# LLD-DDC32E-01 Network Type I/O Controller (DDC)

☑ **Standard Modbus-TCP/Modbus-RTU communication protocol**
☑ **Expandable I/O module for various applications**
☑ **Connect and control over 2000 points**
☑ **Provide relay digital output control(Relay DO)**
☑ **Provide open collector digital output control (Open Collector DO)**
☑ **Provide optically isolated digital input control interface (Isolated DI)**
☑ **Provide 12-bit simulation signal input control interface (AI)**
☑ **Provide 12-bit simulation signal output control interface (AO)**
☑ **24V DC/AC AC/DC power supply model**
☑ **10/100 Mbp Ethernet interface**
☑ **Provide advanced DDC(Direct Data Control) function**
☑ **RS-485 remote equipment data transmission communication, isolation protection (optional)**
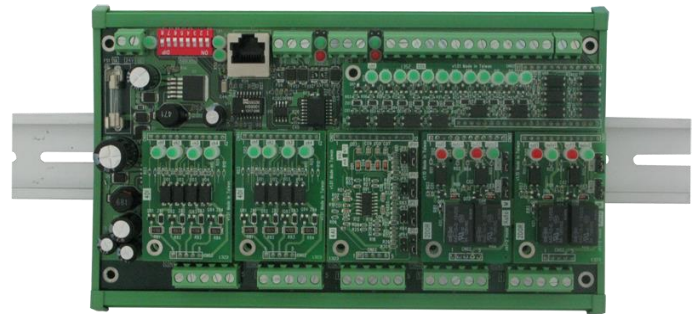
Product Introduction

LLD-DDC32E-01 is a DAM control module with flexibility and high performance-to-price ratio. It has commonly used interface for control and measurement data acquisition with Digital Input/Output and Analog Input/Output. The user, depending on application requirements, can select one to six expansion I/O modules (ModIO module series) of different function, accommodating up to 32 control points. It can also connect to specific expansion module (LLD-ModbusIO-01) via RS-485 interface to obtain more control points.

Besides having standard Modbus-TCP (Ethernet) and Modbus-RTU(RS-485) communication protocol to communicate with remote unit, LLD-DDC32E-01 further provides DDC (Direct Digital Control) field real time control function, which makes it a distributed controller and a programmable controller, with features in multiple points, independent control, fast response and easy programming.

☒ Flexible I/O interface

LLD-DDC32E-01 provides 5+1 I/O module expansion functions and obtains different I/O combination through installation of different modules, and make control and data acquisition functions to be more flexible to satisfy different needs.

The six main I/O modules on the unit can freely install Digital I/O, Analog I/O and relay control module, and provide up to 32 control points.

☒ Modbus Communication Protocol

LLD-DDC32E-01 has a 10/100 Mbps Ethernet interface and can communicate with the main unit via Modbus-TCP or connect to field main unit or other controller, such as HMI, via the two RS-485 interfaces on LLD-DDC32E-01, for field monitoring.

☒ More I/O point control

LLD-DDC32E-01 can expand and connect to LLD-ModbusIO-01 via the two RS-485 interfaces to acquire more I/O control points (over 2000 points).

☒ Easy DDC Management and Program Development Environment

LLD-DDC32E-01 has a simple and easy-to-use management tool, which window type and menu design can facilitate setup and provide real time operation status monitoring function, allowing remote monitoring of operating status for each point.

The management tool also provides DDC command compilation environment, online technical manual and debug model, allowing the user to complete required parameter setup and DDC control application program development with the same management tool.

☒ Complete DDC Control Function

LLD-DDC32E-01 DDC has more than 50 commonly used functions, such as input access, output control, mathematical operation, comparison, time, HVAC, PID…The user can directly develop DDC program and conduct upload and testing via the management tool.

LLD-DDC32E-01 MCU Carrier

Exterior Description
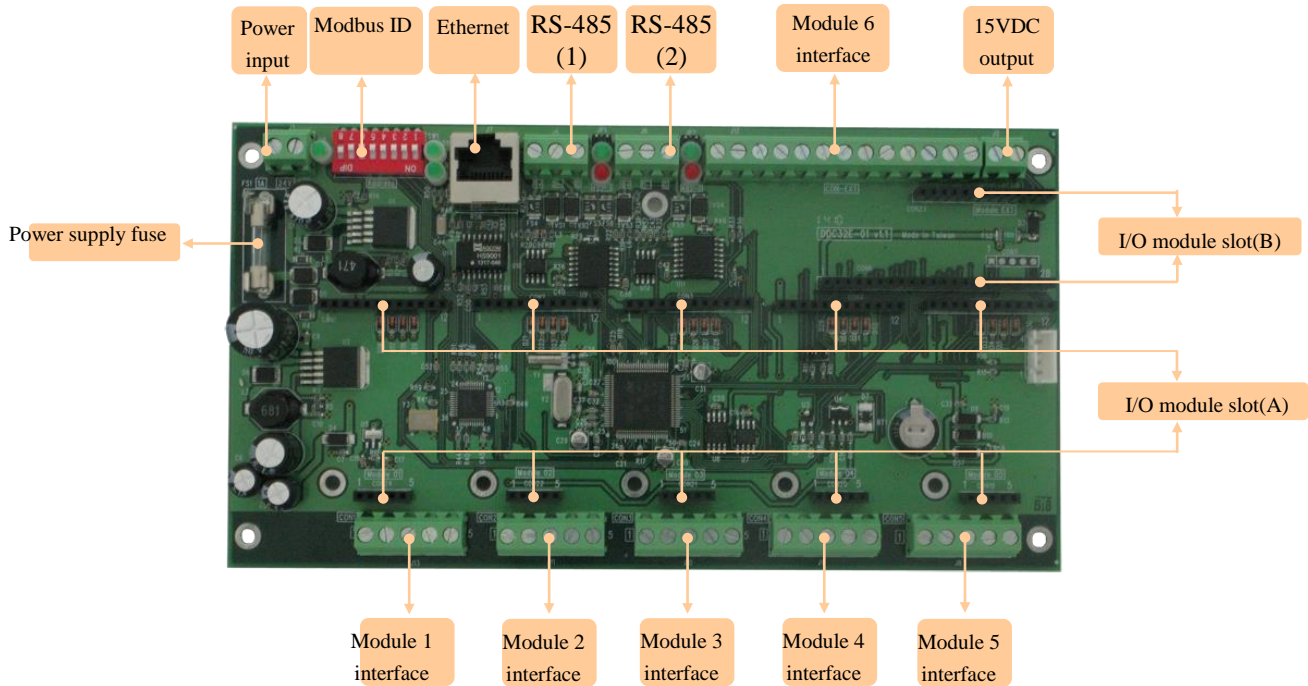
System Core
▷ MCU：ST STM32F207VE (Cortex™-M3 32-bit)
▷ Memory：512KB FLASH, 128KB SRAM, 8KB FRAM, 2048KB SPI FLASH

Network interface
▷ Quantity：1
▷ Type：10/100 BaseT Ethernet
▷ Connector：RJ45

RS-485 Serial Port interface
▷ Quantity：2
▷ RS-485 signal：Data+, Data-, GND
▷ Protection：15KV ESD and 400W surge protection, 2KVrms isolation protection **(Optional)**
▷ Connector：5.00mm 3-pin terminal block
▷ Baud Rate：4,800 ~ 115,200 bps
▷ Parity：None, Even, Odd
▷ Data Bits：8
▷ Stop Bit：1, 2 bits

I/O Module Expansion Slot (A)
▷ Quantity：5
▷ Connector A：2.54mm 12-pin　pin header
▷ Connector B：2.54mm 5-pin　pin header
▷ Connector C：5.00mm 5-pin terminal block

I/O Module Expansion Slot(B)
▷ Quantity：1
▷ Connector A：2.54mm 22-pin　pin header
▷ Connector B：2.54mm 13 pin　pin header
▷ Connector C：5.00mm 13-pin terminal block

Mechanism
▷ Control panel dimension：200 x 107 x 23 mm
▷ Installed IO module：200 x 107 x 27 mm
▷ Installed IO module and Din-Rail carrier：202 x 121 x 40 mm

Power
▷ Working voltage：24V AC/DC
▷ Power Connector：2-pin 5.00 mm terminal block
▷ Protection：1A fuse
▷ Power consumption：0.5~11W (depending on installed ModIO module)

Others
▷ LED indicator：power, serial port
▷ DIP Switch：MODBUS Slave 定址& RS-485 type
▷ Applicable temperature：0~50℃
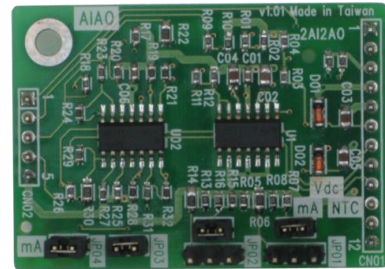▷ Applicable humidity：20%~80% RHG
▷ Certification：CE/FCC

Specialized I/O Expansion Module (A)
## Common Specifications
▷ Dimensions：35 x 50mm
▷ Fixation hole：3.5mm x 1

▷ Pin header A：2.54mm 12-pin x 1 (connect to carrier MCU)
▷ Pin header B：2.54mm 5-pin x 1 (connect to exterior connector of carrier)

AI/AO Module (ModIO-AIO)
### simulation input/output control(analog input/output)
▷ AI Quantity：2 points
▷ AO Quantity：2 points
▷ Signal type：4~20mA / 0-10VDC / NTC (by jumper)
▷ Resolution：12-bit
▷ Protection：OP input/output buffer
▷ Installation limit：1 piece (each MCU carrier is only allowed to install one piece of ModIO-AIO)

AI Module (ModIO-AI)
simulation input control(analog input)
▷ Quantity：4 points
▷ Signal type：4~20mA / 0-10VDC / NTC (by jumper)
▷ Resolution：12-bit
▷ Protection：OP input buffer
▷ Installation limit：2 pieces (each MCU carrier is only allowed to install 2 pieces of ModIO-AI)
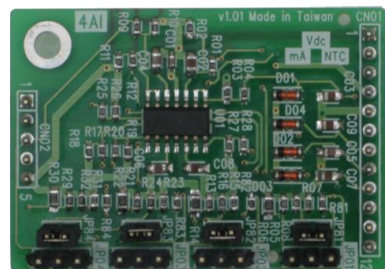
## AO Module (ModIO-AO)
Simulation output control(analog output)
▷ Quantity：4 points
▷ Signal type：4~20mA or 0-10VDC(by jumper)
▷ Resolution：12-bit
▷ Protection：OP output buffer
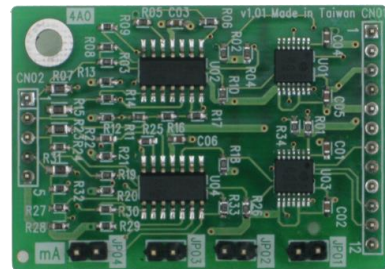
DI Module (ModIO-DI)
digital input control(isolated digital input)
▷ Quantity：4 points
▷ Model：wet contact / sink mode
▷ Input voltage range：5~24VDC
▷ Input protection：2000 Vrms optically isolation protection
▷ LED indicator：DI status
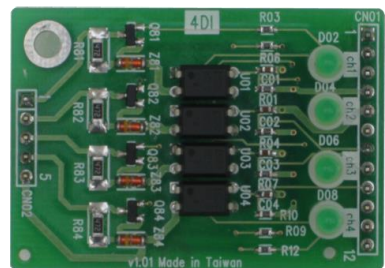
DO Module A (ModIO-DO)
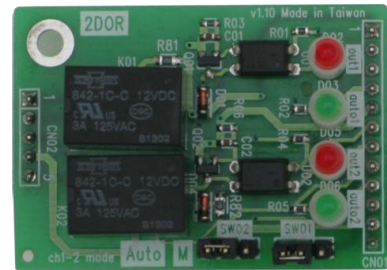### Digital output control(open collector output)
▷ Quantity：4
▷ Signal type： Open Collector
▷ Load capacity：5~24 VDC @ 200mA
▷ Signal protection：2000 Vrms optically isolated protection
▷ LED indicator：DO status
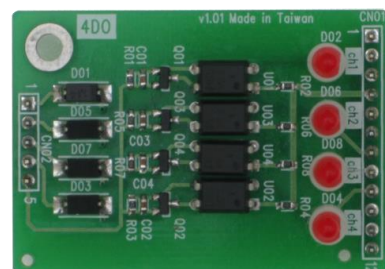
DO Module B (ModIO-Relay)
Relay output control (relay output)

▷ Quantity：2
▷ Signal type：SPDTRelay
  Ch-A：N.O. / COM
  Ch-B：N.O./ N.C. / COM
▷ Control model：automatic (by S/W) and manual control
▷ Connection point capacity：1A@120VAC, 2A@24VDC
▷ Signal protection：2000 Vrms optically isolation protection
▷ LED indicator：DO status
▷ Manual/automatic control and status monitoring (by jumper)

Specialized I/O Expansion Module (B)
Common Specifications

▷ Fixation hole：3.5 mm x 1
▷ Pin header A：2.54 mm 22-pin x 1 (connect to carrier MCU)
the exterior connector of carrier)
▷ Pin header B：2.54 mm 13-pin x 1 (connect to

### Expansion DI Module (ModIO-12DI)
Digital output control (isolated digital input)

▷ Quantity：12
▷ Model：wet contact / sink mode
▷ Input voltage range：5~24VDC
▷ Input protection：2000 Vrms optically isolation protection
▷ LED indicator：DI status
▷ Dimensions：25 x 100mm

Expansion DO Module (ModIO-12DO)
Digital output control (isolated digital Output)

▷ Quantity：12
▷ Signal type：Open Collector
▷ Load capacity：5~24 VDC @ 200mA
▷ Signal protection：2000 Vrms optically isolation protection
▷ LED indicator：DO status
▷ Dimensions：25 x 106mm
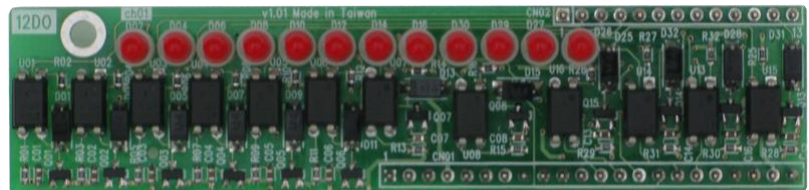
# LLD-DDC32E-01 Software Specifications

Management Tool Functions

▷ Ethernet interface is applicable to standard Modbus-TCP communication protocol.

▷ RS-485 interface can be defined as communication port (Modbus-RTU) or I/O expansion port (connect to LLD-Modbus IO-01 up to 64 pieces/ 32 pieces for each port)

▷ Complete online literatures, providing Chinese instructions to greatly reduce entry barrier

▷ Subprogram function provides program code management and application example explanation

▷ Real time input/output and register data access and setup

▷ For AI application, the user can self-define 10K NTC resistance reference table.

▷ RS-485 communication interface basic parameter setup (menu)
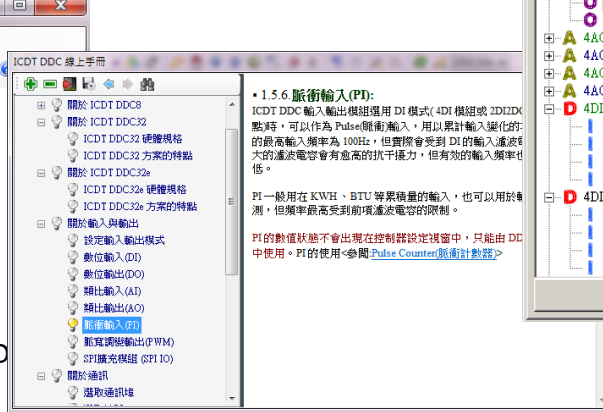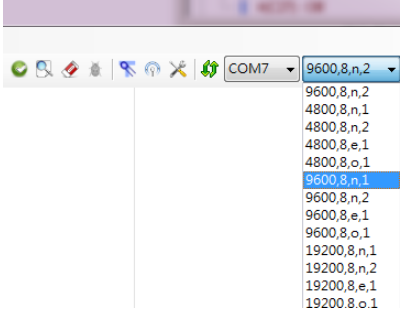
▷ Firmware update function allows online

▷ The user can edit, upload and access D

DDC Program Control

▷ DDC service and 16KB DDC program space

▷ Online instant debug, pause and single step execution, facilitate the understanding of program operation and output results.

▷ Online update DDC control program at any time.

▷ Over 50 high level functions and commands, computing with PID control conditions and various time computing, mathematical computing and logic computing functions, to easily achieve independent operation requirement and dissipate control risk.

▷ 2000 Coils and 2000 Registers to support memory function at power failure, save operating and setup values from power failure damage.

▷ All DI points work for pulse input, with max input frequency 100 Hz, broad product application range

▷ DDC program has password protection function to prevent access to the program and the intelligent property right

▷ Firmware online update function to simplify firmware modification procedure

▷ Screen to show DDC command compilation reference
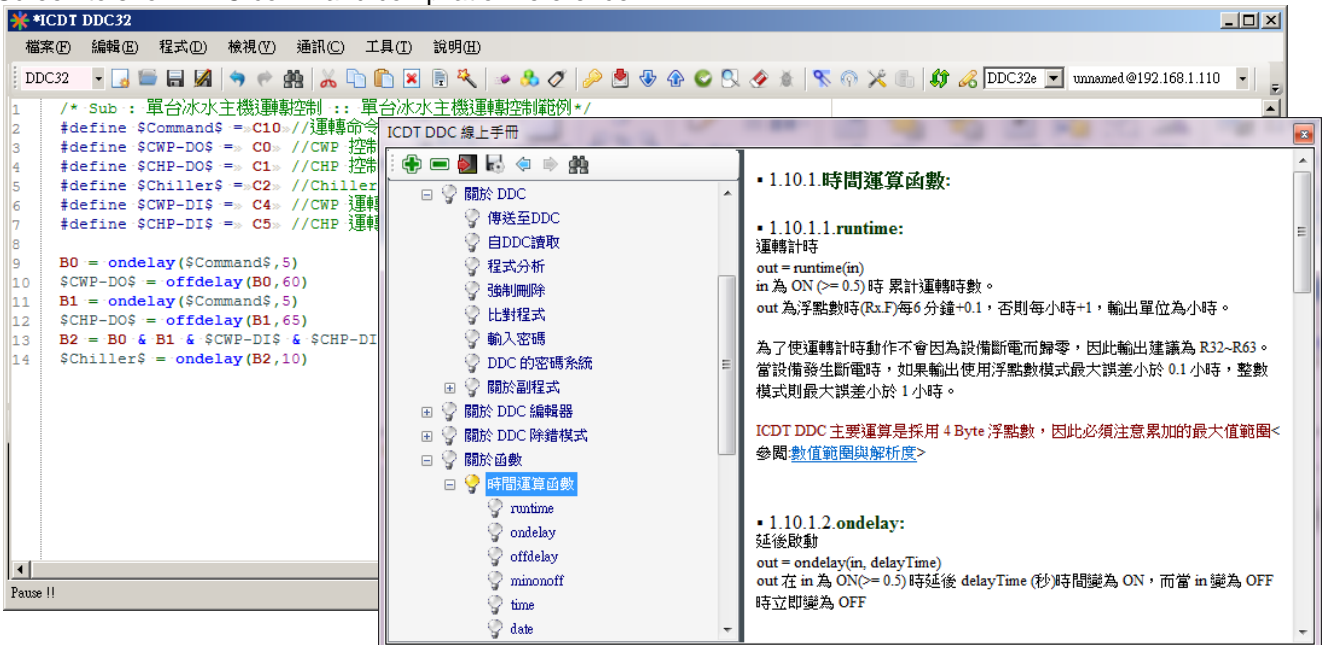
LLD-DDC32E-01 Product Model Number

Function Carrier

▷ **LLD-DDC32E-01☐**

→ Blank – basic model

I – RS-485 interface with 2000 Vrms isolation protection
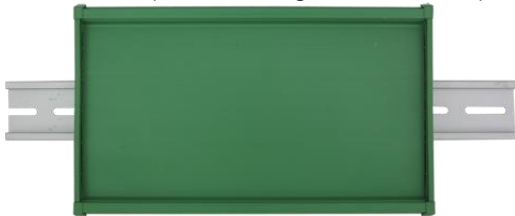
DDC expandable control Module MCU carrier

Expansion Module

▷ **ModIO-AI**
4-ch 12bit 4~20mA/0~10VDC simulation signal input (Analog Input) Module

▷ **ModIO-AO**
4-ch 12bit 4~20mA/0~10VDC simulation signal output (Analog Output) Module

▷ **ModIO-AIO**
2+2 12bit 4~20mA/0~10VDC simulation signal input/output (Analog Input / Analog Output) Module

▷ **ModIO-DI**
4-ch 5~24 VDC isolation protection digital input (Digital Input) Module

▷ **ModIO-DO**
4-ch 5~24 VDC isolation protection digital open collector output (Open Collector Output) Module

▷ **ModIO-Relay**
2-ch 2A DC/AC Relay output (Relay) Module

▷ **ModIO-12DI**
12-ch 5~24 VDC isolation protection digital input (Digital Input) Module

▷ **ModIO-12DO**
12-ch 5~24 VDC isolation Protection digital open collector output (Open Collector Output) Module

Accessory

▷ **LLD-CR-01**
Din-Rail carrier used by LLD-DDC32E-01

▷ **LLD-Case-02**
Iron casing designated for LLD-DDC32E-01 (no prints and tag)   Note: MoQ requirement

Figure
LLD-CR-01 (not include guide rail below)

LLD-Case-02

This figure is LLD-Case-01