

RSBT



Troubleshooting

LED Status Indications

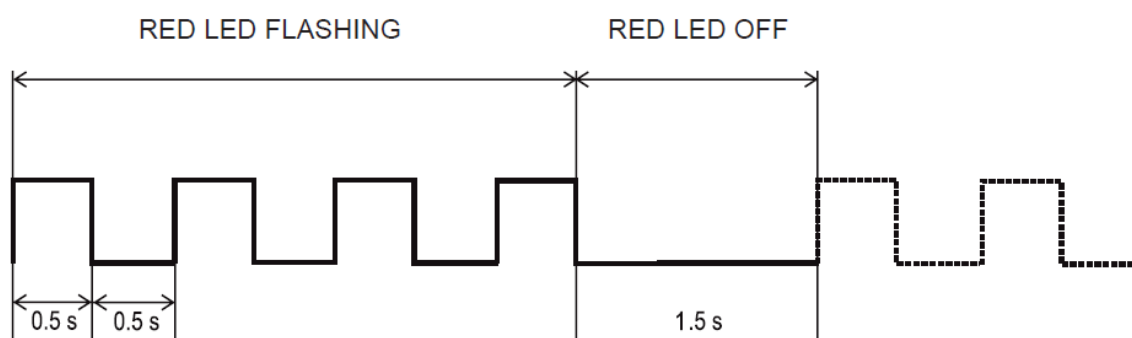
State	Supply (green LED)	Alarm (red LED)
Idle	ON	OFF
Ramping	ON	OFF
Bypass	ON	OFF
Alarm	ON	Flashing

Relay status indication

State	Supply (green LED)	Relay contact position		
		RSBT 45mm (V21../V61..)	RSBT 120 mm (CV0, CVC)	
		Alarm (11, 12, 14)	Alarm (11, 12, 14)	Bypass (21, 22, 24)
Idle	ON	11, 12	11, 12	21, 22
Ramping	ON	11, 12	11, 12	21, 22
Bypass	ON	11, 12	11, 12	21, 24
Alarm	ON	11, 14	11, 14	21, 22

Alarms

The RSBT includes a number of diagnostics and protection features each of which is signalled through a flashing sequence on the red LED. After each flashing cycle, there is a delay (OFF time) on the red LED of 1.5 sec before the next cycle starts. During the alarm recovery period, the red LED will flash at twice the frequency to indicate that the RSBT is in recovery mode.



Number of flashes	2
Alarm	Wrong phase sequence
Alarm description	If the connection to the soft starter is not done in the correct sequence (L1, L2, L3), the RSBT will trigger the wrong phase sequence alarm and the motor will not be started.
Alarm recovery period	N/A
Consecutive alarms for hard reset	1
Action to recover alarm	User intervention is required to change the wiring sequence to recover alarm.
Troubleshooting	Check that wiring on L1, L2, L3 is in the correct sequence

Number of flashes	3		
Alarm	Line voltage out of range		
Alarm description	RSBT models have fixed over-voltage and under-voltage alarm limits. When the mains voltage is out of these limits for more than 5 seconds the line voltage out of range alarm will be triggered.		
	Model	Under-voltage limit	Over-voltage limit
	RSBT22	187 VAC	250 VAC
	RSBT40	330 VAC	470 VAC
	RSBT48	200 VAC	500 VAC
Alarm recovery period	5 minutes		
Consecutive alarms for hard reset	N/A		
Action to recover alarm	The alarm will self-recover after 5 minutes from when the supply voltage is within limits.		
Troubleshooting	Check supply voltage level across L1, L2, L3 terminals		

Number of flashes	4
Alarm	Frequency out of range
Alarm description	If the frequency measured by the RSBT is > 66.5 Hz and < 44.5 Hz for at least 1 second, this alarm will trigger.
Alarm recovery period	5 minutes
Consecutive alarms for hard reset	N/A
Action to recover alarm	Check for any disturbance on the voltage network. The voltage waveform may be disrupted when unfiltered variable frequency drives are used.
Troubleshooting	In the case where variable frequency drives are present, ensure that proper EMI filters are installed

Number of flashes	5
Alarm	Locked rotor condition (during ramp)
Alarm description	If a current $\geq 4 \times I_e$ for 100 msec is detected, the RSBT will issue the locked rotor alarm.
Alarm recovery period	5 minutes
Consecutive alarms for hard reset	2
Action to recover alarm	The alarm will self-recover after 5 minutes. If the soft starter remains in alarm for more than 5 minutes (due to consecutive alarms) then a power reset (reset of L1, L2, L3 is required).
Troubleshooting	- Check that the RSBT model is suitably rated for the motor - Check motor windings resistance to check if motor is damaged

Number of flashes	6
Alarm	Ramp-up time (> 1 sec)
Alarm description	The RSBT will trigger this alarm if the compressor does not reach full speed within 1 second. The alarm protects the bypass relays from switching a high current.
Alarm recovery period	5 minutes
Consecutive alarms for hard reset	2
Action to recover alarm	The alarm will self-recover after 5 minutes. If the alarm is triggered twice consecutively, then the user must switch OFF and then ON the mains (L1, L2, L3) to perform a hard reset. This will reset the alarm.
Troubleshooting	• Check that the correct model of RSBT is being used • Check that the connections to the compressor are correct • Check for any mechanical blockage of the compressor

Number of flashes	7
Alarm	Over-temperature
Alarm description	The RSBT constantly measures the heatsink and thyristors (SCRs) temperature. If the maximum internal temperature is exceeded (for a minimum of 0.5 sec) an over-temperature alarm is triggered. This condition can be triggered by too many starts per hour, an over-load condition during starting and/or stopping or a high surrounding temperature.
Alarm recovery period	Depends on the cooling period. The RSBT will only recover if the internal temperature is within safe limits.
Consecutive alarms for hard reset	N/A
Action to recover alarm	The alarm will self-recover - the recovery period will depend on the cooling time required by RSBT. The higher the surrounding temperature, the longer the cooling period.
Troubleshooting	• Check that the specified number of starts/hr is not exceeded • Check that the surrounding temperature around the soft starter is within limits

Number of flashes	8
Alarm	Current not normal (during bypass)
Alarm description	The RSBT measures the current during bypass state. If the current is $> 1.15 \cdot I_e$ for at least 1 second, the RSBT will trigger this alarm and switch OFF the output. This condition can result in case of an overload condition or because the RSBT model is under-rated for the load it is controlling.
Alarm recovery period	5 minutes
Consecutive alarms for hard reset	2
Action to recover alarm	The alarm will self-recover after a period of 5 minutes. If the alarm is triggered twice consecutively, then the user must switch OFF and then ON the mains (L1, L2, L3) to perform a hard reset. This will reset the alarm.
Troubleshooting	• Check that the correct model of RSBT is being used • Check that the connections to the compressor are correct • Measure the current with a clamp meter on any of L1, L2, L3 phases and check if the current is within the expected levels. If the current is higher than the RSBT rated current, change the RSBT to a larger model

Number of flashes	9
Alarm	Supply voltage unbalance
Alarm description	The RSBT measures the voltages on all the three phases and if there is a difference of more than 10% for ≥ 5 sec between any of the phases, the RSBT will trigger the voltage unbalance alarm.
Alarm recovery period	5 minutes
Consecutive alarms for hard reset	N/A
Action to recover alarm	The alarm will start a self-recovery of 5 minutes from the moment the voltage on L1, L2, L3 are within 10% of each other. If the voltage unbalance remains $> 10\%$, the RSBT will remain in alarm state.
Troubleshooting	• Check for any loose connections on the mains and load-side terminals • Check supply voltage level across L1, L2, L3 terminals and see if there is any unbalance • Check resistance on motor windings to see if any of the coils is damaged

