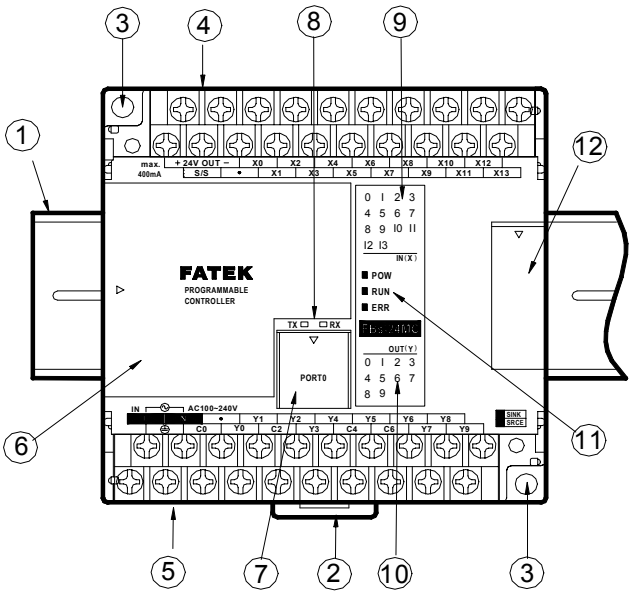
# Chapter 1 Introduction of FATEK FBS Series PLC

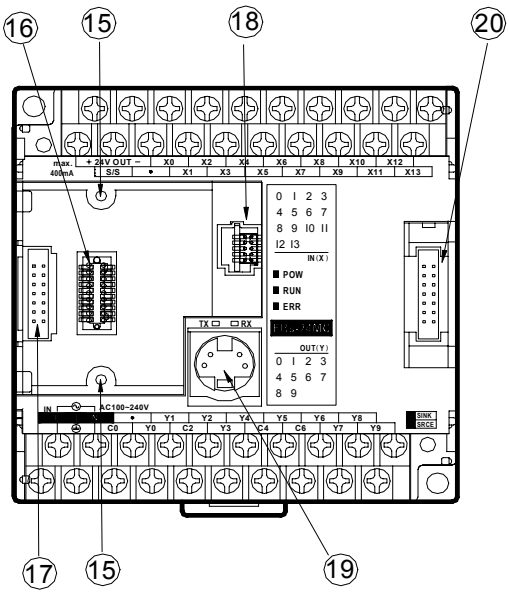
The FATEK FBS Series PLC is a new generation of micro PLC equipped with excellent functions comparable to medium or large PLC, with up to five communication ports. The maximum I/O numbers are 256 points for Digital Input (DI) and Digital Output (DO), 64 words for Numeric Input (NI) and Numeric Output (NO). The Main Units of FBS are available in three types: MA (Economy Type), MC (High-Performance Type), and MN (High-Speed NC Type). With the combination of I/O point ranges from 10 to 60, a total of 17 models are available. Fourteen DI/DO and 12 NI/NO models are available for Expansion Units/Modules. With interface options in RS232, RS485, USB and Ethernet, the communication peripherals are available with 14 boards and modules. The various models are described in the following:

## 1.1 Appearance of Main Unit

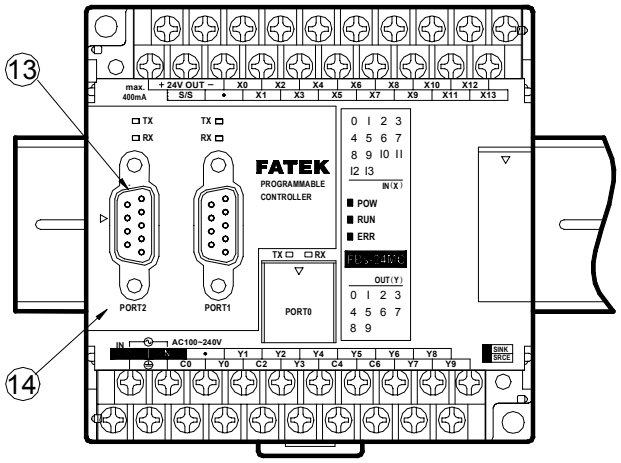
All the Main Units of FBS-PLC have the same physical structure. The only difference is the case width. There are four different case sizes, which are 60mm, 90mm, 130mm, and 175mm. The figure below will use the Main Unit case of the FBS-24MC as an example for illustration:




(Front view without Communication Board)




(Front view with cover plate removed)




(Front view with CB-22 Board installed)

① 35mm-width DIN RAIL
② DIN RAIL tab
③ Hole for screw fixation ( $\phi$ 4.5×2)
④ Terminals of 24VDC power input and digital input (Pitch 7.62mm)
⑤ Terminals of main power input and digital output (Pitch 7.62mm)
⑥ Standard cover plate (without communication board)
⑦ Cover plate of built-in communication port (Port 0)

⑧ Indicators for transmit (TX) and receive (RX) status of built-in communication port (Port0).

⑨ Indicator for Digital Input (Xn).

⑩ Indicator for Digital Output (Yn).

⑪ Indicator for system status (POW, RUN, ERR).

⑫ I/O output expansion header cover [units of 20 points or beyond only], with esthetic purpose and capable of securing expansion cable.

⑬ FBs-CB22 Communication Board (CB).

⑭ FBs-CB22 CB cover plate (each CB has its own specific cover plate)

⑮ Screw holes of communication board.

⑯ Connector for communication board (for CB2, CB22, CB5, CB55, and CB25)

⑰ Connector for Communication Module (CM) (only available in MC/MN model, for CM22, CM25, CM55, CM25E, and CM55E connection).

⑱ Connector for Memory Pack.

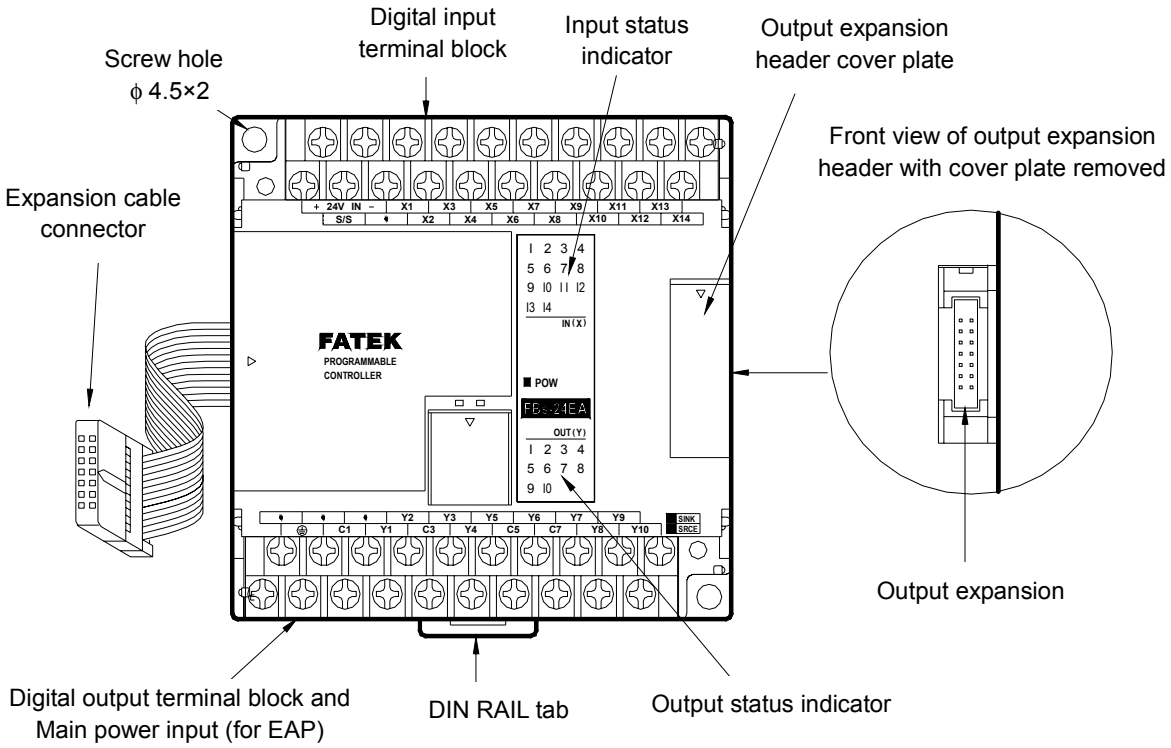
⑲ Connector for built-in communication port (Port 0) (With USB and RS232 optional, shown in the figure is for RS232)

⑳ I/O output expansion header (only available in units with 20 points or beyond), for connecting with cables from expansion units/modules.

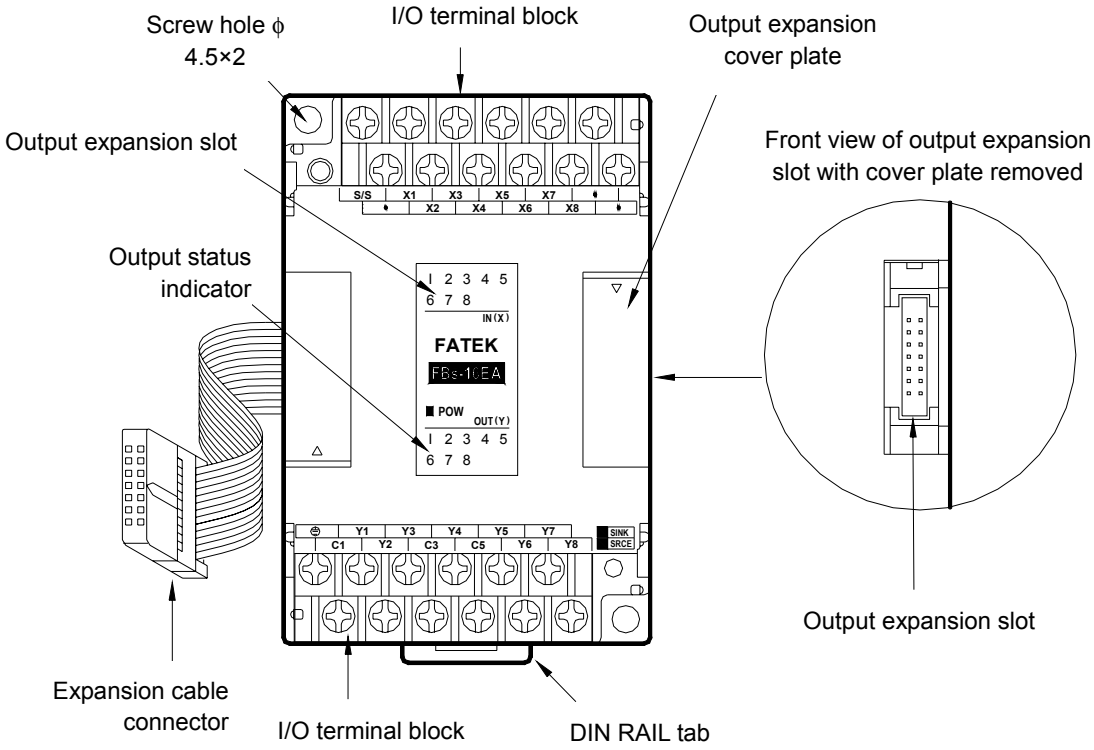
## 1.2 Appearance of Expansion Unit/Module

There are three types of cases for expansion units/modules. One type uses the same case as main unit that of the 90mm, 130mm, and 175mm, while the other two have thinner 40mm and 60mm cases, which are for expansion modules. All expansion cables (left) of expansion units/modules are flat ribbon cables (6cm long), which were soldered directly on the PCB, and the expansion header (right) is a 14Pin Header, with this to connect the right adjacent expansion units/modules. In the following, each of the three types of expansion units/modules is described as an example:

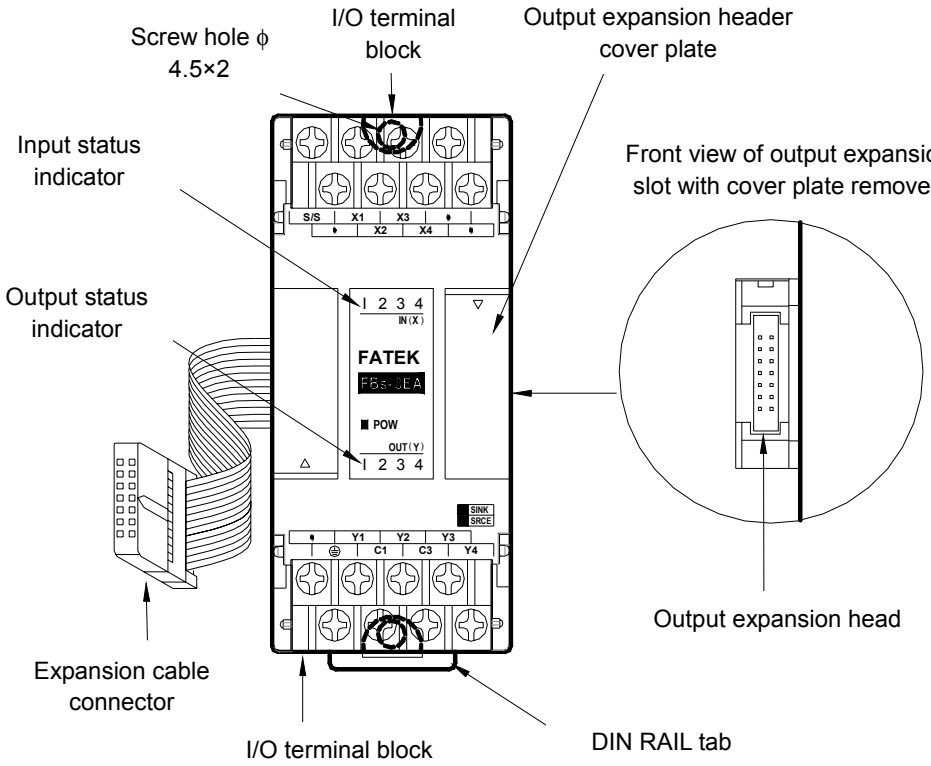
- Expansion unit/module with 90mm, 130mm, or 175mm width case: [-24EA(P), -40EA(P), -60EA(P), -TC16, -RTD16]



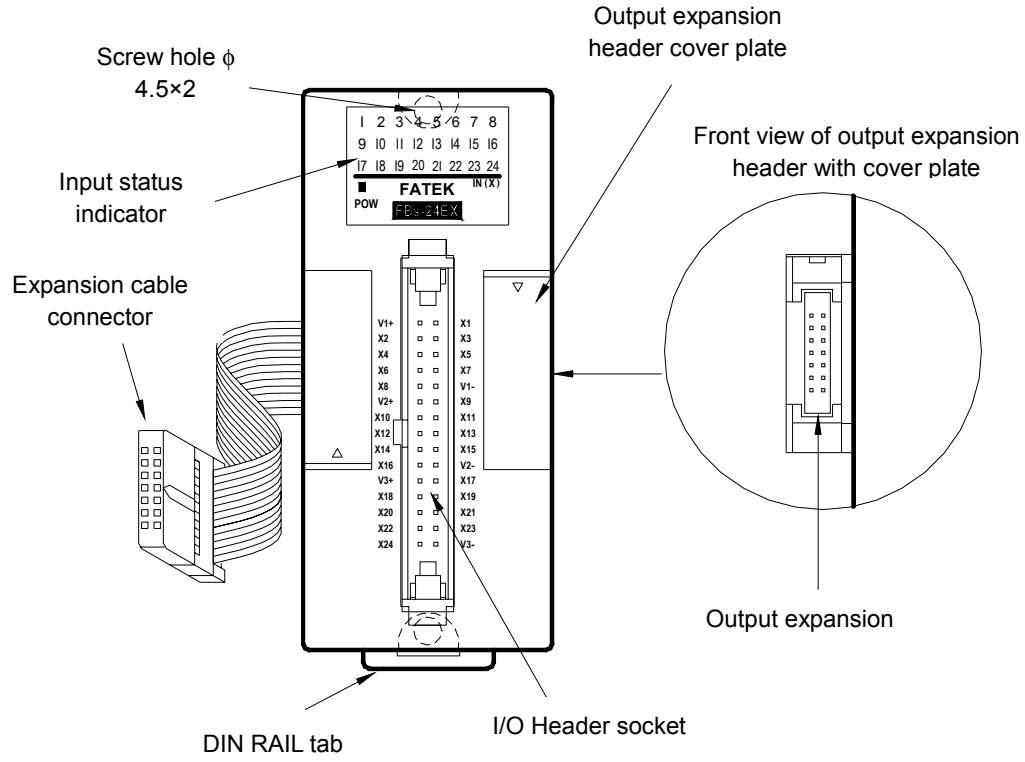
- Expansion unit/module with 60mm width case: (-16EA, -16EY, -20EX)




- Expansion module with 40mm width case: (-8EA, -8EY, -8EX, -6AD, -2DA, -4DA, -4A2D, -7SG△, -TC2, -TC6, -RTD6, -CM5H)

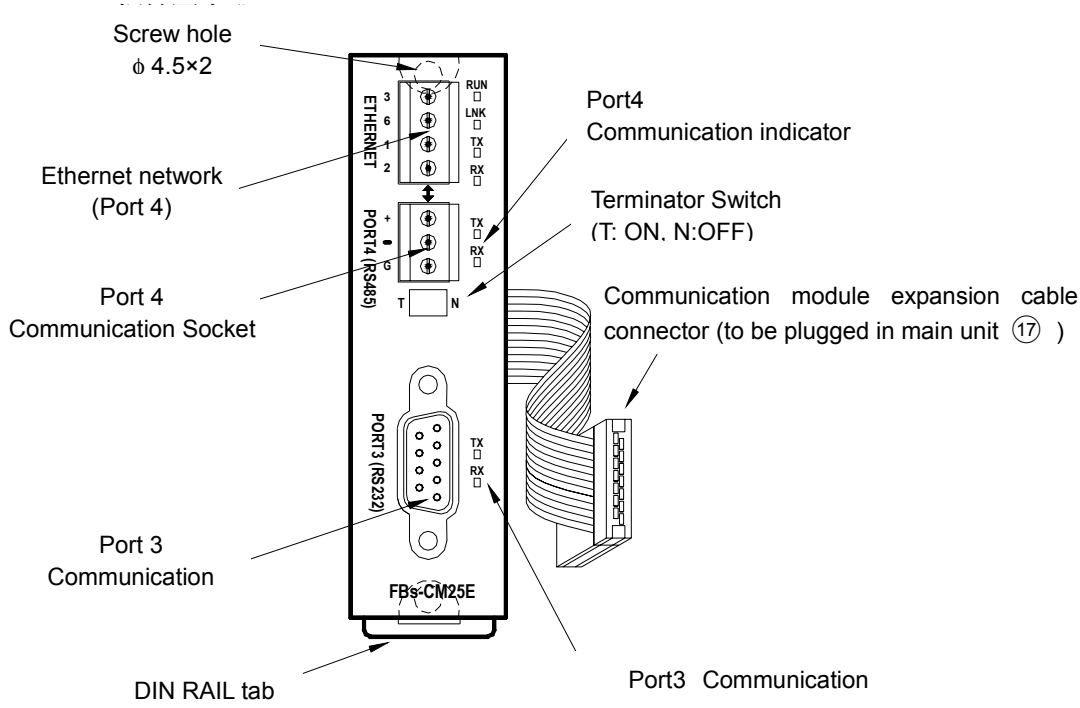


- Expansion module with 40mm width case: (-24EX, -24EYT, -32DGI)




## 1.3 Appearance of Communication Expansion Module

The Communication Module (CM) of FBs-PLC has a 25mm-width case, which can be used in the following seven modules: -CM22, -CM25, -CM55, -CM25E, -CM55E, -CM25C, -CM5R.



## 1.4 List of FBS PLC Models

| Item Name | | Model Number | Specifications |
|---|---|---|---|
| **NC Control Main Unit** | | FBs-20MN□◇Δ－◎ | 2 points 7920KHz 5VDC differential input, 10 points 24VDC digital input (20KHz), 2 points 7920KHz 5VDC differential output, 6 points (R/T/S) digital output (Model "T" 6 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, detachable terminal block |
| | | FBs-32MN□◇Δ－◎ | 4 points 920KHz 5VDC digital differential input, 16 Points 24VDC digital input (20KHz for 12 Points), 4 points 7920KHz 5VDCdigital differential output, 8 Points (R/T/S) digital output (Model "T" 4 Points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, detachable terminal block |
| | | FBs-44MN□◇Δ－◎ | 8 points 7920KHz 5VDC digital differential input, 20 Points 24VDC digital input (20KHz for 8 points), 8 points 7920KHz 5VDCdigital differential output, 8 points (R/T/S) digital output (Model "T" 4 Points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, detachable terminal block |
| **Advanced Main Unit** | | FBs-10MC□◇Δ－◎－XY | 6 points 24VDC digital input (2 points 100KHz＋4 points 20KHz), 4 points (R/T/S) digital output (Model "T" 2 points 100KHz＋2 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, I/O is not expandable |
| | | FBs-14MC□◇Δ－◎－XY | 8 points 24VDC digital input (2 points 100KHz＋6 points 20KHz), 6 points (R/T/S) digital output (Model "T" 2 points 100KHz＋4 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, I/O is not expandable |
| | | FBs-20MC□◇Δ－◎－XY | 12 points 24VDC digital input (2 points 100KHz＋10 points 20KHz), 8 points (R/T/S) digital output (Model "T" 2 points 100KHz＋6 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC |
| | | FBs-24MC□◇Δ－◎－XY | 14 points 24VDC digital input (2ppoints 100KHz＋12 points 20KHz), 10 points (R/T/S) digital output (Model "T" 2 points 100KHz＋6 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, detachable terminal block |
| | | FBs-32MC□◇Δ－◎－XY | 20 points 24VDC digital input (2 points 100KHz＋14 points 20KHz), 12 Points (R/T/S) digital output (Model "T" 2 points 100KHz＋6 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, detachable terminal block |
| | | FBs-40MC□◇Δ－◎－XY | 24 points 24VDC digital input (2 points 100KHz＋14 points 20KHz), 16 points (R/T/S) digital output (Model "T" 2 points 100KHz＋6 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, detachable terminal block |
| | | FBs-60MC□◇Δ－◎－XY | 36 points 24VDC digital input (2 points 100KHz＋14 points 20KHz), 24 points (R/T/S) digital output (Model "T" 2 points 100KHz＋6 points 20KHz output), 1 RS232 or USB port (expandable up to 5), built-in RTC, detachable terminal block |
| **Basic Main Unit** | | FBs-10MA□◇Δ－◎ | 6 points 24VDC digital input (up to 10KHz in 4 points), 4 Points (R/T/S) digital output (Model "T" has 4 points 10KHz output), one RS232 or USB port (can be expanded up to 3), I/O is not expandable |
| | | FBs-14MA□◇Δ－◎ | 8 points 24VDC digital input (up to 10KHz in 4 points), 6 points (R/T/S) digital output (Model "T" has 4 points 10KHz output), one RS232 or USB port (can be expanded up to 3), I/O is not expandable |
| | | FBs-20MA□◇Δ－◎ | 12 points 24VDC digital input (up to 10KHz in 4 points), 8 points (R/T/S) digital output (Model "T" has 4 points 10KHz output), one RS232 or USB port (can be expanded up to 3) |
| | | FBs-24MA□◇Δ－◎ | 14 points 24VDC digital input (up to 10KHz in 4 points), 10 points (R/T/S) digital output (Model "T" has 4 points 10KHz output), one RS232 or USB port (can be expanded up to 3) |
| | | FBs-32MA□◇Δ－◎ | 20 points 24VDC digital input (up to 10KHz in 4 points), 12 points (R/T/S) digital output (Model "T" has 4 points 10KHz output), one RS232 or USB port (can be expanded up to 3) |
| | | FBs-40MA□◇Δ－◎ | 24 points 24VDC digital input (up to 10KHz in 4 points), 16 points (R/T/S) digital output (Model "T" has 4 points 10KHz output), one RS232 or USB port (can be expanded up to 3) |
| | | FBs-60MA□◇Δ－◎ | 36 points 24VDC digital input (up to 10KHz in 4 points), 24 points (R/T/S) digital output (Model "T" has 4 points 10KHz output), one RS232 or USB port (can be expanded up to 3) |
| **Expansion Power** | | FBs-EPOW-◎ | Power supply for expansion module, with single 5VDC and dual 24VDC voltage output and up to 20VA capacity |
| **Digital Expansion Unit** | | FBs-24EAP□◇－◎ | 14 points 24VDC digital input, 10 points (R/T/S) digital output, built-in power supply |
| | | FBs-40EAP□◇－◎ | 24 points 24VDC digital input, 16 points (R/T/S) digital output, built-in power supply |
| | | FBs-60EAP□◇－◎ | 36 points 24VDC digital input, 24 points (R/T/S) digital output, built-in power supply |
| **Digital I/O Module** | **Digital Expansion Unit** | FBs-8EA□◇ | 4 points 24VDC digital input, 4 points (R/T/S) digital output |
| | | FBs-8EX | 8 points 24VDC digital input |
| | | FBs-8EY□◇ | 8 points (R/T/S) digital output |
| | | FBs-16EA□◇ | 8 points 24VDC digital input, 8 points (R/T/S) digital output |
| | | FBs-16EY□◇ | 16 points (R/T/S) digital output |
| | | FBs-20EX | 20 points 24VDC digital input |
| | | FBs-24EA□◇ | 14 points 24VDC digital input, 10 points (R/T/S) digital input |
| | | FBs-40EA□◇ | 24 points 24VDC digital input, 16 points (R/T/S) digital output |
| | | FBs-60EA□◇ | 36 points 24VDCdigital input, 24 points (R/T/S) digital output |
| | **High-Density Digital Expansion Module** | FBs-24EX | 24 points high-density 24VDC digital input, 30-Pin Header with latch |
| | | FBs-24EYT | 24 points high-density transistor Sink type digital output (0.1A max.), 30-Pin Header with latch |

| Item Name | | Model Number | Specifications |
|---|---|---|---|
| Numeric I/O Module | Numeric I/O Expansion Module | FBs-7SG1 | 1 set (8 digits) 7 segment LED display (or 64 Points independent LED) output display module, 16-Pin Header connector |
| | | FBs-7SG2 | 2 set (16 digits) 7 segment LED display (or 128 Points independent LED) output display module, 16-Pin Header connector |
| | | FBs-32DGI | 8 set 4 digits (total 32 digits) Thumbwheel switch (or 128 Points independent switch) multiplex input module, 30-Pin Header connector |
| | Analog Expansion Module | FBs-6AD | 6 channel, 14 bits analog input module (-10V~0V~+10V or -20mA~0mA~+20mA) |
| | | FBs-2DA | 2 channel, 14 bits digital output module (-10V~0V~+10V or -20mA~0mA~+20mA) |
| | | FBs-4DA | 4 channel, 14 bits digital output module (-10V~0V~+10V or -20mA~0mA~+20mA) |
| | | FBs-4A2D | 4 channel, 14 bits analog input + 2 channel, 14 bits digital output combo analog module (-10V~0V~+10V or -20mA~0mA~+20mA) |
| | Temperature Input Module | FBs-TC2 | 2 channel thermocouple temperature input module with 0.1℃ resolution |
| | | FBs-TC6 | 6 channel thermocouple temperature input module with 0.1℃ resolution |
| | | FBs-RTD6 | 6 channel RTD temperature input module with 0.1℃ resolution |
| | | FBs-TC16 | 16 channel thermocouple temperature input module with 0.1℃ resolution |
| | | FBs-RTD16 | 16 channel RTD temperature input module with 0.1℃ resolution |
| Communication Expansion Module | | FBs-CM22 | 2 port RS232 (Port3+Port4) communication module |
| | | FBs-CM55 | 2 port RS485 (Port3+Port4) communication module |
| | | FBs-CM25 | 1 port RS232 (Port3)+1 port RS485 (Port4) communication module |
| | | FBs-CM25E | 1 port RS232 (Port3)+1 port RS485 (Port4)+Ethernet network interface communication module |
| | | FBs-CM55E | 1 port RS485 (Port3)+1 port RS485 (Port4)+Ethernet network interface communication interface |
| | | FBs-CM25C | General purpose RS232 ◄⟶► RS485 Converter with optical isolation |
| | | FBs-CM5R | General purpose RS485 Repeater with optical isolation |
| | | FBs-CM5H | General purpose 4-port RS485 HUB with optical isolation |
| Communication Expansion Board | | FBs-CB2 | 1 port RS232 (Port2) communication board |
| | | FBs-CB22 | 2 port RS232 (Port1+Port2) communication board |
| | | FBs-CB5 | 1 port RS485 (Port2) communication board |
| | | FBs-CB55 | 2 port RS485 (Port1+Port2) communication board |
| | | FBs-CB25 | 1 port RS232 (Port1)+1 port RS485 (Port2) communication board |
| | | FBs-CBE | 1 port Ethernet communication board |
| Communication Cable | | FBs-232P0-9F-150 | FBs-Main unit Port0 RS232 to 9Pin female D-Sub communication cable, 150cm long |
| | | FBs-232P0-9M-400 | FBs-Main unit Port0 RS232 to 9Pin male D-Sub communication cable, 400cm long |
| | | FBs-USBP0-180 | FBs-Main unit Port0 USB communication cable (standard USB A ◄⟶► B) |
| Memory Pack | | FBs-PACK | FBs-PLC Program memory pack with 20Kword program, 20Kword register, and write protection switch |
| Programming Device | | FP-07C | Hand held programmer for FBs-PLC |
| | | WinProladder | WinProladder Programming software for Windows |
| Others | | FATEK Comm. Server | FATEK DDE communication server |
| | | FBs-XTNR | Extension cable adapter |
| | | HD30-22AWG-200 | Include 22AWG I/O cable for 30Pin Header connector, 200cm long ( for FBs-24EX, -24EYT, and -32DGI) |
| 16/7 Segment LED Display Board | | DBAN.8(DBAN.8LEDR) | 0.8〞×4 16 segment display board (with red LED installed ) |
| | | DBAN2.3(DBAN2.3LEDR) | 2.3〞×4 16 segment display board (with red LED installed ) |
| | | DB.56 (DB.56LEDR) | 0.56〞×8 7 segment display board (with red LED installed) |
| | | DB.8 (DB.8LEDR) | 0.8〞×8 7 segment display board (with red LED installed) |
| | | DB2.3 (DB2.3LEDR) | 2.3〞×8 7 segment display board (with red LED installed) |
| | | DB4.0 (DB4.0LEDR) | 4.0〞×4 7 segment display board (with red LED installed) |
| Simple People Human Machi--ne Interface | | FB-DAP-B(R) | 16×2 LCD character display, 20key keyboard, 24VDC power supply, RS-485 communication interface (suffixed R means wireless read card module included) |
| | | FB-DAP-C(R) | 16×2 LCD character display, 20key keyboard, 5VDC power supply, RS232 communication interface (suffixed R means wireless read card module included) |
| RFID Card | | CARD-1 | Read-only wireless card (for FB-DAP-BR/CR) |
| | | CARD-2 | Read/Write wireless card(for FB-DAP-BR/CR) |
| Education and Training Kit | | FBs-TBOX | 46cm × 32cm × 16cm suitcase, containing FBs-24MCT main unit, FBs-CM25E communication module (RS232+RS485+Ethernet network), 14 simulated input switches, 10 external relay isolation output, Doctor terminal outlet I/O, peripherals such as stepping motor, encoder, 7 segment display, 10 of 10 $\phi$ LED indicator, thumbwheel switch, and 16key keyboard. |

1. □：Blank－relay output，T－transistor output，S－TRIAC output
2. ◇：Blank－Sink（NPN），J－Source（PNP）
3. △：Blank－built-in RS232 port，U－built-in USB port
4. ◎：Blank－100~240VAC power supply， D－24VDC power supply
5. Specifications are subject to changes without further notice.
6. XY：(optional),The expanding 120KHz inputs(X) and output(Y), there are 1~6 Points can be expanded for both X,Y.
   Example:FBs-24MCT-21,Its means expanding 2 points of 120KHz input(total 4 points) and 1 point of 120 KHz output(total 3 points). And FBs-24MCT-02 means only expanding 2 points of 120KHz output(total 4 points).

## 1.5 Specifications of Main Unit

"*" Default Settings

| Item | | | | | Specification | Note |
|---|---|---|---|---|---|---|
| Execution Speed | | | | | 0.33uS／per Sequence Command | |
| Space of Control Program | | | | | 20K Words | |
| Program Memory | | | | | FLASH ROM or SRAM＋Lithium battery for Back-up | |
| Sequence Command | | | | | 36 | |
| Application Command | | | | | 300 (113 types) | Include Derived Commands |
| Flow Chart (SFC) Command | | | | | 4 | |
| Single Point《BIT Status》 | X | Output Contact(DI) | | | X0～X255 (256) | Corresponding to External Digital Input Point |
| | Y | Output Relay(DO) | | | Y0～Y255 (256) | Corresponding to External Digital Output Point |
| | TR | Temporary Relay | | | TR0～TR39 (40) | |
| | M | Internal Relay | Non-retentive | | M0～M799 (800)* | Can be configured as retentive type |
| | | | | | M1400～M1911 (512) | |
| | | | Retentive | | M800～M1399 (600)* | Can be configured as non-retentive type |
| | | Special Relay | | | M1912～M2001 (90) | |
| | S | Step Relay | Non-retentive | | S0～S499 (500)* | S20~S499 can be configured as retentive type |
| | | | Retentive | | S500～S999 (500)* | Can be configured as non-retentive type |
| | T | Timer "Time Up" Status Contact | | | T0～T255 (256) | |
| | C | Counter "Count Up" Status Contact | | | C0～C255 (256) | |
| Register《WORD Data》 | TMR | Current Time Value Register | 0.01S Time base | | T0～T49 (50)* | T0 ~ T255 Numbers for each time base can be flexibly adjusted. |
| | | | 0.1S Time base | | T50～T199 (150)* | |
| | | | 1STime base | | T200～T255 (56)* | |
| | CTR | Current Counter Value Register | 16-Bit | Retentive | C0～C139 (140)* | Can be configured as non-retentive type |
| | | | | Non-retentive | C140～C199 (60)* | Can be configured as retentive type |
| | | | 32-Bit | Retentive | C200～C239 (40)* | Can be configured as non-retentive type |
| | | | | Non-retentive | C240～C255 (16)* | Can be configured as retentive type |
| | HR DR | Data Register | | Retentive | R0～R2999 (3000)* | Can be configured as non-retentive type |
| | | | | | D0～D3999 (4000) | |
| | | | | Non-retentive | R3000～R3839 (840)* | Can be configured as retentive type |
| | HR ROR | | | Retentive | R5000～R8071 (3072)* | When not configured as ROR, it can serve as normal register (for read/Write) |
| | | | | Read-only Register | R5000～R8071 can be configured as ROR, default setting is (0)* | ROR is stored in special ROR area and not consume program space |
| | | | | File Register | F0～F8191 (8192)* | Must save/retrieved via special commands |
| | IR | Input register | | | R3840～R3903 (64) | Corresponding to external numeric input |
| | OR | Output Register | | | R3904～R3967 (64) | Corresponding to external numeric output |
| | SR | Special System Register | | | R3968～R4167 (197) R4000～R4095 (96) | Except R4152～4154 |
| | 〈Special Register〉 | 0.1mSHigh Speed Timer register | | | R4152～R4154 (3) | |
| | | High Speed Counter Register | Hardware(4 sets) | | DR4096～DR4110 (4×4) | |
| | | | Software (4 sets) | | DR4112～DR4126 (4×4) | |
| | | Real Time Calendar Register | | | R4128 (sec) / R4128 (min) / R4130 (hour) / R4131 (day) | Not available in MA model |
| | | | | | R4132 (month) / R4133 (year) / R4134 (week) | |
| | XR | Index Register | | | V、Z (2), P0～P9 (10) | |
| Interrupt Control | | External Interrupt Control | | | 32 (16 point input positive/negative edges) | |
| | | Internal Interrupt Control | | | 8 (1, 2 3, 4, 5, 10, 50, 100mS) | |
| 0.1mS High Speed Timer (HST) | | | | | 1 (16bits), 4 (32bits, derived from HHSC) | |

| | | | | |
|---|---|---|---|---|
| High Speed Counter | Hardware High Speed Counter (HHSC) /32Points | Channels | Up to 4 | • Total number of HHSC and SHSC is 8.<br>• HHSC can change into High Speed Timer with 32 bits/0.1mS Time base. |
| | | Counting mode | 8 (U/D, U/D×2, K/R K/R×2, A/B, A/B×2, A/B×3 A/B×4) | |
| | | Counting frequency | Up to 100KHz (single-end input) or 920KHz (differential input) | |
| | Software High Speed Counter (SHSC) /32Points | Channels | Up to 4 | |
| | | Counting mode | 3 (U/D、K/R、A/B) | |
| | | Counting frequency | Maximum sum up to 10KHz | |
| Communication Interface | Port0 (RS232 or USB) | | Communication Speed 4.8Kbps～921.6Kbps (9.6Kbps)* | |
| | Port1～Port4 (RS232, RS485 or Ethernet) | | Communication Speed 4.8Kbps～921.6Kbps (9.6Kbps)* | Port1～4 talk FATEK or Modbus RTU Master/Slave Communication Protocol |
| | Maximum Connections | | 254 | |
| NC Positioning Output (PSO) | Number of Axes | | Up to 4 | |
| | Output Frequency | | 920KHz single output (single or A/B way)<br>920KHz(single way) and 460KHz(A/B way) differential output. | |
| | Output Pulse Mode | | 3 (U/D、K/R、A/B) | |
| | Positioning Language | | Special Positioning Programming Language | |
| HSPWM Output | Number of Points | | Up to 4 | |
| | Output Frequency | | 72Hz～18.432KHz (with 0.1% resolution)<br>720Hz～184.32KHz ( with 1% resolution) | |
| Captured input | Points | | Max.36 points (all of main units have the feature) | |
| | | | > 10 μS(super high speed/high speed input) | |
| | Captured pulse width | | > 47 μS(medium speed input) | |
| | | | > 470 μS(mid/low speed input) | |
| Setting of Digital Filter | X0～X15 | | Frequency 14KHz ~ 1.8MHz | Chosen by frequency at high frequencies |
| | | | Tine constant 0 ~ 1.5mS/0 ~ 15mS,adjustable by step of 0.1mS/1mS | Chosen by time constant at low frequencies |
| | X16～X35 | | Time constant 1mS~15mS,adjustable by step of 1mS | |

## 1.6 Environmental Specifications

| Item | | | Specification | Note |
|---|---|---|---|---|
| Operating Ambient Temperature | Enclosure equipment | Minimum | 5°C | Permanent Installation |
| | | Maximum | 40°C | |
| | Open equipment | Minimum | 5°C | |
| | | Maximum | 55°C | |
| Storage Temperature | | | -25°C～+70°C | |
| Relative Humidity (non-condensing, RH-2) | | | 5%～95% | |
| Pollution Level | | | Degree II | |
| Corrosion Resistance | | | By IEC-68 Standard | |
| Altitude | | | ≦2000m | |
| Vibration | Fixated by DIN RAIL | | 0.5G, for 2 hours each along the 3 axes | |
| | Secured by screws | | 2G, for 2 hours each along the 3 axes | |
| Shock | | | 10G, 3 times each along the 3 axes | |
| Noise Suppression | | | 1500Vp-p, width 1us | |
| Withstand Voltage | | | 1500VAC, 1 minute | L, N to any terminal |

**⚠ Warning**

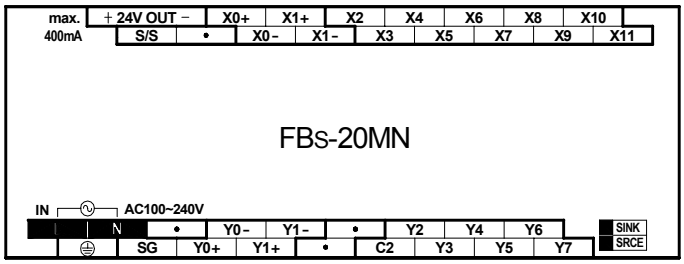
The listed environmental specifications are for FBs-PLC under normal operation. Any operation in environment not conform to above conditions should be consulted with FATEK.

## 1.7 Connection Diagrams of Various Models

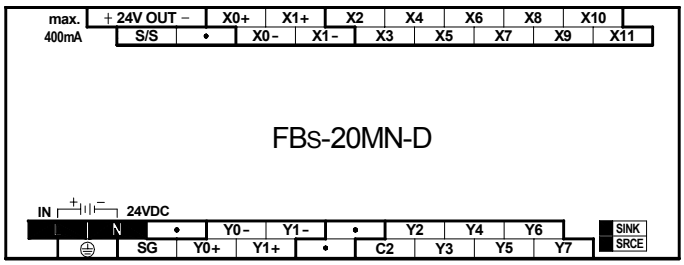
### 1.7.1 NC Control Main Unit [7.62mm Detachable Terminal Block]

- 20 point digital I/O main unit (12 points IN, 8 points OUT)

AC Power

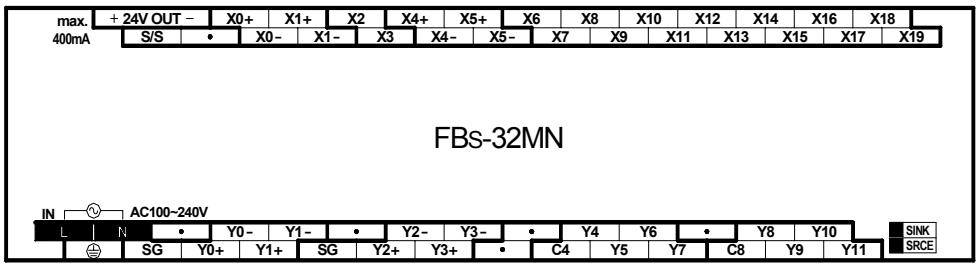



DC Power

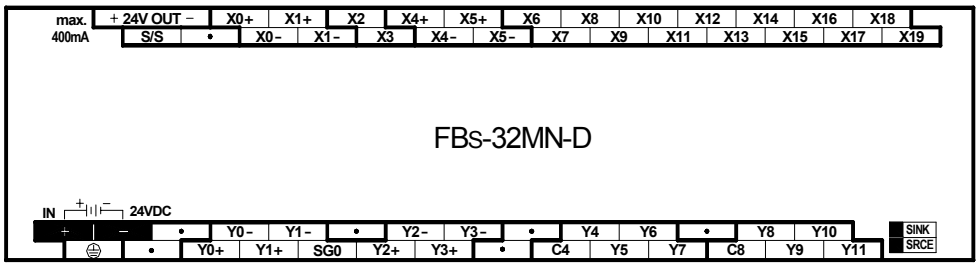



- 32 point digital I/O main unit (20 points IN, 12 points OUT)

AC Power

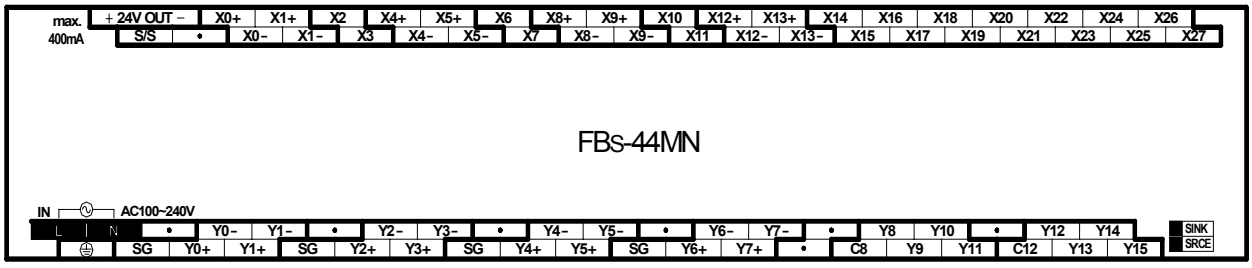



DC Power

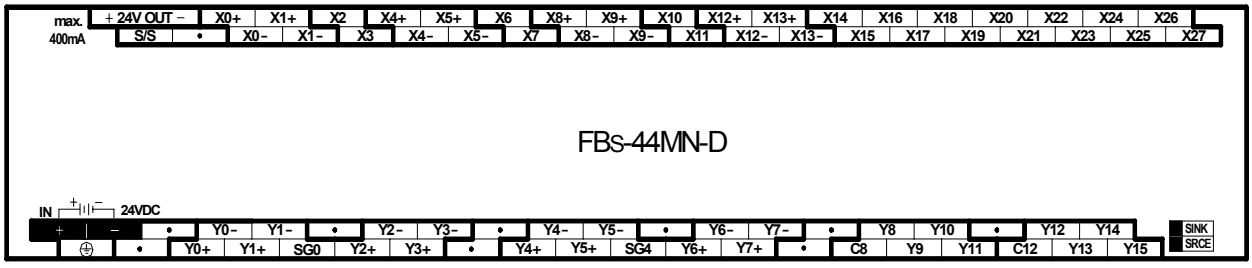



- 44 point digital I/O main unit (28 points IN, 16 points OUT)

AC Power




DC Power

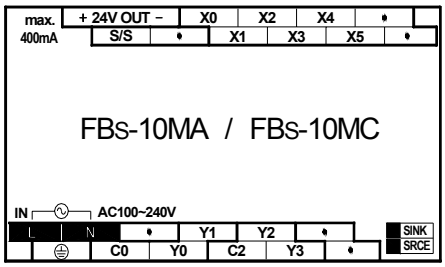


## 1.7.2 Basic/Advanced Main Unit

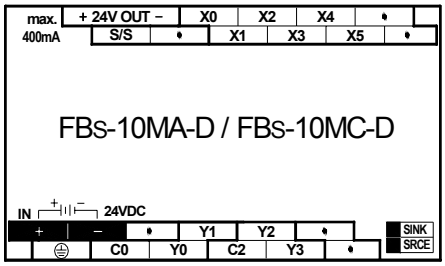
[7.62mm Terminal Block, fixed in model MA, detachable in models MC/MN]

- 10 point digital I/O main unit (6 points IN, 4 points OUT)

AC Power

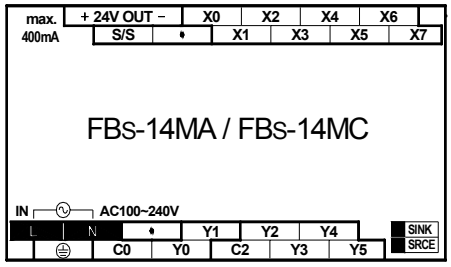



DC Power

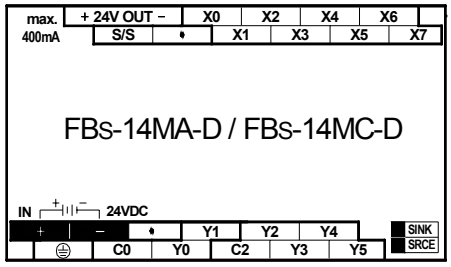



- 14 point digital I/O main unit (8 points IN, 6 points OUT)

AC Power

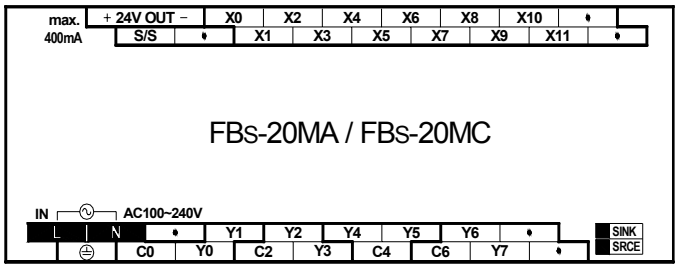



DC Power

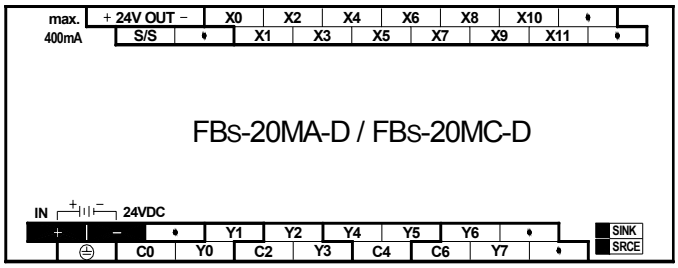



- 20 point digital I/O main unit (12 points IN, 8 points OUT)

AC Power

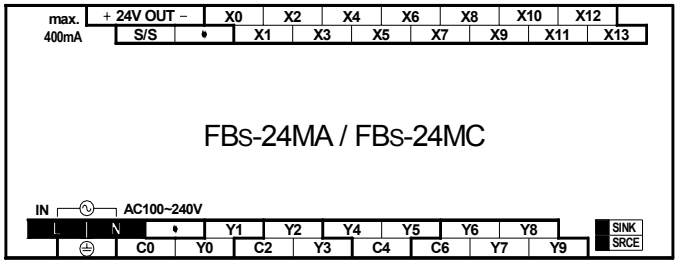



DC Power

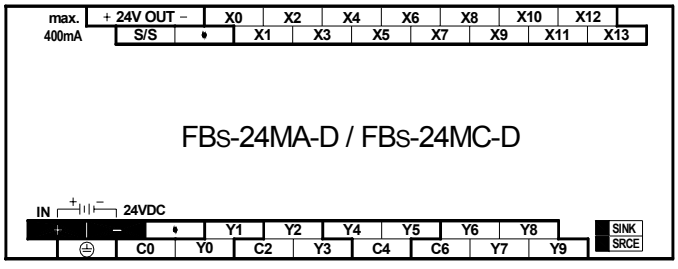



- 24 point digital I/O main unit (14 points IN, 10 points OUT)

AC Power

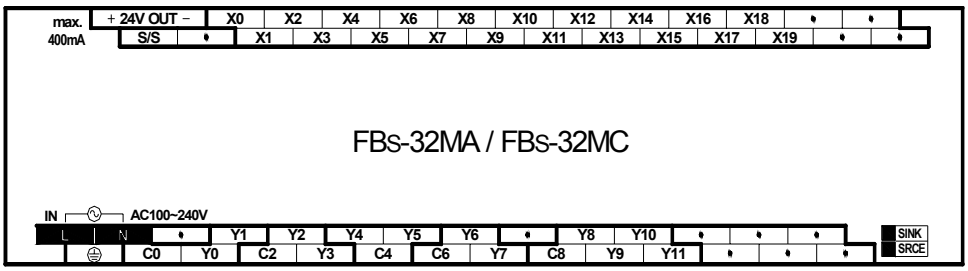



DC Power

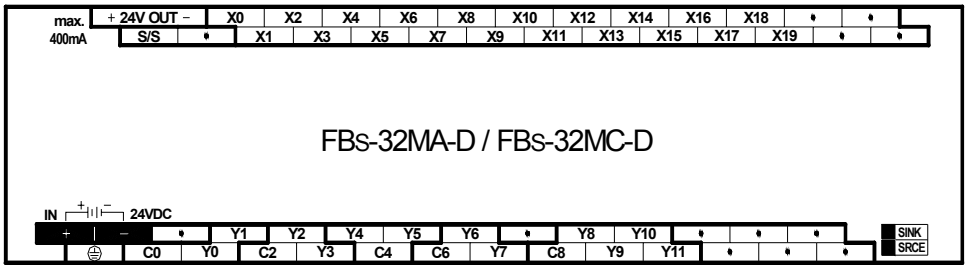


- 32 point digital I/O main unit (20 points IN, 12 points OUT)

AC Power

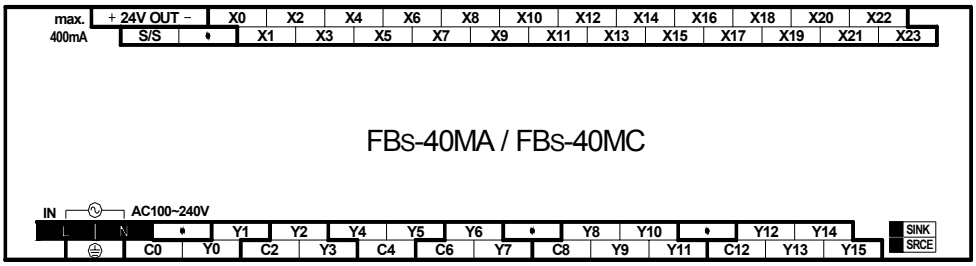



DC Power

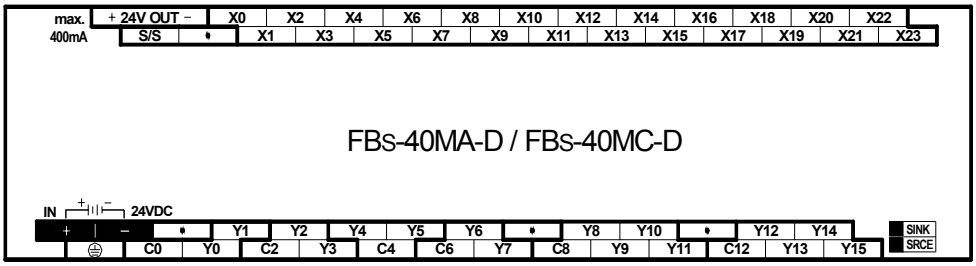



- 40 point digital I/O main unit (24 points IN, 16 points OUT)

AC Power

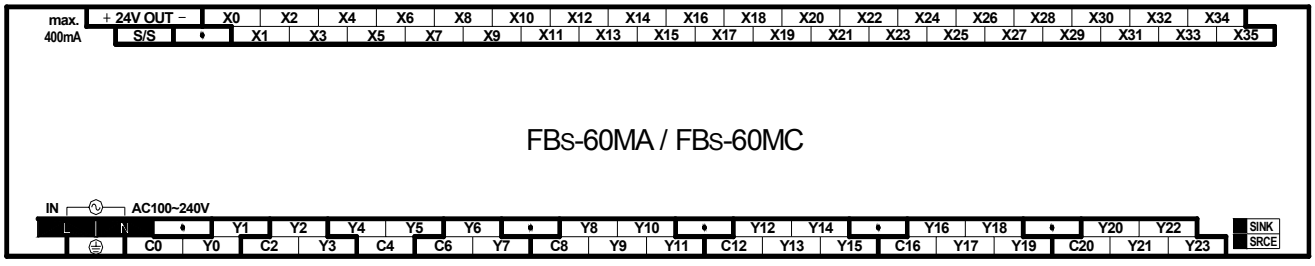



DC Power

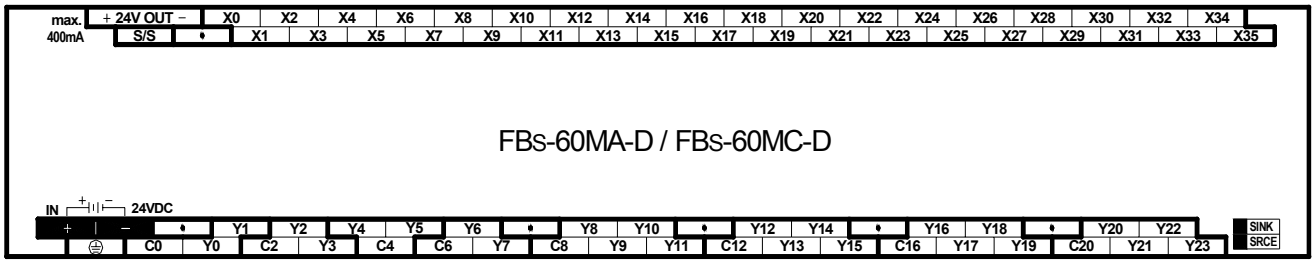



- 60 point digital I/O main unit (36 points IN, 24 points OUT)

AC Power



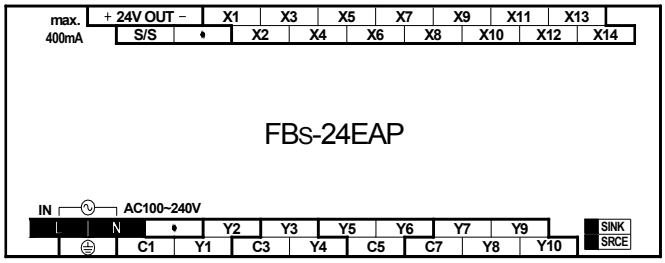

DC Power



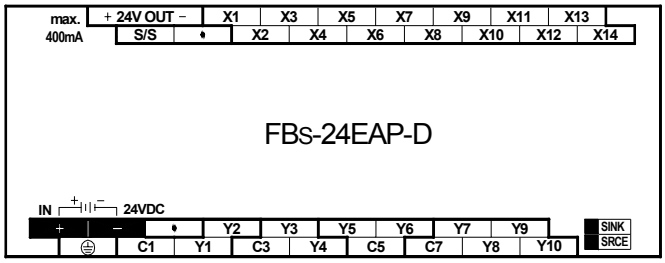
## 1.7.3 Digital I/O Expansion Unit [7.62mm fixed terminal block]

- 24 point I/O expansion unit (14 points IN, 10 points OUT)

AC Power

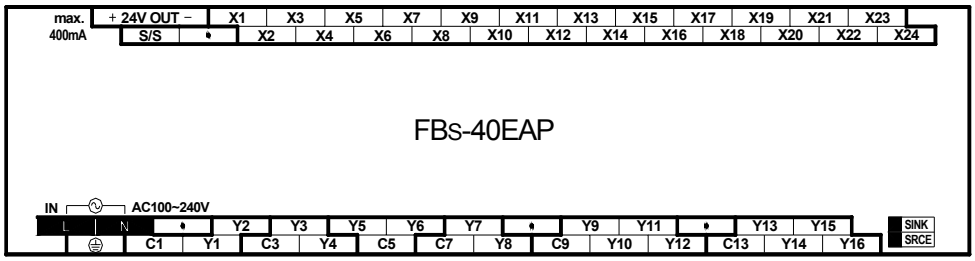



DC Power

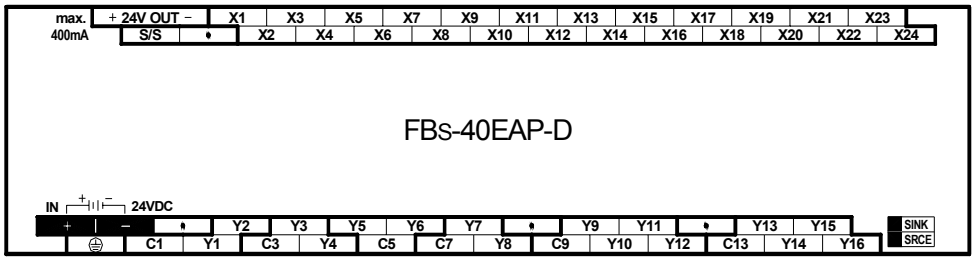



- 40 point I/O expansion unit (24 points IN, 16 points OUT)

AC Power

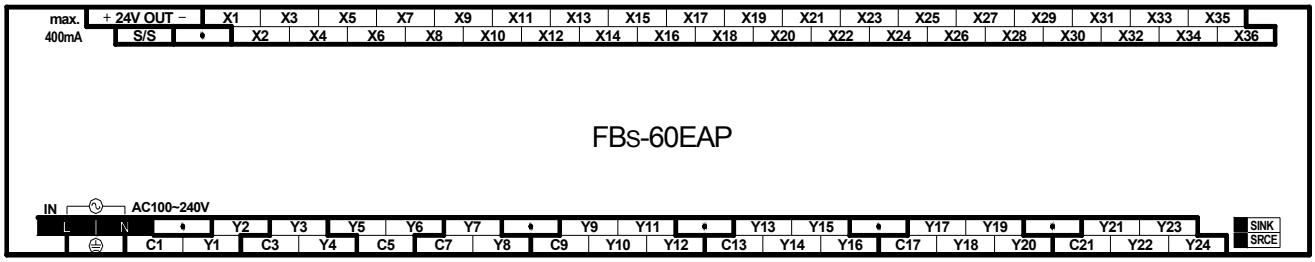



DC Power

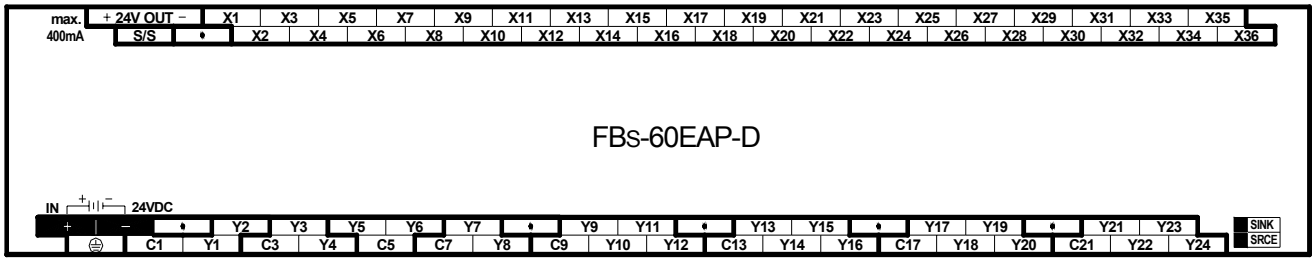



- 60 point I/O expansion unit (36 points IN, 24 points OUT)

AC Power

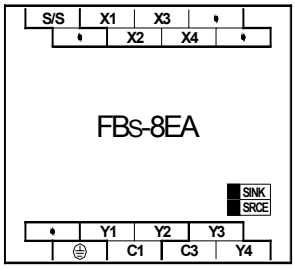



DC Power

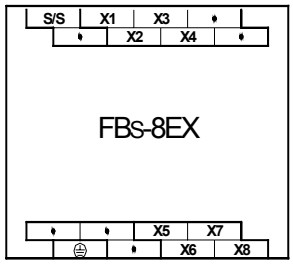


## 1.7.4 Digital I/O Expansion Module [7.62mm fixed terminal block]

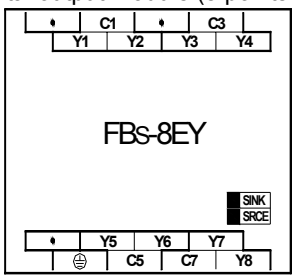
- 8 point digital I/O module (4 points IN, 4 points OUT)



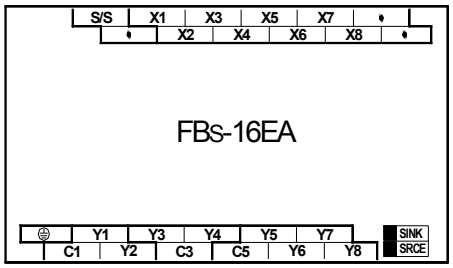

- 8 point digital input module (8 points IN )



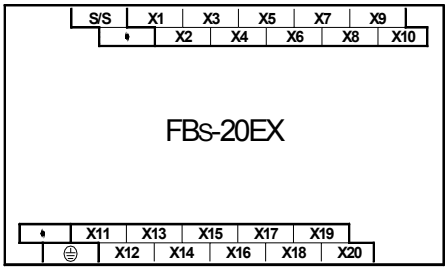

- 8 point digital output module (8 points OUT)



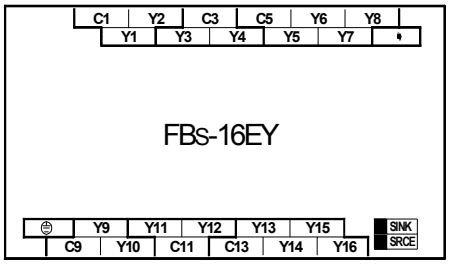

- 16 point digital I/O module (8 points IN, 8 points OUT)



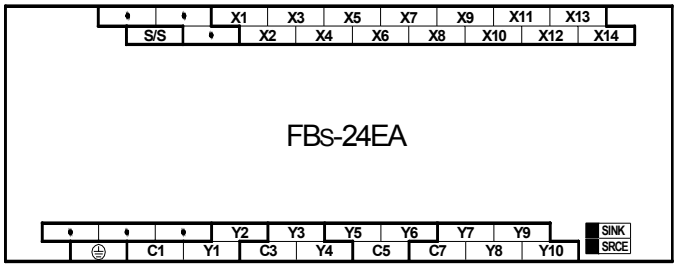

- 20 point digital input module (20 points IN)



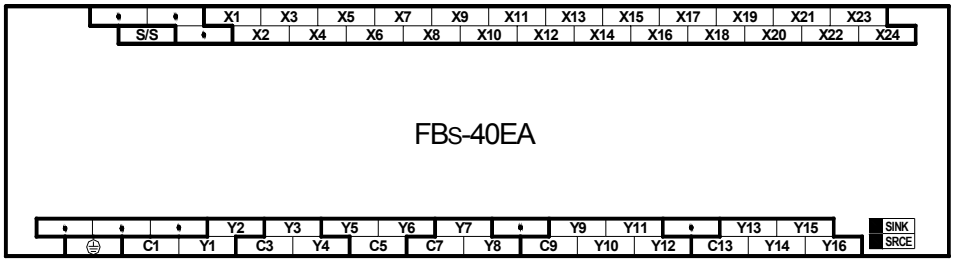

- 16 point digital output module (16 points OUT)



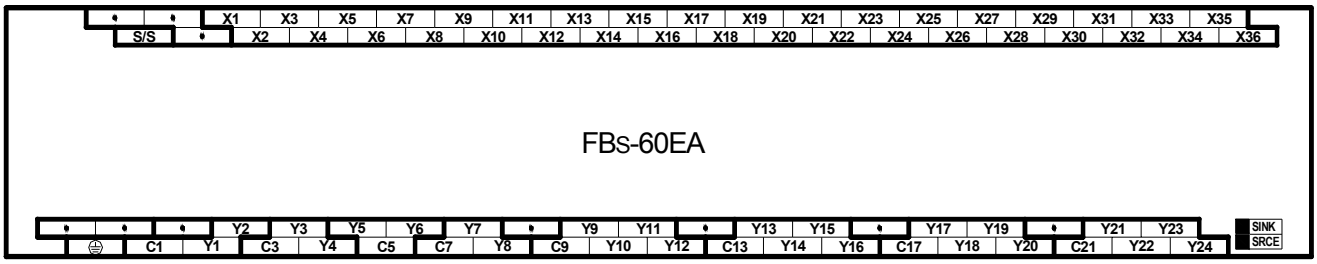

- 24 point digital I/O module (14 points IN, 10 points OUT)




- 40 point digital I/O module (24 points IN, 16 points OUT)



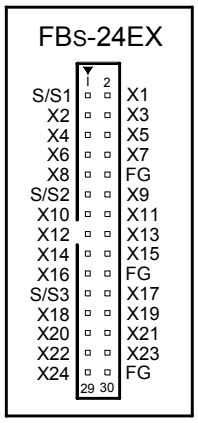

- 60 point digital I/O module (36 points IN, 24 points OUT)



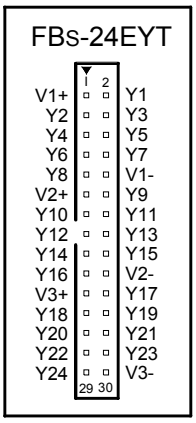
## 1.7.5 High-Density Digital I/O Expansion Module

[30Pin/2.54mm Header connector]

- 24 point high-density input module
  (24 points IN)



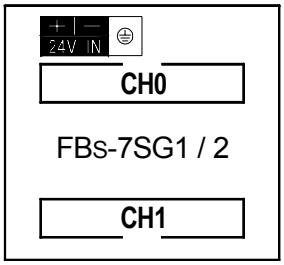

- 24 point high-density transistor output module
  (24 points OUT, SINK Type)



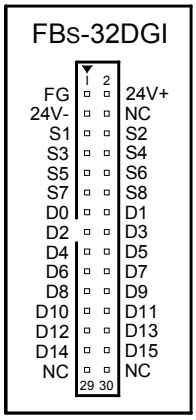

## 1.7.6 Numeric I/O Expansion Module

[2.54mm Header connector]

- 7 segment LED display module
  (8 digits/-7SG1, 16 digits/-7SG2)
  [16 pin/2.54mm Header connector]



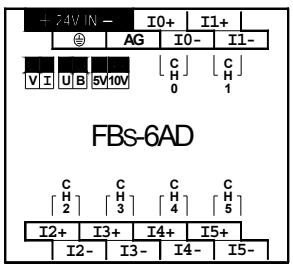

- Thumbwheel switch multiplex input module
  (4 digits×8)
  [30Pin/2.54mm Header connector]



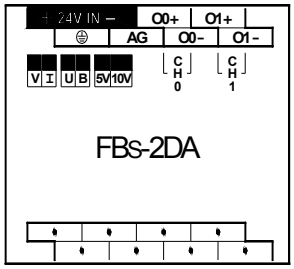

## 1.7.7 Analog I/O Expansion Module

[7.62mm fixed terminal block]

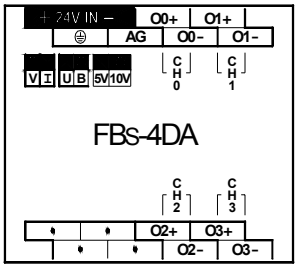
- 6 channel A/D analog input module



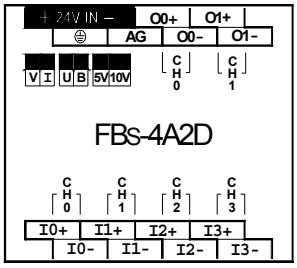

- 2 channel D/A output module



- 4 channel D/A output module



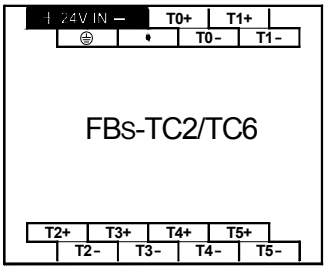

- 4 channel A/D input, 2 channel D/A output module



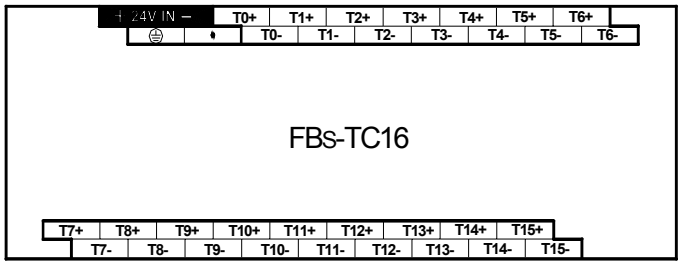

## 1.7.8 Temperature Input Module

[7.62mm fixed terminal block]

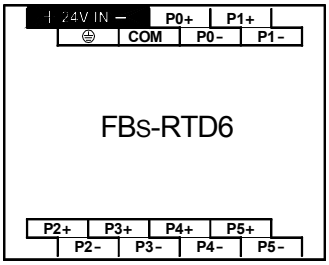
- 2/6 channel thermocouple input module



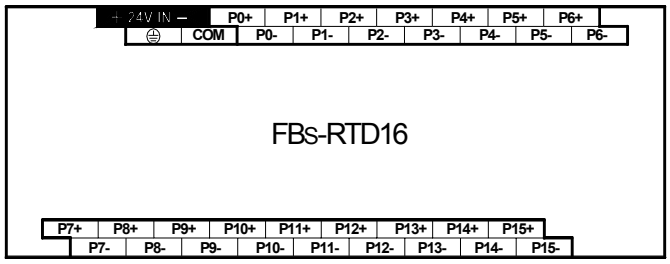

- 16 channel thermocouple input module




- 6 channel RTD input module



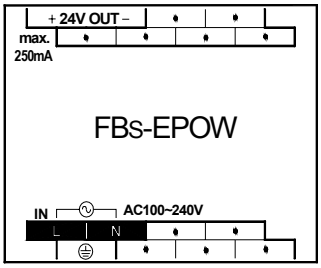

- 16 channel RTD input module



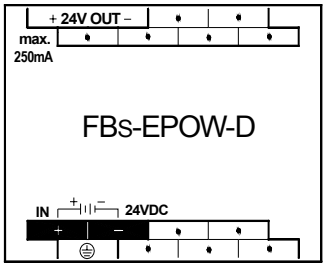

## 1.7.9 Expansion Power Module

[7.62mm fixed terminal block]

AC Power



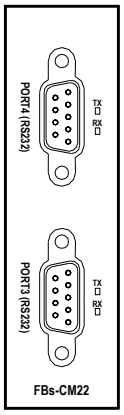

DC Power



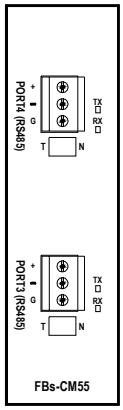
## 1.7.10 Communication Module (CM)

[DB-9F connector/3Pin or 4Pin Plug able terminal block]

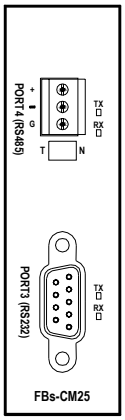
- 2 RS232 ports



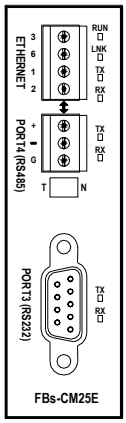

- 2 RS485 ports



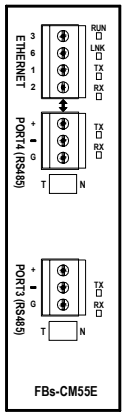

- 1 RS232＋1 RS485 ports



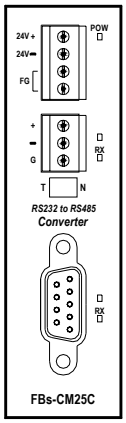

- 1 RS232＋1 RS485＋Ethernet



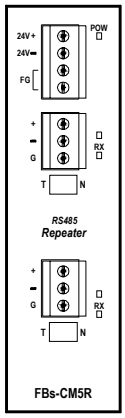

- 2 RS485 ports＋Ethernet



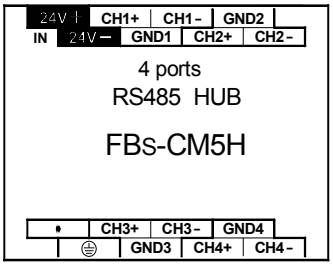

- RS232 ⟷ RS485 Converter




- RS485 Repeater



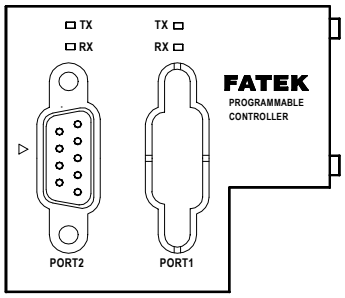

- 4 ports RS485 HUB
  (7.62mm fixed terminal block)



## 1.7.11 Communication Board (CB)

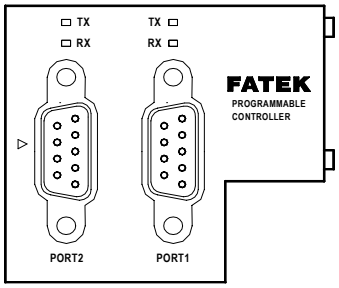
[DB9F/3Pin plug able terminal block](Below are outlooks of CB and the corresponding cover plates)

- 1 RS232 port



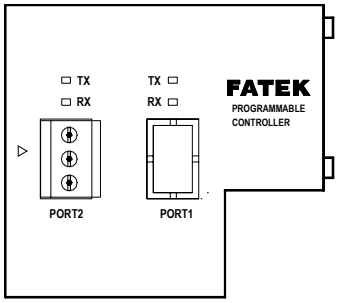

FBs-CB2

- 2 RS232 ports



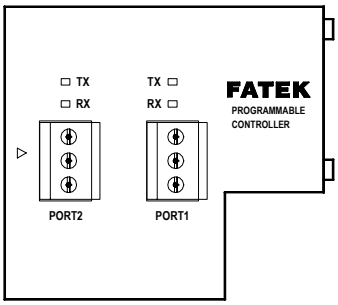

FBs-CB22

- 1 RS485 port



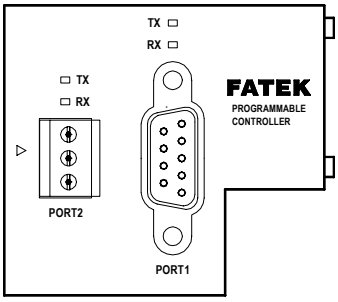

FBs-CB5

- 2 RS485 ports



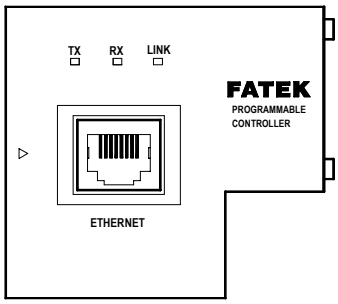

FBs-CB55

- 1 RS232＋1 RS485 ports




FBs-CB25

- 1 Ethernet port




FBs-CBE

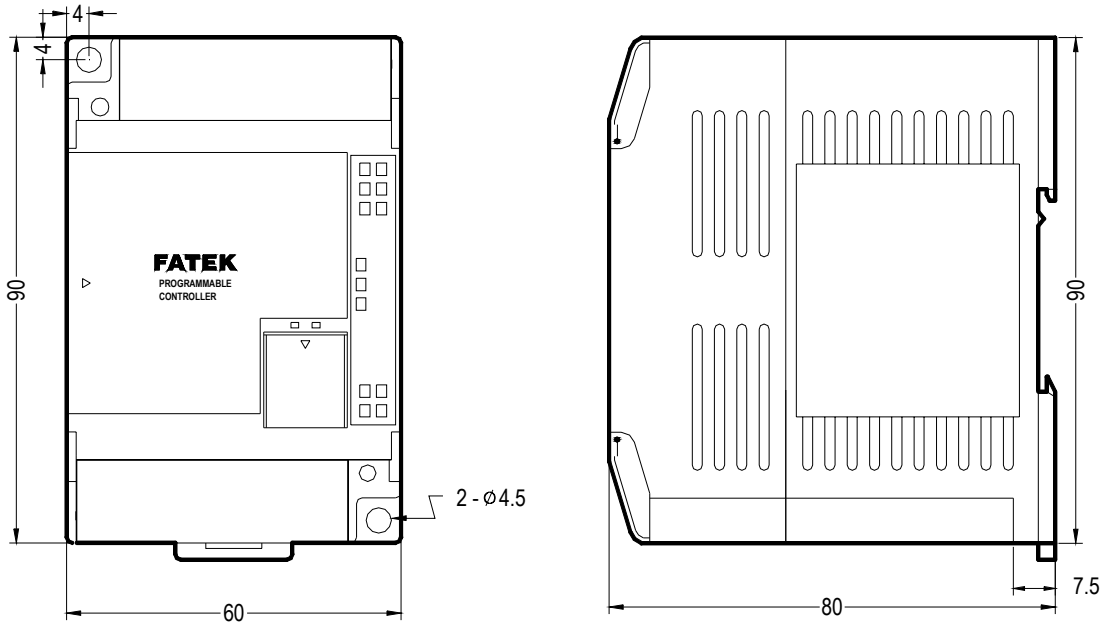
## 1.8 Drawings with External Dimensions

(1) Outlook I：

Main Unit：FBs-10M△, FBs-14M△

Expansion Module：FBs-16E△, FBs-20EX

＊ (Main Unit and Expansion Module have the same type of base, with different top cover, as shown in the figure)

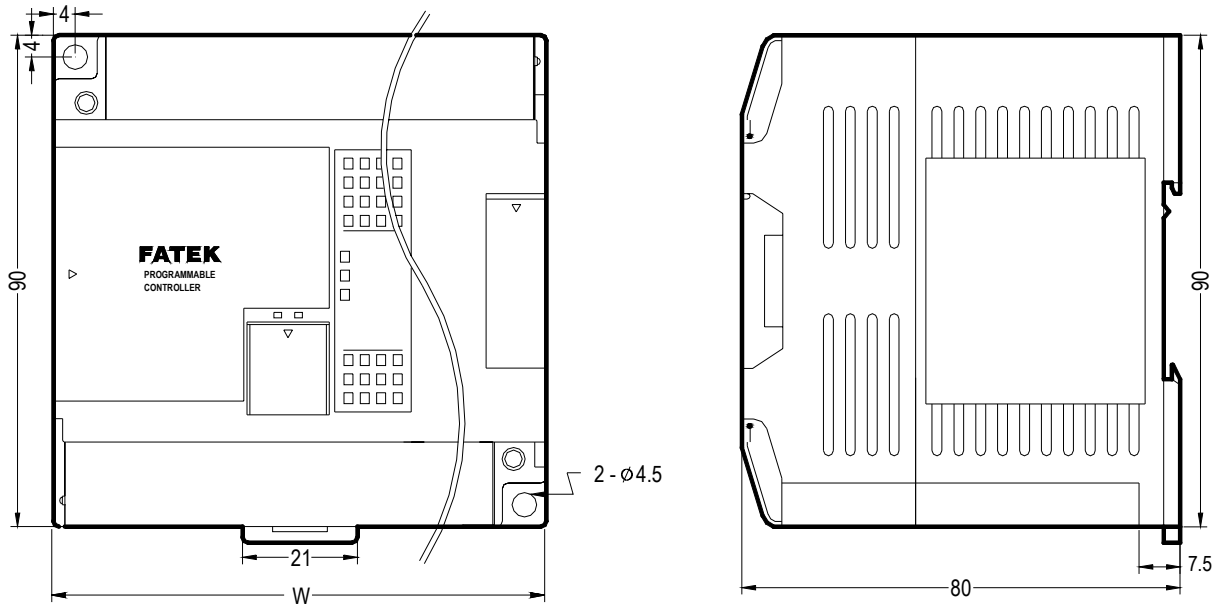



units：mm

(2) Outlook II：

Main Unit：FBs-20M△, FBs-24M△, FBs-32M△, FBs-40M△, FBs-60M△

Expansion Module：FBs-24EA(P), FBs-40EA(P), FBs-60EA(P), FBs-TC16, FBs-RTD16




units：mm

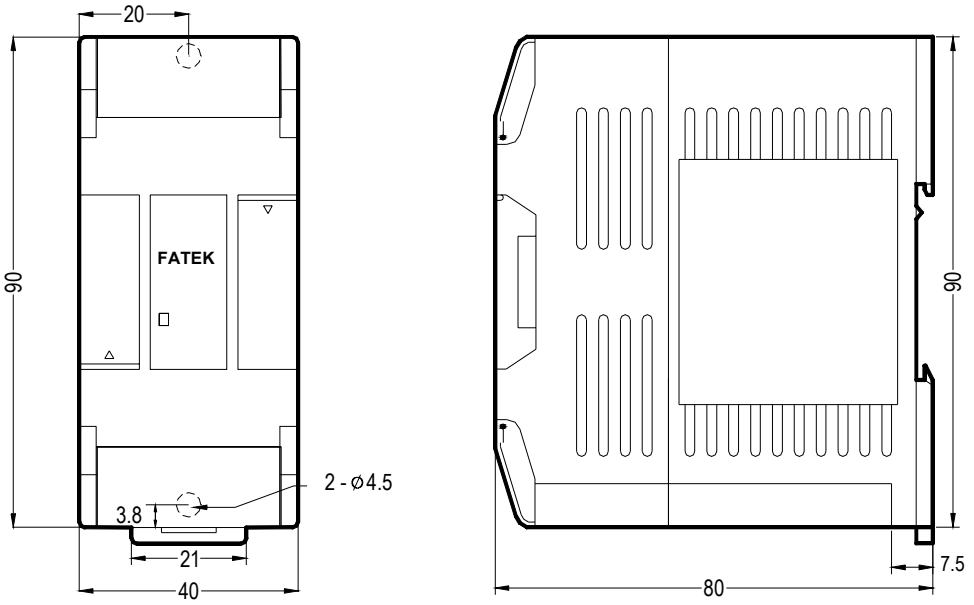
| W | Model |
|---|---|
| 90mm | FBs-20M△, FBs-24M△, FBs-24EA(P), FBs-TC16, FBs-RTD16 |
| 130mm | FBs-32M△, FBs-40M△, FBs-40EA(P) |
| 175mm | FBs-60M△, FBs-60EA(P) |

(3) Outlook III：

Expansion Module：① FBs-8E△, FBs-7SG△, FBs-6AD, FBs-2DA, FBs-4DA, FBs-4A2D, FBs-TC2, FBs-TC6, FBs-RTD6, FBs-CM5H

② FBs-24EX, FBs-24EYT, FBs-32DGI

＊(Modules ① and ② have the same type of base, with different top cover. Top cover of Module ① is shown in the following figure)

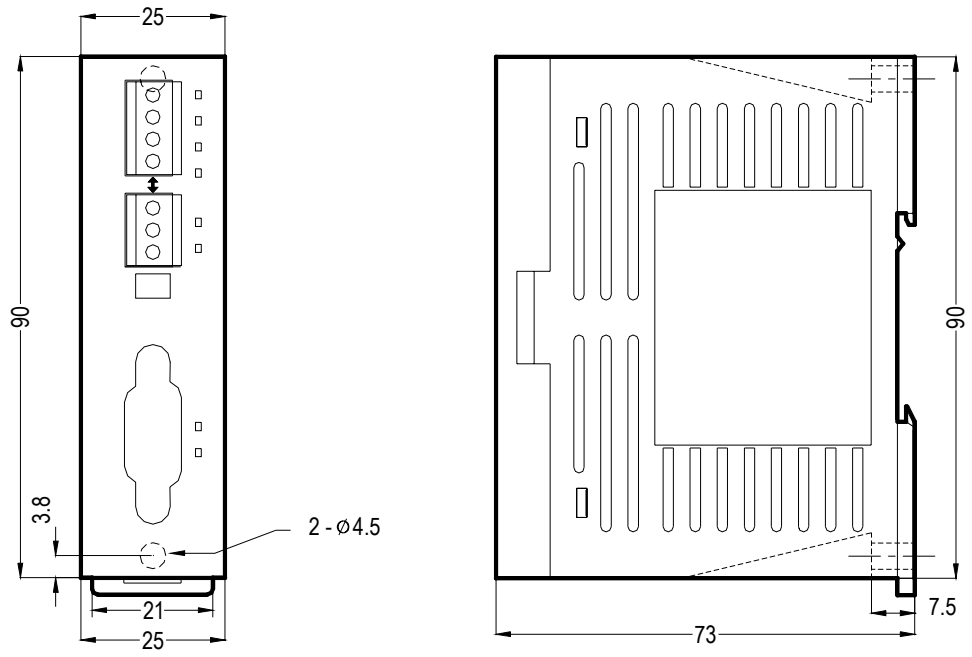



units：mm

(4) Outlook IV:

Communication Module：FBs-CM22, FBs-CM55, FBs-CM25, FBs-CM25E, FBs-CM55E, FBs-CM25C, FBs-CM5R

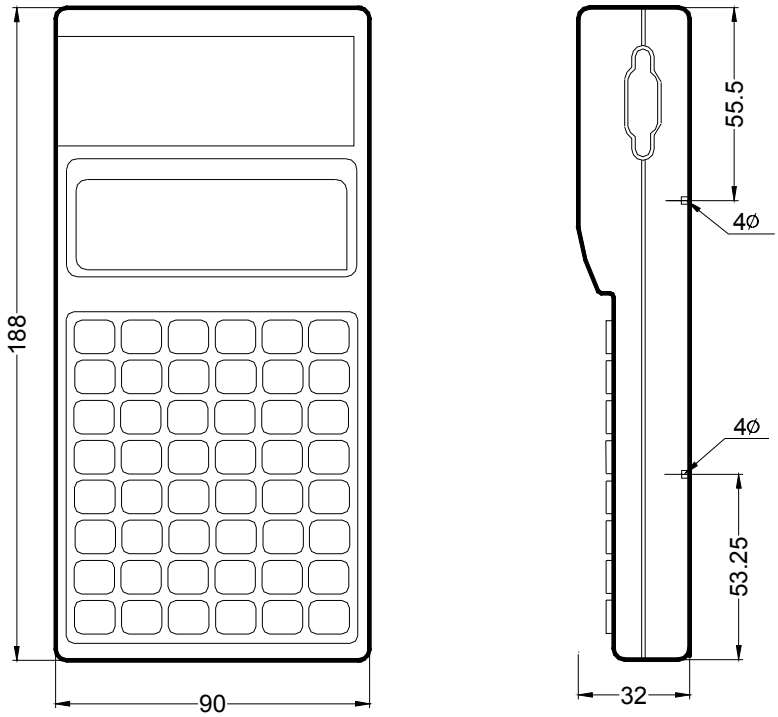
＊ (All modules have the same type of base, with different top cover. Top cover of Module -CM25E is shown in the figure)



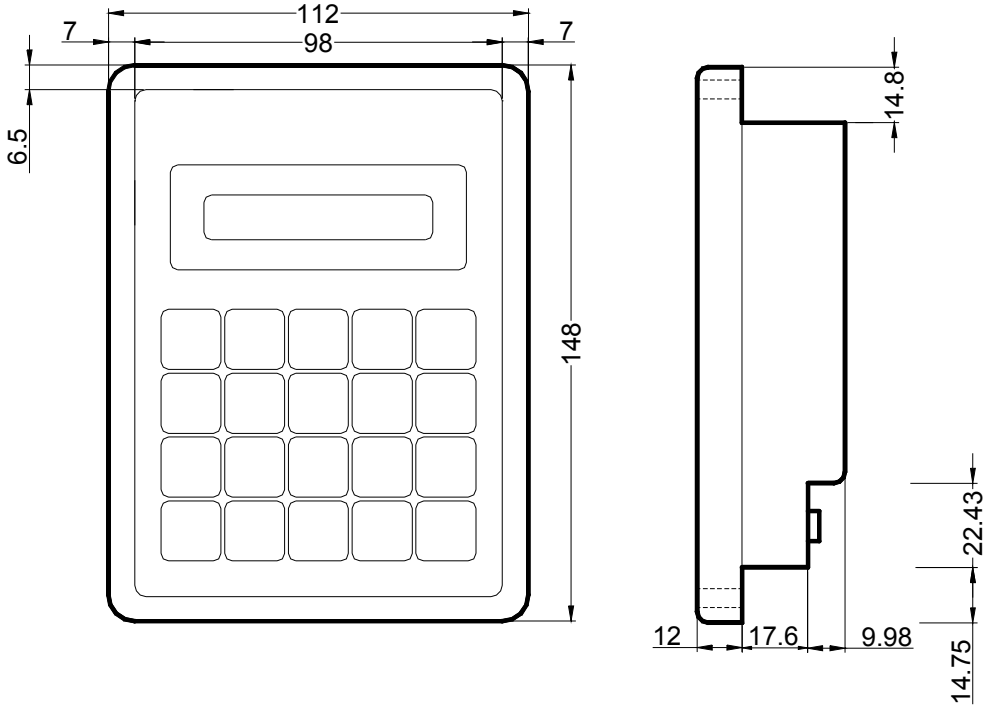

units：mm

(5) Outlook V：

Programming Panel：FP-07C




units：mm

(6) Outlook VI：

Data Access Panel：FB-DAP