Master Connection Diagram
Series C
R-Frame Circuit Breaker
with DIGITRIP RMS Trip Units
<table>
<thead>
<tr>
<th>LINE</th>
<th>TITLE OF SHEET</th>
<th>SHEET NO.</th>
<th>REV.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INDEX - DIAGRAM</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TRIP UNIT AND ACCESSORY MOUNTING LOCATIONS</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>TERMINATION DIAGRAM</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>DIGITRIP RMS NON GROUND FAULT TRIP UNIT CONNECTIONS</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GFP CONNECTIONS, 3PH., 3 WIRE</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>GFP CONNECTIONS, 3PH., 4 WIRE RESIDUAL</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>GFP CONNECTIONS, 3PH., SOURCE GROUND</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>CURRENT SENSOR CONNECTIONS</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>NEUTRAL PROTECTION 3 POLE</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>NEUTRAL PROTECTION 4 POLE</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>AUXILIARY SWITCH CONNECTIONS</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>ALARM (SIGNAL)/LOCKOUT SWITCH CONNECTIONS</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>SHUNT TRIP CONNECTIONS</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>UNDervoltage release connections</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>LOW ENERGY SHUNT TRIP CONNECTIONS</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>MOTOR OPERATOR CONNECTIONS</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>GENERAL NOTES</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>GFP ZONE INTERLOCKING CONNECTIONS</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>SHORT DELAY ZONE INTERLOCKING CONNECTIONS</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>REMOTE ALARM (DIGITRIP RMS 310 ONLY)</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>REMOTE ATRALARMS FOR DIGITRIP RMS 600/700/800 &amp; 610/810/910/750/1050</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>INCOM CONNECTIONS FOR DIGITRIP RMS 700/800 &amp; 810/910/750/1050</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>MOTOR OPERATOR CONNECTION WITH INCOM CONTROL</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>RD BREAKER WITH DIGITRIP GROUND FAULT &amp; INCOM - RMS 800/810/910/750/1050</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>RD BREAKER WITH DIGITRIP GROUND FAULT AND INCOM</td>
<td>25</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>LINE</th>
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<tbody>
<tr>
<td>A</td>
<td>FRAME INSTRUCTIONS</td>
<td>IL29C107</td>
</tr>
<tr>
<td>B</td>
<td>DIGITRIP RMS 500</td>
<td>IL29C-851</td>
</tr>
<tr>
<td>C</td>
<td>AUXILIARY SWITCH</td>
<td>IL29C125</td>
</tr>
<tr>
<td>D</td>
<td>ALARM (SIGNAL)/LOCKOUT SWITCH</td>
<td>IL29C185</td>
</tr>
<tr>
<td>E</td>
<td>SHUNT TRIP</td>
<td>IL29C150</td>
</tr>
<tr>
<td>F</td>
<td>UNDervoltage release</td>
<td>IL29C178</td>
</tr>
<tr>
<td>G</td>
<td>LOW ENERGY SHUNT TRIP</td>
<td>IL29C151</td>
</tr>
<tr>
<td>H</td>
<td>MOTOR OPERATOR</td>
<td>IL29C205</td>
</tr>
<tr>
<td>I</td>
<td>TERMINAL BLOCK</td>
<td>IL29C312</td>
</tr>
<tr>
<td>J</td>
<td>DIGITRIP RMS 600</td>
<td>IL29-852</td>
</tr>
<tr>
<td>K</td>
<td>DIGITRIP RMS 700</td>
<td>IL29-853</td>
</tr>
<tr>
<td>L</td>
<td>DIGITRIP RMS 800</td>
<td>IL29-854</td>
</tr>
<tr>
<td>M</td>
<td>DIGITRIP RMS TRIP UNIT IN SERIES C R FRAME</td>
<td>IL29C707</td>
</tr>
<tr>
<td>N</td>
<td>DIGITRIP RMS 510</td>
<td>IL29-865</td>
</tr>
<tr>
<td>O</td>
<td>DIGITRIP RMS 610</td>
<td>IL29-886</td>
</tr>
<tr>
<td>P</td>
<td>DIGITRIP RMS 810</td>
<td>IL29-888</td>
</tr>
<tr>
<td>Q</td>
<td>DIGITRIP RMS 310</td>
<td>IL29-883</td>
</tr>
<tr>
<td>R</td>
<td>DIGITRIP RMS 910</td>
<td>IL29-889</td>
</tr>
<tr>
<td>T</td>
<td>DIGITRIP RMS 750/1050</td>
<td>IL29C891</td>
</tr>
</tbody>
</table>

RD MASTER CONNECTION DIAGRAM INDEX

IL29C714
SHEET 1

Effective July 1998
NOTE:
THE MAXIMUM NUMBER OF ACCESSORIES THAT MAY BE INSTALLED IN ANY ONE CIRCUIT BREAKER IS LIMITED BY THE NUMBER OF PHYSICAL MOUNTING POSITIONS.

RD MASTER CONNECTION DIAGRAM
TRIP UNIT AND ACCESSORY MOUNTING LOCATIONS
FIXED MOUNTED BREAKER
WITH SIDE MOUNTED TERMINAL BLOCKS  

SECONDARY CONNECTORS
C1-C12, D1-D12 FOR TRIP UNIT
CONNECTIONS ONLY

SECONDARY CONNECTORS
A1-A12, B1-B12 FOR ACCESSORY
CONNECTIONS ONLY

RAISED RING
(CAVITY NO.1 ONLY)

WIRING TERMINATION
MALE PIN W #73479CJ1E OR
W #73479CJ1ER OR
AMP "MULTIMATE" TYPE III+
P/N 66099-4
FEMALE SOCKET AMP "MULTIMATE"
TYPE III+ P/N 66101-4
HANDCRIMP TOOL
AMP P/N 90067-4 FOR #16-18
EXTRACTION TOOL
AMP P/N 305183-R

TYPICAL DISCONNECT PLUG
AS VIEWED FROM FRONT OF BREAKER

COLOR CODED
LEAD AS
CUSTOMER SUPPLIED
TERMINAL BLOCK

TYPICAL LEAD TERMINATION

FRONT VIEW
DRAWOUT MOUNTED

DRAWOUT MOUNTED BREAKER

RD MASTER CONNECTION DIAGRAM
TERMINATION DIAGRAM
RD MASTER CONNECTION DIAGRAM
DIGITRIP RMS Non-Ground Fault Trip Unit Connections
1600/2000/2500 A Breakers

1. See Sheet 19 and Note 2 on Sheet 17 for Short Time Zone
   Interlocking Connections D9, D10

2. 1600A breakers equipped with a non-ground fault
    Digitrip 310 trip unit. Do not include an auxiliary
    sensor circuit board. Not for use on SCR applications

Effective July 1998
BASIC BREAKER INTERNAL CONNECTIONS (PARTIAL ONLY)

1) EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

2) SEE SHEET 18 AND NOTE 1 ON SHEET 17 FOR GFP ZONE INTERLOCKING CONNECTIONS C4, C5

RD MASTER CONNECTION DIAGRAM
RD WITH DIGITRIP RMS UNIT-GROUND FAULT EXTERNAL CONNECTIONS 3PH,3W 1600/2000/2500A BREAKERS

IL29C714
SHEET 5

Effective July 1998
RD MASTER CONNECTION DIAGRAM
RD WITH DIGITRIP RMS UNIT-GROUND FAULT EXTERNAL
CONNECTIONS 3PH, 4W RESIDUAL 1600/2000/2500A BREAKERS

1. EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION NO. ON SIDE OF BREAKER

2. CONNECT NEUTRAL SENSOR SO THAT POLARITY RELATIONSHIP TOWARDS SOURCE IS IDENTICAL FOR PHASE AND NEUTRAL SENSORS

3. USE NO. 14 OR NO. 12 COPPER WIRE PER IL 1053 ON NEUTRAL SENSOR SECONDARY CONNECTIONS.

4. NEUTRAL SENSOR RATIO MUST MATCH SENSORS IN BREAKER FRAME

5. SEE SHEET 18 AND NOTE 1 ON SHEET 17 FOR GFP ZONE INTERLOCKING CONNECTIONS C4, C5

IL29C714
SHEET 6

Effective July 1998
RD MASTER CONNECTION DIAGRAM
RD WITH DIGITRIP RMS UNIT-GROUND FAULT EXTERNAL
Connections 3PH SOURCE GROUND 1600/2000/2500A BREAKERS

1. EXTERNAL SHORTING STRAPS MUST BE IN PLACE DURING TESTING AND OPERATING CONDITIONS PER INSTRUCTION N.P. ON SIDE OF BREAKER

2. CONNECT NEUTRAL SENSOR SO THAT POLARITY RELATIONSHIP TOWARDS SOURCE IS IDENTICAL FOR PHASE AND NEUTRAL SENSORS

3. USE NO. 14 OR NO. 12 COPPER WIRE PER IL 1053 ON NEUTRAL SENSOR SECONDARY CONNECTIONS

4. NEUTRAL SENSOR RATIO MUST MATCH SENSORS IN BREAKER FRAME

5. SEE SHEET 18 AND NOTE 1 ON SHEET 17 FOR GFP ZONE INTERLOCKING CONNECTIONS C4, C5

Effective July 1998
RD MASTER CONNECTION DIAGRAM
TYPICAL CURRENT SENSOR CONNECTIONS FOR RD 1600/2000/2500A
(USE WITH DIGITRIP RMS)

(1) CONNECT D5 TO D6 AND D7 TO D8 ON FOUR POINT GFP TERMINAL BLOCK FOR RESIDUAL SENSING. (SEE ALSO SHEET 6).
(2) CONNECT D5 TO D8 ON FOUR POINT GFP TERMINAL BLOCK FOR SOURCE GROUND SENSING. (SEE ALSO SHEET 7).
BASIC BREAKER
INTERNAL CONNECTIONS
(PARTIAL ONLY)

NOTE: BREAKER MUST BE MARKED:
"BREAKER HAS NEUTRAL PROTECTION PROVISIONS".

RD MASTER CONNECTION DIAGRAM
3 POLE RD WITH DIGITRIP RMS UNIT-NEUTRAL PROTECTED
CONNECTIONS, 3PH,4W 1600/2000/2500A BREAKERS

IL29C714
SHEET 9

Effective July 1998
RD MASTER CONNECTION DIAGRAM
4 POLE RD WITH DIGITRIP RMS UNIT - NEUTRAL PROTECTED
CONNECTIONS 3PH,4W, 1600/2000/2500A BREAKERS
NOTE:
The maximum number of accessories that may be installed in any one circuit breaker is limited by the number of physical mounting positions.

RD MASTER CONNECTION DIAGRAM
AUXILIARY SWITCH CONNECTIONS
**Table**

<table>
<thead>
<tr>
<th>CAT. NO.</th>
<th>NO. OF a/b SWITCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1L6RA, A1L6RPK</td>
<td>1</td>
</tr>
<tr>
<td>A2L6RA, A2L6RPK</td>
<td>2</td>
</tr>
</tbody>
</table>

**Diagrams**

- **Fig. A**: Break (Lockout) TYP.
- **Fig. B**: Make (Alarm) TYP.
- **Fig. C**: Preferred
- **Fig. D**: B7 B8 B9
- **Fig. E**: A7 A8 A9

**Note:**

The maximum number of accessories that may be installed in any one circuit breaker is limited by the number of physical mounting positions.

**RD Master Connection Diagram**

**Alarm (Signal) / Lockout Switch Connections**
NOTE:
The maximum number of two shunt trips may be installed in any one circuit breaker.

RD MASTER CONNECTION DIAGRAM
Shunt Trip Connections
NOTE:
THE MAXIMUM NUMBER OF TWO UVRS MAY BE INSTALLED IN ANY ONE CIRCUIT BREAKER.

RD MASTER CONNECTION DIAGRAM
UNDERVOLTAGE RELEASE CONNECTIONS
NOTE:
THE MAXIMUM NUMBER OF ACCESSORIES THAT MAY BE INSTALLED IN ANY ONE CIRCUIT BREAKER IS LIMITED BY THE NUMBER OF PHYSICAL MOUNTING POSITIONS.

RD MASTER CONNECTION DIAGRAM
LOW ENERGY SHUNT TRIP
RD MASTER CONNECTION DIAGRAM
Motor Operator Connections

1. CONTROL TRANSFORMER MAY BE REQUIRED TO MEET SUPPLY REQUIREMENTS.
2. CIRCUIT BREAKER AND MOTOR OPERATOR SHOWN IN OPEN / RESET POSITION.

LEGEND
- X - ON AUX. RELAY
- Y - OFF AUX. RELAY
- LS/X - ON LIMIT SWITCH
- LS/Y - OFF LIMIT SWITCH
- IS - INTERLOCK SWITCH
- a - ON BREAKER AUX. SWITCH
- b - OFF BREAKER AUX. SWITCH
- PB - ON PUSHBUTTON – MOMENTARY
- PB - OFF PUSHBUTTON – CONTACTS
- MOTOR OPERATOR TERMINAL BLOCK

EATON

Effective July 1998
1. ALL RD BREAKERS EQUIPPED WITH DIGITRIP RMS 500, 600, 700, 800, 510, 610, 810, 910, 750, AND 1050 TRIP UNITS WITH GFP WILL TRIP NEAR INSTANTANEOUSLY (0.04 – 0.12 SEC.) REGARDLESS OF THE TIME BAND SETTING – IF DOWNSTREAM INTERLOCK WIRING IS NOT EMPLOYED AND/OR A JUMPER IS NOT ADDED BETWEEN CONTROL TERMINALS C4 AND C5. WITH THE JUMPER ADDED, THE BREAKER WILL RESPOND TO THE PRE-SET TIME DELAY SETTING. CONSIDER ADDING THIS JUMPER FOR ALL INSTALLATIONS WITH GFP ON THE MAIN BREAKER ONLY. FOR INSTALLATIONS WITH MULTIPLE LEVELS OF GFP, SEE SHEET 18.

2. ALL RD BREAKERS EQUIPPED WITH DIGITRIP RMS 500, 600, 700, 800, 510, 610, 810, 910, 750 AND 1050 TRIP UNITS EQUIPPED WITH AN ADJUSTABLE SHORT TIME DELAY SETTING WILL TRIP NEAR INSTANTANEOUSLY (0.04 – 0.12 SEC.) REGARDLESS OF THE TIME BAND SETTING – IF DOWNSTREAM INTERLOCK WIRING IS NOT EMPLOYED AND/OR A JUMPER IS NOT ADDED BETWEEN CONTROL TERMINALS D9 AND D10. WITH THE JUMPER ADDED, THE BREAKER WILL RESPOND TO THE PRE-SET TIME DELAY SETTING. FOR SELECTIVE COORDINATION, INTERLOCK WIRING SHOULD BE EMPLOYED. SEE SHEET 19.

3. RD - BREAKERS HAVE BEEN DESIGNED FOR MAXIMUM PROTECTION, CONTROL, COMMUNICATIONS AND ACCESSORY UTILIZATION. FOR THIS REASON ALL LEADS IN THE SECONDARY CONTROL BLOCKS MAY NOT BE USED BY A CUSTOMER FOR A PARTICULAR APPLICATION.

WARNING

BREAKER AUTOMATIC OPEN AND CLOSE OPERATIONS BY INCOMMUNICATION SIGNALS (VIA TERMINALS C11 AND C12) UNDER SYSTEM OPERATING OR MAINTENANCE PERIODS COULD CAUSE SEVERE PERSONAL INJURY OR DEATH. INSTALL APPROPRIATE PERMISSIVE CONTROL MEANS (SEE IL29C714 SHEET 23) TO AVOID UNDESIRED REMOTE CLOSING DURING MAINTENANCE OPERATIONS AND PROVIDE ADEQUATE EQUIPMENT WARNINGS FOR NORMAL OPERATION PERIODS.

RD MASTER CONNECTION DIAGRAM

GENERAL NOTES
RD MASTER CONNECTION DIAGRAM
TYPICAL GROUND FAULT ZONE INTERLOCKING
CONNECTIONS FOR RADIAL 6 DISTRIBUTION SYSTEM
(USE WITH DIGITRIP RMS
EQUIPPED WITH GROUND FUNCTION)

1. JUMPER MUST BE ADDED ON EACH DOWN STREAM BREAKER
WHERE TIME DELAY AS PRE-SET IS REQUIRED.
SEE ALSO NOTE 1 SHEET 17.

2. TWIST TOGETHER AND RUN SEPARATE FROM POWER CABLES
#14 OR #18 COPPER WIRE IS REQUIRED PER UL-1853.
LENGTH OF RUN IS NOT CRITICAL.

3. A MAXIMUM OF 20 BREAKERS MAY BE CONNECTED
IN PARALLEL IN ZONE 3 WHEN EMPLOYED WITHOUT
SELF-INTERLOCK.

4. A MAXIMUM OF 20 BREAKERS MAY BE CONNECTED IN
PARALLEL WHEN EMPLOYED WITH SELF-INTERLOCK BY
ADDING SIGNAL DIODES TYPE 1N4004 OR EQUIVALENT
AS SHOWN IN ZONE 3 ALTERNATE.

5. A MAXIMUM OF 5 BREAKERS MAY BE CONNECTED
IN PARALLEL IN ZONE 3 WHEN EMPLOYED WITH
SELF-INTERLOCK.

6. SPECIAL ZONE INTERLOCKING CONSIDERATIONS MUST
BE REQUIRED ON DOUBLE-ENDED (DUAL SOURCE) OR
MULTI-SOURCE DISTRIBUTION SYSTEMS TO PROVIDE
DESIRED INTERLOCKING SEQUENCES.
1. JUMPER MUST BE ADDED ON EACH DOWN STREAM BREAKER WHERE TIME DELAY AS PRE-SET IS REQUIRED. SEE ALSO NOTE 2 SHEET 17.

2. TWIST TOGETHER AND RUN SEPARATE FROM POWER CABLES #14 OR #16 COPPER WIRE IS REQUIRED PER UL-1053.
   LENGTH OF RUN IS NOT CRITICAL.

3. A MAXIMUM OF 20 BREAKERS MAY BE CONNECTED IN PARALLEL IN ZONE 3 WHEN EMPLOYED WITHOUT SELF-INTERLOCK.

4. A MAXIMUM OF 20 BREAKERS MAY BE CONNECTED IN PARALLEL WHEN EMPLOYED WITH SELF-INTERLOCK BY ADDING SIGNAL DIODES TYPE 1N4004 OR EQUIVALENT AS SHOWN IN ZONE 3 ALTERNATE.

5. A MAXIMUM OF 5 BREAKERS MAY BE CONNECTED IN PARALLEL IN ZONE 3 WHEN EMPLOYED WITH SELF-INTERLOCK.

RD MASTER CONNECTION DIAGRAM
TYPICAL SHORT DELAY ZONE INTERLOCKING CONNECTIONS FOR RADIAL DISTRIBUTION SYSTEM
(USE WITH DIGITRIP RMS EQUIPPED WITH SHORT DELAY FUNCTION)

IL29C714
SHEET 19

Effective July 1998
RD MASTER CONNECTION DIAGRAM
REMOTE ATR ALARMS FOR USE WITH DIGITRIP RMS 310

ATR CONTACT RATING
AC 0.5A @ 230 VAC
DC 1A @ 28 VDC

50/60HZ CONTROL VOLTAGE
(120 OR 230)

GF ALARM TEST AND
RESET MOMENTARY CONTACT
(CUSTOMER SUPPLIED)
**RD MASTER CONNECTION DIAGRAM**

REMOTE ATR ALARMS FOR USE WITH DIGITRIP RMS TYPES 600, 700, 800, 610, 810, 910, 750, AND 1050

IL29C714

SHEET 21

Effective July 1998
RD MASTER CONNECTION DIAGRAM
INCOM CONNECTIONS FOR USE WITH
DIGITRIP RMS TYPES 700, 800, 810, 910, 750, AND 1050

1) ELECTRIC OPERATOR FUNCTION REQUIRED TO REMOTELY CLOSE BREAKER VIA INCOM. SEE SHEET 23.

2) SUPPLIED AS STANDARD WITH DIGITRIP TYPE 700, 800, 810, 910, 750, AND 1050. IF ELECTRIC OPERATOR IS NOT SUPPLIED, RED AND BLUE LEADS WILL BE PRESENT BUT NOT CONNECTED.

3) PT MODULE IS NOT SUPPLIED WITH TYPE 750 TRIP UNITS.
RD MASTER CONNECTION DIAGRAM
Motor Operator Connections

1 CONTROL TRANSFORMER MAY BE REQUIRED TO MEET SUPPLY REQUIREMENTS.
2 CIRCUIT BREAKER AND MOTOR OPERATOR SHOWN IN OPEN / RESET POSITION.

X - ON AUX. RELAY
Y - OFF AUX. RELAY
LS/X - ON LIMIT SWITCH
LS/Y - OFF LIMIT SWITCH
IS - INTERLOCK SWITCH
LCS - LATCH CHECK SWITCH

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IL29C714
SHEET 23

Effective July 1998
RD MASTER CONNECTION DIAGRAM
Motor Operator Connections
Cat No. EOPTOBC (With Incom Control)
DIGITRIP 700, 800, 810, 910, 750, AND 1050

LEGEND
X - ON AUX. RELAY
Y - ON AUX. RELAY
LS/X - ON LIMIT SWITCH
LS/Y - OFF LIMIT SWITCH
LS/Z - OFF LIMIT SWITCH
PB - ON PUSHBUTTON
IS - INTERLOCK SWITCH
LCS - LATCH CHECK SWITCH
ATR - TERMINAL BLOCK

1 CONTROL TRANSFORMER MAY BE REQUIRED TO MEET SUPPLY REQUIREMENTS.
2 CIRCUIT BREAKER AND MOTOR OPERATOR SHOWN IN OPEN / RESET POSITION.