

Reclosers

Kyle Type VXE Electronic Control SCADA Input/Output Board Installation and Operation Instructions

Service Information
S280-16-3

**Applicable to VXE15 reclosers serial number 10061 and above,
VXE27 reclosers serial number 162 and above.**

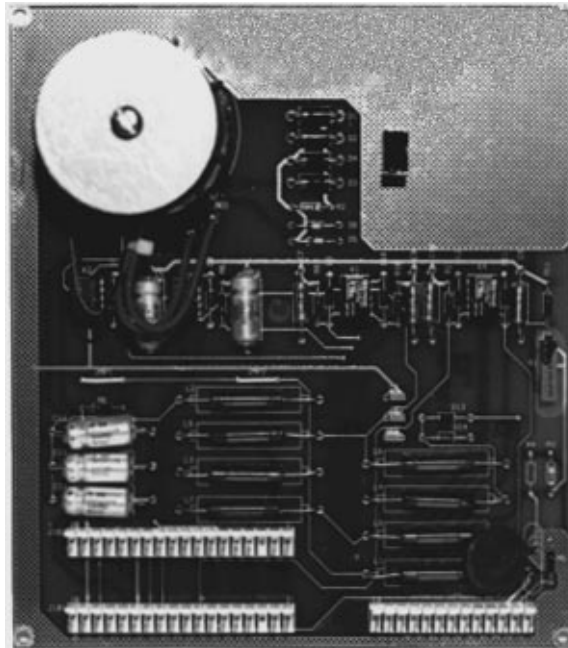


Figure 1.
SCADA I/O Board

Contents	
Description	1
Safety Information	2
Hazard Statements	2
Safety Instructions	2
Additional Information	2
Connections	2
Kit Parts	3
Operation	3
Field Installation	4
Shop Testing	6
Wiring Schematic	7

DESCRIPTION

The SCADA input/output circuit board provides remote operation and status functions for the VXE recloser control. Connections to the SCADA board are made through a 19 pin receptacle located in the bottom of the control box.

Customer provided wiring and contacts allow remote operation of Lockout, Close with Cold Load Pickup, and Non-Reclose Set and Reset functions. Local operation of the non-reclose function is also possible by manually setting the appropriate switch on the control box or recloser. Neither the remote non-reclosing contacts nor the local non-reclose selector switches can override the operation of the other.

The accessory also provides monitoring contacts for the purpose of remotely monitoring the recloser contact status and non-reclose status.

Remote monitoring of line current is also available with the use of the SCADA accessory. A DC output current equivalent to the actual line current is available for monitoring purposes.


The SCADA accessory requires either a continuous line current above 3 amps, or the use of the internal 9 Vdc battery.


SAFETY INFORMATION

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statements


This manual contains two types of hazard statements:


 **WARNING:** Refers to hazards or unsafe practices which could result in severe personal injury, or death, and equipment damage.


 **CAUTION:** Refers to hazards or unsafe practices which could result in damage to equipment or in personal injury.


Safety Instructions


Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

 **WARNING:** Hazardous voltage. Contact with high voltage will cause severe personal injury or death. Follow all locally approved safety procedures when working around high voltage lines and equipment. G103.1

 **WARNING:** Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage. G101.0

 **CAUTION:** Recloser misoperation. The control must be removed from service prior to performing any maintenance, testing, or programming changes. Failure to comply may result in mis-operation (unintentional operation) of the recloser. T216.1

 **CAUTION:** Equipment damage; misoperation. External leads must be shielded and the shield must be grounded at both ends. Terminate each lead with a GE V150LA20A metal oxide varistor (MOV), or equivalent, at the remote end. Attach MOV's between the leads and ground. Failure to properly shield and protect leads can result in equipment damage and/or unintentional operation. G117.1

 **CAUTION:** Follow all locally approved safety practices when lifting and mounting the equipment. Use the lifting lugs provided. Lift the load smoothly and do not allow the load to shift. Improper lifting may result in equipment damage. G106.0

Additional Information

These instructions do not claim to cover all details or variations in the equipment, procedures, or process described, nor to provide directions for meeting every possible contingency during installation, operation, or maintenance. When additional information is desired to satisfy a problem not covered sufficiently for the user's purpose, please contact your Cooper Power Systems sales engineer. Refer to Installation and Operation Instruction S280-16-1 (KA2048-385) for information on VXE Reclosers.

TABLE 1
Ordering Information

VXE SCADA Input/Output Board Service Kit, field installed.	KVXE700
VXE SCADA Input/Output Board, factory installed.	KVXE56

CONNECTIONS

When installed in a VXE control, the SCADA board is internally interconnected to the existing main board using supplied cables and mounting hardware. Refer to figure 2 for a layout of the main accessory components.

Leads from the customer's remote actuating and monitoring devices are connected to receptacle (P2) located in the bottom of the control cabinet.

An optional 19 pin cable assembly (VXE-57-ft. length) is available for direct interconnection to receptacle P2.

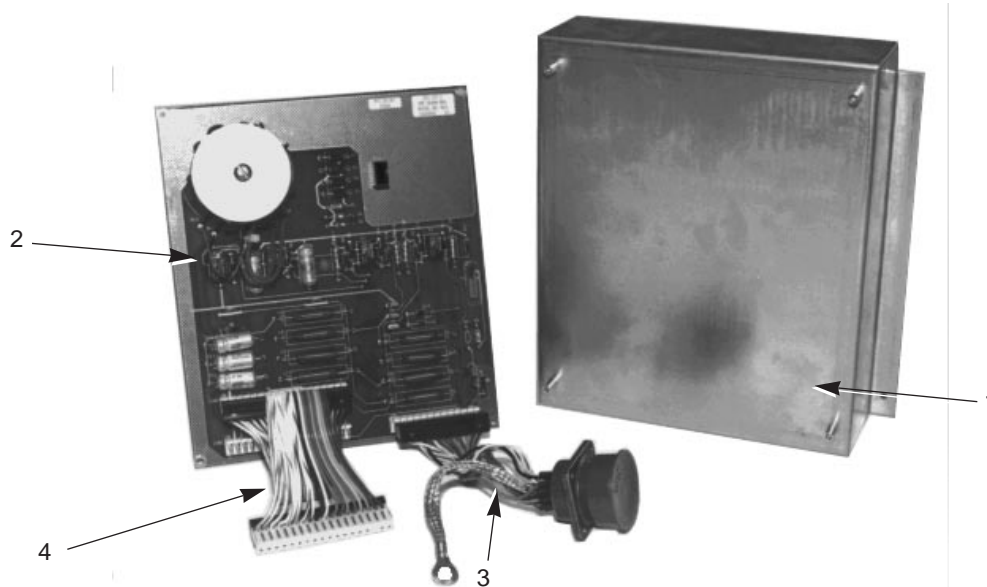


Figure 2.
SCADA I/O Board Kit Parts

KIT PARTS

Item	Part No.	Description	Qty.
1.	SEC-123	Shield Box	1
2.	SEC-127	SCADA Circuit Board	1
3.	SEC-118	SCADA Control Cable Assembly	1
4.	SEC-124	Cable Assembly	1

Hardware Bag (Not Shown):

Machine Screw, Round Head, #6-32UNC-2A x 1/2	13
Lockwasher, External Tooth, #6,	13
Nut, Hex, Machine, #6-32UNC-2B	4

Note: Above part numbers are for identification purposes only. Individual parts cannot be purchased separately.

OPERATION

Remote Trip to Lockout provides the ability to trip and lockout the recloser from a remote signal. Operation requires a momentary contact closure (.1 to 1 SEC.) between pins D and B at receptacle P2.

Remote Close with Cold Load Pickup provides remote closing from lockout by a momentary contact closure (.1 to 1 SEC.) between pins E and B at receptacle P2. Once closed the control will be in Cold Load Pickup for the duration programmed by switch S9 on the control.

Remote Non-Reclose Set provides remote non-reclosing by a momentary contact closure (.1 to 1 SEC.) between pins F and B at receptacle P2.

The non-reclose function can be obtained in three ways:

1. by lowering the non-reclose handle on the mechanism;
2. by setting the "operations to lockout switch" (S2) in the control to 1;
3. by supplying a momentary contact closure to the SCADA non-reclose set pins.

Any of the above three conditions will place the control in non-reclose mode independent of each other.

Remote Non-Reclose Reset provides to return to normal reclosing by a momentary contact closure (.1 to 1 SEC.) between pins G and B at receptacle P2.

Remote Recloser Open/Close Status indicator provides a dry contact closure between pins H and K at receptacle P2 when the recloser is closed. Contact rated 1 amp @ 28 Vdc.

Remote Lockout Status provides a closed contact between pins L and K at receptacle P2 when the recloser is in LOCKOUT and a closed contact between pins M and K when the recloser is NOT in lockout. Contacts rated 1 amp @ 30 Vdc.

Remote Non-Reclose Status indicator provides a closed contact between pins J and K at receptacle P2 when the control is in the Reclose mode. Contacts rated 1 amp @ 28 Vdc.

Note: Remote non-reclose status does not reflect status of local non-reclose switches.

Remote Analog Current Monitor supplies a 0 to .5 mA DC signal, corresponding to 0 to 500 amps of recloser current, between pins C (+) and B (-) at receptacle P2. Output is calibrated to $\pm 5\%$ from 75 to 500 amps of primary current.

FIELD INSTALLATION

1. Remove the VXE control from operation.
2. Loosen control door screws and open the control box lid.
3. Refer to figure 3. Remove the battery cable from connector J1, control cable from connector J2, and control lockout indicator cable from connector J3 on the original circuit board. Do not bend the tabs or terminal pins on the connectors.
4. Remove the four mounting screws securing the circuit board to control box. Retain the screws for reassembly.

5. Remove the circuit board and position on top of shield box as shown in figure 4. The box must be positioned so that the gap and terminal strips are towards the bottom and the cutouts are towards the top as shown in figure 4. Use the existing mounting screws removed in step 4 to secure circuit board to box.

6. Remove plastic holes plugs from control box and install SCADA control cable assembly (SEC-118). To eliminate cable twisting, install SCADA control cable (19 pin connector end) with key way towards the bottom of control box. Secure with four 1/2" machine screws and lockwashers and nuts on inside of control box.

Note: If control will not be put in operation immediately, install plastic cap on end of cable connector.

7. In lower left hand corner of control box, remove top nut and star washer securing ground connector to control box. Add the braided wire terminal from control cable assembly to screw and reinstall star washer and nut. Move the cable assembly out of the way for SCADA board installation.

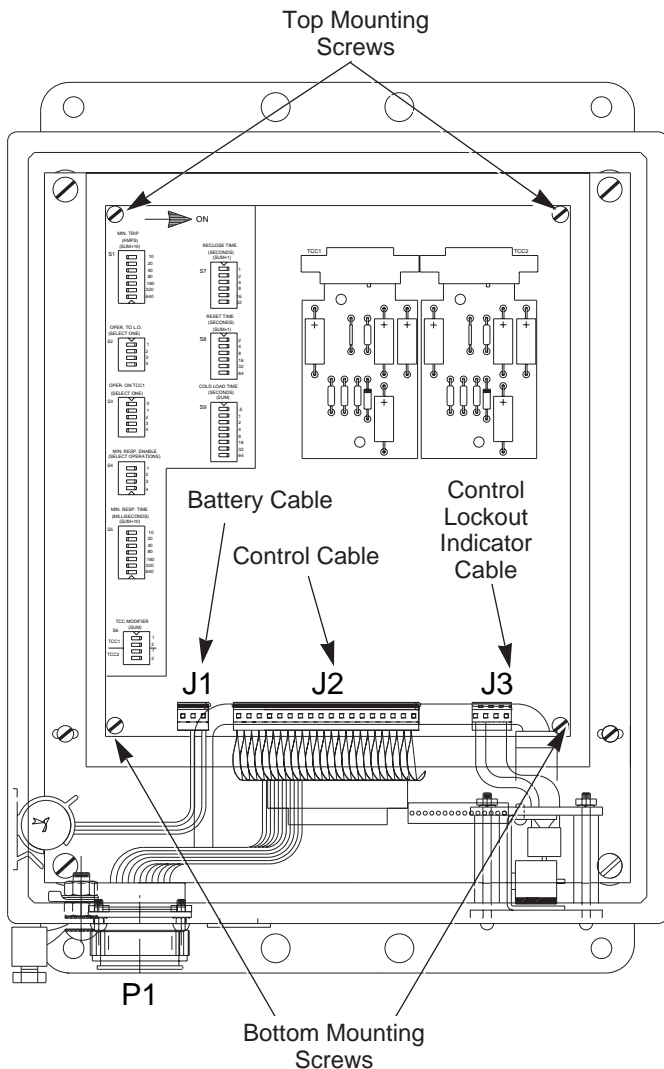


Figure 3.
Programmable Circuit Board

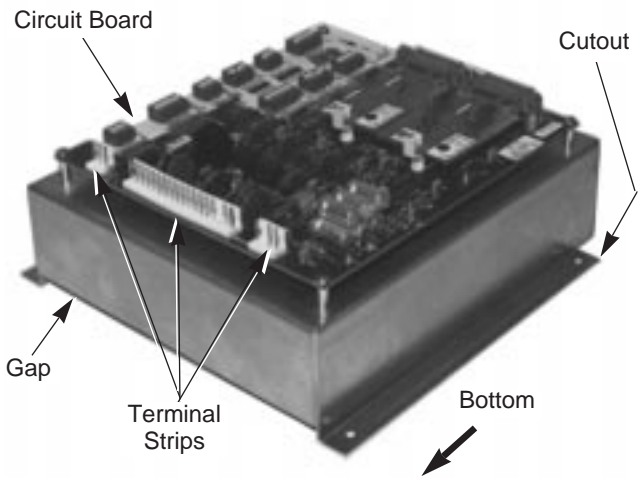


Figure 4.
Mounted Circuit Board to Shield Box

8. Position SCADA board (SEC-119) in control box using existing mounting holes and hardware as shown in figure 5. The terminal strips should be towards the bottom and the transformer towards the top of control box. Secure board with four 1/2" machine screws and lockwashers.
9. Refer to figure 5. Connect the cable assemblies to SCADA board as follows:
 - a. Connect original control cable (from P1) to connector J101.
 - b. Connect one end of cable assembly (SEC-124) to connector J102.
 - c. Connect SCADA control cable assembly (SEC-118) from P2 to J103.

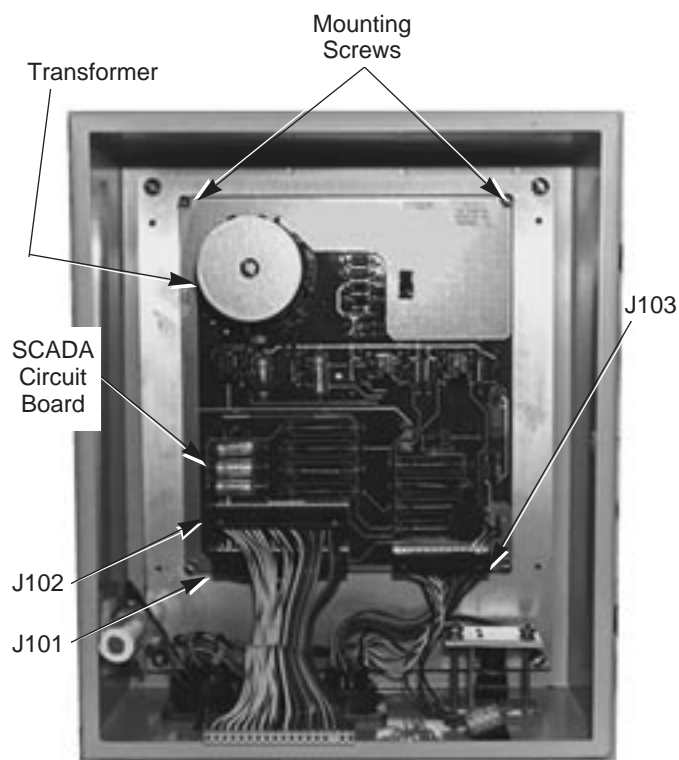


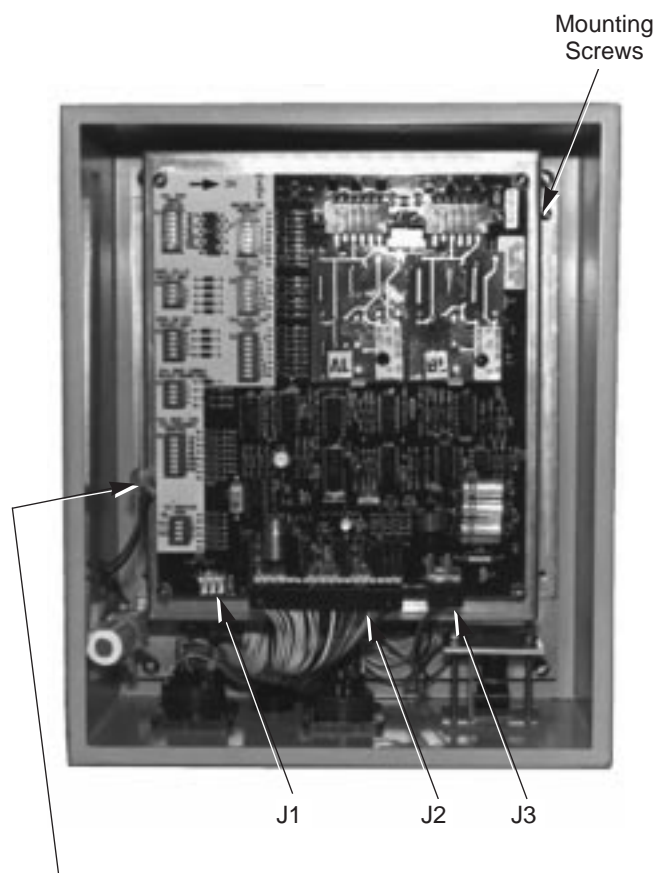
Figure 5.
SCADA Board Cables

10. Position shield box/circuit board assembly into control box with terminal strips towards bottom as shown in figure 6. Secure with four machine screws and lockwashers.

CAUTION: Control mis-operation. Make sure wires are not pinched or insulation cut by shield box. Damage to wire insulation could result in control mis-operation.

11. Connect SCADA board cable to connector J2 on control circuit board.
12. Connect control lockout indicator cable to J3.
13. Connect battery cable to connector J1.

Note: If testing is not to be performed immediately, do not connect battery cable to J1 until testing is to be performed or control is put into operation. Battery must be disconnected when control is not in operation.
14. Test operation of the SCADA board per shop testing procedures before putting control into operation.



Do not connect battery cable to J1 until control is put into operation.

Figure 6.
Circuit Board/Box Installation

SHOP TESTING

The functional testing of the VXE Control SCADA I/O circuit board will require connection to a properly operating VXE recloser. A high current source and manual closing handle will also be required.

Note: The manual closing handle will only be required for VXE reclosers where potential closing power is not readily available. Reference VXE installation manual S280-16-1 for further information on using closing handle.

1. Initial Set-Up:

a. Set control dip switches as follows:

S1 = 50 amps.....	Min-Trip
S2 = 4 operations.....	Operations to Lockout
S3 = 2 operations	Operations on TCC1
S4 = All Off	Min-Response Enable
S5 = 10 ms (all off).....	Min-Response Time
S6 = All Off.....	TCC Modifier
S7 = 2 seconds	Reclose Time
S8 = 9 seconds.....	Reset Time
S9 = 0 seconds (all off)	Cold Load Pickup Time

b. Verify that both TCC plugs are properly installed on the control circuit board.

c. Connect control to VXE recloser.

d. Verify non-reclose handle is in the up (reclose) position on recloser.

e. Connect the control battery to the J1 connector.

2. Remote Recloser Open/Close Status:

a. Open Status: with the yellow manual operating handle of the recloser pulled to the lockout position, check for an open circuit between pins H and K at receptacle P2.

b. Manually close the recloser. The de-energized recloser is manually closed by raising the yellow manual operating handle to the closed position and using the manual closing tool to rotate the main operating shaft of the recloser mechanism 90°.

c. Closed Status: check for continuity between pins H and K at connector P2.

3. Remote Trip to Lockout:

a. With the recloser closed, momentarily short pins D and B at receptacle P2. Verify that the recloser opened and the lockout indicator flag on the bottom of the control box indicates lockout.

4. Remote Close:

a. With the recloser open and the yellow manual operating handle in the closed position, momentarily short pins E and B at receptacle P2. If the recloser has closing power available, unit should close. For units without closing power, listen for an audible thump inside the recloser which indicates the reclose mechanism has been properly energized. Yellow handle should drop in approximately 20 seconds indicating an under voltage lockout.

5. Remote Lockout Status:

a. Recloser Lockout Status: with the recloser in a lock-out state, check for continuity between pins L and K at receptacle P2.

b. Manually close recloser. The de-energized recloser is manually closed by raising the yellow manual operating handle to the closed position and using the manual closing tool to rotate the main operating shaft of the recloser mechanism 90°.

c. Recloser Status — **Not** Locked Out: check for continuity between pins M and K at receptacle P2.

6. Remote Non-Reclose Set:

a. With the unit closed, momentarily short Pins F and B at receptacle P2.

b. Apply 100 amps of current through the recloser and verify that the recloser trips OPEN 1 time and the lockout flag indicates on the bottom of the control box.

7. Remote Non-Reclose Reset:

a. With the control still in a locked out condition, momentarily short pins G and B at receptacle P2.

b. Manually close recloser (no load current applied).

c. Again apply the 100 amp load current to the recloser. The recloser should operate through program sequence.

Note: Because primary closing power may not be available, manual closing with the use of the closing tool may be required after each trip operation. Listen for an internal thump inside the recloser, once heard use the manual closing tool to close recloser.

8. Remote Non-Reclose Status:

a. Remote non-reclose status is verified by checking for an open circuit between pins J and K at receptacle P2 when the unit is in the non-reclose mode, and a closed contact between pins J and K when the unit is in the normal reclose mode.

9. Remote Analog Current Monitor:

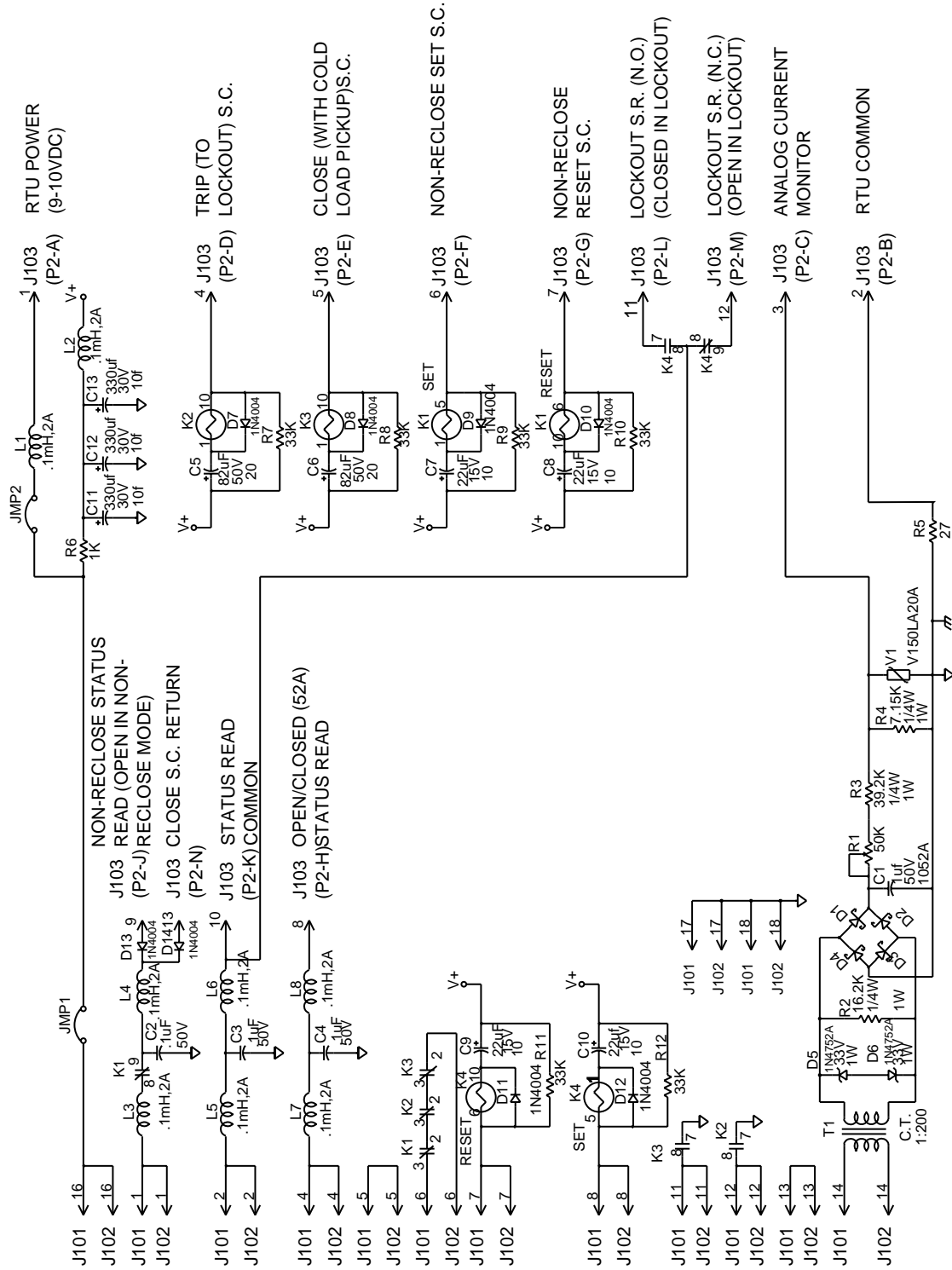
a. Set control min-trip, switch (S1) to 330 amps (position 6 only in "ON" position).

b. Manually close the recloser.

c. Calibrate primary current source to 150 amps.

d. Connect a 0-200 micro amp DC ammeter between pins C (+) and B (-) at receptacle P2. Verify that ammeter reads between 145 and 155 micro amps.

10. If control or SCADA board fails to perform properly, double check all wiring connections and re-test. If control or SCADA board still fails to operate properly, contact your Cooper Power Systems sales engineer or the Kyle Service Department.



Wiring Schematic



Cooper Power Systems

**Quality from
Cooper Industries**