

Application and Settings of the Hot Line Tag Function in the GE 850R Recloser Control

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Applies to firmware versions: 2.6 and 2.7

Application

Hot-line tag (HLT) protects line personnel working on a de-energized line. With recloser control, the reclosing function poses a danger if an accident occurs on an energized line. Once tripped, reclosing restores power, which could energize a line when it is not wanted. Typically, hot-line tag performs the following functions:

- Disables all reclosing
- Disables remote (SCADA) and local, manual closing
- Enables an instantaneous overcurrent element (IOC, IEEE 50, IEC I>>) dedicated to HLT

A hot-line-tag function is provided with the GE 850R recloser control. This application note describes the required settings in the 850R control that provides the functionality for HLT as well as proper targeting and event recording. Common settings are shown, as well as specific settings for both three-pole and single-pole tripping applications.

Settings shown are taken from an 850R connected to a PC using the GE Multilin EnerVista 8 Series Setup software, which can be obtained from the Software/Firmware link on this page: <u>https://www.gegridsolutions.com/multilin/catalog/850.htm</u>

Common settings

Figure 1 shows the Common Setup settings in the Recloser Trip Close Logic. Confirm (assign) pushbutton PB 6 is programmed to the HLT function at **Hot Line Tag Input**. Confirm or make the settings highlighted in red. For three-pole tripping applications, the **Force 3 Pole Trip Initiation** setting shown is not necessary. For single-pole applications, assign pushbutton PB 6 to **Force 3 Pole Trip Initiation**. There might be circumstances where the **Force 3 Pole Trip Initiation** setting will be used for other functions. In this case, use FlexLogic to OR the functions needed to force three-pole initiation.

Quick Connect Device Quick Connect Device Device Definition Target Messages Status Metering	-	
Quick Setup	📲 Common Setup // SUPER_850R	λ.CID : C:\Users\2 🗖 🔲 🔀
Setpoints	In the tran	
Device	📑 Save 🔤 Restore 🗒	Default
System		
Current Sensing	SETTING	PARAMETER
Voltage Sensing	Function	Enabled
Power Sensing	Trip Seal In Time	0.00 s
Power System	Yellow Handle Trip	Disabled
Recloser	Yellow Handle Trip Input	Off
Recloser Trip Close Logic	Yellow Handle Timer	0.00 s
Common Setup	Hot Line Tag Input	PB 6 ON (Hot Line Tag)
3 Phase Setup	Force 3 Pole Trip Initiation	PB 6 ON (Hot Line Tag)
1 Phase Setup	Events	Enabled
Switches SP	Targets	Latched
+ HexCurves	Tangete	Latonou

Figure 1. Recloser Trip Close Logic > Common Setup settings (single-pole application)



Force to lockout

There are two methods to force the recloser control to lockout.

All Phase LO Initiation

By factory default, hot-line-tag pushbutton PB 6 forces lockout when configured in the setting **All Phase LO Initiation**, shown in Figure 2. If you want to use this setting for another function, then use the second method (To Last Shot).



Figure 2. Auto Reclose > AR Common Setup settings

To Last Shot

Figure 3 shows the Control > Auto Reclose setup settings that force the recloser control to lockout for a hot-line tag condition. The setting **To Last Shot** forces the recloser to the last shot when pushbutton PB 6 is on (HLT is True). Any subsequent trip locks out the recloser and prevents closing. Make or confirm the following settings shown in red. For single-pole-tripping applications, make the Phase A (shown), Phase B and Phase C Setup settings. For three-pole-tripping applications, make only the Three Phase Setup settings.



- Control	📓 Phase A Setup // Quick Connect: Quick Connect Device: Setpoints: Control: Aut 👝 💷 🗨		
Setpoint Group			
Local Control Mode	Save Restore Detault		
Breaker Control	SETTING	PARAMETER	
Overhead Switch Control	Block/Cancel	Off	
Overhead Switch Control	Manual Close	Off	
Pole Discordance	Manual Reset From Lockout	Off	
Witual Input Control	Reduce Maximum To 1	Off	
T D	Reduce Maximum To 2	Off	
Inp Bus	Reduce Maximum To 3	Off	
🕀 🗝 Breaker Failure	Skip Shot	Off	
Synchrocheck 1	To Last Shot	PB 6 ON (Hot Line Tag)	
	Stall Dead Timer	Off	
Synchrocheck 2	Rate Superv	Disabled	
Cold Load Pickup	Max Rate Per Hour	25 /hour	
Auto Sectionalizer	Reclose Superv	Off	
	Zone Coordination	Disabled	
- Auto Reclose	ZC Phase Current Pickup	1.000 x CT	
AR Common Setup	ZC Neutral Current Pickup	0.300 x CT	
Three Phase Setur	ZC Pickup Time	0.020 s	
Three Phase Setup	ZC Dropout Time	0.020 s	
Phase A Setup	Rate Superv Output Relays	Relay : Disabled	
Phase B Setup	In Progress Output Relays	Relay : Disabled	
Dhara C Catur	Lockout Output Relays	Relay : Disabled	
Phase C Setup	Events	Enabled	

Figure 3. Auto Reclose > Phase Setup settings

Assigning hot-line tag to Auxiliary Relays

Figure 4 shows the settings for the 850R trip and close relays. Please note that your virtual-output numbers may differ from this example. Map all trip and close contacts in Recloser > Recloser Setup— do NOT use the Outputs > Output Relays settings, which are shown in Figure 8, along with blocking settings.

It is NOT RECOMMENDED to assign recloser/switch opening and closing to discrete output relays. However, if you want to HLT block discrete output relays [see Figure 8], then you must configure HLT blocking, as described in the section *Contact blocking*.

These examples are for 850R recloser applications, where you select output relays for the trip and close functions at System > Recloser Trip Close Logic actions. For 850R switch applications, select open and close relays at System > Switches SP.

	📳 Recloser Setup // Quick Connect: Quick Connect Device: Setpoints: System 📼 💷 💌			
Device Definition	Bave Bestore Default			
Device		SETTING	PARAMETER	
System	Name		RCL	
Current Sensing	Туре		Single Phase	
Voltage Sensing	Ph A Contact	nput 52a	Virtual Output 1 On (52A_A)	
Power Sensing	Ph A Contact	nput 52b	Virtual Output 2 On (52B_A)	
Power System	Ph B Contact I	nput 52a	Virtual Output 3 On (52A_B)	
Recloser	Ph B Contact I	nput 52b	Virtual Output 4 On (52B_B)	
Recloser Trip Close Logic	Ph C Contact I	nput 52a	Virtual Output 5 On (52A_C)	
Common Setup	Ph C Contact I	nput 52b	Virtual Output 6 On (52B_C)	
- 3 Phase Setup	1 Pole Ph A Tr	ip Relay Select	Relay 9	
1 Phase Setup	1 Pole Ph A Close Relay Select		Relay 10	
Switches SP	1 Pole Ph B Tr	ip Relay Select	Relay 11	
FlexCurves	1 Pole Ph B Cl	ose Relay Select	Relay 12	
Inputs	1 Pole Ph C Trip Relay Select		Relay 13	
Outputs	1 Pole Ph C Cl	ose Relay Select	Relay 14	
Recloser Setup // 850R_2-7_Testing_8-21-20.CID : C:\GE Files\8 Series Relay				
SETTING	SETTING		PARAMETER	
Name			RCL	
Туре			Three Phase	
Contact Input 52a	Contact Input 52a		Contact Input 1 On (CI 1)	
Contact Input 52b			Contact Input 2 On (CI 2)	
3 Pole Trip Relay Sele	ct		Relay 9	
3 Pole Close Relay Se	lect		Relay 10	

Figure 4. Output-relay settings, 1 Pole and 3 Pole



Prevent logging of local/remote, close-initiate events

The HLT function does not stop a manual close from being initiated, however, it blocks the close outputs from closing. This action benefits post-event analysis for personnel working with the device. However, to prevent logging of the local and remote close-initiate events; apply the logic in Figure 5. This logic blocks the close pushbutton (PB2 by default) and any external contact input (CI 1 shown here).



Figure 5. Pushbutton and external blocking logic

To use this logic, use the settings shown in Figure 6. Please note that your virtual-output numbers may differ from this example.

Communications			
Data Logger	Local Control Mode // Quick C	onnect: Quick Connect Device: Setpoints: C 📃 💷 💒	
Fault Report			
Event Data	Save Restore Default		
Flex States	SETTING	PARAMETER	
Front Panel	Select Before Operate	Disabled	
Resetting	Local Mode	PB 5 OFF (Remote Enbld)	
Installation	Manual Control	Off	
Clear Records	Bkr/Sw Select Timeout	5 min	
System	BKR Local Open	Programmable Pushbutton 1 ON (Open)	
Inputs	BKR Local Open Ext	Off	
Outputs	BKR Local Close	Virtual Output 21 On (LocCls+HLT)	
	BKR Local Close Ext	Virtual Output 22 On (ExtCLS+HLT)	
Monitoring	Local Open Delay	0 s	
Control	Local Close Delay	5 s	
Setpoint Group	Events	Enabled	
Breaker Control	Targets	Self-Reset	

Figure 6. HLT block-close settings



Block remote control

To block remote control, use the settings in red in Figure 7.

Quick Connect Device		
Device Definition		
Target Messages		
⊡ Status		
Metering		
Quick Setup		
Setpoints		
Device		
Custom Config		
Real Time Clock		
Security		
Communications		
······ Transient Recorder		
Data Logger	2011	
Fault Report	Breaker Control // Quick Conn	ect: Quick Connect Device: Setpoints: Control 📃 💷 🛋
Event Data	las las las	
Flex States	📸 Save 🗃 Restore 🚟	Default
Front Panel		
Resetting	SETTING	PARAMETER
Installation	BKR 1 Control	
Clear Records	Remote Open	Off
± System	Remote Close	Off
⊕ Inputs	Remote Close Remote Block Open	Off Off
turning System turning Syste	Remote Close Remote Block Open Remote Block Close	Off Off PB 6 ON (Hot Line Tag)
System Inputs Outputs Protection	Remote Close Remote Block Open Remote Block Close Bypass Rem Blk Open	Off Off PB 6 ON (Hot Line Tag) Off
System System Inputs Outputs Protection Monitoring	Remote Close Remote Block Open Remote Block Close Bypass Rem Blk Open Bypass Rem Blk Close	Off Off PB 6 ON (Hot Line Tag) Off Off
System System Inputs Outputs Protection Monitoring Control	Remote Close Remote Block Open Remote Block Close Bypass Rem Blk Open Bypass Rem Blk Close Close Sync Spvn BlKR1	Off Off PB 6 ON (Hot Line Tag) Off Off Bypass
System System Inputs Outputs Monitoring Control Setpoint Group Inset Control Mode	Remote Close Remote Block Open Remote Block Close Bypass Rem Bik Open Bypass Rem Bik Close Close Sync Byrn BKR1 Events	Off Off PB 6 ON (Hot Line Tag) Off Off Bypass Disabled
System System Inputs Outputs Protection Monitoring Control Setpoint Group Local Control Mode Bracker Control	Remote Close Remote Block Open Remote Block Close Bypass Rem Blk Open Bypass Rem Blk Close Close Sync Spvn BKR1 Events Targets	Off Off PB 6 ON (Hot Line Tag) Off Off Bypass Disabled Self-Reset

Figure 7. Remote HLT blocking

Contact blocking

As previously stated, all trip and close contacts should be mapped in the Recloser Setup settings as shown in Figure 4, (not in Outputs > Output Relays). The setting **Hot Line Tag Input** (in Control > Auto Reclose > AR Common Setup) will NOT block the outputs in the Output Relays section. The Output Relay settings are for configuration of auxiliary-relay applications only—do not use these output contacts for recloser-/switch-control outputs.

Blocking Output Relays

If output relays are used for closing operations, then HLT pushbutton PB 6 must be configured to block these output contacts. Add "PB 6 On (Hot Line Tag)" to the **Block** setting, shown in red in Figure 8, for any output contacts used to close as well as outputs to be blocked by hot-line tag (in this example, [F4] Close and [F7] Aux Relay 3).



	SETTING	PARAMETER	^
	[F1] Trip		
	Name	Aux Relay 1	
	Seal-In Time	0.10 s	
🗇 Outels Connect	Block	Off	
	Operate	BKR1 Local Close (BKR1)	
Quick Connect Device	Туре	Pulsed	
	Operation	Non-Failsafe	
Device Definition	Events	Enabled	
Target Messages			
	[F4] Close		
± Status	Name	Close 3P	
	Seal-In Time	0.10 s	
in motoring	Block	PB 6 ON (Hot Line Tag)	
Quick Setup	Operate	BKR1 Local Close (BKR1)	
Setpointe	Туре	Pulsed	
	Operation	Non-Failsafe	
Device	Events	Enabled	
- Sustem			
I System	[F7] Aux Relay 3		
Inputs	Name	Aux Close 3P	
	Block	PB 6 ON (Hot Line Tag)	
	Operate	BKR1 Manual Close (BKR1)	
Output Relays	Туре	Self-Reset	
Vitual Octoreta	Operation	Non-Failsafe	
Virtual Outputs	Events	Enabled	

Figure 8. Example of contact blocking for Output Relays

Instantaneous overcurrent

Use the settings in red in Figure 9 to enable an instantaneous overcurrent element that is active only when HLT is active. When hot-line tag pushbutton PB 6 is on, the block is false, allowing the IOC element to function. HLT IOC tripping is for HLT only; it is more sensitive than other IOC elements.

Protection			
Group 1			
Current			
Phase TOC			
Phase IOC	🕼 Phase IOC // Quick Connect: Quick Connect Device: Setpoints: Protection: Gr 📃 😐 💌		
Phase Directional OC		1	
Neutral TOC	📸 Save 📷 Restore 🕁	Default	
Neutral IOC		DADAMETED	
Neutral Directional OC	SETTING [GROUP 1]	PARAMETER	
Ground TOC	Phase IOC 1		
Ground IOC	Function	Trip	
Ground Directional OC	Input	Phasor	
Restricted Ground Fault	Pickup	1.000 x CT	
Switch On To Fault	Direction	Disabled	
Negative Sequence TOC	Pickup Delay	0.000 s	
Negative Sequence IOC	Dropout Delay	0.000 s	
Negative Sequence Directional OC	Block	PB 6 OFF (Hot Line Tag)	
Broken Conductor	Relays	Relay : Disabled	
Load Encroachment	Events	Enabled	
Themal Overload	Targets	Self-Reset	
Theima Ovendau			

Figure 9. HLT instantaneous overcurrent enable

Summary

The application and settings listed in this document are a guide to help you design your hot-line tag scheme. If it you want to include other functionality within HLT, please contact your technical support representative. Factory technical support can be reached at 1-800-547-8629 or email, <u>multilin.tech@ge.com</u>.