Magnum DS and DSL Low Voltage Power Circuit Breaker Engineering Data

Effective January 2005

Magnum DS Power Circuit Breaker Family

Magnum DS Narrow Frame Breaker and Drawout Cassette

Magnum DS Narrow Frame Drawout Cassette (rear view)
PURPOSE

This engineering data is expressly intended to provide outline drawings, connection diagrams, trip unit time-current characteristic curves, document references and other material not necessarily provided elsewhere for fixed and drawout Magnum DS/DSL Circuit Breakers and any associated drawout cassettes.

This information is also available from the Eaton website at www.Eaton.com

For application information, consult Eaton or see applicable Product Guides, Technical Documents, Application Publications and/or Industry Standards.

All possible contingencies which may arise during installation operation or maintenance, and all details and variations of this equipment do not purport to be covered by this appendix. If further information is desired by purchaser regarding his particular installation, operation or maintenance of particular equipment, contact the local Eaton representative.

SAFETY

All safety codes, safety standards and/or regulations must be strictly observed in the installation, operation and maintenance of this equipment.

ANY WARNINGS OR CAUTIONS INCLUDED AS PART OF THIS DOCUMENT ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE TO FAMILIARIZE PERSONNEL WITH THE STYLE OF PRESENTATION. THIS WILL HELP TO INSURE THAT PERSONNEL ARE ALERT TO WARNINGS. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE.
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**Breaker Accessories & Option Kits**

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**Cassette Accessories & Option Kits**

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**Miscellaneous Accessories**

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Section 2: Connection Diagrams

The connection diagrams for all Magnum DS/DSL Circuit Breakers using Digitrip RMS trip units are shown in Figures 2-1 through 2-8.
Figure 2-1 Connection Diagram for Narrow and Standard Frame with Digitrip 220/520/520M/520MC

T.D. 01301004E
Figure 2-2 Connection Diagram for Standard Frame with Digitrip 1150
Figure 2-3 Connection Diagram for Double-wide Frame with Digitrip 520/520M/520MC with ABCABC Configuration

Notes:
1. 4 WIRE CRIMP CONNECTION.
2. 3 WIRE CRIMP IF HIGH INST TRIP MODULE IS SUPPLIED.
3. SOCKET USED WITH DIGITRIP 520M GROUND ALARM POWER SUPPLY MODULE WILL "HANG CONNECTED" DIGITRIP IF DIGITRIP 220 OR 520 IS SUPPLIED.
4. ALL CONTACTS SHOWN WITH BREAKER IN OPEN POSITION AND WITH SPRING NOT CHARGED AND WITH K2-9 K2-7 520/520M/520MC
5. THE SPRING RELEASE ACCESSORY CONSISTS OF A "SR" COIL AND A P.C. BOARD. THE PRINTED CIRCUIT PROVIDES A 0.20 SECOND PULSE FOR THE CLOSING OPERATION. VOLTAGE MUST BE REMOVED AND THEN REAPPLIED FOR SUBSEQUENT OPERATION.
6. TO PROVIDE SELECTED TIME DELAYS FOR SHORT TIME AND/OR GROUND TIME FUNCTIONS FOR TESTING OR NON-ZONE INTERLOCKING APPLICATIONS, A JUMPER FROM B-8 TO B-9 IS REQUIRED.
7. ON THREE POLE BREAKERS ONLY, HAVING ... THE SAME AS THE PHASE SENSORS AND IS LOCATED WITHIN THE BREAKER FRAME. THE SECONDARY CONTACTS B-4, B-5, ARE NOT WIRED OUT.
8. SECOND SHUNT TRIP MAY BE INSTALLED (USING A-7, A-8 CONTACTS) IN PLACE OF UVR. THIRD AUX SWITCH NOT INSTALLED (B-29, B-30) IN SERIES WITH SPRING RELEASE DEFEATS ANTI-PUMP FUNCTION AND IS NOT RECOMMENDED. SEE NOTE 5 FOR SPRING RELEASE LATCH CHECK SWITCH.
9. THESE CONTACTS ARE ASSIGNED AS A HIGH LOAD ALARM.
10. THE OTS (OVERCURRENT TRIP SWITCHES) WILL OPERATE DIRECTLY FROM THE DIGITRIP DRIVING THE TA (TRIP ACTUATOR) TO TRIP THE CIRCUIT BREAKER. THE OTS REQUIRES A MANUAL LOCAL RESET VIA RED BUTTON DEPRESSION.
11. THE OTS (OVERCURRENT TRIP SWITCHES) WILL OPERATE DIRECTLY FROM THE DIGITRIP DRIVING THE TA (TRIP ACTUATOR) TO TRIP THE CIRCUIT BREAKER. THE OTS REQUIRES A MANUAL LOCAL RESET VIA RED BUTTON DEPRESSION.
12. THE OTS (OVERCURRENT TRIP SWITCHES) WILL OPERATE DIRECTLY FROM THE DIGITRIP DRIVING THE TA (TRIP ACTUATOR) TO TRIP THE CIRCUIT BREAKER. THE OTS REQUIRES A MANUAL LOCAL RESET VIA RED BUTTON DEPRESSION.
13. THE SPRING RELEASE, THE CLOSING PULSE WILL OCCUR WHEN THE MECHANISM IS CHARGED AND RESET (WHEN REQ.)
Figure 2-4 Connection Diagram for Double-Wide Frame with Digitrip 520/520M/520MC with AABBCC Configuration

CLOSE COIL B-13
CLOSE CONTACT B-12
OUTPUT- G_ALARM J3-1
GROUND ALARM POWER SUPPLY
OUTPUT+ Z_COM J3-2 J3-3
LINE (OPTIONAL 520M, GREEN RED K2-1
13 +30VDC INPUT (520M & 520MC ONLY) K2-2
K2-4 N1 N2
#22 AWG SEE NOTE 1 K2-7
K2-9 K2-8
N N
52b
R/1
SEE NOTE 5 K2-11
H2
SEE NOTE 13
PCB
SEE NOTE 1
SEE NOTE 7
SEE NOTE 9
SEE NOTE 11
SEE NOTE 12
SEE NOTE 14
NOTE 1. 4 WIRE CRIMP CONNECTION.
NOTE 2. 3 WIRE CRIMP IF HIGH INST TRIP MODULE IS SUPPLIED.
NOTE 3. SOCKET USED WITH DIGITRIP 520M GROUND ALARM POWER SUPPLY MODULE WILL “HANG UNCONNECTED” IF DIGITRIP 220 OR 520 IS SUPPLIED.
NOTE 4. ALL CONTACTS SHOWN WITH BREAKER IN OPEN POSITION AND WITH SPRING NOT CHARGED AND WITH TRIP UNIT IN “NON-TRIPPED” STATE (OTS SWITCHES).
NOTE 5. THE SPRING RELEASE ACCESSORY CONSISTS OF A “SR” TRIP FUNCTION FOR LSIG TRIP STYLE. HOWEVER, FOR A LSI STYLE TRIP UNIT, THE CONTACTS ARE ASSIGNED AS A HIGH LOAD ALARM.
NOTE 6. TO PROVIDE SELECTED TIME DELAYS FOR SHORT TIME ELECTRIC OPERATOR
NOTE 7. 2. 3 WIRE CRIMP IF HIGH INST TRIP MODULE IS SUPPLIED.
NOTE 8. AN OPTIONAL SR-LATCH CHECK SWITCH (LCS) ACCESSORY MAY BE CONNECTED TO THE SPRING RELEASE. THE (CLOSED) LCS DELAYS THE SPRING READY TO CLOSE (CHARGED AND RESET). (THIS WILL INSURE THAT THE LATCH WILL ALWAYS BE IN THE PROPER STATE BEFORE THE SPRING RELEASE PULSE IS INITIATED.) IF VOLTAGE IS MAINTAINED TO THE SPRING RELEASE, THE CLOSING PULSE WILL OCCUR WHEN THE MECHANISM IS CHARGED AND RESET (LCS OPEN). VOLTAGE MUST BE REMOVED AND THEN RE-APPLIED TO THE SPRING RELEASE FOR SUBSEQUENT OPERATION.
NOTE 10. 2. 3 WIRE CRIMP IF HIGH INST TRIP MODULE IS SUPPLIED.
NOTE 11. SECOND SHUNT TRIP MAY BE INSTALLED (USING A-7, A-8 CONTACTS) IN PLACE OF UVR. THIRD AUX SWITCH NOT AVAILABLE WITH SECOND SHUNT TRIP.
NOTE 12. ONLY ONE LATCH CHECK SWITCH MAY BE INSTALLED. USE OF CUSTOMER-ACCESSIBLE LATCH CHECK SWITCH (WHEN REQ.) IN SERIES WITH SPRING RELEASE DEFEATS ANTI-PUMP FUNCTION AND IS NOT RECOMMENDED. SEE NOTE 5 FOR SPRING RELEASE LATCH CHECK SWITCH.
NOTE 13. THESE CONTACTS ARE ASSIGNED AS A LOAD ALARM. FOR A LSI STYLE TRIP UNIT, THE CONTACTS ARE ASSIGNED AS A HIGH LOAD ALARM.
Figure 2-5 Connection Diagram for Double-wide Frame with Digitrip 1150 with ABCABC Configuration

NOTES:
1. ON THREE POLE BREAKERS ONLY (NOT EIGHT PCB), HAVING GROUND FAULT FUNCTIONALITY, A JUMPER INSTALLED FROM B-6 TO B-7 WILL ENABLE SOURCE GROUND FAULT SENSING AND DISABLE RESIDUAL GROUND FAULT ... BE REASSIGNED FOR SOURCE GROUND SENSOR INPUTS.
2. ALL CONTACTS SHOWN WITH BREAKER IN OPEN POSITION AND WITH TRIP UNIT IN "NON-TRIPPED" STATE (OTS SWITCHES) AND SPRING CHARGED. THE SPRING RELEASE ACCESSORY CONSISTS OF A "OPTIONAL" SWITCH (B29-B-30) IN SERIES WITH SPRING RELEASE DEFEATS ANTI-PUMP FUNCTION AND IS NOT RECOMMENDED. SEE NOTE 3 FOR SPRING RELEASE LATCH CHECK SWITCH.
3. THE SPRING RELEASE LATCH CHECK SWITCH (WHEN SUPPLIED) REQUIRES A MANUAL LOCAL RESET VIA RED BUTTON DEPRESSION. (WHEN REQ.)
4. TO PROVIDE SELECTED TIME DELAYS FOR SHORT TIME MOTOR OPERATOR SWITCH SHOWN WITH BREAKER CLOSING SPRING DISCHARGED.
5. FOUR POINT SOCKET USED HERE.
6. SECOND SHUNT TRIP MAY BE INSTALLED (USING A-7, A-8 CONTACTS) IN PLACE OF UVR. THIRD AUX SWITCH NOT AVAILABLE WITH SECOND SHUNT TRIP.
7. ONLY ONE LATCH CHECK SWITCH MAY BE INSTALLED. USE OF CUSTOMER-ACCESSIBLE LATCH CHECK SWITCH (B29-B-30) IN SERIES WITH SPRING RELEASE DEFEATS ANTI-PUMP FUNCTION AND IS NOT RECOMMENDED. SEE NOTE 3 FOR SPRING RELEASE LATCH CHECK SWITCH.
8. INST. HIGH INSTALLED (OPT.)
9. ON 4 POLE BREAKERS (ACTUALLY 8 PHYSICAL POLES), THE NEUTRAL CURRENT SENSORS ARE LOCATED WITHIN THE BREAKER FRAME. THE SECONDARY CONTACTS ARE NOT WIRED OUT.
10. MOTOR OPERATOR SWITCH SHOWN WITH BREAKER SPRING DISCHARGED.
11. MOTOR OPERATOR SWITCH SHOWED (WHEN MOUNTED ON LEFT SIDE OF BREAKER) INSTALLED)
12. SECOND SHUNT TRIP MAY BE INSTALLED (USING A-7, A-8 CONTACTS) IN PLACE OF UVR. THIRD AUX SWITCH INSTALLED)
13. ONLY ONE LATCH CHECK SWITCH MAY BE INSTALLED. USE OF CUSTOMER-ACCESSIBLE LATCH CHECK SWITCH (B29-B-30) IN SERIES WITH SPRING RELEASE DEFEATS ANTI-PUMP FUNCTION AND IS NOT RECOMMENDED. SEE NOTE 3 FOR SPRING RELEASE LATCH CHECK SWITCH.
14. ON 4 POLE BREAKERS (ACTUALLY 8 PHYSICAL POLES), THE NEUTRAL CURRENT SENSORS ARE LOCATED WITHIN THE BREAKER FRAME. THE SECONDARY CONTACTS ARE NOT WIRED OUT.
15. JUMPERING B-3 (NPOW) TO B-7 TERMINAL WILL ELIMINATE REVERSE POWER CONDITION.
Figure 2-6 Connection Diagram for Double-wide Frame with Digitrip 1150 with AABBC Configuration
Figure 2-7: Magnum DSL Connection Diagram with Blown Fuse Trip

NOTES:
1. 4 WIRE CRIMP CONNECTION
2. 3 WIRE CRIMP IF HIGH INST TRIP MODULE IS SUPPLIED.
3. SOCKET USED WITH DIGITRIP 520M GROUND ALARM POWER SUPPLY MODULE WILL "HANG UNCONNECTED" IF
   DIGITRIP 220 OR 530 IS SUPPLIED.
4. ALL CONTACTS SHOWN WITH BREAKER IN OPEN POSITION AND WITH SPRING NOT CHARGED AND WITH TRIP UNIT IN
   "NONTRIPPED" STATE (OTS SWITCHES).
5. THE SPRING RELEASE ACCESSORY CONSISTS OF A "SP" COIL AND A PCB BOARD. THE PRINTED CIRCUIT PROVIDES A
   .30 SECOND PULSE FOR THE CLOSING OPERATION. VOLTAGE MUST BE REMOVED AND THEN REAPPLIED FOR
   SUBSEQUENT OPERATION.
6. TO PROVIDE SELECTED TIME DELAYS FOR SHORT TIME AND/OR GROUND TIME FUNCTIONS FOR TESTING OR NON-
   ZONE INTERLOCKING APPLICATIONS, A JUMPER FROM A-7 TO B-9 IS REQUIRED.
7. ON THREE POLE BREAKERS ONLY, HAVING GROUND FAULT FUNCTIONALITY, A JUMPER INSTALLED FROM B-6 TO B-7
   WILL ENABLE SOURCE GROUND FAULT SENSING AND DISABLE RESIDUAL GROUND FAULT SENSING. INPUTS B-4 AND B-5
   WILL BE REASSIGNED FOR SOURCE GROUND SENSOR INPUTS.
8. FOR NON-AUTO, OMIT DIGITRIP UNIT AND RELATED COMPONENTS AND WIRING FROM ASSEMBLY.
9. MOTOR OPERATOR SWITCH SHOWN WITH BREAKER CLOSING SPRING DISCHARGED.
10. FOR RESIDUAL GROUND FAULT SENSING, THE NEUTRAL SENSOR MUST MATCH THE PHASE CURRENT SENSOR AND
    RATING FLUID VALUE.
11. SECOND SHUNT TRIP MAY BE INSTALLED (USING A-7, A-6 CONTACTS IN PLACE OF UVR). THIS AUX SWITCH NOT
    AVAILABLE WITH SECOND SHUNT TRIP.
12. ONLY ONE LATCH CHECK SWITCH MAY BE INSTALLED USE OF CUSTOMER ACCESSIBLE LATCH CHECK SWITCH (B-38,
    B-39, B-30) IN SERIES WITH SPRING RELEASE DEFEATS ANTI-PUMP FUNCTION AND IS NOT RECOMMENDED. SEE NOTE 5
    FOR SPRING RELEASE LATCH CHECK SW.
13. THESE CONTACTS ARE PROVIDED FOR DIGITRIP 520M AS STANDARD OR 520M AS OPTIONAL ACCESSORY. THE
    CONTACTS ARE ASSIGNED FOR GROUND ALARM ON GROUND TRIP FUNCTION FOR 520M TRIP STYLE, HOWEVER, FOR A
    520MC TRIP UNIT, THE CONTACTS ARE ASSIGNED AS A HIGH LOAD ALARM.
14. THE OTS OVER CURRENT TRIP SWITCHES WILL OPERATE DIRECTLY FROM THE DIGITRIP DRIVING THE TA (TRIP
    ACTUATOR); TO TRIP THE CIRCUIT BREAKER, THE OTS REQUIRES A MANUAL LOCAL RESET VIA RED BUTTON.
NOTES:
1. 3 WIRE CRIMP IF HIGH INST TRIP MODULE IS SUPPLIED
2. ALL CONTACTS SHOWN WITH BREAKER IN OPEN POSITION AND WITH SPRING NOT CHARGED AND WITH TRIP UNIT IN "NON-TRIPPED" STATE (OTS SWITCHES).
3. THE SPRING RELEASE ACCESSORY CONSISTS OF A "SR" COL AND A PC BOARD. THE PRINTED CIRCUIT PROVIDES A 20 SECOND PULSE FOR THE CLOSING OPERATION. VOLTAGE MUST BE REMOVED AND THEN REAPPLIED FOR SUBSEQUENT OPERATION.

AN OPTIONAL LATCH CHECK SWITCH (LCS) ACCESSORY MAY BE CONNECTED TO THE SPRING RELEASE. THE CLOSING LCS DELAYS THE SPRING RELEASE PULSE UNTIL THE BREAKER MECHANISM IS READY TO CLOSE (CHARGED AND RESET). THIS WILL INSURE THAT THE LATCH WILL ALWAYS BE IN THE PROPER STATE BEFORE THE SPRING RELEASE PULSE IS INITIATED. IF VOLTAGE IS MAINTAINED TO THE SPRING RELEASE, THE CLOSING PULSE WILL OCCUR WHEN THE MECHANISM IS CHARGED AND RESET (LCS OPEN). VOLTAGE MUST BE REMOVED AND REAPPLIED FOR SUBSEQUENT OPERATION.

4. TO PROVIDE SELECTED TIME DELAYS FOR SHORT TIME AND/GROUND TIME FUNCTIONS FOR TESTING OR NON-ZONE INTERLOCKING APPLICATIONS, A JUMPER FROM B-8 TO B-9 IS REQUIRED.

5. ON A BREAKER EMPLOYING THE GROUND FAULT FUNCTION, A JUMPER INSTALLED FROM B-6 TO B-7 WILL ENABLE SOURCE GROUND FAULT SENSING AND DISABLE RESIDUAL GROUND FAULT SENSING. INPUTS B-4 AND B-5 WILL BE REASSIGNED FOR SOURCE GROUND SENSOR INPUTS.

6. NORMALLY OPEN CONTACT PROGRAMMED AS RELAY A VIA DIGTRIP FRONT PANEL (ALARM CONTACT).
7. NORMALLY CLOSED CONTACT PROGRAMMED AS RELAY B VIA DIGTRIP FRONT PANEL (BLOCK CONNECT CONTACT).
8. NORMALLY OPEN CONTACT PROGRAMMED AS RELAY C VIA DIGTRIP FRONT PANEL (LATCHING CONNECT)
9. MOTOR OPERATOR SWITCH SHOWN WITH BREAKER CLOSING SPRING DISCHARGED.
10. ON 4 POLE BREAKERS, THE NEUTRAL SENSOR IS THE SAME STYLE AND WIRED THE SAME AS THE PHASE SENSOR AND ARE LOCATED WITHIN THE BREAKER FRAME. THE SECONDARY CONTACTS B-4, B-6 ARE NOT WIRE OUT.
11. FOUR POINT SOCKET TUSED HERE.
12. SECOND SHUNT TRIP MAY BE INSTALLED USING A T, A-6 CONTACTS IN PLACE OF UVR, THIRD AUXILIARY SWITCH NOT AVAILABLE WITH SECOND SHUNT TRIP.
13. ONLY ONE LATCH CHECK SWITCH MAY BE INSTALLED USING CUSTOMER ACCESSIBLE LATCH CHECK SWITCH \( B, B-30 \) IN SERIES WITH SPRING RELEASE DEFECTS ANTI-PUMP FUNCTION AND IS NOT RECOMMENDED. SEE NOTE 3 FOR SPRING RELEASE LATCH CHECK SWITCH.
14. THE OTS (OVERCURRENT TRIP SWITCHES) WILL OPERATE DIRECTLY FROM THE DIGTRIP DRIVING THE TA (TRIP ACTUATOR) TO TRIP THE CIRCUIT BREAKER. THE OTS REQUIRES A MANUAL LOCAL RESET VIA RED BUTTON DEPRESSION.
Section 3: Trip Unit Time-Current Curves

The time current curves shown in Figures 3-1 through 3-13 are for particular trip unit models. All protection function time-current settings should be made following the recommendations of the specifying engineer in charge of the installation.
Figure 3-1 Digitrip 220 - Long Delay and Instantaneous
Figure 3-2 Digitrip 220+ - Long Delay
Figure 3-3 Digitrip 220+ - Instantaneous
Figure 3-4 Digitrip 520/520M/520MC - Instantaneous
Figure 3-5 Digitrip 520/520M/520MC - Long Delay and Short Delay
Figure 3-6 Digitrip 520/520M/520MC - Ground (Earth)
Figure 3-7 Digitrip 1150 - Instantaneous
Figure 3-8 Digitrip 1150 - I^2T and Short Delay

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## Circuit Breaker Time/Current Curves (Phase Current)

Magnum and Magnum DIN Breakers

Response: Long Delay (LT) & Short Delay Trip

This curve is for 50Hz or 60Hz applications.

<table>
<thead>
<tr>
<th>Available Sensors</th>
<th>Matching Rating Plug in Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>600A</td>
<td>600A</td>
</tr>
<tr>
<td>1200A</td>
<td>1200A</td>
</tr>
<tr>
<td>2500A</td>
<td>2500A</td>
</tr>
<tr>
<td>600A</td>
<td>600A</td>
</tr>
<tr>
<td>1200A</td>
<td>1200A</td>
</tr>
<tr>
<td>2500A</td>
<td>2500A</td>
</tr>
</tbody>
</table>

### Notes:

1. This is a Long MEMORY (if enabled) effect that can set the Long Delay. The memory effect comes into play as current above the Long PU value exists for a time and then is cleared by the tripping of a short delay element or a circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in shorter time than normal. The amount of time delay modulation is due to the amount of time that has elapsed since the previous overload. Approximately five minutes is required between overloads to completely reset memory.

2. This curve is shown as a multiple of Long PU setting (I).

3. Trip Long Time = Long Time * 100%

4. The actual pickup point is at 110% of the Long PU current, with a 5% tolerance.

### Long Time Curve Equation:

Trip Long Time = Long Time * 100%

5. In this time region, the I' (LT) Long Time function will function and be no larger than the Short Time setting. This is to avoid a short circuit.

6. SHOR'T PU Not also has a M1 setting, which may extend out where the SHORT PU will be more effective.

<table>
<thead>
<tr>
<th>Adjustable Range</th>
<th>M1 setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100A to 1200A</td>
<td>M1 = 100A</td>
</tr>
<tr>
<td>100A, 200A, 300A</td>
<td>M1 = 100A</td>
</tr>
<tr>
<td>300A, 500A</td>
<td>M1 = 100A</td>
</tr>
<tr>
<td>500A</td>
<td>M1 = 100A</td>
</tr>
</tbody>
</table>

7. The Short PU points have conventional 100% x 5% tolerance.

### Short Time Curve:

**SHOR'T TIME FLAT only** setting 0.5 to 5.0 in 0.5 increments. (Promised to be 0.5 to 5.0 in 0.2 increments)

8. Short Time FLAT setting 0.5 to 5.0 in 0.2 increments

9. Curve applies from 0.50A to 600% ambient. Currents below 50% cause automatic trip. Breaker must be applied according to Continuous Rating at Different Ambient tables.

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**Figure 3-9 Digitrip 1150 - I'T and Short Delay**

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Figure 3-10 Digitrip 1150 - Ground (Earth)
Figure 3-11 Digitrip 1150 - Moderately Inverse and Short Delay
Figure 3-13 Digitrip 1150 - Extremely Inverse and Short Delay
Section 4: Drawout Circuit Breaker Cassette Outlines and Dimensions

The Magnum DS/DSL Circuit Breaker connects to the fixed primary stabs of the drawout cassette through the primary finger clusters attached to the rear of the circuit breaker. Two different frame sizes cover all Magnum DS Circuit Breakers and one frame size covers all Magnum DSL Circuit Breakers from an overall dimensional standpoint. Circuit breaker drawings are not provided here, since the drawout breaker fits into the cassette, and it is the cassette which is mounted to accommodate the circuit breaker. The cassette drawings shown in Figures 4-1 through 4-39 provide all the dimensional information required for all mounting configurations. Review carefully for a specific installation.
Figure 4-2 800-1600A Narrow Frame Cassette (Overall Dimensions)
Figure 4-3 800-1600A Narrow Frame Cassette (Accessory Dimensions)
Figure 4-4 800-1600A Narrow Frame Cassette (3-Pole Stab and Stab Bracing)
Figure 4-5 800-1600A Narrow Frame Cassette (Door Cutout and Breaker Positions)

DOOR CUT-OUT & BREAKER POSITIONS

NOTES:
1. IMPERIAL DIMENSIONS ARE INCHES ON TOP
   METRIC DIMENSIONS ARE SAME BOTTOM
2. ALL DIMENSIONS ARE REFERENCE ONLY.

FRONT VIEW

MOUNTING HOLES FOR DOOR FRAME AND BREAKER KIT (6 PLACES)

RIGHT SIDE VIEW

ENCLOSURE DOOR DIMENSION DIMENSIONS ARE NOT TO SCALE

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Figure 4-6 800-1600A Narrow Frame Cassette (Front Mount Terminal Locations)
Figure 4-7 800-3200A Standard Frame Universal Cassette (3-Pole Mounting Locations)
Figure 4-8 800-3200A Standard Frame Universal Cassette (Overall Dimensions)

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Figure 4-9 800-3200A Standard Frame Universal Cassette (Accessory Dimensions)
Figure 4-10 800-3200A Standard Frame Universal Cassette (3-Pole Vertical Stab)
Figure 4-11 800-3200A Standard Frame Universal Cassette (3-Pole Horizontal Stab)
Figure 4-12 800-3200A Standard Frame Universal Cassette (Door Cutout and Breaker Positions)
Figure 4-13 800-3200A Standard Frame Universal Cassette (4-Pole Mounting Locations and Overall Dimensions)
Figure 4-14 800-3200A Standard Frame Universal Cassette (4-Pole Accessory Information and Vertical Stabs)
Figure 4-15 800-3200A Standard Frame Universal Cassette (4-Pole Horizontal Stabs and Front View)
Figure 4-17 4000-5000A Double-Wide Frame Universal Cassette (Overall Dimensions)
Figure 4-18 4000-5000A Double-Wide Frame Universal Cassette (Accessory Dimensions)
Figure 4-19 4000-5000A Double-Wide Frame Universal Cassette (3-Pole Vertical Stabs)
Figure 4-20 4000-5000A Double-Wide Frame Universal Cassette (3-Pole Horizontal Stabs)
Figure 4-21 4000-5000A Double-Wide Frame Universal Cassette (Door Cutout and Breaker Positions)
Figure 4-22 4000-5000A Double-Wide Frame Universal Cassette (4-Pole Mounting Locations and Overall)
Figure 4-23 4000-5000A Double-Wide Frame Universal Cassette (4-Pole Accessory Information and Vertical Stabs)
Figure 4-24 4000-5000A Double-Wide Frame Universal Cassette (4-Pole Horizontal Stabs and Front View)
Figure 4-25 800-3200A Standard Frame Basic Cassette (3-Pole Mounting Locations)
Figure 4-26 800-3200A Standard Frame Basic Cassette (Overall Dimensions)
Figure 4-27 800-3200A Standard Frame Basic Cassette (Accessory Dimensions)
Figure 4-28 800-3200A Standard Frame Basic Cassette (3-Pole Stab and Stab Bracing)
Figure 4-29 800-3200A Standard Frame Basic Cassette (Door Cutout and Breaker Positions)
Figure 4-31 4000-5000A Double-Wide Frame Basic Cassette (Overall Dimensions)
Figure 4-32 4000-5000A Double-Wide Frame Basic Cassette (Accessory Dimensions)
Figure 4-33 4000-5000A Double-Wide Frame Basic Cassette (3-Pole Stabs and Stab Bracing)
Figure 4-34 4000-5000A Double-Wide Frame Basic Cassette (Door Cutout and Breaker Positions)
Figure 4-35 MDSL Cassette Overall Dimensions (800-2000 Amp Frame)
Figure 4-36 MDSL Cassette 3-Pole Mounting Locations Dimensions (800-2000 Amp Frame)
Figure 4-37 MDSL Cassette 3-Pole Vertical Stab Dimensions (800-2000 Amp Frame)
Figure 4-38 MDSL Cassette Door Cutout/Breaker Positions Dimensions (800-2000 Amp Frame)

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Figure 4-39 MDSL Cassette Accessory Dimensions (800-2000 Amp Frame)
Section 5: Fixed Circuit Breaker
Outlines and Dimensions

The standard Magnum DS Circuit Breaker is supplied with horizontally mounted primary connections. Optional vertical primary adaptors are available for different bus configurations. Refer to Figures 5-1 through 5-20 for fixed circuit breaker dimensions, vertical adaptor dimensions and vertical adaptor assembly details. A fixed version of the Magnum DSL Circuit Breaker is not available.
Figure 5-1  800-2000A Narrow Frame Fixed Breaker (Overall Dimensions and Mounting Locations)

OVERALL DIMENSIONS & MOUNTING LOCATIONS

NOTE:
1. IMPERIAL DIMENSIONS ARE INCHES ON TOP, METRIC DIMENSIONS ARE [mm] BOTTOM.
2. ALL DIMENSIONS ARE REFERENCE ONLY.
Figure 5-2 800-2000A Narrow Frame Fixed Breaker (Door Cutout and Vertical Terminals)
Figure 5-3  800-2000A Narrow Frame Fixed Breaker (Enclosure and Horizontal Terminals)

ENCLOSURE & HORIZONTAL TERMINALS

NOTE:

1. RECOMMENDED ENCLOSURE VENTILATION
20 SQ IN MIN TOTAL VENTILATION AREA TOP/REAR
[129 SQ cm]
20 SQ IN MIN TOTAL VENTILATION AREA BOTTOM/REAR
[129 SQ cm]
Figure 5-4 800-2000A Narrow Frame Fixed Breaker (Optional Arc Hood)
Figure 5-5 800-2000A Narrow Frame Fixed Breaker (Optional Front Mount Terminals)

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Figure 5-6 800-1600A Standard Frame Fixed Breaker (Overall Dimensions and Mounting Locations)
Figure 5-7 800-1600A Standard Frame Fixed Breaker (Door Cutout and Vertical Terminals)
Figure 5-8 800-1600A Standard Frame Fixed Breaker (Enclosure and Horizontal Terminals)
Figure 5-9 800-1600A Standard Frame Fixed Breaker (Optional Front Mount Terminals)
Figure 5-10 2000A Standard Frame Fixed Breaker (Overall Dimensions and Mounting Locations)
Figure 5-11 2000A Standard Frame Fixed Breaker (Door Cutout and Vertical Terminals)
Figure 5-12 2000A Standard Frame Fixed Breaker (Enclosure and Horizontal Terminals)
Figure 5-13 2000A Standard Frame Fixed Breaker (Optional Front Mount Terminals)
Figure 5-14 2500-3200A Standard Frame Fixed Breaker (Overall Dimensions and Mounting Locations)
Figure 5-15 2500-3200A Standard Frame Fixed Breaker (Door Cutout and Vertical Terminals)

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Figure 5-16 2500-3200A Standard Frame Fixed Breaker (Enclosure and Horizontal Terminals)
Figure 5-17 2500-3200A Standard Frame Fixed Breaker (Optional Front Mount Terminals)

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Figure 5-18 4000-5000A Double-Wide Frame Fixed Breaker (Overall Dimensions and Mounting Locations)
Figure 5-19 4000-5000A Double-Wide Frame Fixed Breaker (Door Cutout and Vertical Terminals)

T.D. 01301004E
Figure 5-20 4000-5000A Double-Wide Frame Fixed Breaker (Enclosure and Horizontal Terminals)
Section 6: MDSL Current Limiter Curves

Magnum DSL Drawout Circuit Breakers utilize integrally mounted current limiters with 800 through 2000 ampere frame breakers. Characteristic curves applicable to the available current limiters are presented in this section (Figures 6-1 and 6-2). Also refer to the table below for nominal ampere squared second values.

<table>
<thead>
<tr>
<th>Limiter Selection</th>
<th>$i^2t \times 10^3$</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Melting</td>
</tr>
<tr>
<td>MA250</td>
<td>37</td>
</tr>
<tr>
<td>MA300</td>
<td>54</td>
</tr>
<tr>
<td>MA400</td>
<td>96</td>
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<td>MD2500</td>
<td>7900</td>
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<tr>
<td>MD3000</td>
<td>13500</td>
</tr>
</tbody>
</table>
Figure 6-1 Average Melting Time-Current Characteristic Curves

Type Magnum - D.S.L. Limiters.
Average Melting Time-Current Characteristics.
Curves are based on tests exceeding fuse characteristics at ambient temperatures of 60°F and above initial load. Curves are plotted to average test points as all voltages should be A.C. 60Hz.

1000 CHERINGTCO
MOON TOWNSHIP, PA 15108

CURVE 63977103
December 2003
Reference 639771

63977103
Figure 6-2 Peak Let Through Current Characteristic Curves

Type Magnum DSL Limiters.
Peak Let Through Current Characteristics.
Curves are plotted on standard test points so all markings should be

Available Current in Amperes x 10

CURVE 63877203
December 2003
Reference # 638773

63877203