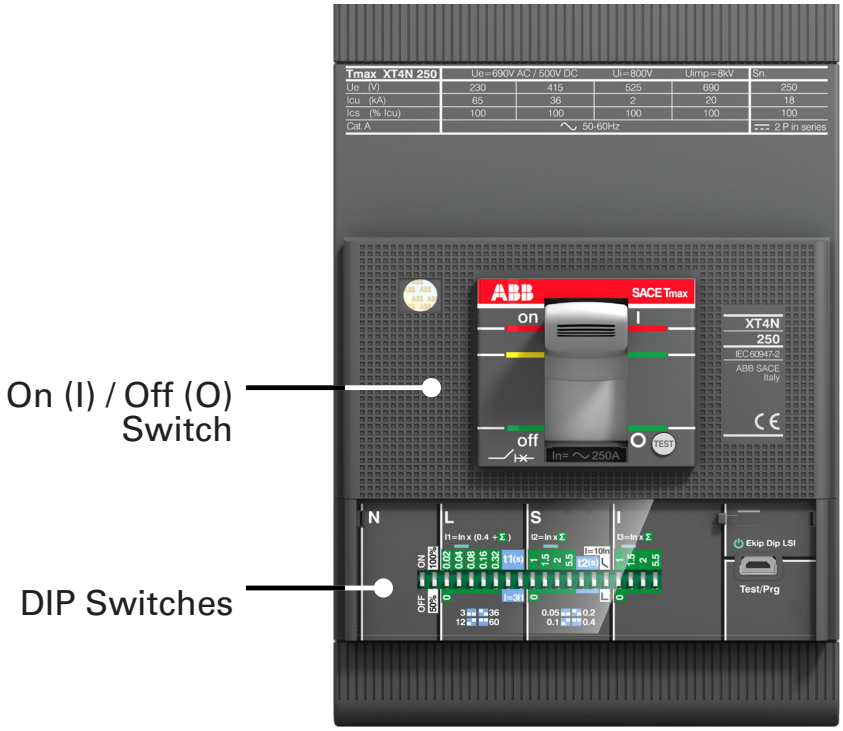
ADJUSTABLE CIRCUIT BREAKERS

All Outdoor PowerRACKs that are in the Load Master® product family, have adjustable breakers for the Cam outputs. The current level of the circuit breakers is adjustable to match the load of the output receptacles. The circuit breakers are adjusted with dip switches located under a clear cover on each circuit breaker.

Figure 3.1: Circuit Breaker (breaker may vary in design)



Function Breakdown of LS/I Breakers

The Ekip Dip LS/I is an electronic trip unit used in ABB's XT series molded case circuit breakers (MCCBs). It provides adjustable protection functions using DIP switches. The LS/I version includes:

L (Long-time protection): Protects against overloads. Providing 16 amerage settings.

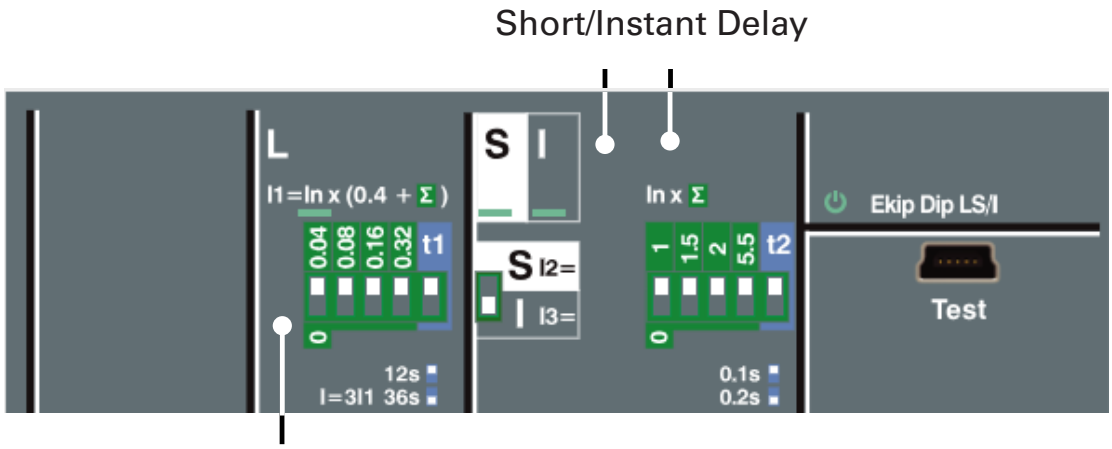
S (Short-time protection): Protects against short-circuits with adjustable delay for selectivity.

I (Instantaneous protection): Trips immediately on very high fault currents.

In Ekip Dip LS/I trip units, the Short-time (S) and Instantaneous (I) protections share a combined control logic, but they are not the same function. The LS/I indicates that the S and I protections are internally coordinated.

Function Breakdown of LS/I Breakers

Figure 3.2: DIP Switches



Long-time Protection (L)
Pickup (Ir): Adjustable from 0.4 × In to 1.0 × In (In = breaker rated current).
Delay (t1): Adjustable delay (in seconds) to prevent nuisance tripping under short overloads.
Purpose: Prevents overheating of cables and conductors due to sustained overload.

Short-time Protection (S)
Pickup (Isd or I2): Adjustable typically 1.5 × Ir to 10 × Ir.
Delay (t2): Adjustable delay (0.1 s to 0.5 s, depending on model).
Purpose: Provides coordination with downstream breakers. Allows a fault closer to the load to be cleared locally before the upstream breaker trips.

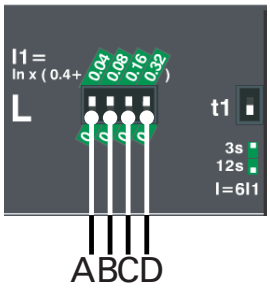
Instantaneous Protection (I)
Pickup (Ii or I3): Adjustable, usually 2 × In up to 15 × In.
Delay: Fixed (no intentional delay).
Purpose: Trips immediately for very high-level short circuits.

DIP Switch Settings
Settings are made with DIP switches on the front of the trip unit. Each function (L, S, I) has its own range of DIP combinations.
L Function: Set Ir (pickup) and t1 (delay)
S Function: Set Isd (pickup) and t2 (delay)
I Function: Set Ii (pickup)

Important: For LS/I breakers, if the fault current is above I2 (the short-time pickup) but below I3, the breaker will trip after the t2 delay (short-time protection). If the fault current is above I3, the breaker will trip instantaneously (I function), regardless of t2. The short-time delay (t2) only applies in the range between I2 and I3.

The trip unit automatically decides based on the current magnitude.

Adjusting the Circuit Breakers



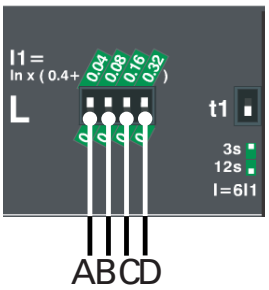
640-1600 Amp Circuit Breaker- DIP Switch Settings

1. Set the DIP switches on the circuit breaker to the closest level indicated in the table below with the set level greater than the actual load
   a. Only adjust the DIP switch labeled "L"
   b. To adjust the circuit breaker, open the clear cover over the DIP switch using a small flathead screw driver
   c. Move each switch (A, B, C, D) into the up or down position based on the table below to achieve the desired output current rating
   d. Close the clear cover over the DIP switch

640-1600 Amp Circuit Breaker Adjustment Settings			
Amps	**Dipswitch Configuration**	**Amps**	**Dipswitch Configuration**
640 Amps	UP / DOWN — A B C D	**1,152 Amps**	UP / DOWN — A B C D
704 Amps	UP / DOWN — A B C D	**1,216 Amps**	UP / DOWN — A B C D
768 Amps	UP / DOWN — B A C D	**1,280 Amps**	UP / DOWN — B A C D
832 Amps	UP / DOWN — A B C D	**1,344 Amps**	UP / DOWN — A B C D
896 Amps	UP / DOWN — C A B D	**1,408 Amps**	UP / DOWN — C A B D
960 Amps	UP / DOWN — A C B D	**1,472 Amps**	UP / DOWN — A C B D
1,024 Amps	UP / DOWN — B C A D	**1,536 Amps**	UP / DOWN — B C A D
1,088 Amps	UP / DOWN — A B C D	**1600 Amps**	UP / DOWN — A B C D

Adjusting the Circuit Breakers (continued)

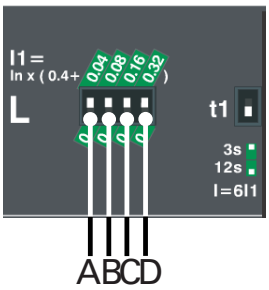
480-1200 Amp Circuit Breaker- DIP Switch Settings



1. Set the DIP switches on the circuit breaker to the closest level indicated in the table below with the set level greater than the actual load
   a. Only adjust the DIP switch labeled "L"
   b. To adjust the circuit breaker, open the clear cover over the DIP switch using a small flathead screw driver
   c. Move each switch (A, B, C, D) into the up or down position based on the table below to achieve the desired output current rating
   d. Close the clear cover over the DIP switch

480-1200 Amp Circuit Breaker Adjustment Settings			
Amps	**Dipswitch Configuration**	**Amps**	**Dipswitch Configuration**
480 Amps	UP / DOWN: A B C D	**864 Amps**	UP / DOWN: A B C D
528 Amps	UP / DOWN: A B C D	**912 Amps**	UP / DOWN: A B C D
576 Amps	UP / DOWN: A B C D	**960 Amps**	UP / DOWN: A B C D
624 Amps	UP / DOWN: A B C D	**1,008 Amps**	UP / DOWN: A B C D
672 Amps	UP / DOWN: A B C D	**1,056 Amps**	UP / DOWN: A B C D
720 Amps	UP / DOWN: A B C D	**1,104 Amps**	UP / DOWN: A B C D
768 Amps	UP / DOWN: A B C D	**1,152 Amps**	UP / DOWN: A B C D
816 Amps	UP / DOWN: A B C D	**1,200 Amps**	UP / DOWN: A B C D

Adjusting the Circuit Breakers (continued)



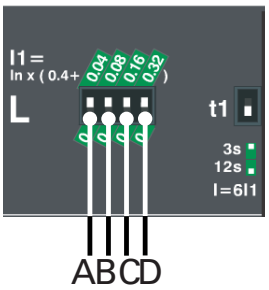
240-600 Amp Circuit Breaker- DIP Switch Settings

1. Set the DIP switches on the circuit breaker to the closest level indicated in the table below with the set level greater than the actual load
   a. Only adjust the DIP switch labeled "L"
   b. To adjust the circuit breaker, open the clear cover over the DIP switch using a small flathead screw driver
   c. Move each switch (A, B, C, D) into the up or down position based on the table below to achieve the desired output current rating
   d. Close the clear cover over the DIP switch

240-600 Amp Circuit Breaker Adjustment Settings			
Amps	**Dipswitch Configuration**	**Amps**	**Dipswitch Configuration**
240 Amps	UP / DOWN: A B C D	**432 Amps**	UP / DOWN: A B C D
264 Amps	UP / DOWN: A B C D	**456 Amps**	UP / DOWN: A B C D
288 Amps	UP / DOWN: A B C D	**480 Amps**	UP / DOWN: A B C D
312 Amps	UP / DOWN: A B C D	**504 Amps**	UP / DOWN: A B C D
336 Amps	UP / DOWN: A B C D	**528 Amps**	UP / DOWN: A B C D
360 Amps	UP / DOWN: A B C D	**552 Amps**	UP / DOWN: A B C D
384 Amps	UP / DOWN: A B C D	**576 Amps**	UP / DOWN: A B C D
408 Amps	UP / DOWN: A B C D	**600 Amps**	UP / DOWN: A B C D

Adjusting the Circuit Breakers (continued)

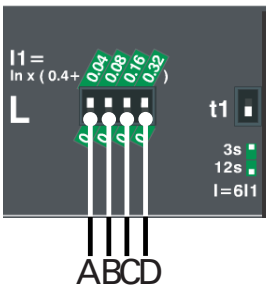
160-400 Amp Circuit Breaker- DIP Switch Settings



1. Set the DIP switches on the circuit breaker to the closest level indicated in the table below with the set level greater than the actual load
   a. Only adjust the DIP switch labeled "L"
   b. To adjust the circuit breaker, open the clear cover over the DIP switch using a small flathead screw driver
   c. Move each switch (A, B, C, D) into the up or down position based on the table below to achieve the desired output current rating
   d. Close the clear cover over the DIP switch

160-400 Amp Circuit Breaker Adjustment Settings			
Amps	**Dipswitch Configuration**	**Amps**	**Dipswitch Configuration**
160 Amps	UP / DOWN: A B C D	**288 Amps**	UP / DOWN: A B C D
176 Amps	UP / DOWN: A B C D	**304 Amps**	UP / DOWN: A B C D
192 Amps	UP / DOWN: A B C D	**320 Amps**	UP / DOWN: A B C D
208 Amps	UP / DOWN: A B C D	**336 Amps**	UP / DOWN: A B C D
224 Amps	UP / DOWN: A B C D	**352 Amps**	UP / DOWN: A B C D
240 Amps	UP / DOWN: A B C D	**368 Amps**	UP / DOWN: A B C D
256 Amps	UP / DOWN: A B C D	**384 Amps**	UP / DOWN: A B C D
272 Amps	UP / DOWN: A B C D	**400 Amps**	UP / DOWN: A B C D

Adjusting the Circuit Breakers (continued)

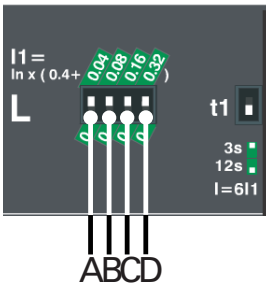


100-250 Amp Circuit Breaker- DIP Switch Settings

1. Set the DIP switches on the circuit breaker to the closest level indicated in the table below with the set level greater than the actual load
   a. Only adjust the DIP switch labeled "L"
   b. To adjust the circuit breaker, open the clear cover over the DIP switch using a small flathead screw driver
   c. Move each switch (A, B, C, D) into the up or down position based on the table below to achieve the desired output current rating
   d. Close the clear cover over the DIP switch

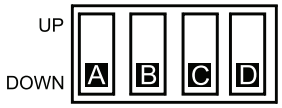
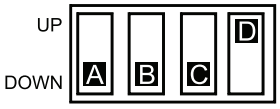
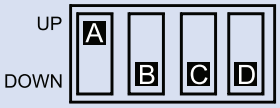
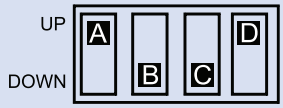
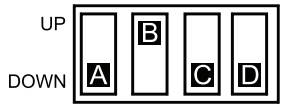
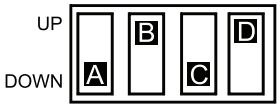
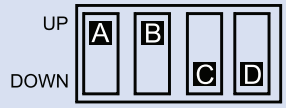
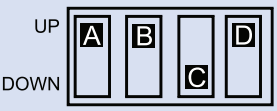
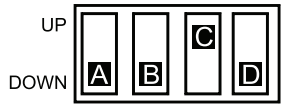
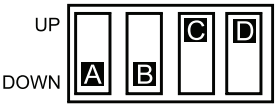
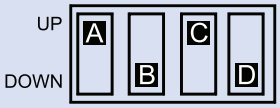
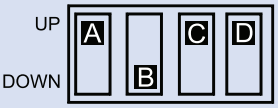
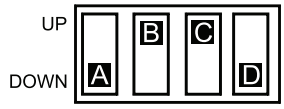
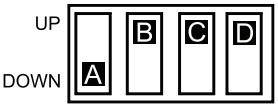
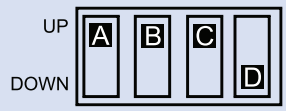
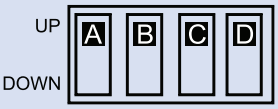
100-250 Amp Circuit Breaker Adjustment Settings			
Amps	**Dipswitch Configuration**	**Amps**	**Dipswitch Configuration**
100 Amps	UP / DOWN: A B C D	**180 Amps**	UP / DOWN: A B C D
110 Amps	UP / DOWN: A B C D	**190 Amps**	UP / DOWN: A B C D
120 Amps	UP / DOWN: B A C D	**200 Amps**	UP / DOWN: B A C D
130 Amps	UP / DOWN: A B C D	**210 Amps**	UP / DOWN: A B C D
140 Amps	UP / DOWN: C A B D	**220 Amps**	UP / DOWN: C A B D
150 Amps	UP / DOWN: A C B D	**230 Amps**	UP / DOWN: A C B D
160 Amps	UP / DOWN: B C A D	**240 Amps**	UP / DOWN: B C A D
170 Amps	UP / DOWN: A B C D	**250 Amps**	UP / DOWN: A B C D

Adjusting the Circuit Breakers (continued)



60-150 Amp Circuit Breaker- DIP Switch Settings

1. Set the DIP switches on the circuit breaker to the closest level indicated in the table below with the set level greater than the actual load
   a. Only adjust the DIP switch labeled "L"
   b. To adjust the circuit breaker, open the clear cover over the DIP switch using a small flathead screw driver
   c. Move each switch (A, B, C, D) into the up or down position based on the table below to achieve the desired output current rating
   d. Close the clear cover over the DIP switch

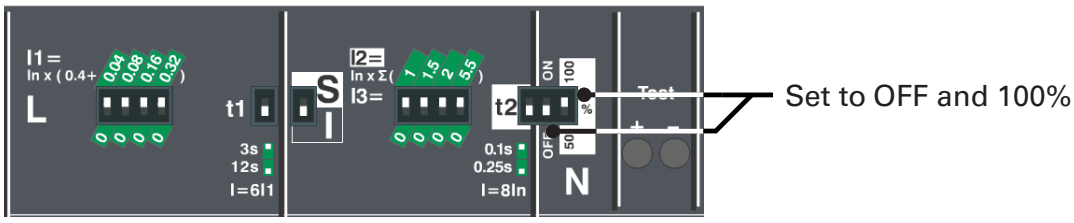
60-150 Amp Circuit Breaker Adjustment Settings			
Amps	**Dipswitch Configuration**	**Amps**	**Dipswitch Configuration**
60 Amps		**108 Amps**	
66 Amps		**114 Amps**	
72 Amps		**120 Amps**	
78 Amps		**126 Amps**	
84 Amps		**132 Amps**	
90 Amps		**138 Amps**	
86 Amps		**144 Amps**	
102 Amps		**150 Amps**	

TROUBLESHOOTING GUIDE

To help determine what has caused a circuit breaker to trip, it is important to configure the simplest possible power distribution system set-up under which the problem still occurs. The loads connected to the system might exceed the circuit breaker rating, in which case a larger power distribution unit would be needed. If a larger power distribution unit is needed, contact Lex Products with the load information and requirements of the specific application to determine the appropriate power distribution system.

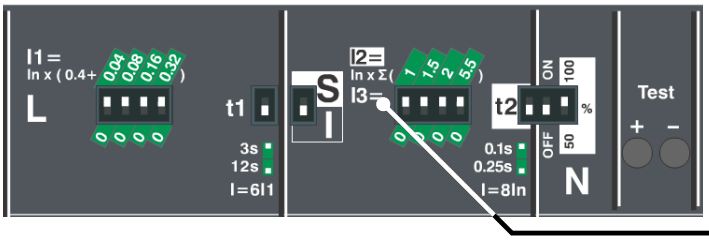
Circuit Breaker Tripping During Normal Operation

1. Verify whether circuit breaker long delay settings are set as needed
   a. Ensure the N setting is at 100% and the ON/OFF functionality next to the N is set to OFF
   b. These dip switches are intended for specialized single phase applications and do not apply to the Load Master series under normal operation
2. Retry turning on the circuit after adjustments are made



Set to OFF and 100%

3. If a large inductive load such as an air conditioner was turned on when the circuit breaker tripped, raise inrush settings or increase the trip time delay
   a. The inrush settings can be adjusted by turning on the dip switches for I3.
   b. All dip switches up will result in the maximum inrush tolerance of ten times the circuit breaker rating



I3 dip switches: Move all dip switches UP for maximum inrush tolerance

Circuit Breaker Tripping When Powering Up

1. Follow the steps outlined for circuit breakers tripping during normal operation
2. If the issue persists, disconnect the output connections from the circuit breaker that is tripping
3. Turn on all circuit breakers
   a. If the circuit breaker trips, contact Lex Products for technical assistance
   b. If the circuit breaker does not trip proceed to the next step

Circuit Breaker Tripping When Powering Up (continued)

4. Connect the cable to the corresponding circuit breaker outlets and turn off all attached loads
5. Turn on the circuit breaker
   a. If the circuit breaker trips, disconnect cabling used and check for short circuits
   b. Turn off all circuit breakers, check the cabling connected to the Outdoor PowerRACK, and check connected loads for shorts circuits

How to Check an Outdoor Rack for Short Circuits

1. Disconnect incoming power from the Outdoor Rack
2. Turn on circuit breaker(s) for the circuit(s) to be tested
3. Using a continuity meter or a multimeter, set to continuity/resistance mode and connect one probe to the input ground (green) Cam-type connector brass
4. Take the other probe of the meter and check if there is continuity between each Cam-type connector and ground
5. If there is continuity (R < 1 kΩ, or the meter lights up or beeps), there is short circuit present
   a. Contact Lex Products Technical Services department
6. If there is no continuity, repeat step 3 and 4 checking if there is continuity between the neutral (white) Cam-type connector and the other Cam-type connectors
7. If continuity is detected, there is a short circuit present
   a. Contact Lex Products if a short circuit is detected

No Power at Receptacles

1. Ensure that connections are in place and tight
2. Ensure that power source is live
   a. Activate if not on
3. Ensure that circuit breakers are 'I/ON'
4. If a circuit breaker trips, identify source of short circuit or overload and correct before resetting circuit breaker
   a. Check to see if the circuit is overloaded and reduce loads as needed
   b. Check for short circuits in the cabling or load device and correct as needed
5. For those receptacles that include a GFCIs:
   a. Ensure the GFCIs are set by pressing the 'RESET' button
6. If a GFCI trips, identify source of current leakage and correct before resetting the GFCI
   a. Check to see if the circuit is overloaded and reduce loads as needed
   b. Check for short circuits in the cabling or load device and correct as needed
7. If there is still no power at receptacles:
   a. Remove PDU from use
   b. Contact Lex Products for next course of action