Temp. Measuring Module : CH2 Temp. Data
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Temp. Measuring Module : CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_ADJERR	%UX0.z.3	BOOL	Temp. Measuring Module : CH3 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH3_BOUT	%UX0.z.23	BOOL	Temp. Measuring Module : CH3 Disconnection Flag
Tag	GlobalVariable	_0z_CH3_FINDEN	%UX0.z.467	BOOL	Temp. Measuring Module : CH3 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH3_MAX	%UW0.z.19	WORD	Temp. Measuring Module : CH3 Temp. Max. Data
Tag	GlobalVariable	_0z_CH3_MIN	%UW0.z.18	WORD	Temp. Measuring Module : CH3 Temp. Min. Data
Tag	GlobalVariable	_0z_CH3_RJCDS	%UX0.z.475	BOOL	Temp. Measuring Module : CH3 Cold Junction Compensation Enable

XBF-TC04S Analog Thermocouple Input Module Configuration, *continued*

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH3_SCAL	%UW0.z.11	WORD	Temp. Measuring Module : CH3 Scaling Data
Tag	GlobalVariable	_0z_CH3_SETERR	%UX0.z.27	BOOL	Temp. Measuring Module : CH3 Error Code
Tag	GlobalVariable	_0z_CH3_TEMP	%UW0.z.7	WORD	Temp. Measuring Module : CH3 Temp. Data
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Activation Status
Tag	GlobalVariable	_0z_CH_ADJERR_ARY	%UX0.z.0	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH_FINDEN_ARY	%UX0.z.464	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH_RJCDS_ARY	%UX0.z.472	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH_SCAL_ARY	%UW0.z.8	ARRAY[0..3] OF WORD	Temp. Measuring Module : Each CH Scaling Data
Tag	GlobalVariable	_0z_CH_SETERR_ARY	%UX0.z.24	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Error Code
Tag	GlobalVariable	_0z_CH_TEMP_ARY	%UW0.z.4	ARRAY[0..3] OF WORD	Temp. Measuring Module : Each CH Temp. Data
Tag	GlobalVariable	_0z_EEPROMERR	%UX0.z.13	BOOL	Temp. Measuring Module : Offset/Gain Backup Error Flag
Tag	GlobalVariable	_0z_EXT_PWR_ERR	%UX0.z.12	BOOL	Temp. Measuring Module : External Power Error
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Temp. Measuring Module : Ready Flag
Tag	GlobalVariable	_0z_WDT_ERR	%UX0.z.14	BOOL	Temp. Measuring Module : H/W Error Flag