# GCAN-4055

CANopen IO (8DI/8DO)

User Manual


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# Contents

# 1 Introduction

## 1.1 Overview

GCAN-4055 is an I/O module that use CANopen protocol to communicate with the controller. The module have 8 digital input channel and 8 digital output channel. It is widely used in distributed acquisition and control system.

## 1.2 Properties at a glance

| | | | |
|---|---|---|---|
| Digital input | Channel | 8 | |
| | Input signals | Wet contact | Dry contact |
| | Input voltage | 24V DC | -- |
| | Allowed range | 0-30V DC | -- |
| | Logic 1 signal | +5-30V DC | Switch on |
| | Logic 0 signal | ≤3V DC | Switch off |
| | Isolation method | Coupling isolation | |
| Digital output | Channel | 8 | |
| | Output signals | MOS tube drain output | |
| | Output voltage | +24V DC | |
| | Allowed range | Maximum voltage + 30V DC | |
| | Logic 1 signal | +24V DC | |
| | Logic 0 signal | 0V | |
| | Current | Maximum current 150mA | |
| | Isolation method | Coupling isolation | |
| CAN-Bus | Interface types | OPEN terminals | |
| | Baud rate | 5Kbps-1Mbps | |
| | Node ID | 1-127 | |
| | Communication | CANopen | |
| | Insulation voltage | 1500V DC-DC | |
| System parameter | Power supply | +9-30V DC | |
| | Working temperature | -40-+85 ℃ | |
| | Size | 121mm*70mm*26mm | |
| | Weight | 110g | |

# 2 Instruction

GCAN-4055 DIP switch and terminal interface definition are shown in figure 2.1 and figure 2.2.

As shown in figure 2.1, GCAN-4055 DIP switch 1 is reset switch, and switch 2-8 are the node number setting switch. On the right hand side 1-4 is the baud rate setting switch.

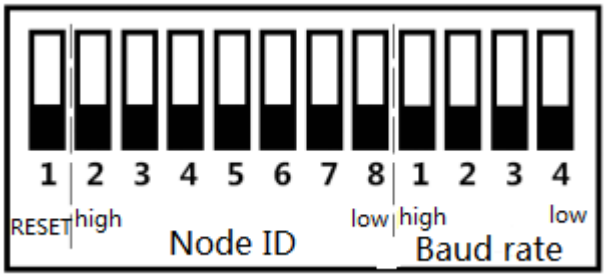



Figure 2.1 GCAN-4055 DIP switch

As shown in figure 2.2, the function of GCAN-4055 pins are as follows:

- V+: Connect power supply (+ 10V ~ + 30V DC)
- V -: Connect power negative
- PE: Shield
- CAN_L: CAN_L
- CAN_H: CAN_H
- CAN_PE: CAN Shield
- CAN_GND: CAN_GND
- DI_COM: Dry contact input signal reference
- DI_GND: Wet contact input grounding
- DI_0~DI7: Dry/Wet contact input
- DO_GND: Digital output GND
- DO_0~DO7: Digital output


Figure 2.2 GCAN-4055 port

# 3 Configuration

Users can set the node number and baud rate of GCAN-4055 using the DIP switch.

Please note: The new parameters will not take effect until the converter power on again.

## 3.1 CAN node number configuration

As shown in figure 3.1, the user will set the DIP switch to "ON", bit is "1", set to "OFF" , bit is "0" . The DIP switch 2-8 can set node ID, the eighth is the lowest bit, the second is highest bit. The node ID is the sum of the decimal values. node ID has a valid range of 0 ~ 127.

Please note: The first switch default is off, please do not change it.

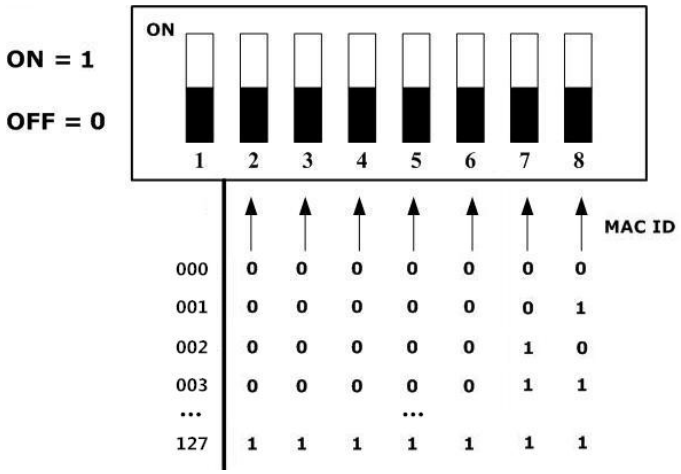



Figure 3.1 CAN node number description

## 3.2 CAN baud rate configuration

1-4 of the right DIP switch can set baud rate. The following table is shown in table 3.2.

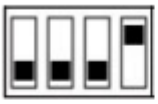
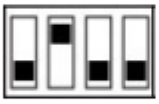
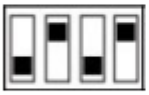
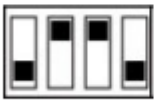
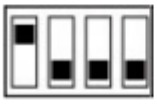
| Graphic | Baud rate | Graphic | Baud rate |
|---|---|---|---|
|  | 1000k |  | 800k |
|  | 500k |  | 250k |
|  | 125k |  | 100k |
|  | 50k |  | 20k |
|  | 10k | | |

Table 3.2 CAN baud rate configuration

# 4 Connect to converter

## 4.1 Power supply

GCAN-4055 support +9-30V DC power supply. We recommend to use 12V or 24V DC voltage-stabilized power supply.

## 4.2 Connect to CAN-Bus

In practical use, connecting the CAN_H to CAN_H and CAN_L to CAN_L, then communication can be realized.

**Note:** The CAN-Bus network adopts topological structure, only the two furthest terminal need to connect 120Ω terminal resistance between CAN_H and CAN_L. See figure 3.2.

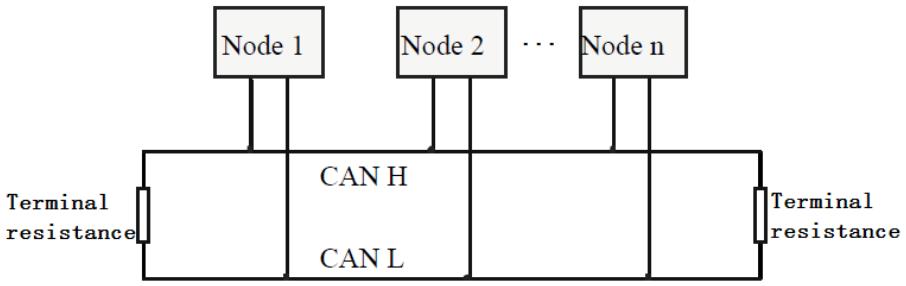



Figure 3.2 CAN-Bus network

## 4.3 System LED

GCAN-4055 has one PWR indicator, one COM indicator, one CAN indicator to indicate the converter status. More functions are shown in table 3.2.

| Indicator | State | Meaning |
|---|---|---|
| PWR | ON | Power supply normal |
| | OFF | Power supply error |
| SYS | Blinking | Enter standby mode |
| CAN | Blinking | CAN-Bus data transmission |
| | Red | CAN-bus error |

Table 3.2 GCAN-4055 LED state

# 5 Application example

**Note: All slave station in this chapter are set to 1.**

This chapter will use USBCAN-II Pro converter and ECANTools software to receive and transmit CAN-Bus data.

You are welcome to purchase it through contact information in the last page of this manual. You can connect USBCAN-II Pro converter CAN1 channel to the CAN-Bus channel of GCAN-4055. Then open the ECANTools software and select the correct baud rate.

## 5.1 Node status

The GCAN-4055 module meets the standard CANopen CiA301 agreement, which is the standard CANopen slave station. After starting the GCAN-4055, it will send out a frame of data to the master station. The frame ID is 0x700+Node ID (such as 0x701), the cycle time is 1 second (object dictionary 0x100C, node guard time).As shown in figure 5.1, this data can be received using the ECANTools software.

In the startup data, the first byte of the frame data is the Node state values.

0x04 means the node is stopped, 0x05 means the node is operating state, 0x7F means the node is in a pre-operational state.

| Frame ID（HEX） | DLC | Frame data（HEX） | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 701 | 1 | 7F | -- | -- | -- | -- | -- | -- | -- |

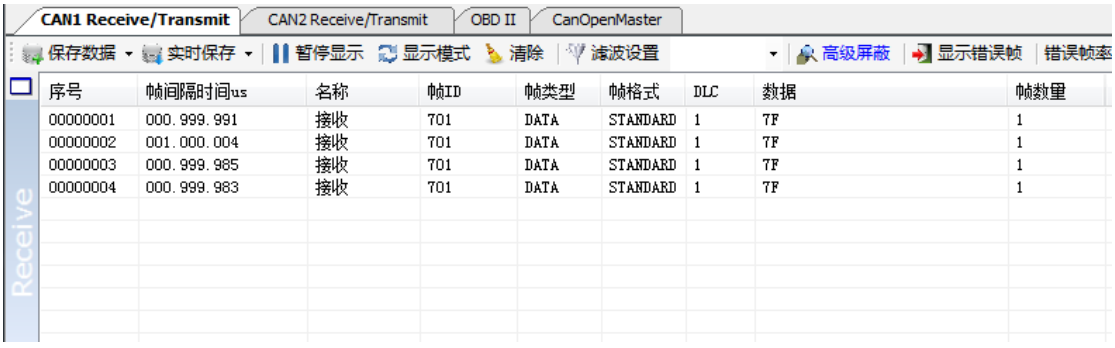



Figure 5.1 Start monitoring interface.

## 5.2 Start command

GCAN-4055 will send one frame to master station.

Frame ID is 0x700+Node ID（X）. Length of the data is 1. Frame data is 0x00.

| Frame ID（HEX） | DLC | Frame data（HEX） | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 70X | 1 | 00 | -- | -- | -- | -- | -- | -- | -- |

For example, GCAN-4055 will automatically send a data when it starts.

USBCAN-II Pro converter can receive this data and display it, as shown in figure 5.2.

| Frame ID（HEX） | DLC | Frame data（HEX） | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 701 | 1 | 00 | -- | -- | -- | -- | -- | -- | -- |

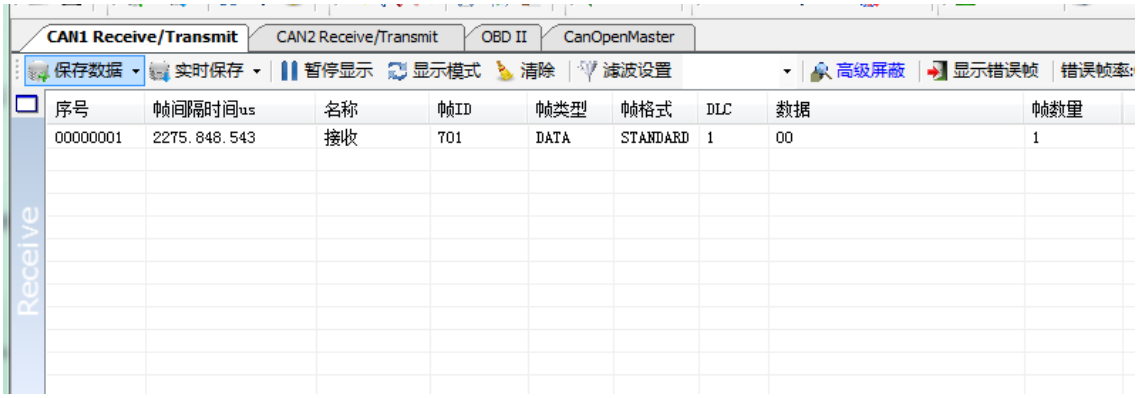



Figure 5.2 starts the command

## 5.3 NMT command（Network management）

Users can use the NMT command of CANopen master station or manually simulate the CANopen protocol to control the GCAN-4055 to start or stop. Manual simulation of CANopen protocol start up module data is shown in the following table.

| Frame ID（HEX） | DLC | Frame data（HEX） | | | |
|---|---|---|---|---|---|
| 000 | 2 | Byte1 Command Identifiers | Byte2 node address | Byte3 ~ Byte8 | |
| | | 01 | 01 | - | Start remote node |
| | | 02 | 01 | - | Stop remote node |
| | | 80 | 01 | - | Enter pre-operational state |

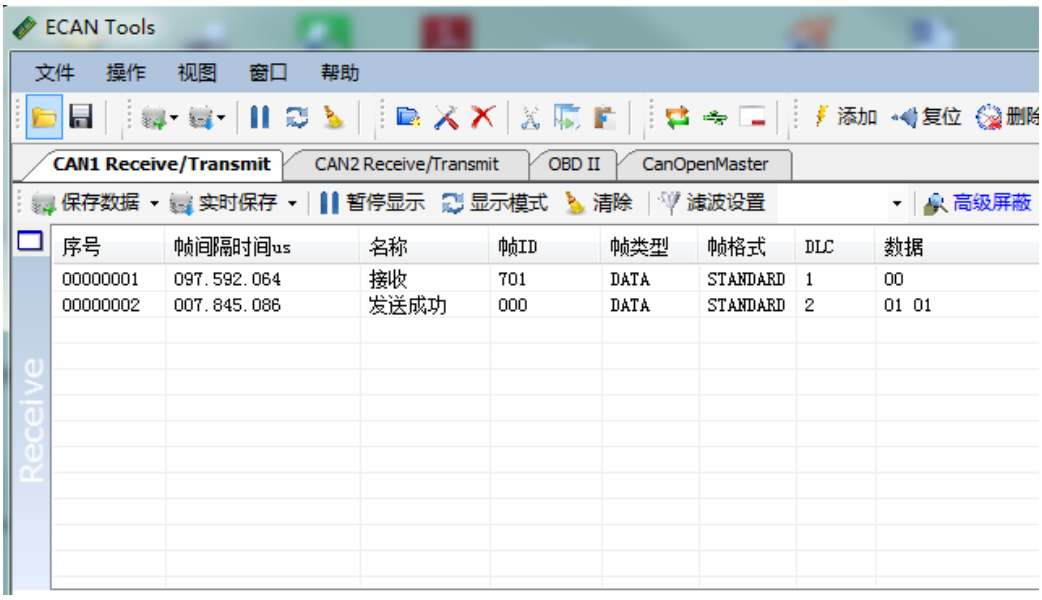



Figure 5.3 NMT start up command

## 5.4 PDO command

TPDO1 of GCAN-4055 is used to indicate the state of input and output. Each of them is represented by one byte. RPDO1 is used to change the state of digital output. It is controlled by one byte.

### 5.4.1 RPDO command (RPDO1, send by the master station)

Users can send data using CANopen master station or manual simulation. You can set the output status of GCAN-4055 module. Frame ID is 0x200+Node ID(X). Length of the data is 1. The first byte of the frame data is used to set output state, each bit set to 1 represents output, 0 represents no output.

| Frame ID（HEX） | DLC | Frame data（HEX） | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 20X | 1 | Byte1 | | | | | | | | Byte2 ~ Byte8 |
| | | XX | | | | | | | | - |
| | | Bit7 DO7 | Bit6 DO6 | Bit5 DO5 | Bit4 DO4 | Bit3 DO3 | Bit2 DO2 | Bit1 DO1 | Bit0 DO0 | - |

For example, the DO_3 state of the module is set to output, and the remaining DO state is no output. You can send the data as shown in the table below and figure 3 in figure 5.4.

| Frame ID（HEX） | DLC | Frame data（HEX） | |
|---|---|---|---|
| 201 | 1 | Byte1<br>DO | Byte2 ~ Byte8 |
| | | 08<br>（0000 0100） | - |

Figure 5.4 PDO command monitoring interface

GCAN-4055 receives the data as shown in the table of the third data in figure 5.5.

### 5.4.2 TPDO command (TPDO1, send by GCAN-4055)

GCAN-4055 uses TPDO to send the current input and output status. Frame ID is 0x180 + Node ID (X). The data length is 2. The first byte is the input state, and the second byte is the output state. Each bit is 1 represents input/output, 0 represents no input/output. GCAN-4055 has two kinds of TPDO transmission modes. Trigger mode and circulation mode.

Default is trigger mode, in this mode, only when DI or DO changes, GCAN-4055 will send TPDO data.

In the circulation mode, GCAN-4055 sends out a TPDO data every 100ms (Cycle time can be changed). Show the state of DI and DO at that time.

| Frame ID (HEX) | DLC | Frame data（HEX） | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18X | 1 | Byte1<br>DI | | | | | | | | Byte2<br>DO | Byte3 ~ Byte8 |
| | | XX | | | | | | | | XX | - |
| | | Bit7<br>DI7 | Bit6<br>DI6 | Bit5<br>DI5 | Bit4<br>DI4 | Bit3<br>DI3 | Bit2<br>DI2 | Bit1<br>DI1 | Bit0<br>DI0 | Like byte 1 | - |

For example, all DI state is no input, and the DO3 state is output, and the remaining DO states are no output. GCAN-4055 sends the data as shown in the table below and the fourth data in figure 5.5.

| Frame ID (HEX) | DLC | Frame data（HEX） | | |
|---|---|---|---|---|
| 181 | 2 | Byte1<br>DI state | Byte2<br>DO state | Byte3 ~ Byte8 |

| | | | | |
|---|---|---|---|---|
| | | **00**<br>**0000 0000** | **08**<br>**0000 0100** | **-** |

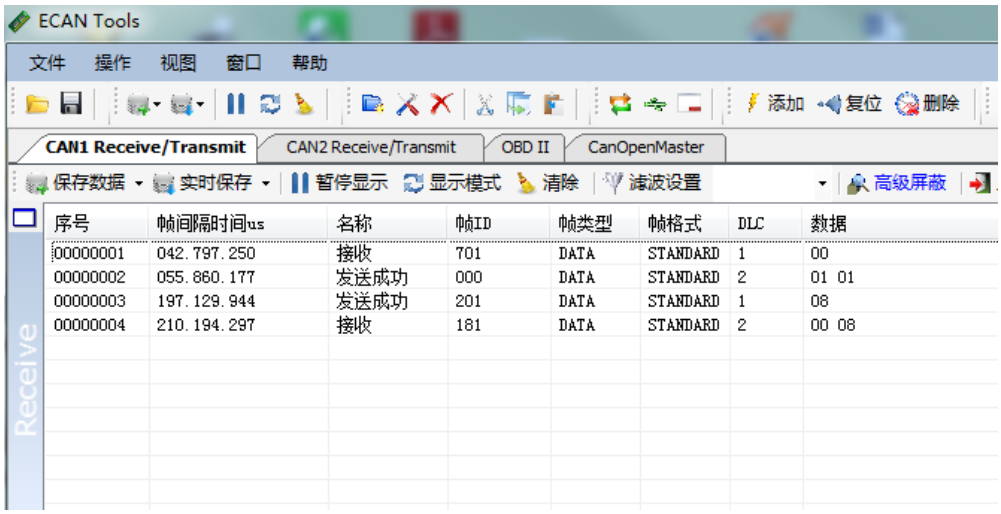



Figure 5.5 PDO command monitoring interface

## 5.5 SDO command

The user can send the SDO instructions to modify the TPDO transmission mode of GCAN-4055 through the CANopen master station or manual simulation. There are two types of work modes that can be set - trigger mode (default) and circulation mode.

### 5.5.1 Circular pattern configuration

The circulation mode is shown in figure 5.6. After entering the circulation mode, GCAN-4055 sends TPDO to master station every once in a while.

Setting method:

① Get GCAN-4055 into the pre-operational state (see 5.3).

② Send a frame ID of 601 to GCAN-4055, frame data is 2F 00 18 02 FE 00 00 00. The frame ID of the reply of GCAN-4055 will be 581 after successful delivery, the frame data is 60 00 18 02 XX XX XX. This indicates that the change is successful.

③ Send the Start remote node (see 5.3) to start the converter, GCAN-4055 sends one TPDO data every 100ms (by default). This is the success of the configuration circulation pattern.

**Note: If you need to change the interval time of the circulation mode. After the second step, Send frame ID 601 to GCAN-4055. The frame data is 2F 00 20 01 XX 00 00 00. The red part is the change in the time interval (Hexadecimal), maximum FF, unit ms.**

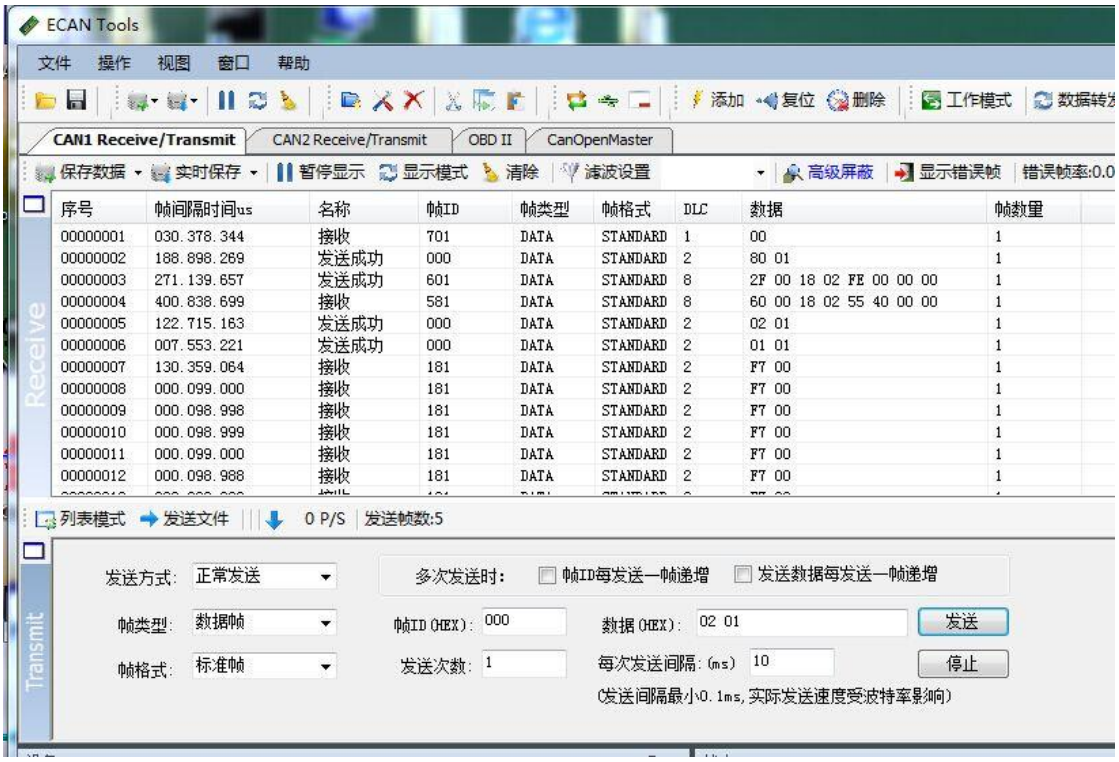



Figure 5.6 the SDO command monitoring interface

### 5.5.2 Trigger mode configuration specification (default mode)

The trigger mode is shown in figure 5.7, GCAN-4055 only sends TPDO to master station when IO is changed.

Setting method:

① Get the GCAN-4055 into the pre-operational state (see 5.3).

② Send the frame ID to the converter 601, and the frame data is 2F 00 18 02 FF 00 00 00. The frame ID of the module response will be 581 after the successful delivery, and the frame data will be 60 00 18 02 XX XX XX.

③ After setting success, send the start remote node (see 5.3) to start the converter. The converter only sends a TPDO data indicating that the configured circulation mode is successful.

# 6 GCAN-4055 object dictionary

| Index | Subindex | Name | Type | Attribute | Default | describe |
|---|---|---|---|---|---|---|
| **Communication parameter area** | | | | | | |
| 0x1000 | - | Device Type | UINT32 | RO | 0x00004055 | Device type |
| 0x1001 | | Error Register | UINT8 | RO | 0 | Current error type |
| 0x1003 | 0 | number of errors | UINT8 | RO | 0 | - |
| | 1~4 | standard error field | UINT32 | RO | 0 | Historical emergency error code |
| 0x1005 | - | COB-ID SYNC | UINT32 | RW | 0x00000080 | - |
| 0x1006 | | Communication Cycle Period | UINT16 | RW | 0x2710 | Communication cycle |
| 0x1007 | | Sync Windows Length | UINT32 | RW | 0 | - |
| 0x1008 | | Manufacturer device name | STRING | CONST | GCTech | Device name |
| 0x1009 | | Manufacturer hardware version | STRING | CONST | 2.0 | Hardware version |
| 0x100A | | Manufacturer software version | STRING | CONST | 2.0 | Software version |
| 0x100C | | Guard Time | UINT16 | RW | 0x038E | - |
| 0x100D | | Life Time Factor | UINT8 | RW | 3 | - |
| 0x1017 | | Producer Heartbeat Time | UINT16 | RW | 0 | - |
| 0x1018 | 0 | number of Entries | UINT8 | RO | 0x04 | - |
| | 1 | Vendor-ID | UINT32 | RO | 0x00000001 | - |
| | 2 | Product code | UINT32 | RO | 0101 | Product code |
| | 3 | Revision number | UINT32 | RO | 0x00000000 | Revised code |
| | 4 | Serial number | UINT32 | RO | 0x00000001 | Sequence code |
| **RPDO communication parameters** | | | | | | |
| 0x1400 | 0 | Highest sub-index supported | UINT8 | CONST | 1 | - |
| | 1 | COB-ID used by RPDO | UINT32 | RW | Node ID+ 0x80000200 | RPDO COB-ID |
| 0x1401 | 0 | Highest sub-index supported | UINT8 | CONST | 0 | - |
| 0x1402 | 0 | Highest sub-index supported | UINT8 | CONST | 0 | - |
| 0x1403 | 0 | Highest sub-index supported | UINT8 | CONST | 0 | - |
| 0x1600 | 0 | number of mapped | UINT8 | RW | 1 | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | objects | | | | |
| | 1 | 1st application object | UINT32 | RW | 0x30010008 | Map 8DO to RXPDO1 |
| 0x1601 | 0 | number of mapped objects | UINT8 | RW | 0 | - |
| 0x1602 | 0 | number of mapped objects | UINT8 | RW | 0 | - |
| 0x1603 | 0 | number of mapped objects | UINT8 | RW | 0 | - |

## TPDO communication parameters

| | | | | | | |
|---|---|---|---|---|---|---|
| 0x1800 | 0 | Highest sub-index supported | UINT8 | CONST | 2 | - |
| | 1 | COB-ID used by TPDO | UINT32 | RW | NODEID+ 0x80000180 | TPDO COB-ID |
| | 2 | transmission type | UINT8 | RW | 0xFF（255） | Transport type.0xFF is the trigger mode, 0xFE is the circulation mode, and the circulation mode deadline is set in index 0x2000 |
| 0x1801 | 0 | Highest sub-index supported | UINT8 | CONST | 0 | - |
| 0x1802 | 0 | Highest sub-index supported | UINT8 | CONST | 0 | - |
| 0x1803 | 0 | Highest sub-index supported | UINT8 | CONST | 0 | - |
| 0x1A00 | 0 | number of mapped objects | UINT8 | RW | 2 | |
| | 1 | 2nd application object | UINT32 | RW | 0x30000008 | Map 8DI to RXPDO1 |
| | 2 | 3rd application object | UINT32 | RW | 0x30010008 | Map 8DO to TXPDO1 |
| 0x1A01 | 0 | number of mapped objects | UINT8 | RW | 0 | |
| 0x1A02 | 0 | number of mapped objects | UINT8 | RW | 0 | |
| 0x1A03 | 0 | number of mapped objects | UINT8 | RW | 0 | |

## Equipment state

| | | | | | | |
|---|---|---|---|---|---|---|
| 0x2000 | 0 | Set TXPDO inhibit time | UINT8 | RO | 0x01 | Set the TXPDO deadline |
| | 1 | TPDO1 inhibit time | UINT8 | RW | 100 | TPDO1 inhibit time is ms |
| 0x3000 | | 8 DI | UINT8 | RO | 0 | 8 input address |
| 0x3001 | | 8 DO | UINT8 | RW | 0 | 8 output address |

# Sales and service

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