

# OverCurrent test for Pishtaz protection relay

Prepared by the technical team of Hengam Petrochemical

## AMPro Overcurrent:

### 1) Test Results:

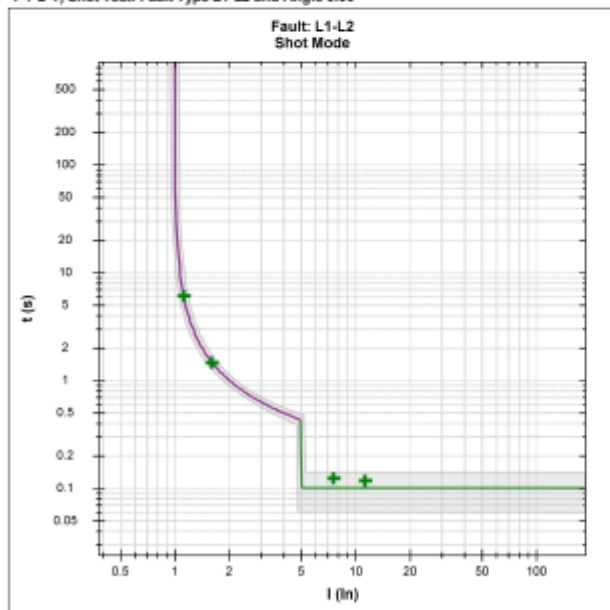
#### 1-1) Shot Test:

##### 1-1-1) Short Table:

Row	Fault Type	I Test	I Test Relative	Factor	Relative to	Angle	t nom.	t act.	Dev.%	Dev.s	tmin	tmax	Result
1	L1-L2	1.117kA	No	1.117x	51	0°	6.315s	6.093s	-3.52%	-222.6ms	4.162s	12.36s	Passed
2	L1-L2	1.605kA	No	1.605x	51	0°	1.472s	1.459s	-0.86%	-12.68ms	1.267s	1.734s	Passed
3	L1-L2	7.594kA	No	7.594x	51	0°	100.0ms	123.2ms	23.20%	23.20ms	60.00ms	140.0ms	Passed
4	L1-L2	11.38kA	No	11.376x	51	0°	100.0ms	115.8ms	15.60%	15.60ms	60.00ms	140.0ms	Passed
5	L2-L3	1.117kA	No	1.117x	51	0°	6.315s	6.053s	-4.15%	-262.2ms	4.162s	12.36s	Passed
6	L2-L3	1.605kA	No	1.605x	51	0°	1.472s	1.460s	-0.78%	-11.48ms	1.267s	1.734s	Passed
7	L2-L3	7.594kA	No	7.594x	51	0°	100.0ms	121.6ms	21.60%	21.60ms	60.00ms	140.0ms	Passed
8	L2-L3	11.38kA	No	11.376x	51	0°	100.0ms	119.6ms	19.60%	19.60ms	60.00ms	140.0ms	Passed
9	L3-L1	1.117kA	No	1.117x	51	0°	6.315s	6.100s	-3.40%	-215.0ms	4.162s	12.36s	Passed
10	L3-L1	1.605kA	No	1.605x	51	0°	1.472s	1.461s	-0.73%	-10.68ms	1.267s	1.734s	Passed
11	L3-L1	7.594kA	No	7.594x	51	0°	100.0ms	125.6ms	25.60%	25.60ms	60.00ms	140.0ms	Passed
12	L3-L1	11.38kA	No	11.376x	51	0°	100.0ms	118.4ms	18.40%	18.40ms	60.00ms	140.0ms	Passed
13	L1-L2-L3	1.117kA	No	1.117x	51	0°	6.315s	6.057s	-4.09%	-258.2ms	4.162s	12.36s	Passed
14	L1-L2-L3	1.605kA	No	1.605x	51	0°	1.472s	1.457s	-1.02%	-15.08ms	1.267s	1.734s	Passed
15	L1-L2-L3	7.594kA	No	7.594x	51	0°	100.0ms	122.4ms	22.40%	22.40ms	60.00ms	140.0ms	Passed
16	L1-L2-L3	11.38kA	No	11.376x	51	0°	100.0ms	117.6ms	17.60%	17.60ms	60.00ms	140.0ms	Passed

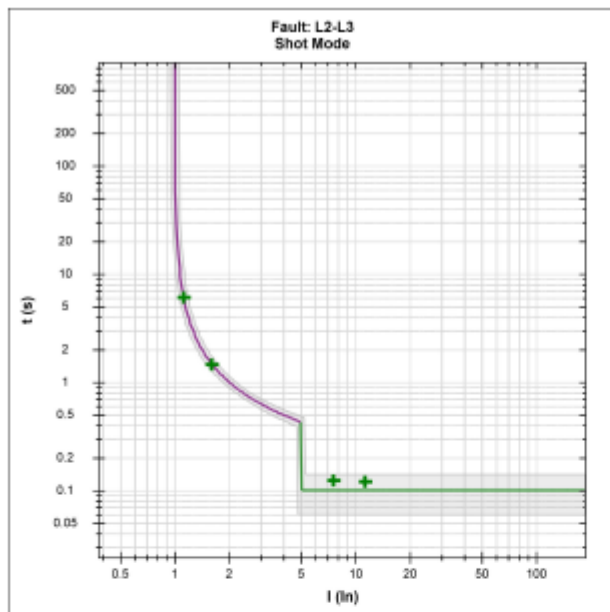
#### 1-1-2) Shot Test: Fault Type L1-L2

##### 1-1-2-1) Shot Test: Fault Type L1-L2 and Angle 0.00 °



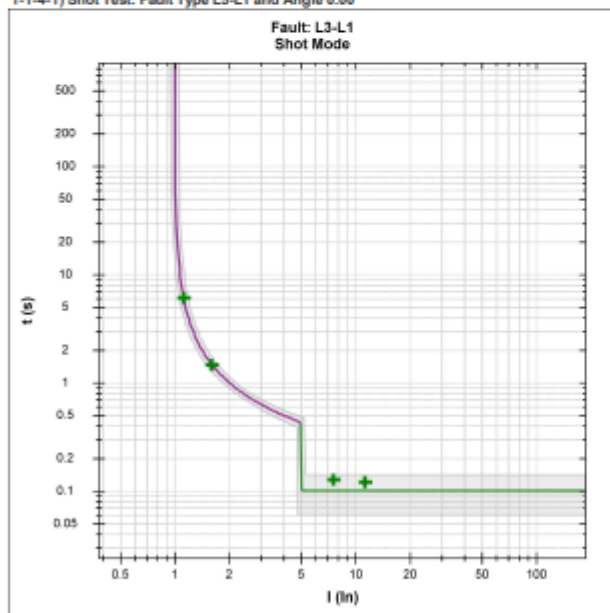
#### 1-1-3) Shot Test: Fault Type L2-L3

##### 1-1-3-1) Shot Test: Fault Type L2-L3 and Angle 0.00 °



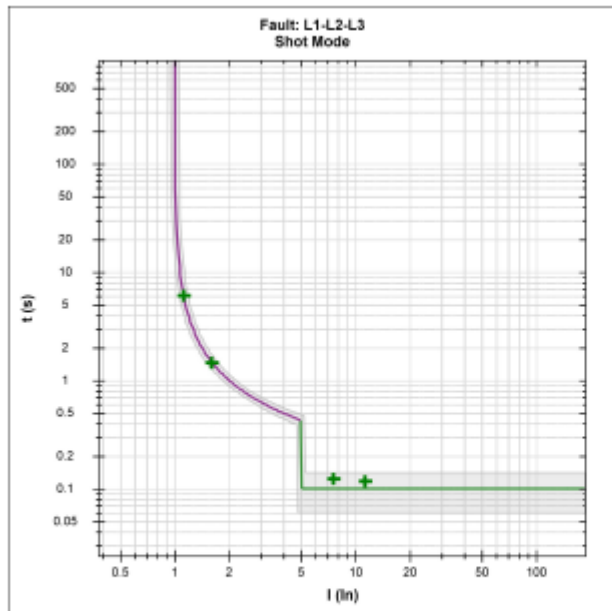
1-1-4) Shot Test: Fault Type L3-L1

1-1-4-1) Shot Test: Fault Type L3-L1 and Angle 0.00 °



1-1-5) Shot Test: Fault Type L1-L2-L3

1-1-5-1) Shot Test: Fault Type L1-L2-L3 and Angle 0.00 °



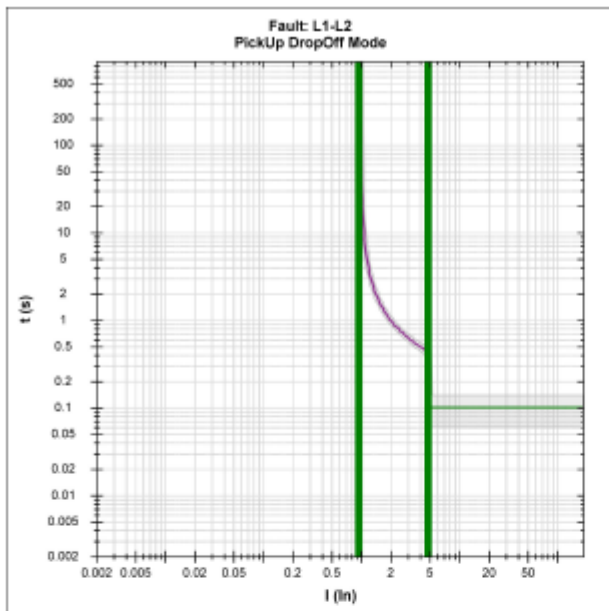
## 1-2) Pickup-DropOff Test:

### 1-2-1) Short Table:

Row	Fault Type	Target Type	I Test	Angle	Reset Ratio	PickUp $\Delta t$	DropOff $\Delta t$	$\Delta var$	PickUp start	PickUp end	DropOff end	PickUp act.	DropOff act.	Reset Ratio act.	PickUp Error	DropOff Error	Result
1	L1-L2	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.000kA	920.0A	0.9200	0%	-3.16%	Passed
2	L1-L2	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.000kA	4.600kA	0.9200	0%	-3.16%	Passed
3	L2-L3	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.000kA	920.0A	0.9200	0%	-3.16%	Passed
4	L2-L3	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.000kA	4.600kA	0.9200	0%	-3.16%	Passed
5	L3-L1	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.000kA	920.0A	0.9200	0%	-3.16%	Passed
6	L3-L1	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.000kA	4.600kA	0.9200	0%	-3.16%	Passed
7	L1-L2-L3	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.000kA	920.0A	0.9200	0%	-3.16%	Passed
8	L1-L2-L3	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.000kA	4.600kA	0.9200	0%	-3.16%	Passed

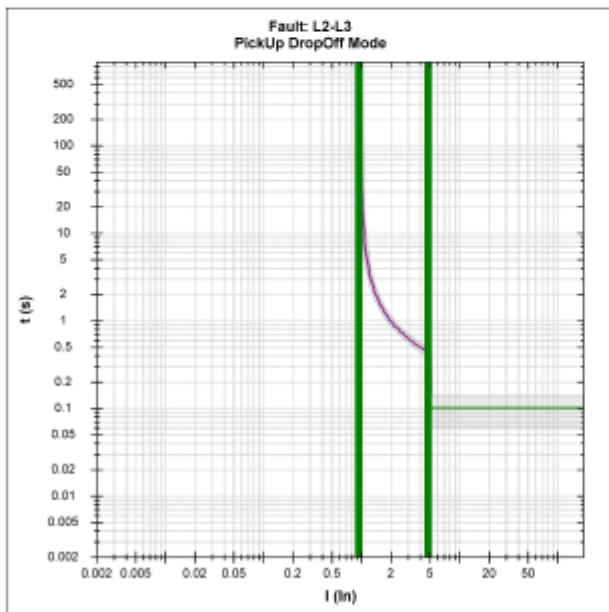
### 1-2-2) Pickup-DropOff Test: Fault Type L1-L2

#### 1-2-2-1) Pickup-DropOff: Fault Type L1-L2 and Angle 0.00 °



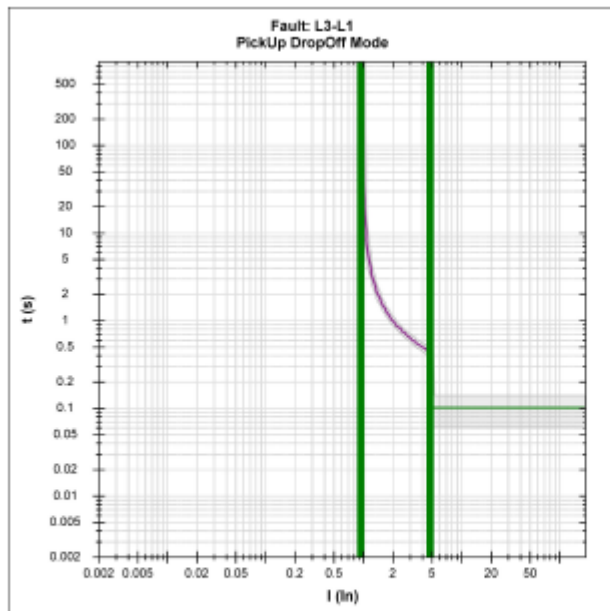
1-2-3) Pickup-DropOff Test: Fault Type L2-L3

1-2-3-1) Pickup-DropOff: Fault Type L2-L3 and Angle  $0.00^\circ$



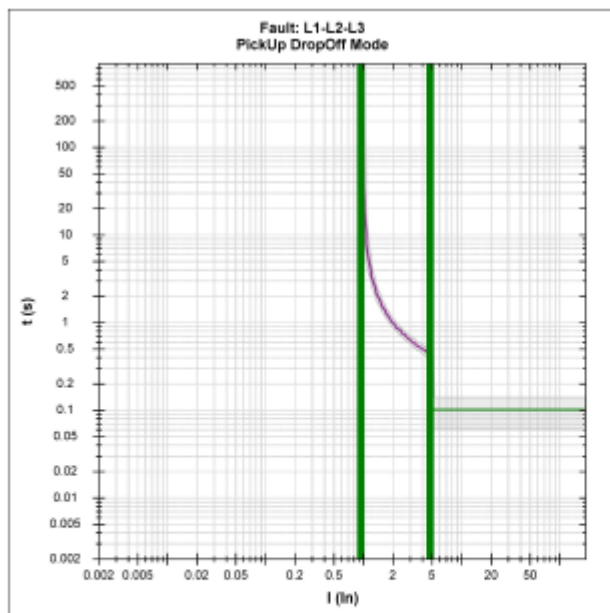
1-2-4) Pickup-DropOff Test: Fault Type L3-L1

1-2-4-1) Pickup-DropOff: Fault Type L3-L1 and Angle  $0.00^\circ$



1-2-5) Pickup-DropOff Test: Fault Type L1-L2-L3

1-2-5-1) Pickup-DropOff: Fault Type L1-L2-L3 and Angle  $0.00^\circ$



# OverCurrent test for Sepam protection relay

Prepared by the technical team of Hengam Petrochemical

# AMPro Overcurrent:

## 1) Test Results:

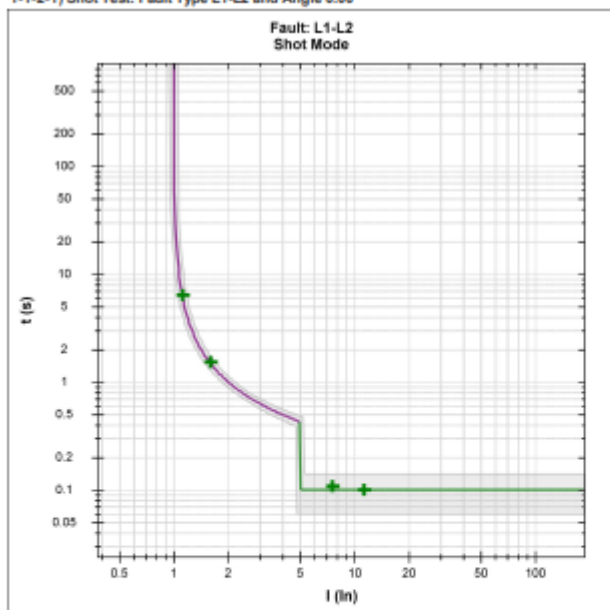
### 1-1) Shot Test:

#### 1-1-1) Short Table:

Row	Fault Type	ITest	ITest Relative	Factor	Relative to	Angle	t nom.	t act.	Dev.%	Dev.s	tmin	tmax	Result
1	L1-L2	1.117kA	No	1.117x	51	0°	6.315s	6.405s	1.44%	99.63ms	4.162s	12.36s	Passed
2	L1-L2	1.605kA	No	1.605x	51	0°	1.472s	1.518s	3.13%	46.12ms	1.267s	1.734s	Passed
3	L1-L2	7.594kA	No	7.594x	51	0°	100.0ms	108.0ms	8.00%	8.000ms	60.00ms	140.0ms	Passed
4	L1-L2	11.38kA	No	11.376x	51	0°	100.0ms	100.4ms	0.40%	400.0µs	60.00ms	140.0ms	Passed
5	L2-L3	1.117kA	No	1.117x	51	0°	6.315s	6.726s	6.50%	410.2ms	4.162s	12.36s	Passed
6	L2-L3	1.605kA	No	1.605x	51	0°	1.472s	1.512s	2.70%	39.72ms	1.267s	1.734s	Passed
7	L2-L3	7.594kA	No	7.594x	51	0°	100.0ms	105.2ms	5.20%	5.200ms	60.00ms	140.0ms	Passed
8	L2-L3	11.38kA	No	11.376x	51	0°	100.0ms	103.2ms	3.20%	3.200ms	60.00ms	140.0ms	Passed
9	L3-L1	1.117kA	No	1.117x	51	0°	6.315s	6.523s	3.29%	297.8ms	4.162s	12.36s	Passed
10	L3-L1	1.605kA	No	1.605x	51	0°	1.472s	1.519s	3.19%	46.92ms	1.267s	1.734s	Passed
11	L3-L1	7.594kA	No	7.594x	51	0°	100.0ms	120.0ms	20.00%	20.00ms	60.00ms	140.0ms	Passed
12	L3-L1	11.38kA	No	11.376x	51	0°	100.0ms	108.4ms	8.40%	8.400ms	60.00ms	140.0ms	Passed
13	L1-L2-L3	1.117kA	No	1.117x	51	0°	6.315s	6.517s	3.19%	291.4ms	4.162s	12.36s	Passed
14	L1-L2-L3	1.605kA	No	1.605x	51	0°	1.472s	1.512s	2.73%	40.12ms	1.267s	1.734s	Passed
15	L1-L2-L3	7.594kA	No	7.594x	51	0°	100.0ms	113.6ms	13.60%	13.60ms	60.00ms	140.0ms	Passed
16	L1-L2-L3	11.38kA	No	11.376x	51	0°	100.0ms	100.0ms	0.00%	0.000s	60.00ms	140.0ms	Passed

#### 1-1-2) Shot Test: Fault Type L1-L2

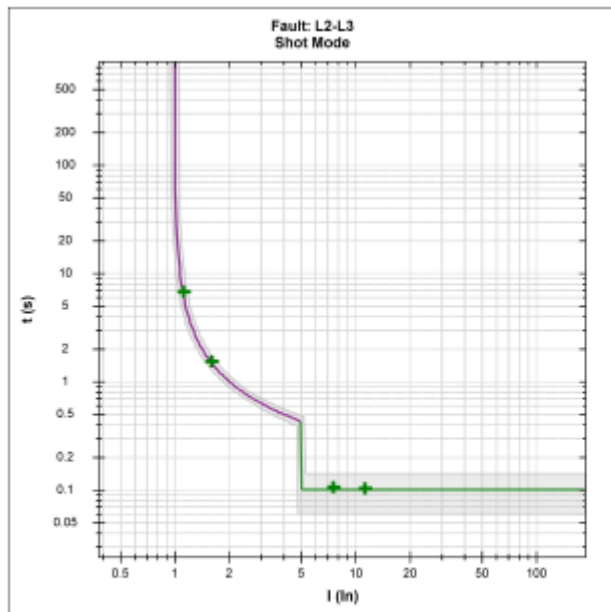
##### 1-1-2-1) Shot Test: Fault Type L1-L2 and Angle 0.00 °



#### 1-1-3) Shot Test: Fault Type L2-L3

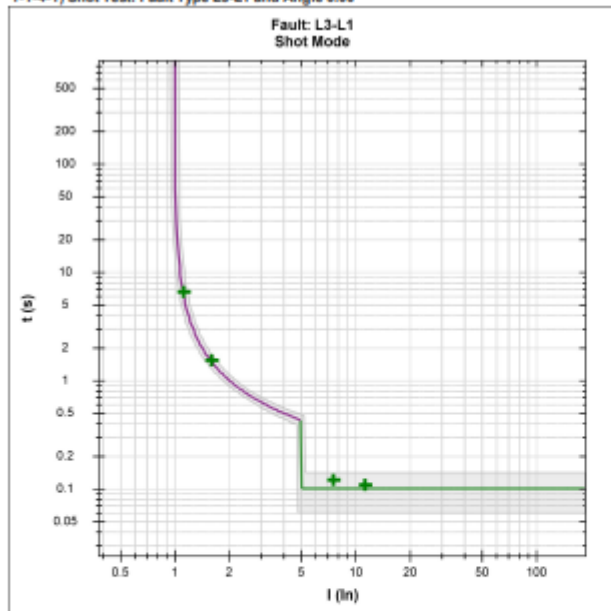
##### 1-1-3-1) Shot Test: Fault Type L2-L3 and Angle 0.00 °





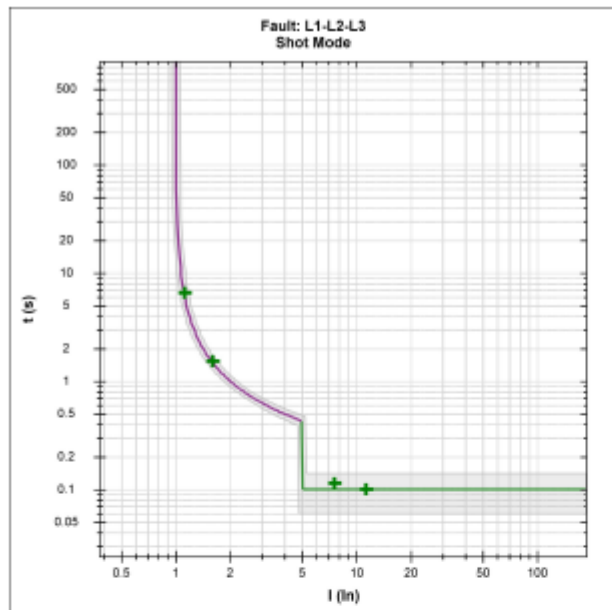
1-1-4) Shot Test: Fault Type L3-L1

1-1-4-1) Shot Test: Fault Type L3-L1 and Angle 0.00 °



1-1-5) Shot Test: Fault Type L1-L2-L3

1-1-5-1) Shot Test: Fault Type L1-L2-L3 and Angle 0.00 °



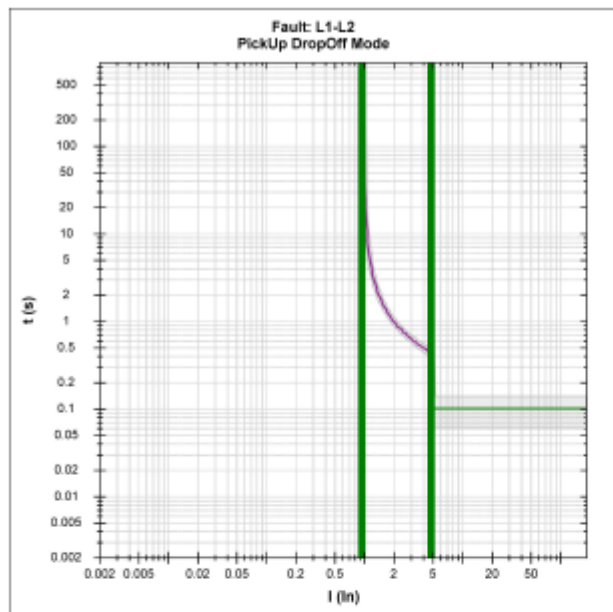
## 1-2) Pickup-DropOff Test:

### 1-2-1) Short Table:

Row	Fault Type	Target Type	I Test	Angle	Reset Ratio	PickUp $\Delta t$	DropOff $\Delta t$	$\Delta var$	PickUp start	PickUp end	DropOff end	PickUp act.	DropOff act.	Reset Ratio act.	PickUp Error	DropOff Error	Result
1	L1-L2	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.000kA	920.0A	0.9200	0%	-3.16%	Passed
2	L1-L2	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.100kA	4.600kA	0.9020	2.00%	-3.16%	Passed
3	L2-L3	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.020kA	920.0A	0.9020	2.00%	-3.16%	Passed
4	L2-L3	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.100kA	4.600kA	0.9020	2.00%	-3.16%	Passed
5	L3-L1	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.020kA	940.0A	0.9216	2.00%	-1.05%	Passed
6	L3-L1	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.100kA	4.600kA	0.9020	2.00%	-3.16%	Passed
7	L1-L2-L3	Current	1.000kA	0°	0.9500	100.0ms	100.0ms	20.00A	800.0A	1.200kA	800.0A	1.000kA	920.0A	0.9200	0%	-3.16%	Passed
8	L1-L2-L3	Current	5.000kA	0°	0.9500	100.0ms	100.0ms	100.0A	4.000kA	6.000kA	4.000kA	5.100kA	4.600kA	0.9020	2.00%	-3.16%	Passed

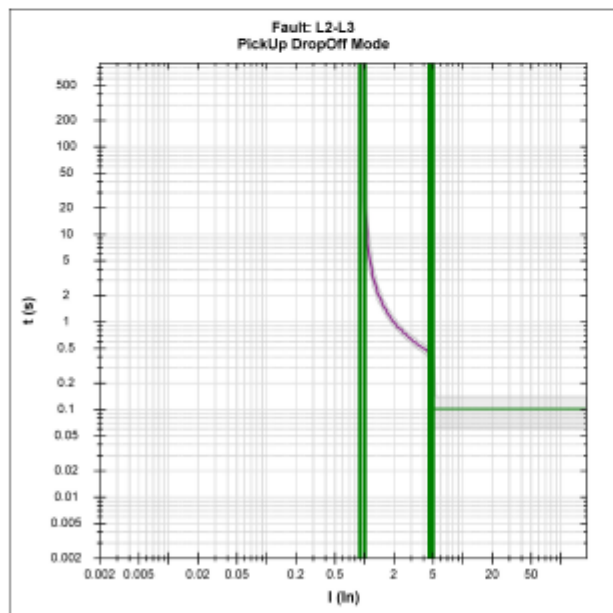
### 1-2-2) Pickup-DropOff Test: Fault Type L1-L2

#### 1-2-2-1) Pickup-DropOff: Fault Type L1-L2 and Angle 0.00 °



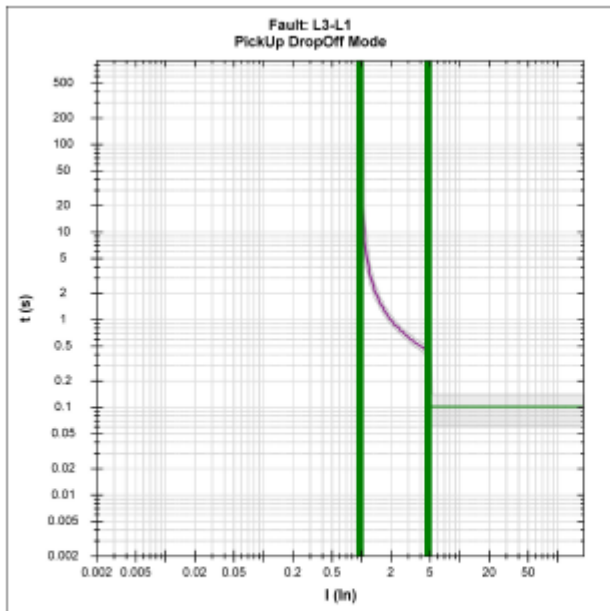
1-2-3) Pickup-DropOff Test: Fault Type L2-L3

1-2-3-1) Pickup-DropOff: Fault Type L2-L3 and Angle  $0.00^\circ$



1-2-4) Pickup-DropOff Test: Fault Type L3-L1

1-2-4-1) Pickup-DropOff: Fault Type L3-L1 and Angle  $0.00^\circ$



1-2-5) Pickup-DropOff Test: Fault Type L1-L2-L3

1-2-5-1) Pickup-DropOff: Fault Type L1-L2-L3 and Angle  $0.00^\circ$

