EtherCAT IO Slave Module

ES-16I16O-S2

User Guide

Version: V.1.1.3

Date: 2020.07

Contents

Chapter 1: Product Introduction

1.1 Digital Input and Output

- 16 digital input channels and 16 digital output channels
- Input / Output voltage: 0 and 3.3V DC
- Input pull down resistor : 50K ohm
- Output source current: -18 mA
- Output sink current: 17 mA

1.2 Power Requirements

- DC input: DC 24V

1.3 EtherCAT

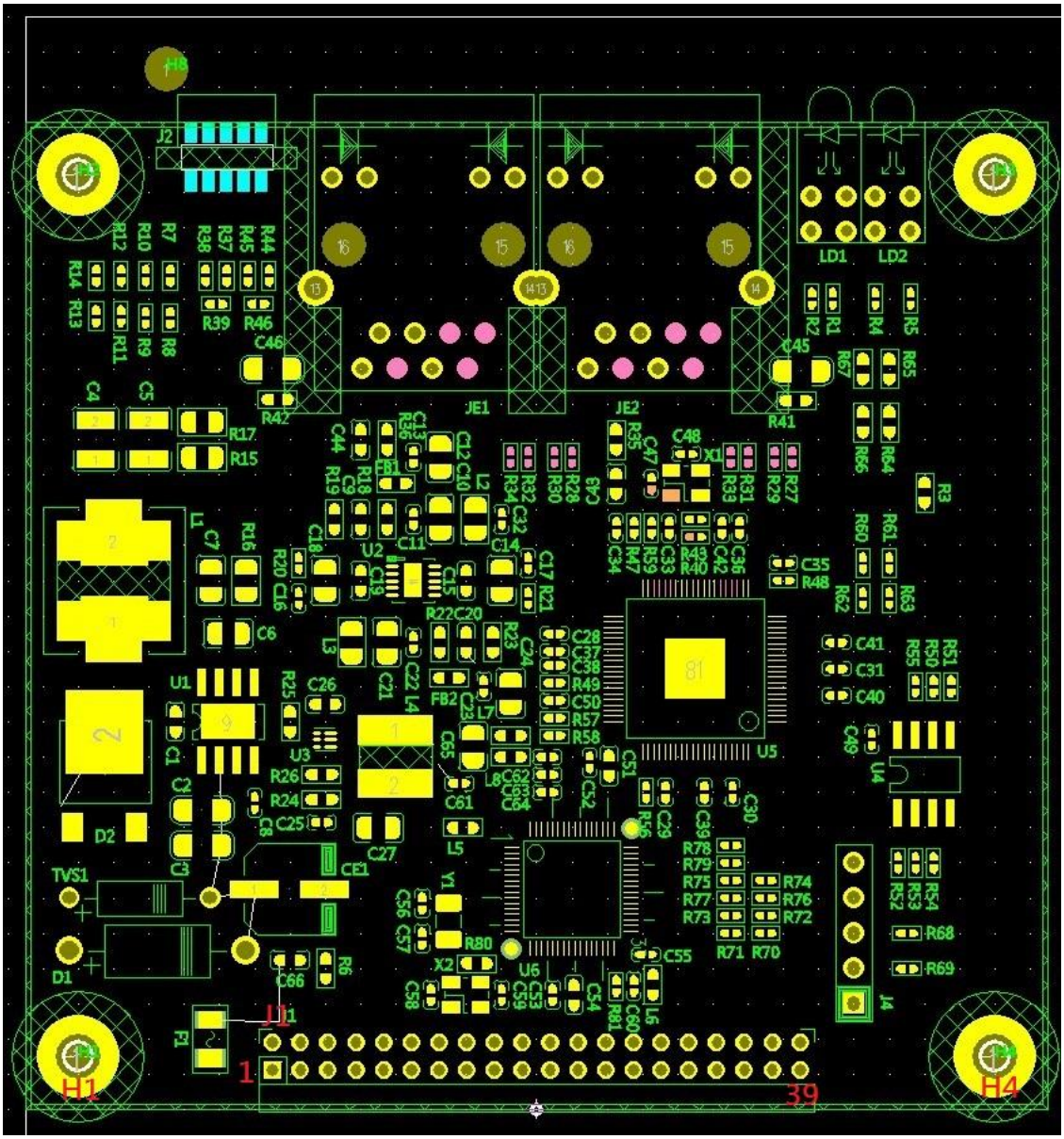
- Data transfer medium: Ethernet cable(CAT5e), shield type: S/STP or S/UTP
- Ethernet interface: 2x RJ-45
- Data transfer rate: 100Mbps, full duplex
- Protocol: EtherCAT

1.4 Environment

- Operating temperature: 0℃ to 65℃

Chapter 2: Connector Pinout Assignments and Wiring Diagrams

2.1 Mounting Data



- PCB dimension(mm): 73.66(W) x 71.2(L) x 19.05(H)
- Mounting holes distance(mm): 66.04(W) x 63.5(L)
- H1 hole to J1 Pin1 horizontal distance: 14.02mm

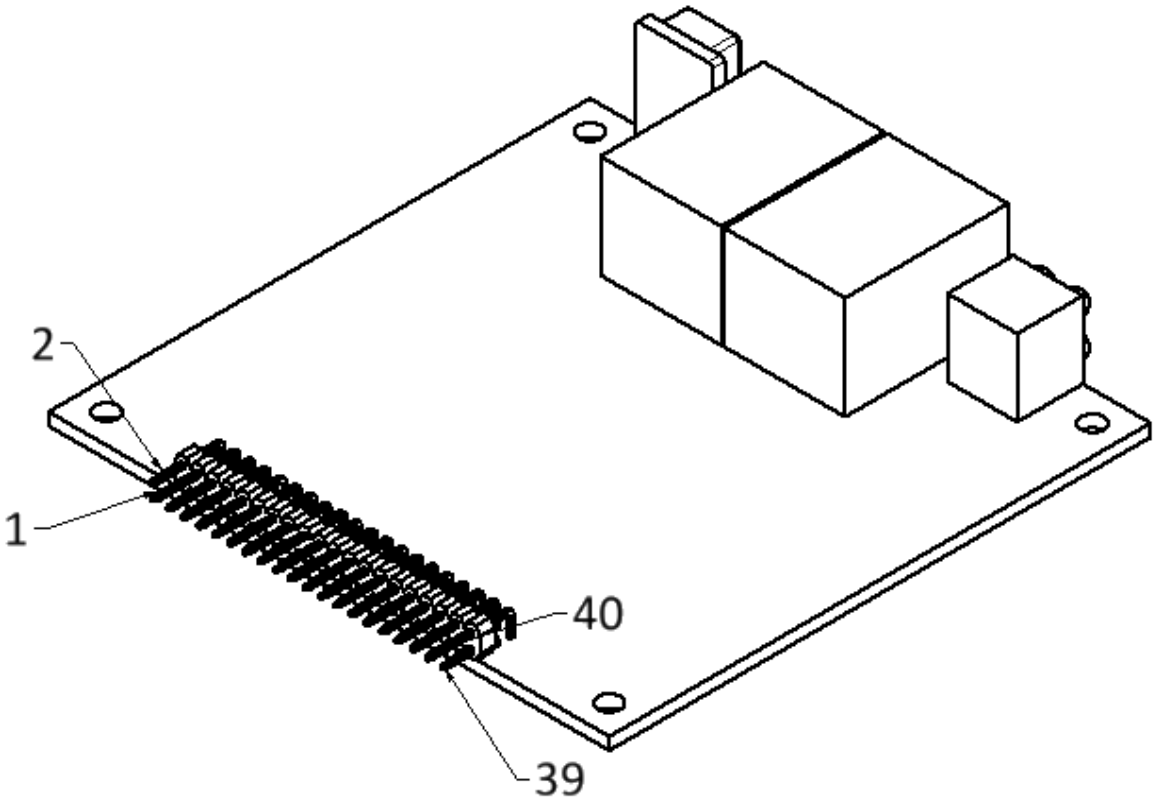


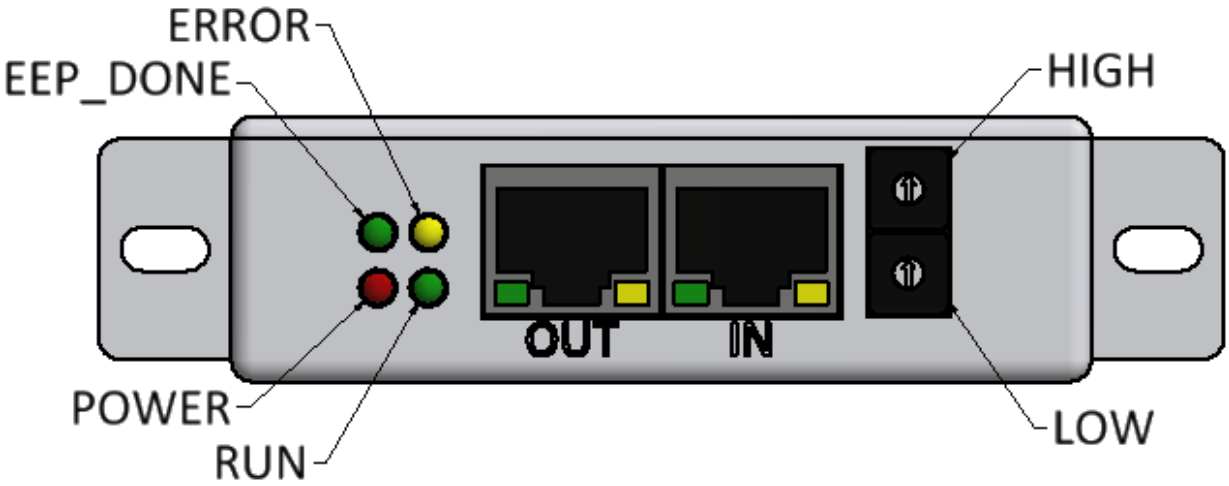
Table.1 Pin Definition

Pin	Name	Type	Pin	Name	Type
1	24VIN	POWER	21	Ground	POWER
2	Ground	POWER	22	Ground	POWER
3	3.3V OUT*	POWER	23	Output 0	OUT
4	Ground	POWER	24	Output 1	OUT
5	Input 0	IN	25	Output 2	OUT
6	Input 1	IN	26	Output 3	OUT
7	Input 2	IN	27	Output 4	OUT
8	Input 3	IN	28	Output 5	OUT
9	Input 4	IN	29	Output 6	OUT
10	Input 5	IN	30	Output 7	OUT

11	Input 6	IN	31	Output 8	OUT
12	Input 7	IN	32	Output 9	OUT
13	Input 8	IN	33	Output 10	OUT
14	Input 9	IN	34	Output 11	OUT
15	Input 10	IN	35	Output 12	OUT
16	Input 11	IN	36	Output 13	OUT
17	Input 12	IN	37	Output 14	OUT
18	Input 13	IN	38	Output 15	OUT
19	Input 14	IN	39	Ground Earth	POWER
20	Input 15	IN	40	Ground Earth	POWER

*Note: Pin 3 (3.3V output) maximum output current: 1.8A

2.2 LED Indicator & Function



Station alias address

SW1/SW2: station alias address. ESC loads the 8-bit alias address to register 0x12 if reset. SW1 is the higher hex digit; SW2 is the lower one.

POWER (Red)	
ON	Power supply has been connected to 24 VDC
OFF	Power supply is not connected to 24VDC

RUN LED (Green)	
LED Response	FSM State
OFF	1-Init
Flash	4-Safe OP, 1x
Blinking	2-PreOp
Flickering	3-Bootrap
ON	8-Op

EEP_DONE (Green)	
ON	EEPROM done
OFF	Fail

ERROR LED (Yellow)	
LED Response	Error State
OFF	No Error
Flash 1x-12x	Process Data Watchdog timeout, 2x

Blinking	PDI configuration unstopped type
Flickering	I2C EEPROM loading error
ON	PDI Watchdog timeout

RJ45 LED Yellow	
ON	Data transmitting
OFF	No data transmitting

2.3 Note - Before You Begin

- Ensure you have stable, clean working environment.
- Before working on any components, make sure the power is off.
- Ground yourself before touching any components.
- Static electricity may damage the elections components.

Chapter 3: Objects

3.1 Sync Manager Objects

Sync Manager 2 PDO Assignment

Index	Sub Index	Type	Access	Value	Description
0x1c12	0	USINT	RW	0 to 2 (default:2)	Number of RxPDO mappings
0x1c12	1	UINT	RW	0x1600, 0x1601 (default:0x1600)	First RxPDO mappings
0x1c12	2	UINT	RW	0x1600, 0x1601 (default:0x1601)	Second RxPDO mappings

Sync Manager 3 PDO Assignment

Index	Sub Index	Type	Access	Value	Description
0x1c13	0	USINT	RW	0 to 2 (default:2)	Number of TxPDO mappings
0x1c13	1	UINT	RW	0x1a00, 0x1a01 (default:0x1a00)	First RxPDO mappings
0x1c13	2	UINT	RW	0x1a00, 0x1a01 (default:0x1a01)	Second RxPDO mappings

The object 0x1C12/0x1C13 can be changed only in the EtherCAT Pre-Operational state

3.2 PDO Mapping Objects

RxPDO 0

Index	Sub Index	Type	Access	Value	Description

0x1600	0	USINT	RO	1	Number of PDO entries
0x1600	1	UDINT	RO	0x70000108	First entry of RxPDO 0

RxPDO 1

Index	Sub Index	Type	Access	Value	Description
0x1601	0	USINT	RO	1	Number of PDO entries
0x1601	1	UDINT	RO	0x70000208	First entry of RxPDO 1

TxPDO 0

Index	Sub Index	Type	Access	Value	Description
0x1a00	0	USINT	RO	1	Number of PDO entries
0x1a00	1	UDINT	RO	0x60000108	First entry of TxPDO 0

TxPDO 1

Index	Sub Index	Type	Access	Value	Description
0x1a01	0	USINT	RO	1	Number of PDO entries
0x1a01	1	UDINT	RO	0x60000208	First entry of TxPDO 1

3.3 Digital Input Objects

Index	Sub Index	Type	Access	Value	Description
0x6000	0	USINT	RO	2	Number of digital input object
0x6000	1	USINT	RO	0 to 0xff (default:0)	Digital input byte 0
0x6000	2	USINT	RO	0 to 0xff (default:0)	Digital input byte 1

0x6000:1 Digital input byte 0 is mapping to Input 0 to Input 7

0x6000:2 Digital input byte 1 is mapping to Input 8 to Input 15

The digital input objects are updated if and only if the EtherCAT state machine is in Safe-OP or OP state.

3.4 Digital Output Objects

Index	Sub Index	Type	Access	Value	Description
0x7000	0	USINT	RO	2	Number of digital output object
0x7000	1	USINT	RO	0 to 0xff (default:0)	Digital output byte 0
0x7000	2	USINT	RO	0 to 0xff (default:0)	Digital output byte 1

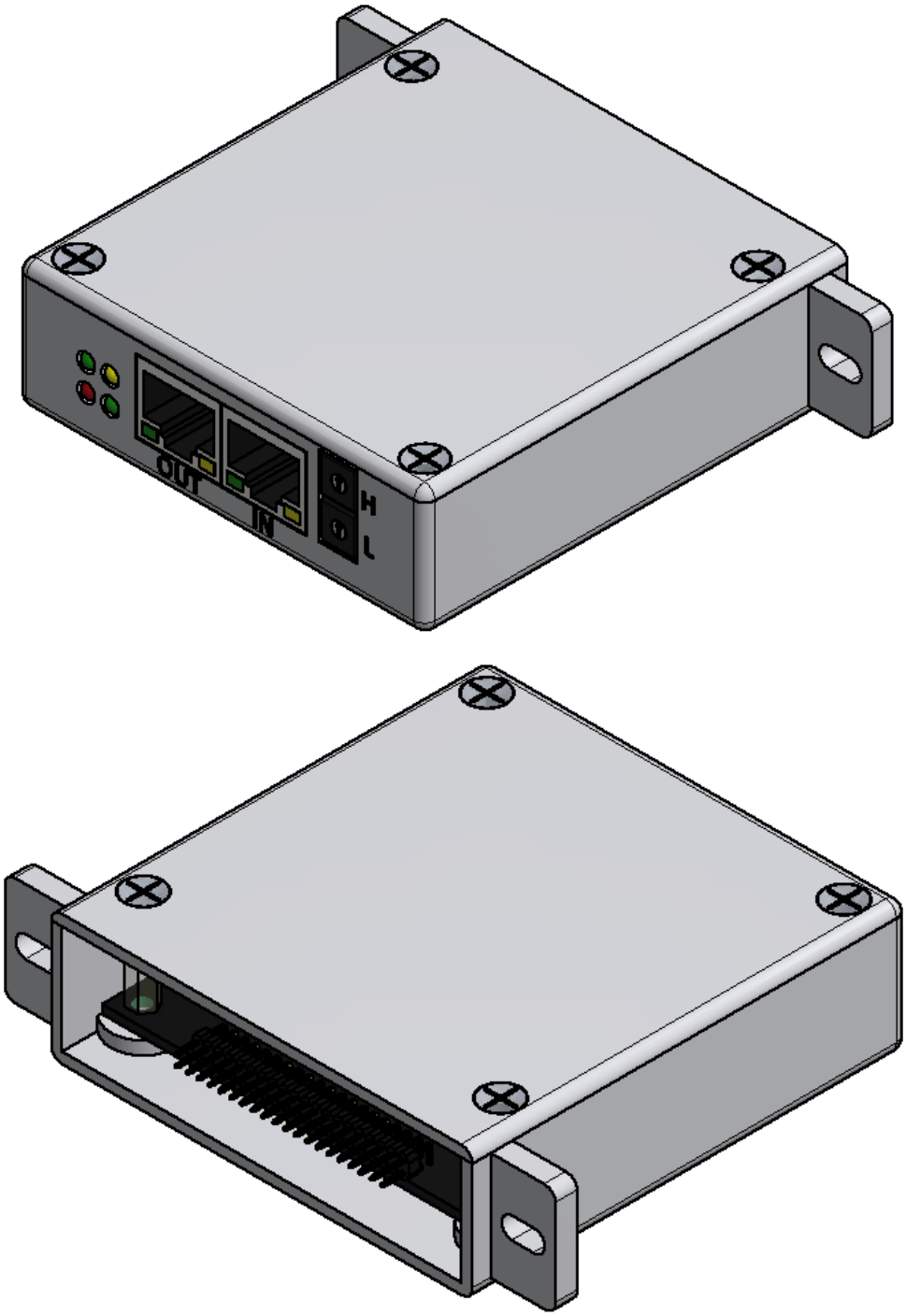
0x7000:1 Digital output byte 0 is mapping to OUT 0 to OUT 7

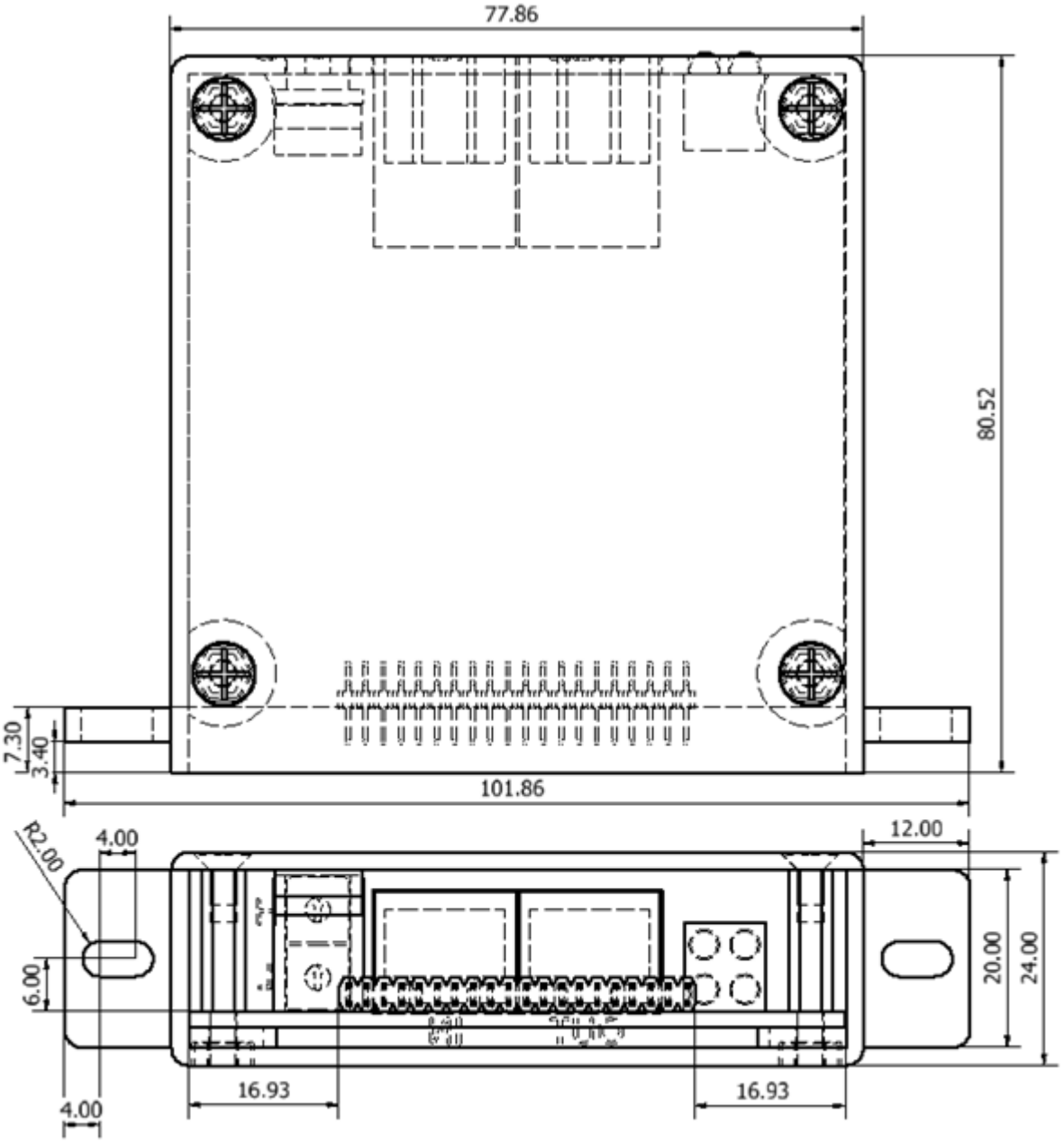
0x7000:2 Digital output byte 1 is mapping to OUT 8 to OUT 15

The digital output objects are updated if and only if the EtherCAT state machine is in OP state.

Chapter 4: PCB Enclosure Shells

4.1 Plastic Shell Diagrams





Unit: mm

Tolerance: 0 ~ +0.2 mm