

CT-5122 2-channels encoder/SSI input

1 Module features

- ◆The module supports two channels of SSI encoder input.
- ◆Each encoder channel supports SSI absolute encoder signal input.
- ◆Each encoder channel supports 1 digital input signal with an input voltage of 5Vdc or 24Vdc.
- ◆Each encoder channel supports 1 digital output signal with an output voltage of 5Vdc.
- ◆The module internal bus and field input adopt magnetic isolation
- ◆The module carries 16 LED indicators.
- ◆The module supports the maximum clock frequency of 2MHz.
- ◆The encoder reading interval time could be set.
- ◆The data bit length and the start and end bit positions could be set.

2 Technical parameters

General Parameters	
Power	Max.65mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Nominal:24Vdc, Range: 19.2~28.8Vdc
Wiring	Max.: AWG 18
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operating Temperature of Vertical Installation	-35°C~60°C
Operating Temperature of Horizontal Installation	-35°C~70°C
Relative Humidity	5~ 95%RH (No Condensation)
Storage Temperature	-40°C~85°C
Storage Humidity	5~ 95%RH (No Condensation)
Manufacturing Test Temperature	-40°C~75°C
Ingress Protection Rating	IP20
Input Parameters	
Channel Number	2-channel encoder
LED Indicator	12 channel LED indicator
Encoder Signal type	Differential signal, 5V
Data Frame Length	10-40 bit
Position Value Length	Maximum of 32 bit
Position Value Format	Supports gray code or binary
Location Value LSB/MSB	Settable
SSI Encoder Clock Frequency	≤2MHz
DI Turn-on Voltage	Min.5Vdc to Max.28Vdc
DI Turn-off Voltage	Max.2.7Vdc
DI Turn-on Current	Max.5mA/channel@28V
DI Input Impedance	>10.0kΩ
DI Input Delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
DO Output Voltage	24V, range ±10%
DO Output Current	Max.500mA
DO Output Sink Current	Max.5uA

WARNING

UNEXPECTED EQUIPMENT OPERATION

Do not exceed any of the ratings specified in the environmental and electrical characteristics table.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

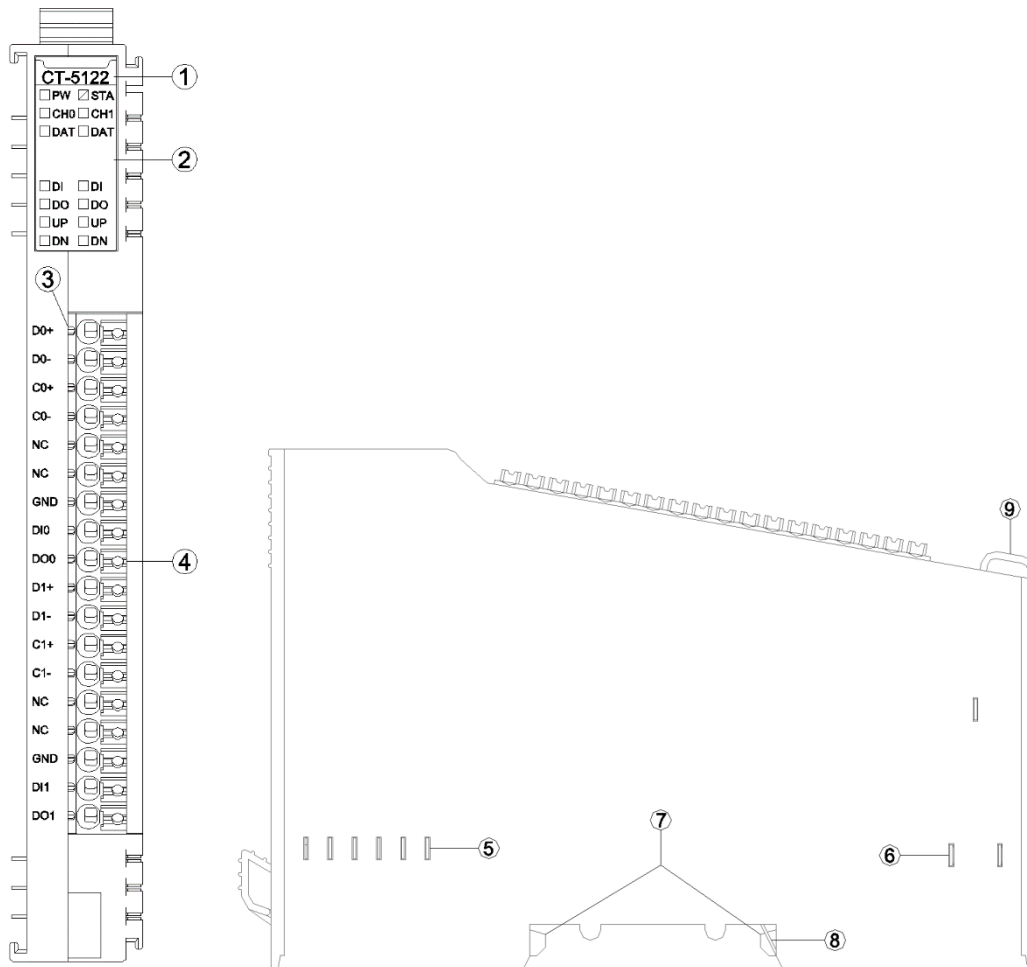
AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

Ne dépassez aucune évaluation spécifiée dans le tableau de caractéristiques environnementales et électriques..

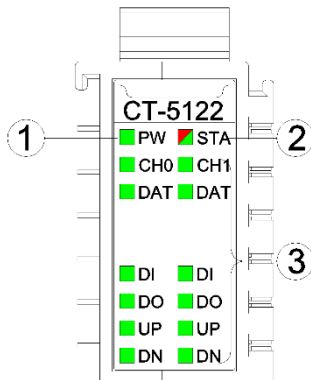
Le fait de ne pas suivre les instructions peut entraîner une défaillance de la protection fournie par l'équipement, ce qui peut entraîner des conséquences graves, comme des blessures ou des dommages à l'équipement.

3 Hardware interfaces



- ① Module Type
- ② State indicator
- ③ Channel indicator
- ④ Wiring Terminal and identification
- ⑤ Internal Bus
- ⑥ Field Power
- ⑦ Buckle
- ⑧ Grounding Spring Sheet
- ⑨ Fixed Wiring Harness

3.1 LED indicator definition



- ① Power LED indicator (green)
- ② Module State indicator LED (red/green)
- ③ Input channel indicator LED (green)

PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
CH0 CH1 channel indicator LED	Definition
ON	Channel enable
DAT channel indicator LED	Definition
ON	The input data line is at high level when idle
OFF	The input data line is at low level when idle
DI input indicator	Definition
ON	Input signal high level
OFF	Input signal invalid
DO output indicator	Definition
ON	Output signal high level
OFF	Output signal invalid
UP indicator	Definition
ON	Encoder in positive rotation
OFF	Encoder is stationary or in contrarotation
DN indicator	Definition
ON	Encoder in contrarotation
OFF	Encoder is stationary or in positive rotation

WARNING

UNEXPECTED EQUIPMENT OPERATION

By viewing the PW indicator, could determine the power supply status of a module. If the PW is steady green, the power supply is normal. Otherwise, the module cannot work properly.

When the module is initially powered on, there will be 3S for the backplane bus connection. After the backplane bus is initialized, STA is in the green steady state. If STA is in the green blinking state, it indicates that the backplane bus has not been initialized, and it needs to be powered off and restarted for re-initialization.

STA abnormal working state occurs during the normal operation of the module, please check the firmware version information of all modules, and consult ODOT technical support for details.

If a module is upgraded, check that all modules are in the normal state after the upgrade. Otherwise, an exception may occur.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

En regardant l'état de l'indicateur de PW, jugez l'état d'alimentation du module. Le feu vert PW reste allumé et l'alimentation est normale. Autrement, le module ne fonctionnera pas correctement.

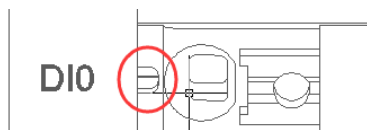
Lorsque le module est alimenté initialement, il y aura 3S pour la connexion de bus de backboard. STA est un état vert permanent après l'initialisation du bus de backboard. Si STA est en état de clignotement vert, cela signifie que l'initialisation du bus de backboard n'est pas passée et doit être redémarrée hors tension et réinitialisée.

L'état de fonctionnement anormal de STA se produit pendant le fonctionnement normal du module, veuillez vérifier les informations de version du firmware de tous les modules, et consulter le support technique ODOT pour plus de détails.

Si le module a une opération de mise à niveau, après l'achèvement de la mise à niveau, le besoin de vérifier que tous les modules sont dans l'état normal avant de courir, sinon il conduira à une exception.

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3.2 Field channel LED indicator (Green)



When the input signal of the input channel is valid, the corresponding field channel indicator is on (only the DI/DO wiring terminal of the encoder channel carries the indicator).

3.3 Terminal definition

Terminal Number	Symbol	Description
1	D0+	CH0 encoder data input +
2	D0-	CH0 encoder data input -
3	C0+	CH0 encoder clock output +
4	C0-	CH0 encoder clock output -
5	NC	Not connected
6	NC	Not connected
7	GND	Signal ground
8	DI0	CH0 digital signal input
9	DO0	CH0 digital signal output
10	D1+	CH1 encoder input +
11	D1-	CH1 encoder data input -
12	C1+	CH1 encoder clock output +
13	C1-	CH1 encoder clock output -
14	NC	Not connected
15	NC	Not connected
16	GND	Signal ground
17	DI1	CH1 digital signal input
18	DO1	CH1 digital signal output

WARNING

UNEXPECTED EQUIPMENT OPERATION

Calculate the maximum field power current consumption of a single module based on the actual field load. If the total field power current consumption of all I/O modules exceeds the power supply capacity of the field power supply, you must add an extra power expansion module. Otherwise, an output channel exception may occur.

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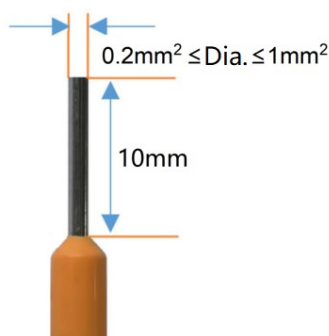
! AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

Calculez la consommation maximale de courant de champ d'un seul module en fonction de la charge de champ réelle. Si la consommation totale de courant de champ de tous les modules d'E/S dépasse la capacité d'alimentation de l'alimentation de champ, vous devez ajouter un module d'extension de puissance supplémentaire. Dans le cas contraire, une exception de canal de sortie peut se produire.

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When connecting a cold-pressed terminal, the terminal must be terminated and checked in strict accordance with the corresponding termination specifications or requirements, and connect the cold-pressed terminal according to the corresponding node serial number. The conductor should use copper conductor and the conductor core should be larger than 0.2mm^2 and smaller than 1mm^2 (AWG18~AWG24). Cold-pressed terminal parameters are as follows:



! WARNING

UNEXPECTED EQUIPMENT OPERATION

Strip the length of the conductor insulation layer is greater than 10mm to ensure reliable signal connection.

The wire needs to use copper wire and the wire core is greater than or equal to 0.2mm^2 and less than or equal to 1mm^2 to ensure reliable signal connection.

When connecting a cold-press terminal, connect the cold-press terminal strictly in accordance with the corresponding termination specifications or requirements, and connect the cold-press terminal according to the corresponding node serial number.

Do not power on cold-press terminals until they are properly connected or fully locked.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

Dépouillez la longueur de la couche isolante du fil plus de 10mm pour assurer la connexion fiable du signal.

Le conducteur doit utiliser le fil de cuivre et le noyau de fil est supérieur ou égal à 0,2 mm², inférieur ou égal à 1mm², afin d'assurer la connexion fiable du signal.

Lorsque les terminaux de presse à froid sont terminés, ils doivent être terminés et visualisés en stricte conformité avec les spécifications ou les exigences correspondantes et terminés selon le numéro de série de noeud correspondant.

Il est interdit d'activer les bornes à froid avant qu'elles ne soient correctement articulées ou complètement verrouillées.

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DANGER

FIRE DANGER

Use the correct wiring rules only for the maximum current capacity of the I/O channel and power supply.

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WARNING

UNEXPECTED EQUIPMENT OPERATION

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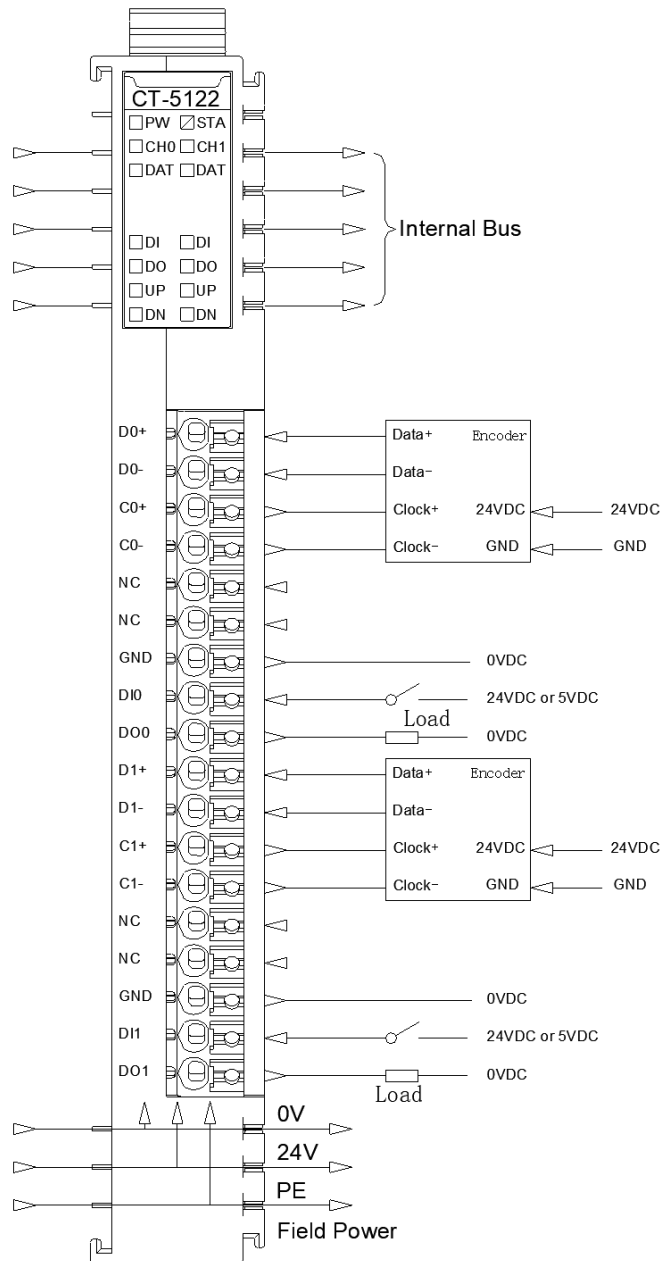
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4 Wiring



NOTICE

EQUIPMENT INOPERABLE

Do not crimp the spring terminal with more than the maximum pressure specified for the terminal. Otherwise, the resilience of the spring terminal may be damaged and the terminal rebound may be affected.

Do not press the spring terminal with a sharp tool when removing cable from the channel. Otherwise, the spring terminal will be damaged.

Failure to follow these instructions may result in equipment damage.

5 Process data definition

< 2 Analog Input (SSI Encoder) > Submodule process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Encoder Count DOWN Ch#0	Encoder Count UP Ch#0	DI Ch#0	Data Line Status Ch#0
Byte 1	Reserved							
Byte 2	Reserved				Encoder Count DOWN Ch#1	Encoder Count UP Ch#1	DI Ch#1	Data Line Status Ch#1
Byte 3	Reserved							
Byte 4	Absolute Position Value Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Capture Position value Ch#0							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Absolute Position Value Ch#1							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Capture Position value Ch#1							
Byte 17								
Byte 18								
Byte 19								
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved						DO Ch#0	
Byte 1	Reserved							
Byte 2	Reserved						DO Ch#1	
Byte 3	Reserved							

Data description:

Data Line Status Ch#(0-1): Indicates the idle status of the Data line of the corresponding channel (Normally, idle data is high level. If the value is 0, the polarity of the input signal is reversed, and the polarity of the input signal line needs to be switched) .

0: Data line level is low when idle

1: Data line level is high when idle

DI Ch#(0-1): The position is 1 when the corresponding channel input signal is valid, and 0 when the input is invalid.

0: Input signal invalid

1: Input signal valid

Encoder Count UP Ch#(0-1): The encoder counts up and in positive rotation.

Encoder Count DOWN Ch#(0-1): The encoder counts down and in contrarotation.

Absolute Position Value Ch#(0-1): Absolute position value, 32-bit signed integer, automatically clear after overflow.

Capture Position value Ch#(0-1): Capture position value, 32-bit signed integer, When DI is set to capture, the pulse meter value is captured to the pulse capture value at the selected edge.

DO Ch#(0-1): The position is 1 when the corresponding channel output signal is valid, and 0 when the output is invalid.

0: Output signal invalid

1: Output signal valid

6 Configuration parameters definition

<2 Analog Input (SSI Encoder)> Submodule configuration parameter definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					16Bit Data Format	32Bit Data Format	
Byte 1	Reserved		Frame Bit Length Ch#0					
Byte 2	Reserved				SSI CLK Frequency Ch#0			
Byte 3	SSI Interval Time Ch#0							
Byte 4								
Byte 5	Reserved						Gray Conversion Ch#0	
Byte 6	Reserved		LSB Bit of Position Value Ch#0					
Byte 7	Reserved		MSB Bit of Position Value Ch#0					
Byte 8	Reserved						Counter Storage Ch#0	
Byte 9	Reserved						DI Function Selection Ch#0	
Byte 10	Reserved					Capture Mode Ch#0		
Byte 11 ... Byte 30	Reserved							
Byte 31	Reserved		Frame Bit Length Ch#1					
Byte 32	Reserved				SSI CLK Frequency Ch Ch#1			
Byte 33	SSI Interval Time Ch#1							
Byte 34								
Byte 35	Reserved						Gray Conversion Ch#1	
Byte 36	Reserved		LSB Bit of Position Value Ch#1					
Byte 37	Reserved		MSB Bit of Position Value Ch#1					
Byte 38	Reserved						Counter Storage Ch#1	
Byte 39	Reserved						DI Function Selection Ch#1	
Byte 40	Reserved					Capture Mode Ch#1		
Byte 41 ... Byte 60	Reserved							

Data description:

16Bit Data Format: Byte transfer order of channel state. (Default: 0)

0: A-B

1: B-A

32Bit Data Format: The byte transfer order of a channel count value. (Default: 0)

0: AB-CD

1: BA-DC

2: CD-AB

3: DC-BA

Frame Bit Length Ch#(0-1): SSI frame length of encoder. (Default value: 13)

The value ranges from 10 to 40.

SSI CLK Frequency Ch#(0-1): The clock frequency when data is read. (Default: 1)

0:125KHz

1: 250KHz

2: 500KH

3: 1.0MHz

4: 1.5MHz

5: 2.0MHz

SSI Interval Time Ch#(0-1): Interval time (unit: 100us) the value range could be set 1 ~ 65535.

Gray Conversion Ch#(0-1): Gray Code Conversion enabled (default: 1)

0: Disable

1: Enable

LSB Bit of Position Ch#(0-1): LSB bit number of position value. The value range is 0 ~ 39 (default: 0)

MSB Bit of Position Ch#(0-1): The MSB bit number of the position value. The value range is 1 ~ 40 (default: 12)

Counter Storage Ch#(0-1): Enable storage. When the storage function is enabled, the IO module will save the count value to the non-volatile memory in real time, and

load the last saved count value at the next power-on. (Default: 1)

0: Disable

1: Enable

DI Function Selection Ch#(0-1): DI function selection (Default: 0)

0: Normal DI function

1: Pulse capture function

Capture Mode Ch#(0-1): Capture mode (default: 0)

0: Rising edge capture

1: Falling edge capture

2: Double edge capture

WARNING

UNEXPECTED EQUIPMENT OPERATION

Signal loss occurs if the encoder SSI frame parameters are improperly set.

If the LSB bit number and MSB bit number parameters of the encoder position value are set improperly, the signal loss will occur.

If the encoder gray code parameter is set improperly, the signal loss will occur.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

Si les paramètres du cadre SSI de l'encodeur ne sont pas réglés correctement, une perte de signal se produira.

La perte de signal se produira si les paramètres LSB bit number et MSB bit number de la valeur de position de l'encodeur ne sont pas réglés correctement.

Si les paramètres du code gris de l'encodeur ne sont pas réglés correctement, la perte de signal se produira.

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A Dimension drawing

