

MODEL **S8T-DCBU-02**
BUFFER BLOCK

EN INSTRUCTION MANUAL

Thank you for purchasing this S8T-DCBU-02. This INSTRUCTION MANUAL describes the information such as function, performance, and how to use the product required for using the S8T-DCBU-02.

- Please operate the S8T-DCBU-02 by the qualified specialist having the electrical know how.
- Read this instruction manual with enough, and use the product with enough understanding.
- Keep this instruction manual close at hand and use it for reference during operation.

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CAUTION

• CAUTION : FOR USE IN A CONTROLLED ENVIRONMENT. REFER TO MANUAL FOR ENVIRONMENTAL CONDITIONS.
• ATTENTION : POUR UTILISATION EN ATMOSPHÈRE CONTRÔLÉE. CONSULTER LA NOTICE TECHNIQUE.

Key to Warning Symbols

CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Warning Symbols

- [Installation and Environment]
- Minor fires may occasionally occur or wires may become detached causing the backup operation to fail if screws are not tightened properly. Torque ratings for field wiring terminals, 9.6 to 10 in-lb (1.08 to 1.13 N·m) single wire only, 9.6 in-lb (1.08 N·m) for two wires. Tighten terminal screws to the specified torque so that they do not become loose.
 - Minor electric shock may occasionally occur. Warning: Not to leave an open bus connector installed in the end module.
 - Minor electric shock may occasionally occur and the backup operation will fail if the connector becomes disconnected. Be sure to lock the slider and track stopper securely when connecting the Basic Block and the S8T-DCBU-02 to prevent the connector from being disconnected due to vibration.
 - Internal parts may occasionally deteriorate or be damaged and the backup operation may not be sufficient. Do not use the S8T-DCBU-02 for applications that subject the load to frequent inrush currents or overload currents.
 - The S8T-DCBU-02 may occasionally be damaged. Do not allow any clippings or cuttings to enter the S8T-DCBU-02 during mounting.
- [Operation]
- Minor burns may occasionally occur. Do not touch the terminals or bus connectors of the S8T-DCBU-02 or primary power supplies unless the S8T-DCBU-02 is fully discharged.
 - Minor electric shock may occasionally occur. Do not add or remove the S8T-DCBU-02 while power is being supplied.
- [Maintenance]
- Minor electric shock may occasionally occur. Do not disassemble the S8T-DCBU-02 or touch the interior of the S8T-DCBU-02.
 - Working voltage can be 220V max. inside. This voltage can be also available 30s after the switch off.

Precautions for Safe Use

- Setting and Selecting Power Supply to be Connected
 - Do not connect a power supply other than the ones specified below.
 - Specified Power Supply: S8TS Series, S8VS Series, S8ZK Series. (Only single SELV Power Supply) S8J Series, S8PS Series.
 - Only power supplies with an output voltage of 24V and an output capacity of 25W minimum, 600W maximum can be connected.
- When selecting the power supply to be connected, take both the operation current and power of S8T-DCBU-02 into consideration, allowing sufficient margin.
 - The load shall not exceed the lowest temperature ratings of both the connected power supply minus the rated charging current of the S8T-DCBU-02.
- Do not connect both the S8T-DCBU-02 and the S8T-DCBU-01 to the same power supply and loads.
- Mounting/Storage Environment
 - Store the S8T-DCBU-02 at an ambient temperature of -25 to +65°C, and a relative humidity of 25% to 90%.
 - For UL508 Listing, Surrounding Air Temperature 25°C
 - Use the S8T-DCBU-02 at a relative humidity of 25% to 85%.
 - Do not use the S8T-DCBU-02 where it would be subjected to direct sunlight.
 - Do not use the S8T-DCBU-02 where it would be subjected to penetration of liquid, foreign substance, or corrosive gas.
 - Do not install the S8T-DCBU-02 in places subjected to shock or vibration. A device such as a conductor contact breaker may be a vibration source. Install the S8T-DCBU-02 as far as possible from possible sources of shock or vibration. Additionally, install a PFP-M End Plate on each end of the Product.
 - If the S8T-DCBU-02 is used in an area with excessive high-frequency noise, be sure to separate the S8T-DCBU-02 as far as possible from the noise sources.
- Installation/Wiring
 - Minor electric shock or malfunction may possibly occur. Connect the ground wire completely.
 - Minor fires may possibly occur. Check the terminals to be sure they are wired correctly.
 - Close the terminal cover to help prevent short-circuiting terminals with foreign objects.
 - Use the wiring material specified in the following table to protect wires from smoking and burning due to load abnormalities. Also, the backup operation may not be sufficient due to voltage drop if thin wiring materials are used.

Precautions for Safe Use

I/O Terminals: Connect maximum two wires, AWG14 to 20, same size and type only to each field wiring terminal.

Load current	Number of connected S8T-DCBU-02	Recommended wire diameter
Up to 2.5A	1	AWG14 to 20 (Cross-sectional area: 0.517 to 2.081 mm ²)
Up to 5.0A	2	AWG14 to 18 (Cross-sectional area: 0.823 to 2.081 mm ²)
Up to 7.5A	3	AWG14 to 16 (Cross-sectional area: 1.309 to 2.081 mm ²)
Up to 10A	4	AWG14 (Cross-sectional area: 2.081 mm ²)

Signal output terminals:
Solid wire AWG16 to 26 (Cross-sectional area: 0.129 to 1.309 mm²)
Stranded wire AWG16 to 24 (Cross-sectional area: 0.205 to 1.309 mm²)
(Wires to be stripped : 11 mm)

- Do not apply a force greater than 100 N to the terminal block when tightening the terminals.
- Be sure to remove the sheets covering the S8T-DCBU-02 before turning ON the power supply and confirm that nothing is interfering with heat dissipation.
- Setting/Mounting
 - The internal parts may occasionally deteriorate or be broken due to adverse heat radiation. Operate the S8T-DCBU-02 only under the specified conditions.
 - Ensure sufficient heat dissipation when installing the Product to increase its long-term reliability.
 - Install the Product so that a natural airflow occurs around it.
- Precautions in Using
 - After connecting the devices to the S8T-DCBU-02, check whether sufficient backup is performed correctly by operating the S8T-DCBU-02.
 - Check the load current using the actual system in advance to confirm that there is sufficient leeway in the backup time.
 - Check to confirm that the READY indicator and the output function correctly. The backup operation may not be sufficient if the READY indicator and output do not function correctly.
 - The S8T-DCBU-02 will perform the backup operation not only for instantaneous power interruptions or voltage drops, but also when the power supply is OFF. The backup time is particularly long for light loads. Check the devices connected to the S8T-DCBU-02 to be sure it has stopped operation correctly.
 - Periodic Inspection and Periodic Replacement
The S8T-DCBU-02 contains built-in electrolytic capacitors, which has a limited life. Perform periodic inspection and replacement. The performance of the electrolytic capacitor will deteriorate as the total operating time increases, eventually leading to insufficient performance. Refer to the following guidelines for periodic replacement.

Ambient temperature	Guideline of replacement	
	With Spacer (Fig.5)	Connected to S8TS (Fig.6)
Up to 30°C	15 years	15 years
40°C	12 years	8.5 years
50°C	6 years	5.5 years (See note.)
60°C	3 years	—

- Note: The load ratio of the S8TS is limited to 60%.
- Handling the Bus Line Connector
 - Do not drop the Bus Line Connector or subject it to strong shock.
 - Do not connect and disconnect the Bus Line Connector more than 20 times. Also, do not touch the terminals on the Bus Line Connector. Connection failure may cause deterioration of electric performance.
 - The temperature shall not exceed the lowest temperature ratings of both the connected power supply and the S8T-DCBU-02.
 - See product catalogue for details.

Suitability for Use

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product. NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also Product catalog for Warranty and Limitation of Liability.

Conformance to EU Directives

Refer to the catalogue and this instruction manual for details on the operating condition for EMC-compliance.

Fig.1 Nomenclature and dimensions

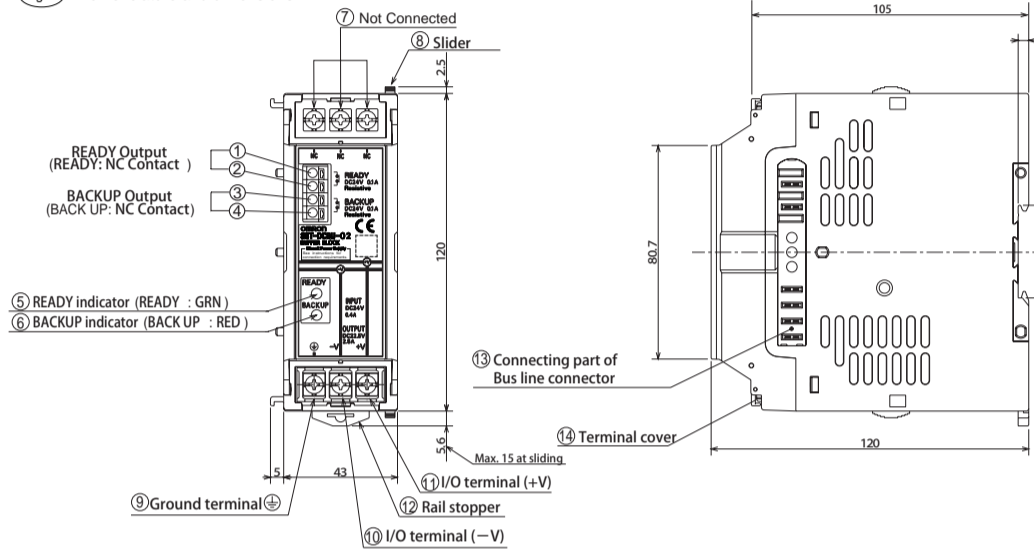
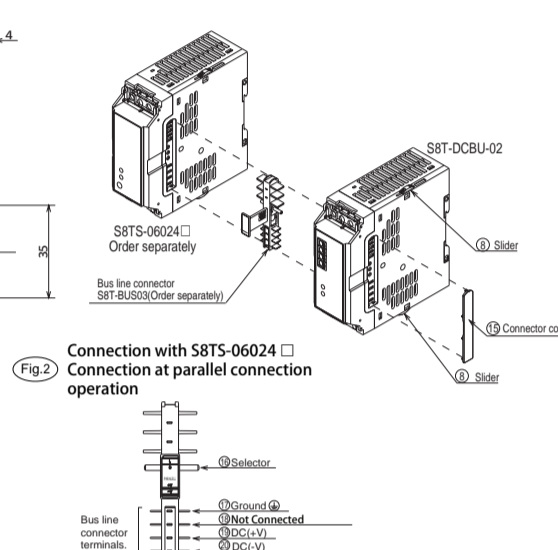


Fig.2 Connection with S8TS-06024 □ Connection at parallel connection operation



Safety Standards

- The DC Bus line connector terminals (⑨, ⑩), I/O terminal (⑪, ⑫) are not insulated.
- Overvoltage category II.
- This equipment is for protection class III.
- Climatic class: 3K3
According to EN62477-1.
- Warning not to leave an open bus connector installed in the end module.

According to UL508

- To comply with UL508 (Class2; per UL1310), Meet all of following conditions.
- Class 2 output rating - 24 VDC, 2.5 A
 - Connection to a single S8TS-06024 □
 - Connection of single S8T-DCBU-02

Precautions for Correct Use

■ Power Supply to be Connected
The power consumption of the S8T-DCBU-02 is approximately 10W, so make sure that the output capacity of the power supply is sufficient.
If the S8T-DCBU-02 is connected to a previously installed power supply, the voltage may drop due to the power supply overcurrent protection, or backup operations may not be possible.
Note:
Connect a power supply within the specified derating range, considering the power consumption of the S8T-DCBU-02.

■ Mounting
• Mounting Direction
Standard mounting (Fig.3) Yes
Horizontal mounting (Fig.4) No
Other mounting No

• Mounting Space
* 1 Direction of air circulation
* 2 75 mm min
* 3 75 mm min
* 4 20 mm min

• Connecting to the S8TS-06024 □ (Fig.7, Fig.8, Fig.9)
When connecting one or more S8T-DCBU-02 Blocks to the S8TS-06024 □ using Bus Line Connectors, connect them to either the left or right end of the Blocks. Heat dissipation will be interfered with if the S8T-DCBU-02 Blocks are not connected to the end.

■ Wiring Method (Fig.10, Fig.11, Fig.12, Fig.13)
Note:
Use the largest wire size possible and keep the wiring distance as short as possible. If the voltage drop caused by the wiring material is too large, the backup operation may not be sufficient.

■ Input Voltage
24VDC to 28VDC
Note:
The input voltage to the S8T-DCBU-02 should not be reduced to 23VDC or below by adjustment or overloading the power supply because this would cause current to be sourced from both the power supply and the backup unit at the same time and the signal output relays will switch rapidly.

■ Output Voltage
The output voltage for the backup operation is automatically adjusted internally by detecting the input voltage. The backup operation is started when the input voltage drops 2V.
Note:
The output voltage during the backup operation is a maximum of 2V lower than the voltage input at an input voltage of 24V.

■ Backup Time
* 1 typ value (Vin: 24VDC)
* 2 Guaranteed Value (Vin: 24VDC)
* 3 typ value (Vin: 28VDC)
* 4 typ value for 2 products connected in parallel (Vin: 24VDC)
Notes:
1. The backup time may be reduced if a fixed power load (such as a DC-DC converter) is connected.
2. If the input voltage increases, the output voltage for the backup operation will also increase, reducing the backup time due to the higher power consumption of the load.

■ Serial Connection
Two Blocks cannot be connected in series to increase the output voltage to 48V or to create positive and negative outputs.

■ Parallel Operation Connection
The output current and backup time for the backup operation can be increased by connecting Blocks in parallel.
Standard number of Blocks for parallel operation: 2
Maximum number of Blocks for parallel operation: 4
• Output Ratings
1 unit : 22.5V 2.5A
2 units in parallel : 22.5V 5.0A
3 units in parallel : 22.5V 7.5A
4 units in parallel : 22.5V 10A

The backup time will be greatly reduced if three or more Blocks are connected in parallel and the output current for the backup operation exceeds 5A. Refer to the graphs in the catalog for details on the backup time during parallel operation.
Note:
Although the number of Blocks that can be connected when using the S8TS-06024 □ is five when calculated from the current capacity of the Bus Line Connector, only a maximum of four S8T-DCBU-02 can actually be connected in parallel.

■ Using the Bus Line Connector
• S8T-BUS03
When connecting to the S8TS-06024 □, always use the S8T-BUS03 Bus Line Connector. This Connector connects only the DC lines. It does not connect AC lines.
S8T-BUS03 is equipped with a selector for the prevention of erroneous connection of a different output voltage specification of the power supply unit. Slide the selector in the 24V position.
• Disconnection of Bus line connector (Fig.16)
Insert a flat tip screwdriver at each end of the Bus line connector alternately to remove.

■ Relation between the Momentary Power Failure Time and the Backup Time
The relation between the momentary power failure time and the backup time required to compensate the failure is differed as shown in the following figure. Construct the system so as to secure the following backup time for setting the product.
(Fig.17)

■ Checking Operation • Periodic Inspection Method
After connecting the Blocks, check the Buffer Block using the following procedure to confirm that it operates correctly for momentary power failures on the AC input. Use this procedure for maintenance as well.

(1) Turn ON the AC power supply that has been connected.
(2) Check the Ready indicator on the S8T-DCBU-02 to confirm that it is lit.
• LED (5) READY: green ON
• Relay (READY ① - ②): open
(Up to 60 seconds is required to charge the internal capacitor before the indicator lights.)
(3) Use a timer and create a momentary power failure on the AC input of the expected length of time.
Considering variations in characteristics, using 140% or more of the power failure time is recommended. (Fig.18)
(4) Check to confirm that the expected backup operation was performed. The operation of the BACKUP indicator and BACKUP output should be as shown below during the backup operation. Check these as well.
• LED (6) BACKUP: red ON
• Relay (BACKUP ③ - ④): closed

Note:
Check the backup operation under conditions that are safe and will cause no problems if the backup operation fails.

■ Dielectric Strength Test
Both the ground terminal (9) and I/O terminals (11, 12) are designed so as to be endurable for 1000VAC for 1 minute. When testing, set the cutoff current for the withstand voltage test device to 20mA.
Notes:
1. Increase / decrease test voltage gradually. Sudden switching of 1000VAC may cause a voltage surge, damaging the power supply.
2. Be sure that all terminals are short-circuited for protecting I/O terminals and signal output terminal from breakage.

■ Insulation Resistance Test
When testing the insulation resistance of the power supply, use a DC ohmmeter at 500VDC.
Note:
Be sure that all terminals are short-circuited for protecting I/O terminals and signal output terminal from breakage.

■ Reverse Connection Protection
The S8T-DCBU-02 will be protected even if the positive and negative I/O terminals are connected in reverse.

■ Overload protection
The load and the power supply are automatically protected from overcurrent damage by this function. Overload protection is activated at an overcurrent detection point of 5.8 to 6.8A.
When the output current returns within the rated range, overload protection is automatically cleared.
Note:
Continuation of operation in the overcurrent status may cause deterioration or breakage of internal elements.

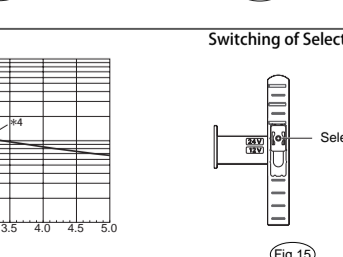
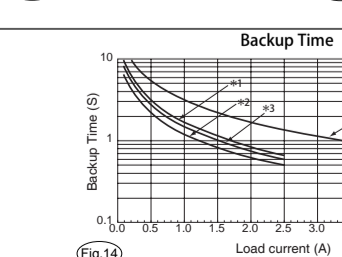
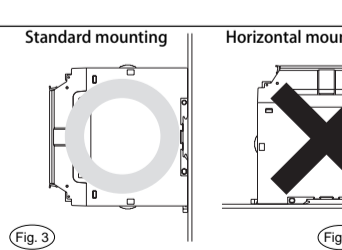
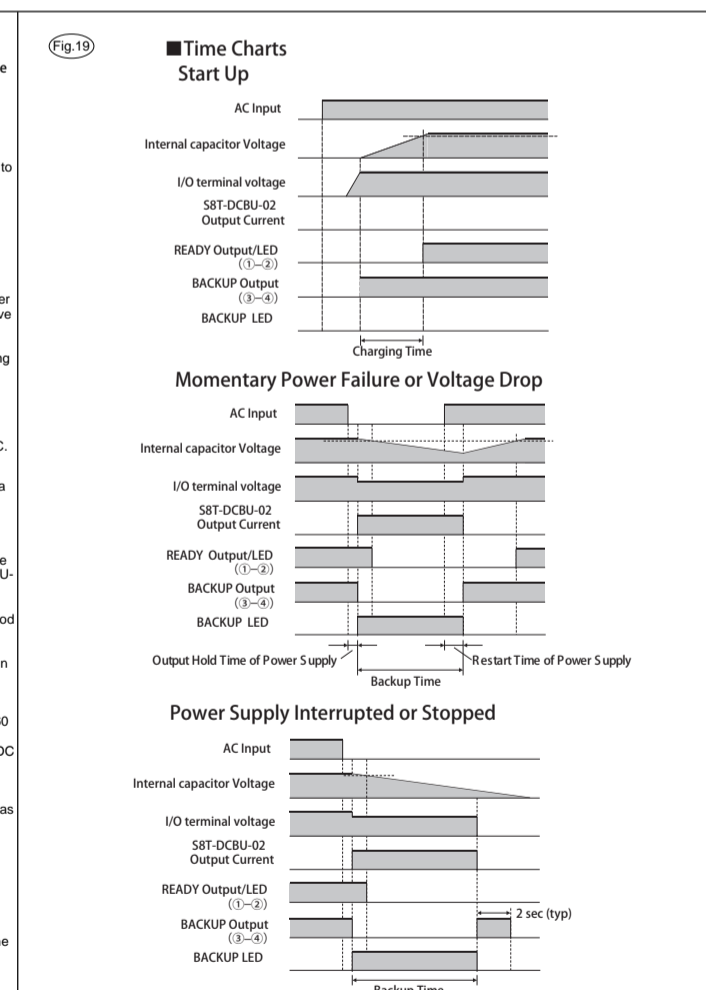
■ Overvoltage Protection
If a voltage that is higher than the specified input voltage is input or the output voltage exceeds the specified voltage, the overvoltage protection circuit will operate at between 31 and 36V to shut OFF the output voltage of the S8T-DCBU-02 and protect the load from damage due to overvoltages.
To restore operation, turn OFF the input power supply for 1 minute or longer and then turn it back ON.

Notes:
1. Remove the cause of the overvoltage before turn the input power supply back ON.
2. The backup operation will not be performed when the overvoltage circuit operates to shut OFF the output.

■ Backup Operation (Indication+Output)
The S8T-DCBU-02 will switch to the backup operation if a voltage drop is detected on the connected power supply.
• LED (6) BACKUP: red ON
• Relay (BACKUP ③ - ④): Closed

When the backup operation functions, the energy in the internal capacitor will be discharged to the load. When the voltage of the power supply then recovers, the S8T-DCBU-02 will start charging the capacitor. Up to 60 seconds is required to charge the capacitor completely. The backup operation may therefore not function for the required period if the backup operation starts while the capacitor is being charged.
The following are examples in which the backup operation may not be sufficient.
(1) The backup operation starts within 60 seconds after turning ON the power supply.
(2) The backup operation is started consecutively within 60 seconds of the previous backup operation.
(3) A rapid change in the load or other factor causes the DC voltage to drop, resulting in the backup operation, and then the backup operation occurs again within 60 seconds.
The READY indicator and READY output will function as shown below when the internal capacitor is being charged.
• LED (5) READY: green OFF
• Relay (READY ① - ②): Closed

Notes:
1. The contact capacity of the output relay is 0.1A at 24VDC.
2. The backup operation may be repeatedly performed if the connected power supply is overloaded. Remove the cause of the overload immediately.
3. The backup operation does not detect drops in the AC input.



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