

# FATEK®

## FBS-series Programmable Controller

### User's Manual - II

### **[ Advanced Application ]**

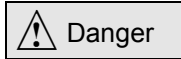
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## Attention related to safety (Read carefully before application)

⊙ For the purpose of ensuring your personal safety and protecting this product and its peripheral equipment, read this manual regarding the safety functions carefully before installation and operation of the FBs PLC. The three safety categories of this manual are classified into 「Danger」, 「Warning」, 「Caution」 grade according to the danger level and are preceded by the “⚠” symbol. Following is their description:



Indicates casualty or serious damage or property loss will result if the correct instruction was not followed.



Casualty or serious damage or property loss may result if the correct instruction was not followed.



Indicates minor damage or property loss will result if the correct instruction was not followed.

⊙ This manual is a guideline for qualified personnel on how to install the FBs PLC correctly and use it safely. The qualified personnel stated here means professional electromechanical engineering personnel who is familiar with safety specifications and methods of grounding, circuit wiring, peripheral equipment system etc. and possesses practical experience.

### Danger

⊙ Keep in mind before using the PLC

Abnormality in the external power supply or failure of the PLC itself will result in the PLC or the complete system emerging in an unsafe status, and may cause unpredictable actions. Such actions may cause human injury, death, or serious damage of the unit itself. Thus, please design a separate external safety protection circuit, such as emergency stop circuit, machine replacement device, or redundant safety protection circuit in your application with the following safety considerations:

1. Emergency stop circuit, safety protection circuit, motor positive/reverse interlock circuit, upper/lower limit destruction prevention circuit of position control, etc. These circuits should be hardwired and external to the PLC.
2. The PLC is unable to detect the abnormality of the input signal circuit (such as overload or interrupted PLC input circuit. The PLC interprets them as OFF, then erroneous output may result in the PLC and may cause major safety problems, thus external detection and protection circuits should be provided in addition to the PLC.
3. The output components of the PLC, whether relay, transistor, or TRIAC are possible to cause permanent ON or OFF and resulting in serious accidents, thus protection by additional external circuits or mechanisms is necessary for the output points to avoid major safety problems.

# PREFACE

It has been more than ten years since FATEK Automation Corporation first introduced its FB series PLC in 1993. Since then, to maintain a leading edge in functionality of the FB-PLC, there have been two major revamps in redesigning the ASIC(Application specific IC), while keeping the function and dimension downward compatible. Though the revenue of our FB-PLC is still keep growing and remains superior in quality, functionality and competitiveness to our rivals, shrinking the dimension of the FB-PLC is still a common request when compared with other brands of PLC. In light of the need to design a compact yet highly functional micro PLC, the FBs series was launched by FATEK as a all-new series of micro PLC designed and developed to better serve the market demand for the next decade.

To maintain a competitive edge in the next decade, the design of the function specifications of FBs-PLC have greatly exceeded a lot of micro PLC presently sold in the market. For instance, it comes with many advanced hardware functions, including five communication ports with the speed up to 921.6 Kpbs, four sets of hardware high-speed counters with counting frequency up to 920 KHz, four sets of high-speed pulse outputs with linear interpolation function and output frequency can up to 920 KHz, four sets high-speed PWM(Pulse width modulation) output with 184.32KHz max. output frequency, and five sets of 0.1ms time-base high-speed counters. In the meantime, to strengthen cost competitiveness, the FATEK have developed a SoC(System on a chip) for FBs-PLC that integrates all peripherals and CPU into a single chip. This cuts down the physical bulk and reduces costs, as well as improves its reliability, allowing the compact FBs-PLC to provide the functions incomparable by medium- to large-size PLC, and excels the user of FBs-PLC to outrun its peers.

The FBs-PLC's instruction set not only contains additional newly high-end functional instructions, but it is also fully compatible with the previous FB series PLC. When compared with the earlier generation of FB series PLC, the new FBs-PLC not only possess greatly improved communication functions, totaling 14 communication boards and communication modules for user's option, but there is also an added USB interface in addition to the existing RS-232, RS-485 and Ethernet. In I/O module, besides the previous FB-PLC's modules, there has been an added 16-segment (alphanumeric) display module, thumbwheel switch multiplex input module, A/D and D/A combo modules and so forth. The temperature module has been revamped to a general structure, with a built-in CPU, allowing it to connect various temperature sensor such as J, K, R, S, E, T, B, and N thermocouples or pt-100, pt-1000's RTD.

The FBs-PLC's user manual comes in two volumes. Volume I covers the basic topics regarding the hardware and Instruction Set, while Volume II covers the advanced topics about the special modules and their application. The 'Hardware' part of Volume I present an introduction to the FBs-PLC's hardware framework, covering the mechanism, installation, power, I/O and safety compliance description. The 'Instruction Set' part of Volume I describes the FBs-PLC's instruction category and their functionality. The Volume II focuses on advanced applications, such as communication, networking, interrupt, high-speed counting, NC positioning output, temperature PID, multiplex input/output and so forth, together with simplified illustrations and application descriptions.

# FBs-PLC User's Manual II 【Advanced Application】

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