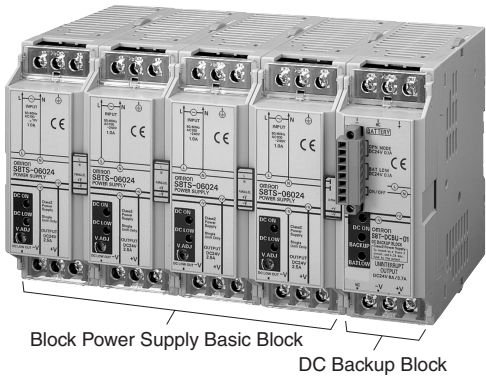


DC Backup Block for S8TS

S8T-DCBU-01

DC Backup Block for S8TS for Preventing 24 VDC Outages due to Instantaneous Power Failures

- Supplies 24 VDC for a fixed period of time even during AC input outages to considerably improve system reliability.
- Block Power Supply Basic Block is connected by the Bus Line Connector.
Simple system configuration
- Alarms are notified by indication on main unit and by alarm signal output.



Ordering Information

DC Backup Block (See Note 1.)

Input voltage	Output voltage	Output current	Model number
24 to 28 VDC	24 V	3.7 A/ 8 A (See note 2.)	S8T-DCBU-01

- Note:** 1. One Bus Line Connector, S8T-BUS03, is included as an accessory.
2. When specified battery, LC-□122R2□□, is in use: Max. 3.7 A
When specified battery, LC-□123R4□□, is in use: The output current can be selected by the overcurrent protection operating point selector.

Battery Holder

Model number
S82Y-TS01

Basic Block

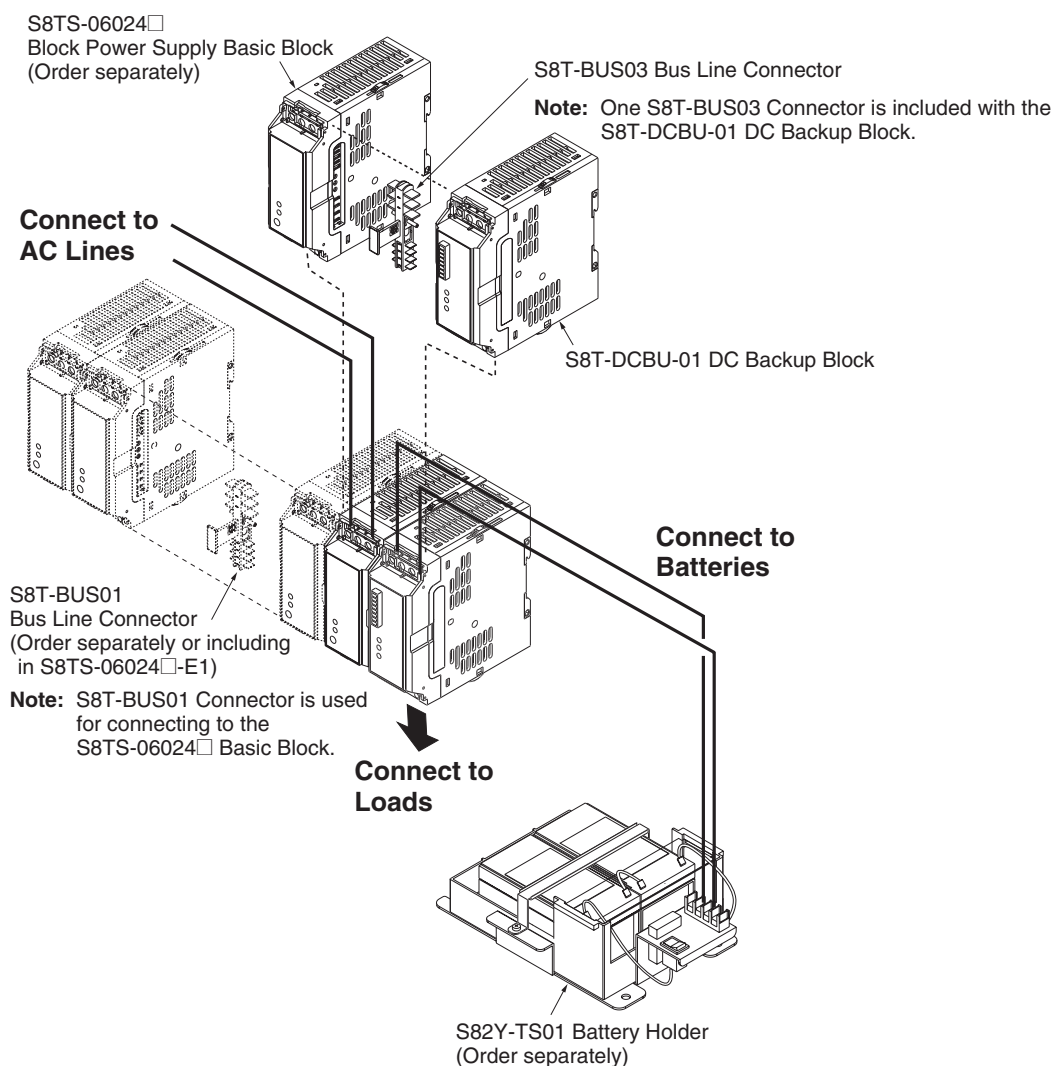
Type	Input voltage	Output voltage/Output current	Model number
Screw terminal type	With Bus Line Connectors	24 V/ 2.5 A	S8TS-06024-E1
	Without Bus Line Connectors		S8TS-06024
Connector terminal type	With Bus Line Connectors		S8TS-06024F-E1
	Without Bus Line Connectors		S8TS-06024F

- Note:** Use S8T-DCBU-01 together with the Block Power Supply Basic Block(s).
For more information on the Basic Block, refer to the S8TS data sheet (Cat.No. T022-E1).

Battery

See on Page 2 for the battery ordering information.

■ Basic Configuration



Max. No. of Connected S8TS-06024□ Units and Designated Battery

Area where battery is sold		Japan		Europe		Areas other than Japan and Europe	
Overcurrent protection operating point selector	Max. No. of connected S8TS-06024□ units	LC-P122R2J	LC-P123R4J	LC-R122R2PG	LC-R123R4PG	LC-R122R2P	LC-R123R4P
5.7 A (typ.)	2 (3 in the case of N+1 redundant operation)	Yes	Yes	Yes	Yes	Yes	Yes
11.7 A (typ.)	4 (5 in the case of N+1 redundant operation)	—	Yes	—	Yes	—	Yes

- Note:**
1. The designated battery is made by Matsushita (Panasonic).
 2. The designated battery is rated at 12 V. Use two batteries in series.
 3. S8T-DCBU-01 shall be connected with S8TS-06024□ when in use.
 4. Consult OMRON or Panasonic sales representatives when purchasing batteries.

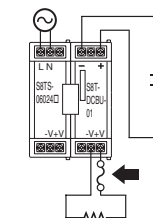
Specifications

■ Ratings/ Characteristics

Item		Model	S8T-DCBU-01
Input		Voltage (See note 1.)	24 to 28 VDC
Output (See note 2.)	Normal operation	Voltage	24 VDC (See note 3.)
		Load variation influence (See note 4.)	6% max.
	Backup operation	Voltage	21.0 to 27.4 VDC (See note 5.)
		Min. output current	LC-□122R2□□ 0.11 A LC-□123R4□□ 0.17 A
		Backup time (reference value) (See note 6.)	LC-□122R2□□ 8 min/ 3.7 A (at 25°C, battery fully charged, start of battery service life) LC-□123R4□□ 4 min/ 8.0 A (at 25°C, battery fully charged, start of battery service life)
Charging	Method		Stable voltage/current charging method
	Charge voltage (See note 7.)		27.4 V/ 26.2 V (typical)
	Max. charge current		0.35 A (typical)
	Overvoltage protection (See note 7.)		Yes (30 V typical)
Additional functions	Protection functions	Backup stop function (See note 7.)	Yes (18.5 V typical)
		Overcurrent protection (See note 7.)	Yes (5.7 A/ 11.7 A typical)
		Battery misconnection protection (See note 7.)	Yes
	Input function	Backup ON/OFF input (See note 7.)	Yes
	Output functions	Output indicator	Yes (color: green)
		Battery status indicator (See note 7.)	Yes (color: red)
		Battery status output (See note 7.)	Yes (relay: 24 VDC, 0.1 A)
		Backup status indicator	Yes (color: red)
		Operation mode output	Yes (relay: 24 VDC, 0.1 A)
Other	Ambient operating temperature (See note 4.)		Operating: Refer to the derating curve in <i>Engineering Data</i> . (with no condensation or icing) Storage: -25 to 65°C
	Ambient humidity		Operating: 25% to 85%; Storage: 25% to 90%
	Dielectric strength (See note 4. and 8.)		3.0 kVAC for 1 minute (between all S8TS-06024□ AC input terminals, and all S8T-DCBU-01 terminals/ all S8TS-06024□ output terminals; detection current: 20 mA) 2.0 kVAC for 1 minute (between all S8TS-06024□ AC input terminals and GR terminals; detection current: 20 mA) 1.0 kVAC for 1 minute (between all S8T-DCBU-01 terminals/ all S8TS-06024□ output terminals, and between GR terminals; detection current: 20 mA)
	Insulation resistance (See note 4.)		100 MΩ min. (between all S8T-DCBU-01 terminals and all S8TS-06024□ outputs, and between all S8TS-06024□ AC inputs and GR terminals) at 500 VDC
	Vibration resistance (See note 4. and 9.)		10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions
	Shock resistance (See note 4. and 9.)		150 m/s ² , 3 times each in ±X, ±Y, and ±Z directions
	Electromagnetic interference (See note 4.)		Conforms to FCC Class A, EN50081-2/1993
	EMS (See note 4.)		Conforms to EN61000-6-2/1999
	Approved standards		UL: UL508 (Listing, Class 2: Per UL1310) (See note 10.), UL60950, UL1604 (Class I /Division 2) cUL: CSA C22.2 No.14, No.60950, No.213 (Class I /Division 2) EN/VDE: EN50178 (=VDE0160), EN60950 (=VDE0806)
	Size		120 × 120 × 43 mm
	Weight		Approx. 350 g

- Note:** 1. Refer to *Output Voltage Adjustment for S8TS-06024□* on page 44 for details.
2. The output is specified at power output terminals.
3. Specified by performance of S8TS-06024□ Basic Block.
4. Specified by S8TS-06024□ connection.
5. Output voltage goes down to 21.0 V (min.) when the backup operation is activated.
6. Refer to *Backup Time (Reference Value)* on page 51 for details.
7. Refer to *Functions* on page 46 for details.
8. Set the detection current to 20 mA × N when S8TS-06024□ Basic Block N Blocks are connected.
9. Be sure to mount End Plates (PFP-M) on both ends of the Power Supply.
10. To be compliant with UL508 (Class2: per UL1310), take one of following each measure. Note that the number of S8TS-06024□ to be connected to the S8T-DCBU-01 shall be one.
• Connect S8T-DCBU-01 to S82Y-TS01 having its fuse replaced with an UL-Listed and DC rated 32 VDC min./ 3 A max. one.
• Connect an UL-Listed and DC rated 32 VDC min./ 2.5 A max. fuse at the location shown in Figure 1.

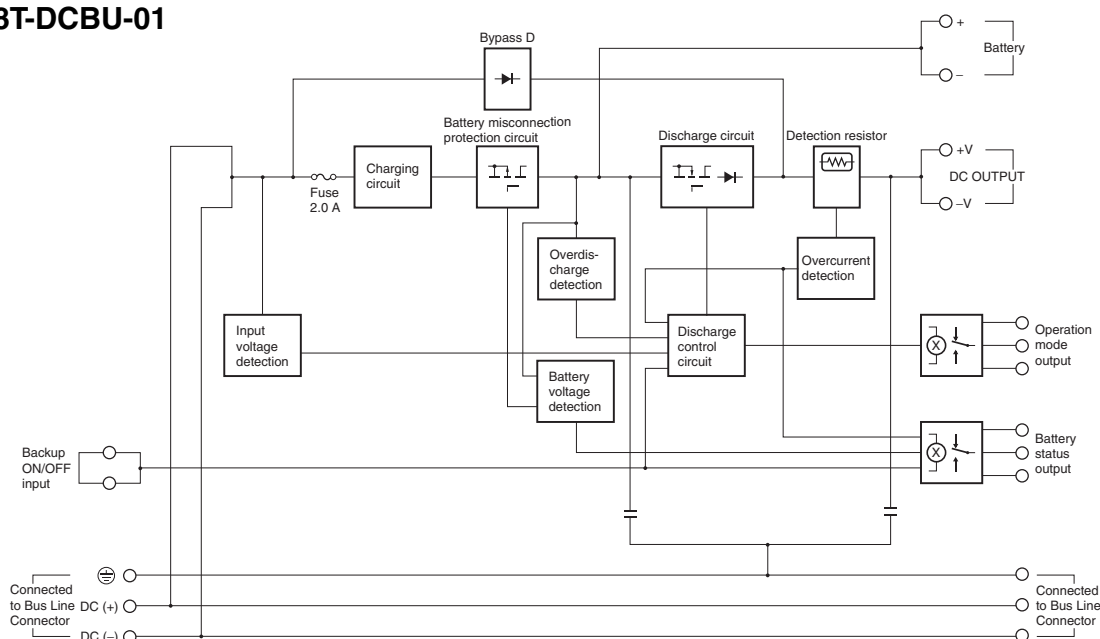
(Figure 1)



Connections

■ Block Diagram

S8T-DCBU-01



Operation

■ How to Use the Unit

Battery Connection

For battery connection, it is recommended that a Battery Holder (S82Y-TS01) be used. If the S82Y-TS01 is not used, insert a switch and a fuse between the battery and the S8T-DCBU-01. For selection and layout of the switch and fuse, refer to *Battery Holder S82Y-TS01* on page 44.

Battery Overdischarge

The battery discharges in the following three conditions (1) to (3). When the battery has overdischarged, the battery service life may be shortened abnormally or backup operation may be disabled due to inability to recharge. To protect the battery against overdischarge, take the appropriate action as described below.

- (1) Discharge due to load of backup operation (See Note 1.)
Use the backup stop function (refer to page 46). Backup operation is automatically stopped when the battery connecting terminal voltage drops down to 18.5 V, which prevents a rapid discharge of the battery.
Leaving the unit in this condition for a long time, even after the backup operation has stopped, may cause the discharge to be hastened due to standby current of the product, thus causing overdischarge. In that case, refer to the item (2).
- (2) Discharge due to standby current of the S8T-DCBU-01 (See Note 1.)
Battery discharge is hastened by standby current consumption that occurs due to circuit structure of S8T-DCBU-01 even if the AC power is turned OFF and the load is not applied. In case of Table 1, disconnect the batteries in order to protect the battery against overdischarge. There are two ways to disconnect the batteries as follows:

- 1) Turn the Battery Holder switch OFF. (See Notes 2 and 4.)
Connect the external circuit to prevent failure to turn the switch off. (See Note 8.)
- 2) Open backup ON/OFF input terminals by external signal, and disconnect the batteries by external relay. (See Figure 2 and Notes 2, 4 and 8.)

Table 1. Possibility of Overdischarge due to Standby Current Consumption

		When the battery is not disconnected:	
		Frequent backup operation or insufficient may charge abnormally shorten the battery service life.	The battery overdischarges and cannot be recharged, resulting in failure in backup operation. (See Note 3.)
Turn the AC power after assembly OFF. (See Note 7)			Yes
Turn the AC power OFF during maintenance or inspection.			Yes
When the AC power is frequently turned ON and OFF:	Turn the AC power OFF (1 hour/day)	Yes	
	Turn the AC power OFF (16 hours/day)	Yes	
	Turn the AC power OFF for 2 days.	Yes	Yes
	Turn the AC power OFF for about 1 week.		Yes
Storage and transportation			Yes
Power outage for hours			Yes

Note: 1. The battery discharges continuously due to standby current of the S8T-DCBU-01 even when the backup stop function is used or when backup operation is stopped by opening the backup ON/OFF input.

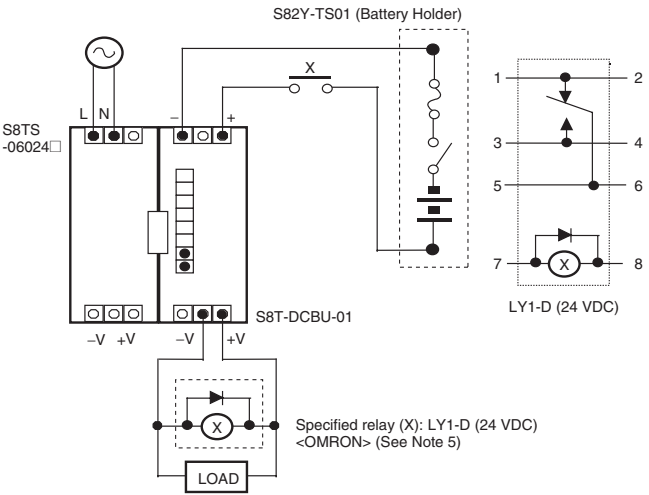
2. Turn the Battery Holder switch OFF or the SW shown in Figure 2. Unnecessary backup operation shortens the battery service life for the following two reasons. When turning the AC power OFF, be sure to turn the Battery Holder switch ON or the SW shown in Figure 2.
 - Full charge requires 24 to 28 hours. Activating backup operation before charging fully shortens the battery service life due to insufficient charge.
 - Every time charging and discharging is repeated, the battery service life is shortened.
3. When battery connector terminal voltage drops to 15.5 V (typical) or below, S8T-DCBU-01 stops charging due to the erroneous battery connection protection function. When the battery nears end of life (when the battery capacity becomes less than half of the original capacity), if only AC power is turned OFF and the unit is left in this condition for 2 days (under the temperature of 25°C), backup operation may be disabled due to inability to recharge. (Refer to *Protection Against Erroneous Battery Connection* on page 47.)
4. Do not use batteries in an area where corrosive gases (silicon gas, sulfide gas, organic gas, chlorine gas) may enter. If the relay ("X" shown in Figure 1 and 2) or switch (Battery Holder, SW shown in Figure 2) is exposed to corrosive gases for an extended period, the contact surface corrodes, causing unstable or loose connection, thus disabling recharge or backup operation.
5. The following table shows the ambient temperature and humidity when using LY1-D (24 VDC). LY1-D (24 VDC) has a built-in diode in order to absorb counter-voltage generated by the operation coil. As this causes polarity in the operation coil, be careful when wiring. Refer to the individual catalogs for details.

	Ambient temperature	Ambient humidity
LY1-D (24 VDC)	Output current 4 A or under: -25 to +55°C Output current 4 A or over: -25 to +40°C	5 to 85%

6. On the SW shown in Figure 2, voltage and current increase to 15 V when opened and 2 mA when short-circuited. Be careful when selecting the switch.
7. The standby current becomes live and discharging is hastened even when AC power is not wired, but the battery is left wired.
8. Should the operator forget to turn off the Battery Holder switch in Figure 1 or the SW in Figure 2, the backup operation continues until the battery connecting terminal voltage drops down to 18.5 V (typical), then the battery is disconnected by the relay (X). If the battery is left in this condition for a long time exceeding the period of time shown in the tables below, the overdischarge is hastened due to self-discharge, thus disabling backup operation due to inability to recharge.

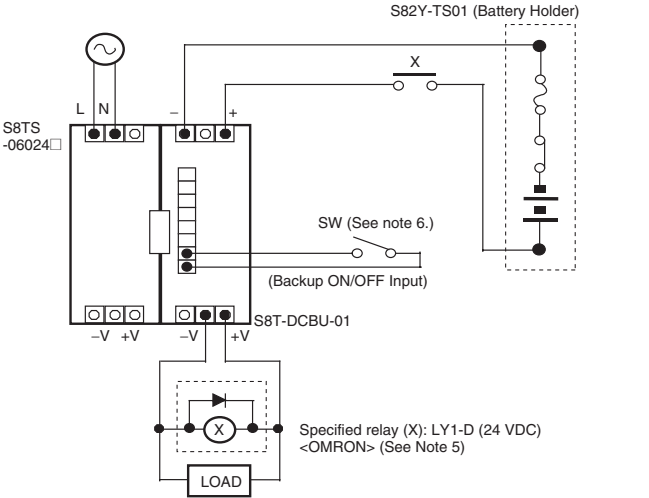
Battery	Ambient temperature	Load current	Length of months that disables recharge	
			Battery service life early stage	Battery service life ending stage
LC-□122 R2□□	20 °C	0.11 A	1.0 month	0.5 months
		2.2 A	2.0 months	1.0 month
	40 °C	0.11 A	0.5 months	0.25 months
		2.2 A	1.0 month	0.5 months
LC-□123 R4□□	20 °C	0.17 A	1.0 month	0.5 months
		4.8 A	3.0 months	1.5 months
	40 °C	0.17 A	0.5 months	0.25 months
		4.8 A	3.0 months	1.5 months

Figure 1. Overcharge protection circuit when operator forgets to turn Battery Holder switch OFF



- When forgetting to turn Battery Holder switch OFF:
1. Start backup operation after turning OFF AC power.
 2. When the battery connecting terminal voltage drops down to 18.5 V (typical), the backup operation stops, opening the relay point and disconnecting the battery from the body.

Figure 2. Overcharge protection circuit using external signal (Backup ON/OFF input)



1. Open the backup ON/OFF input terminals by external signal (switch) (Backup becomes impossible.)
2. When AC power is turned OFF, 24 VDC drops, opening the relay point and disconnecting the battery from the DC Backup Block body.

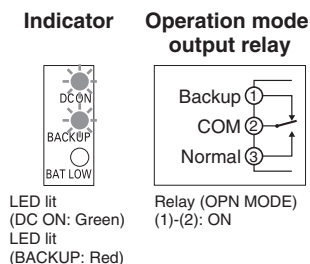
- (3) Self-discharge of the battery
- The battery self-discharges even when it is disconnected from the S8T-DCBU-01. When transporting or storing the unit for long hours, charge the battery at the intervals specified below to prevent overdischarge.

Ambient temperature	Charging intervals
Under 20 °C	9 months
20 to 30 °C	6 months
30 to 40 °C	3 months

Backup Function

(Backup status indication, Operation mode output)

S8T-DCBU-01 detects output voltage drop of S8TS-06024□ to switch to backup operation.

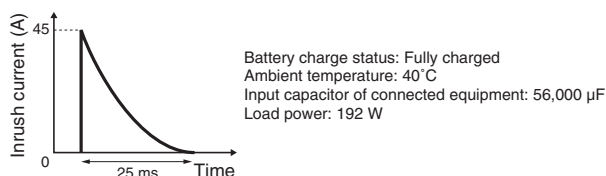


Backup operation continues for about 7 seconds even after the output voltage of S8TS-06024□ is restored.

		Backup status	LED (BACKUP: Red)	Relay (OPN MODE)
Power failure		Continuous backup operation	Lit	Backup (1)-(2): ON
Failure of one unit of S8TS-06024□	During operation of one unit of S8TS-06024□			
	During operation of multiple units of S8TS-06024□ *	Repetition of switching between Normal operation and Backup operation at an interval of about 7 seconds	Blink at an interval of about 7 seconds	Repetition of switching between Normal ((3)-(2): ON) and Backup ((1)-(2): ON)
Upon activation of overcurrent protection function of S8TS-06024□ *				

* If this state occurs, a probable cause is an S8TS-06024□ overload or it is out of order. Immediately eliminate the cause of the trouble.

- Note:**
- If switching between backup operation and Normal operation is repeated, the output voltage changes accordingly.
 - The contact capacity of the relay is 24 VDC 0.1A.
 - Do not use the battery upon a steep load fluctuation or at a peak load exceeding the rated current. The output voltage of S8TS-06024□ may drop to switch to backup operation, and shorten the battery service life.
 - The maximum inrush current specified below (on assumption with a 56000 μF capacitive load) flows when backup operation starts.



Charging Circuit

Charging Time (Reference Values)

Battery used	100% charged	80% charged
LC-□122R2□□	24 to 48 hours	5 hours
LC-□123R4□□		8 hours

Note: The battery takes the time specified above to be charged. If power failure occurs at a time shorter than the necessary charging time (power failure right after the setup, or repeated failure in a short period of hours), backup operation may not continue for the necessary time.

Output Voltage Adjustment for S8TS-06024□

The DC Backup Block detects output voltage drop of connected S8TS-06024□ to switch to backup operation.

Do not set the output voltage of S8TS-06024□ to lower than the factory shipment setting because, even though the output voltage of S8TS-06024□ is adjustable with Output voltage adjustor. Otherwise, it may operate in the backup operation mode.

Wiring Length Between S8T-DCBU-01 and Battery

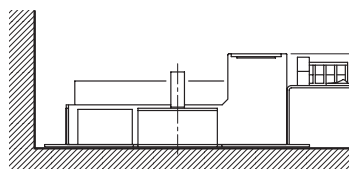
Connect S8T-DCBU-01 and the battery using a cable having a wire diameter specified in *Recommended Wire Diameter* (page 55) within a wiring length of 1.5 m.

Because the battery voltage is monitored at the battery connecting terminal, a large wiring impedance increases the voltage drop from wiring, reducing the backup time.

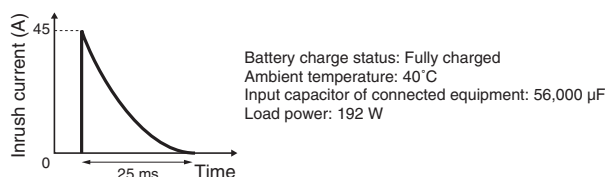
Battery Holder S82Y-TS01

We recommend using the S82Y-TS01 Battery Holder for connecting and installing the battery. Take the following points into consideration when using the S82Y-TS01:

- Contact between leaking battery fluid and metal parts having an electric potential may cause smoke or fire. To prevent this, the Battery Holder uses a resin battery tray. Set up the Battery Holder in the direction shown below.



- The inrush current shown below flows when backup operation is switched to. The peak value and time of this inrush current vary according to the capacity of the input capacitor of the connected equipment, battery charge status, battery wiring length, and ambient temperature. The switch and fuse of the S82Y-TS01 are selected taking this inrush current into consideration. When replacing the fuse, use only the specified fuse. (Littelfuse, 257015 (15 A))

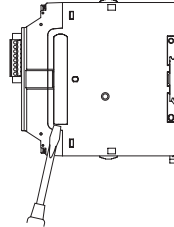


- In the event that the battery generates inflammable gases, place the switch and fuse away from the convection path of the inflammable gas to prevent the switch or fuse from causing ignition and explosion.
- Keeping the S8T-DCBU-01 connected to the battery with AC power OFF may cause the battery to overdischarge due to standby current of the S8T-DCBU-01, which may considerably shorten the service life of the battery and may disable recharging. To prevent this, turn the switch OFF. (Refer to *Battery Over-discharge* on page 42.)

Mounting and Removing the Bus Line Connector

Pay attention to the following points to maintain electrical characteristics.

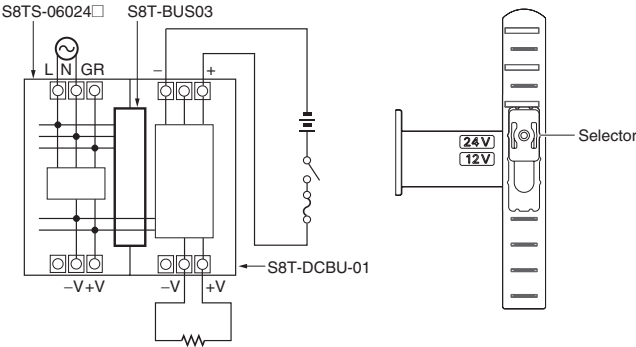
- Do not insert/remove the Connectors more than 20 times.
- Do not touch the Connector terminals.
- To remove the Connectors, insert a flat-bladed screwdriver alternately at both ends.



S8T-BUS03

Use S8T-BUS03, which only DC lines are connected with. (AC line not connected).

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 24 V position.



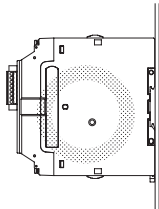
Mounting

Mounting Direction

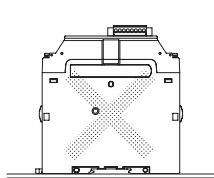
Standard mounting	Yes
Back down mounting	No
Other mounting	No

Use standard mounting only. Using any other mounting method will prevent proper heat dissipation and may result in deterioration or damage of internal elements.

Standard mounting



Back down mounting



Operation Check

After connecting S8TS-06024 and S8T-DCBU-01, it is recommended to check the DC Backup Block if it is correctly operating in the following procedure.

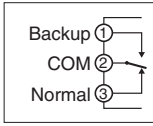
1. Turn ON the Battery Holder.
2. Turn ON the AC power to the S8TS-06024.
3. Wait for 10 sec. or more then check if the DC Backup Block is in Status 1.

Indicator



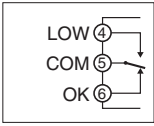
LED lit (DC ON: Green)

Operation mode output relay



Relay (OPN MODE) (3)-(2): ON

Battery status output relay



Relay (BAT LOW) (6)-(5): ON

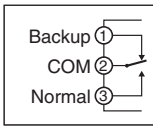
4. Turn OFF the AC power of the S8TS-06024.
5. Confirm that Backup operation is correctly performed in Status 2.

Indicator



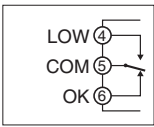
LED lit (DC ON: Green)
LED lit (BACKUP: Red)

Operation mode output relay



Relay (OPN MODE) (1)-(2): ON

Battery status output relay

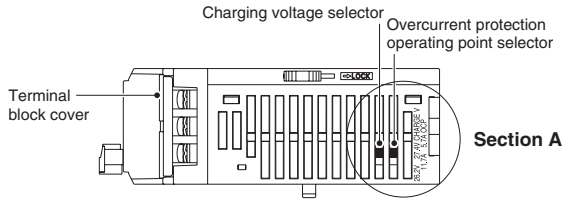


Relay (BAT LOW) (6)-(5): ON

6. Turn ON the AC power of the S8TS-06024.

- Note:**
1. Perform operation checks after arranging a state where no fault occurs even if the connected devices are turned OFF in the midway.
 2. The operation mode may not changed to Backup, if AC power is turned OFF within 10 sec. at Step 3.
 3. When turning the AC power OFF or storing or transporting the unit after operation checks, follow the instructions described in *Battery Overdischarge* on page 42.

■ Functions



Charging Voltage Selector

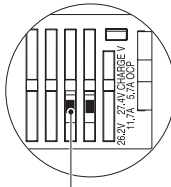
Select either 27.4 V or 26.2 V at the charging voltage selector to select the charging voltage.

Because the battery manufacturer recommends 27.4 V as charging voltage, it is recommended to charge at 27.4 V.

In this case, 27.4 VDC, which is the charging voltage of the batteries, may output depending on the state of connected load when the operation changes to Backup.

Note: If the battery is charged at 26.2 V, the battery capacity decreases each time the battery is charged, and the backup time gradually decreases.

Enlarged View of Section A



Charging voltage selector

(Reference value)

	Capacity reduction in each charge-and-discharge cycle
At 25°C	Reduction by 10%
At 0°C	Reduction by 20%

Overvoltage Protection Circuit

If the charge voltage is about 30 V or above, the charge voltage is cut off to prevent the battery from being overcharged.

How to Reset Overvoltage Protection

Reset Overvoltage protection with following steps after arranging a state where no fault occurs even if the connected devices are turned off in the midway.

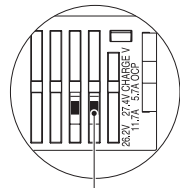
1. Turn OFF the Battery Holder switch.
2. Turn OFF the AC power of the S8TS-06024□.
3. Leave the power supply OFF for 1 minute or more.
4. Turn ON the Battery Holder switch.
5. Turn ON the AC power of the S8TS-06024□ again.

Note: 1. Remove the cause before turning on the AC power again.
 2. As an AC input OFF status is the same as a power failure, the S8T-DCBU-01 will perform backup operation. Sometimes charging cannot be performed for the required backup time as the battery is not sufficiently charged. For this reason, first make sure that backup operation is not needed before turning the Battery Holder switch and then the AC input OFF.
 3. The off time necessary for restoration assumes connection of five units of S8TS-06024□, without a load, and fully charged batteries.

Overcurrent Protection Operating Point Selector

5.7 A (typ.) or 11.7 A (typ.) can be selected with the selector as an overcurrent protection operating point during backup operation. Select 5.7 A (typ.) for one or two units of S8TS-06024□ (or three units during N+1 redundancy operation), or select 11.7 A (typ.) for three or four units (or five units during N+1 redundancy operation). The shipment setting is 5.7 A (typ.).

Enlarged View of Section A



Overcurrent protection operating point selector

Overcurrent Protection Function

During Normal Operation

An overcurrent is notified in the following way.

- LED (BAT LOW: Red) lights up.
- Relay (BAT LOW) is in the LOW mode ((4)-(5): ON).

If power failure occurs in this state, an overcurrent protection function is activated to fail to backup.

During Backup Operation

The overcurrent protection operating point can be selected from either 5.7 A (typ.) or 11.7 A (typ.) using the selector. The output is cut off when overcurrent protection is activated.

Note: Continuation of operation in the overcurrent status may cause deterioration or breakage of internal elements.

Backup Stop Function

When the battery connecting terminal voltage drops down to 18.5 V, backup operation is automatically stopped to protect the battery against overdischarge due to load current.

- Note:** 1. Battery discharge is continued by standby current consumption of the S8T-DCBU-01 even when backup operation is stopped. Do not leave the unit in this condition for a long time. (Refer to *Battery Overdischarge* on page 42.)
 2. Remaining battery capacity is zero when the battery voltage is 18.5 V (typical).

Backup ON/OFF Input Function

If the backup ON/OFF input terminals are short-circuited, backup is enabled, while if the terminals are open, backup is disabled. The terminal is non-voltage input type and the short and open circuits are specified below.

Short	Impedance with 1 kΩ or below Flowing current at 0 Ω: About 2 mA Residual voltage: 1 V or below
Open	Impedance: 400 kΩ or more

With the shipment setting, a short bar is installed to short-circuit across the backup ON/OFF input terminals.

When the backup ON/OFF input terminals are open, the following signs inform that backup is disabled.

- LED (BAT LOT: Red) is lit.
- Relay (BAT LOW) is in the LOW mode ((4)-(5): ON).

Note: Battery discharge is continued by standby current consumption of the S8T-DCBU-01 even when backup operation is stopped. Do not leave the unit in this condition for a long time. (Refer to *Battery Overdischarge* on page 42.)

Protection Against Erroneous Battery Connection

When the DC Backup Block is turned on, the charging circuit is separated if battery connection terminal voltage become below about 15.5 V. This function protects the battery and the main body upon erroneous connection of the batteries (with reverse polarity or with only one 12 V battery).

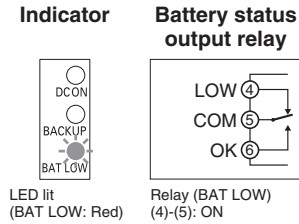
Activation of the erroneous battery connection function is notified in the following way.

- LED (BAT LOW: Red) lights up.
- Relay (BAT LOW) is in the LOW mode ((4)-(5): ON).

- Note:**
1. When the battery is disconnected while the AC power is ON after the battery is connected in a normal way (Battery Holder switch OFF, Battery Holder fuse blown, battery connection wires off), the indication of battery status or output will not respond.
 2. Do not replace batteries when the AC power is on. The erroneous battery connection protection function will not be activated even if the unit is connected with the polarity reversed, but the S8T-DCBU-01 will be damaged, and the Battery Holder fuse will be blown.

Battery Status Indication and Battery Status Output

A battery charging/discharging fault (1. through 4. described below) is notified in the following way.



If power failure occurs in this state, backup operation does not start or the backup time becomes shorter. Remove the cause of the fault immediately.

1. About 22.5 V or lower battery connecting terminal voltage (BAT LOW will be released when the voltage goes up to 24.5 V or over).
2. Activation of erroneous battery connection protection function.
3. Open battery ON/OFF input terminals.
4. Overcurrent status during Normal operation.

- Note:**
1. Even if BAT LOW is released, it doesn't mean that the battery charging is finished.
 2. Relay contact capacity is 24 VDC and 0.1A.

Battery Replacement

The lead battery deteriorates.

Replace the battery while referring to the following replacement period as a reference.

- Note:**
1. Battery deterioration accelerates when its service life limit draws near.
 2. The battery replacement timing assumes the battery has reached half its original capacity.
 3. The life varies according to the storage and operating environment, output wattage, and the frequency of backup operation.
 4. Fire may be caused in worst case, if batteries are continuously used beyond its replace timing. Replace batteries periodically to avoid the worst case.
 5. Do not replace batteries when the AC power is on. The erroneous battery connection protection function will not be activated even if the unit is connected with the polarity reversed, but the S8T-DCBU-01 will be damaged, and the Battery Holder fuse will be blown.

1. Replacement Guideline

Replace the battery using the following table as a guideline:

Battery	Ambient temperature	Life of battery	Approximate replacement interval
LC-R122R2□□ LC-R123R4□□	20 °C	2 to 3 years	2 years
	30 °C	1 to 1.5 years	1 year
	40 °C	0.5 to 0.75 years	0.5 years
LC-P122R2□□ LC-P123R4□□	20 °C	4 to 6 years	4 years
	30 °C	2 to 3 years	2 years
	40 °C	1 to 2 years	1 year

Note: The conditions in the table above is estimated as: charged at 27.4 V, discharged with 8 A (for LC-□123R4□□), 3.7 A (LC-□122R2□□), backup operation once a month bases.

2. Measuring Backup Time

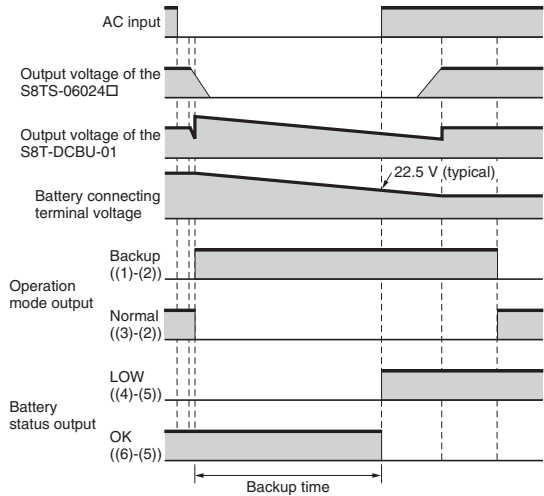
The backup time can be measured by the procedure below. When the battery is new, first measure the initial backup time value.

Replace the battery if backup operation is not performed for the required backup time during periodic maintenance or the backup time has fallen below the half or less of initial value.

Note:

1. Make sure that at least 48 hours have elapsed since the previous backup operation, and that the battery is correctly connected, and then measure the backup time.

2. Measure the backup time after making sure that no problems will occur as a result of stopping power supply.
- (1) Turn the AC power line OFF, and backup the S8T-DCBU-01.
 - (2) Measure the time that the battery status output relay turns to LOW ((4)-(5): ON) after the operation mode output relay is backed up ((1)-(2): ON). (This is the backup time.)
 - (3) When the battery status output relay turns LOW ((4)-(5): ON), turn the AC power line ON.



Periodic Inspection of the Battery

We recommend periodically inspecting the battery as follows:

- Check the battery connecting terminal voltage. (In a 27.4 V series connection, make sure that each battery is charged to 13.7 V.)

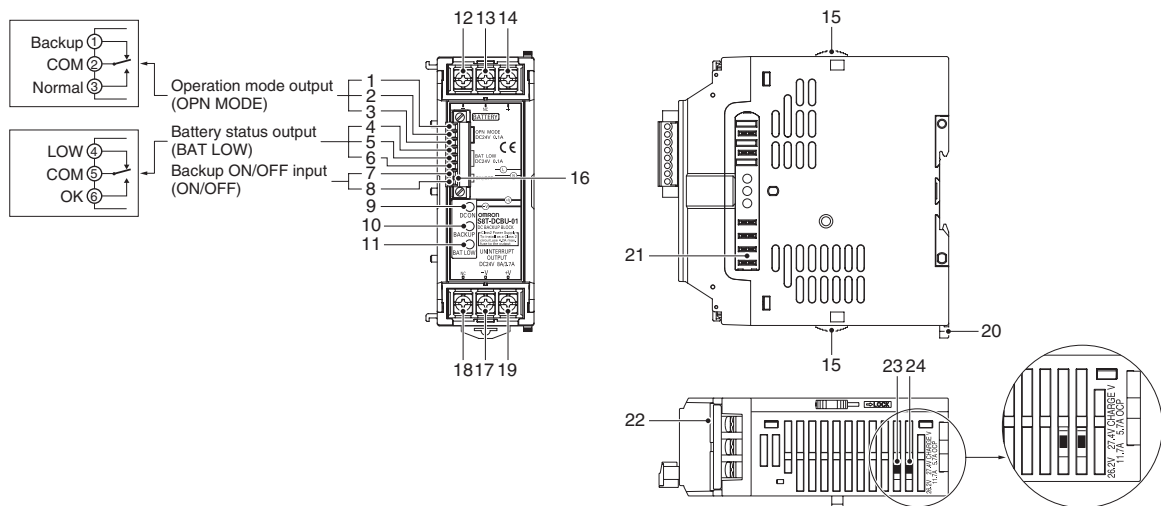
- Check battery wiring and connections. (Check the batteries and S8T-DCBU-01 connections for loose screws.)
- Make sure that backup operation is performed normally in a simulated power failure state.

Note: Check the backup operation after making sure that no problems will occur as a result of stopping power supply.

Installation

DC Backup Block

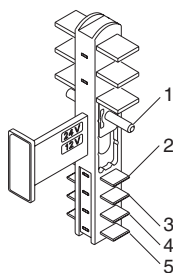
S8T-DCBU-01



- | | | |
|---|--|--|
| (1) Backup: Operation Mode Output Relay | (10) Backup Status Indicator (BUCKUP: Red) | (19) DC Output Terminal (+V) |
| (2) COM: Operation Mode Output Relay | (11) Battery Status Indicator (BAT LOW: Red) | (20) Rail Stopper |
| (3) Normal: Operation Mode Output Relay | (12) Battery Connecting Terminal (–) | (21) Connecting part of Bus Line Connector |
| (4) LOW: Battery Status Output Relay | (13) NC | (22) Terminal Block Cover |
| (5) COM: Battery Status Output Relay | (14) Battery Connecting Terminal (+) | (23) Charging Voltage Selector |
| (6) OK: Battery Status Output Relay | (15) Slider | (24) Overcurrent Protection Operating Point Selector |
| (7) ON/OFF: Backup ON/OFF Input | (16) Short Bar | |
| (8) GND: Backup ON/OFF Input | (17) DC Output Terminal (–V) | |
| (9) Output Indicator (DC ON: Green) | (18) NC | |

Bus Line Connector

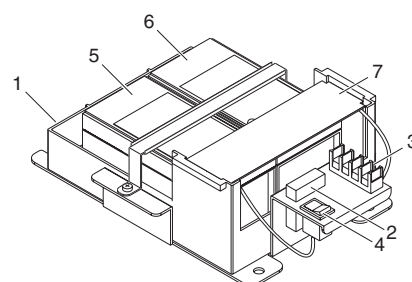
S8T-BUS03



- (1) Selector
- (2) Ground Terminal
- (3) NC
- (4) DC Output Terminal (+)
- (5) DC Output Terminal (–)

Battery Holder

S82Y-TS01



- (1) Battery Tray
- (2) Fuse
- (3) Terminal Block
- (4) Switch
- (5) Battery A (Order separately)
- (6) Battery B (Order separately)
- (7) Protection Cover

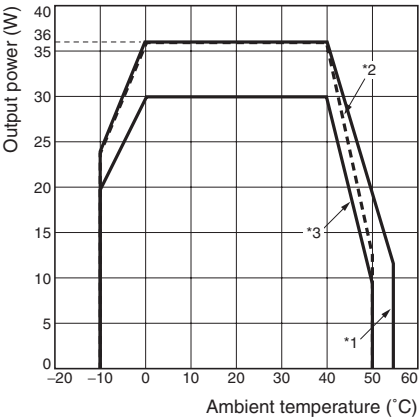
Engineering Data

Engineering Data
Derating Curve

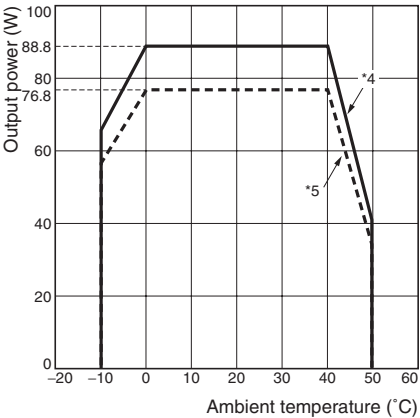
Number of S8TS-06024□ units	S8TS-06024□ rated input	Derating curve	Rated output power
1	200 to 240 VAC	*1	36 W (1.5 A)
	100 to 120 VAC	*2	
1 (+1)	100 to 120 VAC/200 to 240 VAC	*3	30 W (1.25 A)
2		*4	88.8 W (3.7 A)
2 (+1)		*5	76.8 W (3.2 A)
3		*6	146.4 W (6.1 A)
3 (+1)		*7	128.4 W (5.35 A)
4		*8	192 W (8 A)
4 (+1)		*9	168 W (7 A)

- Note:** 1. Add one more S8TS-06024□ Basic Block if a redundant system is used.
2. If natural air circulation is limited, use the forced air cooling to prevent overheating.
3. The peripheral temperature is specified at the place 50 mm downward from the main body of the DC Backup Block.
4. The operating temperature range of the battery is 0 to 40°C; it is different from that of S8T-DCBU-01.
And the ambient temperature of battery is specified with the temperature at the battery surface.
5. The amount of output wattage at multi-connected S8TS-06024□ become smaller than the simple sum of each wattage, since S8T-DCBU-01 consumes energy from S8TS-06024□.

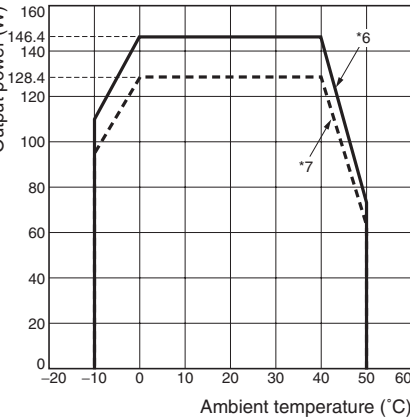
S8T-DCBU-01



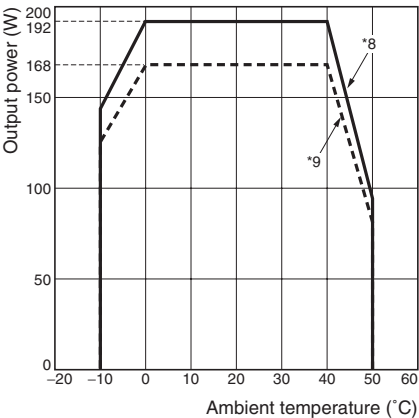
S8T-DCBU-01



S8T-DCBU-01

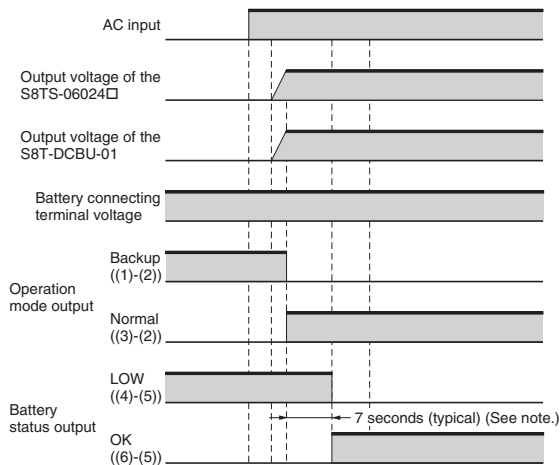


S8T-DCBU-01



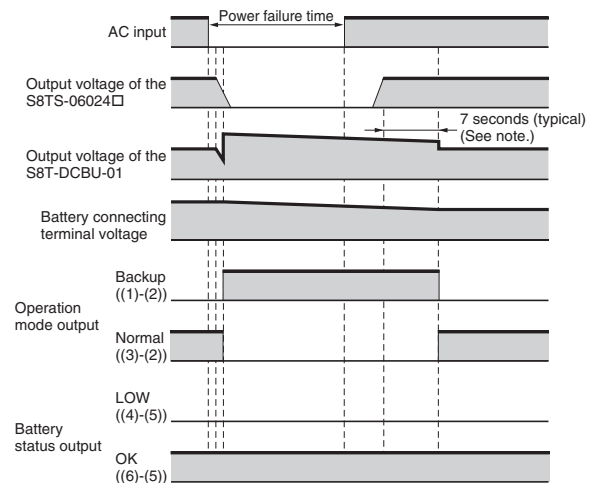
Time Charts

Startup



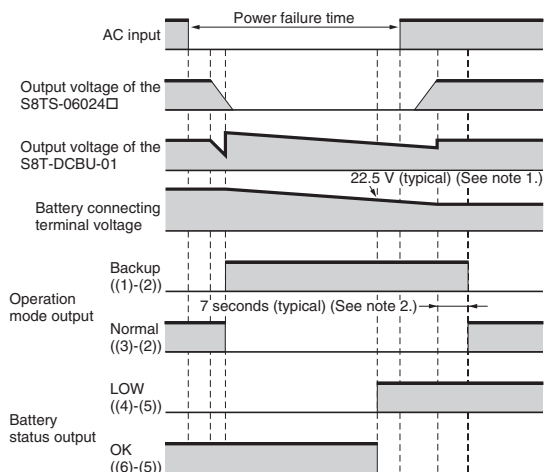
Note: Backup operation is not possible during the period (7 seconds (typical)) that the battery status output relay is LOW after the S8T-DCBU-01 is started up.

Power Failure (When the Battery Connecting Terminal Voltage does not Reach the BAT LOW Voltage)



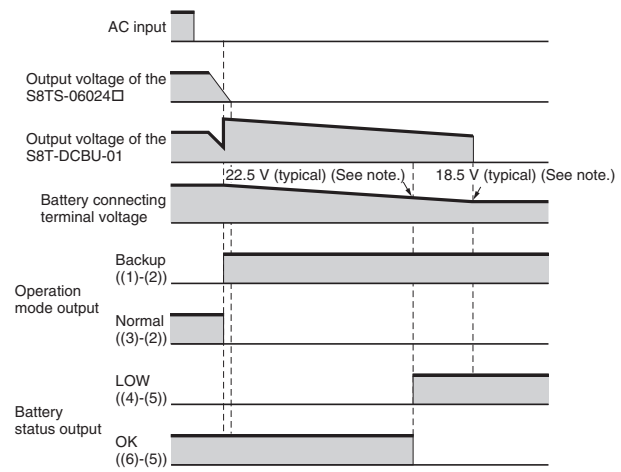
Note: Backup operation is continued for seven seconds after the power is restored from a power failure.

Power Failure (When the Battery Connecting Terminal Voltage Reaches BAT LOW Voltage)



- Note:**
- When the battery connecting terminal voltage falls below 22.5 V (typical), the status of the battery status output relay changes to LOW.
 - After the power failure is recovered, the backup operation continues for seven seconds (typical).

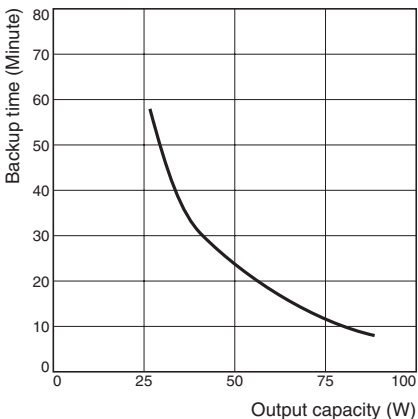
Power Failure (When the Battery Connecting Terminal Voltage Reaches the Backup Stop Voltage)



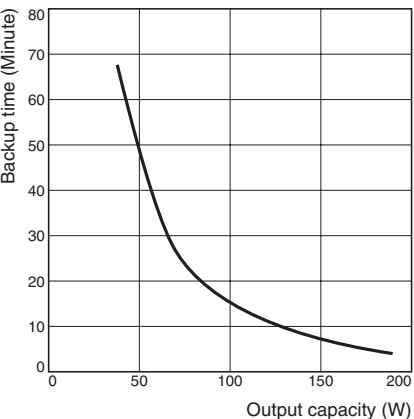
Note: When the battery connecting terminal voltage falls below 22.5 V (typical), the status of the battery status output relay changes to LOW, and when the battery connecting terminal voltage falls below 18.5 V (typical), backup operation is stopped. If the backup operation is left stopped for a long time, the battery discharge is continued due to standby current consumption of S8T-DCBU-01, which may shorten the battery service life or disable the backup due to inability to recharge. To prevent this, follow the instructions described in *Battery Overdischarge* on page 42.

■ Backup Time (Reference Value)

Backup Time when LC-□122R2□□ is Used



Backup Time when LC-□123R4□□ is Used



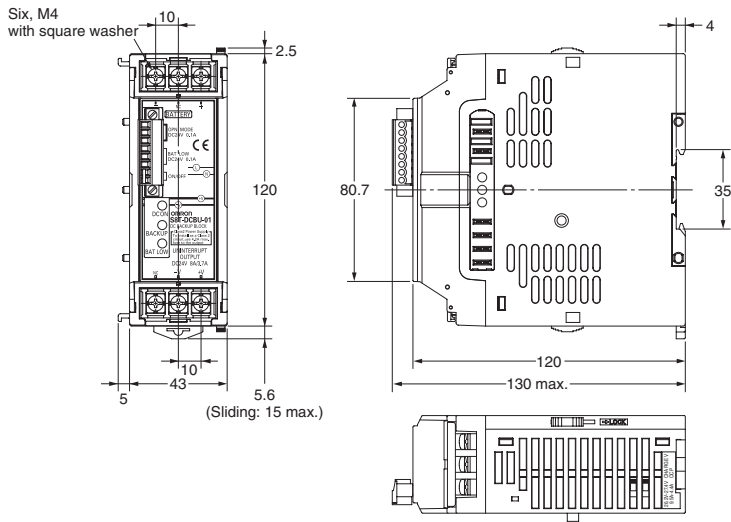
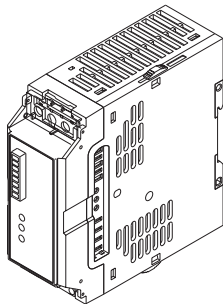
- Note: 1.** Backup time conditions
- Backup time: the duration of time from starting the backup until the output voltage reaches 21.0 V.
 - Ambient temperature: 25°C
 - Battery: New product fully charged to 27.4 V
 - Length of wire between S8T-DCBU-01 and battery: 1.5 m
- 2.** The backup time changes depending on the capacity of connected equipment, ambient temperature, and battery service life.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

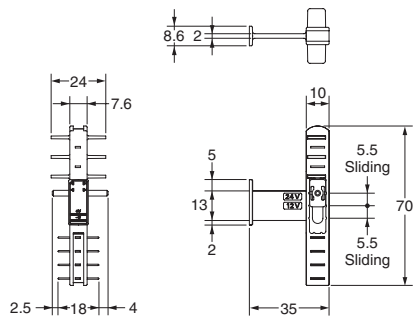
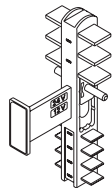
DC Backup Block

S8T-DCBU-01



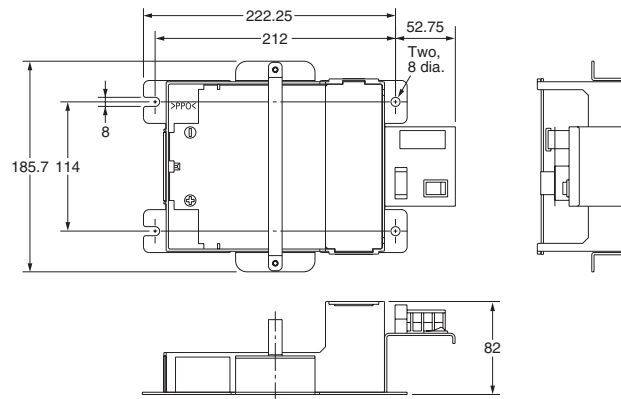
Bus Line Connector

S8T-BUS03



Battery Holder

S82Y-TS01



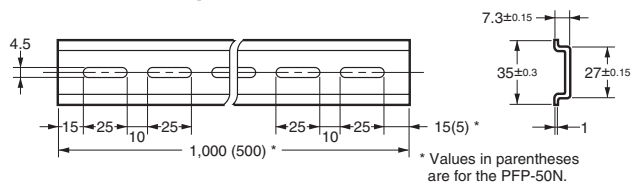
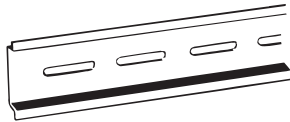
DIN Track

Note: All units are in millimeters unless otherwise indicated.

Mounting Track (Material: Aluminum)

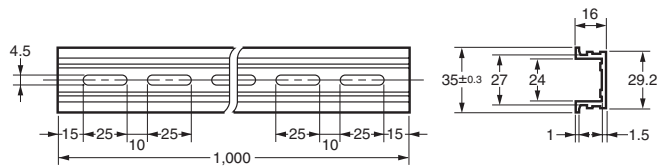
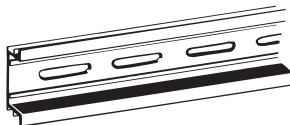
PFP-100N

PFP-50N



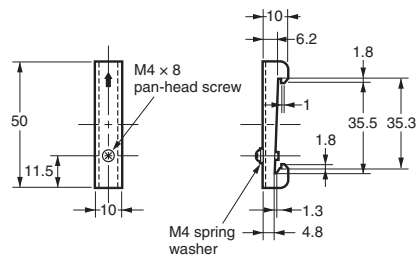
Mounting Track (Material: Aluminum)

PFP-100N2



End Plate

PFP-M



Warranties, Limitations of Liability

■ WARRANTY

Omron's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

■ LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

In no event shall responsibility of Omron for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

■ SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the product 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 PRODUCT 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.

Precautions

WARNING

[Usage]

Do not use the battery where there is a possibility that it may cause loss of life or injury, such as areas where there is medical or other critical equipment.

Caution

[Usage]

The battery is designed for a short hour backup in the application where AC power is constantly sent. When the AC power is turned OFF or there are several hours of power failure, follow the instructions described in *Battery Overdischarge* on page 42. Battery service life may be shortened abnormally, or backup may be disabled due to the inability to recharge.

[Battery Overdischarge]

To protect the battery against overdischarge, follow the instructions described in *Battery Overdischarge* on page 42. When the battery has overdischarged, the battery service life may be shortened abnormally or backup operation may be disabled due to inability to recharge.

[Installation and Environment]

Do not use the battery in a tight area or near an object that generates sparks, such as contactors, relays, or static charge. The battery may generate flammable gases when it is charged, so that fire or explosion may be caused.

Tighten the terminal screws with torque 1.08 N·m and tighten the connector screw and threaded flange with torque 0.20 N·m. Loose screws may cause fire.

The tightening torque for terminal screws on the Battery Holders is 0.74 N·m. Loose screws may result in fire.

Do not remove any connector cover unless using Bus line connectors. Electric shock may be caused.

When connecting the Basic Block and DC Backup Block, lock the slider and rail stopper. If they are locked insufficiently, linkage may be disconnected due to vibration, causing electric shock.

Do not connect the load or capacitor between S8T-DCBU-01 and battery. This may shorten the battery service life or disable the backup operation due to malfunction of the overcurrent protection function when the backup operation is changed over.

Do not use batteries other than the designated ones. If a battery other than the designated ones is used, smoke and fire may be caused.

Do not apply resin including a migrational plasticizer on the battery. Cracks will generate in the battery to cause leakage of electrolyte.

When using metallic tools to install the battery to the Battery Holder, use one insulated with vinyl tape or the like. A short circuit may cause heat or spark, possibly causing a broken battery, fire or explosion.

Connect the battery correctly. Wrong connection may cause smoke or fire.

Install and transport the Battery Holder in the specified direction. If the installation and transportation is not done as specified, battery fluid may leak, or the battery may not be protected from leakage, which may cause smoke or fire.

Do not operate the battery in an area exceeding 40°C. The battery may deteriorate quickly and cause fire.
(Operating temperature range of a battery: 0 to 40°C)

Do not use the battery in an area where there are corrosive gases. If it is left in this condition for a long time, the contact surface of the switch or relay may corrode and cause unstable or loose contact, disabling the backup operation due to the inability to recharge. If corrosive gas enters into the battery, fire may result in the worst case.

Do not use new and old, different types, and different residual capacities of batteries mixed. Smoke and fire may be caused.

Do not use the DC Backup Block for the applications in which connected load causes frequent inrush current.

See “Additional Precautions According to UL1604” for UL1604 conformance.

[Operation]

Follow the precautions of a battery when using. A battery could be dangerous if it is used incorrectly.

Do not touch the product during power-on, and immediately after power-off. Hot surfaces may cause heat injury.

Do not add or separate the DC Backup Block during power-on. Electric shock may be caused.

To stop the unit in case of an emergency, turn the AC power OFF and disconnect the battery. If only the AC power is turned OFF, the device that is powered by the battery does not stop. This may cause damage to the device or injury to persons.

Replace the battery immediately if it is fully drained. If the fully drained battery is kept in use, fire may be caused.

If malodor, abnormal noise, smoke or liquid is issued from the battery, turn off the switch of the Battery Holder. Continuation of operation in this state may cause fire.

Keep away from electrolyte leaking from the battery. Lost sight or burns may be caused. Flush electrolyte entering eyes or contacting the skin with a large volume of clean water and get medical attention.

Do not use the Battery Holder in locations subject to shocks or vibrations. Shocks or vibrations may cause battery performance to deteriorate.

[Maintenance]

Do not disassemble the product or touch internal parts during power-on. Electric shock may be caused.

When performing maintenance, turn the AC power OFF before disconnecting the battery (Refer to *Battery Overdischarge* on page 42). If only the AC power is turned OFF, the device that is powered by the battery does not stop.

Be careful during installation of the battery or Battery Holder or replacement of the battery to avoid dropping the battery. A dropping battery may cause injuries and burns caused by leaking electrolyte.

Do not install or replace the battery in the presence of flammable gases. Sparks generated when the battery is connected may cause explosion or fire.

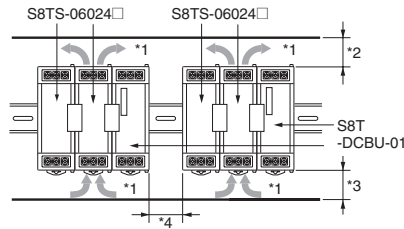
Do not disassemble or remodel the battery. Diluted sulfuric acid may leak, possibly causing loss of sight or burns.

Do not short-circuit the battery using a metallic matter. Electric shock, fire or burns may be caused.

Observe a self-imposed control, laws and regulations for disposal or collection (recycle) of a battery. Explosion may be caused if a battery is thrown in fire.

Mounting

To improve the long-term reliability of devices, give due consideration to heat dissipation when mounting. With the S8T-DCBU-01, heat is dissipated by natural convection. Mount Blocks in a way that allows convection in the atmosphere around them.

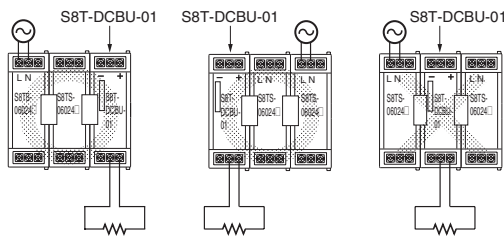


- *1. Convection of air
- *2. 75 mm min.
- *3. 75 mm min.
- *4. 10 mm min.

When cutting out holes for mounting, make sure that cuttings do not enter the interior of the products.

Before turning the Power Supply ON, be sure to remove sheets that were used as covers during mounting, and make sure that heat release is not obstructed.

Connect the S8T-DCBU-01 to the right or left end of S8TS-06024□ Basic Blocks.



Installation/ Wiring

Before installation, make sure that the charging voltage selector and the overcurrent protection operating point selector are properly set up.

Ensure that input and output terminals are wired correctly.

Close the terminal cover to avoid short circuit of terminals with a foreign object.

Use the following material to wire to load and to the batteries for preventing wiring material from smoke or fire caused by the abnormal load.

Do not press down the terminal block or connector terminal at more than 100 N force when tightening the terminal screws.

Be sure to remove the sheets covering the product for machining before power-on.

Recommended Wire Diameter

Overcurrent protection operating point selector	Number of connected S8TS-06024□	Recommended wire diameter
5.7 A (typ.)	1, 2	AWG 14 to 18 (cross-sectional area: 0.823 to 2.081 mm ²)
	3	AWG 14 to 16 (cross-sectional area: 1.309 to 2.081 mm ²)
11.7 A (typ.)	3, 4, 5	AWG 14 (cross-sectional area: 2.081 mm ²)

Installation Environment

Do not use the Power Supply in locations subject to shocks or vibrations. In particular, install the Power Supply as far away as possible from contactors or other devices that are a vibration source. Be sure to mount End Plates (PFP-M) on both ends of the Power Supply.

Install the Power Supply well away from any sources of strong, high-frequency noise.

Installing/ Storage Environment

- Store the product with ambient temperatures -25 to $+65^{\circ}\text{C}$, and relative humidity 25 to 90 %.
- Since the internal components could be deteriorated or broken under the high temperature and high load (outside the derating curve), do not use the DC Backup Block.
- Use the product with relative humidity 25 to 85 %.
- Avoid places where the product is subjected to direct sunlight.
- Avoid penetration of metal chips when processing mounting holes.
- Avoid places where the product is subjected to penetration of liquid, foreign substance or corrosive gas.
- Avoid places subjected to shock or vibration. A device such as a conductor may be a vibration source. Set the DC Backup Block as far as possible from possible sources of shock or vibration. Additionally, install the end plate (PFP-M) to both ends of the power supply.
- If the DC Backup Block is used in an area with excessive electronic noise, be sure to separate the DC Backup Block as far as possible from the noise sources.

When Storing the battery for an extended period of time, observe the following two precautions. If not observed, the life of battery could be extremely short.

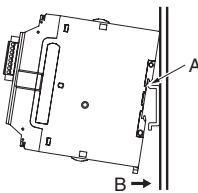
- Turn the Battery Holder switch OFF. Discharge will be continued by the standby current consumption of S8T-DCBU-01.
- Repeat charging in the period designated by the manufacture of the battery. The battery self-discharges even during storage.

Handling of Bus Line Connector

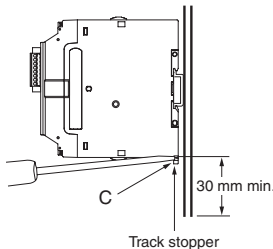
Do not drop or give strong impact on the Bus Line Connector.

DIN Track Mounting

To mount the Block on a DIN track, hook portion (A) of the Block onto the track and press the Block in direction (B).



To dismount the Block, pull down portion (C) with a flat-blade screwdriver and pull out the Block.



■ Troubleshooting

This page lists the errors that may occur when the S8T-DCBU-01 is used, along with their probable causes and remedies. Check the relevant item.

When	Probable cause	Description	Remedies
Installation	S8T-DCBU-01 cannot be connected.	The Bus Line Connector is provided with a selector for preventing misconnection of 12 V and 5 V specification S8TS units. For this reason, connection is not successful if different specification units are installed.	Set the selector on the Bus Line Connector (provided) to 24 V. Refer to <i>S8T-BUS03</i> on page 45 for details.
When checking the performances Refer to <i>Operation Check</i> on page 45 for details.	The S8T-DCBU-01 output indicator does not light in operation check procedure, step 2.	The S8T-DCBU-01 operates by the output of the S8TS-06024□. A probable cause is that the Bus Line Connector is not connected as the input voltage is connected by the Bus Line Connector (provided).	Connect the S8T-DCBU-01 to S8TS-06024□ using the Bus Line Connector (provided). Refer to <i>Basic Configuration</i> on page 40 for details.
	The connected S8TS-06024□ does not operate in operation check procedure, step 2.	A probable cause is that the S8T-DCBU-01 is connected between S8TS-06024□ Basic Blocks.	The S8T-BUS03 Bus Line Connector for connecting the S8T-DCBU-01 is not connected to the AC power line. Connect the S8T-DCBU-01 to the left or right end of S8TS-06024□ Basic Blocks.
	The battery status indicator is lit even 10 seconds or more after the power is turned ON in operation check procedure, step 3.	A probable cause is that the battery was connected with the + and – polarities reversed.	Connect the battery correctly. Refer to <i>Protection Against Erroneous Battery Connection</i> on page 47 for details.
		A probable cause is that the battery voltage falls below to 22.5 V. (The battery may have self-discharged or discharged due to standby current of the S8T-DCBU-01.)	Check the battery connecting terminal voltage. If it is lower than 18.5 V, replace the battery. Be sure to follow the instructions described in <i>Battery Overdischarge</i> on page 42 from now on.
		A probable cause is that the backup ON/OFF input is open.	Short the backup ON/OFF input. (Before shipment, the backup ON/OFF input is shorted.) Refer to <i>Backup ON/OFF Input Function</i> on page 46 for details.
		A probable cause is that the overcurrent protection function of the connected S8TS-06024□ is active.	As energy is consumed by S8T-DCBU-01, the total output capacity of the number of connected S8TS-06024□s cannot be obtained. Connect one more S8TS-06024□ Basic Block. Refer to the <i>Derating Curve</i> on page 49 for details.
		A probable cause is that the overcurrent protection function selector switch on the S8T-DCBU-01 is set low.	When three or more S8TS-06024□ Basic Blocks are connected, set the overcurrent protection function selector switch to 11.7 A (typical). (The default setting is 5.7 A (typical).) Refer to <i>Overcurrent Protection Operating Point Selector</i> on page 46 for details.
		A probable cause is that the output voltage adjustment trimmer of the connected S8TS-06024□ is set lower than the factory set voltage.	The S8T-DCBU-01 detects drops in the output voltage of the S8TS-06024□ and switches over to backup operation. Adjust the output voltage adjustment trimmer on the S8TS-06024□ so that the output in a no-load state is 24.5 V or more. Refer to <i>Output Voltage Adjustment for S8TS-06024□</i> on page 44 for details.
	The backup operation is not performed in operation check procedure, step 5.	A probable cause is that inrush current during backup operation caused the fuse on the battery to blow.	Select a fuse taking the inrush current when backup operation is switched to into consideration. The recommended S82Y-TS01 Battery Holder is selected taking this inrush current into consideration. Refer to <i>Battery Holder S82Y-TS01</i> on page 44 for details.

When	Probable cause	Description	Remedies
When S8T-DCBU-01 is used	The backup state is not returned to even after the power is restored from a power failure.	A probable cause is that a protection function on the S8TS-06024□ was activated to stop S8TS-06024□ operation.	Cancel the protection functions on the S8TS-06024□. (Turn OFF the power of S8TS-06024□ Basic Block, and after at least one minute turn ON the input voltage again.)
	Output was cut during backup operation.	A probable cause is that the battery voltage falls due to discharge and the backup stop function is activated.	If a remedy is required during backup operation, allow backup to finish until the battery status indicator light.
		A probable cause is that an overcurrent state is reached due to load fluctuations during backup operation.	Provide sufficient margin for the load capacity when using the S8T-DCBU-01.
	Backup operation and regular operation are alternately repeated.	A probable cause is that one of the S8TS-06024□s is out of order when two or more S8TS-06024□s are connected.	Replace the out-of-order S8TS-06024□. Refer to <i>Backup Function</i> on page 44 for details.
		A probable cause is that the S8TS-06024□ is in an overcurrent state due to load fluctuations during regular operation.	Provide sufficient margin for the load capacity when using the S8T-DCBU-01.
When inspecting batteries	The battery status indicator is lit nevertheless it is charged over 24 hours.	A probable cause is that the battery may have discharged due to self-discharged or standby current of the S8T-DCBU-01 while the AC power is OFF.	Replace the battery. Be sure to follow the instructions described in <i>Battery Overdischarge</i> on page 42 from now on.
	Backup time is too short.	A probable cause is that backup operation has been performed frequently (AC power OFF during nighttime or holidays).	Replace the battery. Be sure to follow the instructions described in <i>Battery Overdischarge</i> on page 42 from now on.
		A probable cause is that the battery has reached the end of its service life.	We recommend periodically replacing the battery. Refer to <i>Battery Replacement</i> on page 47 for details.
		A probable cause is that the AC power is OFF for an extended period of time with the battery connected.	Replace the battery. Be sure to follow the instructions described in <i>Battery Overdischarge</i> on page 42 from now on.
		A probable cause is that battery characteristics caused the backup time to shorten in low temperatures.	Check the backup time in the operating environment before use.
	The battery voltage is extremely low.	A probable cause is that the AC power is OFF for an extended period of time with the battery connected.	Replace the battery. Be sure to follow the instructions described in <i>Battery Overdischarge</i> on page 42 from now on.
	The voltages of the two batteries used in series are considerably different.	A probable cause is a battery abnormality.	Replace both batteries.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. T027-E1-02

In the interest of product improvement, specifications are subject to change without notice.