CANopen Slave Device

CAN-2018C

Application User's Manual

Warranty

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1 Introduction

1.1 Overview

CANopen is one kind of the network protocols based on the CAN bus and mainly used for embedded network system, such as industrial machine control , vehicle control system, factory automation, medical equipments control, remote data acquisition, environmental monitoring, and packaging machines control, etc.

The CAN-2018C module follows the CiA DS-301 version 4.02 and DSP-401 version 2.1. It is easy to access the thermocouple status and set the configuration by using the standard CANopen protocol. The CAN-2018C has passed the validation of the CiA CANopen Conformance Test tool. Therefore, the provided EDS file is standard for any other standard CANopen masters. By using the 8-channel thermocouple input and the CANopen masters of ICP DAS, you can quickly build a CANopen network to approach your requirements.



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1.2 Hardware Specifications

Analog Input:

- Input Channels: 8
- Input Type: +/- 15mV, +/- 50mV, +/- 100mV, +/- 500mV, +/- 1V, +/- 2.5V, -20mA ~ +20mA (Requires Optional External 125Ω Resistor), Thermocouple(J, K, T, E. R. S, B, N, C)
- Resolution: 16-bit
- Accuracy: +/-0.1% FSR
- Sampling Rate: 10 Samples/ sec (Total)
- Zero Drift: +/- 10μV/ °C
- Span Drift: +/- 25 ppm/ °C
- Common Mode Rejection: 86 dB
- Normal Mode Rejection: 100 dB
- Input Impedance: >400 kΩ
- Individual Channel Configuration: Yes
- Open Thermocouple Detection: Yes
- Over-voltage Protection: 240 Vrms
- 4 kV ESD Protection: Yes, Contact for each terminal.
- Intra-module Isolation, Field to Logic: 3000 V_{DC}

Others:

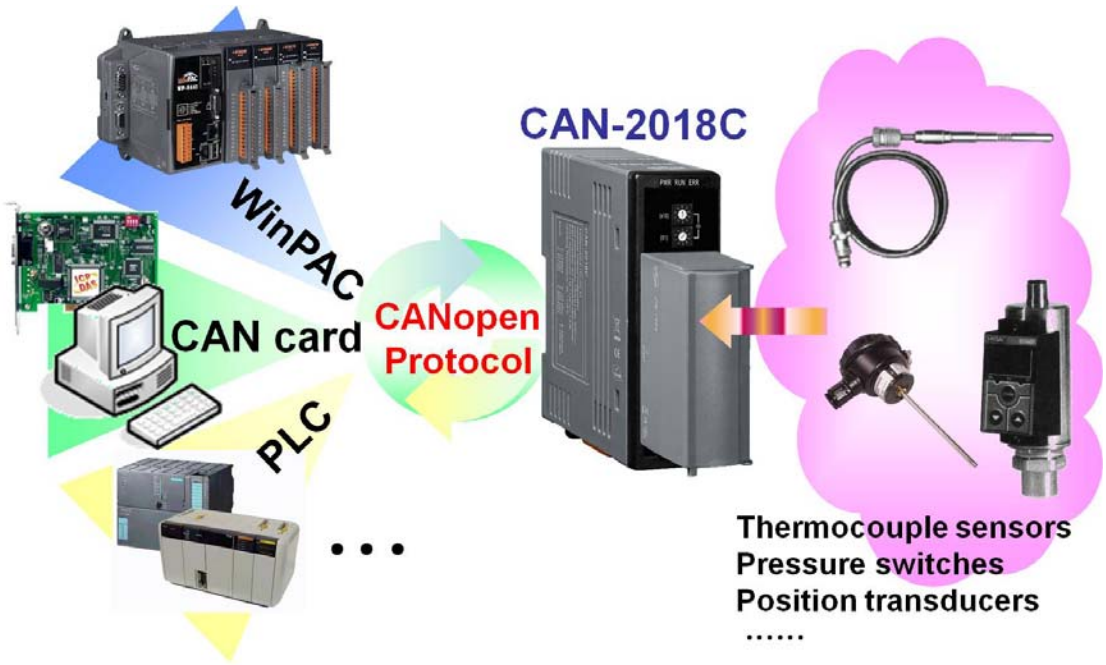
- Power LED: PWR (red)
- CANopen Status LED: RUN (green) / ERR (orange)
- Power Supply: Unregulated +10 ~ +30 V_{DC}.
- Power Consumption: 1.5 W.
- Storage Temperature: -30 ~ +80 ℃.
- Humidity: 10 to 90% RH, Non-condensing.
- Dimensions: 32.3 mm x 99 mm x 78 mm (W x L x H) Detail.

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1.3 Features

- Standard CANopen general I/O slave devices.
- CANopen Version: DS-301, v4.02.
- Device Profile: DSP-401, v2.1
- Provide 8 differential thermocouple input channels.
- CANopen transfer rate: 10 kbps, 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, 1000 kbps.
- Maximum CANopen slave Node-ID up to 99.
- Support NMT, PDO, SDO, EMCY, SYNC, Guarding, and Heartbeat protocol.
- Pass the validation of the CANopen Conformance Test
- Provide EDS file for the CANopen master interfaces

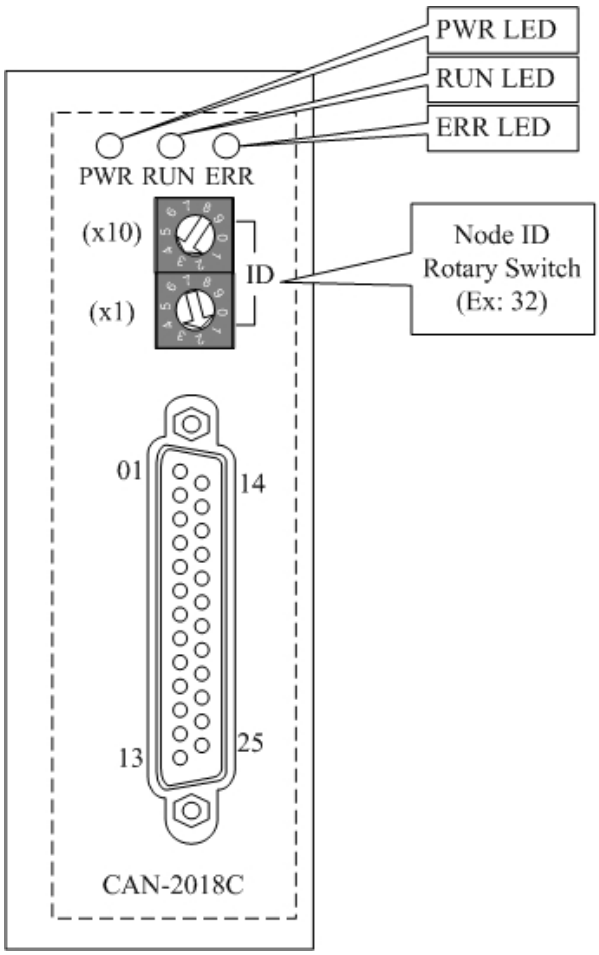
1.4 Application



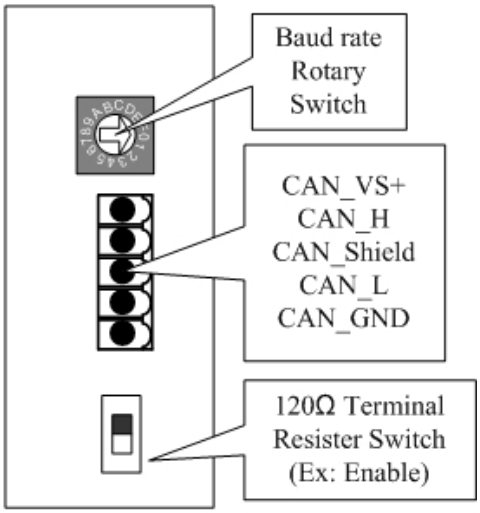
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2 Hardware

2.1 Structure



(Top View)

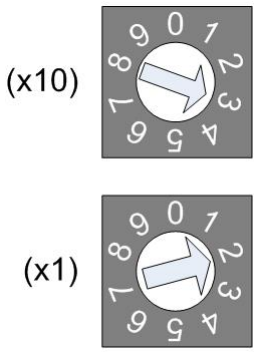


(Bottom View)

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2.2 Node ID & Baud Rate Rotary Switch

The rotary switches for node ID configure the node ID of the CAN-2018C module. These two switches are for the tens digit and the units digit of node ID. The node ID value of this demo picture is 32.



Node ID rotary switch

The rotary switch for baud rate handles the CAN baud rate of the CAN-2018C module. The relationship between the rotary switch value and the practical baud rate is presented in the following table.



Baud rate rotary switch

Rotary Switch Value	Baud rate (k BPS)
0	10
1	20
2	50
3	125
4	250
5	500
6	800
7	1000

Baud rate and rotary switch

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2.3 LED Description

Power LED

The CAN-2018C needs a 10 ~ 30 V_{DC} power supply. Under a normal connection, a good power supply and a correct voltage selection, as the unit is turned on, the LED will light up in red.

Run LED

The Run LED indicates the CANopen operation state. The description of the LED state is shown below. About the details, please refer to the section 2.3.1 of the CAN-2000C user manual.

LED Signal	State	Description
OFF	No power	Power Supply is not ready
Single Flash	Stopped	The device is in Stopped state
Blinking	Pre-operation	Device is in pre-operational state
Always ON	Operation	Device is in operational state

Error LED

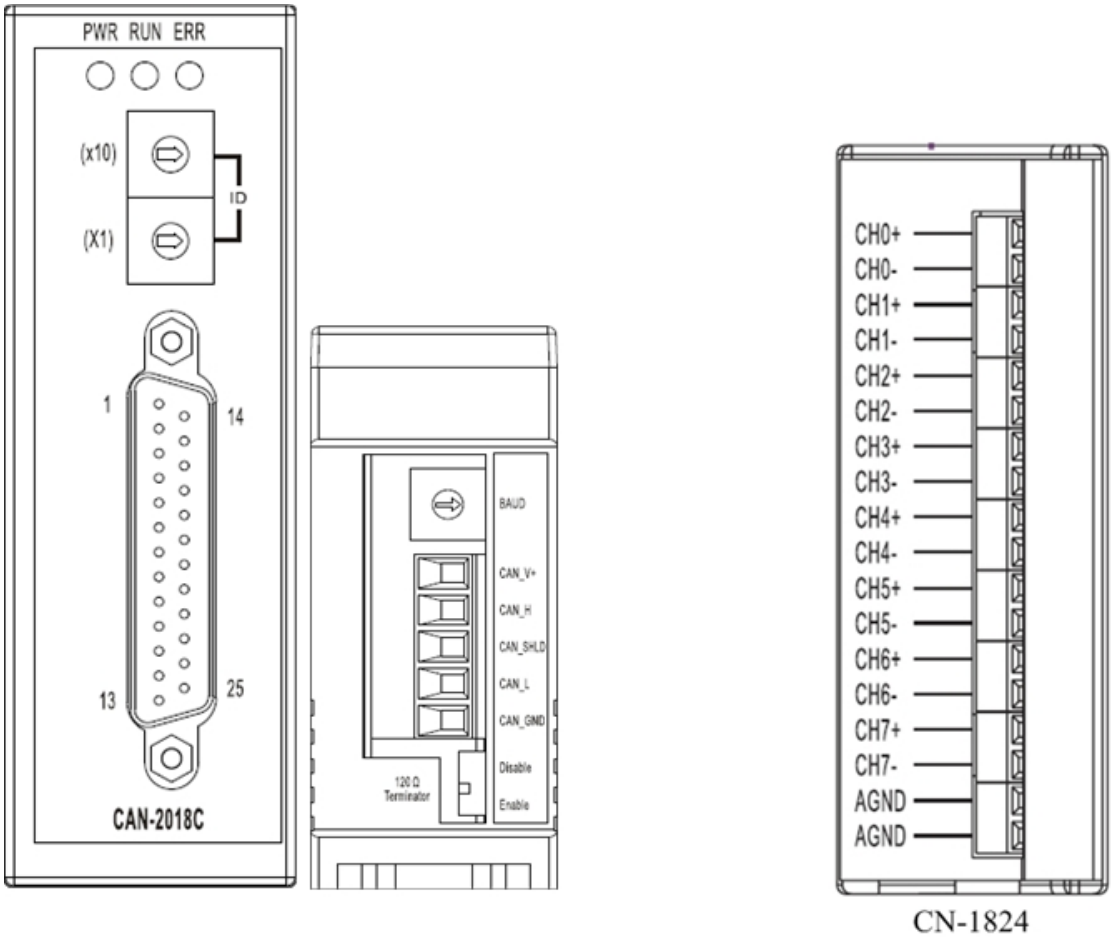
The Error LED indicates the CANopen error state. The description of the LED state is shown below. About the details, please refer to the section 2.3.2 of the CAN-2000C user manual.

LED Signal	State	Description
OFF	No error	Device is in working condition.
Single Flash	Error Warning	At least one error of the CAN controller has occurred.
Double Flash	Guarding fail.	Guard event happened.
Always ON	Bus Off	The CAN controller is bus off.

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2.4 PIN Assignment

CAN-2018C + CN-1824 (daughter board)

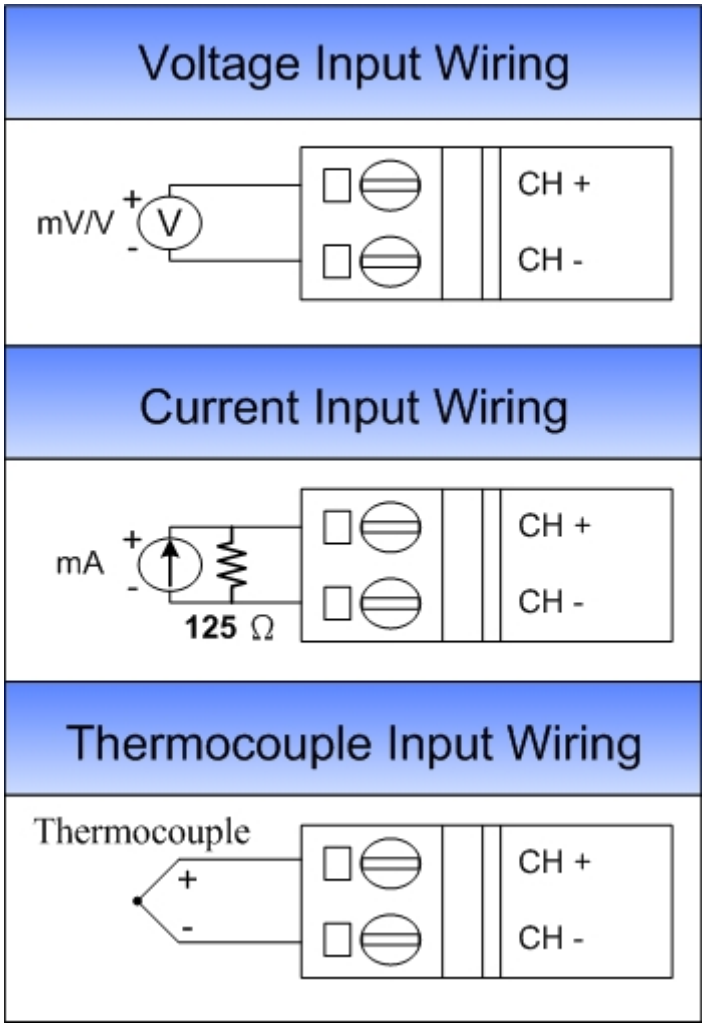


Pin Assignment Name	Terminal No.		Pin Assignment Name
+5V	01	14	DGND
CJC	02	15	CH0+
CH0-	03	16	CH1+
CH1-	04	17	CH2+
CH2-	05	18	CH3+
CH3-	06	19	CH4+
CH4-	07	20	CH5+
CH5-	08	21	CH6+
CH6-	09	22	CH7+
CH7-	10	23	N.C.
N.C.	11	24	N.C.
N.C.	12	25	AGND
AGND	13		
		Shield	F.G.

CAN-2018C 25-pin Female D-Sub Connector

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2.5 Wire Connection



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3 Application

3.1 Object Dictionary

General Communication Entries

Idx	Sidx	Description	Type	Attr	Default
1000h	0h	device type	UNSIGNED 32	RO	00040191h
1001h	0h	error register	UNSIGNED 8	RO	0h
1003h	0h	largest subindex supported for "predefine error field"	UNSIGNED 8	RO	0h
	1h	actual error (the newest one)	UNSIGNED 32	RO	---
	…	...	...	…	---
	5h	actual error (the oldest one)	UNSIGNED 32	RO	---
1005h	0h	COB-ID of Sync message	UNSIGNED 32	RW	80h
1008h	0h	manufacturer device name	VISIBLE_STRING	RO	CAN-2018C
1009h	0h	manufacturer hardware version	VISIBLE_STRING	RO	03
100Ah	0h	manufacturer software version	VISIBLE_STRING	RO	1.00-20110930
100Ch	0h	guard time	UNSIGNED 16	RW	0h
100Dh	0h	life time factor	UNSIGNED 8	RW	0h
1010h	0h	largest subindex supported for "store parameters"	UNSIGNED 8	RO	1h
1010h	1h	save all hardware parameter	UNSIGNED 32	RW	---
1011h	0h	largest subindex supported for "restore default parameters"	UNSIGNED 8	RO	1h
1011h	1h	restore all default parameters	UNSIGNED 32	RW	---
1014h	0h	COB-ID of EMCY	UNSIGNED 32	RW	80h+**x**
1015h	0h	Inhibit time of EMCY	UNSIGNED 16	RW	0h
1017h	0h	producer heartbeat time	UNSIGNED 16	RW	0h
1018h	0h	largest subindex supported for "identity object"	UNSIGNED 8	RO	4h
	1h	vender ID	UNSIGNED 32	RO	0000013Ch
	2h	product code	UNSIGNED 32	RO	00002018h
	3h	revision number	UNSIGNED 32	RO	---
	4h	serial number	UNSIGNED 32	RO	---

Note: x is Node-ID of the module

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SDO Communication Entries

Idx	Sidx	Description	Type	Attr	Default
1200h	0h	largest subindex supported for "server SDO parameter"	UNSIGNED 8	RO	2
	1h	COB-ID form client to server (RxSDO)	UNSIGNED 32	RO	600h+**x**
	2h	COB-ID form server to client (TxSDO)	UNSIGNED 32	RO	580h+**x**

Note: x is Node-ID of the module

RxPDO Communication Entry

Idx	Sidx	Description	Type	Attr	Default
1400h	0h	Number of entries	UNSIGNED 8	RO	2
	1h	COB-ID used by RxPDO	UNSIGNED 32	RW	200h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
1401h	0h	Number of entries	UNSIGNED 8	RO	2
	1h	COB-ID used by RxPDO	UNSIGNED 32	RW	300h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
1402h	0h	Number of entries	UNSIGNED 8	RO	2
	1h	COB-ID used by RxPDO	UNSIGNED 32	RW	400h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
1403h	0h	Number of entries	UNSIGNED 8	RO	2
	1h	COB-ID used by RxPDO	UNSIGNED 32	RW	500h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
1404h	0h	Number of entries	UNSIGNED 8	RO	2
	1h	COB-ID used by RxPDO	UNSIGNED 32	RW	C000 0000h
	2h	Transmission type	UNSIGNED 8	RW	---
…	…	…	…	…	…
1409h	0h	Number of entries	UNSIGNED 8	RO	2
	1h	COB-ID used by RxPDO	UNSIGNED 32	RW	C000 0000h
	2h	Transmission type	UNSIGNED 8	RW	---

Note: x is Node-ID of the module

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RxPDO Mapping Communication Entry

Idx	Sidx	Description	Type	Attr	Default
1600h	0h	Number of entries	UNSIGNED 8	RW	0
1601h	0h	Number of entries	UNSIGNED 8	RW	0
1602h	0h	Number of entries	UNSIGNED 8	RW	0
…	…	…	…	…	…
1609h	0h	Number of entries	UNSIGNED 8	RW	0

TxPDO Communication Entry

Idx	Sidx	Description	Type	Attr	Default
1800h	0h	Number of entries	UNSIGNED 8	RO	5
	1h	COB-ID used by TxPDO	UNSIGNED 32	RW	180h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
	3h	Inhibit time	UNSIGNED 16		0
	4h	reversed	---	---	---
	5h	Event timer	UNSIGNED 16		0
1801h	0h	Number of entries	UNSIGNED 8	RO	5
	1h	COB-ID used by TxPDO	UNSIGNED 32	RW	280h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
	3h	Inhibit time	UNSIGNED 16		0
	4h	reversed	---	---	---
	5h	Event timer	UNSIGNED 16		0
1802h	0h	Number of entries	UNSIGNED 8	RO	5
	1h	COB-ID used by TxPDO	UNSIGNED 32	RW	380h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
	3h	Inhibit time	UNSIGNED 16		0
	4h	reversed	---	---	---
	5h	Event timer	UNSIGNED 16		0
1803h	0h	Number of entries	UNSIGNED 8	RO	5
	1h	COB-ID used by TxPDO	UNSIGNED 32	RW	480h+**x**
	2h	Transmission type	UNSIGNED 8	RW	FFh
	3h	Inhibit time	UNSIGNED 16		0
	4h	reversed	---	---	---
	5h	Event timer	UNSIGNED 16		0
1804h	0h	Number of entries	UNSIGNED 8	RO	5
	1h	COB-ID used by TxPDO	UNSIGNED 32	RW	8000 0000h
	2h	Transmission type	UNSIGNED 8	RW	---

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	3h	Inhibit time	UNSIGNED 16		0
	4h	reversed	---	---	---
	5h	Event timer	UNSIGNED 16		0
…	…	…	…	…	…
1809h	0h	Number of entries	UNSIGNED 8	RO	5
	1h	COB-ID used by TxPDO	UNSIGNED 32	RW	8000 0000h
	2h	Transmission type	UNSIGNED 8	RW	---
	3h	Inhibit time	UNSIGNED 16		0
	4h	reversed	---	---	---
	5h	Event timer	UNSIGNED 16		0

Note: x is Node-ID of the module

TxPDO Mapping Communication Entry

Idx	Sidx	Description	Type	Attr	Default
1A00h	0h	Number of entries	UNSIGNED 8	RO	0
1A01h	0h	Number of entries	UNSIGNED 8	RO	4
	1h	AI value of channel 0	UNSIGNED 32	RW	6401 0110h
	2h	AI value of channel 1	UNSIGNED 32	RW	6401 0210h
	3h	AI value of channel 2	UNSIGNED 32	RW	6401 0310h
	4h	AI value of channel 3	UNSIGNED 32	RW	6401 0410h
1A02h	0h	Number of entries	UNSIGNED 8	RO	4
	1h	AI value of channel 4	UNSIGNED 32	RW	6401 0510h
	2h	AI value of channel 5	UNSIGNED 32	RW	6401 0610h
	3h	AI value of channel 6	UNSIGNED 32	RW	6401 0710h
	4h	AI value of channel 7	UNSIGNED 32	RW	6401 0810h
1A03h	0h	Number of entries	UNSIGNED 8	RO	0
1A04h	0h	Number of entries	UNSIGNED 8	RO	0
1A05h	0h	Number of entries	UNSIGNED 8	RO	0
…	…	…	…	…	…
1A09h	0h	Number of entries	UNSIGNED 8	RO	0

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AI Channel Type Code Function

Idx	Sidx	Description	Type	Attr	Default
2004h	0h	Number of entries	UNSIGNED 8	RO	8
	1h	AI type code for channel 0	UNSIGNED 8	RW	0Eh
	…	…	…	…	…
	8h	AI type code for channel 7	UNSIGNED 8	RW	0Eh

Note: Please refer to "Appendix B" for all supported AI type code

AI Channel offset Function

Idx	Sidx	Description	Type	Attr	Default
2020h	0h	Number of entries	UNSIGNED 8	RO	8
	1h	AI offset for channel 0	INTEGER 16	RO	0
	---	---	---	---	---
	8h	AI offset for channel 7	INTEGER 16	RO	0

When the users apply the CAN-2018C, the replied value of the AI channels may have the constant error due to the wire material, environment, and so forth. In order to solve this problem, the CAN-2018C provides the offset value for each AI channel. It can be used to compensate the error of each AI channel to the practical value. The following table shows the representation for the AI offset value.

Object	Range	Parameter Description
2020h	0000h ~ FFFFh	Channel**x** AI offset value 0000h ~ 7FFFh => 0 ~ +32767 FFFFh ~ 8000h => -1 ~ -32768

Note: Channel**x** is channel number of module

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Cold Junction Compensation (CJC) Function

Idx	Sidx	Description	Type	Attr	Default
2021h	0h	Number of entries	UNSIGNED 8	RO	3
	1h	CJC Enable/Disable	UNSIGNED 8	RW	1
	2h	CJC Value	INTEGER 16	RO	---
	3h	User defined CJC Offset Value	INTEGER 16	RW	0

Object	Sidx	Range	Parameter Description	Default
2021h	1h	0: Disable CJC others: Enable CJC	Enable/Disable CJC	1
	2h	Appendix B	CJC temperature value (Valid when CJC Enabled)	Measured by CJC element
	3h	Appendix B	User-defined CJC temperature value	0

Note: Users can apply the CJC temperature value from the CJC element or the constant value configured by the users. If the CJC function is on, the CJC temperature value from the CJC element will be obtained in the object with the index 2021h and the subindex 2h. In this case the value from the object with index 2021h and subindex 3h is useless. If the CJC function is off, the users can define a CJC constant value in the object with the index 2021h and subindex 3h. No matter the practical applied CJC temperature value is from the subindex 2h or 3h, the CJC value will be added into the practical AI values when the users read these AI data. About the CJC value scaling, please refer to the following table.

Input Range	Data Format	Max Value	Min Value
-30 to +100 (℃)	Engineer Unit	+100	-30
	2's Complement HEX	03E8h	FED4h

CJC (cold junction compensation) Scaling

Power On Operational Mode

Idx	Sidx	Description	Type	Attr	Default
2100h	0h	Number of entries	UNSIGNED 8	RO	1
	1h	0: Preoperational mode at power on. Others: Operational mode at power on.	UNSIGNED 8	RW	0

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Analog Input Function

Idx	Sidx	Description	Type	Attr	Default
6401h	0h	Number of entries	UNSIGNED 8	RO	8
	1h	The AI value of channel 0	INTEGER 16	RO	0
	…	…	…	…	…
	8h	The AI value of channel 7	INTEGER 16	RO	0

Note: Please refer to "Appendix B" for AI value range

Analog Input Interrupt Trigger Selection

Idx	Sidx	Description	Type	Attr	Default
6421h	0h	Number of entries	UNSIGNED 8	RO	8
	1h	The configurations for channel 0	UNSIGNED 8	RW	7h
	…	…	…	…	…
	8h	The configurations for channel 7	UNSIGNED 8	RW	7h

The meanings of the configuration of the interrupt trigger are shown below. Users can configure the upper limit, lower limit, and the delta for each AI channel by writing the value into the object with index 6424h ~ 6426h. When the interrupt trigger enables (configured by the object with index 6423h), the CAN-2018C feedbacks the TxPDO with the AI value which reaches the condition configured by the interrupt trigger selection. For example, if the users set the bit 0 of the interrupt trigger selection to 1, the CAN-2018C feedbacks the AI value automatically while this AI value exceeds the upper limit. In some case, the CAN-2018C may send a lot of TxPDOs because of the trigger of the AI upper limit or lower limit. Users can control the minimum time period between the two CAN messages to the AI value by configuring the Inhibit time of the TxPDO. The bigger Inhibit time value you set, the longer time period between the two TxPDOs you get.

Bit no.	**Interrupt trigger selection**
0	The AI value exceeds the upper limit
1	The AI value is less than the lower limit
2	The change of the AI value is more than the delta
3 to 7	Reverse

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Analog Input Global Interrupt Trigger Enable

Idx	Sidx	Description	Type	Attr	Default
6423h	0h	Analog Input Global Interrupt Trigger Enable	Boolean	RW	0

Analog Input Interrupt Upper Limit Integer

Idx	Sidx	Description	Type	Attr	Default
6424h	0h	Number of entries	UNSIGNED 8	RO	8
	1h	AI upper limit of channel 0	INTEGER 32	RW	-
	…	…	…	…	…
	8h	AI upper limit of channel 7	INTEGER 32	RW	-

Note: Please refer to "Appendix B" for AI upper limit range

Analog Input Interrupt Lower Limit Integer

Idx	Sidx	Description	Type	Attr	Default
6425h	0h	Number of entries	UNSIGNED 8	RO	8
	1h	AI lower limit of channel 0	INTEGER 32	RW	-
	…	…	…	…	…
	8h	AI lower limit of channel 7	INTEGER 32	RW	-

Note: Please refer to "Appendix B" for AI lower limit range

Analog Input Interrupt Delta Unsigned

Idx	Sidx	Description	Type	Attr	Default
6426h	0h	Number of entries	UNSIGNED 8	RO	8
	1h	AI delta value of channel 0	UNSIGNED 32	RW	3E8h
	…	…	…	…	…
	8h	AI delta value of channel 7	UNSIGNED 32	RW	3E8h

Note: These values are used to define the acceptable AI change ranges for each AI channels. The default for these values is 1000, and may have different range for the physical value because of the settings of the type code. Please refer to the appendix B for the type code definition.

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3.2 Store and Restore Object

The users can write the value 65766173h to object with index 1010h and subindex 1 to save the application setting, or write the value 64616F6Ch to object with index 1011h and subindex 1 and reboot the module to load the factory default. The following table lists the relative objects which will be stored or restored after writing these two objects. The factory default for these objects is also shown below.

Index	Sub Index	Description	Factory Default
2004h	1 ~ 8	AI type codes for channel 0~ 7	0Eh
2020h	1 ~ 8	AI offsets for channel 0 ~ 7	0
2021h	1	CJC Enable/Disable	1h
	2	CJC Value	--
	3	user-defined CJC offset value	0
2100h	1	Set Module to Operation Mode when powering on	0
6421h	1 ~ 8	AI interrupt trigger selections for channel 0 ~ 7	07h
6423h	0	AI global interrupt enable	0
6424h	1 ~ 8	AI interrupt upper limits for channel 0 ~ 7	7FFFh
6425h	1 ~ 8	AI interrupt lower limits for channel 0 ~ 7	E99Ah
6426h	1 ~ 8	AI interrupt delta vlues for channel 0 ~ 7	3E8h
1400h	1 ~ 2	RxPDO1 parameter	--
...	...	...	...
1409h	1 ~ 2	RxPDO10 parameter	--
1600h	0 ~ 8	RxPDO1 mapping information	--
...	...	...	...
1609h	0 ~ 8	RxPDO10 mapping information	--
1800h	1 ~ 5	TxPDO1 parameter	--
...	...	...	...
1809h	1 ~ 5	TxPDO10 parameter	--
1A00h	0 ~ 8	TxPDO1 mapping information	--
...	...	...	...
1A09h	0 ~ 8	TxPDO10 mapping information	--

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3.3 Application Object

The users can read the object with index 6401h and subindex 1 ~ 8 to get the thermocouple or analog value of the channel 0 ~ 7, and the range for each AI type codes are listed in Appendix B. If the users wants to change the analog input type, write the type code to the object with index 2004h and subindex 1 ~ 8. For example, if the node ID of CAN-2018C is 1, the following command would be used:

11-bit COB-ID (bit)											RTR	Data Length	8-byte Data (byte)							
Func Code				Node ID																
10	9	8	7	6	5	4	3	2	1	0			0	1	2	3	4	5	6	7
1	1	0	0	0	0	0	0	0	0	1	0	8	2F	04	20	01	05	00	00	00

SDO client → **SDO server (CAN-2018C)**

11-bit COB-ID (bit)											RTR	Data Length	8-byte Data (byte)							
Func Code				Node ID																
10	9	8	7	6	5	4	3	2	1	0			0	1	2	3	4	5	6	7
1	0	1	1	0	0	0	0	0	0	1	0	4	60	04	20	01	--	--	--	--

SDO client ← **SDO server (CAN-2018C)**

Writing object with index 2004h and subindex 1 to 05h means to change the type code of the AI channel 0 to 05h (the AI measurement range is -2.5V ~ +2.5V).

11-bit COB-ID (bit)											RTR	Data Length	8-byte Data (byte)							
Func Code				Node ID																
10	9	8	7	6	5	4	3	2	1	0			0	1	2	3	4	5	6	7
1	1	0	0	0	0	0	0	0	0	1	0	8	40	01	64	01	00	00	00	00

SDO client → **SDO server (CAN-2018C)**

11-bit COB-ID (bit)											RTR	Data Length	8-byte Data (byte)							
Func Code				Node ID																
10	9	8	7	6	5	4	3	2	1	0			0	1	2	3	4	5	6	7
1	0	1	1	0	0	0	0	0	0	1	0	4	4B	01	64	01	FF	3F	--	--

SDO client ← **SDO server (CAN-2018C)**

Reading object with index 6401h and subindex 1 means to get the value of the AI channel 0. According to the type code 05h set before, the replied value of the AI channel 0 is 3FFFh (+1.25V).

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3.4 Default PDO Mapping

RxPDO mapping list:

ID	Len	D 0	D 1	D 2	D 3	D 4	D 5	D 6	D 7
200h + x	0	Reserved							
300h + x	0	Reserved							
400h + x	0	Reserved							
500h + x	0	Reserved							

TxPDO mapping list:

ID	Len	D 0	D 1	D 2	D 3	D 4	D 5	D 6	D 7
180h + x	0	Reserved							
280h + x	8	AI ch0		AI ch1		AI ch2		AI ch3	
380h + x	8	AI ch4		AI ch5		AI ch6		AI ch7	
480h + x	0	Reserved							

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3.5 EMCY Communication

The data format of the emergency object data follows the structure bellows.

Byte	0	1	2	3	4	5	6	7
Content	Emergency Error Code		Error register	Manufacturer specific Error Field				

Each bit on the error register is defined as follows.

Bit	Meaning
0	generic error
1	current
2	voltage
3	temperature
4	communication error (overrun, error state)
5	device profile specific
6	reserved (always 0)
7	manufacturer specific

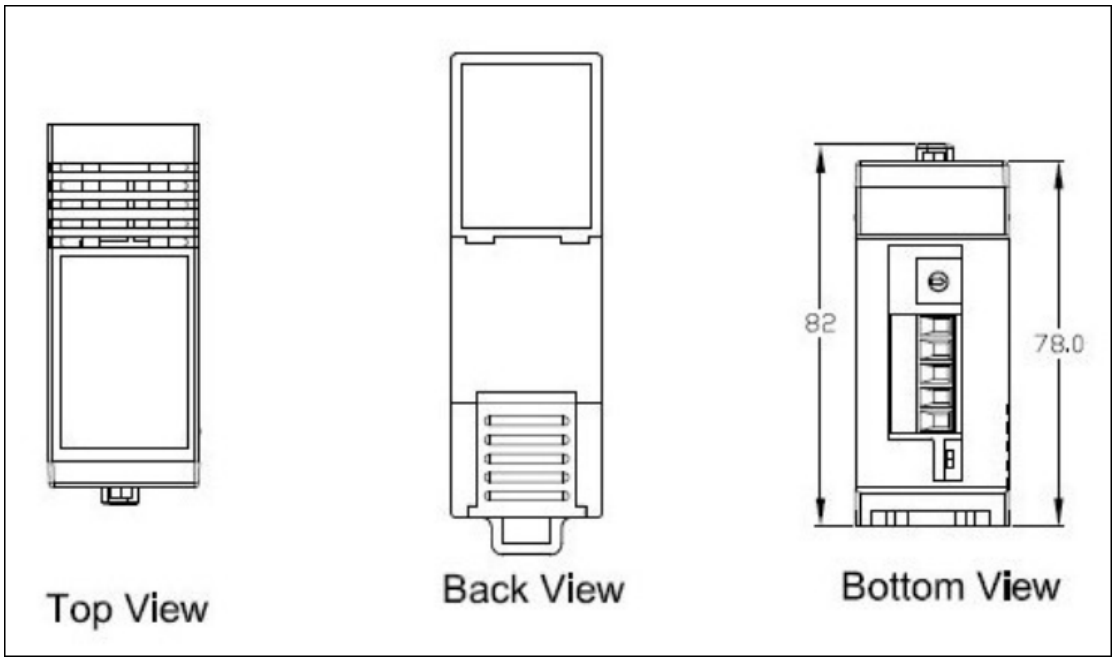
The emergency error codes and the error register are specified in the following table.

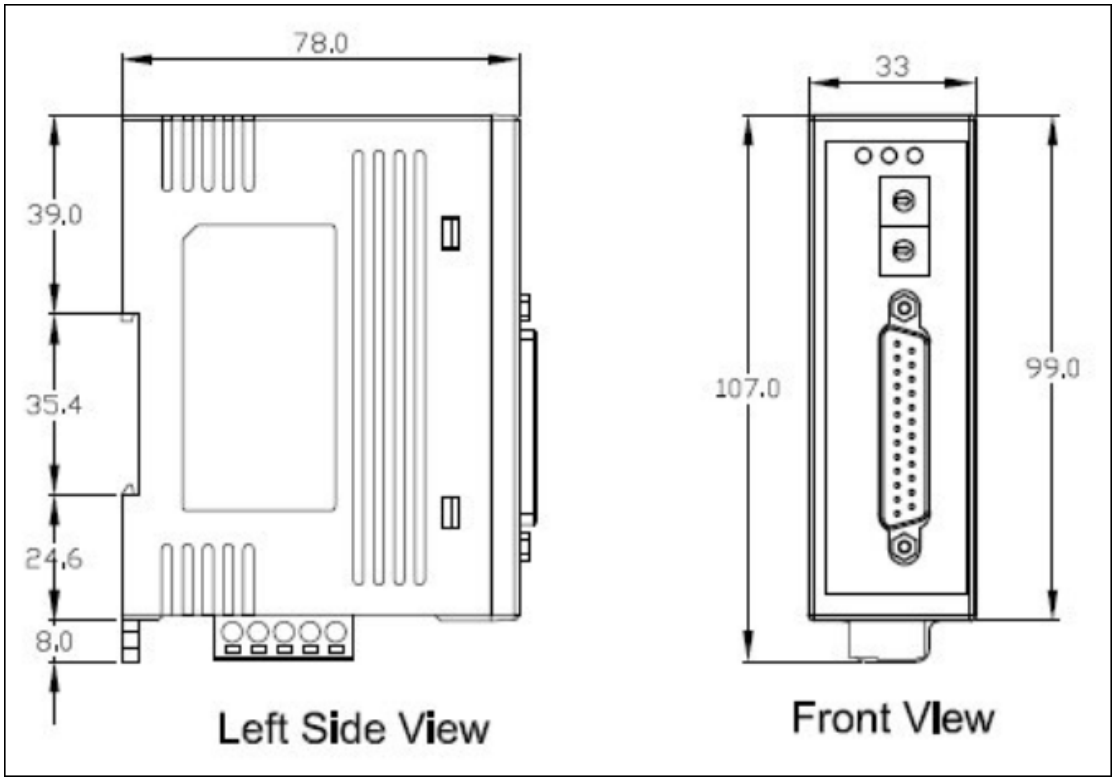
Emergency Error Code		Error Register	Manufacturer Specific Error Field			Description
High Byte	Low Byte		First Byte	Last Four Bytes		
00	00	00	00	00 00 00 00		Error Reset or No Error
10	00	81	01	00 00 00 00		CAN Controller Error Occur
50	00	81	02	00 00 00 00		EEPROM Access Error
81	10	11	04	00 00 00 00		Soft Rx Buffer Overrun
81	10	11	05	00 00 00 00		Soft Tx Buffer Overrun
81	10	11	06	00 00 00 00		CAN Controller Overrun
81	30	11	07	00 00 00 00		Lift Guarding Fail
81	40	11	08	00 00 00 00		Recover From Bus Off
82	10	11	09	00 00 00 00		PDO Data Length Error
FF	00	80	0A	00 00 00 00		Request To Reset Node Or Communication
FF	00	2E	0B	00 00 Upper limit alarm	00 00 Low limit alarm	Upper/Low Limit Alarm For Each Channel

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Appendix A: Dimension

CAN-2018C dimension:

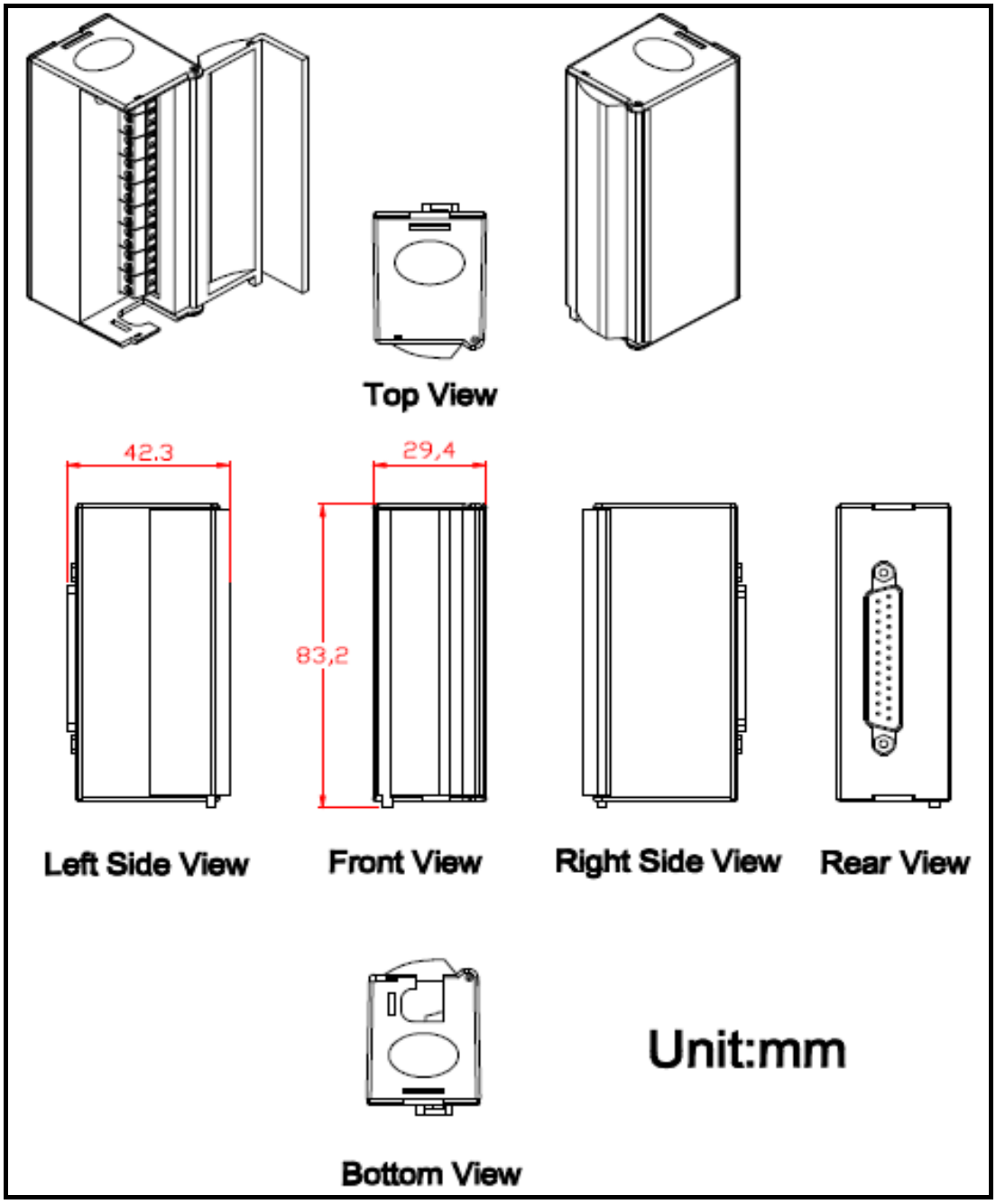




Unit: mm

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CN-1824 dimension:



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Appendix B: Type Code Definition

Type Code Definition for CAN-2018C

Type Code	Input Range	Data Format	Max Value	Min Value
00h	-15 to +15 mV	Engineer Unit	+15	-15
		2's Complement HEX	7FFFh	8000h
01h	-50 to +50 mV	Engineer Unit	+50	-50
		2's Complement HEX	7FFFh	8000h
02h	-100 to +100 mV	Engineer Unit	+100	-100
		2's Complement HEX	7FFFh	8000h
03h	-500 to +500 mV	Engineer Unit	+500	-500
		2's Complement HEX	7FFFh	8000h
04h	-1 to +1 V	Engineer Unit	+1	-1
		2's Complement HEX	7FFFh	8000h
05h	-2.5 to +2.5 V	Engineer Unit	+2.5	-2.5
		2's Complement HEX	7FFFh	8000h
06h	-20 to +20 mA (with 125Ω resistor)	Engineer Unit	+20	-20
		2's Complement HEX	7FFFh	8000h
0Eh	J Type (℃)	Engineer Unit	+1200	-210
		2's Complement HEX	7FFFh	E99Ah
0Fh	K Type (℃)	Engineer Unit	+1372	-270
		2's Complement HEX	7FFFh	E6D0h
10h	T Type (℃)	Engineer Unit	+400	-270
		2's Complement HEX	7FFFh	A99Ah
11h	E Type (℃)	Engineer Unit	+1000	-270
		2's Complement HEX	7FFFh	DD71h
12h	R Type (℃)	Engineer Unit	+1765	-50
		2's Complement HEX	7FFFh	FC60h
13h	S Type (℃)	Engineer Unit	+1765	-50
		2's Complement HEX	7FFFh	FC60h
14h	B Type (℃)	Engineer Unit	+1820	0
		2's Complement HEX	7FFFh	0000h
15h	N Type (℃)	Engineer Unit	+1300	-270
		2's Complement HEX	7FFFh	E56Bh
16h	C Type (℃)	Engineer Unit	+2320	0
		2's Complement HEX	7FFFh	0000h

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Note:
Getting the 7FFFh value in all of the thermocouple type codes, it means that the thermocouple wires are broken.

CJC (cold junction compensation) Definition for CAN-2018C

Input Range	Data Format	Max Value	Min Value
-30 to +100 (℃)	Engineer Unit	+100	-30
	2's Complement HEX	03E8h	FED4h

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Appendix C: Update Firmware

If users want to update the firmware of the CAN-2000C series devices, users need to download firmware update tool “FW_Update_CAN Tool” to do it.

“FW_Update_CAN Tool” downloads link:
http://ftp.icpdas.com.tw/pub/cd/fieldbus_cd/canopen/slave/can-2000c/tools/fw_update_can_tool/

Below are the “FW_Update_CAN Tool” supports modules:
I-7530, I-7530A, tM-7530, tM-7530A
I-7540D, I-7540DM
I-7565, tM-7565, I-7565-H1, I-7565-H2
PISO-CM100U, PISO-CAN200, PISO-CAN400

New firmware downloads link:
http://ftp.icpdas.com.tw/pub/cd/fieldbus_cd/canopen/slave/can-2000c/

Select the slave module folder that would update firmware and download “can-20xx_vxx.fw” firmware file.

Before start to update firmware, users need switch Node-ID rotary switch to 0 and then boot up the CAN-2000C module. The CANopen module will into “firmware update mode” and three LEDs (red, green, yellow) would flash together. Then users just need refer to “fw_update_can_vxx.pdf” and operate step by step to update firmware.

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