

7SR224 Recloser Controller

Overcurrent Relay

Document Release History

This document is issue **2012/12**. The list of revisions up to and including this issue is:

2012/12	First issue
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Software Revision History

2012/12	2435H85010 R7c-7a	File handling during shutdown

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Contents

Document Release History	1
Software Revision History	1
1. Relay Instrumentation	3
1.1. Favourite Meters	3
1.2. Current Meters	3
1.3. Voltage Meters	4
1.4. Frequency Meters	4
1.5. Power Meters	6
1.6. Energy Meters	6
1.7. Wattmetric Meters	6
1.8. Directional Meters	7
1.9. Thermal Meters	7
1.10. Single-Triple Meters	7
1.11. Auto-Reclose Meters	8
1.12. Synchronising Meters	8
1.13. Loss of Voltage Meters	8
1.14. Maintenance Meters	9
1.15. General Alarm Meters	11
1.16. Battery Condition Meters	11
1.17. Capacitor condition Meters	11
1.18. Power Quality Meters	12
1.19. Demand Meters	12
1.20. Binary Input Meters	14
1.21. Binary Output Meters	14
1.22. Virtual Meters	14
1.23. Communication Meters	15
1.24. Miscellaneous Meters	16
1.25. Quick Logic Meters	16

1. Relay Instrumentation

1.1. Favourite Meters

Instrument	Description
<p>----- FAVOURITE METERS > to view -----</p>	<p>This allows the user to view his previously constructed list of 'favourite meters' by pressing TEST/RESET ► button and the READ DOWN button to scroll through the meters added to this sub-group</p> <p>To construct a sub-group of favourite meters, first go to the desired meter then press ENTER this will cause a message to appear on the LCD 'Add To Favourites YES pressing ENTER again will add this to the FAVOURITE METERS Sub-menu. To remove a meter from the FAVOURITE METERS sub-menu go to that meter each in the FAVOURITE METERS sub-menu or at its Primary location press ENTER and the message 'Remove From Favourites' will appear press ENTER again and this meter will be removed from the FAVOURITE METERS sub-group</p>

1.2. Current Meters

Instrument	Description
<p>----- CURRENT METERS > to view -----</p>	<p>This is the sub-group that includes all the meters that are associated with Current TEST/RESET ► allows access to this sub-group</p>
<p>Primary Current Ia 0.00A Ib 0.00A Ic 0.00A</p>	<p>Displays the 3 phase currents Primary RMS values</p>
<p>Secondary Current Ia 0.00A Ib 0.00A Ic 0.00A</p>	<p>Displays the 3 phase currents Secondary RMS values</p>
<p>Nom Current Ia 0.00xIn ----° Ib 0.00xIn ----° Ic 0.00xIn ----°</p>	<p>Displays the 3 phase currents Nominal RMS values & phase angles with respect to PPS current.</p>
<p>Pri Earth Current In 0.000A Ig 0.000A Isef 0.000A</p>	<p>Displays the 3 Earth currents Primary RMS values</p>
<p>Sec Earth Current In 0.000A Ig 0.000A Isef 0.000A</p>	<p>Displays the 3 Earth currents Secondary RMS values</p>
<p>Nom Earth Current In 0.000xIn ----° Ig 0.000xIn ----° Isef 0.000xIn ----°</p>	<p>Displays the 3 Earth currents Nominal RMS values & phase angles with respect to PPS current.</p>
<p>I Seq Components Izps 0.00xIn ----° Ips 0.00xIn ----° Inps 0.00xIn ----°</p>	<p>Displays the Current Sequence components Nominal RMS values & phase angles with respect to PPS current.</p>
<p>2nd Harmonic Current Ia 0.00xIn</p>	<p>Displays the 3 phase currents 2nd Harmonic components Nominal RMS values.</p>

Instrument	Description
Ib 0.00xIn Ic 0.00xIn	
Last Trip current Ia 0.00 A Ib 0.00 A Ic 0.00 A	Displays the Current recorded for the most recent trip operation for the 3 phase currents
Last Trip current I _g 0.00 A	Displays the Current recorded for the most recent trip operation .for the measured earth current

1.3. Voltage Meters

----- VOLTAGE METERS > to view -----	This is the sub-group that includes all the meters that are associated with Voltage TEST/RESET ► allows access to this sub-group
Prim Ph-Ph Voltage Vab 0.00V Vbc 0.00V Vca 0.00V	Displays the Phase to Phase Voltage Primary RMS values
Sec Ph-Ph Voltage Vab 0.00V Vbc 0.00V Vca 0.00V	Displays the Phase to Phase Voltage Secondary RMS values & Angles with respect to PPS voltage.
Nominal Ph-Ph Voltage Vab 0.00xVn ----o Vbc 0.00xVn ----o Vca 0.00xVn ----o	Displays the Phase to Phase Voltage Nominal RMS values
Prim Ph-N Voltage Va 0.00V Vb 0.00V Vc 0.00V	Displays the Phase to Neutral Voltage Primary RMS values
Sec Ph-N Voltage Va 0.00V Vb 0.00V Vc 0.00V	Displays the Phase to Neutral Voltage Secondary RMS values & Angles with respect to PPS voltage.
Nom Ph-N Voltage Va 0.00xVn ----o Vb 0.00xVn ----o Vc 0.00xVn ----o	Displays the Phase to Neutral Voltage Nominal RMS values
V Seq Components Izps 0.00V ----o Ipps 0.00V ----o Inps 0.00V ----o	Displays the Voltage Sequence components Nominal RMS values & phase angles with respect to PPS voltage.
Calc Earth Voltage Pri 0.00V Sec 0.00V ----o	Displays the calculated Earth voltage both primary and secondary which also shows the secondary angle
Prim Ph-Ph Voltage Vxy 0.00V Vyz 0.00V Vzx 0.00V	Displays the Phase to Phase Voltage Primary RMS values for the xyz side voltage inputs on 6VT models only.
Sec Ph-Ph Voltage Vxy 0.00V	Displays the Phase to Phase Voltage Secondary RMS values & Angles

Vyz	0.00V	with respect to PPS voltage for the xyz side voltage inputs
Vzx	0.00V	
Nominal Ph-Ph Voltage		Displays the Phase to Phase Voltage Nominal RMS values for the xyz side voltage inputs on 6VT models only.
Vxy	0.00xVn ----o	
Vyz	0.00xVn ----o	
Vzx	0.00xVn ----o	
Prim Ph-N Voltage		Displays the Phase to Neutral Voltage Primary RMS values for the xyz side voltage inputs
Va	0.00V	
Vb	0.00V	
Sec Ph-N Voltage		Displays the Phase to Neutral Voltage Secondary RMS values & Angles with respect to PPS voltage for the xyz side voltage inputs on 6VT models only.
Vx	0.00V	
Vy	0.00V	
Vz	0.00V	
Nom Ph-N Voltage		Displays the Phase to Neutral Voltage Nominal RMS values for the xyz side voltage inputs on 6VT models only.
Vx	0.00xVn ----o	
Vy	0.00xVn ----o	
Vz	0.00xVn ----o	
XYZ V Seq Components		Displays the Voltage Sequence components Nominal RMS values & phase angles with respect to PPS voltage for the xyz side voltage inputs on 6VT models only.
Izps	0.00V ----o	
Ipps	0.00V ----o	
Inps	0.00V ----o	
Last Trip Voltage		Displays the voltages recorded for the most recent trip operation
Va	0.00V	
Vb	0.00V	
Vc	0.00V	
CS/NVD Voltage (Vx)		Displays the 4th voltage (Vx) for the 4x VT models, both primary and secondary which also shows the phase angle. This voltage can be used for NVD, Vx 27/59 or where available Checksync.
Pri	0.00V	
Sec	0.00V ----o	

1.4. Frequency Meters

Instrument	Description
----- FREQUENCY METERS > to view -----	This is the sub-group that includes all the meters that are associated with Frequency TEST/RESET ► allows access to this sub-group
Frequency 0.000Hz	Displays the power system frequency.

1.5. Power Meters

Instrument	Description
----- POWER METERS > to view -----	This is the sub-group that includes all the meters that are associated with Power TEST/RESET ► allows access to this sub-group
Phase A 0.0W Phase B 0.0W Phase C 0.0W P (3P) 0.0W	Displays Real Power
Phase A 0.0VAr Phase B 0.0VAr Phase C 0.0VAr Q (3P) 0.0VAr	Displays Reactive Power
Phase A 0.0VA Phase B 0.0VA Phase C 0.0VA S (3P) 0.0VA	Displays Apparent Power
PF A 0.00 PF B 0.00 PF C 0.00 PF (3P) 0.00	Displays Power factor

1.6. Energy Meters

Instrument	Description
----- ENERGY METERS > to view -----	This is the sub-group that includes all the meters that are associated with Energy TEST/RESET ► allows access to this sub-group
Active Energy Exp 000000x10kWh Imp 000000x10kWh	Displays both imported and exported Active Energy
Reactive Energy Exp 000000x10kVArh Imp 000000x10kVArh	Displays both imported and exported Reactive Energy

1.7. Wattmetric Meters

Instrument	Description
----- WATTMETRIC > to view -----	This is the sub-group that includes all the meters that are associated with the Wattmetric function TEST/RESET ► allows access to this sub-group
IresR 0.000A Pres 0.00W IresR Angle 0.0deg Io-Vo Angle 0.0deg	Displays the values of the Real component of residual current, the residual real power, the phase of the residual current.

1.8. Directional Meters

Instrument	Description
----- DIRECTIONAL METERS > to view -----	This is the sub-group that includes all the meters that are associated with Directional elements TEST/RESET ► allows access to this sub-group.
P/F Dir (67) ----- No Dir	The appropriate values from the selection will be displayed. No Dir, PhA Fwd, PhA Rev, PhB Fwd, PhB Rev, PhC Fwd, PhC Rev
Calc E/F Dir (67N) ----- No Dir	The appropriate values from the selection will be displayed. No Dir, E/F Fwd, E/F Rev
Meas E/F Dir (67G) ----- No Dir	The appropriate values from the selection will be displayed. No Dir, E/F Fwd, E/F Rev
SEF Dir (67SEF) ----- No Dir	The appropriate values from the selection will be displayed. No Dir, SEF Fwd, SEF Rev

1.9. Thermal Meters

Instrument	Description
----- THERMAL METERS > to view -----	This is the sub-group that includes all the meters that are associated with Thermal TEST/RESET ► allows access to this sub-group
Thermal Status Phase A 0.0% Phase B 0.0% Phase C 0.0%	Displays the thermal capacity

1.10. Single-Triple Meters

Instrument	Description
----- SINGLE TRIPLE METERS > to view -----	This is the sub-group that includes all the meters that are associated with the Single Triple option TEST/RESET ► allows access to this sub-group. Only seen on models that have the Single-Triple option
Single Triple Mode Mode A 3PTrip3PLO	Displays the Single triple mode which is in operation.

1.11. Auto-Reclose Meters

Instrument	Description
----- AUTORECLOSE METERS > to view -----	This is the sub-group that includes all the meters that are associated with Autoreclose TEST/RESET ► allows access to this sub-group.
Autoreclose Status Out Of Service Close Shot 0	Status of the autoreclose for the non single-triple models.
Autoreclose Status A= Out Of Service B= Out Of Service C= Out Of Service	Status of the autoreclose for the single-triple models.
Close Shot A 0 Close Shot B 0 Close Shot C 0	Status of the current autoreclose shot number for the single-triple models.

1.12. Synchronising Meters

SYNC METERS →to view	This is the sub-group that includes all the meters that are associated with Synchronising TEST/RESET ► allows access to this sub-group
Line Volts 0.00V Bus Volts 0.00V Line Freq 0.000Hz Bus Freq 0.000Hz	Displays the voltages used for synchronising in models that include this function
Phase Diff 0.0Deg Slip Freq 0.000Hz Voltage Diff 0%	Displays the calculated synchronising parameters in models that include this function

1.13. Loss of Voltage Meters

LOSS OF VOLTS METERS →to view	This is the sub-group that includes all the meters that are associated with SLoss of Voltage TEST/RESET ► allows access to this sub-group
Loss of Volts Status Disabled	Displays the current status of the Loss of Volts logic in the LOV models only.

1.14. Maintenance Meters

Instrument	Description
----- MAINTENANCE METERS > to view -----	This is the sub-group that includes all the meters that are associated with Maintenance TEST/RESET ► allows access to this sub-group
CB Total Trips Count 0 Target 100	Displays the number of CB trips experienced by the CB for the non single-triple models
CB A Total Trips Count 0 Target 100	Displays the number of CB trips experienced by the phase A CB for the Single Triple models only
CB B Total Trips Count 0 Target 100	Displays the number of CB trips experienced by the phase B CB for the Single Triple models only
CB C Total Trips Count 0 Target 100	Displays the number of CB trips experienced by the phase C CB for the Single Triple models only
CB Ph A Trips Count 0 Target 100	Displays the number of CB trips which were diagnosed as being issued for faults involving the A phase for the non single-triple models
CB Ph B Trips Count 0 Target 100	Displays the number of CB trips which were diagnosed as being issued for faults involving the B phase for the non single-triple models
CB Ph C Trips Count 0 Target 100	Displays the number of CB trips which were diagnosed as being issued for faults involving the C phase for the non single-triple models
CB Ph E/F Trips Count 0 Target 100	Displays the number of CB trips which were issued for operation of-earth fault elements for the non single-triple models
CB Delta Trips Count 0 Target 100	Displays the number of CB trips experienced by the CB
CB A Delta Trips Count 0 Target 100	Displays the number of CB trips experienced by the phase A CB for the Single Triple models only
CB B Delta Trips Count 0 Target 100	Displays the number of CB trips experienced by the phase B CB for the Single Triple models only
CB C Delta Trips Count 0 Target 100	Displays the number of CB trips experienced by the phase C CB for the Single Triple models only
CB Count To AR Block Count 0 Target 100	Displays the number of CB trips experienced by the CB. When the target is reached the relay will only do 1 Delayed Trip to Lockout for the non single-triple models.
CB A Count To AR Block Count 0 Target 100	Displays the number of CB trips experienced by the A phase CB on the Single-Triple models only. When the target is reached the relay will only do 1 Delayed Trip to Lockout on the A phase CB.
CB B Count To AR Block Count 0 Target 100	Displays the number of CB trips experienced by the B phase CB on the Single-Triple models only. When the target is reached the relay will only do 1 Delayed Trip to Lockout on the B phase CB.
CB C Count To AR Block Count 0	Displays the number of CB trips experienced by the C phase CB on the Single-Triple models only. When the target is reached the relay will only do 1

Instrument	Description
Target 100	Delayed Trip to Lockout on the C phase CB.
CB Freq Ops Count Count 0 Target 10	Displays the number of CB trips experienced by the CB over the last rolling 1 hr period. When the target is reached the relay will only do 1 Delayed Trip to Lockout for the non single-triple models.
CB-A Freq Ops Count Count 0 Target 10	Displays the number of phase A CB trips experienced by the CB over the last rolling 1 hr period. When the target is reached the relay will only do 1 Delayed Trip to Lockout for the single-triple models.
CB-B Freq Ops Count Count 0 Target 10	Displays the number of phase B CB trips experienced by the CB over the last rolling 1 hr period. When the target is reached the relay will only do 1 Delayed Trip to Lockout for the single-triple models.
CB-C Freq Ops Count Count 0 Target 10	Displays the number of phase C CB trips experienced by the CB over the last rolling 1 hr period. When the target is reached the relay will only do 1 Delayed Trip to Lockout for the single-triple models.
CB LO Handle Ops Count 0 Target 100	Displays the number of operations of the Circuit Breaker Lockout handle for the non single-triple models
CB-A LO Handle Ops Count 0 Target 100	Displays the number of operations of the phase A Circuit Breaker Lockout handle for the single-triple models
CB-B LO Handle Ops Count 0 Target 100	Displays the number of operations of the phase B Circuit Breaker Lockout handle for the single-triple models
CB-C LO Handle Ops Count 0 Target 100	Displays the number of operations of the phase C Circuit Breaker Lockout handle for the single-triple models
CB Wear Phase A 0.00MA ² s Phase B 0.00MA ² s Phase C 0.00MA ² s	Displays the current measure of circuit breaker wear for the non single-triple models.
CB Wear Remaining Phase A 0% Phase B 0% Phase C 0%	Displays the current measure of circuit breaker wear remaining as a percentage of the alarm level setting for the non single-triple models.
CB Wear A Count 0.00MA ² s Target 100MA ² s Remaining 100%	Displays the current measure of Phase A circuit breaker wear for the single-triple models.
CB Wear B Count 0.00MA ² s Target 100MA ² s Remaining 100%	Displays the current measure of Phase B circuit breaker wear for the single-triple models.
CB Wear C Count 0.00MA ² s Target 100MA ² s Remaining 100%	Displays the current measure of Phase C circuit breaker wear for the single-triple models.

1.18. Power Quality Meters

Instrument	Description
----- POWER QUALITY METERS > to view -----	This is the sub-group that includes all the meters that are associated with Power Quality TEST/RESET ► allows access to this sub-group.
Pole 1 27sag SARFI SIARFI 0 SMARFI 0 STARFI 0	Displays the number of undervoltage sags per type since last reset
Pole 2 27sag SARFI SIARFI 0 SMARFI 0 STARFI 0	Displays the number of undervoltage sags per type since last reset
Pole 3 27sag SARFI SIARFI 0 SMARFI 0 STARFI 0	Displays the number of undervoltage sags per type since last reset
System Interrupts P1 interrupts 0 P2 interrupts 0 P3 interrupts 0	Displays the number of voltage interruptions since last reset
Pole 1 59 swell SARFI SIARFI 0 SMARFI 0 STARFI 0	Displays the number of overvoltage swells per type since last reset
Pole 2 59 swell SARFI SIARFI 0 SMARFI 0 STARFI 0	Displays the number of overvoltage swells per type since last reset
Pole 3 59 swell SARFI SIARFI 0 SMARFI 0 STARFI 0	Displays the number of overvoltage swells per type since last reset

1.19. Demand Meters

Instrument	Description
----- DEMAND METERS > to view -----	This is the sub-group that includes all the meters that are associated with the demand metering. TEST/RESET ► allows access to this sub-group
V Phase A Demand Max 0.00V Min 0.00V Mean 0.00V	Shows the Max, Min and Mean Voltage for Phase A.
V Phase B Demand Max 0.00V Min 0.00V Mean 0.00V	Shows the Max, Min and Mean Voltage for Phase AB
V Phase C Demand Max 0.00V	Shows the Max, Min and Mean Voltage for Phase AC

Instrument	Description
Min 0.00V Mean 0.00V	
V Phase AB Demand Max 0.00V Min 0.00V Mean 0.00V	Shows the Max, Min and Mean Voltage for Phase A.B
V Phase BC Demand Max 0.00V Min 0.00V Mean 0.00V	Shows the Max, Min and Mean Voltage for Phase BC
V Phase CA Demand Max 0.00V Min 0.00V Mean 0.00V	Shows the Max, Min and Mean Voltage for Phase CA.
I Phase A Demand Max 0.00A Min 0.00A Mean 0.00A	Shows the Max, Min and Mean for Phase A.
I Phase B Demand Max 0.00A Min 0.00A Mean 0.00A	Shows the Max, Min and Mean for Phase B.
I Phase C Demand Max 0.00A Min 0.00A Mean 0.00A	Shows the Max, Min and Mean for Phase C.
Power P 3P Demand Max 0.00W Min 0.00W Mean 0.00W	Shows the Max, Min and Mean for Power P 3P Demand.
Power Q 3P Demand Max 0.00VAr Min 0.00VAr Mean 0.00VAr	Shows the Max, Min and Mean for Power Q 3P Demand.
Power S 3P Demand Max 0.00VA Min 0.00VA Mean 0.00VA	Shows the Max, Min and Mean for Power S 3P Demand.
Frequency Demand Max 0.000Hz Min 0.000Hz Mean 0.000Hz	Shows the Max, Min and Mean for System Frequency Demand.

1.20. Binary Input Meters

Instrument	Description
----- BINARY INPUT METERS > to view -----	This is the sub-group that includes all the meters that are associated with the Binary inputs TEST/RESET ► allows access to this sub-group
BI 1-8 ---- ---- BI 9-16 ---- ----	Displays the state of DC binary inputs 1 to 16 (The number of binary inputs may vary depending on model)
BI 17-24 ---- ---- BI 25-32 ---- ----	Displays the state of DC binary inputs 17 to 32 (The number of binary inputs may vary depending on model)
BI 33-33 -	Displays the state of DC binary input 33 (The number of binary inputs may vary depending on model)

1.21. Binary Output Meters

Instrument	Description
----- BINARY OUTPUT METERS > to view -----	This is the sub-group that includes all the meters that are associated with the Binary Outputs TEST/RESET ► allows access to this sub-group
BO 1-8 ---- ---- BO 9-16 ---- ----	Displays the state of DC binary Outputs 1 to 16. (The number of binary outputs may vary depending on model)
BO 17-24 ---- ---- BO 25-30 ---- --	Displays the state of DC binary Outputs 17 to 30. (The number of binary outputs may vary depending on model)

1.22. Virtual Meters

Instrument	Description
----- VIRTUAL METERS > to view -----	This is the sub-group that shows the state of the virtual status inputs in the relay TEST/RESET ► allows access to this sub-group
V 1-8 ---- ---- V 9-16 ---- ----	Displays the state of Virtual Outputs 1 to 16 (The number of virtual inputs will vary depending on model)

1.23. Communication Meters

Instrument	Description
----- COMMUNICATION METERS > to view -----	This is the sub-group that includes all the meters that are associated with Communications ports TEST/RESET ► allows access to this sub-group
COM1 COM2 COM3 COM4	Displays which com ports are currently active
COM1 TRAFFIC Tx1 0 Rx1 0 Rx1 Errors 0	Displays traffic on Com1
COM2 TRAFFIC Tx2 0 Rx2 0 Rx2 Errors 0	Displays traffic on Com2
COM3 TRAFFIC Tx3 0 Rx3 0 Rx3 Errors 0	Displays traffic on Com3
COM4 TRAFFIC Tx4 0 Rx4 0 Rx4 Errors 0	Displays traffic on Com4
EN100 INFORMATION Version 04.07.01 Part# BF1111111111	Displays EN100 information
Network Config Mac 00000000 IP 000.000.000.000 NM 255.255.255.000	Displays EN100 network information
...	Displays further EN100 61850 information

1.24. Miscellaneous Meters

Instrument	Description
----- MISCELLANEOUS METERS > to view -----	This is the sub-group that includes indication such as the relays time and date, the amount of fault and waveform records stored in the relay TEST/RESET ► allows access to this sub-group
Date 01/01/2000 Time 22:41:44 Waveform Recs 0 Fault Recs 0	This meter displays the date and time and the number of Fault records and Event records stored in the relay
Event Recs 0 Data Log Recs 0	

1.25. Quick Logic Meters

Instrument	Description
----- QUICK LOGIC METERS > to view -----	This is the sub-group that includes all the meters that are associated with QuickLogic. TEST/RESET ► allows access to this sub-group
E 1-8 ---- E 9-16 ----	Shows the state of all the equations
E1 Equation EQN =0 TMR 0-0 =0 CNT 0-1 =0	Shows the state of an individual equation. EQN shows the equation state. TMR shows the timer progress and state for the equation. CNT shows the count progress and state for the equation.
...	
E16 Equation EQN =0 TMR 0-0 =0 CNT 0-1 =0	Shows the state of an individual equation. EQN shows the equation state. TMR shows the timer progress and state for the equation. CNT shows the count progress and state for the equation.