869 Advanced Motor Control – A Comprehensive Control Solution for Motor Applications
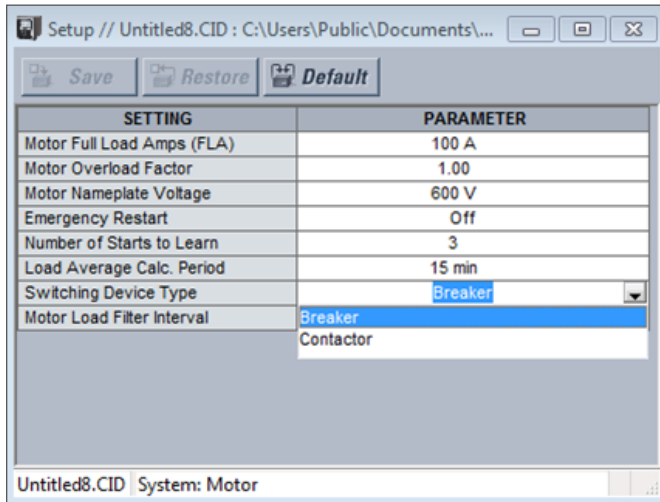
8 Series Mini Paper

imagination at work

Breaker/Contactor control

The 869 protection relay can control and monitor two types of motor switching devices: breakers and contactors. The selection is straightforward, and the wiring similar to the SR469. The settings are shown below:

SETTING	PARAMETER
Motor Full Load Amps (FLA)	100 A
Motor Overload Factor	1.00
Motor Nameplate Voltage	600 V
Emergency Restart	Off
Number of Starts to Learn	3
Load Average Calc. Period	15 min
Switching Device Type	Breaker
Motor Load Filter Interval	Breaker
	Contactor

Untitled8.CID System: Motor

Front panel/remote control

The 869 provides operator control of the motor from the front panel via several pushbuttons or by executing SCADA commands from the remote location. This is a significant improvement compared to the 469 relay where these control features were not available.
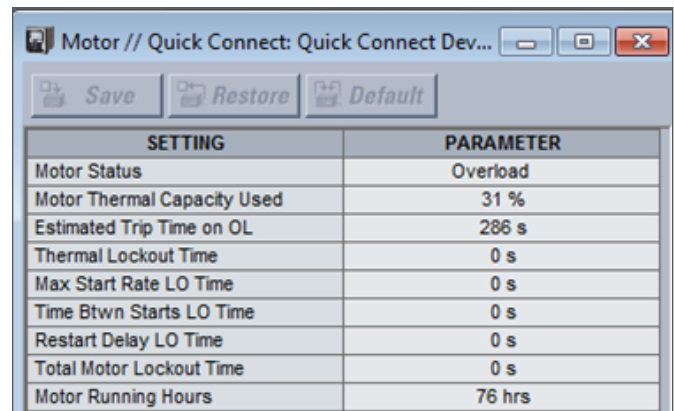
There are three pushbuttons with associated status LEDs on the relay faceplate. All three pushbuttons and all three LEDs are programmable. The labels in shown in Figure below match the default assignment.

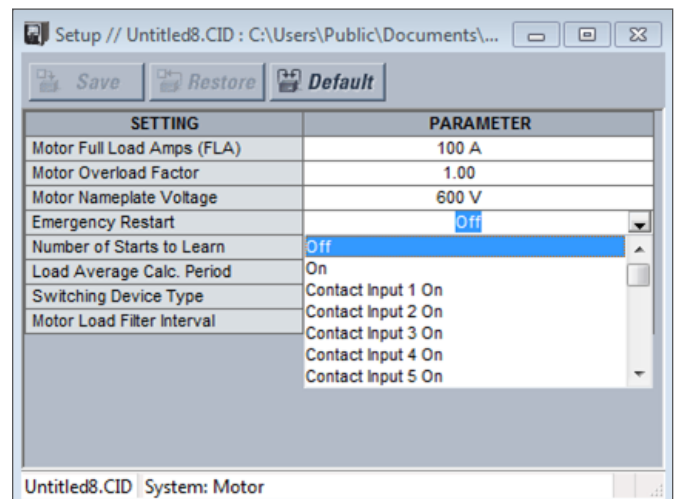| STOP	START	F1
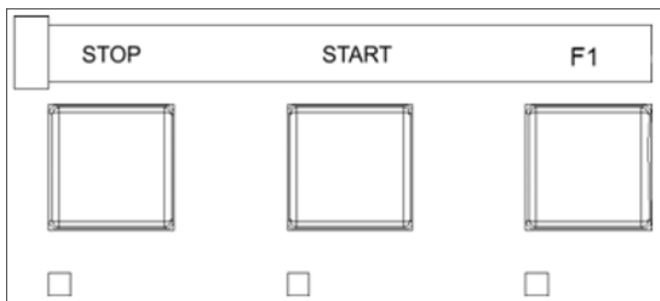
Start Supervision Inhibit

Start Supervision consists of four elements that guard against excessive starts. They are: Thermal Start Inhibit, Maximum Starting Rate, Time between Starts, and Restart Delay. All Start Supervision elements operate Output relay 3 (Start Inhibit).

- **Thermal Start Inhibit.** Inhibits starting if there is insufficient thermal capacity remaining
- **Maximum Starting Rate.** The number of start attempts allowed in a time interval.
- **Time Between Starts.** Enforces a minimum time duration between two start attempts.
- **Restart Delay.** Ensures a specific time passes from the motor stopping and being restarted.

SETTING	PARAMETER
Motor Status	Overload
Motor Thermal Capacity Used	31 %
Estimated Trip Time on OL	286 s
Thermal Lockout Time	0 s
Max Start Rate LO Time	0 s
Time Btwn Starts LO Time	0 s
Restart Delay LO Time	0 s
Total Motor Lockout Time	0 s
Motor Running Hours	76 hrs

Emergency restart

This function overrides all four Start Supervision Inhibit elements and when activated, provides an emergency start of the motor. It must only be used in an emergency when the process is more important than protecting the motor. The feature is assignable to any contact input or any operand as shown in Figure below.

SETTING	PARAMETER
Motor Full Load Amps (FLA)	100 A
Motor Overload Factor	1.00
Motor Nameplate Voltage	600 V
Emergency Restart	Off
Number of Starts to Learn	Off
Load Average Calc. Period	On
Switching Device Type	Contact Input 1 On
Motor Load Filter Interval	Contact Input 2 On
	Contact Input 3 On
	Contact Input 4 On
	Contact Input 5 On

Untitled8.CID System: Motor

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Output Relays Operation Type and Flexibility

Either Failsafe or Non-Failsafe Operation Type can be assigned to any 869 output relay except the Critical Failure Relay. Failsafe operation causes the output relay to be energized when the operand assigned to operate that relay is low and de-energized when the same operand is high.

A failsafe relay also changes state (if not already activated by an operand driving this output relay) when control power is removed from the 869. Conversely a non-failsafe relay is de-energized in its normal non-activated state and will not change state when control power is removed from the 869 (if not already activated by a protection element).

The list includes Output Relay 1 (Trip) and Output Relay 2 (Aux/Close). The Operation Type selection is simple and it is shown in Figure below. The default selection for the Breaker application is "Non-Failsafe" and the default selection for the Contactor application is "Failsafe". This is a significant improvement compared to older motor relays where all output relays except the Critical Failure Relay have a fixed Non-Failsafe functionality.

SETTING	PARAMETER
Trip	
Name	Trip
Block	Off
Type	Latched
Operation	Non-Failsafe
Events	Non-Failsafe
	Failsafe
Aux Relay 2	
Name	Aux Relay 2
Operate	Off
Seal-In Time	0.100 s
Type	Pulsed
Operation	Non-Failsafe
Events	Enabled

Additionally output relays can be selected either Pulsed or Latched and be sealed-in for a user-definable time.