

SACE Emax 2 Ekip Hi-Touch dual setting of protections

Data centers, hospitals, manufacturing plants, and many other facilities rely on backup generators to maintain continuity of electrical service when there is an unexpected power outage.

Due to the inherent differences between a utility supplied power source and an emergency generator the protective device current thresholds and settings that apply to the utility power may not be appropriate for the generator supplied power source.

The protective device would need to be reprogrammed or a separate protective device with different settings would need to be activated to adequately protect the generator and maintain continuity of service.

With the **Ekip Hi-Touch**, a powerful trip unit developed for **SACE Emax 2** air circuit breaker, continuity of service and selectivity can be maintained using the integrated dual setting feature.



With the dual setting feature two user selectable protective parameter sets are available; these two parameter sets are called Set A and Set B.

They are completely interchangeable and either can be configured as the default or alternate parameter set.

The dual setting feature can also add an extra level of protection against Arc Flash within a system.

When this feature is used in a switchgear, for example, it can be set to activate the second set of parameters that minimize protection delays if the switch gear door is opened. This can

greatly reduce the risk of an operator being injured by an arc flash incident.

When this feature is activated it can be used to alternate between these two sets of protective parameters for:

- Overload (L – ANSI 49)
- Time delayed overcurrent (S – ANSI 51 & 50TD)
- Thermal Memory
- Instantaneous overcurrent (I – ANSI 50)
- Closing on short circuit (MCR)
- Ground fault (G – ANSI 51N & 50NTD)
- Instantaneous ground fault (G – ANSI 50N)
- Ground fault on toroid (Gext – ANSI 51G & 50GTD)
- Neutral protection
- Start-up function
- Zone selectivity for functions S and G (ANSI 68)
- Current unbalance (IU – ANSI 46)
- Undervoltage (UV – ANSI 27)
- Overvoltage (OV – ANSI 59)
- Under-frequency (UF – ANSI 81L)
- Over-frequency (OF – ANSI 81H)
- Voltage unbalance (VU – ANSI 47)
- Residual current (Rc – ANSI 64 & 50NTD)
- Reverse active power (RP – ANSI 32R)
- Syncrocheck (SC – ANSI 25, optional)
- Cyclical direction of the phases (ANSI 47)
- Power factor (ANSI 78)
- Current thresholds
- Power Controller function (optional)
- 2nd Time delayed overcurrent (S2 – ANSI 50TD)
- 2nd Instantaneous overcurrent (2I – ANSI 50)
- 2nd Ground fault (ANSI 50GTD/51G & 64REF)
- Directional overcurrent (D – ANSI 67)
- Zone selectivity for function D (ANSI 68)
- 2nd Undervoltage (UV2 – ANSI 27)
- 2nd Overvoltage (OV2 – ANSI 59)
- 2nd Under-frequency (UF2 – ANSI 81L)
- 2nd Over-frequency (OF2 – ANSI 81H)

The dual setting of protections is particularly useful in LV microgrids when they switch to stand-alone operation.

SACE Emax 2

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Generator Safety

In addition to all of the powerful capabilities of the **Ekip Hi-Touch** trip unit, the **SACE Emax 2** air circuit breaker is also available with an **Ekip G Hi-Touch** trip unit.



This advanced trip unit has all of the same protective functions of the Ekip Hi-Touch trip unit but with even more specialized protective functions required by generators integrated into the **Ekip G Hi-Touch**, such as:

- Voltage controlled overcurrent protection (S (V) – ANSI 51V)
- 2nd Voltage controlled overcurrent protection (S2 (V) – ANSI 51V)
- Minimum current (UC – ANSI 37C)
- Maximum residual voltage (RV – ANSI 59N)
- Rate of frequency change (ROCOF – ANSI 81R)
- Loss of field or reverse reactive power (RQ – ANSI 40 or 32RQ)
- 2nd Loss of field or reverse reactive power (RQ2 – ANSI 40 or 32RQ)
- Maximum reactive power (OQ – ANSI 32Q)
- Maximum active power (OP – ANSI 32P)
- Minimum active power (UP – ANSI 37P)



These integrated generator protective functions can be used to replace costly and bulky external generator protective relays and wiring thus saving time and money for the equipment builder without sacrificing functionality.

For more information on how to apply Ekip G's generator protections see the ["Generators protection: Ekip G trip unit for SACE Emax 2"](#) white paper.

Selectivity

The dual setting feature can be used to maintain selective coordination within an electrical system. For example, if an emergency generator (backup power source) is activated because of loss of utility power from the grid, an alternate set of protection settings can be enabled automatically due to this event. The alternate settings can be optimized for the characteristics of the emergency generator which ensures the incoming supply and load side circuit breakers will remain selectively coordinated.

Under normal service conditions of the installation shown in Figure 1, the circuit breakers C are programmed to be selectively coordinated with the upstream main circuit breaker A, supplied by the utility grid, and the downstream load circuit breakers D. By switching from the utility power source to the emergency power source, circuit breaker B now becomes the upstream main circuit breaker on the supply side of circuit breakers C.

Circuit breaker B, being the main circuit breaker supplied by an emergency generator, must be set to current thresholds and tripping times that are suited to the characteristics of the generator and therefore the values of the parameter settings in circuit breakers C on the load side may not be selectively coordinated with circuit breaker B. By means of the "dual setting" function of the Ekip Hi-Touch trip unit, it is possible to switch the parameter set of circuit breakers C from a set which guarantees selectivity with circuit breaker A, to another set which guarantees selectivity with circuit breaker B.

Figure 1

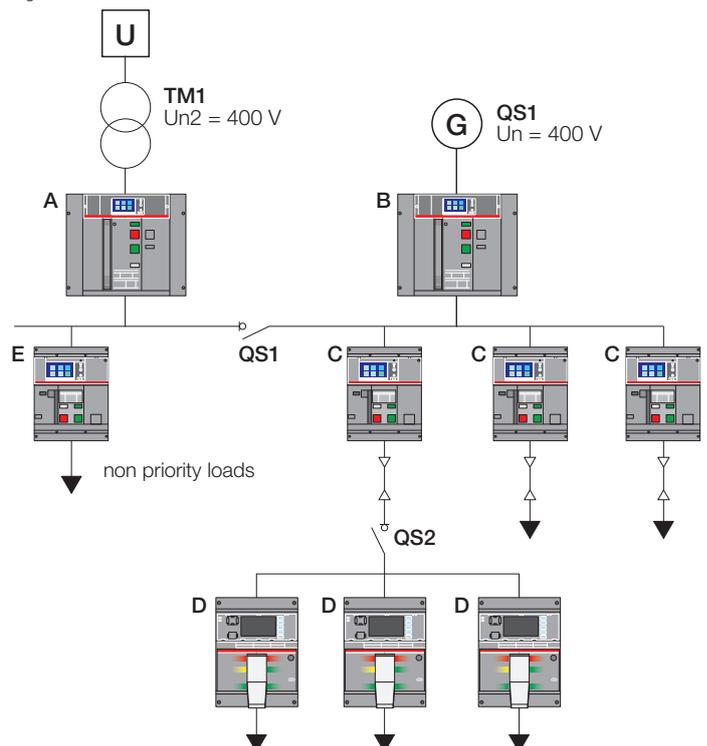


Figure 2 shows the time-current curves of the installation under normal service conditions. The current thresholds and time delay values set allow for a selectively coordinated system, no intersection of the time-current curves.

Figure 2

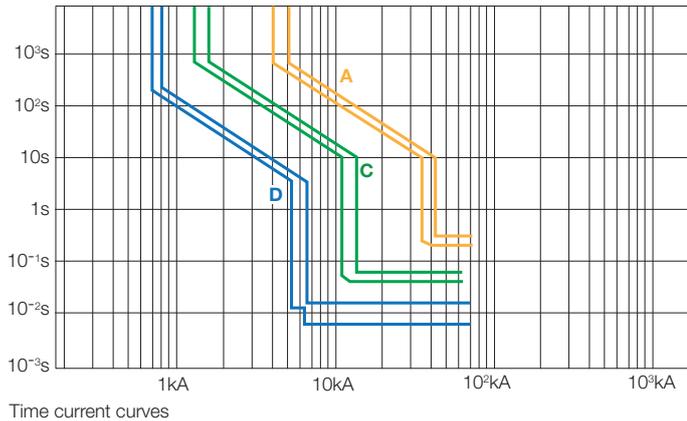


Figure 3 shows the situation in which, after switching, the power is supplied by the backup generator through circuit breaker B. If the settings of circuit breakers C are not modified, there will be no selectivity with the generator circuit breaker B.

Figure 3

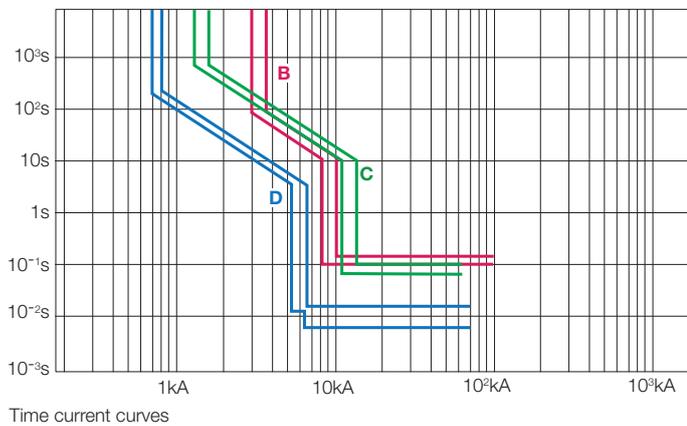
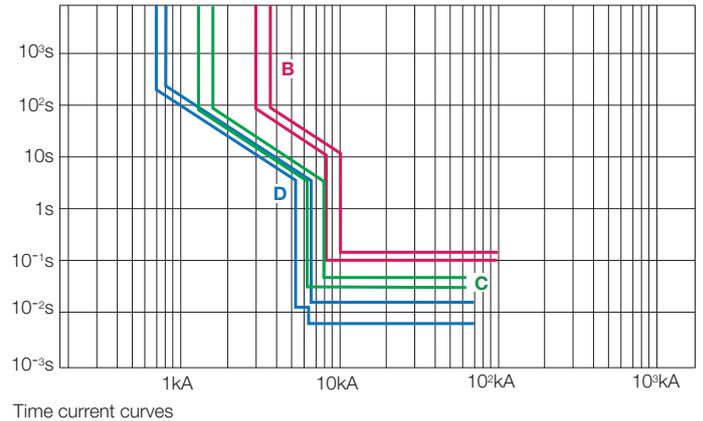


Figure 4 shows how it is possible to switch to a set of parameters which guarantees selective coordination between circuit breakers C and B by means of the “dual setting” function.

Figure 4



Methods to activate dual setting parameters

Activation of the alternate set of protection parameters on the Emax 2 Ekip Hi-Touch trip unit can be managed by:

- Digital input using an Ekip Signaling module;
- Communication network, by using one of the seven Ekip Communication protocols;
 - Modbus RS-485
 - Profibus
 - DeviceNet
 - Modbus TCP
 - Profinet
 - EtherNet/IP
 - IEC61850
- Directly from the Ekip Hi-Touch display;
- By a settable internal time, after circuit breaker closing

Conclusion

In an electrical installation it is very important to make sure that both personnel and equipment are protected and working under safe conditions. It is also important to make sure that your electrical system not only stays up and running during a power outage, but remains selectively coordinated for maximum continuity of electrical service. The Emax 2 Ekip Hi-Touch and Ekip G Hi-Touch trip units with dual setting feature can help make all of these possibilities a reality.

Contact us

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