

# OMRON

# 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 elelctrical know how.
  Read this instruction manual with enough, and use the product with
  enough understandaing.
  Keep this instruction manual close at hand and use it for reference
- during operation.

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READY Output (READY: NC Contact )

BACKUP Output (BACK UP: NC Contact)

(5) READY indicator (READY : GRN) (6) BACKUP indicator (BACK UP : RED)

9Ground terminal $\oplus$ 

1174817-6D

} ‱w C€

8 Slider

7 Not Connected

**⚠** CAUTION

# Minor electric shock may occasionally occur. Do not disas 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 CAUTION : FOR USE IN A CONTROLLED ENVIRONMENT.REFER TO MANUAL FOR ENVIRONMENTAL CONDITIONS. ATTENTION : POUR UTILISATION EN ATMOSPHÈRE CONTRÔLÉE. CONSULTER LA NOTICE TECHNIQUE. (Fig. 1) Nomenclature and dimensions

Key to Warning Symbols

Warning Symbols

Indicates a potentially hazardous situation which, if not avoided.

0

A

A

 $\bigcirc$ 

 $\bigcirc$ 

◬

A

1

◬

may result in minor or moderate injury or in property damage

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 ont become loose

Minor electric shock may occasionally occur. Warning: Not to leave an open bus connector installed in the end module.

operation will fail if the connector becomes disconnected. Be sure lock the slider and track stopper securely when connecting the Bas 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.

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.

Minor electric shock may occasionally occur and the backup operation will fail if the connector becomes disconnected. Be

### 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, S82K Series.
   (Only single SELV Power Supply) S82J 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 sufficien 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. or 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
- Installation/Wiring
- Minor electric shock or malfunction may possibly occur. Connnect the

- Minor electric shock or malfunction may possibly occur. Connnect 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.

# 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. 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. Guideline of replacement

Precautions for Safe Use

Signal output terminals: Solid wire AMG16 to 26 (Cross-sectional area: 0.129 to 1.309 mm²) Stranded wire AMG16 to 24 (Cross-sectional area: 0.205 to 1.309 mm<sup>2</sup>)

Do not apply a force greater than 100 N to the terminal block when tightening the terminals.

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 in its long-term reliability.

Instail the Product so that a natural airriow 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.

Install the Product so that a natural airflow occurs around it.

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

S8T-DCBU-02

(wires to be stripped: 11 mm)

Up to 7.5A

Up to 10A

Setting/Mounting

als: Connect maximum two wires, AWG14 to 20, same size and type only to each field wiring terminal

Recommended wire diameter

WG14 to 20 (Cross-sectional area: 0.517 to 2.081 mm

AWG14 to 18 (Cross-sectional area: 0.823 to 2.081 mm AWG14 to 16 (Cross-sectional area: 1.309 to 2.081 mm AWG14 (Cross-sectional area: 2.081 mm²)

With Spacer (Fig.5) Connected to S8TS (Fig.6) Up to 30°C 15 years 15 years 40°C 12 years 8.5 years 6 years 5.5 years (See note.) 60°C 3 years

ratio of the S8TS is lir

- 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 temper the connected power supply and the S8T-DCBU-02.

Suitability for Use

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

regulations that apply to the combination of the products in the customer's

Take all necessary steps to determine the suitability of the product for the stems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product

(9) See product catalogue for details.

# (8) Slide Θ 15 Connector cove Connection with S8TS-06024 (13) Connecting part of (Fig.2) Connection at parallel connection Bus line connector 14 Terminal cover

### Safety Standards

- ls ( ⑩ , ⑳ ), I/O terminal ( ⑩ . ⑪ ) are not

- insulated.

  2. Overvoltage category II.

  3. This equipment is for protection class III.

  4. Climatic class: 3K3

  According to EN62477-1.

  5. Warning not to leave an open bus connector installed in the end module.

  Prenez soin de ne pas laisser un connecteur de bus ouvert installé dans le module d'extrémité.

### 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

S8T-DCBU-02

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

Conformance to EU Directives

### **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 capasity 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

connect a power supply within the specified derating range onsidering the power consumption of the S8T-DCBU-02.

No

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

Mounting Space

\* 1 Direction of air circulation

\* 2 75 mm min

either the left or right end of the Blocks. Heat dissipation will be interfered with if the S8T-DCBU-02 Blocks are not

■ Wiring Method

Fig.3 Fig.4

Fig.5 Fig.6

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.

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 automatical idjusted internally by detecting the input voltage. The backu operation is started when the input voltage drops 2V. The output voltage during the backup operation is a maximum

- 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)

Two Blocks cannot be connected in series to increase the output voltage to 48V or to create positive and negative

■ Serial Connection

■ Parallel Operation Connection

Max. 15 at sliding

1)I/O terminal (+V)

Rail stopper

 $\bigcirc$  I/O terminal (-V)

The output current and backup time for the backup operatio 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 Batings 1, 10/18 f Blocks for parallel operation: 1 unit ; 22.5V 2.5A 2 units in parallel ; 22.5V 5.0A

2 units in parallel; 22.59 5.0A
3 units in parallel; 22.59 7.5A
4 units in parallel; 22.59 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 th
catolog for details on the backup time during parallel

Note: Although the number of Blocks that can be connected whe using the S8TS-06024 — is five when calculated from the current capacity of the Bus Line Connector, only a maximu of four S8T-DCBU-02 can actually be connected in parallel.

■ Using the Bus Line Connector

8T-BUS03
When connecting to the S8TS-06024 □ , always use the S8T-BUS03 Bus Line Connector. This Connected connects only the DC lines. It does not connect AC lines.

S8T-BUS03 is equipped with a selector for the

SBT-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 Insert a flat tip screwdriver at each end of the Bus line connector alternately to remove.

and the Backup Time
The relation between the momentary power failure Time
and the backup time required to compensate the failure i
differed as shown in the following figure. Construct the
system so as to secure the following backup time for
setting the product.

Momentary Power Failure Time AC Input ₩₩ I/O Terminal

Output Hold Time of Power Supply Backup Time Power Supply Restart time of (Required Backup Time) =(Momentary Power Failure Time)+ (Restart Time)-(Output Hold Time)

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.

(Restart Time)-(Output Hold Time)

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

(1)Turn ON the AC power supply that has been (2)Check the Ready indicator on the S8T-DCBU-02 to

(2)Uneax the Heady indicator on the S91-DCBU-02 to confirm that it is lit.

\*\*LED( ③ ,READY: green)ON

\*\*Relay(READY ① - ② :open)

(Up to 60 seconds is required to charge the internal capasitor before the indicator lights.)

(3)Use a timer and create a momentary power failure on

(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% on more of the power failure time is recommended. (§ 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( @ , BACKUP: red)(ON • Relay(BACKUP § - @ ): closed)

Note:

Check the backup operation under conditions that are safe and will cause no problems if the backup operation

■ Dielectric Strength Test
Both the ground terminal (⑨) and I/O terminals (⑩,⑪) are designed so as to be endurable for 1000VAC for 1 minute. When testing, set the cutoff current for the withstand voltagetest device to 20mA.

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 termi

■ Insulation Resistance Test When testing the insulation resistance of supply, use a DC ohmmeter at 500VDC sistance of the powe

Be sure that all terminals are short-circuited for protecting I/O terminals and signal output terminal from breakage.

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

■ Overload rotection
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

■ 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 a 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 fo 1 minute or longer and then turn it back ON.

Notes:

1. Remove the cause of the overvoltage before turn the input power supply badk ON.

2. The backup operation will not be performed when the overvoltage circuit operates to shut OFF the output.

■ READY Operation(Indication•Output)
The READY indicator and READY output will function as shown below after the internal capacitor is completely charged and the Block is ready to perform the backup operation. Up to 60 seconds is required for the capacitor to harce completely.

charge completely.

\*\*LED(③ READY) green)ON

\*\*Relay(READY) — ②: open)

The following status will occur if there is an error in the charge voltage of the intermal capacitor or the output voltage of the S8T-DCBU-02.

\*\*LED(⑤, READY) green)OFF

\*\*Relay(READY) — ②: Closed)

The backup operation will not be sufficient or will fail under the above status. If this status occurs, immediately remove the cause of the error, such as the following causes.

(1)The connected DC voltage is 23V or less.

(2)The terminals have been connected in reverse or wiring is otherwise not correct.

(4)The overcurrent protection circuit of the connected on reverse or w is otherwise not correct.

(3)The overvoltage protection circuit has oprrated.

(4)The overcurrent protection circuit of the connected power supply has operated.

The contact capacity of the output relay is 0.1A at 24VDC.

■ 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(@, BACKUP: ea()ON
• Relay(BACKUP ®) — @: 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 recobers, the S8T-DCBU-02 will start charging 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.

charged.

The following are examples in which the backup operation may not be sufficient.

may not be sufficient.

(1) The backup operation starts within 60 seconds after turning 00 ht pe 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 v shown below when the internal capacitor is charged.
• LED(③,READY:green)OFF
• Relay(READY①-②: 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.

### Fig.19 **■**Time Charts

Start Up AC Input I/O terminal voltage S8T-DCBU-02 **BACKUP Output** BACKUP LED

**Momentary Power Failure or Voltage Drop AC Input** I/O terminal voltage S8T-DCBU-02 READY Output/LED BACKUP Output BACKUP LED

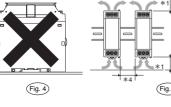
## Power Supply Interrupted or Stopped

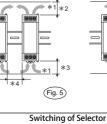
Output Hold Time of Power Supply

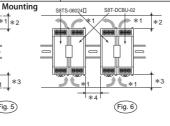
AC Input I/O terminal voltage S8T-DCBU-02 Output Current 2 sec (typ) BACKUP Output (3-4) **BACKUP LED** 

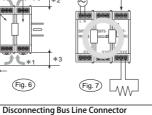
# Standard mounting Fig. 3

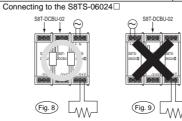


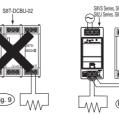


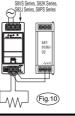


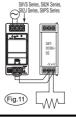


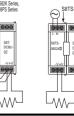






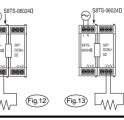




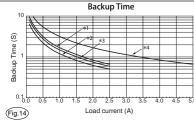


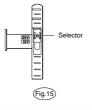
Backup Time

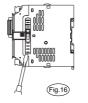
Wiring Method

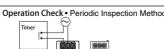


Restart Time of Power Supply











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