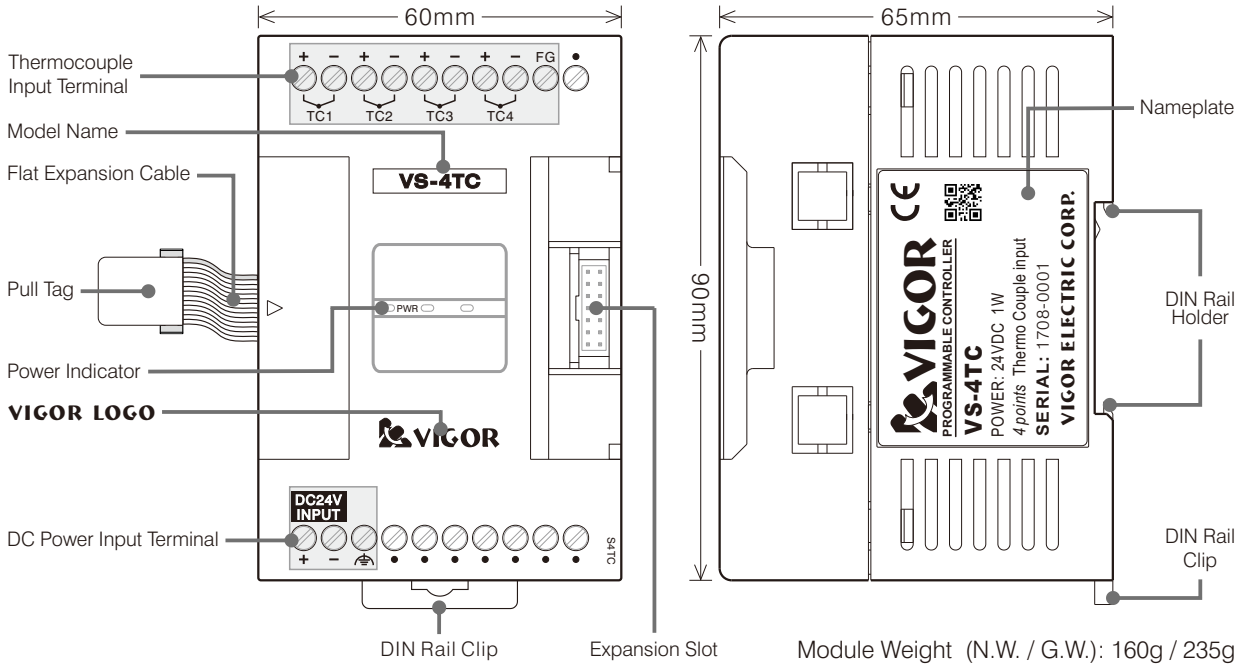
VS-4TC Thermocouple Temperature Input Module

The VS-4TC Thermocouple Temperature Input Module can receive external 4 channels of thermocouple (TC) signals and convert those into digital temperature values. When the FROM instruction is executed, the VS Main Unit reads out temperature data from the VS-4TC module and stores that into registers. Thus, it provides the reference data for digital monitoring and related controls.

Since the conversion circuit for those input channels is not divided, the isolated (ungrounded) thermocouple sensors and reducing interference are required.

The VS-4TC Thermocouple Temperature Input Module requires a DC 24V external power input for the isolated DC to DC regulated power to provide its temperature converter. Also, between the PLC inner circuit and the converter are isolated by the Magnetic-coupler thus the module can get a stable temperature conversion. Please read following instructions before use.

- Product Exterior



Module Weight (N.W. / G.W.): 160g / 235g

- Product Specification

Temperature Input Specification

Item		Specification
Sensor Type		K, J, R, S, T, E, B or N type isolated (ungrounded) thermocouple
Measurable Range	K	–200 ℃ ~ 1200 ℃ (–328 ℉ ~ 2192 ℉)
	J	–160 ℃ ~ 1200 ℃ (–256 ℉ ~ 2192 ℉)
	R	0 ℃ ~ 1768 ℃ (32 ℉ ~ 3214.4 ℉)
	S	0 ℃ ~ 1768 ℃ (32 ℉ ~ 3214.4 ℉)
	T	–220 ℃ ~ 400 ℃ (–364 ℉ ~ 752 ℉)
	E	–220 ℃ ~ 1000 ℃ (–364 ℉ ~ 1832 ℉)
	B	300 ℃ ~ 1800 ℃ (572 ℉ ~ 3272 ℉)
	N	–200 ℃ ~ 1300 ℃ (–328 ℉ ~ 2372 ℉)
Converted Value		The measurement results are indicated by the unit of 0.1 ℃ or 0.1 ℉
Resolution		0.1 ℃ (0.1 ℉)
Overall Accuracy		±0.5 % (full scale.) ±1 ℃
Response Time		500 ms

Basic Specification

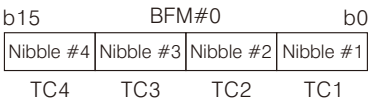
Item	Specification
Isolation Method	The external DC 24V input through an isolated DC/DC power to provide temperature convert circuits; Magnetic-coupler isolation between PLC and temperature converters; No isolation between input channels (ungrounded thermocouple is required)
Power Consumption	DC 24V ± 20%, 30mA (Max.) from external + DC 5V 15mA from PLC's inner power

- Definition of Buffer Memory BFM in the VS-4TC Module

The VS-4TC module uses the BFMs to communicate with the VS Main Unit for the parameter setting and converted value access.

BFM No.	Component Description
#0	To assign the thermocouple types for TC1~TC4. When the power is turned from OFF to ON, the default value is H0000.
#2	To assign the scale of temperature measurement. 0: ℃ ; 1: ℉ ; other values: ℃ . When the power is turned from OFF to ON, the default value is 0.
#3	To set the average times of TC1. When the power is turned from OFF to ON, the default value is 1. The available range is 1~32,767, otherwise it is equivalent to 1.
#4	To set the average times of TC2.
#5	To set the average times of TC3.
#6	To set the average times of TC4.
#11	Converted temperature value of TC1, with unit as 0.1 ℃ or 0.1 ℉.
#12	Converted temperature value of TC2, with unit as 0.1 ℃ or 0.1 ℉.
#13	Converted temperature value of TC3, with unit as 0.1 ℃ or 0.1 ℉.
#14	Converted temperature value of TC4, with unit as 0.1 ℃ or 0.1 ℉.
#29	Status and error flag.
#30	Identification code: VS-4TC = K205 (can use the FROM instruction to check whether the place is this module or not)
#31	The version number of this module. (the content value □□ indicates Ver. □.□)

BFM #0 To appoint the types of thermocouples:

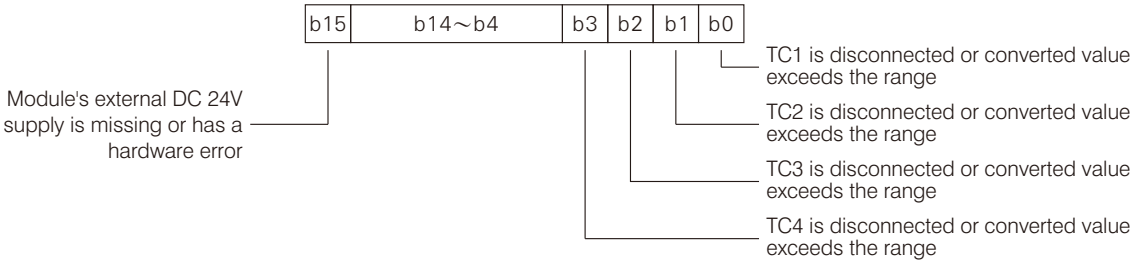


Value of Nibble	0	1	2	3	4	5	6	7
Thermocouple Type	K	J	R	S	T	E	B	N

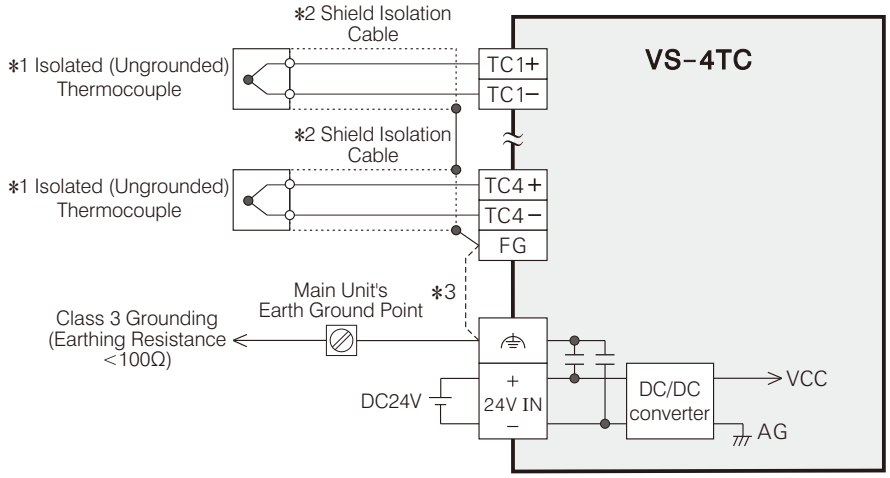
If Value of Nibble is not 0~7, the channel is disabled.

Example: If the BFM #0 of a VS-4TC is set to be H8100, then
TC1 & TC2: K Type thermocouple input;
TC3: J Type thermocouple input; TC4: disabled.

BFM #29 Status and Error Flag: (0: normal; 1: error)



- External Wiring



∗1: Always use isolated (ungrounded) thermocouple sensor.

∗2: Please use the shield isolation cable for every temperature input. Must keep the signal cable away from any power line (including the power of motor, valve or contactor) to prevent external interference or module damage.

∗3: Please connect the end of cable shield to the FG terminal. If the noise is huge, should connect the FG to the ⏚ terminal at the Main Unit.

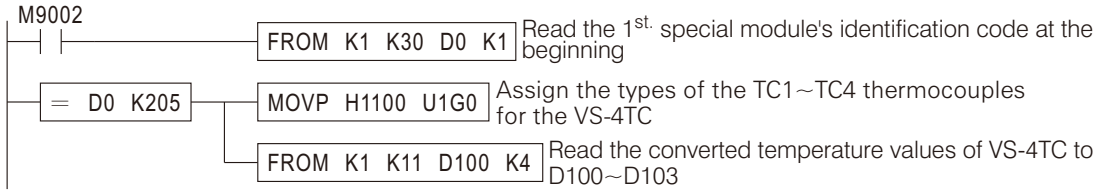
∗4: Please use appropriate compensating cables for thermocouple extension.

- Example Program

The VS-4TC is installed next to the Main Unit and became the 1st. special module.

Its TC1～TC2 are used for K type thermocouples, TC3～TC4 are used for J type thermocouples.

Temperature converted values of TC1～TC4 are sequentially stored at D100～D103.



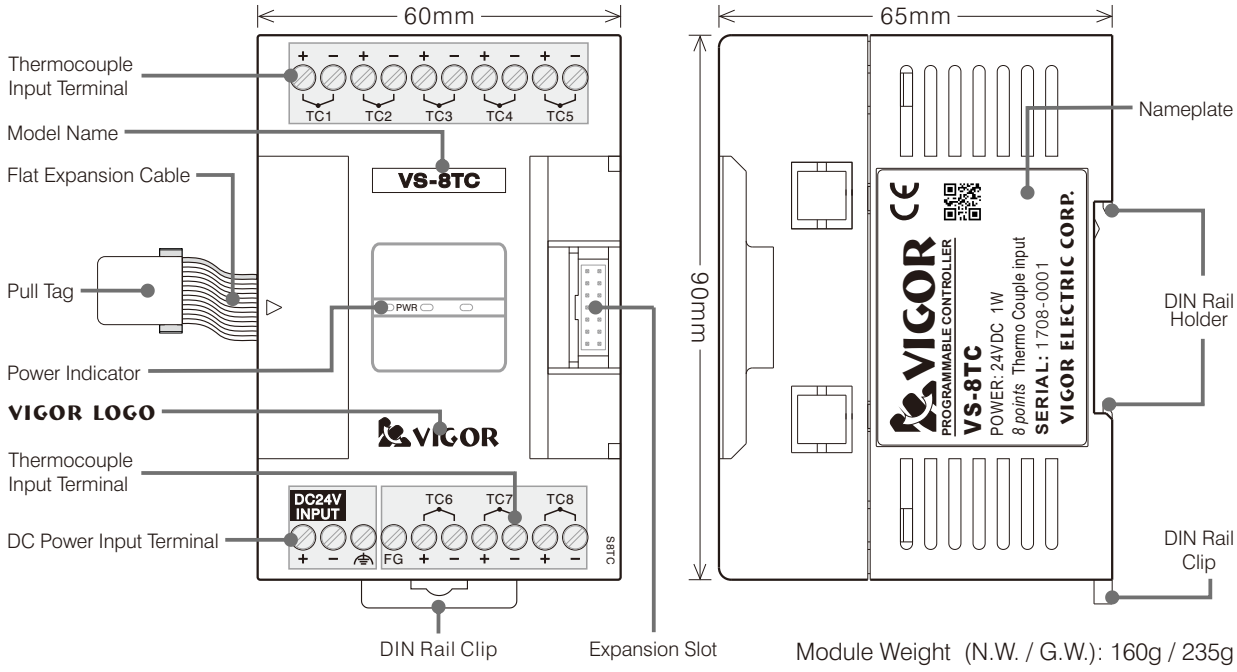
VS-8TC Thermocouple Temperature Input Module

The VS-8TC Thermocouple Temperature Input Module can receive external 8 channels of thermocouple (TC) signals and convert those into digital temperature values. When the FROM instruction is executed, the VS Main Unit reads out temperature data from the VS-8TC module and stores that into registers. Thus, it provides the reference data for digital monitoring and related controls.

Since the conversion circuit for those input channels is not divided, the isolated (ungrounded) thermocouple sensors and reducing interference are required.

The VS-8TC Thermocouple Temperature Input Module requires a DC 24V external power input for the isolated DC to DC regulated power to provide its temperature converter. Also, between the PLC inner circuit and the converter are isolated by the Magnetic-coupler thus the module can get a stable temperature conversion. Please read following instructions before use.

- Product Exterior



Module Weight (N.W. / G.W.): 160g / 235g

- Product Specification

Temperature Input Specification

Item		Specification
Sensor Type		K, J, R, S, T, E, B or N type isolated (ungrounded) thermocouple
Measurable Range	K	–200 ℃ ~ 1200 ℃ (–328 ℉ ~ 2192 ℉)
	J	–160 ℃ ~ 1200 ℃ (–256 ℉ ~ 2192 ℉)
	R	0 ℃ ~ 1768 ℃ (32 ℉ ~ 3214.4 ℉)
	S	0 ℃ ~ 1768 ℃ (32 ℉ ~ 3214.4 ℉)
	T	–220 ℃ ~ 400 ℃ (–364 ℉ ~ 752 ℉)
	E	–220 ℃ ~ 1000 ℃ (–364 ℉ ~ 1832 ℉)
	B	300 ℃ ~ 1800 ℃ (572 ℉ ~ 3272 ℉)
	N	–200 ℃ ~ 1300 ℃ (–328 ℉ ~ 2372 ℉)
Converted Value		The measurement results are indicated by the unit of 0.1 ℃ or 0.1 ℉
Resolution		0.1 ℃ (0.1 ℉)
Overall Accuracy		±0.5 % (full scale.) ±1 ℃
Response Time		500 ms

Basic Specification

Item	Specification
Isolation Method	The external DC 24V input through an isolated DC/DC power to provide temperature convert circuits; Magnetic-coupler isolation between PLC and temperature converters; No isolation between input channels (ungrounded thermocouple is required)
Power Consumption	DC 24V ± 20%, 30mA (Max.) from external + DC 5V 15mA from PLC's inner power

- Definition of Buffer Memory BFM in the VS-8TC Module

The VS-8TC module uses the BFM to communicate with the VS Main Unit for the parameter setting and converted value access.

BFM No.	Component Description
#0	To assign the thermocouple types for TC1～TC4. When the power is turned from OFF to ON, the default value is H0000.
#1	To assign the thermocouple types of TC5～TC8. When the power is turned from OFF to ON, the default value is H0000.
#2	To assign the scale of temperature measurement. 0: ℃ ; 1: ℉ ; other values: ℃ . When the power is turned from OFF to ON, the default value is 0.
#3	To set the average times of TC1. When the power is turned from OFF to ON, the default value is 1. The available range is 1～32,767, otherwise it is equivalent to 1.
#4	To set the average times of TC2.
#5	To set the average times of TC3.
#6	To set the average times of TC4.
#7	To set the average times of TC5.
#8	To set the average times of TC6.
#9	To set the average times of TC7.
#10	To set the average times of TC8.
#11	Converted temperature value of TC1, with unit as 0.1 ℃ or 0.1 ℉.
#12	Converted temperature value of TC2, with unit as 0.1 ℃ or 0.1 ℉.
#13	Converted temperature value of TC3, with unit as 0.1 ℃ or 0.1 ℉.
#14	Converted temperature value of TC4, with unit as 0.1 ℃ or 0.1 ℉.
#15	Converted temperature value of TC5, with unit as 0.1 ℃ or 0.1 ℉.
#16	Converted temperature value of TC6, with unit as 0.1 ℃ or 0.1 ℉.
#17	Converted temperature value of TC7, with unit as 0.1 ℃ or 0.1 ℉.
#18	Converted temperature value of TC8, with unit as 0.1 ℃ or 0.1 ℉.
#29	Status and error flag.
#30	Identification code: VS-8TC = K206 (can use the FROM instruction to check whether the place is this module or not)
#31	The version number of this module. (the content value □□ indicates Ver. □.□)

BFM #0 & BFM #1 To appoint the types of thermocouples:

b15			BFM#0	b0
Nibble #4	Nibble #3	Nibble #2	Nibble #1	
TC4	TC3	TC2	TC1	

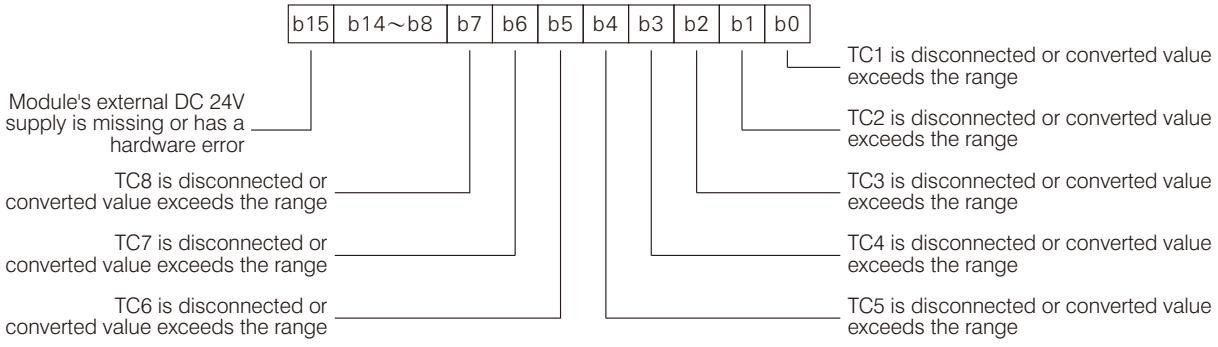
Value of Nibble	0	1	2	3	4	5	6	7
Thermocouple Type	K	J	R	S	T	E	B	N

If Value of Nibble is not 0～7, the channel is disabled.

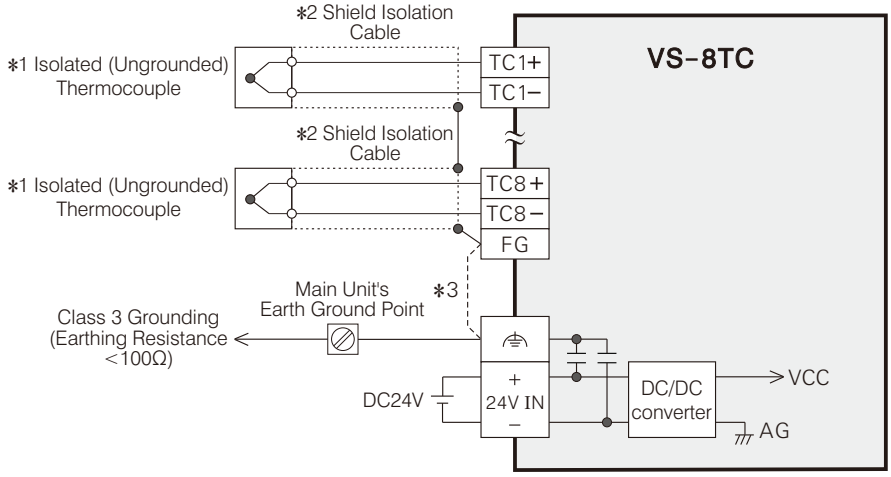
b15			BFM#1	b0
Nibble #4	Nibble #3	Nibble #2	Nibble #1	
TC8	TC7	TC6	TC5	

Example: If the BFM #0 of a VS-8TC is set to be H8100, then
TC1 & TC2: K Type thermocouple input;
TC3: J Type thermocouple input; TC4: disabled.

BFM #29 Status and Error Flag: (0: normal; 1: error)



● External Wiring



∗1: Always use isolated (ungrounded) thermocouple sensor.

∗2: Please use the shield isolation cable for every temperature input. Must keep the signal cable away from any power line (including the power of motor, valve or contactor) to prevent external interference or module damage.

∗3: Please connect the end of cable shield to the FG terminal. If the noise is huge, should connect the FG to the ⏚ terminal at the Main Unit.

∗4: Please use appropriate compensating cables for thermocouple extension.

● Example Program

The VS-8TC is installed next to the Main Unit and became the 1st. special module.

Its TC1～TC4 are used for K type thermocouples, TC5～TC7 are used for J type thermocouples, TC8 is disabled. Temperature converted values of TC1～TC7 are sequentially stored at D100～D106.